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DENMARK

Strategic Environmental Assessment & The Danish Energy Sector

Exploring non-programmed strategic decisions

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Publication date:
2012

Document Version
Accepted author manuscript, peer reviewed version

Link to publication from Aalborg University

Citation for published version (APA):
Lyhne, I. (2012). *Strategic Environmental Assessment & The Danish Energy Sector: Exploring non-programmed strategic decisions*. Institut for Samfundsudvikling og Planlægning, Aalborg Universitet.

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"Strategic Environmental Assessment and the Danish Energy Sector" is a doctoral thesis based on a Ph.D. project with the same title. The overall aim of the project has been to assist actors in the energy sector in developing a meaningful way of applying SEA at strategic level. Understanding of how strategic decisions are made is a prerequisite for achieving this target, and the thesis therefore explores the strategic decision-making processes of contemporary energy infrastructure developments.

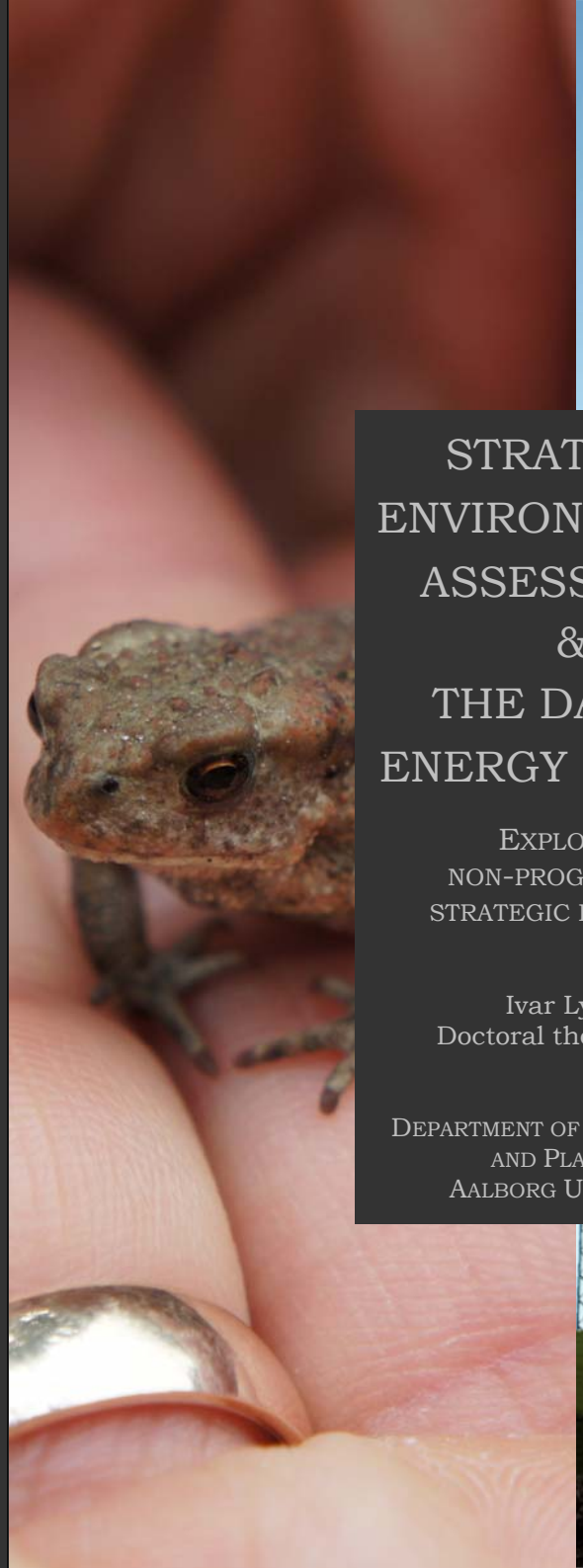
The highlights of this thesis are:

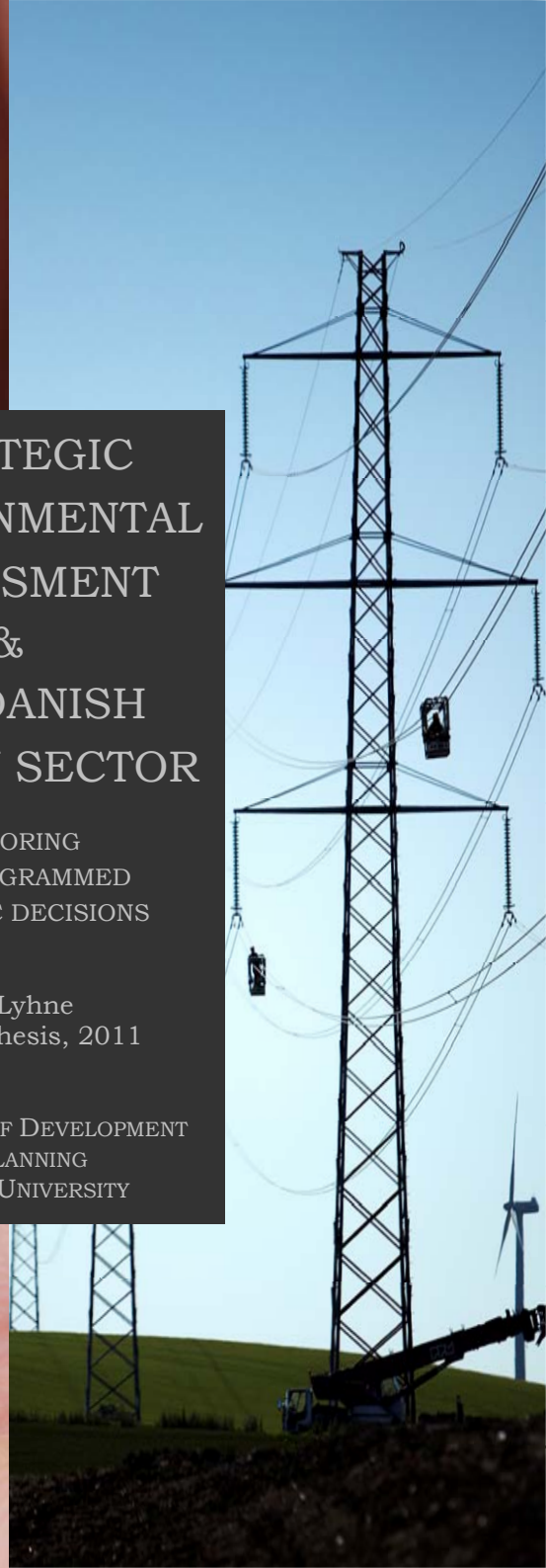
- A combination of disciplines in a continuum of perspectives on strategic decision-making provides a strong framework for enhancing insight into how decisions are made.
- Sense-making theory is a pertinent frame for increasing insight into how we create meaning of information, which is crucial for how we perceive strategic choices and determine relevant alternatives.
- Empirical cases reveal how strategic decision-making in the sector is characterised by an extensive interaction between policy-making and planning in a highly dynamic context.
- The outlined characteristics challenge the application of SEA especially in terms of timing and flexibility. SEA practice is still in its infancy in the Danish energy sector, but SEA is achieving increased attention in the sector.
- The change agent research approach used in the project is relevant medium for a critical interdependence between theory and practice that at the same time promotes more sustainable decision-making.

The research is based on interaction with a range of actors in the Danish energy sector, hereunder Energinet.dk and the Danish Energy Agency. It draws on contemporary cases of policy and planning decisions like the development of offshore wind power and natural gas infrastructures. Application of SEA on these cases is crucial for reducing the risk of unintended environmental impacts and for enhancing attention to relevant alternatives prior to decision-making.

SEA and the Danish energy sector: Exploring non-programmed strategic decisions

Ivar Lyhne





STRATEGIC ENVIRONMENTAL ASSESSMENT & THE DANISH ENERGY SECTOR

Exploring non-programmed strategic decisions

Ivar Lyhne
Doctoral thesis, 2011

Department of Development and Planning
Aalborg University

STRATEGIC ENVIRONMENTAL ASSESSMENT
&
THE DANISH ENERGY SECTOR

EXPLORING NON-PROGRAMMED STRATEGIC DECISIONS

Ivar Lyhne

Doctoral thesis, 2011

DEPARTMENT OF DEVELOPMENT AND PLANNING
AALBORG UNIVERSITY

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Printed by Uniprint, Aalborg University

The publication:

Title: SEA and the Danish Energy sector: Exploring non-programmed strategic decisions

ISBN: 978-87-91404-14-6

Number of pages: 292 (329 with appendixes)

Front cover: Photo copyrights by Energinet.dk and Svend Lyhne

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The Ph.D. project:

Project title: Strategisk miljøvurdering i energisektoren [Strategic environmental assessment in the energy sector]

Project period: August 2008 - November 2011

Ph.D. supervisor: Professor Lone Kørnøv

Partner: Energinet.dk

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ABBREVIATIONS AND ACRONYMS

AESOP:	Association of European Schools of Planning
ANSEA:	Analytical Strategic Environmental Assessment
CCS:	Carbon capture and storage
DASEP:	Danish Agency of Spatial and Environmental Planning
DEA:	Danish Energy Agency
EA:	Environmental assessment
EIA:	Environmental impact assessment
IAIA:	International Association for Impact Assessment
NGSSP:	Natural Gas Security of Supply Plan
SEA:	Strategic environmental assessment
TSO:	Transmission system operator (on energy)

DEFINITION OF TERMS

Some of the terms used in this thesis are overlapping each other in the literature used. Therefore, they are defined as follows:

Strategic environmental assessment (SEA) and environmental impact assessment (EIA)

- SEA is "a systematic, decision aiding procedure for evaluating the likely significant environmental effects of options throughout the policy plan or programme development process, beginning at the earliest opportunity, including a written report and the involvement of the public throughout the process" (Sheate et al. 2001, p. 7). The concept of SEA used in this thesis is presented in details in appendix B.
- EIA is also a systematic, decision aiding procedure for evaluating the likely significant environmental effects, however, in contrast to SEA, EIA is oriented towards individual projects and towards alternatives rather than options.

Decision and choice

- Decision has its origin in the Latin 'decidere' = to cut off (Merriam-Webster online). A decision is thus given importance and it is cutting off other options (see chapter 4)
- Choice has its origin in the Old English 'cēosan' = to choose. A choice is here understood as less prominent and decisive. A decision can be constituted by a range of choices.

Equivocality, ambiguity and uncertainty

- Uncertainty is about lack of knowledge, e.g. "an individual's perceived inability to predict something accurately" (Milliken 1990, p. 136). Uncertainty is categorised in several types by Berkeley and Humphreys (1982) and Rotmans and van Asselt (2001).
- Ambiguity is about unclear meaning: "Ambiguous situations are situations that cannot be coded precisely into mutually exhaustive and exclusive categories" (March 1994, p. 178). In contrast to uncertainty, ambiguity is a lack of a clear-cut meaning of the information.
- Equivocality is the "richness and multiplicity of meaning that can be superimposed on a situation" (Weick 1989, p. 174) and compared to ambiguous situations, equivocality "is more about the confusion created by two or more meanings" (p. 174)

PREFACE

A professor once told me that a Ph.D. project is a rare chance for going in depth into aspects of research; three years of immersion into aspects of interest is not easy to achieve in other ways. I have treasured this chance and indeed enjoyed being immersed in theories of human behaviour and being a change agent that investigates the mysterious strategic decision-making in the energy sector in order to facilitate change.

This thesis is an outcome of a three-year Ph.D. project on strategic environmental assessment and the energy sector. The research has been carried out at Aalborg University in collaboration with and co-financed by Energinet.dk. The project period has been convergent with a period of considerable strategic developments in the energy sector, which has made the project even more interesting: With immense investments in energy infrastructure, the need for consideration of environmental issues in strategic decision-making has never been greater.

The thesis is a writing-up of thoughts and inputs gained throughout the three years of study. In its final appearance, it hides a myriad of compromises between ambitions and pragmatism, between simplicity and complexity, between interests and expectations, and between ideals and reality. It is primarily addressed to researchers and practitioners with interest in the relation between strategic environmental assessment and strategic decision-making processes, especially within energy sectors. The content may, however, be relevant for people working with other tools as the issues of timing, perceiving, and changing touched upon in the thesis are relevant in any decision-aid context.

The insight into strategic decision-making processes has been facilitated by openness and interest in the research from a range of persons in Energinet.dk and in the Danish Energy Agency. Especially Kim Behnke, Energinet.dk, has been a great inspiration and an inexhaustible source of insight.

With a remarkable engagement and inspiration, Lone Kørnøv has supervised the project by competent contesting and suggesting on ideas, approach, and arguments. The project has indeed benefitted from her disputes of the 'religions' that I have constructed during the process.

Thanks to all the persons that have been involved in this project. I am grateful for your input and I hope that the process has been as fruitful for you as it has for me. Thanks for helping me widen my horizon, for letting me into your worlds, and for teaching me to play jazz as a critical friend.

A special thanks to my family for reminding me about the world outside the Ph.D. project and for your whole-hearted support during the process.

Ivar Lyhne

Hjedsbæk,

November 2011

SUMMARY

(A Danish summary is found in appendix A)

This thesis explores non-programmed strategic decision-making processes in the Danish energy sector in order to discuss how to apply strategic environmental assessment (SEA) in a meaningful way. Contemporary decision-making processes on major energy infrastructures are scrutinised to identify when and how environmentally decisive choices are made in the interaction between multiple actors. These decisions often involve situations, which the involved actors have not experienced before. This non-programmed character constitutes a particular challenge for SEA application that is not described in existing SEA literature.

In the current years, the Danish energy sector is undergoing comprehensive changes in politics, infrastructure, technologies, actor composition, and regulatory setup. In order to avoid unintended environmental effects or lost opportunities for environmental improvements in these comprehensive changes, environmental issues must be considered in the strategic decision-making process.

The purpose of SEA is to integrate environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development. The literature on SEA draws on theories about decision-making, however, so far there is limited knowledge about strategic, non-programmed decisions, and how this type of decision-making, is challenging the application of SEA.

Knowledge about how strategic decisions are made is fragmented in disciplines and models. The thesis approaches this fragmentation by exploring synergies in combining models of different levels of detail in a continuum of perspectives on strategic decision-making. To enhance a limited insight into detailed socio-psychological processes within SEA, sense-making theory is introduced and insights from sense-making and decision-making theory are combined to enhance the understanding of how we create meanings of information and how these meanings interact with our choices. In this respect, the thesis draws on writings by James G. March, Herbert A. Simon and Karl E. Weick.

The continuum of perspectives is used as a framework for unravelling strategic decision-making in the Danish energy sector. Recent cases of energy planning and projects are analysed and the thesis reveals how policy-making and planning interact and obscure questions of responsibility and timing of SEA; how strategic dynamics complicate the framing of alternatives in an SEA process of gas infrastructure planning; how practitioners' determination of significance of environmental impacts in a strategic choice on energy issues is characterised by ambiguities and diversity. These empirical findings are adding to the theoretical understanding of strategic, non-programmed decision-making.

As spin-offs to the investigations into strategic decision-making processes, the thesis articulates the scope of the SEA legislation in terms of what plans and programmes in the energy sector SEA are - and may be - mandatory. Discussions of the scope and the role of SEA have been key issues in the process of making a stance on SEA in the two most important state organisations in the strategic development of the Danish energy sector, Energinet.dk and in the Danish Energy Agency.

The thesis is based on a change agent research approach and this way of doing research is investigated and discussed in terms of its relevance and potentials in an SEA context. Based on three empirical cases, the change agent approach is considered a rewarding but demanding approach. In line with the change agent approach, the thesis reflects a threefold ambition of the Ph.D. project:

- To facilitate development of SEA practice through interaction and involvement of actors in investigations
- To communicate experiences to other Danish and international actors
- To contest assumptions in the SEA literature and propose developments to how strategic decision-making processes are understood.

In conclusion, the thesis outlines elements of how SEA can be applied in a meaningful way in the strategic decision-making processes in the Danish energy sector. It furthermore presents an outline of the meaningfulness of the combination of the change agent research approach and the conceptual combination of theories of decision-making and sense-making in achieving insight in strategic decision-making processes. The main conclusions are:

- A combination of disciplines in a continuum of perspectives on strategic decision-making provides a strong framework for enhancing insight into how decisions are made
- Sense-making theory is a pertinent frame for increasing insight into how we create meaning of information, which is crucial for how we perceive strategic choices and determine relevant alternatives.
- The change agent research approach used in the project is relevant medium for a critical interdependence between theory and practice that at the same time promotes more sustainable decision-making.
- Empirical cases reveal how strategic decision-making in the sector is characterised by an extensive interaction between policy-making and planning in a highly dynamic context.
- The outlined characteristics challenge the application of SEA especially in terms of timing and flexibility. Orienting SEA towards formal plans is not adequate. Instead, an approach of targeting pivotal decisions on specific infrastructures may be relevant, although this approach is not without drawbacks
- Compromises with public involvement at strategic level may be meaningful in competitive environments between TSOs.

INTRODUCTION

CHAPTER 1

THE NEED FOR A MEANINGFUL WAY OF APPLYING SEA

CHAPTER 2

RESEARCH QUESTIONS AND STRUCTURE

CHAPTER 1: THE NEED FOR A MEANINGFUL WAY

OF APPLYING SEA

> *"The essence of ultimate decision remains impenetrable to the observer - often, indeed, to the decider himself […] There will always be the dark and tangled stretches in the decisionmaking process mysterious even to those who may be most intimately involved"*
> (John F Kennedy 1963)

There is indisputably a great physical and contextual difference between the White House decision-making and the strategic decision-making in the Danish energy sector. Nonetheless, Kennedy's portrayal of decision-making catches - in an excellent way - the mystique around the strategic development in the energy sector. This mystique has been portrayed as decades of fierce power struggles and dramas (Trong and Limann 2009) and it has given rise to a range of conspiracies (e.g. Springborg 2011). An EU directive on environmental assessment of plans and programmes from 2001 has put pressure on this mystery, since a prerequisite for fulfilling the directive's target of integrating environmental considerations into strategic decision-making is to understand and make at least some of these dark and tangled stretches transparent. And this quest is the point of departure for this thesis.

In order to improve the influence of strategic environmental assessment (SEA) on decision-making, theories of decision-making have been considered for decades within SEA literature. The development in the use of these theories in SEA literature has similarities with the development in the decision-making discipline itself: In the early years, rational models were dominating and from experienced inadequacies with this model, a range of alternative theories have been suggested, so that the field now can be characterised as a patchwork of theories of decision-making. Every theory of decision-making has it advantages and disadvantages and one of the main arguments of this thesis is that to increase an understanding of decision-making processes, synergies in the width of the patchwork must be utilised. Decision-making theories should thus not be seen as separate and incompatible theories, but as complementary and potentially synergistic. The thesis explores synergies of a combination of perspectives with different level of detail. It proposes a continuum that ranges from process models providing an overview of decision-making in one end, to models providing insight into the details of social-psychological processes in human choices in the other end. The continuum seeks to combine two theoretical branches, which have had a

crucial role in our understanding of decision-making processes: James G March and Herbert A Simon's writings on decision-making in organisations (e.g. March and Simon's "Organizations" from 1958) and Karl E Weick's writings on sense-making (especially Weick's "Sense-making in Organizations" from 1995). Each of these theoretical branches provides genuine insight into important aspects of decision-making, and both of them, it is argued, are needed to understand strategic decision-making processes and the relations between SEA and strategic decision-making.

The Danish energy sector has during the previous decade undergone comprehensive changes in regulation, technologies, actor composition, and in politics. The current developments do not seem to be minor to the previous development, since foci on climate change, renewable energy, 'prosumers', intelligent control, economic recovery, and security of supply create a dynamic in the entire sector. Due to the magnitude of the developments, integration of environmental considerations into the strategic development of the sector is crucial. As this thesis will reveal, environmental aspects are unsystematically considered at the strategic level, and the practice of applying SEA to strategic decision-making is only slowly evolving; the present developments are to a large extent made without an integrated and systematic consideration of environmental impacts and in the worst case, the environmental consequences of the strategic decisions may be far more comprehensive than what the actors suppose.

When SEA was introduced, the energy sector was regarded an important sector (Jay 2010), and the energy sector is explicitly mentioned in the European Directive on SEA as one of the sectors within which environmental assessments is required for certain plans and programmes. However, the investigations in this thesis indicate that the Directive is not designed in a way that meets the characteristics of the Danish energy sector, and the energy sector seems reluctant to adapt its strategic decision-making processes to the Directive. To find ways forward in this 'conflict', this Ph.D. project has played a role in creating the dynamics needed to foster a practice of SEA.

This thesis unravels the scarcely described ways in which a range of stakeholders, interests and actions form strategic developments in the Danish energy sector. Central in this exploration is when and how environmental issues are considered and what role SEA may and do play. This unravelling of the strategic decision-making processes constitutes an important input in the discussions of how SEA can be meaningfully applied. It reveals interesting insights into how policy-making and planning interact and obscure questions of responsibility, tiering of assessments, and timing of SEA; into how strategic dynamics complicates SEA application, especially in the framing of alternatives in an SEA process; and into the ambiguities and diversity in how practitioners determine significance of environmental impacts of a strategic choice on energy issues.

The thesis reflects a threefold ambition in the Ph.D. project:

- To empower the energy sector to develop a practice on SEA through participation and involvement of actors in investigations
- To communicate experiences on SEA practice to other Danish and international actors
- To contest assumptions in the SEA literature and propose developments to how the relation between SEA and strategic decision-making processes can be understood.

These ambitions are reflected in empirical investigations of practice in the energy sector and in theoretical studies of decision-making theory. As spin-offs to the investigations on strategic decision-making processes, the thesis investigates the scope of the SEA legislation in terms of decisions in the energy sector and discourses on the role of SEA among key actors in the sector. These two topics have been key issues in the considerations on how to apply SEA in Energinet.dk and in the Danish Energy Agency. Furthermore, the thesis discusses ways of doing research by exploring the change agent approach.

THE DANISH ENERGY SECTOR

The strategic decisions studied in this Ph.D. project concerns major infrastructure such as a gas connection between Norway and Denmark with an estimated cost of NOK 10 billion (Gassco 2010) and a decision of cabling the Danish high voltage grid with an estimated cost of at least DKK 17 billion (Energinet.dk 2009h). The European Commission (2010a) suggests expanding the energy infrastructure using a vast amount of money: "Over the next ten years, energy investments in the order of € 1 trillion are needed" (p. 2). Such investment decisions are complex as regulation and sectors are interrelated; an example is described by Wittrup (2011, translated): "[E]ach wind power plant that we build help energy companies in Europe to live up to their CO_2 reduction targets, which causes even lower prices on CO_2-quotas - and thus better possibilities for using cheap coal […] Apparently simple energy policy initiatives may result in complete different consequence than what was intended - maybe even the opposite".

The Danish energy sector is of global interest due to the high percentage of wind power and the experiences of handling fluctuating energy. Utilisation of batteries in electrical vehicles and Smart Grid are a few of the current initiatives to facilitate an increase in renewable energy and the Danish system is considered a test laboratory for a range of international actors (Wittrup 2010). Besides the domestic initiatives to facilitate renewable energy is development of international energy infrastructure. International infrastructure is a priority at a European level, and Denmark plays a special role due to its geography as a spatial link between Scandinavia and mid-Europe.

Despite a high percentage of renewable energy, the energy sector is responsible for a considerable amount of environmental impacts. As an example, the production of energy accounts for almost 40 % of the total Danish SO_2 emissions and around 26 % of NO_x emissions in 2007 (NERI 2011). Added to these emissions are a range of debated environmental issues like visual impacts of infrastructure, uptake of land for biomass, and resource consumption.

So how are strategic decisions made in the Danish energy sector? At a first glance, strategic decisions seem to be made in a straightforward hierarchical system of EU programmes, governmental energy strategies, political agreements on energy policies, ministerial regulations, and formal infrastructure plans in Energinet.dk. A second glance, however, reveals a complex picture of opaque decision-making processes, where decisions seem to be made in windows of opportunity that are motivated by many other things than the formal objectives of increasing security of supply or lowering customer prices. Strategic decisions often seem to deal with novel situations, new technology, or a new actor composition. Therefore, they seem to involve elements of non-programmed decisions, as characterised by Simon (1960, p. 6): "Decisions are non-programmed to the extent that they are novel, unstructured, and consequential" and "[t]here is no cut-and-dried method of handling the problem because it hasn't arisen before, or because its precise nature and structure are elusive or complex, or because it is so important that it deserves a custom-tailored treatment". In a similar vein, Shrivastava (1985) describes decision-making at strategic level as "ambiguous and uncertain situations" (p. 97). Furthermore, the strategic decisions in the Danish energy sector often seem to take place outside formal decision systems, which are important in terms of integration of SEA. Strategic decisions with these characteristics include 'something else' than the formal, predictable and programmed decisions, which much SEA literature and guidance has been based upon. This 'something else' is a central interest in this thesis.

These non-programmed and non-prescribed strategic decisions must be related to the Danish legislation on environmental assessment. At policy-level, national laws and government proposals are subject to Circular no. 159 of September 16, 1998 (first circular in 1993) requiring an assessment of environmental consequences. At planning level, certain types of plans and programmes are subject to act no. 936 of September 24, 2009 (first act in 2004), requiring SEA. Practice is, however, disappointing seen from an SEA perspective: At national policy-making level, only the Government's energy action plan "Energi 21" from 1996 has been subject to a thorough environmental assessment, although a range of consequential decisions have been made at this level since the commencement of the circular. At the national planning level, the only two SEAs made concerned the Offshore Wind Action Plan in 2008 and the "Gas in Denmark" 2010 security of supply plan. Presently, we witness a growing SEA practice with a current SEA of test sites for windmills, an SEA of locations for inshore windmill parks as well as an SEA of oil and gas exploration in an unexploited area in the Nord Sea being undertaken. Still, a range of strategic decisions on this level is avoiding SEA attention as outlined in chapter 9. The limited application of the formal SEA process may among other things be due to the opaqueness of strategic decision-making in the sector and due to decisions being made outside the formal decision-making arenas. As this thesis will argue, bilateral cooperation and the dynamics of the sector challenge the flexibility of SEA and the orientation towards formal plans. In describing these challenges, a manager in Energinet.dk points at the mismatch between the expectation of a hierarchical decision-making process in which to apply SEA and the decision-making practice centred on specific connections:

> *"The world is just not put together in the way, that we have the entire range of options and then narrow it, when we are about to plan a connection - like we would prefer. It happens in a totally different way."* (Vinther 2011, translated)

Another manager in Energinet.dk emphasises the inertia of strategic decision-making processes in the context of bilateral cooperation:

> *"It is like we are seated in a high-speed train and through the window we see a sign saying 'SEA process', but it is too late to press the stop button"* (A manager in Energinet.dk 2009, translated)

The problems of applying SEA and the slow start of SEA application in the energy sector seems, however, not unique for Denmark. Besides a considerable amount of SEAs of offshore energy in Great Britain, all the researchers and practitioners from energy sectors around the world that I have approached are in a depressing tone reporting a deficient or only slowly evolving practice on SEA. In a review of practice in a wide range of countries throughout the world, Jay (2010) reports that "the experience of officially sanctioned energy-related SEAs remains relatively scant, suggesting that authorised practice remains slow to develop" (p. 3494). He further argues that SEA "has received relatively little attention" (p. 3489) in the energy sector compared to other tools developed to improve environmental protection. This, he argues, seems to be changing, since "a number of operators of large-scale electricity grid systems have started to carry out SEA for their development plans" (p. 3491) accompanied by a "… steadily growing interest in SEA as a tool for incorporating environmental considerations more effectively into the development of energy systems." (p. 3494)

With limited international experiences on SEA in energy sector strategic decision-making and other international experiences on SEA tied to widely different organisational and legislative setups, the Danish energy sector needs to a large extent to look inwards to find a meaningful way of applying SEA at a strategic level. If strategic decision-making processes are not understood, actors risk applying SEA on plans that formalise rather than constitute strategic decisions and the actual decisions will in this way not be based on the systematic and participatory environmental considerations provided by the SEA process.

THE STORY OF THE PH.D. PROJECT AND MAIN RESEARCH AREAS OF THIS THESIS

This Ph.D. project is motivated by a common interest between Energinet.dk and Aalborg University in finding a meaningful way of applying SEA in the strategic decision-making processes in the Danish energy sector. Meaningful is used in this respect to emphasise that the intension is to go beyond legislative requirements to a societal cost-effective level: From the beginning, the project was oriented towards clarifying how to time SEA application so that decision-makers have the opportunity to use the input from the SEA process as basis for their decisions and to use SEA in a way that the society benefits from. Meaningful is thus defined by the project partners, but has similarities with the intensions of SEA application in other research and practices. The societal cost-effective orientation has its point of departure in the direct linkage between Energinet.dk's administrative costs and the levies on energy. The use of 'meaningful' also reflects a normative stance among the partners of the Ph.D. project in line with the sustainable development notions (The World Commission on Environment and Development 1987) and an acknowledgement of a need to change practice towards better consideration of environmental aspects. The basic idea of the EU Directive on

SEA is to change practice "with a view to promoting sustainable development" (article 1) and a normative stance is therefore inherent in all SEA initiatives, see also appendix B.

Faced with a need to unravel strategic decision-making processes in order to develop a meaningful way of applying SEA, the Ph.D. project has from its beginning been oriented towards participation in practice. The expectation was that a participative approach would give insight into how strategic decision-making processes unfold, as well as insights into the meaning central actors make of SEA and its legislation. This understanding is in line with a generally accepted notion that SEA practitioners need to learn how decision-making processes evolve. In the field of evaluation, Weiss (1988, p. 6) state that: "A number of writers have been urging evaluators to understand the decision-making systems in organizations and the policymaking system in government if we want our evaluations to have any influence" (Weiss 1988, p. 6). Nitz and Brown make a similar point in the field of SEA by arguing that "a precondition to SEA exploiting any of its potential to provide policy makers with information regarding the environmental consequences of their decisions, and consequently influencing those decisions towards more sustainable outcomes, requires SEA to learn how the policy making process works" (Nits and Brown 2001, p. 331).

With the comprehensive changes in the Danish energy sector, this thesis focuses on developing an understanding of how the decision-making process works in terms of decisions with non-programmed elements. The strategic decisions studied in this thesis are defined as:

> *Non-programmed, formal as well as informal decisions at a strategic level that are potentially decisive for subsequent decisions on environmental aspects*

In order to ease the communication, this definition is referred to by the notion of 'strategic decisions'. As an example of such a novel situation is the contemporary decision-making on intelligent control of the energy system, in which new actors, new technology and new regulation are involved. The design of the intelligent control is - at least indirectly - environmentally decisive, however, there are limited experiences upon which an SEA can be conducted.

The ways of doing participative research in order to achieve insight in decision-making processes and facilitate a change in practice are another main focus area in this thesis. Combining a change orientation with research is, however, not unproblematic and a range of issues about pragmatism, validity, and ethics - just to mention a few - have to be considered by the change agent researcher. The thesis shows that if such issues are coped with, this participative and change oriented way of doing research is indeed rewarding for the involved actors.

For me as an upcoming Ph.D. fellow, the prospect of engaging with actors within the energy sector as an open-minded and autonomous researcher seemed an ideal situation for critically investigating the potential of the SEA tool in practice, and for exploring environmental considerations in the black box of strategic decision-making in the energy sector. Energinet.dk's interest in SEA seemed to be a window of opportunity for improving practice that simply was too appealing and promising to decline. Furthermore, the chance to work with non-programmed and unstructured decision-making processes seemed to be an

interesting opportunity to investigate the implications of these processes for SEA in theory and practice.

The focus on theories of decision-making in this project has evolved from a growing personal frustration with a widely unconstructive critique of the rational behaviour theory, which the environmental assessment tools were developed upon; a range of articles criticise this point of departure without empirically testing practical solutions for how to bring the SEA tool further. The frustration has led my focus to Karl E Weick's theory of how we make sense of events as a theory that may help shed light on some of the aspects of strategic decision-making, which are not deeply understood in the SEA literature. Weick's writings seemed for example an obvious heuristic for investigating how actors create meaning of impacts and of questions like whether developments are SEA obligatory and what alternatives to work with. Sense-making theory should, however, not be yet another isolated perspective on decision-making in the literature, but integrated with the dominating discourses of decision-making in the field. The thesis therefore involves a theoretical focus on these two disciplines concerned with human choices and a conceptual framework that makes use of insights from both disciplines. With a unified conceptual framework, the hope is to avoid inconsistencies and enhance synergies between the disciplines. Sense-making has previously been related to energy planning by Greitzer et al. (2008) who argue that with "increasing complexity and interconnectivity of the electric power grid, the scope and complexity of grid operations continues to grow" and that sensemaking "deserves further consideration by designers of decision support systems for power grid operations" (p. 1). Sense-making theory is here used due to its insight into how we make sense of complex issues and equivocal stimuli. The relevance of sense-making for energy planning argued by Greitzer et al. only increases the relevance of sense-making theory in this thesis.

The focus on how we create meaning was also motivated by an interest in how SEA influences decision-makers. Using Shrivastava's (1985) distinction on the role of strategic knowledge as either instrumental or enlightening (p. 97), SEA literature seemed widely to focus on the instrumental role of providing a basis for decision-making. The use of sense-making theory may help putting focus on the enlightening role in which "strategic knowledge is often subjective, soft, diffused, vague, nonspecific, and unquantified" (p. 97). In this respect, information is used to develop "a context of knowledge and meaning for unknown possible actions and for talking about experience" (March 1987, p. 163). Sense-making theory may help focusing on how strategic knowledge are conceptualising vocabulary and influencing problem formulation by "predisposing decision makers toward certain selective views of the problem" (p. 97). Furthermore, the focus on equivocality and how humans organize reality seemed a promising counterbalance to widespread portrays of simple and predictable decision-making processes in the SEA literature. Sense-making provided not only an opportunity for exploring SEA in practice, but also an opportunity for discussing how our understandings of SEA are constructed through interactive sense-making processes.

The state of the art of these research areas are outlined in the following as a point of departure for presenting the research questions and the structure of the thesis.

1.1 STATE OF THE ART AND CONTRIBUTIONS

This chapter presents a brief review of the state of the art of the research on the three overall research areas of this thesis: The relation between SEA and strategic decision-making processes in energy sectors; the relations between theories of decision-making and sense-making; change agent research as a way of doing research within the field of SEA. The specific chapters in the thesis are expanding the review when relevant. The review of the state of the art is a point of departure for showing how the investigations in this thesis contribute to the existing research and for formulating research questions. The state of the art reviews are based on a search in journals that publicise environmental impact assessment (EIA) and SEA research and searches within journals within the decision-making and action research disciplines. The journals within these disciplines are supplemented by a snow-balling method of searching journals which interesting articles refer to.

Only contributions to research are outlined in the following although the practical and 'academic' contributions of this thesis are highly interlinked and mutually supportive. The practical contributions to practice in the energy sector have mainly been clarification of process elements of strategic decision-making and input to the interpretation of SEA regulation in terms of energy sector characteristics. Other practical contributions are awareness raising and advice on when and how to consider environmental aspects in concrete strategic decision-making processes.

SEA AND STRATEGIC DECISION-MAKING IN THE ENERGY SECTOR

The energy sector oriented research on SEA of strategic decision-making processes is limited, which may partly be due to a limited practice on SEA in the energy sectors as pointed at by Jay above. Elements of research can be found within review reports on specific countries (Jay 2010; Sheate et al. 2004) and within a few rather academic exercises on the potentials of SEA in the sector (e.g., Noble and Storey 2001; Nilsson 2005) of which two have been oriented to the potential of SEA in the private sector (Jay and Marshall 2005; Jay 2007). This group of research points at status and boundary conditions for SEA in the energy sector, but research into the possibilities of applying SEA in a meaningful way given the characteristics of strategic decision-making in energy sectors are negligible.

Looking beyond the energy sector, theories of decision-making has gained increased importance and attention within environmental assessment literature. The relation between the concept of SEA and decision theory is explored by among others Kørnøv and Thissen (2000), by Nitz and Brown (2001) in terms of policy-making, by Cherp et al. (2007) in terms of strategy formation, and by Elling (2008) in terms of rationalities. Specific approaches have been developed based on theories of decision-making with the analytical SEA (ANSEA) approach (Caratti et al. 2004) and the strategy-based SEA guidance in Portugal (Partidário 2007) as prominent examples. The ANSEA project uses theories of decision-making to introduce the concept of "decisive moments" into the SEA literature. Decisive moments are in an SEA perspective defined as moments "that have a significant influence on the environmental impacts of the policy, programme or plan that is under decision" (Dalkmann et al. 2004, p. 387). The focus on decisive moments is a reaction to the insufficiency of solely focusing on the formal planning systems and therefore interesting in terms of the strategic

decisions studied in this thesis. Despite being mentioned in a range of publications, the concept of decisive moments or "decision-windows" is rarely empirically investigated in an SEA context - with Pischke and Cashmore (2006) as a notable exemption.

When it comes to the field of SEA, there is a stunningly low amount of research into sense-making and socio-psychological processes of strategic decision-making. The few and fragmented studies related to such processes deal with issues of frames, discourses, interpretation and communication. Runhaar (2009) focuses on frames and meaning as explanation of how SEA contributes to decision-making. Vicente and Partidário (2006) discuss perception and interpretation in SEA processes in a communication perspective. Wibeck (2009) explores communication of uncertainty between policy-makers and civil servants in assessing environmental progress and concludes that "the present and earlier studies have highlighted a need for further research into the recontextualization processes taking place when uncertainties are taken out of their original (scientific) contexts and put into new contexts, for example, policy making or public debate. […] The sense-making processes occurring as actors in the policy and practitioner arenas interpret expert messages thus need further study." (p. 99). Without referring to Weick, Stoeglehner et al. (2009) stage the planner as a "sense-maker" (p. 114) in SEA implementation. In a broader look on journals that publish environmental assessment studies, Weick has been mentioned in a few publications: Within planning and management of the environment, Aarts et al. (2007) use sense-making to explain inter-human processes in innovation networks. Hertin et al. (2008) include sense-making among the cognitive approaches that form the "intellectual basis of soft [regulation] instruments" (p. 261).

In terms of insight into details in the socio-psychological processes of human choices in SEA processes, much can be learned from research and findings within a range of related fields. Organisation and management studies have, as an example, a long tradition of research into these processes, e.g. into how managers generate sense (Rouleau 2005; Starbuck and Milliken 1988). Within the sense-making literature itself, the amount of empirical research into how we make sense is modest and empirical research is regarded an important way of developing the field (Weick et al. 2005). Helms Mills et al. (2010) state that "there is still a lack of empirical studies that draw specifically upon Weick's framework as a method of analysis." (p. 192).

In the light of the outlined state of the art, the contributions of this thesis are:

- Increasing knowledge about how to apply SEA in a meaningful way in strategic decision-making processes in the energy sector by exploring the Danish case.
- Supplement to the limited empirical exploration of 'decisive moments' in SEA literature.
- Increasing insight into socio-psychological processes of how we in practice make sense and make choices in SEA process and strategic decision-making.

COMBINATIONS OF DECISION-MAKING AND SENSE-MAKING THEORY

The effort of embracing theories of decision-making and sense-making in a single conceptual framework is treated in a handful of studies. Most remarkably, Choo (2006) proposes a bridge between the two disciplines in his book "The Knowing Organisation" in which he conceptualises sense-making as processes that precede decision-making. Ericson (2010) proposes a sensed decision-making approach focusing on emotion-related interpretative

processes. Seligman (2006) studies sense-making within an innovation-decision process. Lipshitz and Strauss (1997) combine sense-making with other models of naturalistic decision-making in a heuristic for coping with uncertainty. The existing efforts of combining decision-making and sense-making widely leave the impression that sense-making is about making sense of signals prior to decision-making. None of the efforts describes sense-making and decision-making as complementary and concurrent processes in spite of the common elements of the disciplines; Choo (2002) regards the disciplines "complementary ways of understanding information seeking and use in organizations" (p. 8) and concludes: "Any attempt to study the use of information in organizations would benefit from applying the two points of view" (p. 8).

The similarities between the two disciplines are obvious although only cursory explored. March and Weick were both pioneers in "a new style of theorizing that provided amendments to the rational model by focusing on social actors in open systems" (Colville et al. 1999, p. 136). March (1994) often refers to interpretation: "Each vision [of decision making] assumes that decision makers interpret their situations and their experiences, that they make sense of them in order to make decisions" (p. 207) and "Interpretation is treated as central, sense making as a basic need" (pp. 207-208). Likewise, Weick draws on March and other decision-making researchers in his description of the processes of sense-making, for example Simon on management behaviour (Weick 1995, p. 70).

In terms of the research on how to relate the theories of decision-making and sense-making, the contributions of this thesis are:

- An increased understanding of the similarities and complementarities of the two disciplines
- A conceptual framework that portrays the human choice as concurrent processes of decision-making and sense-making

CHANGE AGENT RESEARCH WITHIN SEA

Research in which the researcher collaborates with communities or people under study is described in many streams of collaborative research: Participatory action research (Whyte 1991), action Science (Argyris and Schön 1974), Co-operative Inquiry (Bradbury and Reason 2006), and others. One of the streams that emphasises on an active role of the researcher in contributing to change is the action research as described by Aagaard Nielsen and Svensson (2006). They define action research as "Action research is […] a perspective on how to conduct research. However, there must, of course, be an *action* component, that is, the research should support a normative *change* in one way or another (in problem solving, developmental work, restructuring, etc.) while, at the same time, producing new knowledge" (p. 13, original emphasis). Despite different nuances and backgrounds among the traditions, the term 'change agent research' is this thesis used as a common concept for participatory, critical research aimed at creating change.

Collaborative research is undoubtedly widespread within the field of SEA as many researchers also are practitioners and use the practice as part of their research, e.g. Valve (1999). Furthermore, a normative stance is inherent in much research on SEA, e.g. that environmental consideration ought to be part of decision-making, the public must be

involved, and SEA should lead to changes in practice (e.g. Ren and Shang 2005, Hilding-Rydevik and Bjarnadóttir 2007).

The researchers within the field are, however, generally not articulating their reflections and concerns about collaboration and change orientation in their articles. This lack of articulation hampers the theoretical and practical development on how to collaborate within research and practice in the field of SEA. The few articles that have an explicit reference to action research or the mentioned related approaches concerns public involvement, e.g. Sully and Pope (2010), indigenous people (Stevenson 1996), and planning processes (McCarthy et al. 2010). The studies argue for the relevance of action research to facilitate organisational learning and capacity-building, to ensure that aboriginal communities control the local research agenda, and to explore the relations between SEA and related planning processes. The authors are, however, not explicit about the potentials and challenges on action research.

Change agent research and research into how decisions are made have an important common interest in human behaviour. Therefore, a range of research bridges these two fields: Stensaker et al. (2008) emphasise the relation between sense-making and change in showing the importance of change agents' sense-making activities in implementation efforts. Allard-Poesi (2005, p. 171) underlines that action research makes it possible for researchers to "fully engage in sensemaking with organization members and recognize the socially constructed aspect of all sensemaking activities". Action research has furthermore been the basis for sense-making methodologies like 'The Cynefin Framework' (Kurtz and Snowden 2003) and 'Action Sensemaking' (Dymek 2008). Besides Allard-Poesi's theoretical considerations on the implications of sense-making theory for change-oriented research, the potential inspiration from sense-making literature to change agent research seems unexplored.

In the light of the state of the art on change agent research within the field of SEA, the contributions of this thesis are:

- Knowledge about the implications and potentials of change agent research within the field of SEA.
- Articulation of potential inspiration to change agent research from insights of sense-making literature.

CHAPTER 2: RESEARCH QUESTIONS AND STRUCTURE

The threefold ambition of the Ph.D. project, the problems outlined above and the state of the art of the main areas of research are in the following leading to research questions that are structuring the thesis.

The overall research question is:

> What do a combination of a change agent research approach and a conceptual combination of decision-making and sense-making provide of insight into how SEA can be meaningfully applied in the strategic decision-making processes in the Danish energy sector?

This overall research question is guided by sub-questions within the three research areas outlined, which all are important elements of answering the overall research question: The way of doing this research, the conceptual basis for this research, and the empirical investigations. The state of the art on change agent research showed limited discussion of this approach in the field of SEA and limited articulation of the implications and potentials of how researchers collaborate with practice in order to facilitate a change. The sub-question of this area of research is:

> i. What does acting as a change agent within the field of SEA involve and what potentials and relevance does it have for research and practice?

The state of the art on research that combines theories of decision-making and sense-making indicated a limited understanding of these two views on human choice as concurrent processes. The intension of combining decision-making and sense-making theories in a model of human choice is to increase understanding of strategic decision-making and SEA processes. The model is to be an element in the conceptual framework on strategic decision-making processes that is constituted by a continuum of perspectives at different levels of detail. The sub-question for this area of research is:

> ii. How can decision-making and sense-making be combined as concurrent processes in a model of human choice and how can this model contribute to a continuum of perspectives on strategic decision-making processes?

The state of the art on research within SEA of strategic decision-making in energy sectors showed limited insight into how to apply SEA in a meaningful way, hereunder a limited understanding of how strategic decisions are made and to what extent environment is

included. This limited knowledge highlights the need to investigate the characteristics of strategic decision-making processes in the Danish energy sector. Thus, the sub-questions for this area of research are:

iii. When in the development of Danish energy infrastructure are strategic decisions made that are potentially decisive for environmental aspects and how are these choices made?

iv. How should SEA be applied in order to approach the characteristics of strategic decision-making in the energy sector?

THE STRUCTURE OF THE THESIS

This Ph.D. thesis is written as a hybrid between a monograph and a collection of papers. The idea has been to write in a format of stories that have a content and format that is equal to papers. In this way, the thesis would provide a range of stories that potentially could become journal articles and at the same time constitutes a coherent report. The journal articles are therefore not separated but integrated in the thesis.

Framed by introductory and concluding chapters, these papers are divided into three parts reflecting the sub-questions. An overview of research questions and the basis for answering these within these three parts are visualised in figure 1. Part A is the outset of the investigations that is developing and explaining the research approach, the conceptual framework and the combination of methods. The sub-question about the potentials and implication of change agent research in the field of SEA is answered through a published empirical investigation conducted in cooperation with colleagues at AAU and a critical reflection on experiences in this Ph.D. project. The sub-question of how decision-making and sense-making can be combined as concurrent processes in a continuum is answered through a theoretical analysis and synthesis of the two fields.

Part B is the empirical investigations of the energy sector with different levels of perspective on the strategic decision-making processes following the conceptual framework. The sub-questions of when and how strategic decisions are made and how SEA should be applied to approach the sector's characteristics are answered in this part. The answers to these sub-questions are primarily found in three investigations of decision-making processes of which two draws on insight from participation in Energinet.dk's strategic development and one is reporting on an experiment of how practitioners make sense. The experiment has been conducted and reported in cooperation with Lone Kørnøv. Special focus is on the non-programmed and unstructured decision-making processes that are argued to pose a distinctive challenge on SEA application as there are no routines or experiences that fit the non-programmed decision-situation.

Part C is "spin-offs" of to the focus on strategic decision-making processes. This part elaborates on the important discussions with actors in the Danish energy sector during the Ph.D. project. These spin-offs concern the scope of the SEA legislation in terms of energy sector plans and programmes and the discourses on how to apply SEA among the actors involved, hereunder Energinet.dk and the Danish Energy Agency. The spin-offs are interlinked with the investigations in Part A and B as ambiguities about scope and

responsibilities have been main troubles in the change agent approach as well as explicit or implicit questions in the processes reported in the investigations.

The list of published and submitted articles is as follows:

- Kørnøv, L, Lyhne, I, Larsen, SV and Hansen, AM, 2011, 'Change agents in the field of strategic environmental assessment: What does it involve and what potentials does it have for research and practice?'. Journal of environmental assessment policy and management, 13(2), pp. 203-228.
- Lyhne, I 2011. Between Policy-making and Planning: SEA and Strategic Decision-making in the Danish Energy Sector. Journal of environmental assessment policy and management, 13(3), pp. 319-341.
- Lyhne, I 2011. How strategic dynamics complicate the framing of alternatives in an SEA process. Impact assessment and project appraisal. Accepted (under review).
- Lyhne, I and Kørnøv, L 2011. How do we make sense of significance? Findings from a laboratory experiment on an SEA case. Submitted to Journal of Environmental Management (October 2011).

Co-author statements with declaration of co-authorship and work-sharing are found in appendix G.

Research problem: Strategic decision-making processes in the Danish energy sector seem characterised as being unstructured and non-programmed and no existing SEA solutions may thus be adequate. At the same time, SEA practice in the energy sector is weak and there is a need for understanding decision-making to develop a meaningful way of applying SEA.

Research question: What do a combination of a change agent research approach and a concep-tual combination of decision-making and sense-making provide of insight into how SEA can be meaningfully applied in the strategic decision-making processes in the Danish energy sector?

Part A: Research, conceptual and methodological frameworks

Sub-question i: What does acting as a change agent within the field of SEA involve and what potentials and relevance does it have for research and practice?

Answer based on: Investigation of change agents research in the field of strategic environmental assessment and reflection on experiences

Sub-question ii. How can decision-making and sense-making be combined as concurrent processes in a model of human choice and how can this model contribute to a continuum of perspectives on strategic decision-making processes?

Answer based on: Theoretical analysis of the two disciplines, review of efforts of combining these, and synthesis. Testing through empirical investigations.

Part B: Unravelling through empirical investigations

Sub-question iii: When in the development of Danish energy infrastructure, are strategic decisions made that are decisive for environmental aspects, and how are these choices made?

Answer based on: Empirical investigations of the strategic decision-making processes in the Danish energy sector based on participation in Energinet.dk and an experiment

Sub-question iv: How should SEA be applied in order to approach the characteristics of strategic decision-making in the energy sector?

Answer based on: Discussion of the answers to sub-question iii in relation to experiences and practice within the field of SEA.

Part C: Spin-offs. Elaboration of important discussions on scope and role of SEA

Synthesis of the parts into elements of a meaningful way of applying SEA and ways forward

Figure 1: The structure of the thesis.

FRAMEWORKS

CHAPTER 3

RESEARCH FRAMEWORK AS CHANGE AGENT RESEARCH

CHAPTER 4

CONCEPTUAL FRAMEWORK ON STRATEGIC DECISION-MAKING PROCESSES

CHAPTER 5

METHODOLOGICAL FRAMEWORK FOR INVESTIGATIONS

CHAPTER 3: RESEARCH FRAMEWORK

AS CHANGE AGENT RESEARCH

> *"[O]ne area of concern [for good quality of assessments is] differences between research and other technical contributions intended to strengthen assessment methodologies and the types of assessment methods considered usable by practitioners*" (Lee 2006, p. 57).
>
> *"We need to consider new strategic positions closer to the knowledge production being carried on within the organizations we study, without assuming that immediate relevance is our primary objective"* (Huff 2000a, p. 288)
>
> *"We are well past the time when it is possible to argue that good research will, because it is good, influence the policy process […]. The relation is both more subtle and more tenuous. […]. So long as researchers presume that research findings must be brought to bear upon a single event, a discrete act of decision making, they will be missing those circumstances and processes where, in fact, research can be useful. However, the reorientation away from "even decision making" and to "process decision making" necessitates looking at research as serving an "enlightenment function" in contrast to an "engineering function"* (Rist 2000, pp. 1002-3)

How we do research is important for how the research is used in practice. If there is no linkage between research and practice, research may be inadequate as Lee points at in the quote above. As outlined in the introduction, this Ph.D. project has an inherent change orientation towards co-creating a meaningful SEA practice in the energy sector. The research conducted is intended for practice and how the research is formed and conducted is therefore crucial for the possibilities for changing practice. As a point of departure for the discussions in this chapter, the two other quotes above argue for a need for consider the relation between research and practice, arguing that a closer positions and more continuous interaction is necessary. This closer cooperation needs, however, to be balanced with a critical position by the researcher in order not to assume that immediate relevance is the primary objective, as Huff argues.

This chapter presents the framework for the research conducted in this Ph.D. project and the considerations of how to interact with practice as a researcher. The chapter explores the ways of doing research with focus on the change agent research approach as a way to bridging research and practice. It thus forms the answer to the first sub-question: "What does acting as

a change agent within the field of SEA involve and what potentials and relevance does it have for research and practice?"

The investigation of relevance and potentials of the change agent research in the first subchapter is in the second subchapter supplemented by a detailed and critical discussion of the experiences with this approach in this Ph.D. project. The second subchapter is a description of how the research approach has revealed itself in practice with personal considerations on how to impact practice and theory towards a better practice on SEA and a better understanding of strategic decision-making processes. This includes considerations of how to navigate between the research partners' interests.

The research framework is complemented by the conceptual framework and the methodological framework in the following chapters and it is therefore focused narrowly on the research approach and reflections on choices made during the process.

3.1 CHANGE AGENT IN THE FIELD OF SEA

Knowledge is produced in a variety of social settings that all have unique strengths and weaknesses. The characteristics of the social settings influence to what extent the findings are accepted, applied, and retained in organisations and society. Researchers working with sustainability and aiming at changing practice therefore ought to be reflexive on what social settings they do research within.

Specification of the social setting of knowledge production increases transparency of the research. Transparency is typically connected to the methods used and data collected, however, transparency on the social settings in which the research is conducted is of equal importance: Is the research paid and ordered by a company to promote certain interests? Is the research co-produced with the collaborating partners of the research to increase insight? Is the research a result of a sustained critical view that is made possible by distance and autonomy to the researched? Specification of the social setting thus assists the audience's making up its mind about the intensions and interests behind the research.

The social setting of research is discussed among proponents of divergent settings in terms of the relevancy and "scientific" merit of specific settings. Greenwood and Levin (2000) are for instance criticising university based social research and Jamison (2001) is criticising Mode 2 research. Research aimed at sustainability and change is not limited to specific social settings and research in a variety of settings is most likely necessary to achieve the needed change. A main argument in this subchapter is that research focusing on decision-making and SEA would benefit from a combination of a close relation to the actors studied and a critical distance.

This subchapter presents an investigation of the change agent research approach that is dominating this Ph.D. project. Change agent research is categorised as a distinctive mode of knowledge production and the implications and potentials are explored in the field of SEA. A summary of the investigation is presented in figure 2, which is a reproduction of a poster presented at the Nordic Research Day on Impact Assessment 2010. In the literature, change agents are given a variety of names, e.g. "implementation agents" (Spillane et al. 2002) with different nuances on the role and perspective on the change.

Nordic Research Day on Impact Assessment 2010

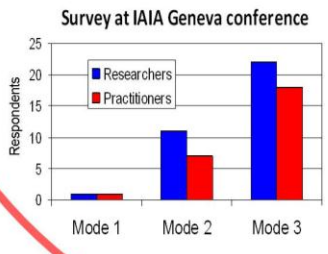
Change agents & Impact Assessment

Change agents to close the gap between impact assessment science and practice

One of the challenges facing impact assessment is finding ways to work in research and practice that allow appropriate action and critical interrogation of action to enable and support sustainable change.

Change agent is seen as a way to close the experienced gab between science of IA and practice of IA. It is closely linked to current societal needs and undertaken in cooperation between science and practice. It is in this investigation understood as a combination of Mode 3 research defined by Kurek et al. (2007) and a normative framework as described by Jamison (2001).

"To make green knowledge through SEA, and impact decision making, science and practice needs to be connected"



A simple survey of modes of knowledge production at IAIA Geneva conference indicated a dominant self-image among practitioners and researchers of engaging in mode 3 knowledge production.
The survey indicates a widespread awareness of the need to interact, however, it may be an alarming indicator that only a minor amount engage in mode 1 knowledge production.

Change agent as a mode of knowledge production

Mode 1: Classic research

Knowledge is produced solely by researcher

Goals and methods of knowledge production are defined solely by researchers

Knowledge production is independent of practice in terms of economy and information

Mode 2: Entrepreneurship

Knowledge is produced mainly by researchers

Goals and methods of knowledge production are defined mainly by practice

Knowledge production is dependent in terms of economy and information - between researchers and practice

Mode 3: Change Agents

Knowledge is produced in cooperation between researchers and practice

Goals and methods of knowledge production are ongoing negotiation between researchers and practice

Knowledge production is an interdependent relation between researchers and practice

Investigating change agent potentials and roles

Cases	Potentials for research and practice		Role of researcher
Case 1 concerns the first generation of SEA in relation to the national energy infrastructure in Denmark (gas and electricity).	**Access to people, processes and information** by participation gives possibilities for testing hypothesis	*"The strength is that SEA **theory is challenged by reality's diversity** of asymmetrical courses and sudden political and strategic changes."* (Head of Section, Energinet.dk)	**Helping out:** The researcher is a 'critical friend' trying to change the system from the inside
Case 2 concerns SEA of mega industry in Greenland in a system with no legislation or guidelines in place.	**Ownership of outputs of autonomous research** where the organisation may work as a platform for disseminating research results to society and other practitioners.	*"[It] have had **great impact for progress and development of the specific SEA**, that Anne has 'wafted over the water' in different matters" (Head of Department, The Greenlandic Self Rule)*	**Taking side:** The researcher develops a kind of partisanship with the society against impacts of industry
Case 3 concerns the Danish process of preparing river basin management plans and SEAs of these (implementing the EU Water Framework Directive)	**Dialogue on direction of research** and continuous "reality-check" of the research in the interaction with practitioners	*"Sanne gets input for understanding everyday life and problems of the practitioners. Thereby the research study adjusts to a more societal beneficial approach." (Head of Department, Rambøll)*	**Giving advice:** The researcher keeps an academic distance in advising the organisation with professional input

The three investigated cases are cooperations between Aalborg University and external organisations, which are characterised by interdependence on economy, information exchange and engagement. At the same time, the setup of the cooperation gives the researcher organisational autonomy.

The investigation of the three cases also identifies risk and weaknesses of the approach: The external organisation needs backing from the entire organisation to fully benefit from the research; contextual changes such as change of organisational tasks may hinder the impact of the research

The investigation also shows that Mode 3 research is not dissociated from Mode 1 and Mode 2 research. Rather the experience is that a choice of mode suited for the specific phase of research makes it possible to utilise the advantages of each mode.

References:
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Jamison, Andrew. 2001. *The Making of Green Knowledge*. Cambridge University Press.

DCEA | THE DANISH CENTRE FOR ENVIRONMENTAL ASSESSMENT

The investigation and poster is made by
Professor PhD Lone Kørnøv
Assistant professor Sanne Vammen Larsen
PhD fellow Anne Merrild Hansen
PhD fellow Ivar Lyhne

Figure 2: Poster presented at the Nordic Research Day on Impact Assessment in 2010

The concept of 'change agent' is used in different contexts: Change agents can be practitioners in an organisational setup as described in Buchanan and Boddy (1992) or academics in an organisational or societal setup as described in the action research tradition (e.g. Aagaard Nielsen and Svensson 2006). Despite a notable difference between the two contexts in terms of the position of the change agent and the content of the related literature, both traditions give valuable inspiration and advice to change agent research. The theoretical basis of the change agent approach described in this subchapter portrays the social setting of research as four ways of doing research given by the dimensions of strategic interdependence and organisational autonomy.

The intension of exploring and discussing the change agent research is not to disdain other ways of doing research, neither generally nor within the field of SEA. The exploration of the change agent research is meant to supplement rather than supplant other ways of doing research. Part of the supplement is to show relevance and potentials in certain social setups.

Within the field of SEA, change plays an important role for both researchers and practitioners. Hilding-Rydevik and Bjarnadóttir (2007) describe change as a indirect demand: "The generally stated desire that an application of SEA should and can contribute to integration [of environmental concerns into planning processes]… is, in effect, an indirect demand that something needs to be changed in the operating mode of planning in relation to environmental perspectives, concerns, and information" (p. 675). This demand is spelled out in the objective of the EU Directive on SEA (2001/42/EC): "The objective of this Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes". This indirect demand for change is the framework which SEA change agent researchers and practitioners work within.

SOCIAL SETTING OF THIS PH.D. PROJECT

This Ph.D. project is partly funded by Energinet.dk (1/3) and by Aalborg University (2/3). As described in the introduction, the project has a threefold ambition of empowering practice to change, to communicate experiences from practice, and to contest assumptions and propose developments to the literature in terms of the relation between SEA and strategic decision-making processes. The ambitions are formed as a merge of interests between Energinet.dk, Aalborg University and me as a Ph.D. fellow. The navigation among these interests is elaborated in subchapter 3.2.

The cooperation with Energinet.dk and other actors in the energy sector during the project period has varied in terms of the distance between what I investigated and me as a researcher. The variation of distance concerned both physical distance as well as mental distance to practice. This variation has influenced the content of the critical stance towards the investigated: In highly participatory phases, the critical stance has been materialised as suggestions to practice, whereas in distanced phases, the critical stance has been materialised in a wider critique of the system and its practice. Figure 3 shows the varying distance to the investigated processes and actors in a crude categorisation of periods in the Ph.D. project. The first year of the project was carried out in the head office of Energinet.dk and the last two at AAU. The varying distance is partly a deliberate choice and partly determined by private

needs. The deliberate part was based on an idea of learning to know practice from the start to avoid building up additional prejudices or a resilient point of view. The distance became a matter of slight concern in Energinet.dk in the beginning of 2010 after the period at their head office, which also is mentioned in the following article. The subsequent period was characterised by more distanced research and a more critical stance towards Energinet.dk and other actors.

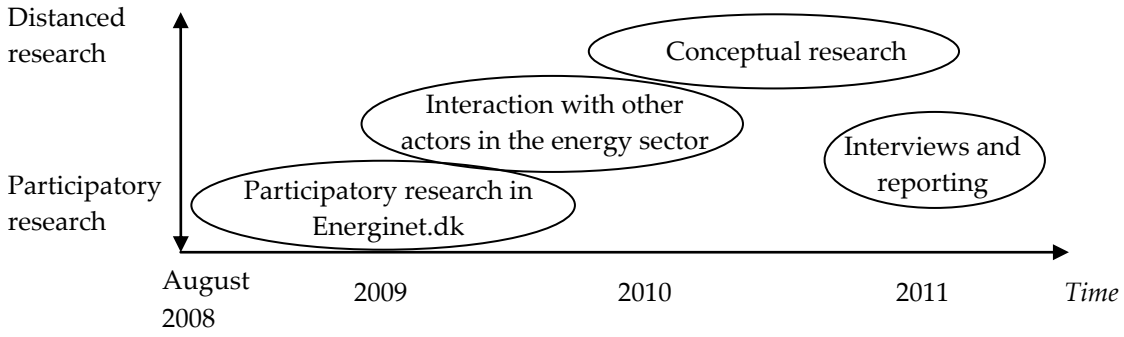

Figure 3: Distance to the researched during the Ph.D. project.

Transparency of the social setting of this project is visible in each article with different emphasis: The article on change agent research (Kørnøv et al. 2011) is transparent on the settings of the cases and the investigations of strategic decision-making (Lyhne 2011a, 2011b, and Lyhne and Kørnøv 2011) are transparent on support co-funding by Energinet.dk in the acknowledgement and two of the articles (Lyhne 2011b and Lyhne and Kørnøv 2011) refer to the change agent article to explain the setting in which the research is conducted. These descriptions could, however, easily be more elaborated on interests and intensions and therefore, this chapter supplements the brief indications of the social setting.

The change agent article presented below reflects a common research approach and interest among a small group of researchers in The Danish Centre for Environmental Assessment. The reflections are formulated during one and a half year and finalised in January 2011. A basic driver for the reflections is a belief that reflexivity on the setup of research is important, especially when it comes to research that aims at influencing society towards a more sustainable development.

JOURNAL ARTICLE:

CHANGE AGENTS IN THE FIELD OF STRATEGIC ENVIRONMENTAL ASSESSMENT: WHAT DOES IT INVOLVE AND WHAT POTENTIALS DOES IT HAVE FOR RESEARCH AND PRACTICE?

Published in Journal of Environmental Assessment Policy and Management
Vol. 13, No. 2 (June 2011) pp. 1–27
DOI: 10.1142/S1464333211003857

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ABSTRACT

One of the challenges facing strategic environmental assessment (SEA) is finding ways to work in research and practice allowing critical interrogation and appropriate action to support sustainability. The point of departure for this article is the hypotheses that cooperative knowledge-production, where SEA researchers interact with the societal milieu as change agents, provides a potential for SEA research and practice to further sustainability. Based on literature and three cases, this paper seeks to contribute to two questions: 'what does acting as a change agent within the field of SEA involve?' and 'what potentials does it have for research and practice?' The three cases illustrate how SEA research and practice have complementary perspectives, and used together can support reflective SEA practice and practice-based SEA research. Theoretically the current understanding and discussion on change agents is sharpened through the focus on real-life linkages, putting forward the contextual influence and the unpredictability related hereto.

Keywords: Change agent, Mode 3 research, strategic environmental assessment, knowledge production.

INTRODUCTION

The point of departure and underlying assumption behind this paper is that to produce knowledge through SEA and impact decision-making, science and practice needs to be connected.

During the last decade science and technology have increasingly been harnessed in the quest for a transitioning towards sustainability, among other things grounded in the belief that for knowledge to be useful from a sustainability perspective, it generally needs to be coproduced through close cooperation between scholars and practitioners (Clark and Dickson 2003). The important scholarly discussion about the role and effectiveness of environmental assessment (EA) as a tool to promote sustainable development has simultaneously increased over the last years, and it has been questioned if EA has the wanted impact on the planning and decision making process. The discussion involves questioning whether EA tools are too often developed from an expert-driven perspective without sufficient attention to contextual circumstances including the practitioners' needs and capacities (Emmelin 2006) and without sufficient understanding and recognition of the actual non-linear decision making processes (Richardson 2005; Kørnøv and Thissen 2000; Lawrence 2000; Nilsson and Dalkmann 2001; Bina 2001). The reasons for the experienced gab between EA research and practice can be found in these arguments, and can be due to a scientific non- or low collaborative knowledge production, with a clear demarcation between science and practice.

The practice of connecting theoretical knowledge with practical problems, including a high personal engagement, is by Andrew Jamison (2001; 2008), called 'change-oriented research' and refers to a knowledge making which is problem-based with the aim"…to intervene creatively and constructively in an ongoing social or political process: to contribute to change. Rather than the traditional notion of enlightenment, by which is usually meant that the role of the scientist is to provide insights for the broader society, derived from a "disinterested" pursuit of the truth, change-oriented research is about empowerment, where the researcher applies knowledge gained from experience to processes of social learning, carried out together with those being 'studied'" (Jamison 2010, p. 9). This engagement of the researcher as a change agent is in different fields of research referred to by other names like e.g. participatory planning, empowerment and action research. Research, which is closely linked to current societal needs and is undertaken in cooperation between science and practice, is also termed 'Mode 3' (Huff and Huff, 2001; Kurek et al. 2007). Kurek et al. (2007) provides an analytical framework for studying the strategic positioning of the researcher, which makes it possible to distinguish between modes of research.

Such a situated form of knowledge making can from the authors' point of view be seen as having a potential to help reconnect research and practice concerning SEA, with an aim to serve the needs and concerns of society in relation to sustainability. This paper is inspired by both Jamison's normative framework and argument about the need for change-oriented research, and by the analytical framework developed by Kurek et al. (2007). These frameworks are used for discussing experiences with connecting science and practice, and thereby approach the mentioned insufficiencies in the field of SEA. The hypothesis, which this paper is based on, is that combining the frameworks so that the SEA researcher acts a change agent within a Mode 3 positioning has a potential to improve the connection between research and practice and promote sustainable development.

AIM

At Aalborg University's Department of Development and Planning, three research projects on SEA are conducted by researchers acting as change agents. This paper seeks to collect and communicate experiences from these cases. The paper is aimed at contributing to the following questions:

- What does acting as a change agent within the field of SEA involve? and
- What potentials does it have for research and practice?

The analyses in this paper make up an illustrative collection of experiences, illuminating possible ways of conducting SEA research in Mode 3 and the potentials it may have. It is not the aim of the paper to compare research modes, but rather to develop an analytical framework that may be used for discussing different modes of research.

With this aim, first an analytical framework is developed through a discussion of different research modes in section 2. In section 4, this framework is used for presenting and analysing the three cases, in terms of what it involves to conduct Mode 3 research, and acting as a change agent within the field of SEA. This covers discussions of strategic positioning in relation to the formal and informal frames for the research projects. In section 5 this is followed by an analysis of the potentials of Mode 3 research, based on the authors' and collaborating organisations' observations and assessments of the research projects. Thus focus is on the potentials of conducting Mode 3 research, both seen from the perspective of the researcher and from the perspective of the organisation. This underpins the objective of the paper: to identify if and how this specific setup of research provides potentials in terms of practice in the organisation and in terms of research.

THE DISCUSSION OF RESEARCH MODES

When discussing the different modes of research with focus on the connection of research and practice, the contribution of Gibbons and colleagues in "The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies" from 1994 is found very relevant and inspiring. This work is an influential contribution to the ongoing discussion of the need to improve research relevance and knowledge flows from science to practice. Gibbons et al. distinguish between two modes of knowledge production.

Mode 1, typically produced in universities and named 'ivory tower research' by critics, has the characteristics of largely being discipline-based, intra-scientifically produced and not related to a specific context for application (Gibbons et al. 1994). In Gibbons words "This structure provides the guidelines for researchers about what the important problems are, how they should be tackled, who should tackle them, and what should be regarded as a contribution to the field. In its social dimensions, it also prescribes the rules for accrediting new researchers, procedures for selecting new university faculty, and criteria for their advancement within academic life" (Gibbons 1999, p. 9).

The strength of the structured research in Mode 1 is widely acknowledged. However, when it comes to research aiming at changing practice, Mode 1 research meets criticism, e.g. the risk of limited relevance of research for society. Mode 1 research on SEA does not necessarily take point of departure in experienced problems in certain contexts, and therefore it may not be

relevant and it may not be applied. In line with this criticism, Gibbons (1999) point at a need for knowledge production, which is 'socially robust', ensured through a new social contract between research and society. It becomes not just a matter of *how* knowledge is produced but also *what* knowledge is produced. Here Mode 2 research offers a different approach.

In Mode 2 the relationship between science and practice is characterised by interaction and cooperation, which according to Gibbons and colleagues leads to change-oriented science in which "the boundaries between the intellectual world and its environment have become blurred" (Gibbons et al. 1994, p. 81). The characteristics are knowledge produced trans-disciplinarily, jointly and bound to a specific context. Therefore, Mode 2 research is validated by its relevance for practice. Compared to mode 1, mode 2 is argued to be "more timely, more practical, more democratic" (Huff 2000a, p. 291)

Huff (2000a) criticizes Mode 2 research for having limitations "especially as it moves away from science and technology into management" (p. 291). According to Huff (2000a, p. 292), Mode 2 research is too pragmatic and tends to make "big bets on the basis of limited evidence". Another criticism of Mode 2 is the commercialisation of research, e.g. raised by Jamison in 'The Making of Green Knowledge'. Research is defined by market interests in funding organisations rather than by the interest among researchers (Jamison 2001). Furthermore, Jamison (2001, p. 124) criticizes Mode 2 for limited change "…many of the actual practices of the companies they run and/or represent all too often continue to follow a 'business as usual' strategy".

The discussion of research modes and trends in knowledge production has received considerable scholarly attention (Nowotny et al. 2001). In the midst of these discussions the concept of Mode 3 arose.

Strategic positioning and Mode 3

In line with Jamison's discussion of the need for a 'change-oriented research', the limitations of Mode 2 lead Huff and Huff to suggest Mode 3 knowledge production with the purpose "…to assure survival and promote the common good, at various levels of social aggregation" triggered by "…appreciation and critiques of the human conditions, as it has been, is, and might become" (Huff and Huff 2001, p. 53). The researcher within this Mode 3 is closely linked to societal needs and compared to Mode 2 is capable of influencing his milieu by creating demand for the scientific knowledge instead of supplying on an external demand (Kurek et al. 2007).

Some characteristics, used in the literature on Mode 3, are multiple stakeholder involvement and interdisciplinarity, conversation and cooperation, community driven, engagement in study field, high organisational autonomy and strategic interdependence (Huff and Huff 2001; Kurek 2008). The normative element of Mode 3 is explicated by the goal of a 'future good' (Huff and Huff 2001) and 'giving voice' through science as social advocacy (Jamison 2009).

Whereas in Mode 1 the researcher mainly is accountable to oneself, and in Mode 2 accountable to the milieu and financing organisation, the researcher in Mode 3 is mainly accountable to the people and/or environment affected both in the research process and the

research outcome. Mode 3 involves not only personal, active engagement and intervention in on-going processes, but also a normative framework within which the researcher works.

The relationship between the change agent and the milieu (researchers, government, industry and NGO) is established through negotiation, and the researcher in Mode 3 must make on-going choices of how much he is willing to let others influence the research. An analytical model of the strategic positioning of the researcher within the milieu is developed by Kurek and colleagues (Kurek et al. 2008). The model is based upon two dimensions – organisational autonomy and strategic interdependence – and provides a typology with the different modes of researchers positioning, see figure 4.

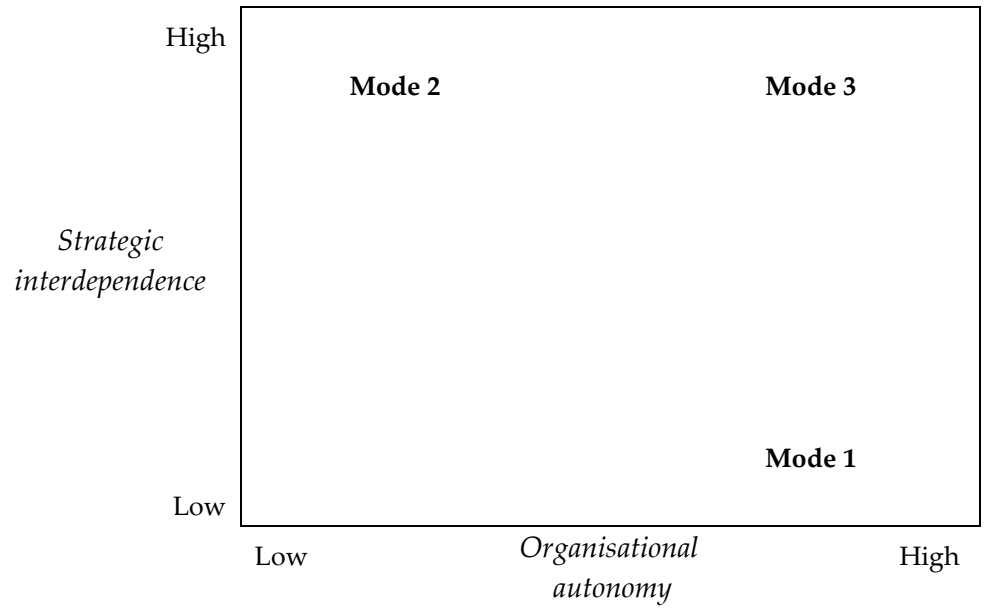

Figure 4: Three modes of strategic positioning. (Based on Kurek et al. 2007, p. 503)

We understand Mode 3 as being characterised by high organisational autonomy and strategic interdependence, and at the same time attributed a normativity guiding the ongoing knowledge making and negotiation process taking place between the researcher and the milieu. Mode 3 is building on and incorporating both Mode 1 and Mode 2 research in the process a researcher within a project and time period often will choose interplay between the different modes. A pure choice of one mode seems unrealistic or unfavourable.

In Mode 3, like in Mode 2, the researcher and milieu share resources (money, time, knowledge) but at the same time the researcher "…autonomously determine directions of research. He retains his responsibility for directing a project" (Kurek et al. 2007, p. 504). So in Mode 3 both the researcher and the milieu are strong enough to sanction each other, and both the strategic interdependence and organisational autonomy is high. This also means that the normative framework, guiding Mode 3 research, is developed by and acceptable to both the researcher and the milieu. The difference is visualised in figure 5.

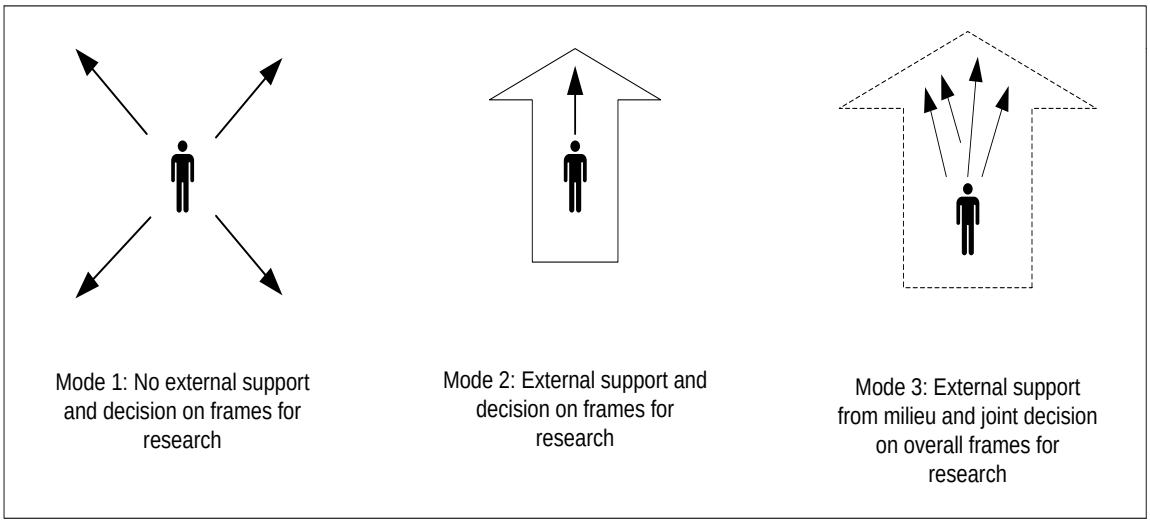

Figure 5: The relation between the researcher and external milieu in the three modes of research.

Thus we are distinguishing between three different modes of research, all with distinct advantages and disadvantages. The focus of this paper is to shed light on experiences with Mode 3 research, answering the questions of what Mode 3 within SEA research involves and what potentials it may have. However, before turning to these questions the cases and methods applied are presented in the following section.

CASES AND METHODS

The analysis in this paper is based upon case studies, from which experiences with Mode 3 research is drawn. In the following the three cases are introduced, and the methods applied in the two analyses are presented. Further information about the three cases is presented continuously in the paper, where it is included in the analysis. The analyses deal with the strategic positioning of the researchers and the potentials for SEA research and practice. The empirical basis for the analyses is document analysis, the researcher's personal observations, and subjective assessments by the researchers as well as the contact person in the organisations.

CASES STUDIED

The study comprises three cases, where Ph.D. researchers are working on their projects in close cooperation with an organisation outside the university. The three research projects have different foci in relation to SEA and different reasoning for the cooperation between SEA research and practice. In all three cases the organisations have co-financed the research projects.

Case 1 is carried out in cooperation with the Danish company Energinet.dk, in charge of Danish energy infrastructure. The project is organised with an AAU-based professor as supervisor and the head of Research and Environment section as main contact person at Energinet.dk.

Aim and methodology: The project concerns the first generation of SEA of plans and programmes in relation to the national energy infrastructure in Denmark (gas and electricity). In this case, Energinet.dk faced implementation of SEA and without sufficient internal professional resources, they initiated cooperation with AAU that ended up with the project aimed at developing and implementing SEA in the energy sector, including SEA methodology targeted at the strategic decision making processes in the sector. The project has theoretical basis in decision-making theory and sense-making theory, which are used to understand practice and develop methodology. The project is based on an interactive research approach, in which the researcher is situated at Energinet.dk for a year, participating in meetings and planning processes. To maintain a critical distance, the remaining two years of the project is carried out at AAU, however, still with periodical participation in meetings at Energinet.dk. The research conducted from AAU is widely based on document analysis and interviews.

Case 2 is carried out in cooperation with the Greenlandic Self Government and is furthermore co-funded by the independent Alcoa Foundation. The project has an AAU-based professor as main supervisor and the head of the department of physical planning from the Greenlandic Self Government as co-supervisor.

Aim and methodology: The project concerns SEA of mega industry in Greenland in a system with no legislation or guidelines in place. This case is rooted in the environmental and democratic challenge of planning and assessing an aluminium smelter in Greenland (Hansen and Kørnøv 2009), with the aim of the research project was to secure a critical and independent view upon the processes and effect of carrying out SEA. The project is conducted as a case study of the SEA and the planning process of an aluminium reduction plant in Greenland. A theoretical approach is taken, combining power theory with impact assessment theory on the concept of effectiveness. These theories are used to setup an analytical frame for the case study. Document analysis is used to determine the chronology, and thus the backbone of the mapping of decisions in the project. Participant observation and statements are collected primarily by qualitative interviews with key persons from the central actor groups, and by attending meetings as an observant. The interviews supplement the document review concerning the case activities and behaviour, also regarding identification of interests among the actor groups and their access to resources. Based on this, reflections regarding effectiveness and power structures relating to the use of SEA as a decision making tool when planning new industries in Greenland will be made in terms of development of process and methodology.

Finally, the project in case 3 is carried out in cooperation between AAU and the major Danish engineering consultancy Rambøll. It is organised with an AAU-based professor as main supervisor and a head of department from Rambøll as co-supervisor.

Aim and methodology: The research takes point of departure in the Danish process of preparing river basin management plans (RBMPs), implementing the EU's Water Framework Directive, and preparing SEAs of these plans. Currently, climate change as an environmental factor has been excluded from the planning process, with the reasoning that there is not enough knowledge about climate change to assess its consequences for the water environment and the RBMPs. On this background, the project is aimed at developing the work with climate change in SEA of the RBMPs. A theoretical approach is taken, using

sociological risk theory as a framework for research. Document analysis, interviews, and a survey is utilised to uncover the attitudes of different actors towards inclusion of climate change in the RBMPs, while a document analysis and interviews are used to assess the experiences with climate change in SEA in Denmark. Based on this, reflections regarding integration of climate change in SEA will be made in terms of development of process and methodology.

ANALYSING WHAT IT INVOLVES TO BE A CHANGE AGENT WITHIN THE SEA FIELD

The conclusion upon the formal strategic positioning of the researchers in the three cases, and thus whether and how they conduct Mode 3 research, is first and foremost reached by analysing the content of the project contracts. The standard issues like e.g. time schedule is not perceived interesting and relevant for this paper, but the non-standard and unique issues are more interesting and symbolise the negotiated parts of the cooperation. The analysis of the contracts is focused on the explicated objectives and the clauses. Both are used to indicate the strategic interdependence and organisational autonomy and thereby map the research mode. In addition informal positioning and negotiation takes places in an ongoing dialogue between the SEA researcher, the university and the collaborating organisation. The analysis of the informal process, influencing the research intention, the methods applied, and the out-put of research, is based upon the researchers observations and experience.

ANALYSING WHAT POTENTIALS ACTING AS A CHANGE AGENT HAS FOR SEA RESEARCH AND PRACTICE?

As stated previously, the hypothesis behind this paper is that Mode 3 research can support SEA and sustainable change via its potentials for connecting research and practice. This constitutes the point of departure for the analysis of what potentials Mode 3 research has. Two sources form the basis for the analysis: The first part is assessments from the researchers that point at potentials for research. These assessments are substantiated by examples from the projects. The second part is based upon open questions related to the potentials for influencing practice. The questions are answered by the contact persons at the organisations. The questions formulated are: 1) “How has the involvement of NN and his/her research influenced the organisation? 2) How has the involvement influenced the broader society?, and 3) “In which way has the involvement and cooperation influenced the SEA (understanding of SEA, the SEA process, the documents)?” and 4) “How would you characterise the strengths and weaknesses of the setup of the cooperation between your organisation and the researcher?"

In respect to the premature concept of Mode 3 research, the sources are (intentionally) not constrained by mode classifications or characteristics. The sources are in stead held open to any impact of the research and this inductive approach may support a refinement of the Mode 3 concept. As the three cases are ongoing research projects, the analysis is primarily focused on the process rather than the outputs. The cases do, however, outline a picture of the potentials of the research mode.

WHAT DOES ACTING AS A CHANGE AGENT WITHIN THE FIELD OF SEA INVOLVE?

The Mode 3 research is analysed in terms of the strategic positioning of the researchers in the three cases, and thus it is assessed whether and how they carry out Mode 3 research. Focus is both on formal and informal frames for the research, and these frames will show what it involves to do Mode 3 research.

The analysis begins with the strategic interdependence and the organisational autonomy in accordance with the model of strategic positioning proposed by Kurek et al. The analysis presented in table 1 and 2 are inspired and to a large extent based upon the work of Kurek, Geurts and Roosendaal (2007; 2008) who build upon Talcott Parsons' theories on social systems. Table 1 gives an overview of the parameters chosen to describe and analyse the strategic interdependence and organisational autonomy. These parameters are inspired by Parsons' model of social systems in which four media can function as exchange means: Inducement (e.g. money), deterrence (negative sanctions), commitment and persuasion (Parsons 1963).

Strategic interdependence - Understood as the deliberate sharing of heterogeneously distributed resources, assets and capabilities between the partners in order to achieve a joint goal.	**Organisational autonomy** - Understood as the researcher's degree of self-governing the research. It is analysed in relation to the researchers autonomy to decide upon:
Economic interdependence Interdependence on exchange of information sources Interdependence on engagement	Research goals Acquiring information Working place and working balance Writing and publishing research results

Table 1: Parameters chosen as basis for describing and analysing modes of research.

Common for the research projects is that most of the strategic positioning is happening in an on-going and informal process between the researcher and the cooperating organisation. This will be analysed and discussed in the following, where the strategic interdependence and the organisational autonomy are analysed separately.

Formal and informal strategic interdependence

Table 2 shows the analysis of whether and how the researchers and organisations have strategic interdependence. The analysis shows an economic interdependence in all three cases. This is partly evident from the contracts and partly evident from the informal negotiations. The economic interdependence gives both parties a possibility for sanctioning.

The analysis of the second parameter, dependence on exchange of information sources, as shown in table 2, reveals some differences. Only case 1 is really highly dependent upon the collaborator. This has to do with the nature of the SEA research: This project has a focus of getting the right environmental information to the right people at the early stage in decision making, and to do so the researcher is very dependent on understanding the processes within the collaborating organisation. The contract in case 1 is a standard contract added restrictions

on confidential data that may only be used after approval by Energinet.dk. However, both case 2 and 3 do experience some dependence upon information from other actors in the milieu, which the collaborating organisation either informally hinders or supports access to.

Another kind of interdependence is engagement in the project. The researcher is dependent on engagement from the organisation, since it is necessary that the organisation continues internal activities relating to the research and is able and willing to consider and use the research to achieve change in these activities. If the organisation is not engaged, the researcher cannot change anything. The organisation is likewise dependent on the engagement of the researcher to fulfil the expectations of changes. In case 1, the researcher is dependent on the engagement of the collaborating organisation developing its SEA system, since this is the object of study and change. At the same time, the company relies on engagement from the research in this process of development, e.g. by securing adequacy in terms of regulation. In case 2 the interdependence is similar, since it also revolves around change in the collaborating organisation. Case 3 is different from this, because the change, which is aimed for, is not restricted to the collaborating organisation, but a wider range of actors.

	High interdependence	**<->**	**Low interdependence**
Economy	Researcher is either fully or partly funded by the organisation and the organisation must get return of their investment in the project		Researcher is economic independent and the organisation is not dependent on return of their investment.
Formal	*Case 1, 2 and 3*		
Exchange of information sources	The organisation is an essential source of information for the researcher and the organisation needs information from the research society		Researcher is not dependent on information from the organisation and opposite
Informal	*Case 1*	*Case 2 and 3*	
Engagement	The researcher and the organisation are mutually dependent on the other parts' engagement in the project		Neither the researcher nor the organisation is dependent on engagement from the other part in the project.
Informal	*Case 1 and 2*	*Case 3*	

Table 2: Analysis of the SEA researcher's strategic interdependence in relation to the collaborating organisation. Whether the dependence is explicated formally (in the contract) or informally in the process is indicated in the left column.

Formal and informal organisational autonomy

Table 3 shows the analysis of whether and how the researchers in the cases have organisational autonomy. Regarding to what extent the researchers set research goals autonomously, the analysis shows both high and medium organisational autonomy for all cases. Formally, based upon the contracts, the autonomy is assessed as high/medium as all

cases include a loosely formulated goal for the research. In case 2, the contract emphasises the need for an autonomous researcher, providing critical and independent guidance based on "insider" knowledge/understanding. It is furthermore emphasised that the researcher must work independently and with high validity in relation to the second co-funder Alcoa Foundation. Differing from this, in case 3 the consultancy expects the Ph.D.-study to "enter directly into Rambøll's work with developing services and having dialogue with costumers", which is limiting the autonomy for setting research goals. Within the broadly stated research goals, the researcher informally decides on the research in negotiation with the collaborating organisation.

	High autonomy	**Medium autonomy**	**Low autonomy**
Autonomy to decide on research goals	Researcher sets research goals within a negotiated overall frame.	Research goals are based upon the problems of the organisation involving the researcher.	The organisation set specific research goals.
Informal and formal	*Case1, 2 and 3*		
Autonomy in the acquisition of scientific knowledge	Researcher decides on how and what data is collected	Joint decisions are made	Decisions on data collection are made by the organisation.
Informal	*Case 1, 2 and 3*		
Autonomy to decide on working place and working balance	Researcher decides upon where to work and to what extent he will do research related work with the organisation.	Joint decisions are made continuously.	The organisation decides upon the working conditions.
Informal and formal	*Case 2*	*Case 1 and 3*	
Writing autonomy	Researcher suggests the content of publications and gives argument why certain theories etc. are chosen.	Researcher edits or re-writes publications partly or fully.	Researcher comment on drafts.
Informal	*Case 1, 2 and 3*		

Table 3: Analysis of the SEA researcher's organisational autonomy in relation to the cooperating organisation. Whether the dependence is explicated formally (in the contract) or informally in the process is indicated in the left column.

The contracts do not mention methods of data collection, besides the data collected through interaction between researcher and collaborating organisation. In all cases the researchers thus have a high autonomy in the acquisition of scientific knowledge.

For case 1 and 3, the organisational autonomy regarding working place and working balance is assessed as medium. For both cases this is due to informal negotiation between the

collaborating organisation and the researcher, but also due to the researchers own interest in being close to what is being studied. Additionally, for case 3, the contract is more explicit and includes the expectation that the researcher "…spends the main part of the time at our office in Virum." For case 2, the organisational autonomy is assessed as high, as there are no restrictions or expectations from the collaborating organisation regarding working place and working balance.

Writing autonomy is high in all cases, as the researchers decide on what should be included in publications, and in which journals to publish their results. In all cases, the milieu has interests in certain media, however, which media to use, remains the researchers' decision.

The two analyses presented in table 2 and 3 show that the cases represent predominantly Mode 3 research, which for the researchers involves high and/or medium strategic autonomy, and primarily high organisational autonomy. The Mode 3 research carried out involves a high engagement in the study field and cooperation with exchange of sources and views. At the same time the researchers retain the responsibility for directing the research and freedom to be critical. For the researcher it thus involves freedom to govern the project within a broadly given frame, which differs from the other modes of research, as shown in figure 5 and discussed in the following.

Despite the categorisation of all three projects as predominantly Mode 3, the analysis reveals that in practice there are differences between what this involves. The differences observed are e.g. different levels of how much the researcher identifies with the study field at a personal level, as well as different levels of critical participation in the processes studied. These differences indicate that within Mode 3 many nuances exist, and that Mode 3 research does not lead to one specific research design and practice. Mode 3 research can be undertaken in various ways, depending upon the specific context including personal preferences, timing, resources etc. After having clarified what conducting Mode 3 research involves in the examples of the three cases, the next step is to analyse the potentials for research and practice.

WHAT POTENTIALS DOES ACTING AS A CHANGE AGENT HAVE FOR RESEARCH AND PRACTICE?

The second part of the aim of this paper is to investigate the potentials of mode 3 research for research and practice. This is done by investigating two issues: 1) if and how being a change agent in relation to SEA influences the research process and content and 2) if and how the research and cooperation influence the organisation and its work with SEA. These two questions are treated in the following by interpreting the Mode 3 research cases in terms of influences enabled by the combination of high autonomy and high interdependence. The interpretation is based on experiences and observations of the researchers and contact persons respectively.

POTENTIALS FOR RESEARCH: THE RESEARCHERS' EXPERIENCE

The first analysis of the potentials for research of Mode 3 research is based on the researchers' experiences from the three cases. This section is organised around main issues of access, dialogue on direction and ownership of the research.

Access to people, processes and information

The researchers point at the potential of access in the close association with the organisations: Access to the right person at the right time and place makes it possible for the researcher to make suggestions that test hypotheses or theories. With high strategic interdependence, the researcher is provided with insight and access to follow processes in the organisation. At the same time, the researcher has high autonomy, which means that the researcher potentially can make suggestions that are relevant for practice and at the same time tests hypotheses or theories as part of the research process. An example of this potential is from case 1, where the researcher has continuously taken part in organisational processes, which has given possibilities for testing hypotheses, e.g. about the timing of decision aid put forward in theories of organisational decision-making.

At the same time the researcher is allowed to use the information independently, which may improve the research, e.g. by getting feedback on the research from a wider research community. An example of this potential is from case 2, in which the researcher was allowed to use confidential documents on assessment practice as basis for research. The confidential data was a key source for research, which included recommendations for how to improve practice. These recommendations would not otherwise be made, as no one else has interest in using this material for this purpose. The combination of interdependence and autonomy thus made it possible to publish research with a highly relevant content.

The close association with the cooperating organisation through the high strategic interdependence has also been experienced as limiting the research, when the researcher is trying to gain access in areas with opposition towards the associated organisation. For example in case study 3, the task of performing SEA of the river basin management plans, which is the topic of the research project, was tendered and won by a competing consultancy. This meant that the researcher being closely associated with a competing consultancy was excluded from studying the process. In other situations, the high organisational autonomy may make it possible for the researcher to go beyond the organisation and interact with competing organisations. Such an act may be validated by a belief that the result of it is (more) beneficial for the research project and the collaboration. This has been possible in case 2, in which the researcher has experienced being excluded from access because of her association with the respective organisations. The researcher used her autonomy and built her own relationships beyond the cooperating organisation, emphasising her relative independence from it.

Dialogue on direction of research

The researchers point at dialogue about the direction of the research as an important potential of the Mode 3 setup. The dialogue is seen as an opportunity for enhancing the relevance to practice and society.

The high interdependence in the cases is likely to ensure a dialogue with the organisation as the organisation has interest in the output of the research. In the three cases, the dialogue has given valuable input from a practical angle to keep the project relevant to practice. The organisational autonomy means that the researcher is still free to develop the research design and secure a scientific rigour independently of the practical wishes of the organisation. In case 1 and 3 this influence has been experienced through the fact that the research results are continuously being "reality-checked" by practitioners from the organisation. In this way the researcher gets a valuable input on whether suggestions are relevant for practice.

This dialogue also poses a challenge for researchers because the researcher constantly has to balance between the interests of the organisation, scientific demands and the researcher's own interest. In case 3, for example, the organisation has clear wishes for immediately usable methodology, while the scientific community expects more time to be spent on issues such as theoretical angle and research methodology.

Ownership of outputs of autonomous research

The last influence identified by the researchers is connected to the utilisation of the results of the research projects. The Mode 3 setup is experienced to give the organisations ownership of the output of the autonomous research, meaning that the output is more likely to be used in the organisations. This support is especially relevant as the researcher - retaining the organisational autonomy - may have chosen approaches and theories that the organisation would not have preferred at first although the researcher found these more beneficial. The combinations of interdependence and autonomy may in such situations make it possible to improve research and practice by double-loop learning processes (Argyris 1977) in the organisations. For example, case 1 is aiming at this by using theory that is not previously related to the field, and the organisation has supported the researcher's choice.

The experience from the case studies is that for the organisations, the sense of ownership is related to getting a return for their investment, cf. table 2. The organisations have invested in the research projects and have had influence on the direction of the research, so that it has relevance, and they will, if at all possible, try to benefit from it in their organisations. The organisations may even work as platforms for disseminating the research results to society and other practitioners. Case 3 is an example of this, because Rambøll will strive to implement any methodology developed, in their subsequent consultancy work, thus communicating it to their clients. The ownership and backing from the collaborating organisation is in case 2 furthermore experienced to give the output of the research a higher status among related institutions.

POTENTIALS FOR PRACTICE: THE ORGANISATIONS' EXPERIENCE

The organisations' responses to the questions of potentials shed light on the cooperative mode of research seen from practitioners' experiences. This section is organised around main issues arising in the written response: The importance of linking research and practice closely; the influence observed and assessed; and the risk and weaknesses.

The importance of close linkages between SEA research and SEA practice

The respondents in general stress the importance of a close relationship between research and practice. The respondents from Energinet.dk and Rambøll e.g. express the value for SEA research as:

> *"The strength is that SEA theory is challenged by reality's diversity of asymmetrical courses and sudden political and strategic changes."* (Head of Section, Energinet.dk)
>
> *"Sanne gets input for understanding everyday life and problems of the practitioners. Thereby the research study adjusts to a more societal beneficial approach."* (Head of Department, Rambøll)

The contextual aspects of practice are hereby put forward as important for enhancing relevancy of SEA research, even though this does not guarantee an easy implementation in practice. The importance for SEA practice is also raised and related to the organisations' motivation for entering a Mode 3 setup. Energinet.dk chose to initiate the cooperation with Aalborg University because they wanted research input to how to practice SEA, on which plans and especially how to integrate SEA into decision making: "It has always been – and still is – the attitude in Energinet.dk, that SEA shall not be a shallow paper exercise. SEA shall enter the decision making processes at a time and with content that makes SEA an active element". The same line of motivation is found in the Self Rule who puts it this way:

> *"I like to see the units' cooperation with Anne as an expression of a greater openness to external challenges than some other units' …Whether it can be said to be evidence that we to a higher degree operate with 'governance' administration principles, I will leave for others to objectively assess – but it is what I as manager of the unit strive for as a principle."* (Head of Department, The Greenlandic Self-Rule)

While Energinet.dk and the Self Rule emphasise both the short and long term perspectives in their views upon the importance of a close relationship between SEA practice and SEA research, Rambøll especially stresses the motivation as short-term business expansion through a competency development. On the long term Rambøll views the importance of cooperation with research for the SEA practice in general:

> *"Rambøll gets access to Aalborg University on a more personal level and thereby easier access to future sparring and development of other cooperations."* (Head of Department, Rambøll)

The researchers' high engagement in practice is by two respondents underlined as important for the cooperative mode and the content of the research. The following statements from Energinet.dk and the Greenlandic Self Rule exemplify this and point to the importance of grounding research in an understanding of specific contextual circumstances:

> *"Ivar has from the first day shown genuine interest in the dilemmas of Energinet.dk, and has very thoroughly acquainted himself with the atypical decision processes behind a decision on large scale infrastructure projects."* (Head of Section, Energinet.dk)
>
> *"In relation to the societal perspective, it has been an unconditioned benefit – supposedly a precondition – for Anne, that she is an integrated part of the Greenlandic society."* (Head of Department, The Greenlandic Self-Rule)

The physical affiliation, involving staying in the environment for periods, is part of the high engagement by the researchers and is stressed as an important basis for the influence on their SEA work. The first-hand acquaintance with the actual projects and issues are mentioned as a positive consequence of physical affiliation – in addition to the possibility of involving the SEA knowledge in the processes and to challenge the work undertaken continuously. The researcher becomes integrated and "… not just an external consultant or observant" (Head of Section, Energinet.dk).

The influence observed and assessed

A general observation in the answers from the respondents is the conclusion that the close cooperation has influenced the respondents' competences through the developed understanding and actual work on SEA:

> *"On the concrete and praxis-related level, it have had great impact for progress and development of the specific SEA, that Anne has 'wafted over the water' in different matters. Anne has through the whole process been a really good sparring partner for me being responsible for the SEA."* (Head of Department, The Greenlandic Self-Rule)

Rambøll who also refers to the personal competency development, but finds it difficult to assess the direct competency development for others and the company in general supports this. The reason put forward is, that the application-oriented part of the research is not yet finished. This may have to do with the character of the company being a consultancy, and the expressed need for tool making. Energinet.dk raises the influence on the competences on a more institutional level:

> *"It has qualified the research project and brought valuable knowledge on SEA from Ivar. Several internal workshops have been held to qualify key employers within SEA. Ivar has participated in the development of internal and external minutes on SEA to be used for establishing a proper SEA policy".* (Head of Section, Energinet.dk)

And continues to stress the influence for other actors and society in general: "Energinet.dk and other authorities have a need to get the SEA processes defined and coordinated properly – in that case the project has already been of great importance".

The hidden influence, or indirect influence, for which it is difficult to establish a clear causal relationship between the research and changes in practice, is discussed as important. The respondent from Greenland explains this indirect influence - due to publication, involvement of informants and just general presence by the researcher - through examples like these:

"In relation to The Bureau of Minerals and Petroleum (BMP) and Anne's insistence on getting access to the (so-called) SEAs written by BMP, I think that this insistence has had an impact on the decision that BMP in January 2010 for the first time has started to publish their SEAs."

"It is difficult to express but it has to do with a small society, and here Anne's contribution to the debate has made the media image a bit more nuanced – not on the axis advocate versus opponent, but on the axis unreflective versus reflective."

These influences are from the authors' perspective related to Mode 3 research, with the normative sight on e.g. democratic SEA processes, supplemented at times with a Mode 1 research to secure the necessary distance to keep a critical stance.

Risks and weaknesses

Working as closely as it has been the case in the three research projects can also be associated with different risks. One is that researchers do not use the synergies between the three modes of research and get too involved in the specific contextual setting with a risk of not keeping enough distance to be critical. The respondent from Energinet.dk raises this risk:

"A potential weakness in the cooperation model is if Ivar is not capable of getting the necessary distance to the experiences in Energinet.dk. If he becomes part of the processes because they are interesting, it might be difficult to keep the appropriate academic distance to the experiences… Energinet.dk has in general not experienced these weaknesses…more to consider as observation points". (Head of Section, Energinet.dk)

Another risk put forward by the respondents is the unpredictability in the research process and thereby the actual possibilities of creating synergies between practice and research. Rambøll experienced a lower degree of synergies due to lack of jobs of relevance to the research project:

"We tried to get jobs within the core of the research field, but unfortunately failed. Had we won just one of these jobs, and especially the environmental assessment of the river basin management plans, it would presumably have meant a greater involvement of Sanne in the production." (Head of Department, Rambøll)

The opposite situation was the case for Energinet.dk, since they during the research period experienced massive intake of large projects, which has given a large empirical base for the research project. These experiences raise the need to acknowledge the unpredictability in having cooperative processes, and that the benefits for SEA and the organisation as such might appear later than assumed. For Rambøll it was also an unexpected experience that the close cooperation between Rambøll and Aalborg University limited the access to the process of preparing SEA of the new RBMPs: "We were very surprised to experience, that the process was so closed, and that Rambøll's cooperation with the university and Sanne in that respect was hindering the openness of the authorities" (Head of Department, Rambøll). Still the research has a role to play, but the influence is more on the societal level than for the company as such: "…the research project can give the Danish approach to integration of climate in environmental assessments a lift…" (Head of Department, Rambøll).

Another risk mentioned, is the lack of engagement from the organisation in general. It is experienced by the respondents that a risk with the cooperative model is that only the key person is fully engaged in bridging SEA research and practice:

> *"Rambøll only benefits from the cooperation, if individuals in Rambøll have time/interest/will in getting involved in the cooperation – our conditions for this has actually not been the best."* (Head of Department, Rambøll)

In the Self Rule the cooperation has also been solely coupled to the key person, which has not given beneficial and automatic access to other parts of the organisation:

> *"Some specific conditions have meant that I have right of disposal over necessary resources and at the same time taken the necessary decision competence for the cooperation to become a reality, but I do not hold a sufficiently high position to personally spread 'the happy message' to other parts of the Self Rule. This work should have been done by others, but unfortunately no one else has taken on this task."* (Head of Department, The Greenlandic Self-Rule)

Trough examples as above it is stressed by the respondents that the members of the organisations need to be open and accessible to make a bigger difference. This is in line with the emphasis on interdependence in the Mode 3 setup.

CONCLUSION AND DISCUSSION

The article has raised the potentials of SEA research being involved in engaged knowledge making starting with the environmental problem. The point of departure has been the international questioning whether SEA is effective in influencing planning and decision-making processes in the quest for sustainable development. The authors further question whether the experienced gab between SEA research and SEA practice can be due to a scientific non- or low cooperative knowledge production. The article, based upon theories on knowledge production and empirical analysis of three cases of SEA research intervention in ongoing processes, reveals results presented and discussed in the following.

WHAT SEA RESEARCH AS MODE 3 INVOLVES

The cases analysed show that Mode 3 research involves predominantly high interdependence between the researcher and the organisation, mainly in terms of economy and engagement. Also a predominantly high organisational autonomy is present, mainly related to acquisition of scientific knowledge and writing. Also there is a measure of autonomy in deciding on research goals, where in Mode 3, research goals are set through a negotiation. The cases also show that doing SEA research can involve different issues, such as different degrees of involvement. Borrowing terminology from Andrew Jamison (2009), three roles for SEA researchers in the process of inclusiveness are shown:

1. *"Taking side"*: The researcher identifies with the field of study (The Greenlandic case in which the researcher develops a kind of partisanship with the Greenlandic society possibly impacted by the drive for implementing new mega industries).

2. *"Helping out"*: The researcher becomes a 'critical friend' (The Energinet.dk case in which the researcher critically participates in the processes in the organisation to find ways for SEA to influence decision making).
3. *"Giving advice"*: The researcher keeps an academic distance in advising the organisation (The Rambøll case in which the researcher gives professional input to the development of SEA of water plans and incorporation of climate change in SEA).

The three cases indicate that Mode 3 researchers work in a variety of ways. This variety may be triggered by different situations that the researchers adapt to in the process of doing research.

POTENTIALS FOR MODE 3 TO INFLUENCE SEA RESEARCH AND SEA PRACTICE

The empirical analysis, based upon the experience and reflection of both the researcher and the key person in the cooperating organisations, shows that in the three cases Mode 3 influences SEA research and practice in other ways than Mode 1 and 2.

The engagement and involvement in what is being studied has developed a timely and real-life correlated understanding of the processes in which we are trying to integrate and use SEA as a means for sustainable development. The context is being brought to the forefront, which is assessed by all parties in the three cases as positive and important for research to increase relevance for SEA practice and influence this. Some of the main potentials experienced by researchers and organisations in the three cases are:

- The research mode renders possible a critical review of planning, assessments and decision making processes, as well as of research
- The research mode furthers development of attitudes towards SEA and development of specific assessment skills within the organisations.
- The research mode assists in building bridges among actors within the organisation, and between the organisation and external actors, and eases the communication of SEA results to e.g. the public.

By cooperating on knowledge making, the researchers have also gained benefits by getting increased access to information and processes. This is assessed as improving both the quality of research, and ongoing dissemination of knowledge and research results in non-academic forum.

The high autonomy in Mode 3 means that the suggestions of the researcher are likely to go beyond the assumptions and rules that govern practice in the milieu.

The overall conclusion from the study is that potentially a researcher, with high autonomy and interdependence, functions as a change agent for more environmentally sustainable decisions by being part of and influencing the field studied – without devaluing or compromising the traditional scholarship.

THE CHALLENGES FOR MODE 3 SEA RESEARCHERS AND THE ORGANISATIONS INVOLVED

Being part of Mode 3 knowledge making is experienced as challenging in different aspects. First, the researcher is putting himself 'in game'. One needs to know and recognise own knowledge, values and delimitations - and at the same time recognise others'. Second, Mode 3 research is, and needs to be, personally driven, based upon a high engagement and clarification of own values. An overall pitfall of Mode 3 research is also the balance of having a close cooperation and at the same time retaining the critical approach of a researcher. It is a challenge to have a high interdependence and at the same time maintain high autonomy, i.e. without compromising slightly with your ability or willingness to be critical to the organisation with which you are associated. For the organisation the study especially shows challenges in getting a broader organisational engagement and commitment in the SEA research.

Despite the focus on Mode 3, the analysis also shows Mode 2 and 1 characteristic in some parts of the Mode 3 research: From time to time, the researcher's work resembles a consultancy for the benefit of the cooperation and in other periods the researcher's efforts resemble traditional science in detailed studies of a specific. In addition to autonomy and interdependence, what distinguishes the Mode 3 researcher from these other modes is also the reflexivity that precedes and follows the efforts resembling other modes. In this way Mode 3 is by the authors seen as a complementary mode to doing research: Incorporating to a certain extent Mode 2 and 1 and thereby combining the benefits of modes. An issue of interest for further interest is a mapping of which modes of research is currently used by researchers in the SEA field.

The point of departure for the article is that if the SEA research society is to make a difference for practice, we need a wide and deep form of cooperation between researchers and practitioners. This cooperation can be achieved through Mode 3 research entailing co-funding, co-formulation of research questions and co-production of results. We as SEA researchers can choose to be close to the SEA practitioners, decision makers and affected parties and at the same time create temporary space of distance to the relevance demands coming from the co-operators to safeguard rigour. The contextually based Mode 3 research, and the appertaining critical pragmatism, can give us one way to minimise the gap between SEA research and SEA practice. Preconditions for this to happen prove to be personal engagement, shared wish for research to make a difference for SEA practice and dialogue with a confrontation of own research intention listening to the intentions of the society.

Acknowledgement

The authors wish to acknowledge the work on change agents by Professor Andrew Jamison and would like to thank Jamison for helpful commenting on a draft of the work.

POSTLUDE: EXPANDING CHANGE AGENT CONCEPTS

The article opens up a range of interesting questions of which a few is addressed in this section: How is the 'critical friend' role conceptualised? How can the concept of change be understood? What competences should the change agent possess? Is the mode more important than the substance of the knowledge production?

THE CRITICAL FRIEND ROLE

The article depicts my role as a 'critical friend' that is helping Energinet.dk and the energy sector out of a problem of applying SEA meaningfully, but what is a 'critical friend'? Costa and Kallick (1993) describe the critical friend as "a trusted person who asks provocative questions, provides data to be examined through another lens, and offers critique of a person's work as a friend. A critical friend takes the time to fully understand the context of the work presented and the outcomes that the person or group is working toward. The friend is an advocate for the success of that work" (p. 50). Costa and Kallick use the metaphor of an ophthalmologist to explain how the critical friend suggests different lenses to the partner to help the partner to learn which ones fits best. Some authors point at the contradiction between the words 'critical' and 'friend', and with point of departure in that critique Swaffield (2002) suggests that "The tension could be seen as the point of balance along a continuum from 'total friend' to 'total critic'" (p. 3). She argues that being a critical friend requires finding an appropriate balance between support and challenge, and she suggest that a solution could be to separate task from people by being a friend to the persons and critical to their actions. Although this solution may sound reasonable, it may be difficult in practice, especially in the project like this Ph.D. project, where there is a need to challenge the practice of a broad range of actors and no resources for building up that many 'friendships' in order to being a critical friend. On the one hand, separation of persons and actions sounds like basic elements of constructive feedback and on the other hand, this separation is difficult in terms of actors, whose identity is closely related to their actions or where I as a researcher have not had time to build up a friendship.

The critical friend may have several concerns: What if the partner does not listen or do not prioritise the time (although it seems obvious to the critical friend that he would benefit from trying other lenses); what if the partner is a heterogeneous organisation that needs different lenses to different people? What if being a friend is not enough? How to balance trust and change when you cannot have both? These concerns came into the Ph.D. project when discourses of a passive role of SEA seemed to dominate in Energinet.dk half-way in the project (see chapter 10). To generate change and change practice on SEA in this situation, the critical friend approach seemed insufficient to change this passive approach, however, I choose to await the situation and focus my research on other actors in the energy sector for a period. Using Coghlan and Brannick's (2005) forms of insider research, the passive approach changed the character of the research collaboration with Energinet.dk from a 'large-scale transformational change' to 'individual engaged in reflective study of professional practice' (p. 49). In terms of the research, the passive approach reduced the possibilities for doing research on SEA in practice and it reduced the partners' potential benefit of the research

collaboration. On the other hand, the passive approach gave insight in the political and organisational issues of SEA application and it leaved time for cooperation with other actors.

The critical friend role is to some extent a double role in the cooperation between a researcher and an external organisation. Kim Behnke points at this mutuality in the article by stating that the strength in the cooperation is not only getting critical input from the researcher to the work in Energinet.dk, but the researcher's experiences of processes in the energy sector may also constitute a critical input to the established theories. Thus, the relation between the researcher and the external partner is a 'critical *inter*dependence'; a two-way criticism between practice and theory with the change agent as facilitator. The critical interdependence is also reflected in the interaction and feedback described in the methodological frame.

The critical interdependence may overcome some of the inherent contradictions in Kurek's dimensions of organisational autonomy and strategic interdependence: Although this framework is relevant for explaining elements of change agent research, it seems impracticable to be highly interdependent and highly autonomous at the same time. Organisations that are highly dependent on research will most likely steer their research resources in their benefit. Thus, researchers that strictly adhere to the Mode 3 knowledge production may likely face difficulties of getting funding.

COMPETENCES OF THE CHANGE AGENT

Researchers acting as change agents need to be skilled both as researchers and change agents. Andrew Pettigrew (2003b) argues that in order to understand change, the researcher must have competences of a social anthropologist, a historian, and a political analyst. Other literature put more emphasis on the 'research competences' such as data collection, writing skills, and planning and execution of learning cycles (e.g. Coghlan and Brannick 2005). The change agent is in Paul Pettigrew's (2003a) description entailed in "inherent ethical, political, and personal turmoils and issues around multilevel dynamics, role ambiguity, power games, political entrepreneurship, and “shadows of the past.”" (p. 375). In this turmoil, the setup is important as the change agents need "good support mechanisms and bestowed power in order to challenge vested and powerful interests" (p. 375). In their book about change agents, Buchanan and Boddy (1992) refer to a portfolio of power skills and manipulative techniques, and they mention activities like: "politicking, the wheeler-dealing, the fixing and negotiating, the coalition building and the trade-offs" (p. 29). The support mechanisms and bestowed power of this Ph.D. project have primarily been the SEA legislation, which must be fulfilled, and a group of powerful people supporting the project.

More specifically on the role of a critical friend, trust is central: Access crucially depends on establishing interpersonal trust between the researcher and the organisation under scrutiny (Cohen et al. 2007). The centrality of trust put up limitations on Buchanan and Boddy's 'backstage activities', as manipulation and collation building risk leading to distrust. Or as Cohen et al. (2007) describe it, "The researcher has to negotiate a potential minefield" (p. 123) not to be seen as an informer or as doing activities that are against the interest of the participants. Having the 'critical interdependence' in mind, trust is a concern for all the partners of the research.

Buchanan and Boddy (1992) argue that change agents have to "support the 'public performance' of rationally ordered and logically phased and visibly participative change with 'backstage activity' in the recruitment and maintenance of support and in seeking and blocking resistance. Despite the access to people and information in Energinet.dk and to some extent among other actors in the energy sector, I have not been very active in the political part of backstage activity; I have found that research ethics and transparency traditions have been more in line with the 'public performance' activities of visibly participative change (although most likely not 'rationally ordered'). I have felt that my role as a critical friend was in line with public performance activities, whereas the backstage activities were the responsibility of key persons in organisations that may use my input. This choice can be criticised for being a passive approach to change, however, ownership of efforts cannot be 'given' from a critical friend. Buchanan and Boddy argue that the two performances must be supplementing each other to make change, and the limitation of the change generated through this Ph.D. project may especially be due to limited activity 'backstage'.

THE CONCEPT OF CHANGE

An important aspect of change agent research and modes of knowledge production not touched upon in the article is how the organisation or society is intended to change. Weick and Quinn (1999) propose a distinction between episodic change and continuous change that is highly relevant for agents of change and their partners. The distinction relates to the characteristics of the organisation, especially how it develops. Episodic change is the planned and infrequent change of organisations that is related to an understanding of organisations as stable and controlled organisations. The episodic change tends to be externally driven and following the Lewinian model of unfreeze-transition-refreeze. In contrast, continuous change is related to a view on organisations as emergent and constantly changing. The continuous change is "a pattern of endless modifications" (p. 366) in continuous cycles of freeze-rebalance-unfreeze: First, sequences are freezed in stories, maps ors schemas; then, these freezed sequences are reinterpreted or relabelled; finally, the sequences are unfreezed to resume improvisation and learning. The role of the change agent is widely different between the two types of change: In the episodic change process, the change agent is the creator of change by influencing practice at certain points in time, whereas the change agent in the continuous change process redirects change by managing language and unblocks learning and improvisation. In the latter, "change agents become important for their ability to make sense of change dynamics already under way" (Weick and Quinn 1999, p. 38). The relevance of the two types of change seems to depend on how structured and routine-based the organisation is as well as the type of change intended.

Several models have been developed for how to understand and manage the substance of change. Leavitt's (1965) model of organisational change is an often cited model, in which the main point is that focus tends to be too much on technology (for instance SEA), as we forget other relevant aspects that interact with the technology, especially actors, structures, and task definitions. In this Ph.D. project, actors, structures and task definitions have been more important than the SEA tool itself, as the challenge of implementing SEA primarily has been the aspects 'around' the tool, rather than 'within' it.

In this Ph.D. project, the change orientation towards developing an SEA practice in the energy sector was in the beginning based on a traditional episodic change understanding with an unfreeze-transition-refreeze approach. Energinet.dk was intended to unfreeze its way of developing infrastructure projects in order to integrate SEA and thereafter to settle on this practice. The SEA pilot on the natural gas security of supply plan, see subchapter 7.1, was a part of this unfreeze-transition process, but it was disturbed by unresolved issues of responsibility and scope, see chapter 10. Instead, the change orientation in this Ph.D. project widely has developed into a continuous change orientation with continuous approaches to relevant actors and an effort of influencing language and concept used on environmental integration at strategic level. This shift is similar to the argument in the quote by Rist above, in which he argues for an reorientation towards processes and an enlightenment function of the research rather than an engineering function: This Ph.D. project started out as an engineering job of developing an meaningful SEA methodology and ended up as an enlightenment or empowering mission. The specific actions in this 'mission' are described in the following subchapter.

KNOWLEDGE PRODUCTION: SUBSTANCE VERSUS BRIDGE

Weick (2001) disputes the importance of debating bridges between university and the surroundings in certain modes of research by arguing that it is of minor importance compared to the importance of raising the right questions. The questioning is the problem rather than the cooperation: "relationships between practitioners and academics are tense, not because there is no bridge over the relevance gap, but rather because there is a bridge that satisfies no one" (Weick 2001, p. S72). The bridge, Weick provokes, is unsatisfactory since it is based on defective assertions about what are important questions and aims, and the relevance problem is due to practitioners' unwillingness to "set aside their fads and begin to work with fundaments" and to academics' unwillingness to "set aside their disciplines and begin to work in a transdisciplinary manner" (p. S72). The field of SEA is not without fads and discipline glorification, but judged from the literature and conference debates, it seems widely transdisciplinary and willing to question fundamental issues the basic need and relevance of SEA. Weick's point about the right question should lead to an equal awareness of bridge and questions, since these are interdependent; they mutually define and facilitate each others in efforts of change.

The combination of disciplines in the conceptual framework can be seen as an acknowledgement of a need to work interdisciplinary in order to deal with some relevant and fundamental aspects of SEA and decision-making processes. The main disciplines in play in this project are the disciplines of decision-making, sense-making, (strategic) environmental assessment, and energy planning (to understand the basis for infrastructure development). Among these disciplines, sense-making was entirely new to me and the project partners. In the thesis, the three first mentioned are most prominent.

Starkey and Madan (2001) combine the questions of content and bridge. They argue, "[c]losing the relevance gap requires that the different stakeholders involved in management research creatively address issues of research content, research process and research dissemination" (p. S3). The creative way of addressing these issues has in this project partly been the staging of the Ph.D. fellow as an independent agent with opportunity of being a

critical friend without hindering objectives, tasks, or affiliations. The experience of the project is that when realising the independency, some actors in the energy sector finds such a critical friend a welcoming and needed sparring partner. The strategic independent change agent role thus provided a unique insight and openness to the dilemmas and challenges in practice and thereby provided a basis for doing research that may bridge the relevance gap. This independent position also provides a relevant form of dissemination of the research in the continuous and open dialogue and knowledge production with relevant actors.

3. 2 APPROACHES TO PRACTICE AND THEORY IN THIS PH.D. PROJECT

> *"Action Researchers work on the epistemological assumption that the purpose of academic research and discourse is not just to describe, understand and explain the world, but also to change it"* (Coghlan and Brannick 2005, p. 7)
>
> *"Change is as much concerned with changing the world view or the organizational view of those involved, as it is with changing decision-making processes… or organization structures. This means challenging, questioning and breaking down the existing shared assumptions, or 'interpretive schemes', or 'cognitive coping mechanisms', held by the organization's members, in order to change attitudes and behaviour"* (Buchanan and Boddy, 1992, p. 25).

This second subchapter supplements the exploration of relevance and potentials of the change agent research in the previous subchapter with details and critical considerations of my experiences of doing research in the change agent approach. The subchapter builds on what Coghlan and Brannick in the quote above term an epistemological assumption of action research; that the purpose of research is also to change the world. In the following, the content and actions in the change process is described. An interesting part of this process is the changing of worldviews as Buchanan and Buddy point at in the quote above. It is important to note that the orientation to change in change agent research has two dimensions: To improve the research to better approach the problems of practice meanwhile being critical and to improve practice towards a normative setup. Both dimensions are inherent in this thesis and treated in the following.

'Approaching' is used here to in line with the critical friend role described above; I have seen my role as activity suggesting, advising, inspiring, facilitating, and criticising rather than 'forcing' people to change at the one extreme and uninterestedly reporting findings in journals without considering audiences in the at the other extreme. The approaching is thus to be seen as input in the streams of events that practitioners and academics face, and whether the input are noticed and retained depends on the people's mental framework, resources and situation. At the same time, the approaching is to be seen as a personal learning process for me as a Ph.D. fellow both in terms of a personal 'How can I know what I think until I hear what I say?' process (see the conceptual framework) and in terms of learning from feedback and responses.

The balance between approaching practice and approaching theory can be related to the balance between immediate and long term relevance. At the 1999 Academy of Management meetings, March argued that the academic research that contributes to knowledge is more important than the research aimed at relevance. According to March, the key role of university is "in raising fundamental issues and advancing knowledge about fundamental processes affecting management […] not in the solution of immediate managerial problems" (Huff 2000b, p. 55). He warns against "a contemporary enthusiasm for immediate relevance [… since researchers] who pursue immediate relevance are likely to produce knowledge that is both redundant with what managers already know, and useful only over a limited time and under limited conditions." (p. 55). This project both concerns the immediate relevance of developing a meaningful practice on SEA in the Danish energy sector, but it also concerns the

more long-term and fundamental contributions e.g. to the understanding of how strategic decisions are made and how sense-making influences SEA processes. Long and short term issues are, however, related as long-term may have an immediate relevance in helping actors in the energy sector "become better reflective practitioners" (Starkey and Madan 2001, p. S4) and the immediate relevance problems may be valuable input to the long-term and fundamental issues.

APPROACHING PRACTICE: SEA AND THE ENERGY SECTOR

The threefold ambition of empowering practice to change, to communicate experiences, and to contest assumptions and propose developments to the literature has involved an approach to a range of actors within or related to the Danish energy sector. An overview of these actors is presented in table 4.

Organisation	**People**	**Main questions discussed**
Energinet.dk	Technical analysts, project developers, managers	How should SEA legislation be interpreted? When to apply SEA in energy infrastructure development to make the most of it? What is 'reasonable alternatives'?
	EA practitioners, including a North European working group	
	Managers and employees playing a key role on environmental considerations	How is environment integrated and when is systematic environmental considerations and public participation relevant?
	Employees coordinating external research	How to do SEA on research programme?
Consultancy companies	System analysts, energy planners	When is energy planning within the scope of SEA legislation? What is 'reasonable alternatives'?
DEA	Employees on wind planning and oil investigation in DEA. Working group on strategic planning.	When is energy planning within the scope of SEA legislation? How to apply SEA in energy context? What decisions to approach?
Regional environmental centre	Employee working on SEAs	When is energy infrastructure subject to SEA?
Municipalities	Planners	Is 'voluntary' heat planning and energy planning subject to SEA?
NGOs (nature)	Members engaged in environmental assessments	How to participate in strategic discussions? What role does SEA play?
AAU	Students within energy technique, energy planning, and environmental management	Who is responsible for SEA application?

Table 4: Organisations and people approached to change practice on SEA and the main questions discussed.

The table shows that a recurrent issue in the approach to the actors in the energy sector is how to interpret legislation in terms of what decisions are subject to SEA. The confusion and discussion on this subject may partly be due to the nature of decisions in the energy sector that differs from the spatial orientation that is inherent in the Danish legislation on environmental assessment. Another recurrent discussion is the interpretation of 'reasonable alternatives' (EU Directive 2001/42/EC, article 5.1), which at the strategic level is a concern since radical alternatives may give rise to politically unwanted debates.

As an example of the interesting discussions is whether SEA reports should include statements like "Overall, the positive impacts far outweigh the negative impacts" (Energinet.dk 2010c, p. 22). In the example, a (anonymised) consultant in the SEA team for Energinet.dk's natural gas security of supply plan argued that the formulation was reasonable as the planning was expected to cause major societal GHG benefits and minor local disturbances on nature, and that the legislation on SEA did not prohibit such formulations. Furthermore, the formulation was argued to help 'scarce-attention' politicians understand (i.e. making sense of) the assessment. The argument was, however, not that simple, I disputed, as the statement included a weighing of impacts of different environmental aspects. If political targets on these aspects were weighed against each other, it would have been possible to conclude on the relation between impacts, but political targets seldom are, and in this example, the statement was a political weighing of impacts on nature versus GHG savings. In the end, the formulation was included in the final SEA report.

The efforts of approaching the actors have often been in the form of personal discussions, and therefore they are rarely documented. The exceptions are found in formal documents. My approach to the Århus Regional Environmental Centre which made the EIA of the Østerild test centre was, without intend, included in the hearing comments in the EIA process (DASEP 2009a). My approach to Energinet.dk is reflected in the official formulation of SEA intensions in Energinet.dk that can be found in appendixes to the company's strategy plan documents (Energinet.dk 2008b, 2010b). And my approach is reflected in the hearing statement on the revision of the law on environmental assessment of plans and programmes (DASEP 2008). Besides the directly visible effects, the approaching has led to more detailed explanation than planned in the pre-analysis of Kriegers Flak grid connection (Energinet.dk 2009a) and influence on the scoping of the SEA of the gas infrastructure planning (Energinet.dk 2010c). Furthermore, the research have had a range of less tangible influences, which Rist (2000) describe as "policy researchers work with policy makers and their staffs over time to create a contextual understanding about an issue, build linkages that will exist over time, and strive constantly to educate about new developments and research findings in the area" (p. 1003). The indirect influence is in line with Weiss' (1988) notion of enlightenment: "Research on knowledge utilization has disclosed that the results of one study rarely influence the direction of the program that was evaluated. But decision makers indicate a strong belief that they are influenced by ideas and arguments that have their origins in research and evaluation. Case studies of evaluations and decisions tend to show that the generalizations and ideas that come from research and evaluation help to shape the development of policy. The phenomenon has come to be known as 'enlightenment'" (Weiss 1988, p. 11). The influence of this Ph.D. project may thus be difficult to measure in short and quantitative terms.

The approaching efforts have been guided by decision-making theory e.g. in being aware of decision windows for influencing. Still, much of the approaching efforts have been 'a shot in the dark' without knowing the potentials and limitation of the 'windows'. As a learning process, these considerations have iteratively sharpened my understanding of who to approach and when. It has been an aim to approach all relevant actors in the energy sector and at the same time focus on the actors that have most interest in cooperating with me. I have not investigated their motivations for cooperating with me, but my impression is that in grasping and interpreting a new legislation and concept like in the case of SEA, there is a need for a strategic independent change agent to answer immediate questions about how to cope with SEA and to create dynamics in organisational routines and awareness; some questions may be embarrassing to ask the Ministry which formulated the legislation and some questions may seem too sensitive to ask a consultant. The interdependence with Energinet.dk created good opportunities for such an autonomous change agent role.

APPROACHING THEORY: INTRODUCING SENSE-MAKING IN THE EA COMMUNITY

> *"[C]ertain situations encourage divergence: for example, in order to get a Ph.D., it is in the interest of a history student to challenge the accepted account, or its interpretation, so that the originality which he brings to the subject is clearly apparent."* (March 1998, p. 8)

In line with March's description of a Ph.D. project as a mechanism for divergence, the intension of the Ph.D. project in terms of approaching theory was to use sense-making theory to enhance understanding of the strategic decision-making with characteristics like the choices in the Danish energy sector. Sense-making theory, I hypothesised, was a way to enhance the theoretical understanding of strategic decisions and their relation to SEA. Besides sense-making, the efforts of approaching theory also concerned reflexivity of the social setup of research, as described in subchapter 3.1. Table 5 presents an overview of the actors that are approached in the efforts, the media, and the content of the discussions with these actors.

The table shows the variety of media through which I have approached theorists, hereunder a webpage on sense-making and impact assessment which I made as a follow up on the discussions at the IAIA'10 conference, see appendix E. Especially the conference presentations and the webpage have generated discussions on sense-making, including what differs sense-making from other constructivist theories and how it may be used in practice. In line with the critical friend role, my intension has been to give input to the interested rather than convince them about the relevance of sense-making, and the IAIA and AESOP (Association of European Schools of Planning) conferences have shown to be relevant arenas for approaching interested and relevant people. The conference presentations have also constituted a test for the framing and use of sense-making in regard to SEA and planning, and the feedback has e.g. lead to interest in sense-making in specific situations. The conference discussions have not only been interesting for academics as many (reflexive) practitioners have engaged in discussions on sense-making by relating sense-making to puzzling events, see appendix E.

Organisation	**Media**	**People**	**Content of discussions**
The assessment-oriented research community within the International Association of Impact Assessment (IAIA) The planning-oriented research community within the Association of European Schools of Planning (AESOP) EA journals	Webpage and news list on sense-making	Visitors of my webpage on sense-making	What is special about sense-making? How to use sense-making in practice? Sense-making explanation of specific events? How to bridge the gap between research and practice?
	Poster, papers and presentation	Conference participants	
	Journals	Unknown reviewers and readers	Relation between change agent research and other modes. How to understand 'tiering' of decision-making.
AAU	Lectures	Students, researchers	How does sense-making differ from other theories?

Table 5: Organisations and people approached to enhance theoretical understanding of strategic decision-making and the content of the discussions.

As examples of the discussed topics are sense-making as a way to make the tacit activities in the beginning of SEA process explicit and the possibilities and ways to improve sense-making abilities (although the latter is an interesting question, it is not directly dealt with in this thesis). The discussions revealed great understanding of the significance of sense-making processes in screening and scoping stages of SEA, and the discussions were at the same time pointing at a need for turning sense-making theory into practical tools and advice.

The effect of the approach to theory is difficult to measure. Judged from correspondence, an effect is awareness and acknowledgement of the relevance of sense-making theory in an SEA perspective. The discussions at the conferences showed reflexivity among participants on their own practice and stances. At the IAIA Geneva conference in 2011, the "Sense-making and impact assessment" poster reproduced in figure 6 was part of competitions for public choice of best poster and the IAIA jury's choice of best poster. According to the President of IAIA at that year, Nick Taylor, the sense-making poster was second in both competitions and it was complimented for proposing an innovative angle to impact assessment and for its ways of communicating the main points.

The considerations in the efforts of approaching theory were e.g. related to how to present sense-making theory to be easily accessible for theorists. Learning from discussions at conferences and in Energinet.dk I changed strategy from presenting sense-making as a separate frame for understanding human behaviour to combine it with decision-making theories of human behaviour, see chapter 4. This new strategy seemed more appropriate when approaching actors that are acting and perceiving within a decision-making paradigm; by relating sense-making and decision-making and show similarities and differences, it became much easier to communicate and achieve a fruitful discussion of where sense-making may provide new answers.

The choice of giving Weick's sense-making theory a prominent role in the Ph.D. was based on an acknowledgement of the plausibility of the theory to explain what I experienced,

hereunder 'gaps' in the explanation provided by decision-making theory. Thus, the choice was based on a mixture of personal experiences, perceived theoretical shortcomings, and the potential for SEA literature. Weick's sense-making theory is inspired by a range of other theories and therefore shares assumptions and understandings with a range of related theories. This has made the separation of sense-making from other theories a recurrent issue during the Ph.D. project. Introducing yet another theory into the IA community risks contributing to an existing "confusing proliferation of definitions and conceptualizations that fail to converge into a coherent whole" (Popper and Lipshitz 2004, p. 181), however, to make sense of complex patterns of social activity, people need, according to Weick (2009, p. 306) to complicate themselves. Sense-making has been my effort on complicating my self in the Ph.D. project.

Focus on sense-making should be seen in relation to the elephant story of understanding phenomena (March 1995, p. 111), so that sense-making is relevant for a certain part of the studied 'elephant' and irrelevant for others. In this thesis, sense-making is hypothesised to be especially relevant for the non-programmed and strategic choices, as argued in chapter 4. The choice of a relatively narrow approach to human behaviour involves biases in terms of interpretation of findings in the extent that these may be better explained by other theories. Related aspects are therefore discussed in subchapter 4.2 and included in the reflections throughout the thesis.

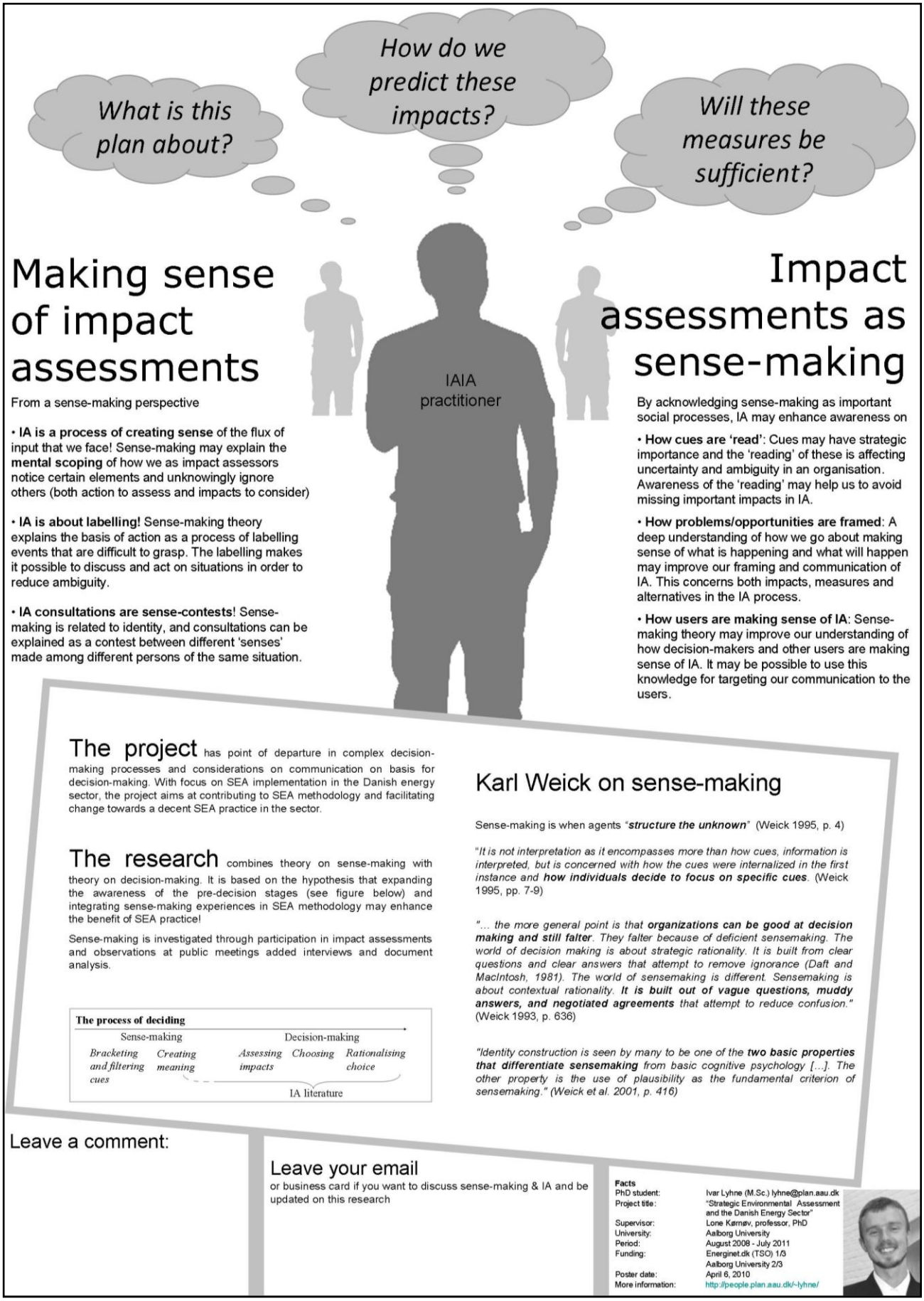

Figure 6: The "Sense-making and impact assessment" poster presented at the IAIA conference in Geneva, 2011.

NAVIGATING BETWEEN PARTNERS' INTERESTS

> *"[B]eing an Action Researcher implies a double task which is not easy to balance: to satisfy the needs of the client and at the same time combine this with research that could add to existent knowledge, some new and, if possible, generic knowledge open for a critical and reflective discussion […] in the scientific community"* (Westlander 2006, p. 54)

In line with Westlander's description of the double task of balancing the interests of the client and the scientific community, this section presents reflections on how to navigate between interests of the partners in this research project. Navigating between these interests has been an important part of the Ph.D. process and the navigation is closely interlinked with important decisions made on research and actors during the process. The section is inspired by the frank description of learning to do research and cope with the many not debated contradictions in interdisciplinary research that Cerwonka and Malkki give in 'Improvising theory' (2007).

This Ph.D. project is constituted by the intersection of three primary actors' interests: Aalborg University, Energinet.dk and me. The two former are of course heterogeneous organisations with several interests of varying dominance and the university interests concerns e.g. incentives in the financial allocation system to universities and interests in the research centre I am attached to. Furthermore, these partners' interests are embedded in a context of interests in the society. What binds these partners together is a common interest in changing practice on SEA in the energy sector, although this common interest has divergent basis. The basis and the influence on choices on research and practice made throughout the project as explained in the following.

Energinet.dk's main interest in the project is to benefit from SEA rather than just fulfilling legislation: "SEA should not be an empty paper-activity. SEA must enter the decision-making processes at a time and with a content that make SEA an active element" (Behnke 2010). This main aim is positioned in a context of caution as Energinet.dk acts within public scrutiny, political debates, and discourses of effectiveness and legitimacy. The pressure on Energinet.dk is reflected in a news paper feature by the chairman of Energinet.dk's board Niels Fog (2011) in which he writes: "The citizens - taxpayers - would be shocked if they knew how much good and qualified working time is used on totally unfounded stories from media-focused, semi-educated researchers [mediehungrende halvstuderede forskere], who do not realise or do not care about how big costs they impose on the society through at best half finished work or in worst case politically sabotaging subjective analyses". Although, this attitude seems more radical than the attitudes I have met in Energinet.dk, it does indicate Energinet.dk's caution towards publicity and research on sensitive topics. As a critical friend, I therefore have been cautious about my formulations in my criticisms and I have chosen to favour internal criticism instead of public criticism. As an example of this choice, the co-authored SEA policy formulation in Energinet.dk's Strategy Plan appendix (Energinet.dk 2010b) was not critical about electricity infrastructure developments that had avoided SEA attention and might have been SEA mandatory. My assessment at that point in time was that both Energinet.dk and the change agent process seemed to benefit more from enthusiasm and forward looking engagement in the SEA policy rather than disputes on previous possible

mistakes. The critical discussion on practice was taking place in other forums and did not seem to be appropriate in the company's public strategy.

Energinet.dk's interest is also indirectly reflected in the insight I have gained. My insight in SEA considerations and choice processes in Energinet.dk is per definition restricted by what I am told and who I am talking to. In some instances I have been depending on persons few persons' openness and willingness to devote time for my questions, and in some instances I have found it necessary to "do a little of the gatekeepers bidding rather than not to do the research at all" (Cohen et al. 2007, p. 124) by approaching other persons than the primary contact persons to learn about the untold.

The interest of the university system is reflected in the Ministerial order on Ph.D. programmes at universities (no 18 of January 14. 2008), which among other things prescribes quality of the research. Within the quality requirement and without an official pressure, the university furthermore has an interest in publication of journal articles with a view to the bibliometric research indicator, which was introduced by the Danish Government in 2010 as a performance based funding mechanism. The interest in publications has had an increasing influence on the communication of this project although it to some extent is in conflict with the change agent approach: If the research and interaction with others are not made through journals on the bibliometric list, they are in principle not rewarded. Similarly, regulation on the Ph.D. assessment committee is favouring university position levels rather than competences of making relevant research.

The quality of the research includes how choices and research is reasoned and communicated. The norms in research seem to be highly favouring rational and logic choices and disfavouring the coincidence and chances that is inherent in a complex and equivocal world. Starbuck (1983) has a similar view on the ideologies governing research and practice: "actions taken unreflectively without specific reasons are irrational and irrationality is bad" (p. 94). For a similar critique, March proposed the Myth of Rationality (March 1995) in which "[a]ctions are “explained” by reference to some consequences that are (or were) anticipated at the time of the action" (March 1998, p. 4). The myth of rationality is present in at least two levels of research: a) the expectation of explaining what is observed as rational behaviour, and b) the expectation of explaining our own behaviour and choices as researchers as rational. March criticises social science for insisting on rational explanations of actions (March 1995, similar critique in Weick 1995, p. 178) and argues that the insistence have made people incredible skilled in explaining our actions rationally. March's critique is a way to articulate that choices on research also is made in other ways: Fundamental choices made in a Ph.D. project like choice of theory or stay abroad involves more aspects than what a human mind can comprehend, why Ph.D. fellows besides efforts on rational choice also rely on gut-feelings, intuition, or non-research elements such as "What country would be most interesting to experience?".

Finally, my interests in the Ph.D. project centres around the issues of personal challenges and changing practice to something more sustainable than the present use of resources and pollution of our planet. For these purpose, the Ph.D. project is a good possibility for interacting with actors that (in principle) accepts the change agent role and at the same time keeping (and be rewarded for) a critical stance. Basically, the interests are grounded in ethical and identity perceptions of a need to actively foster and be part of such change. Besides

personal motivation of creating change, the project is motivated by what Lund (2009) terms "our “public service” obligation" as (p. 75) as public funded researchers. The attractiveness of the research opportunities in the Ph.D. project is of course flanked by basic interests such as a salary and career options.

My interests brings norms into the research, e.g. on SEA: Despite criticism (see appendix B), I regard the SEA tool in its essence a tool with many qualities that is relevant in a wide range of contexts. In principle, SEA is just one of a "myriad sophisticated tools" (Buchanan and O'Connell 2006, p. 33), however, the legislative requirement makes it more topical than many other tools. The norms and convictions that I brought into the project have developed with the growing insight in strategic decision-making processes. As an example, my ideas about public participation have been nuanced from an always necessary element to a pragmatic understanding that in some technical or strategic questions, it may not be meaningful to aim at involving the broad public. Technical questions may instead benefit more from being consulted with NGOs, research institutions and others that in broad terms represent interests of the public.

Learning to play jazz as a critical friend

The navigation between the three actors' interests has similarities with what some organisation scholars describe as an exercise of playing jazz (see the special issue of Organization Science, vol. 9, No. 5 1998, Cerwonka and Malkki 2007): Jazz is improvisation with other people's input based on basic techniques, experience, intuition and playfulness. The jazz-perspective is in the following used as a framework to show the improvisation during the project.

Change agent research is not conducted in isolation, and I 'playing' with a range of persons. Most notable are Kim Behnke and Lone Kørnøv who played central instruments in the change melodies. The improvisation has been most concrete in situations with unpredicted developments and a need for redirection. An example is the official suspension of the planning process on natural gas infrastructure, which the SEA pilot in Energinet.dk was attached to. The research was focused on this project in satisfaction of all partners' interests and the reaction to the cancelling was to change focus from natural gas to SEA challenges in the electricity planning. Another example is the realisation that there are no obvious plans or programmes on which to do an SEA in Energinet.dk, and this understanding challenged the plan-orientation in the SEA legislation. Thus, I changed strategy from a planning-orientation to a project-orientation of being involved in early stages of the development of specific project to look for 'plan-like' choices or relevant stages in the processes to do SEA. In a time when internal questions in Energinet.dk were blocking further progress on SEA, I shifted towards theoretical questions, still with the purpose of benefitting SEA practice and in line with the actors' interests.

The jazz metaphor is in line with March's understanding of evolving preferences, see subchapter 4.1, as the directions and 'interests' of melodies and rhythms evolves when playing jazz. In the project, changing preferences is found e.g. in the ideas of how to apply SEA in Energinet.dk and the contextual changes e.g. to the natural gas planning changed the rhythm and style of the participation.

As a novice in jazz (both literally and metaphorically), I find my navigation perplexed by personal and ethical doubts like: Should I persistently insist on my ideas on environmental considerations in project planning although Energinet.dk employees are of another opinion? How can I defend deviating from established SEA norms when interfering with something as important as environmental governance at strategic level in the Danish energy sector? Should criticism from time to time be 'bended' in favour of cooperation as a critical friend? Many of the doubts are related to the tension between relevance for practice versus scientific rigour, which is a recurrent theme in action research. Kemmis and McTaggart (2000) review action research experiences and point at the tension between methodological rigor and timely results: "In most action research, including participatory action research, the researchers make sacrifices in methodological and technical rigor in exchange for more immediate gains in face of validity: whether the evidence they collect makes sense *to them, in their contexts*" (p. 591, emphasis original). They argue that in this trade-off, "some loss of methodological sophistication is a price worth paying in most practical contexts of transformative social action" (p. 592) and that concerns about methodological sophistication increase with the distance to the investigated and when the results have to stand the scrutiny of researcher communities rather than the people involved. Although, there has been some tension between theoretical sophistication and practical contributions, the trade-offs have been minor in the change agent approach in this project. Although the project started out with focus on practice and relevance, this was related to 'sophisticated' considerations as explained in chapter 4.1.

As an example of 'failed' navigation, and a major frustration (compared to my initial targets and expectations), is my lack of ability to approach hesitations towards SEA among actors in the energy sector. I have not been able to reveal the reasons for some of these hesitations, which frustrates in the efforts to change. It may be a matter of path dependency and inertia of social systems, but such explanations are of minor consolation in trying to fulfil project aims and personal interests. The insight in some of the hesitation has, however, been an interesting experience, arguably also of interest to other practitioners. In favour of the cooperation with actors in the sector, these findings on hesitation and reasons behind are, however, not published. The 'failure' may also be due to my understanding of the critical friend role as not going 'backstage' to get political influence. Buchanan and Boddy (1992) found that change agent practices frequently are faced with problems of interlocking that impede changes, e.g. in waiting for decisions and actions to be taken by other actors or in unclear responsibility. Therefore, the hesitations experienced in the Ph.D. project are likely to be a natural part of change agent practice.

Learning to play jazz in this project has also been learning how to improvise in discussing the research content and results. The shift from presenting sense-making as a separate discipline to combine sense-making and decision-making as continuous process is one example. Improvisation in discussions and interactions has also been a learning process in how to cope with "vested feelings", e.g. in taking responsibility for co-produced results that may involve compromises in terms of research norms. And to learn to engage with people that have different values and practices (or musical training and inspiration) on the topics of the research.

CONCLUDING COMMENTS

As an answer to the first sub-question, this chapter has clarified relevance and potentials of the change agent way of doing research in the field of SEA. Relevance and potentials are of course context dependent and the change agent way of doing research will have other characteristics when used in other context. In this Ph.D. project, high strategic interdependence has improved the content and relevance of the research and high organisational autonomy has made it possible to act as an autonomous change agent and approach the actors and processes that seemed relevant.

The detailed and critical reflections on the approach to theory and practice in this chapter show dilemmas and experiences of the change agent. It indicate a challenge in terms of focus and quality of the research and interaction as it may be difficult for the change agent during the process to have a clear idea of who, what and how it is most relevant to approach in order to change practice towards more sustainable actions and decisions. Experiences and learning processes may improve the change agent' skills and actions, however, a change agent process most likely involves a range of non-programmed and unstructured decisions that make routines and existing solutions potentially inadequate. The change agent processes will thus always need elements of learning and adaptation of the researcher and its partners; in other words "a bit of jazz improvisation".

CHAPTER 4: CONCEPTUAL FRAMEWORK

ON STRATEGIC DECISION-MAKING PROCESSES

> *"Decision making presupposes meaning, an understanding of the way things are and might be, a basis for engaging others in discourse about what is possible and what has happened. Those meanings are often interpretations of fate and nature, but they are human constructions, and decision processes are one of the sites within which the constructions take place."* (March 1994, pp. 258-259)
>
> *"Organizations today face an increasingly turbulent external environment, which is characterized as uncertain, ambiguous and populated by equivocal cues that result in discontinuous rather than evolutionary change. […] Greater uncertainty can lead to confusion and an over-cautiousness that paralyses organizations and their managers into inactivity. Alternatively, ignoring complexity can lead to misplaced over-confidence where decision-making is undertaken with important cues being rejected as they do not conform to existing mental models. One challenge then, is for organizations to be better prepared for escalating uncertainty, for managers to develop their capacities to make sense of phenomena, and to develop a perspective of the future that replaces naïve determinism with social pluralism."* (Wright 2005, p. 86)
>
> *"The tendency in policy research and analysis has become ever more centrifugal, spinning off more methodologies and variations on methodologies, more conceptual frameworks […] A number of critics of the current scene of policy studies […] have argued that any improvements in the techniques of policy research have not led to greater clarity about what to think or what to do."* (Rist 2000, p. 1001)

Finding a meaningful way of applying SEA in strategic decision-making processes requires an in-depth understanding of the decision-making processes. As argued in the introduction and indicated by March above, sense-making has a potential of explaining some of the less understood elements of decision-making processes. A similar argument is put forward by Wright in the quote above in which he points at the challenges of an increasingly turbulent environment and greater uncertainty. Sense-making is important for studying non-programmed strategic decisions, as it is centred on ambiguous and equivocal situations and provide a framework for understanding how people make sense of these.

Decision-making and sense-making is in this chapter sought combined in a framework since they are seen to supplement each other in a number of ways; sense-making theory depicts the

generation of meaning that is interacting with the act on deciding depicted in decision-making theory; decision-making primarily concentrates on fixed entities and phases, whereas sense-making is about the vague questions and "muddy answers" (Weick 1993, p. 636); sense-making is about getting to an understanding of a situation, whereas decision-making is about getting from understanding to decision. The relations between decision-making and sense-making are in the first subchapter clarified in order to combine these into a single model of human choice. The second subchapter integrates this model into a conceptual framework for investigation of strategic decision-making processes that is constituted by a continuum of levels of perspectives.

This chapter constitutes the conceptual framework of the investigations in the thesis. The framework is a continuum of perspectives on strategic decision-making with different level of details. The chapter shows that whereas the overview of strategic decision-making is often found in SEA literature, the detailed insight into how we make decisions is rarely explored. Therefore, the chapter is dominated by this detailed perspective and theories of decision-making and sense-making are combined into a model of human choice with a view to increasing the understanding of strategic decision-making and SEA processes. The chapter thus forms the answer to the second sub-question: "How can decision-making and sense-making be combined as concurrent processes in a model of human choice and how can this model contribute to a continuum of perspectives on strategic decision-making processes?"

The answer to the sub-question concentrates on elements within decision-making and sense-making which explain human behaviour. It should be kept in mind that decision-making and sense-making theory involves a range of other significant elements than what is presented here, e.g. about control and division of work. The three main authors used in this chapter are James G March, Herbert A Simon, and Karl E Weick and their writings include a wealth of insight in other aspects of organisations and decision-making than what is included in this chapter. March is a political scientist and professor in organisation theory, Simon was a political scientist, psychologist and economist, and Weick is an organisational theorist focusing on organisational psychology; all three are highly distinguished professors. It should also be kept in mind that research into human behaviour has been progressed in a variety of disciplines such as mathematics, sociology, psychology, economics and political sciences. Decision-making theory - and to a wide extent also sense-making theory - is constituted on and inspired by insight from a range of these disciplines, however, some aspects of human behaviour may be better explained by other disciplines. With overlap in roots and focus, decision-making and sense-making is here regarded "supplementary domains of knowledge" (Simon 1997) and developments in the theories of human behaviour is regarded more about "fashion" than paradigm shifts (Flyvbjerg 2001, p. 30). The combination of decision-making and sense-making in this chapter is not a paradigm shift in the understanding of human behaviour, although it may provide for a new way of thinking within the literature on SEA.

The combination of decision-making and sense-making is primarily motivated by their mutual supplements, which is hoped to lead to better understanding of decision behaviours; both disciplines involve a genuine insight in strategic decision-making processes from conceptual as well as empirical investigations. The combination is furthermore intended to counteract the centrifugal tendency of research as criticised by Rist above. This centrifugal

tendency seems widespread in SEA literature and bringing yet another fragmented theory into the field seems of little benefit. Finally, the intension of the combination is that the insight of sense-making is easier to communicate and adopt by other researchers and practitioners.

4.1 COMBINING THEORIES OF DECISION-MAKING AND SENSE-MAKING

> *Is 'decision' a retrospective attribution of the observer, namely an account of a cognitive community that attempts to form a coherent view of particular organizational outcomes and the processes that led to them, or does 'decision' signify a distinct empirical event, a moment of actors' choice whereby a course of action has been purposefully committed to? The confusion … has long generated conceptual difficulties…"* (Tsoukias 2010, p. 380)

Decision-making theories are on the one hand a powerful discipline and "the established church of social science (March 1988, p. 2), but on the other hand it is a discipline with widely recognised problems (Reed 1991). One of these problems is the confusion of the ontology of a decision as argued by Tsoukias above and the ontological understanding of a decision is one of the striking differences between the theories of decision-making and sense-making. As this subchapter will show, decision-making and sense-making have a range of similarities and differences that have to be dealt with to combine the theories in a single model.

This subchapter presents how the theories of decision-making and sense-making depict decision-making processes. The relations between the two disciplines and existing efforts on combining these are point of departure for combining insight from the disciplines into a single model of human choice. The subchapter is in line with Simon's plead to emphasising the similarities of different theories of human behaviour rather than stage theories as something new and different; the aim is thus to 'reconcile' sense-making and decision-making processes in a choice circles model.

To concentrate on the core of decision-making theory, the theories of decision-making that are presented in this thesis are the 'roots of strategic decision-making theories' in the shape of Herbert A. Simon, James G. March and Henry Mintzberg's writings from the 1940'ies to 1970'ies (some books used here are later editions). These pieces are in this thesis seen to provide the "gross characteristics" (Simon 1955, p. 100) of decision-making that through subsequent research have been added nuances and insight on processes within these structures. As Simon (1979, p. 293) puts it: "Its references are now badly out of date, but its theoretical structure does not appear to have been superseded by any subsequent work, and indeed has obtained considerable new empirical support." Through comprehensive empirical scrutiny, Eisenhardt and Zbaracki (1992) concluded that empirical research clearly supports decision-making characteristics similar to the writings of Simon, March and Mintzberg. Similarly, Kahneman and Tversky (2000) investigated cognitive aspects and argued that their results and analyses "are consistent with the conception of bounded rationality originally presented by Herbert Simon" (p. 220). The choice of the roots excludes branches of decision-making theory that to a wide extent overlap with sense-making aspects; some formulations

on ambiguity and interpretations in March (1994) are very similar to those of Weick (1989, 1995).

The presentation of sense-making theory is concentrated on Weick's writings from the 60ies to the 90ies, especially Weick's "The Social Psychology of Organizing" from 1979 (the second edition from 1989 used in this thesis) and "Sensemaking in Organisations" from 1995. The latter is called "the theory itself" (Eisenberg 2006, p. 1695) as an elaboration of the ideas from his early writings. In reviewing Weick's work Eisenberg concludes "What I find is that the core ideas have not changed much over three decades, but have built upon each other" (p. 1704). The presentation of sense-making is concentrated on the basic properties and processes of sense-making, e.g. plausibility and retrospectively noticed cues, without covering the supporting empirical research that in part conflates with the research conducted within research on decision-making.

The chosen pieces of decision-making and sense-making have some general characteristics that may ease the combination and increase the relevance for exploring strategic decision-making processes and SEA: They have a social or organisational perspective, they are primarily descriptive on the processes that characterises choice and the choice process, and they are opposing the rational models of choice. The chosen pieces furthermore constitute a time of change from avoidance of the ambiguous and equivocal to focusing on the situations characterised by these. The early writings of Simon are an introduction to human behaviour in general, whereas March and Mintzberg - and indeed Weick - is more focused on the ambiguous, the novel, the unstructured strategic decision-making processes.

STRATEGIC DECISION-MAKING AS EXPLAINED IN DECISION-MAKING THEORY

> *"Decisions in organizations vary widely with respect to the extent to which the decision-making process is programmed. At one extreme we have repetitive, well-defined problems (e.g., quality control or production lot-size problems) involving tangible considerations, to which the economic models that call for finding the best among a set of pre-established alternatives can be applied rather literally. In contrast to these highly programmed and usually rather detailed decisions are problems of a non-repetitive sort, often involving basic long-range questions about the whole strategy of the firm or some part of it, arising initially in a highly unstructured form and requiring a great deal of the kinds of search processes […]. In this whole continuum, from great specificity and repetition to extreme vagueness and uniqueness, we will call decisions that lie toward the former extreme programmed, and those lying toward the latter end non-programmed. This simple dichotomy is just a shorthand for the range of possibilities we have indicated."* (Cyert et al. 1956, pp. 237-238)

Some authors argue that most strategic decisions are non-programmed (e.g. DuBrin 2009, p. 147). Other authors even equal strategic decision-making and non-programmed decision-making (e.g. Christensen 1968). Decision theory includes conceptual as well as empirical insight into this type of decision-making, which Cyert et al. describe in the quote above. Although the focus of this thesis is on the non-programmed choices, programmed decisions are also presented as they play important roles in conserving "scarce and costly decision-

making time and attention" (Simon 1997, p. 89) that then can be used to grasp the non-routine situations, and in being explanation for defective action when people do not diagnose novel situations as novel. The descriptions of decision-making as problem-solving and routine activities are complemented by a presentation of Simon and March's views on preferences and rationalities.

In the quote of Cyert above, decision-making is depicted as a continuum of responses to stimuli with one extreme what March later describe as "explicit calculation of its consequences in terms of objectives" and the other extreme being routines and rules of behaviour. Simon later adds the 'novel' and 'consequential' to the definition of non-programmed decisions (1960, p. 6). The classification of situations as novel depends on the actors involved; a situation may be novel to some actors and well-known to other actors.

Decision-making by problem-solving activity

Rational behaviour is a normative starting-point for a range of theories of decision-making (March 1978). Rational choice is basically the considerations of all relevant consequences and alternatives to a fixed problem in terms of stable and comparable preferences (see e.g. Cyert et al. 1956). The rational model is influential to much theory since "no other theory of judgment and decision can ever match it in scope, power, and simplicity" (Kahnemann and Tversky 2000, p. 221). When it comes to empirical findings, the rational model quickly falls short in explaining behaviour: "If we try to use this framework to describe how real human beings go about making choices in a real world, we soon recognize that we need to incorporate in our description of the choice process several elements that are missing from the economic model" (Cyert et al. 1956, p. 237). Instead, Simon and March depict humans as "intended rational", e.g. in the "administrative man" (Simon 1955, p. 114), and a main theme of their writings is the boundaries to the rational behaviour: In an important sense, all decision is a matter of compromise. Decision-making, Simon argues, is "bounded in terms of limitations on mental capacity, information, clarity of preferences, and consistency between individual's and organisational goals. The alternative that is finally selected never permits a complete or perfect achievement of objectives, but is merely the best solution that is available under the circumstances" (Simon 1997, p. 5).

Simon (1997, p. 62) proposes that decision-making can be seen as two major segments: A) "the development of a system of intermediate values, and an appraisal of their relative weights" and B) "a comparison of the possible lines of action in terms of this value system". The two segments are interacting, e.g. as choices may construct new preferences (March 1978). Within the second segment, Simon depicts decision-making a deliberate choice process consisting of three phases (Simon 1960, pp. 2-3):

- Intelligence; searching the environment for conditions calling for decisions
- Design; inventing, developing, and analysing possible courses of action
- Choice; selecting a course of action from those available.

The progression in phases of decision-making is complex and cyclic. The design phase involves 1) listing alternatives, 2) determination of consequences of the alternatives, 3) comparative evaluation of the sets of consequences (Simon 1997, p. 77). Simon later acknowledges that 'Administrative Behavior' from 1947 lacks focus and inappropriate

explanation for how the agenda is set, how problems are constructed and how alternatives are generated (Simon 1997, p. 122).

Decision-making by routines and rules

The limitation of mental capacity leads Simon to formulate the often cited fallacy of thinking that "more information is better" (Simon, 1973, p. 271) as attention rather than information is the scarce resource. The scarcity of attention makes routines and rules an important part of organisational behaviour as social routines and formal rules allow people to simplify the world to "reduce the difficulty of dealing with a complicated, uncertain and threatening world (Cyert and March 1963, p. 197). In 'Organizations' from 1958, March and Simon (1993) explain organisations' use of performance programs to "routinize" repetitive stimuli. Thereby, choice becomes a simple "stimulus-response pattern" (Simon 1997, p. 117). Adequate classification of stimuli is a requirement for adequate routine reaction and interpretation of events is therefore important (March and Simon 1993, p. 184 and p. 188). The simplification processes of situation-response, Simon argues, "serve to explain many of the phenomena of organizational behaviour" (Simon 1955, p. 114). Decisions made by routines and rules have a close relation to preferences, which are described below.

Routines and rules include standard operating procedures, rules of thumb, cultural norms and professional standards (Cyert and March 1963). Simon (1997) illustrates how routines and rules may be part of organisations' "decision premises" that are used to influence decision-making among organisational members. The premises "tell organization members how to reason about the problems and decisions that face them; where to look for appropriate and legitimate informational premises and goal (evaluative) premises, and what techniques to use in processing these premises" (Simon 1991, p. 126-127). Legislation and guidance on tools like SEA prescribe such decision premises for practice in organisations.

Preferences and rationalities

Both problem-solving activities and routines relates to preferences and rationalities. March argues that individual preferences may be fuzzy and inconsistent, individuals may manage or avoid preferences, preferences may be conflicting in organisations, and future preferences are uncertain as they are developing (March 1978). In line with the two segments described above, March emphasises that rational decisions involve guesses about uncertain consequences as well as ambiguous preferences: "We try to imagine what will happen in the future as a result of our actions and we try to imagine how we shall evaluate what will happen" (March 1978, p. 589). This rational approach has been and is still influential on SEA and other impact assessment tools.

The width of rationalities in decision-making is nicely outlined in the description of forms of rationalities in March (1978, pp. 591-593): Calculated rationality in which decisions follow from calculation of consequences in terms of objectives; limited rationality in which people simplify due to limitations; contextual rationality in which choice behaviour is affected by the context; game rationality in which decisions are affected by people's pursuing of individual objectives in processes like coalition formation; process rationality in which outcomes are secondary to the orchestration of the process; adaptive rationality in which decisions are

affected by learning; selective rationality in which choice is dominated by standard operating procedures; and posterior rationality in which action is conceived as being antecedent to goals.

The game rationality is rooted in an understanding of organisations as political systems of conflict, coalition and bargaining (March 1962); a "certain amount of empirical support" (p. 675) supports this understanding, in which choices and information are made part of the political game. March later acknowledge that theories of conflicts in decision-making are "for the most part, also rational theories" (1991, p. 105) added the complication of multiple actors.

The process of non-programmed choices

In contrast to the rules and routines described above, the novel, non-repetitive, and consequential aspects are in focus in theory related to non-programmed decision-making. Simon and Newell (1958) argued that "the majority of decisions that executives face every day - and certainly the majority of the very most important decisions - lie much closer to the ill-structured than to the well-structured end of the spectrum" (p. 5). Simon (1960) emphasised that "There is no cut-and-dried method of handling the problem because it hasn't arisen before, or because its precise nature and structure are elusive or complex, or because it is so important that it deserves a custom-tailored treatment". In situations like these, Simon emphasises psychological processes as judgement, intuition, and creativity as possible drivers of decision-making.

An important investigation of non-programmed decision-making processes was done by Mintzberg, Raisinghani, and Théorêt in 1976. Although they used the term "unstructured", they defined it similar to Simon's non-programmed decisions: "Unstructured refers to decision processes that have not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists in the organization" (p. 246). They refer to the work of Witte (1972) who empirically found that decision-making is not a linear process, but "a constant relationship between the activities of "information gathering," "development of alternatives," "evaluation of alternatives," and "choices" over the total time period" (Witte 1972, p. 180). In line with Simon's and Witte's work, Mintzberg et al. (1976) depict decision-making as three iterative phases:

- The identification phase. It involves the routines of decision recognition in which opportunities and problems are recognised and thus evoke decision-making activity: "Most strategic decisions do not present themselves to the decision maker in convenient ways; problems and opportunities in particular must be identified in the streams of ambiguous, largely verbal data that decision makers receive" (p. 251); and diagnosis, in which people seek to comprehend the stimuli.
- The development phase. It involves the routines of search of ready made solutions and design of custom-made solutions.
- The selection phase. It involves a screening routine to eliminate unfeasible alternatives and an evaluation-choice routine to select course of action by either judgment, bargaining (political), or analysis (deliberate calculation), and an authorisation routine to ratify the choice in the organisation. Mintzberg et al. are not detailed about the nature of 'judgment'

that is defined as "procedures that [decision-maker] does not, perhaps cannot, explain" (p. 258).

The three phases in the model are influenced by "dynamic factors" (p. 263) that are e.g. delaying the process or restarting it. The political importance and element of managerial control is emphasised by Mintzberg et al.'s as they propose a political routine to deal with the political forces and decision control and communication routines as supporting routines. A simplified understanding is shown in figure 7 which should be understood as including numerous iterations and disruptions between the phases.

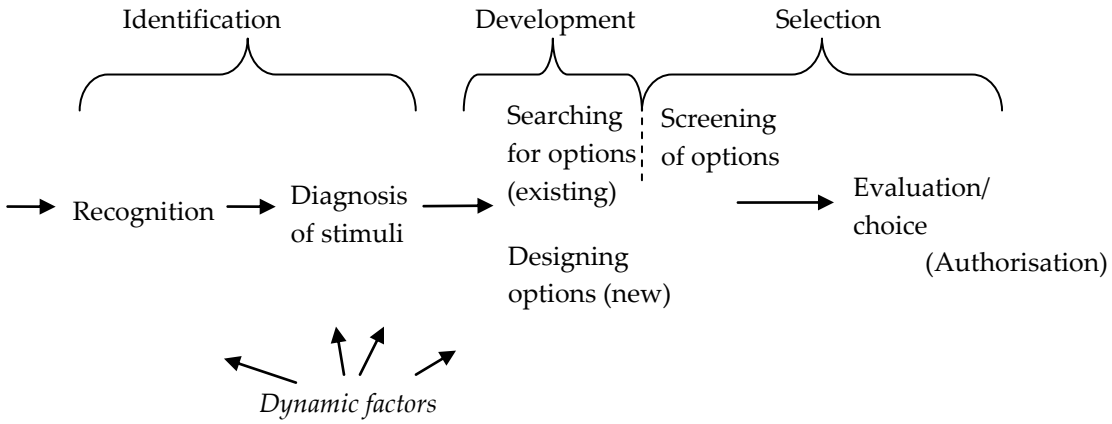

Figure 7: Organisational decision-making as an iterative sequence driven by diagnosis and interruption of events. Adapted from Mintzberg et al. (1976) and (March and Simon 1993)

Mintzberg et al. (1976) note that despite much focus on evaluation-choice in literature, this routine is "far less significant in many of the decision processes we studied than diagnosis or design. Particularly in the case of the custom-made solution, evaluation-choice often appeared to be a kind of trimming on the process, a ratification of the solution that was determined explicitly during design and in part implicitly during diagnosis as well" (pp. 257-258).

In theories of decision-making, non-programmed strategic decision-making is thus explained as a custom-tailored process based on a recognition-diagnosis-search/design-choice sequence. This sequence is made within a context of dynamic factors and it is a complex and iterative process. For the understanding of strategic decision-making processes, decision-making theory includes a wealth of insight in the role of preferences, rationalities, and rules. Although these may not be as important in the non-programmed and strategic decisions, they will be part of the experiences that decision-makers try to make use of in the novel situations.

STRATEGIC CHOICES AS EXPLAINED IN SENSE-MAKING THEORY

> *"How do I know what I think until I hear what I say?"* (Weick 1995, p. 18)
>
> *"[W]henever people are said to make a decision, what really happens is that they are working retrospectively. … The decision actually has already been set in motion before people declare that it has been made. … What is crucial about this is that a decision is an act of interpretation rather than an act of choice."* (Weick 1995, pp. 184-185)
>
> *"… the more general point is that organizations can be good at decision making and still falter. They falter because of deficient sensemaking. The world of decision making is about strategic rationality. It is built from clear questions and clear answers that attempt to remove ignorance […]. The world of sensemaking is different. Sensemaking is about contextual rationality. It is built out of vague questions, muddy answers, and negotiated agreements that attempt to reduce confusion."* (Weick 1993, p. 636)

In contrast to theories of decision-making, theories of sense-making primarily deal with situations that resemble non-programmed and strategic choices: Sense-making is triggered by situations in which the experienced does not match the expected and cannot be dealt with without making sense; sense-making is about discrepancies and equivocality of the situations that people face (Weick 1995, pp. 4,92). Routine organizational behaviour also includes sense-making, however, this sense-making has a less conscious or active character. Sense-making aspects are important in routine behaviour as people's sense can be "modified in intricate ways out of awareness via assimilation of subtle cues over time" (Gioia and Mehra 1996, p. 1229). Rather than making decisions, the focus of sense-making is to make sense of the equivocality of the context, and Weick (2001) suggest that "thinking about human existence as a series of decisions may be less fundamental than thinking about existence as the search for meaning by means of sense-making" (p. S71). He frames decision-making in a process of selecting meaning (Weick 1989, p. 175): "The selection process houses decision-making, but it is crucial to remember that decision-making in the organizing model means selecting some interpretation of the world and some set of extrapolations from that interpretation and then using these summaries as constraints on subsequent acting".

Several authors have contributed to the development of sense-making theory. Therefore a range of definitions of sense-making are put forward, each emphasising specific parts of sense-making processes:

- Organisation perspective: "To make sense is to organize, and sensemaking refers to processes of organizing using the technology of language – processes of labeling and categorizing for instance – to identify, regularize and routinize memories into plausible explanations" (Brown et al. 2008. p. 1055).
- Deliberate perspective: "[S]ense making as the way that humans choose between multiple possible explanations of sensory and other input as they seek to conform the phenomenological with the real in order to act in such a way as to determine or respond to the world around them" (Snowden 2005, p. 46).

- Communication approach perspective: "Sense-Making is an approach to thinking about and implementing communication research and practice and the design of communication-based systems and activities. It consists of a set of philosophical assumptions, substantive propositions, methodological framings, and methods" (Dervin 2005).
- Action-interpretation perspective: "Sensemaking is about the interplay of action and interpretation rather than the influence of evaluation on choice. When action is the central focus, interpretation, not choice, is the core phenomenon" (Weick et al. 2005, p. 409).
- Process perspective: "… sense making is a continuous, social process in which individuals look at elapsed events, bracket packets of experience, and select particular points of reference to weave webs of meaning" (Choo, 1998, p. 70).
- Meta-theoretical perspective: Sense-making "is best described as a developing set of ideas with explanatory possibilities, rather than as a body of knowledge" (Weick 1995, p. xi) and "[t]he sensemaking perspective is a frame of mind about frames of mind that is best treated as a set of heuristics rather than as an algorithm" (Weick 1995, p. xii)

Weick's sense-making

Besides Snowden's deliberate perspective and Dervin's communicative perspective, all the perspectives on sense-making above can be found within Weick's writings. In this thesis, the emphasis of specific perspectives depends on the use of sense-making. Thus, the meta-theoretical perspective is emphasised when relating sense-making to research, and the process and action-interpretation perspectives are emphasised when relating sense-making to decision-making and SEA. In general, sense-making is here understood in accordance with Weick (2009, p. 95):

> *"When people in an* ongoing social *setting experience an interruption, they often* enact *something,* retrospectively *notice meaningful* cues *in what they previously enacted, interpret and retain meaningful versions of what the cues mean for their individual and collective* identity, *and apply or alter these* plausible *meanings in subsequent enactment and retrospective noticing." (Original emphasis)*

Weick refers to sense-making as the process of "structuring the unknown" (1995, p. 4) in a process of enactment, selection and retention (see the figure in the next section). The 'unknown' is something unique or unfamiliar for people and may relate to e.g. content and actions. Weick does not categorise sense-making, and he does therefore not distinguish between 'good' or 'bad' sense-making. Instead, he warns against situations, where sense-making collapse, e.g. when schooling makes fire-fighters unable to sense and make sense of important stimuli in a threatening situation (Weick 1993). In terms of effectiveness, he state that "some sensemaking frameworks lead to more effective behaviors than others do, but the criteria of effectiveness are many and inconsistent, and perceivers usually can appraise effectiveness only in retrospect" (Weick 1995, p. 191). Related to effectiveness, Weick suggest that "The ambiguity and complexity of their worlds imply that perceivers may benefit by using multiple sensemaking frameworks to appraise events; but perceivers are more likely to act forcefully and effectively if they see things simply, and multiple frameworks may undermine organizations' political structures" (p. 191).

Weick (1995) describes seven properties that suggest "what sensemaking is, how it works and where it can fail (Weick 1995, p. 18). These properties constitute ontological, epistemological, and methodological claims:

- Grounded in identity construction. Identity is influencing how people make sense of situations. This inherent in Weick's famous phrase: "How can I know what I think until I see what I say?" (1995, p. 18). Identity is not only individual, but formed by the social interaction (see the social property below). How people interpret and act is depending on how they conceive their and their organization's identity: Images of the organisation is formed by and form actions and interpretations.
- Retrospective. "To learn what I think, I look back over what I said earlier" (Weick 1995, p. 61). Or in the words of Helms Mills and Weatherbee (2006, p. 270): "we rely on what we know to help us make sense". Weick has been criticised for excluding a forward-looking prospective sense-making in 'Sensemaking in Organizations' (Gioia and Mehra 1996) as he hold on to the understanding that sense can only be made from experienced events (Weick 1995). In later writings, Weick opens up for prospective sense-making (Weick et al. 2005) concurrent with other authors (e.g., Wright 2005).
- Enactive of sensible environments. This property covers Weick's concept of enactment: "The term 'enactment' is used to preserve the central point that when people act, they bring events and structures into existence and set them in motion." (Weick 1988, p. 306). Enactment is related to beliefs and experience, why sense-making may be a self-fulfilling prophecy: "People make sense of things by seeing a world on which they already imposed what they believe" (Weick 1995, p. 15).
- Social. "Sensemaking is never solitary because what a person does internally is contingent on others" (Weick 1995, p. 40) or put differently: "What I say and single out and conclude are determined by who socialized me and how I was socialized, as well as by the audience I anticipate will audit the conclusions I reach" (Weick 1995, p. 62). Sense-making is contingent on interaction with others and interacting with organisations' rules, routines and language. Stories, for instance, that are formed through sense-making "can guide action before routines are formulated and can enrich routines after those routines are formulated" (Weick 1995, p. 129).
- Ongoing in nature. "Sense-making never starts", Weick argues (1995, p. 43), since people are always in the middle of things. People are continuously sensing their surroundings, and when they sense anomalies, cues are retrospectively selected and plausible stories are developed. Karnøe (1997) explains the ongoing property of sense-making as driven by "a chronic slippage between cognitive maps and the phenomena to which they refer. The reason is that words and languages are imprecise and discrete labels on subject matter that is continuous" (p. 426).
- Focused on and by extracted cues. "Extracted cues are simple, familiar structures that are seeds from which people develop a larger sense of what may be occurring." (Weick 1995, p. 50). This means that some cues are extracted while ignoring others: "The "what" that I single out and embellish as the content of the thought is only a small portion of the utterance that becomes salient because of context and personal dispositions" (Weick 1995, p. 62). Cues are found in flows of events: "people chop moments out of continuous flows and extract cues from those moments" (Weick 1995, p. 43). The context affects what is

extracted as a cue and how the cue is interpreted (Weick 1995). Cues are extracted by use of frames (Weick 1995) and perceptual filters, which are described by Starbuck and Milliken (1988, p. 40) as "[t]he processes that amplify some stimuli and attenuate others, thus distorting the raw data and focusing attention". Shrivastava (1985) state that "Strategy makers' frames of reference are critical determinants of useful strategic knowledge… They allow decision makers to make sense and meaning by imposing order on a confusing array of raw data" (p. 97). In contrast to theories of interpretation, sense-making "is concerned with how the cues were internalized in the first instance and how individuals decide to focus on specific cues." (Weick 1995, pp. 7-9)

- Driven by plausibility rather than accuracy. Accurate perception is not necessary to fuel action, and it may be neither possible (if possible to tell when it is) nor desirable (cf. the critics of rational behaviour above). To underline the sufficiency of plausibility, Weick (1995) tells a story of Hungarian soldiers that were lost in the snow in the Alps and found their way by use of an old map, which they later experienced was a map of the Pyrenees; "[s]ensemaking is about accounts that are socially acceptable and credible" (Weick 1995, p. 61).

Added to these properties are distinguishing features of sense-making described by Weick et al. (2005). These include that the genesis of sense-making is disruptive ambiguity, that sense-making is organising of flux, beginning in acts of noticing and bracketing, about labelling, about presumption, about action and about organising through communication. In terms of the labelling feature, the importance of labels for acting is described by Hernes (2008): "[T]he mind establishes labels in order to understand what is going on, but then the labels become part of what is going on" (p. 149).

The process of sense-making

In an organisational perspective Weick uses the model of enactment-selection-retention, which is visualised in figure 8. In the enactment with the surrounding people are "bracketing some portion of the stream of experience for further attention" (Weick 1989, p. 45). In the selection process people are "imposing some finite set of interpretations on the bracketed portions" (p. 45), and in the retention process, people are storing interpreted segments for future application. Weick (1989, p. 134) suggests that the enactment-selection-retention sequence in terms of information could be understood as data-meaning-knowledge. In this respect, the model is the reverse of the phrase "How can I know what I see until I hear what I say?" with 'seeing' representing giving meaning and 'saying' representing the data.

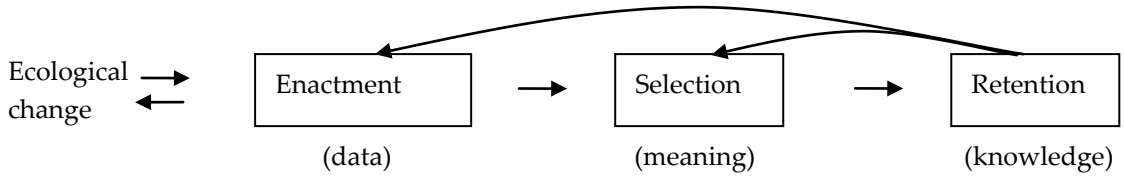

Figure 8: Sense-making in an organisational perspective (Weick et al. 2005, p. 414 and Weick 1989, pp. 133-134)

The ongoing interaction between ecological change (the surroundings) and people's enactment includes "sensemaking activities of sensing anomalies" (Weick et al. 2005, p. 414). People enact the surroundings by punctuating the "flux of circumstances" (Weick et al. 2005, p. 414) and imposing "categories of the portions they enact" (Weick 1995, p. 35). Weick (1989, p. 177) emphasises the importance of 'cause maps' in enactment: "What people impose in their attempts to be reasonable are previous interpretations of causal sequences that have worked - that is, cause maps of previously enacted environments. When current equivocalities are filtered through these prior enactments, some things go unnoticed while others are labeled as familiar, strange, relevant, and so on". If the previous interpretations are not appropriate, sense-making "is biased either toward identifying substitute action or toward further deliberation" (p. 409). In this situation, meanings are still ambiguous. Weick (1989) further emphasises that "The enacted environment is artificial rather than natural in the sense that it is laced with preferences, purposes, idiosyncratic punctuations, desires, selective perceptions, and designs" (p. 176). The 'data' that enters the meaning creation process is thus "the environment of the breeder" (p. 176) and far from objective data.

The process of selection is a "retrospective elaboration of cues made salient during enactment [that] justifies and makes sense of priori action" (Weick 2009, p. 237). In the process of selection people "sort through prior cues, label them and connect them, which often result in plausible stories that are good enough to keep going" (p. 237). Mental frameworks, identity and articulation are important elements in the process of reducing multiple meanings and generate locally plausible story" (Weick 1995, p. 414).

A story is retained in the organisation if it continues to be plausible and gets connected to identity. It gains solidity and then becomes guidance for future action and interpretation. Stories become symbolic coding of action that involves "know-how, recipes, scripts, rules of thumb, and heuristics" (Weick 1995, pp. 125-126). Weick et al (2005) emphasise the close relation between sense-making and organising; "[P]eople organize to make sense of equivocal inputs and enact this sense back into the world to make that world more orderly" (p. 414).

In terms of strategic choices, the processes between enactment and retention are in this thesis regarded of special importance, as it is within these processes that meaning is created. Figure 9 is therefore zooming in on these processes. Like the illustration of the decision-making process, this figure is simplified and not showing the numerous cycles and interaction between the processes. The figure emphasises that when people are experiencing discrepancies and equivocality in their ongoing sensing, they are 'disturbed' (the stippled box): They first look for reasons to resume to action in frameworks or cause maps. These frameworks may be "Institutional constraints, organizational premises, plans, expectations, acceptable justifications, and traditions inherited from predecessors" (Weick et al. 2005, p. 409). If no reasons are found, they label and notice cues in order to generate plausible stories. If these stories seem to be adequate, they are retained as guidance for future action and interpretation.

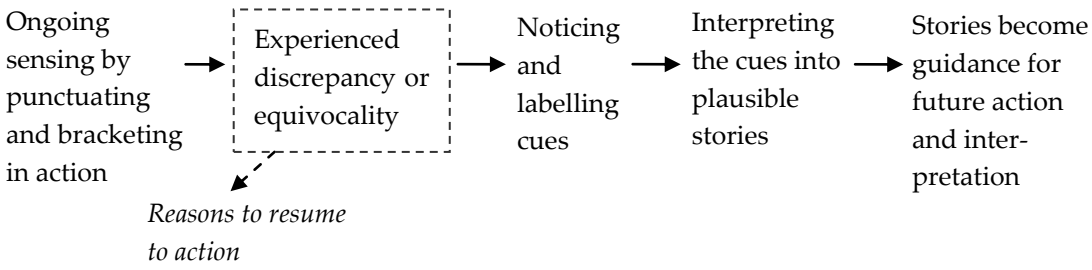

Figure 9: The process of sense-making (adapted from Weick 1995)

The portrayed "action-driven processes of sense-making" (Weick 1995, p. 155) are complemented by "belief-driven processes of sense-making" (p. 133). Both involve beliefs and action, but they differ in their point of departure for generating structures of meaning. When beliefs are the driver, sense-making is an "orderly interaction around *arguing* in an effort to reduce the variety in beliefs that are thought to be relevant, variety in what is noticed, and variety in what is prophesied", or an "orderly interaction around *expecting*" in which foresight activities such as strategic planning, prediction, and extrapolation are processes through which "people's expectations become better articulated, stronger, and potentially more capable of being a potent force in their own validation" (Weick 1995, pp. 134-135). This is in contrast to action-driven sense-making that also covers the "considerable autonomous action that unfolds independent of formal system requirements and in response to a variety of signals [… that] leave puzzles for sensemaking in their wake" (p. 134). In this situation, action "is not prophecy driven. Instead, there is an outcome in search of a prophecy" (p. 134). The action-driven sense-making processes involve 'manipulating' "an otherwise unstable set of events so that it is easier to explain them" and 'committing' through "interpretation focused on explaining behaviors for which people are responsible" (Weick 1995, p. 135). Both belief-driven and action-driven processes have point of departure in some disruption from which meaning is made through a similar process; it is the concrete activities in that process that differs. Processes within tools like SEA seem to involve both belief- and action-driven sense-making and the dominance seems to depend on the situation and the activity.

In theories of sense-making, non-programmed strategic decision-making is thus explained as a process of generating meaning out of equivocal stimuli. Sense-making theory provides insight in how people enact surroundings, label stimuli and create plausible stories.

RELATING DECISION-MAKING AND SENSE-MAKING

> *"Decision making and sensemaking may at first seem to be an odd pair of terms to reconcile. The two have very different perspectives on quite dissimilar domains of human behavior. One quality that does unite them, however, is that decision making and sensemaking are intimately related to the human being as an actor."* (Boland 2008, p. 55)

What is evident from contrasting DM and SM? Besides the quality of decision-making and sense-making of being related to the actions of human being, there are a number of relations between the decision-making and sense-making disciplines. First of all they both rely on an understanding of human knowledge as something subjective and constructed. With differences in vocabulary, issues of ambiguity, retrospective sensemaking, confused and unstable preferences, negotiated goals, and limited rationality are highlighted in the writings of both March and Weick (Dooley et al. 2008) and to some extent in the work of Simon. Added to this list is a range of similarities:

- Diagnosis of stimuli as basis for choice (Simon and March 1993, p. 160) and meaning (Weick 1995, p. 3)
- Critical about the sacred ritual of decision-making with its symbolic activities (March 1987, p. 160, Weick 1995, p. 11)
- The importance of interpretation, which is central to Weick and to the construction of preferences in decision theory (March 1978, p. 596)
- The filtering processes executed e.g. by mental frameworks in Weick (1995, p. 190) and by 'filtering rules' (Cyert and March 1963, p. 130)
- The importance of beliefs for perception (March and Simon 1993, p. 172) and sense-making (Weick 1995, p. 155)
- The process of satisficing on courses of action (Simon 1997) and on plausible stories (Weick 1995)
- Routines that are important in decision-making theory (e.g., Cyert and March 1963) and a social constructed product of sense-making (Weick 1995, p. 36)

The focus on similar issues is reflected in the fact that the authors are quoting each other (e.g. March 1978, Simon 1997, and Weick 1995). Simon (1997) mentions Weick's writings as one of many progresses of his model of administrative behaviour (p. 330), and Weick uses March (especially on ambiguity) and Simon's theories and empirical material to support the explanation of sense-making processes.

Although March (1994) shows understanding for the argument that "understanding and explaining decision behaviour requires recognition of the centrality of interpretation" (p. 218), March and Simon (1993) state that they will not go as far as to replace choice with meaning as the central aspect to life. In this thesis, decision-making and sense-making are regarded so interrelated that neither of them are dominating. Instead, their combined insight and explanatory abilities are given a dominant focus.

The difference in focus on human behaviour processes gives rise to tensions between the presented theories of decision-making and sense-making, which are shown in figure 10. Some of the tensions have been put forward in other literature, but all are relevant for the effort of combining the disciplines.

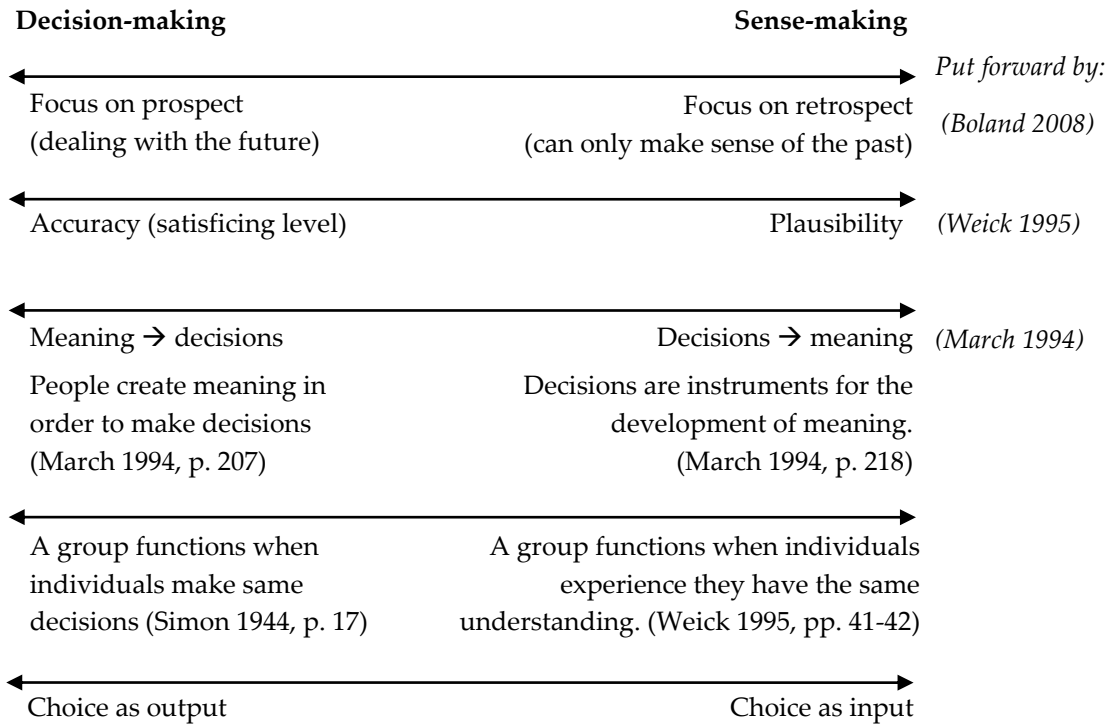

Figure 10: Key tensions between the presented theories of decision-making and sense-making.

These key tensions are in the following elaborated by discussion of ontological and epistemological similarities and differences between the presented theories of decision-making and sense-making. It should be kept in mind that the decision-making theory that is basis for this chapter is the core theories of the 1940-70'ies. This core has been centrifuged in a range of directions in the present theories of decision-making, including in the direction of sense-making. Similarly, sense-making theories are developing in a range of directions. The centrifugal tendency may lead to a dilution of the powerful simplicity of the theories into an ambiguous plurality of perspectives that confuses more than it clarifies human behaviour. The tensions and supplements between decision-making and sense-making would in the present plurality not be as clear and the mutual inspiration and benefits of combining their simplicity would be minor compared to the original core theories.

ONTOLOGICAL AND EPISTEMOLOGICAL SIMILARITIES AND DIFFERENCES

> *"[D]ecision making and sensemaking seem to compliment each other, but we cannot easily combine them, because they have such different ontological and epistemological foundations."* (Boland 2008, p. 59-60)

Blaikie (2000) describes ontology as "claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other" (p. 8), and epistemology as "claims or assumptions about possible ways of gaining knowledge of social reality […] claims about how what is assumed to exist can be known". (p. 8)

Whereas rational choice theory due to its origins in economy theory often is characterised as positivism (e.g. Koppl and Whitman 2004), Simon and March's writings are (gradually) mixing the positivist ontology with other claims and assumption on reality and human behaviour. Weick's theory seems to be within interpretivism (Hatch and Cunliffe 2006), although some co-authored publications (e.g. Daft and Weick 1984) and references (e.g. to Kahnemann in Weick 1995) have character of positivism. Weick do not deny the 'real', but focus on the enacted environment, which he sees as a 'surrogate' environment for the world 'out there' (Weick 1979 referred in Weick 2009). In general, Weick aims at softening the categories and boundaries, e.g. between an organisation and its environment. Figure 11 shows ontological and epistemological claims of the presented theories of decision-making and sense-making. The differences partly reflect the different periods in time in which the 'gross characteristics' of the theories were made.

Focusing narrowly on the early writings of Simon (e.g. his doctoral thesis from 1947), it has some relevancy to argue that it is a purely positivist ontology. 'Administrative Behavior' includes formulations that make consequences and alternatives seem 'given': "At any moment there are a multitude of alternative (physically) possible actions, any one of which a given individual may undertake" (Simon 1997, p. 3) and Simon (1956, p. 136) state that "there exist clues in the environment". Later, Simon (1997) acknowledges that problems and alternatives are generated by humans. Thus, I follow Boland's (2008) argument, that there seem to be a tendency that decision-making theories are describing these aspects as more 'given' than in the sense-making literature.

	Decision-making	Sense-making
Ontology		
Nature of reality	In the early writings of Simon, reality is regarded objective; true reality exists which is consisting of stable pre-existing patterns or order (e.g. causal) that can be discovered. The later writings (e.g. March 1978) depicts reality as ambiguous and thus closer to constructivism.	The world "is largely unknowable and unpredictable" (Weick 1989, p. 364). Reality is enacted and interpreted.
Nature of human beings	In the early writings of Simon, humans are seen as intended rational. Later (e.g. March 1978), other rationalities were emphasised. Similarly, history shows a shift from predicting to explaining human behaviour.	Humans are continuously organizing reality by making sense of events in interaction with each other. Human action is affected by identity and structuring effects.
Epistemology		
Nature of knowledge	Reality can only be imperfectly grasped due to boundaries. People's understanding of reality is therefore "subjective estimates" (Cyert and March 1963, p. 80). Propositions about human behaviour (e.g. March and Simon 1958) are tested against empirical evidence.	Knowledge is constructed and an accumulation of our intellectual inventions. Human knowledge is bound by the constraints and categories they enact (Weick 1989, p. 365). Propositions about human behaviour (Weick 1995) are tested against empirical evidence.

Figure 11: Ontology of decision-making and sense-making.

A notable difference in the ontology of decision-making and the ontology of sense-making is the implicit view on the relation between 'understanding', 'outcome', and 'action'. Boland (1984) describes "rational-analytical approaches to social problem solving" as a process of creating a model of the world out there as a basis for actions, and consequences of the action may lead to revision of the model. In contrast, sense-making has point of departure in action and outcomes lead to retrospective understanding that imposes order on the actions and outcomes (see e.g. Swieringa and Weick 1987). This ontological difference is visualised in figure 12.

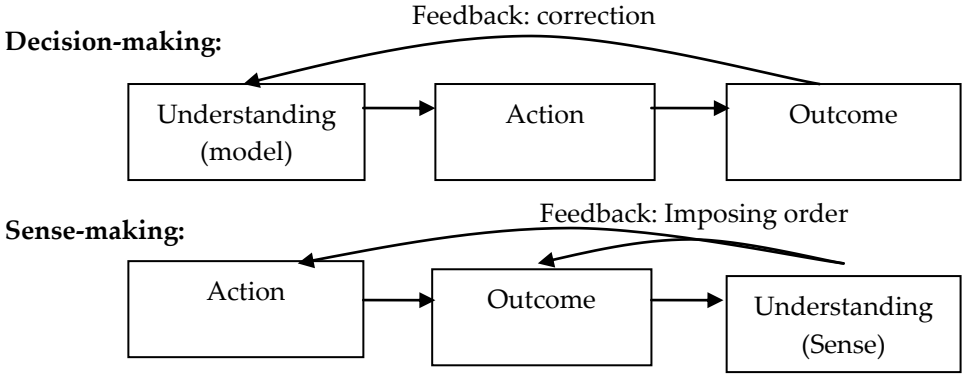

Figure 12: Ontological difference between decision-making and sense-making. Inspired by Boland (1984, p. 870)

Weick's use of references from positivistic research is criticised by Helms Mills et al. (2010) as a "paradoxical treatment of sensemaking as drawing on interpretive insights that are often times presented as grounded in a more positivist notion of epistemological certainty" (p. 187). Weick rarely touches upon the issues of ontology and epistemology, and he even downplays the importance of a fixed ontological stance: "People who study sensemaking oscillate ontologically because that is what helps them understand the actions of people in everyday life who could care less about ontology" (1995, p. 35). He later (1998) elaborates this into an interpretative stance, see the figure above. The ontology of this thesis is described below.

In terms of epistemology the presented theories of decision-making and sense-making have equal understanding of human knowledge as something subjective and constructed. This equal understanding covers a notable difference: Knowledge is subjective in decision-making theory as people only are able to see a *part* of the real and biased by their perception capacities, and subjective in sense-making as people enact their worldview through enactment. Another main epistemological difference is the prospect-retrospect tension illustrated above. The presented theories of decision-making theory and sense-making are equal in their use and empirical support of propositions about human behaviour. None of the authors have a stated aim of developing a grand theory of human behaviour, but to explain behaviour through supporting evidence.

Some efforts of combining decision-making and sense-making theories have been proposed. These have different couplings and different emphasis on decision-making versus sense-making. Notably, all efforts are found in recent publications. The main part of these efforts has point of departure in decision-making and regards sense-making as a preceding process of understanding signals to create a basis for decision-making (see appendix C). The main part of these efforts thus seem to be within a decision-theory understanding rather than a sense-making understanding, as action precedes meaning in sense-making theory. Boland (2008) and Greitzer and Podmore (2008) are the only identified efforts that describe sense-making and decision-making as integrated elements without fitting sense-making into a decision-making framework. A recurring conclusion among the authors is that combining decision-making and sense-making makes it possible to improve practice within decision-making or strategy. Despite these overall similar conclusions, there is a considerable variety and inconsistency between the authors' conceptions. Decision-making and sense-making are

interpreted and combined in widely different ways, which may be due to the contemporary plurality of decision-making and sense-making theories. Although the efforts show interesting elements of the relation between decision-making and sense-making, none of them provides a convincing combination of insight from decision-making and sense-making in a concurrent process. Instead, the insight is fragmented into separate phases despite the overlap of the insight.

COMBINING DISCIPLINES: CHOICE AS THE CENTRE OF FOUR CIRCLES

Based on the above presentations and inspired by the existing efforts of combining the disciplines described in appendix C, decision-making and sense-making are in the following combined into a model of human choice that embraces the insight from both disciplines. The point of departure is that neither of the disciplines will be favoured. Thus, the central aspect of human choice in the model is neither the making of sense nor the making of a decision. The model is aiming at being true to the primary aspects of each theory and the focus is narrowly on the process and not the motivations or reasons for the choices.

Combining decision-making and sense-making requires a stance on the ontological and epistemological tensions outlined above. The pragmatism of the change agent approach suggests a need for a meta-theoretical framework that is flexible and usable for conducting research that is relevant for practice. In line with Weick's ontological oscillation, the point of departure for the combined model is an ontological position that elements of the world are given notwithstanding the human perception and that our knowledge of reality and our social systems, which are the main focus area in this thesis, is constructed by our perceptions, interpretation, and actions. The ontological difference on the relation between choice and meaning outlined above is approached by a more intimate relation in the proposed model.

Modelling for non-programmed strategic choices has to include a deliberate activity as the situation is novel and no routine is sufficient. Learning from sense-making, it furthermore has to emphasise the process of noticing and labelling whatever is dealt with. Finally, it has to emphasise uncertainty in the choices made and iteration in the choice process. In contrast to Simon's writings, it does not make sense to describe strategic choices as consequential, as the consequences of choices cannot be determined in the moment of choosing. The modelling therefore relates to all novel and non-programmed choices at a strategic level regardless of whether they are part of design processes, formal decision processes or implementation processes.

The combination of decision-making and sense-making in a process perspective on strategic choices is not straightforward. The process of reaching an adequate model is explained in appendix C as including an exercise of fitting sense-making into a model of decision-making and vice versa. The preliminary models in the appendix reveals that the exercise of fitting insight from the disciplines into one of the discipline's process understanding results in an inadequate fragmentation of the insight of the other discipline; adding the process insight from sense-making into decision-making e.g. results in a fragmented meaning creation process in each step of decision-making. This inadequate fragmentation reduces the strength of how human choice is explained in each discipline. The problem is approached by

proposing choice as the centre of recurring circles of enacting, diagnosing, search/design, and settling on an option, see figure 13. This simple model emphasises that the strategic decision-making process is cyclic and iterative, but at the same time involving distinctive processes. In this way it supports conflicting empirical evidence of distinct phases and iterations between these. The use of circles is inspired by the inventive early writings of Weick (1989) that among other things emphasises circularity in social interaction and in search processes: "Suppose you thumb through books to find the answer to some question you have. Your first temptation might be to say that the question caused focused searching. But that's not the way it works. Searching is circular. You start with a question, you stumble onto some apparently relevant item, which in turn affects subsequent searching, which in turn redirects your question, etc" (Weick 1989, p. 86).

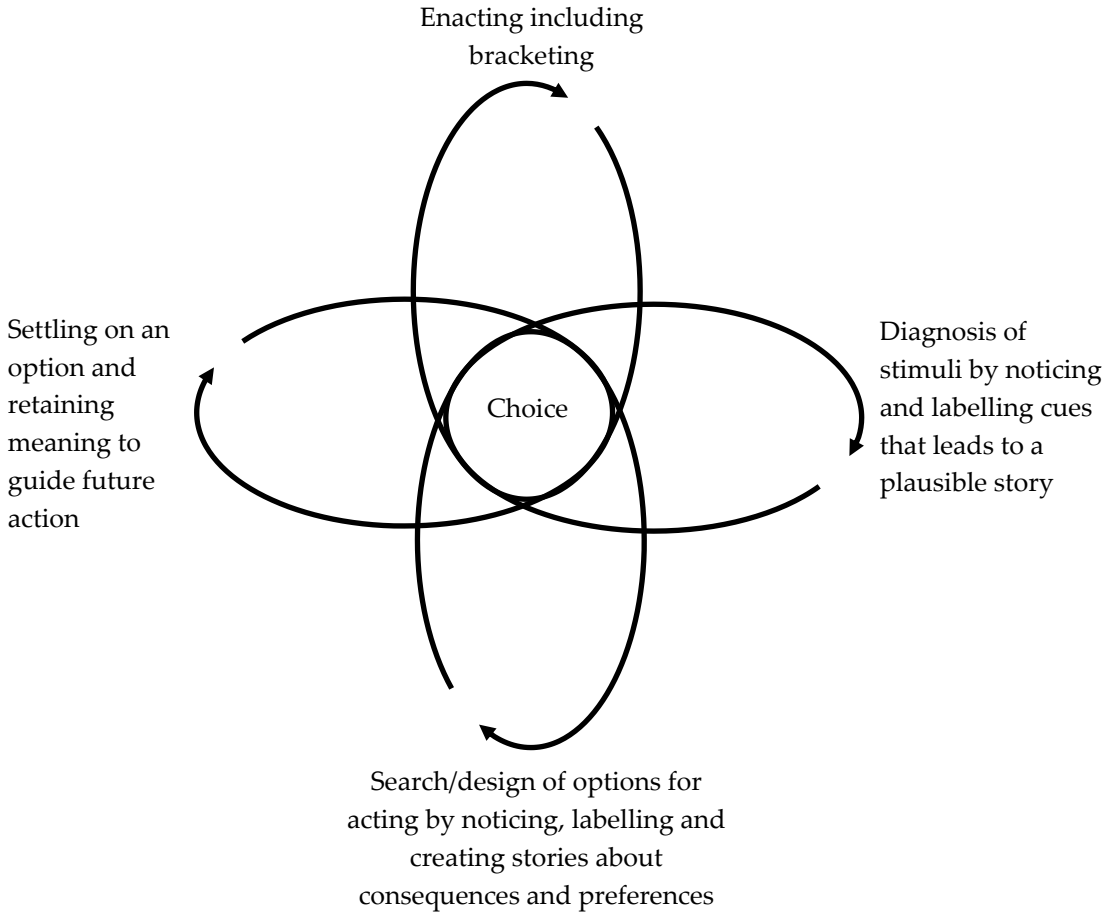

Figure 13: The choice circles model in which strategic decision-making processes are modelled as four circles centred by choice.

The model specifically proposes a linkage between a circle, the choice and the other process circles:

- Settling on an option interacts with enactment, as enactment is a trial of plausibility before retaining meanings and as retention of meanings guides action. This circle furthermore interacts with elements of diagnosis and labelling, e.g. when a meaning is gaining solidity as an adequate way of understanding. Finally, the settling on an option is interacting with the development of options as the developed options may not stand the test of time or scrutiny and thus need rethinking or more development.
- Enactment interacts with diagnosis, as enactment defines what can be labelled, and as labelling influences how we enact our surroundings. A similar interaction is found in the relation with the search/design circle. The bracketing in the enactment brings the process to the diagnosis circle.
- Diagnosis interacts with search/design of options, as diagnosis of the situation determines what options may be relevant, and as discoveries during search/design may redefine the interpretation of the situation.
- Search/design of options interacts as mentioned with the other circles. It does not end the process anymore than any of the other circles, but as the three other circles, it involves element of choice and play an important role in what will be regarded as the overall decision.

In comparison with Weick's model, this choice circles model divides the creation of meaning into two circles, one about on creating meaning of stimuli and one about creating meaning of options. This may seem to favour decision-making, but a similar divide is also found in Weick's writings: In relation to retention, Weick (1989, p. 217) suggests to divide the meaning creation into one part on interpretation guided by the questioning "[k]nowing what I know now, should I change the way I label and connect the flow of experience?" and another part on enactment guided by the questioning "[k]nowing what I know now, should I act differently?". Weick (1989, p. 136) also indicates this distinction in the selection phase by exemplifying both "observing through binoculars" (meaning of situation) and "path findings" (options forward) as part of the selection process.

The concept of choice in the model is not necessarily a deliberate act, but also a not articulated settlement on meaning, or coincidence in action. Choice is a transition from one circle to another, but it is tentative and provisional. At the same time choice is the product of all four circles as they in total constitute a process of choosing an option. The basic of choice in the proposed model is satisficing and plausibility, which Weick et al. (2005) describe as: "People may get better stories, but they will never get *the* story" (p. 415). Satisficing and plausibility are determined by identity, mental models, and behavioural structures in the highly subjective processes of making sense of what is at stake. Satisficing and plausibility are restricted and 'disturbed' by deadlines and formal legislative requirements, like in Boland's (2008) account of design processes: In the case of SEA, creative processes of meaning making and generating preliminary options interrelate with organisational deadlines on presentation of material, hearing periods, etc. The choices may be expressed in formal elements like reports as snap-shots of how the situation was understood at a certain point in time.

The model serves as an analytical framework for investigating choice processes in novel situations. In this perspective, the model has certain characteristics that may facilitate increased understanding of human choice:

- It is plotting the making of a choice as iterations between interacting processes.
- It is shedding light on the choices made during the problem-solving activity.
- It is emphasising the relation between meaning-making and action.
- It is emphasising the creation of a plausible story of relevant options in terms of both preferences and consequences.
- It is shedding light on how cues are internalised and chosen prior to interpretation and deliberate analysis.

The model may be criticised for separating sense-making of the situation in one circle and sense-making of options in another, which may not be fully in line with Weick's writings. Instead, it is in line with e.g. March's (1995) distinction between an interpretation level and action level in organisations. The intention is not to force a separation between these elements, but to emphasise that both aspects needs consideration. The emphasising of the two elements creates an interesting tension between the sense made of a situation and the sense made of options, which will partly be investigated in chapter 8. The model can furthermore be criticised for not explicitly including e.g. the political aspects of decision-making. The model is so generic that it may also be relevant for investigating how people make sense of their political or tactical situation and options. The discussion of political aspects and other not explicitly included aspects are discussed in the following subchapter.

The circularity of the model is provocative - especially in a decision-making theory context - in the sense that it does not offer an 'end' in the sense of a final solution. This is provocative to the field of SEA as the 'rational behaviour' inspired SEA process is designed to be sequential progress towards the best possible account of a developments impacts in the shape of an environmental report. The circle most similar to a 'decision' is the settling on an option circle, although it is depicted as temporary and continuously in development.

The proposed model of a human choice is in the following subchapter integrated in the conceptual framework for the investigations of strategic decision-making processes. In this framework, it constitutes the detailed level in the continuum of levels of perspectives.

4.2 PROPOSING A CONCEPTUAL FRAMEWORK

> *Many things are happening at once; technologies are changing and poorly understood; alliances, preferences, and perceptions are changing; problems, solutions, opportunities, ideas people, and outcomes are mixed together in ways that make their interpretation uncertain and their connections unclear; actions in one part of an organization appear to be only loosely coupled to actions in another; solutions seem to have only modest connection to problems; policies are not implemented; decision makers seem to wander in and out of decision arenas.* (March 1991, pp. 107-108)

This conceptual framework aims at facilitating understanding of strategic decision-making processes which takes place in what March in the quote describes as 'many things happening at once'. The conceptual framework initially defines the type of strategic decision-making studied in this thesis. This definition has reference to the non-programmed and unstructured characteristics outlined in the previous subchapter and adds dimensions of formality and strategic character.

The framework furthermore portrays strategic decision-making processes as a continuum of perspectives of different level of detail. The main argument behind this continuum is that to understand strategic decision-making processes it is neither enough to investigate these processes through a detailed perspective on the social processes involved in the minor choices nor is it enough to investigate the overall developments. An in-depth understanding necessary for developing a meaningful way of applying SEA requires insight into the entire continuum of perspectives.

Imagine that a 'meaningful' way of applying SEA is determined solely on the basis of insight into when ultimate decisions are made and who makes these. Such SEA application would be ignorant of the reasons of these choices, the external influences, and how the persons involved made sense in order to make a decision. In this vein, Miller et al (1996) argue "traditional emphases on decision-making may over-concretize the rather ambiguous, uncertain processes of change and underplay the continual re-definition, re-shaping and reformulation through which strategies arise" (Miller et al 1996, p. 305). On the other extreme, a 'meaningful' way of applying SEA determined solely on the basis of insight into how people determine need for SEA application and significance of environmental impacts risk being inadequate in terms of how strategic decision-making progresses. The combination of decision-making and sense-making in the previous subchapter is e.g. ignorant of the insight from the Garbage Can Model of Organisational Choice by Cohen, March and Olsen (1972). This model emphasises the temporal dimension and describe what elements have to be in place at a certain moment for a choice to be made. The insight from the Garbage Can model is integrated in the continuum through a perspective of overview of strategic decision-making.

The decision-making and SEA literature provides a wealth of models on different level of details that are more or less feasible for understanding strategic decision-making processes. It is not possible to cover the amount of possible investigations and models in the continuum in this thesis. Instead, three models for investigations at specific levels provide the point of departure for three empirically investigations that provide insight into how SEA is

meaningfully applied. These three levels include the two extremes and one in between. Besides facilitating insight into strategic decision-making processes, the three models aimed at contesting certain elements of the SEA concept.

The more detailed perspective on strategic decision-making processes, the more inspiration is found in Weick's writings. The relating and combining of decision-making and sense-making in the previous chapter facilitates a fluent and unproblematic "zoom" between the levels of detail.

THE STRATEGIC DECISION-MAKING PROCESSES STUDIED IN THIS THESIS

The strategic decisions studied in this thesis are defined as:

> *Non-programmed, formal as well as informal decisions at a strategic level that are potentially decisive for subsequent decisions on environmental aspects*

In order to ease the communication, this definition is referred to by use of 'strategic decisions'. The non-programmed element is described in the conceptual framework as decisions of a non-repetitive sort with a highly unstructured form dealing with stimuli that are novel. Novel means in the following chapters novel to the actors in the Danish energy sector. Non-programmed is regarded a dimension and the question is therefore not whether decisions are non-programmed, but to what extent they include non-programmed elements.

The formal and informal element emphasises that the decisions under study are both made in a formal system or made outside the formal system. A formal system may e.g. is constituted by legislatively or organisational structures like legislatively required planning documents.

The strategic element is related to the concept of 'strategy', which has a Greek origin: "Strategy is derived from the Greek word strategos or the "art of the general", that which has to do with determining the basic objectives and allocating resources to their accomplishment" (Noble 2000, p. 206). According to Noble (2000), the strategic element is about determining long-term objectives and principles for courses of action and allocation of resources necessary to achieve these goals. Strategic decisions are part of strategy-making, but they are not strictly defined by organisational or societal hierarchy of decision-making: Strategic decisions may be made by actors at different organisational or social positions and roles. As the following chapters show, a range of actors make a range of decisions which have a strategic element for the organisational or societal strategy-making. The strategic element is therefore in this thesis decisions related to "the art of the general" in terms of goal-setting, developing, or planning.

The decisive element are similar to what JF Kennedy terms 'ultimate decision' (see the introduction), or what Etzioni terms 'fundamental decisions' (Etzioni 1967). Etzioni proposes the concept of 'fundamental decisions' in contrast to incremental decisions, and gave the example of the fundamental decision of "a declaration of war" (p. 387). Fundamental decisions "set basic directions" (p. 388) and "set the context" (p. 387) for numerous incremental decisions. Similar to Etzioni's fundamental decisions, environmentally decisive strategic decisions are setting the context for or 'contextualises' environmental aspects in the following decisions. Etzioni acknowledged the interrelation between fundamental and incremental decisions as the "fundamental decisions are frequently 'prepared' by incremental

ones in order that the final decision will initiate a less abrupt change" (1967, p. 387). The understanding of a type of decisions that are more decisive than others is explicitly and implicitly found in environmental assessment literature, e.g. "critical policy level decisions" (Sanchez-Triana and Enriquez 2006, p. 1), "key decisions" (Therivel 2004, p. 33), "major decisions" (Kennedy 1999, p. 101), and "decisions most critical to the environmental impact" (Caratti 2002, p. 1). Acknowledging the difficulties in predicting whether a decision will be decisive for future action, the definition includes the formulation of 'potentially decisive'. Thus, the strategic decisions studied in this thesis may not have been decisive for environmental aspects, but has the potential for being so.

THE CONTINUUM OF LEVELS OF PERSPECTIVES AND OPERATIVE MODELS

Having defined the strategic decisions studied and proposed a model for combining sense-making and decision-making, the continuum of perspectives is proposed in the following and visualised in figure 14. Using an analogy of a camera, the perspectives in the continuum constitute different lenses with which to scrutinise decision-making; the super ultra-wide angle lens is very useful for the overview and broad pictures and the macro lens is very useful for the minor details in the close up photos. The combination of decision-making and sense-making theory into the choice circles model constitutes the lens for the detailed part. The aim is that the continuum makes it possible to investigate strategic decision-making with a fluent change of lenses and with synergies between the perspectives.

The 'Series of choice' model depicts decision-making as a series of minor choices. An ultimate decision on e.g. energy infrastructure is in this understanding given by a number of choices made in some kind of progression. The model has the potential to reveal the important choices made in practice and show the entry points for a meaningful SEA application. The model is presented in detail in the journal article in subchapter 6.1. This model draws on insight from the concept of 'decision windows' (Dalkmann et al. 2004), which has been inspired by the Garbage Can Model and Teisman's (2000) Rounds Model. The 'Series of choice' model is used in an empirical investigation of strategic decision-making processes in the Danish energy sector in the period 2008-2010. The analytical framework for the investigation in the article emphasises when environmental considerations were included in the series of choices, in which choices the public was consulted and what choices were transparent for the public.

The 'Contextual interaction' model depicts the contextual developments to a given strategic decision-making process and the interactions between the decision-making process and the SEA process. The model has the potential to reveal the nature and influence of the context as a point of departure for discussing how SEA can be meaningfully applied. The model is presented in detail in the journal article in subchapter 7.1. The model is inspired by Cyert, Simon and Trow's (1956) influential study "Observation of a decision" of the feasibility of using electronic data-processing equipment in a medium size corporation. This study shows among other things how the team making this decision acted and reacted to changes in order to make a decision. The model is furthermore inspired by studies that depict the relation between SEA and decision-making, e.g. Partidário and Coutinho's (2011) study of the Lisbon new airport. The analytical framework for the investigation in the article emphasises the challenges of framing alternatives in a context of considerable strategic dynamics.

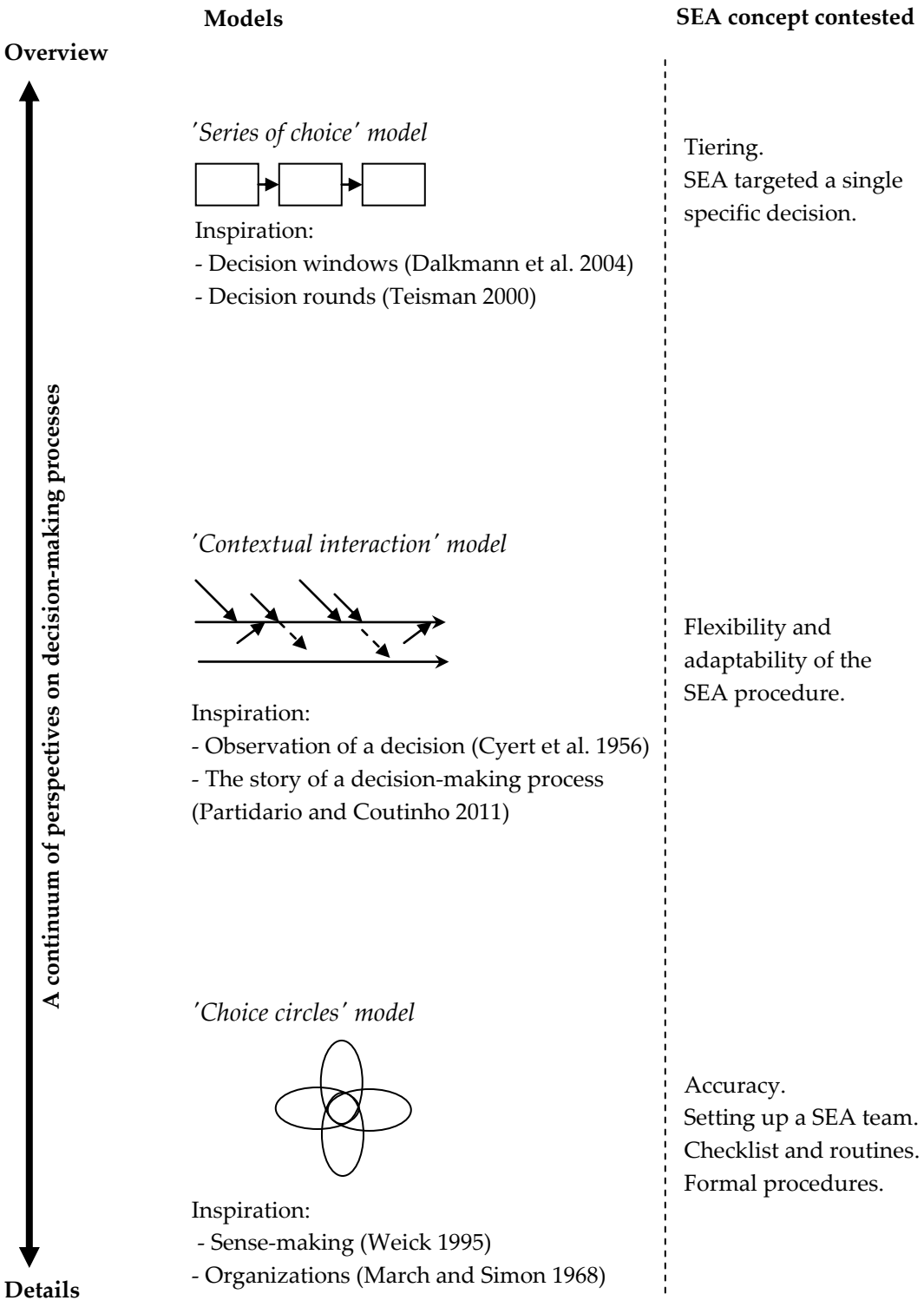

Figure 14: The continuum of perspectives with sketches of the models used to investigate decision-making processes at different 'zoom levels'. The figure furthermore state the SEA concept contested through the empirical investigations by use of the sketched models.

The choice circles model is developed and presented in the previous chapter. It is here used for its potential to reveal how persons make meaning of situations and options in order to settle on a decision. It is used in an experiment of how practitioners make sense of a strategic choice. The analytical framework in the experiment is focused on how people determine significance, hereunder what they notice and how they create meaning of the stimuli.

These three models are complementing each other in terms of what they facilitate explanation about. There is an overlap between the 'Contextual interaction' model and the two other models, however, this overlap only underpin the relevance of studying strategic decision-making processes through a continuum of perspectives. The framework could be criticised for inconsistency between the understanding of 'decisions' in decision-window inspired series of choices model and the ongoing element of choice in the choice circles model, however, the series of choices model is in itself a criticism of the idea of a single, ultimate decision, since the model split up this ultimate decision into a series of choices.

The figure also shows the SEA concepts that are critically examined and contested in the investigations. The decision window-model is used to examine the concept of tiering between policy-making and planning in the strategic decision-making of the Danish energy sector. The contextual interaction-mapping is used to critical examine the possibilities for adapting to contextual changes in an SEA procedure in a case of strategic dynamics and unpredictable developments. Finally, the choice-model is used to critical examine the reminiscences of rational decision-making in implicit assumptions of accuracy and use of checklists and formal procedures.

ASPECTS RELATED BUT EXCLUDED

> *"Sensemaking strikes some people as naïve with regard to the red meat of power, politics, and critical theory."* (Weick et al. 2005, p. 418)

The simplicity of the proposed model does - of course - exclude elements that are important for understanding choice processes and organisational behaviour. The simplicity is not necessary bad and can be seen as a condition for a meaningful model; Weick (2003) points at the risk of multiple variables as "scholars say less and less about more and more" (p. 93). To acknowledge the importance of related aspects, some key related aspects are presented in the following including a discussion of the relation to the conceptual framework. These aspects are attended to in the thesis when the model does not provide sufficient explanation for the investigated. The presented aspects are learning, institutions, and power.

Learning plays an important role in decision-making and in sense-making. Learning is what keeps sense-making elements such as categories relevant. Learning is furthermore what connects sense-making to structures such as routines and rules that are modified when people learn from their making sense of actions. Weick and Westley (1996) emphasise the "intimate and continuing connection between the two" (p. 445), and point at the paradox that learning is about increasing variety, whereas organizing is about reducing variety. They also distinguish between first and second order learning, although second order learning is regarded rare (p. 451). Gnyawali and Stewart (2003) distinguish between modes of learning

similar to a typical distinction between emphasis in decision-making and sense-making: The informational mode of learning is processes of collecting, analysing and distributing information, and the interactive mode of learning is processes of creation and transformation of schemas through actions and interactions. They argue that the mode of learning depends on the perception of uncertainty and equivocality, and propose a typology relevant for strategic decision-making processes. March and Olsen (1989) put equal importance on learning and decision-making theory as they see learning as one of two fundamental processes of organizational intelligence (the other is rational calculation). March and Olsen (1989) and March (1994) point at cognitive and evaluative limitations to learning and emphasise that learning depends on an interpretation of the experienced. In the proposed model, learning may occur in the interaction between the circles, e.g. when enactment show relevance or irrelevance of retained stories. Learning is therefore closely related to the conceptual framework.

Institutions are not often emphasised in literature on sense-making, which may be due to differences in levels: "work drawing on institutionalism has focused primarily on extra-subjective macro-level structures, while sensemaking research has emphasized local and subjective micro-level processes" (Weber and Glynn 2006, p. 1640). The link, however, seems to be a close relationship as "[s]ensemaking is the feedstock for institutionalization" (Weick 1995, p. 36), and Weick refers to Giddens' (1976) insight that "social structures simultaneously are created by and constrain the process of meaning creation" (1995, p. 67). Like rules and routines, institutions may constrain orientations: "… rules provide a pre-existing sensemaking tool that contributes to the plausibility of an interpretation or the likelihood of a cue to be extracted as meaningful" (Helms Mills et al. 2010, p. 190). Weber and Glynn (2006) argue for interactions between sense-making and institutions in proposing a relation in which "institutions are antecedent to (as contextual mechanisms) and emergent from sensemaking (via transformational mechanisms)" (p. 1640). An important point made by Karnøe (1997) is that individuals perceive different meanings for institutionalised norms and rules in their making sense of these, and people enact institutional rules depending on the situation. Thus, sense-making imposes a 'filter' between institutions and people. The vocabulary of institutional theory is often used in decision-making theory, e.g. by March and Olsen (1989). Here, institutions are connected to action, meaning, and power. The model does not explicitly include institutional theory, but institutions are part of the structures that in a dynamic way influence and are influenced by the choice circles.

Power perspectives are rarely dealt with in the writings of Weick, which has been criticised by Helms Mills et al. (2010). Power and sense-making do, however, touches upon some of the same issues, e.g. the framing of knowledge as described by Richardson (2005, p. 347): "The construction of EA methodologies becomes a moment where certain knowledges get framed as being significant, as others are sidelined or ignored (this is the construction of rationality)". Power and meaning creation also overlaps in terms of the agenda setting preceding decision-making as described by Christensen and Daugaard Jensen (1986) and Albrekt Larsen and Goul Andersen (2004). In a more abstract sense, Helms Mills et al. (2010) argue for the importance of "how organizational power and dominant assumptions privilege some identities over others and create them as meaningful for individuals" (pp. 188-189) and Balogun et al. (2005) argue that the power of meaning is "a process of symbol construction and use designed to legitimize one's own action and delegitimize those of opponents… It is

less about agenda-setting, for example, than shaping the language and thought processes through which any agenda item is examined" (p. 263). Also empirical studies have shown clear connections between sense-making and power (e.g. Hope 2009 and Dervin 1998). Power has been introduced to sense-making through the idea of sense-giving (Gioia and Chittipeddi 1991, p. 442) as a "process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality". In the sense-giving perspective, sense-giving and sense-making "occur in a sequential and reciprocal fashion, whereby cognitive stages of understanding (sensemaking) alternate with active stages of influencing (sensegiving)" (Corvellec and Risberg 2007, p. 307). Sense-giving is criticised for resting "on a non-explicit assumption that sense can be owned by top management and that it can be ‘‘given’’ to the personnel or to other audiences in a way that recalls of a material gift" (Corvellec and Risberg 2007, p. 321). Instead, Corvellec and Risberg argue that sense cannot be controlled or given, and that sense is "uncertain, fluctuating and hard-to-locate outcome of the rhizomatic connections that developers ceaselessly seek to establish for audiences" (p. 322). The proposed framework does not emphasise power aspects, although the references show the importance of these for decision-making. Sense-making is further related to power and politics as people may not only make sense of things, but also of power aspects and their political options. A possible separation between sense-making and power aspects could be Albrekt Larsen and Goul Andersen's (2004, p. 11) distinction between meaning creation as creation of problem understandings and preferences as well as agenda setting as selection of problems and putting these on the political agenda.

The exclusion of these aspects determines the ability to explain the investigated strategic decision-making processes. A conceptual framework is a balancing of a holistic framework facilitating broad interpretations versus a narrow framework facilitating in-depth studies. The conceptual framework in this thesis favours the in-depth scrutiny of processual aspects of decision-making and sense-making rather than the related aspects of power, institutions and learning. Power, institutions, learning and other frameworks would facilitate other interpretations of the empirical investigations with other benefits for practice, which underline that this thesis should be seen in relation to other research rather than a universal explanation of practice in the Danish energy sector. With characteristics of the Danish energy sector of drama and power struggles outlined in the introduction into account, there is certainly a need for supplementing the results of this thesis with research into such aspects.

PRELIMINARY IMPLICATIONS AND POTENTIALS FOR SEA THEORY

> *"The myth of rationality gives an advantage to interpretations of managerial life that are tied to contemporary calculations of consequences. It tends to exclude, or treat as anomalies, interpretations tied to rule following, the obligations of identities, the search for meaning, or the confusions of ambiguity and contradictions."* (March 1998, p. 4)

Especially the use of sense-making theory in the conceptual framework seems to challenge the SEA tool in a number of ways. A key challenge is the break with what March terms the myth of rationality, as the model gives rise to understanding of choices as following from the search for meaning, interpretation and identity. The detailed discussion of implications in terms of SEA will follow the empirical investigations based on the conceptual framework, however, some preliminary implications are discussed here to guide the investigations and the methodological choices:

- It challenges the view on the relation between decision-making processes and SEA, which is often simply modelled in SEA literature. Examples of such simple models are found in World Bank (2011) and Therivel (2004).
- Compared to concepts like 'decisive moments' and 'windows of opportunity', the choice circles model blurs these temporal units by emphasising the ongoing element of human choice.
- It emphasises the socio-psychological processes involved in choice processes, which contrast the emphasis on prediction and calculation of impacts and predictable decision-making processes in SEA literature.
- It puts attention to the story behind SEA documents as it directs attention to the earlier events leading to the presented SEA documents rather than taking these as a starting point for scrutiny or decision-making. It thereby criticises the retrospective noticing of cues in the documentation, which may oversimplify causality and overemphasise order (Weick 1995, p. 28).
- It equals prospect with retrospect in the interaction between action and meaning creation, which contradict the emphasis on prospect in SEA theory. The model may e.g. lead to a potential of hearing as an action-driven sense-making process following Weick's "How can I know what I think until I hear what I say?"
- It replaces accuracy with plausibility so that the aim of SEA becomes assessments and alternatives that are plausible for the actors rather than accuracy of impacts and the sufficiency of mitigation options.

The models support the growing understanding of important choices being made outside the formal approval of plans and programmes, which SEA legislation is oriented towards.

The relation and implications for impact assessment tools like SEA is touched upon in the conference poster in figure 15. The poster relates sense-making to a concrete assessment process and articulates the sense-making and sense-giving processes in the process. It furthermore challenges practice by questions like: "Are we reflective about the labels we put on impacts and their uncertainties?"

Sense-making and Impact Assessment

Sense-making and IA

This PhD project is about SEA implementation in the Danish energy sector. The project aims at facilitating a shift towards a decent SEA practice in the sector.

The Danish energy sector is characterised by many changes and uncertainty about developments. A main challenge to SEA implementation is to identify when decisions are made and how assessments should be framed.

The project integrates knowledge about how we make sense of situations into SEA methodology to strengthen the staging of impact assessments and the process of scoping impacts.

The "sense-making way of talking about IA" is in itself hoped to give new insight and awareness.

Sense-making – what and why?

The concept of sensemaking is well named because, literally, it means the making of sense. Active agents construct sensible, sensible events. They "structure the unknown". (Weick 1995, p. 4)

It is more than interpretation, since it focus on "*how the cues were internalized in the first instance and how individuals decide to focus on specific cues*". (Weick 1995, pp. 7-9)

"… organizations can be good at decision making and still falter. They falter because of deficient sensemaking. … Sensemaking is about contextual rationality. It is built out of vague questions, muddy answers, and negotiated agreements that attempt to reduce confusion." (Weick 1993, p. 636)

Nordic sense-making research

Although, sense-making theory is founded by Americans, research on sense-making has been conducted in Nordic business school and universities for decades. This is seen e.g. in the journal Nordic Organisation Studies. Especially business schools in Copenhagen, Bergen and Helsinki are using sense-making theory.

The research on sense-making is seldom related to impact assessment. On of the few examples is Corvellec and Risberg's (2007) study on wind power development, in which they show how impact assessment is part of developers' efforts on influencing sense-making among others "*the way in which developers, as meaning managers, stage the project and provide it with direction.*" (p. 306).

Impact assessment in a Sense-making perspective

	Noticing and bracketing	Creating meaning	Sense-giving
THEORY	Agents enact the context in interaction with "*an almost infinite stream of events and inputs that surround any organizational actor*" (Weick et al. 2005), and retrospectively select cues to start making sense of the interaction. We notice and bracket certain elements and unknowingly ignore other. What we bracket is guided by mental models acquired during work, training, and life experience.	Agents label events that are difficult to grasp and turn selected cues into a story that seems plausible in terms of our identity and experiences. The labelling makes it possible to discuss and act on situations in order to reduce ambiguity. In contrast to much other theory, plausibility is "*the fundamental criterion of sensemaking.*" (Weick et al. 2005, p. 416) and the basis for creating meaning.	Sense-giving is "*the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality.*" (Gioia and Chittipeddi 1991, p. 442) Sense-giving is more political and power oriented than the other elements of sense-making theory.
IMPACT ASSESSMENT	 Prior to the IA process, we somehow notice – from the flux of input that we face - that a development is going on and that it may be relevant to do an IA. Similarly our scoping is based on what we notice – and what we do not notice.	 IA is about labelling and creating a story of cues! We label impacts and significance to make them discussable and create a plausible story of how the development is likely to impact the surroundings.	 IA consultations are sense-making forums – but also sense-contests (Maitlis and Lawrence 2007). Consultations can be explained as contests between different 'senses' that different actors try to impose each other by different framings
EXAMPLE	The natural gas storage of LI Torup was to be re-leashed and expanded. Experience with re-leaching called for focus on xenobiotics. Cues of significance and scope were selected through analysis of samples.	Uncertainty about impacts on a protected area were labelled and turned into a story: - "Concentration of xenobiotic parts will not exceed maximum permissible value for discharge." - "Thus, no immediate or permanent effects are expected"	Sense-giving efforts were obvious at public meetings. The mercury discharge was e.g. framed in two ways: - "2 kg mercury per year is nothing compared to normal intake from sea (800 kg)" - "2 kg mercury per year is way too much for a fragile and protected natural area"
QUESTIONS	If awareness of how we notice and bracket events improve quality of IA e.g. by avoiding missing important impacts, what is it then that we need to know about noticing and bracketing?	Are we critical about the stories we create – how we construct and explain impacts of developments and relevant alternatives? Are we reflective about the labels we put on impacts and their uncertainties? Are we using plausibility as criterion?	Sense-giving may be relevant for improving our communication of meanings How do we become aware of our framings? Can we make sure that the audience notices and brackets the most important aspects?

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Example: Regional Environmental Centre Århus, 2010, Environmental Report and EIA statement of LI Torup storage extension (in Danish)

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Figure 15: Poster on sense-making presented at the Nordic Research Day 2010

CONCLUDING COMMENTS

As an answer to the second sub-question, this chapter has presented a proposal for a model of human choice that combines decision-making and sense-making theories. This model is to be applied in an experiment to gain insight in human choice as well as to test the model.

The chapter furthermore proposes a conceptual framework constituted by a continuum of perspectives of different levels of detail. The continuum is operationalised by three different models of decision-making of which the proposed choice circles model are used to investigate the details of strategic decision-making processes.

The intension with the chapter was to combine the core of the theories of decision-making and sense-making through influential and early works. This intension can, however, be criticised for being out of date compared to the present decision-making theories in which e.g. March has more focus on the importance of meaning in decision-making. As described in the chapter, the gross characteristics of the theories have not changed and the early works are therefore a relevant entry point. Some of the existing efforts on combining decision-making and sense-making (see appendix C) are based on contemporary decision-making theories and these end up with similar understandings on the relation of the two disciplines.

CHAPTER 5: METHODOLOGICAL FRAMEWORK

FOR THE INVESTIGATIONS

> *"Fully acknowledging that our sensemaking of the sensemaking process is an active, purposeful and subjective sensemaking process in itself implies that we re-engage in sensemaking processes. The postmodern route, on the one hand, invites us, through deconstruction, to* engage against *our sensemaking as a way of uncovering both the constitutive and the undecidable character of sensemaking activities. The pragmatist (or participative) route, on the other hand, suggests that, through participative action research, we fully* engage in *sensemaking with organization members and recognize the socially constructed aspect of all sensemaking activities."* (Allard-Poesi 2005, p. 169,)
>
> *"The proliferation of persons, institutes, and centers conducting policy-related work has led to more variations in the manner by which problems are defined, more divergence in the ways in which studies are designed and conducted, and more disagreement and controversy over the ways in which data are analyzed and findings reported".* (Rist 2000, pp. 1001-1002)

To understand strategic decision-making we need to understand how we make sense. In the quote above, Allard-Poesi outlines two routes of being either critical or pragmatic to how our sense-making influences the research. The change agent approach described in chapter 3 cuts across this division and aims at being both critical and engaging as a critical friend. This critical engagement is to position itself in a jumble of ways and opinions on how to do research as pointed at by Rist above.

Whereas the research framework primarily deals with the relation between the social setup of research and the conceptual framework deals with the theoretical understanding that governs the research, this chapter deals with the methodological framework used to answer the research question. The methodology thus provides a frame for consistency between the research and conceptual frameworks and the specific investigations. In the following, emphasis is on the research design, case material, and data collection methods. Research design is in the following understood as the questioning of: "Given this research question (or theory), what type of evidence is needed to answer the question (or test the theory) in a convincing way?" (De Vaus 2001, p. 9). Table 6 presents a brief overview of the relations between research questions, research design, case/material, and methods.

The methodological framework is in the following structured by sections of generic methodological considerations, methodology for the frameworks, and methodology for the empirical investigations of strategic decision-making processes.

	Research questions	Research design		Case/material	Methods
Research framework	I: What does acting as a change agent within the field of SEA involve and what potentials and relevance does it have for research and practice?	Abductive reasoning based on three research projects on SEA with a change agent approach. Deductive development of frame for analysis based on CA literature.		Three Ph.D. projects within SEA and change agent approach (two colleagues' projects and this project).	Questions to partners of the projects. Reflections by the researchers. Analysis of contracts.
Conceptual framework	ii. How can decision-making and sense-making be combined as concurrent processes in a model of human choice and how can this model contribute to a continuum of perspectives on strategic decision-making processes?	Combination is deductive theory building based on review of key writings in early decision-making and sense-making literature. Continuum is deductive conceptual development inspired by literature on decision-making and SEA. Both are tested by investigations in the thesis.		The writing of Karl E Weick, James G March, and Herbert A Simon.	Review of key authors' writings for descriptions of strategic decision-making processes. Review of existing efforts on combining the theories.
Unravelling of strategic decision-making processes	iii: When in the development of Danish energy infrastructure, are strategic decisions made that are potentially decisive for environmental aspects, and how are these choices made?	Empirical investigations by use of the three models of the conceptual framework as inductive development of knowledge about strategic decision-making.	The 'series of choice' model.	Four strategic decision-making processes in the energy sector Energinet.dk's conceptualisation of decision-making	Participation in meetings and assessments of strategic development Energinet.dk. Examination of news media and ministerial reports. Interview and review by involved actors.
			The 'contextual interaction' model	The SEA pilot in Energinet.dk on natural gas plan.	
			The choice circles model	The Ll. Torup gas storage EIA process.	
				Experiment with 10 persons on sense-making on a given case.	Recording of sense-making and analysis of transcriptions.
	iv: How should SEA be applied in order to approach the characteristics of strategic decision-making in the energy sector?	Inductive synthesis of the empirical investigations		The cases of the empirical investigations	-

Table 6: Brief overview of the research design and method for each sub-question.

5.1 GENERIC METHODOLOGICAL CONSIDERATIONS

> *"It seems like people can make sense of anything. This makes life easy for people who study sensemaking in the sense that their phenomenon is everywhere. But effortless sensemaking is also a curse for investigators because it means that they are more likely to see sense that has already been made than to see the actual making of it"* (Weick 1995, p. 49)
>
> *"We as SEA researchers can choose to be close to the SEA practitioners, decision makers and affected parties and at the same time create temporary space of distance to the relevance demands coming from the co-operators to safeguard rigour"* (Kørnøv et al. 2011)

This methodological framework is inspired by sense-making literature in how to investigate and grasp what is under scrutiny. As Weick comments in the quote above, studying of how humans make sense may be both easy and a curse. Critical reflections on how we as researchers make sense of how people make sense may therefore be a 'double curse' of being critical towards effortless sense-making of people's effortless sense-making. The following generic considerations also concern quality criteria for research and as a follow up on the change agent article quoted above, the subchapter discusses rigour of research. As far as I am aware, sense-making, SEA, and change agent research have never been combined before despite their common interest in how people's understanding of things shapes their actions and experiences.

This subchapter presents methodological considerations that are generic for all investigations in this thesis. The considerations concern quality criteria for research combining the fields of sense-making, change agent research approach, and SEA. The considerations furthermore concerns reasoning and design of research. The generic considerations are elaborated and contextualised in the more detailed description of methodology in the following subchapters.

As part of a change agent research, the research designs have been developed in the context of strategic interdependence and organisational autonomy. The designs have therefore been open towards developments and oriented to opportunities for participants to reflect on and possibly change their worldview and practice.

QUALITY CRITERIA FOR RESEARCH ON SENSE-MAKING, CHANGE AGENT, AND SEA

The quality criteria outlined in the following are reflecting the qualitative orientation as well as the constructivism inherent in a sense-making inspired understanding of research.

The insight into how we make decisions presented in the conceptual framework is also relevant for reflecting on the decisions made in research: Research process and findings depend e.g. on the participants' mental frameworks in what is noticed and what stories are generated and retained. With reference to the quote of Allard-Poesi above, acknowledging this is not an easy task. Change agent research can thus be seen as a sense-making process in which the researcher and the studied actors interact by providing stimuli to each other, by developing shared frameworks for interpretation and by arguing for certain interpretations of events. The investigations are an enactment and each investigation is a process of selecting,

processing, understanding and communicating parts of the events and flows of information accessible. Research is in this perspective 'locally' constructed and contextual. Therefore, research elements like themes, ideas, approaches, and methods are a product of cognitive frameworks, shared meanings, experienced disruptions, and local resources.

This locally constructed character of the research is in this thesis balanced by scientific standards in journal review processes and interaction with research communities. These standards concern different forms of validity (e.g. Calder et al. 1982, Lincoln and Guba 2000), which in the social science can be framed as two main positions on validity: "The first, borrowed from positivism, argues for a kind of rigor in the application of method, whereas the second argues for both a community consent and a form of rigor - defensible reasoning, plausible alongside some other reality that is known to author and reader - in ascribing salience to one interpretation over another and for framing and bounding an interpretive study itself" (Lincoln and Guba 2000, p. 178). The latter argument follows the constructivist understanding that "there is no one "correct" interpretation" (Janesick 2000, p. 393).

In his writing on theory construction, Weick (1989) at the same time argues for accuracy of theory and subjective criteria such as "interesting, plausible, consistent, or appropriate" (p. 520) or even "aesthetically pleasing" (p. 517). Whereas accuracy in Weick's writings is related to testing of hypotheses and range of instances explained by a set of assertions, the subjectivity is related to the social, historical, political, and cultural dimension. Weick argues that "[t]heory is a dimension rather than a category" (p. 516) and that quality of theory depends on accuracy in the problem statement that triggers theory building, the conjectures that attempt to solve the problem, and the selection criteria used in the testing of conjectures.

Quality of research is in the action research literature often related to an argument that "ideas and practices should be judged in terms of their usefulness, workability, and practicality and that these are the criteria of their truth, rightness and value" (Reason 2003, p. 104). In this perspective, validity "centers on the workability of the actual social change activity engaged in, and the test is whether or not the actual solution to a problem arrived at solved the problem" (Greenwood and Levin 2000, pp. 96-97). The choice circles model has high quality and validity if it is accepted by the actors of the energy sector and if it is a relevant point of departure for changing practice. Reason and Bradbury (2001) broaden the quality of action research through five questions for action research: 1) Is it explicit on the cooperation? 2) Is it guided by a reflexive concern for practical outcomes? 3) Does it include a plurality of knowing and conceptual-theoretical integrity? 4) Does it engage in significant work? 5) Does it result in new and enduring structures? Most of these quality questions are touched upon in the research frame in chapter 3 and they are as such part of the concerns in the setup and negotiation of the research. The criteria of significance of the work and enduring structures emphasise in line with Huff (2000a) that attention should not be limited to immediate relevance as a longer perspective is needed. This emphasis furthermore converges with the sustainability normativity of the research frame. The action research quality criteria of rightness and value are in line with Weick's emphasis on appropriate and interesting, however, learning from the conceptual framework the determination of usefulness and practicality may be complicated by a plurality of preferences and understandings among the partners involved in the research.

The change agent article points at a need to safeguard rigour in the cooperation with practice. Rigour is by Tobin and Begley (2004) defined as "the means by which we demonstrate integrity and competence" (p. 390). They argue for the need for "placing [rigour] within the epistemology of their work and making it more appropriate to their aims" (p. 390). In this thesis, rigour concerns the consistency pointed at above as well as reliable (or dependable as proposed by Lincoln and Cuba 2000) meaning that is repeatable. This is achieved by being "logical, traceable and clearly documented" (Tobin and Begley 2004, p. 392). The dynamics of the studied objects and constructivist elements of the research would in practice complicate the possibility for repeating the research and get similar findings, however, in principle repeatability is an important character of science. The elements of transferability and objectivity that are often related to scientific rigour are not of major concern in this thesis.

Inspired by these positions on quality of research, the criteria governing the research in this Ph.D. project and the main ways to test these criteria are primarily:

- Social validation of research: Findings validated by commenting of involved actors and the usefulness of the research in practice
- Scientific validation in research: Discussion with academics and journal reviewers on reasoning and the plausibility of constructs
- Methodological rigour: That the research is repeatable for others
- Plausibility: Relating the model to experience and insight in discussion with theorists and practitioners e.g. at conferences, see subchapter 3.2.
- Consistency: Iterative process of developing and testing the research towards the theoretical point of departure and the phenomena that the research concerns.
- Significance of the work: Considering the change potential of the setup of each investigation

These criteria play an important role in enhancing consistency between the research frame, the conceptual frame, the methodological frame, and the empirical studies. The criteria have different weight depending on the character of the specific investigation and the opinions of the actors involved. Social validation is e.g. more important in participatory investigations than in the theoretical investigation in the conceptual framework. A similar argument is also found in e.g. Calder et al. (1982).

The generic research design urges data collection methods that achieve insight in decision-making processes as they unfold. How these methodological requirements are met in the Ph.D. project is described in the following section.

GENERAL CONSIDERATIONS ON REASONING AND APPROACH

The reasoning in the investigations in the thesis is partly deductive in developing and testing of the conceptual framework and partly inductive in generating theories from empirical cases. As an overall process, the research is characterised by abductive reasoning (Alvesson and Skjöldberg 1994, p. 42) of interactive reinterpretation of theoretical knowledge and empirical data. Orton (1997) describes a similar reasoning within studies of organisations as "iterative grounded theory" in which researchers make use of both inductive and deductive reasoning. Like Orton's study, this study of strategic decision-making in the Danish energy sector is in a field of limited existing knowledge of what is happening.

Discussing the Thorngate (1976) dictum that a given study could not simultaneously be general, accurate, and simple, Weick (1989, p. 35) portrays the dictum as a clock face, see figure 16. The clock face has 'general' at 10:00, 'accurate' at 2:00, and 'simple' at 6:00. Weick argues that "If you try to secure any two of the virtues of generality, accuracy and simplicity, you automatically sacrifice the other" (p. 35). Orton (1997) argues that "deductive researchers would center around theory at the 10.00 position, while purely inductive researchers would center around data at the 2:00 position. Most organizational process researchers seem to be centered around the 12:00 position, simultaneously grounded in general theory and accurate data, but very far away from the simplicity of 6:00" (p. 422). To come around this dictum, Weick suggests incorporating complementing research of others or developing theory by alternating among approaches and data that each provides the different elements; he prefers the solution "in which I alternate my research style and systematically try to move among the various positions over the duration of a year or a career" (Weick, 1989, p. 41). Orton is more idealistic in arguing that the challenge is "to find a way to present their complex 12:00 findings in a simple 6:00 format" (1997, p. 422).

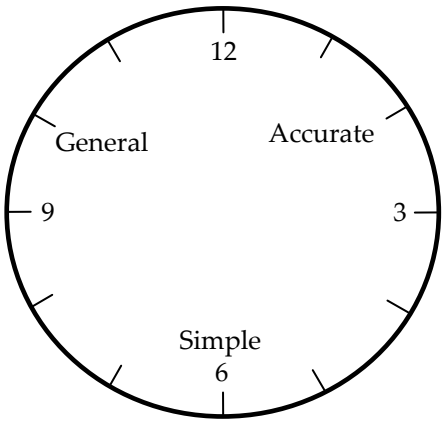

Figure 16: Weick's clock face on the Thorngate dictum.

In this thesis, the research framework is around 08.00 and the empirical investigations of strategic decision-making processes in the energy sector are around 3.00 (accuracy understood as plausibility). The conceptual framework is trying to cut across the clock face by incorporating complementing research areas and proposing a continuum of perspectives. It is thus intended to be general in the sense of being applicable to any context, accurate in the

sense that each model facilitates a plausible reflection of part of the reality, and simple in its final structure (although the development was not simple).

Positioning the empirical investigations around 3.00 is in line with Cyert et al. (1956), who initiate their conclusions by "We do not wish to try to transform one swallow into a summer by generalizing too far from a single example of a decision process". The cases are thus seen as empirical insight in context specific processes that may illustrate and suggest certain characteristics of decision-making. The extent to which the empirical findings may be generalisable to other decision-making processes and other contexts is discussed in the synthesis. The impossible aim of making fully generalisable research in a socially constructed context is coined by Lincoln and Denzin (2000, p. 1058):

> *"The problem of representation will not go away. Indeed, at its heart lies an inner tension, an ongoing dialectic, a contradiction that will never be resolved. On the one hand, there is the concern for validity, or certainty in the text as a form of isomorphism and authenticity. On the other hand, there is the sure and certain knowledge that all text are socially, historically, politically, and culturally located. We, like the texts we write, can never be transcendent"*

A way to deal with the contextually located aspects is to use case study methodology. In line with Yin's (2003) work on case study methodology, case studies are in this thesis regarded "the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon with some real-life context" (Yin 2003, p. 1). 'How questions' are dominating the research questions of this thesis and the change agent research approach is not including control of events in the real-life collaboration. Furthermore, the thesis is concentrated on contemporary phenomena. In terms of the change agent collaboration, case study methodology has relevant characteristics like the potential for learning through cases: "the case study produces precisely the type of context-dependent knowledge which makes it possible to move from the lower to the higher levels in the learning process" (Flyvbjerg 2001, p. 71). As indicated in table 6, case studies are used in the empirical part of the thesis. Table 7 presents an overview of the cases used in the thesis, the investigation they are used in, and what they are a case of.

The investigated cases vary in terms of the degree of non-programmedness, however all cases are considered to have a considerable element of novelty or of non-repetitive problems: Some have a few novel elements, whereas others are characterised by novelty in a range of aspects such as politics, technology, actor composition, legislative setup, etc. How these non-programmed elements challenge SEA application is part of the investigation.

The methodological descriptions in this chapter are to some extent a misleading simplification of the iterative and - in some instances - complex interaction between the efforts of determining data, methods, questions, and purpose. During the Ph.D. process, I have not deliberately sought to reduce the 'messy' process, but utilising the flexibility and openness of a concurrent determination of the key elements of the investigation. The messy process may reduce the rational-scientific value of the investigations in the sense that a more ordered process may provide better opportunities for choosing methodology and sample that to a wider extent meets the original objectives. On the other hand, the messy process seems

more adequate for social interaction in change agent research, in which preferences and relevance changes during the research process due to learning and strategic developments. This practice is supported by Flyvbjerg's (2001) criticism of the expectation of rational and rule-based research: "Researchers do not need to be able to formulate rules for their skills in order to practice them with success. One the contrary, studies show that rules can obstruct the continuous exercise of high-level skills. There is nothing which indicates that researchers at expert level - those who have achieved genuine mastery in the field - use mainly context-independent rules or traditional rationality in their best scientific performances, even though they might depict it as such when they get around to writing their scholarly articles and memoirs" (p. 34).

Investigation	**Cases**	**Case of**
Change agent research (chapter 3)	Three co-funded Ph.D. projects involving collaboration with practice	A change-oriented way of doing research with organisational autonomy and strategic interdependence
Between policy-making and planning (chapter 6)	Four decision-making processes: - The National Test Centre for Windmills - The Offshore Wind Action Plan - The Natural Gas Plan - The Kriegers Flak Interconnection	Strategic decision-making processes in which some choices are made by politicians and some choices are made by planners
Decision-making in Energinet.dk (chapter 6)	Energinet.dk's conceptualisation of its decision-making process from strategic probings to concrete projects	How a key actor in the sector conceptualises strategic decision-making and the timing of SEA
Strategic dynamics (chapter 7)	The context and development in the Natural Gas Security of Supply Plan and the accompanying pilot SEA	A planning process that is influenced by a range of contextual changes
Sense-making in an EA process (chapter 8)	Three persons' perception of changes and description of actions in the EA process of the Ll. Torup gas storage re-leaching	How persons make sense and act on events in a real life context
Public consultation comments (chapter 10)	- The National Test Centre for Windmills - The Offshore Wind Action Plan	Concerns expressed in public consultation comments in EA processes of Danish energy infrastructure

Table 7 Overview of cases used in this thesis, the investigation in which they are used, and what they are a case of.

5.2 METHODOLOGY FOR THE SPECIFIC PARTS OF THE THESIS

Within the frame of the generic methodological considerations, the methodologies applied in the Ph.D. project is described and discussed in the following. The subchapter is divided into methodology for the frameworks and methodology for the empirical investigations.

METHODOLOGY FOR THE FRAMEWORKS

This section presents the methodological considerations relate to the research framework as well as to the conceptual framework. The presentations are brief as each chapter describes the methodology used. The performance in terms of the quality criteria outlined above is stated in table 8.

Abductive research methodology on the change agent approach within SEA

The research question of "What does acting as a change agent within the field of SEA involve and what potentials and relevance does it have for research and practice?" is explored in the chapter on the research framework. The research design is characterised by abductive reasoning (Alvesson and Skjöldberg 1994) as it has point of departure in theories of change agent research, which is deduced into an analytical framework for empirical cases and the findings is induced into a categorisation of roles of change agents. The data collection methods used in the article are a combination of analysis of the contracts on the Ph.D. projects, open questions to contact persons in the cooperating organisations, reflections by the researchers on their experiences, and review of the article by the cooperating organisations. The details about these methods are found in the article. The potentials and implications have been validated by discussions with Energinet.dk and with practitioners at the IAIA'10 conference at which the authors of the article articulated ways of doing research; a significant part of the practitioners as well as researchers expressed they were acting as change agents and acknowledged the identified potentials and relevance.

The quite general demonstration of potentials and relevance of the change agent approach in the article is supplemented with a detailed and critical reflection on the experiences of this Ph.D. project. Methodologically, this detailed reflection has character of a structured narrative of the personal experience of events and choices made during the Ph.D. process. The data for the investigation is email correspondence and notes taken at meetings throughout the project period. The draft versions of the experiences have been discussed with the partners in the Ph.D. project represented by Kim Behnke (Energinet.dk) and Lone Kørnøv (Aalborg University). The aim of the discussion was not a common interpretation of the experiences, but to clarify eventual misunderstandings.

The answer to the research question about potentials and relevance of the change agent approach is reconsidered in the Synthesis based on the findings of the entire thesis.

Deductive development of the conceptual framework

The research question of "How can decision-making and sense-making be combined as concurrent processes in a model of human choice and how can this model contribute to a

continuum of perspectives on strategic decision-making processes?" is explored in the chapter on the conceptual framework. The research design is dominated by deductive theory building based on a literature review of insight into how we make decisions in what I define as key writings in early decision-making and sense-making literature: The writing of Karl E Weick, James G March, and Herbert A Simon. In order to combine the two disciplines, the research design includes a review of decision-making and sense-making literature on existing efforts on combining the theories. The conceptual framework is only indirectly socially validated through discussions on the empirical investigations based on the models with Kim Behnke and Malene Hein Nybroe, Energinet.dk. These discussions did not specifically concern the models.

The development of the framework has been an iterative development between theory and empirical findings and the published journal articles may therefore include fragments of previous version of the framework.

The deductive theory development is part of the overall abductive approach as the theory is tested by the empirical investigations in order to propose amendments and ways forward in the Synthesis.

The modest performance of the conceptual framework on validation is intended to be improved by discussions in the future, e.g. on an upcoming research seminar on Weick's writing in 2011. The high scores of the change agent approach partly follows from the intension of the change article of facilitating improvements and partly from the interaction with practice.

Quality criteria	**Change agent framework**	**Conceptual framework**
Social validation of research by involved actors	High: Agreement on the relevance and potentials among project partners and practitioners in general.	Low: Discussions of the model with a few actors.
Scientific validation in research	High: Discussion with other researchers and journal reviewers.	Low (The research will be discussed at a research seminar).
Repeatable for others	High: The method is transparently described (the results are context dependent).	Medium: The process is transparent, however, the complexity of theories would likely lead to other nuances.
Plausibility in terms of experience and insight	High (personal): The research is based on experiences and insight.	High (personal): The models are selected based on experiences and insight.
Consistency between theory and phenomena	High: Theory and phenomena are closely related as heory is developed upon empirical findings.	High: The framework has been developed in interaction with empirical studies to reflect phenomena.
Change potential of the work	High: The argument is that change agent research can bridge the gap between theory and practice.	Medium: Despite synergistic potentials, the conceptual framework will likely not lead to significant changes in practice or theory.

Table 8. A rough judgement of the performance of the methodology for the change agent and conceptual framework in terms of the quality criteria of this thesis.

METHODOLOGY FOR THE EMPIRICAL INVESTIGATIONS

This subchapter presents the research design and methods for data collection for the empirical investigations that constitutes the unravelling of strategic decision-making processes in the Danish energy sector. All investigations besides the experiment are similar in their research design and use of methods, why these are grouped in this chapter. Differences in the details can be found in the description of approach in the specific investigations. The performance in terms of the quality criteria outlined above is stated in table 10.

Research design for the empirical investigations

The considerations on research design have point of departure in a short review of research designs of studies with a theoretical basis similar to the conceptual framework in this thesis. The review is point of departure for developing a research design for the empirical investigations. More detailed descriptions of methodology of the specific investigations are found in the respective sections of the thesis.

The short review of existing combinations of sense-making and decision-making in the conceptual framework included only highly theoretical publications. To get insight into and inspiration for how to investigate decision-making processes in a way that is in line with the conceptual framework, a number of publications with empirical investigations are reviewed below. These publications are identified by use of the snow-balling method starting from Weick's and March's writings. The criteria for the review of research designs are: Transparency on the research design, focus on empirical data, resulting in knowledge about decision-making, especially in line with the choice circles model elements of diagnosis of situation and/or search/design of options by noticing cues, labelling events and creating stories. The short review of research designs is summarised in table 9.

As seen from the table, managers are often in focus in investigations with a similar conceptual framework. This may be due to the importance of their decisions and their need to relate to ongoing events. The issues in focus vary from specific instances (e.g. restructuring) to ongoing activities (e.g. problem formulation). Furthermore, the setup of the investigations varies from created situations (experiment) to 'real' organisational processes, however, all are framed similar to a case study. A majority of the reviewed investigations are qualitative, which is in accordance with the conclusion made by Craig-Lees (2001, p. 1790) on studies within sense-making in organizational research. Evidence about the organisational processes is both first hand (observation/participation) and second hand (interview/questionnaire). A recurrent strategy for linking evidence to the research question is an analytical process of categorisation followed by conceptualisation. Weick seems to favour cases of extreme actions or accidents to investigate sense-making (e.g. 1990, 1993), however, although situations with extreme pressure on humans seem to bring about interesting aspects of sense-making, the majority of the investigations reviewed above develop valuable insight from far less extreme cases.

Author(s)	Research topic	Research design	Evidence
Lyles and Mitroff (1980)	How do organisations become aware of problems and what characterises problem formulation processes	Analysis of indicators (from study and literature) of how managers sensed organizational problems. Statistical analysis of importance of individual characteristics of the managers	Data about 33 managers' perceptions of the problem-formulation process in their organisations (in hindsight, distanced)
Bargh (1982)	How people select information for further processing	1) Statistical analysis, 2) interpretation of results in terms of existing knowledge.	Data about people's awareness of stimuli in different tasks (experiment)
Lüscher and Lewis (2008)	How managers make sense and act in restructuring	Categorisation of perceptions and actions. Interaction with managers during the restructuring	Data about managers' perception of and actions in restructuring process (ongoing, participating)
Thomas, Clark and Gioia (1993)	How top managers process information about environmental change	1) Statistical analysis including test of hypothesis, 2) interpretation of statistics in terms of hypotheses generated from existing literature	Data about how managers in health care industry scanned and interpreted scenarios. (in hindsight, distanced)
Maitlis and Lawrence (2007)	Conditions that trigger sense-giving and conditions that enable it	1) Development of sense-making narratives, 2) Identification of issues in which people engaged in sense-giving, 3) Conceptualisation of conditions for sense-giving.	Data about sense-making processes with issues in three symphony orchestras, including who was engaged in sense-giving on what issues, the ways they did so, and the reasons behind. (ongoing, observing)
Boland (1984)	Managers' sense-making of projected accounting data	Interpretation of managers' cognitive and emotional experiences	Data about how a management group created future account based on a scenario and used it to make sense of the development until the future account. (experiment)
Corvellec and Risberg (2007)	How developers stage their project and provide it with direction	1) Analysing recurring elements in accounts of what developers do to categorise activities, 2) conceptualising the categories based on argumentation and performance theory.	Data about how energy actors describe their activities and documents on the development processes (in hindsight, distanced)
Weick (1993)	Disintegration of role structures and sense-making	1) Analysis of disintegration, 2) Conceptualisation.	Data about fire-fighters actions and reasoning in a fire (in hindsight, distanced)

Table 9: Review of research designs with a conceptual framework similar to this thesis.

The research design for the first empirical investigation in this thesis based on the 'series of choice' model is a dominantly inductive reasoned characterisation of the interplay between policy-making and planning at strategic level in the Danish energy sector. The model is on the fringe of the research designs reviewed above with its quite distanced and outlining character. The design is an analytical framework for mapping that is inspired by literature on SEA and decision-making, but it is developed in a process of interaction between existing theory and relevant elements of the empirical data. The findings of the mapping are categorised and discussed in a theory development process. The second 'series of choice' investigation concerns the conceptualisation of strategic decision-making and SEA made by Energinet.dk and it has similarities with an interpretative analysis focusing on the meanings of the conceptualisation text. The analysis is point of departure for a discussion of the conceptualisation in terms of the conceptual framework and the SEA literature. The findings are discussed with Kim Behnke from Energinet.dk and partly with Mette Cramer Buch from the Danish Energy Agency.

The research design for the investigation based on the 'Contextual interaction' model is similar to the first 'series of choice' investigation: It is also an inductive reasoning based on a mapping of decision-making and categorisation of the findings. The focus on influences and reasons for choices in the investigation has similarities with Boland's study of sense-making of accounting data above and Lyles and Mitroff's investigation of managers' perceptions. Parts of the investigations are discussed with participants at the IAIA'09 and AESOP'10 conferences and part of the research is discussed with Kim Behnke and Malene Hein Nybroe from Energinet.dk.

Quality criteria	**The empirical investigations in the unravelling**
Social validation of research by involved actors	Medium: The research is discussed with representatives of the involved actors, but there is no broader social acceptance of the findings.
Scientific validation in research	Medium: Part of the research is discussed with other researchers and the research is to some extent validated through journal review.
Repeatable for others	High: The research has a fixed point of departure in models and a clear analytical approach, which makes it repeatable.
Plausibility in terms of experience and insight	Medium: The research is regarded plausible by the (limited amount of) persons that have commented on it.
Consistency between theory and phenomena	High: The theories are induced from the analysis of the phenomena.
Change potential of the work	High: The unravelling of strategic decision-making and the relation to SEA is a key step in developing a meaningful way of applying SEA.

Table 10. A rough judgement of the performance of the methodology for the empirical investigations in terms of the quality criteria of this thesis.

The research design for the investigation based on the 'choice' model on the Ll. Torup case is in line with the research based on the two other approaches; it is also based on a mapping of developments that leads to inductive categorisations. It has similarities with a range of the reviewed studies above, e.g. Risberg and Corvellec's study of how information is staged and

Lüscher and Lewis' study of how persons make sense of events. The research design is based on a case study of an environmental assessment process in Ll. Torup covering different periods of time to investigate developments in how actors make sense of events and information.

The high performance of the empirical investigations determined in table 10 is due to the change agent research approach in which social validation, consistency between theory and practice, and change potential are prioritised.

Combination of methods in the empirical investigations

The methods used in the empirical investigations are to a wide extent a triangulation of participative insight, distanced documentation, and feedback from or interview with the involved actors. The involvement and participation aim at giving a necessary insight into strategic decision-making processes as well as to approach practice. The distanced documentation mainly through literature studies as well as the feedback of involved persons aim at enhancing reliability and validation. These three methods are described in the following.

Insight into choice processes have been gained by participation in planning of energy infrastructure in Energinet.dk and in planning processes of other authorities. As an example of the participation is participation in a meeting on how to integrate environmental concerns in the international interconnection in the Kriegers Flak project. The participation in Energinet.dk was facilitated by a work space at the head office and involvement in planning processes and meetings for the first year of the Ph.D. project, which include participation and observation of a wide range of meetings at different levels in the organisation, see subchapter 3.1 and table 11. A brief review of notes and email correspondence shows interaction with at least 20 persons from at least six different sections in Energinet.dk, who were somehow involved in environmental assessment or strategic choices. My choice of participation prior to (more) theoretical immersion is in line with Weick's (1996) advice of 'drop your tools' in order to be receptive of what is really going on rather than what your schooling prescribes you to see; strictly adhering to heavy methodological and theoretical tools may make "researchers move more slowly and with less agility and make them more susceptible to being overrun" (p. 311). My participation in Energinet.dk was based on a general theoretical introduction from the master thesis, but it was - in my mind - not guided by 'heavy' analytical frameworks or theoretical frames that would exclude me from seeing what was going on.

The participative research approach in the early period of the Ph.D. project was in line with Bjørner Christensen's (2003, 2005) description of his research approach: "I do not formulate working hypotheses or set up a research plan in advance. I do not use organizational diagnoses, models or methods for gathering data. On the contrary, I use the opportunities I have in daily work, in ordinary meetings with clients, taking part in different conversations. During these conversations, or sometimes after them, I reflect and make notes on how I have conducted my work and how I have understood especially what I have experienced as striking moments." This approach emphasises open-mindedness towards the experienced and limited disturbance of the organisational processes that are experienced continuously without interruptions by formal interviews. My choice of this approach made it possible to

describe the story and my making sense of it as it unfolded. Coghlan and Brannick emphasise the concurrent element as part of the critical process of articulating sense-making:

> *"The critical process with respect to articulating your sense-making is making your tacit knowledge explicit. This involves not only providing an analysis of what you think is going on in the story, but also of how you are making sense of it as the story unfolds (Weick, 1995). In other words, sense-making is not only a retrospective process, but is also a process which is concurrent with the story, and in terms of the action research cycle actually shapes the story."* (Coghlan and Brannick 2005, p. 30)

The ongoing reflections on my sense-making and working notes were categorised and dated for later use, and theoretical ideas were continuously formed in an abductive approach. The choice of the open-minded approach contrasts well-planned investigations and could be criticised for not fulfilling scientific standards and for being unstructured. The open-minded approach is according to Weick a point of departure for research into sense-making: "Research and practice in sensemaking needs to begin with a mindset to look for sensemaking … and a search for those outcroppings and ideas that fascinate" (Weick 1995, p. 191). At the beginning of the Ph.D. project, the open approach seemed the right way to go forward since I had little knowledge about the nature of strategic decision-making processes in the energy sector. Weick (1995) quotes Starbuck and Milliken (1988) for disapproving uncritical reliance on hypotheses: "People investigate hypotheses from the viewpoint that they are correct, and as long as result can be interpreted within current frameworks, the frameworks need not change, or even be evaluated" (p. 192). The open-minded approach was thus a balancing of being blinded by hypothesis and knowing what to look for in the participation.

The participatory research in the first year involved challenges of explicating knowledge and steering the research. Achieved through participation, the insight in the strategic decision-making processes has been tacit as well as explicit knowledge about how decisions were made. The tacit knowledge, e.g. about work processes and assumptions, has been a natural part of the participation, however, for the critical research and change efforts it had to be made explicit. Questioning the basis for conclusions and discussions with other researchers were main elements of making tacit knowledge explicit and this was a process of seizing the opportunity when it arose rather than creating forced and unpleasant situations for the actors. Furthermore, changes in the ongoing processes complicated ethical aspects of informing and agreeing with participants on the content and consequences of the research when 'negotiation access' (Hammersley and Atkinson 1983, p. 42)

After the first year of daily participation in Energinet.dk, I shifted working space to Aalborg University, see the change agent prelude, and the participation in Energinet.dk became fragmented in time and therefore more distanced. Still, the research was characterised by co-development of the overall ideas of the research and insight into the strategic decision-making. The change in distance to Energinet.dk is reflected in the authoring: The first year involved co-authoring of e.g. SEA methodology (Energinet.dk 2008a) with Energinet.dk, whereas the co-authoring with Energinet.dk in the distanced period was limited and primarily based on feedback.

The achievement of insight is in line with the methods that Weick (1995) identifies as relevant for studying sense-making. Among other methods, Weick specifically mention grounded theory, work diaries, field observation, interviews, and participant observation (p. 172). Interviews were in many instances redundant as many interview-like questions were asked as part of the participation and continuously noted. If events needed further clarification, small-talk was used for retrospective accounts of the experienced. Interviews risk being retrospective and rationalised reconstruction of events based on memories which become increasingly blurred over time. Using the words of Kundera (1995, p. 126): "Man proceeds in the fog. But when he looks back to judge people of the past, he sees no fog on their path. From his present, which was their faraway future, their path looks perfectly clear to him, good visibility all the way. Looking back, he sees the path, he sees the people proceeding, he sees their mistakes, but not the fog". The reconstructions may furthermore unintendedly or intendedly be affected by the individual's shifting emotional states and political interests. Therefore, insight in processes as they unfold is favoured.

In some investigations, access to the unfolding of experiences has not been possible and a range of interviews has therefore been conducted, see the overview in table 11. To prioritise flexibility, these interviews have been semi-structured: "It has a sequence of themes to be covered, as well as suggested questions. Yet at the same time there is an openness to changes of sequence and forms of questions in order to follow up the answers given and the stories told by the subjects" (Kvale 1996, p. 124). Due to the distance and "a point in time" character of the interview situation, it is vulnerable in terms of misinterpretation, ambiguity of questions, over-emphasis of specific themes and attention, etc. Interviewees have been asked to account for their experiences of events prior to questions of explaining and interpreting these events. This sequence has increased the possibility for understanding the interviewees' sense-making and positions.

To the extent that it did not disrupt the flow of the conversation, summative questions and validating questions have been asked. Furthermore, the interview questions have concerned concrete events and examples to support and explain the opinions of the interviewees. To prioritise trust in the change agent approach, questions that included sensitive opinions and political aspects have not been audio recorded. In most interviews, the interviewees were careful to state what they did not want to be cited for. When possible and suitable, the interviews were recorded and transcribed. Thus, the thesis is based on nearly 100 pages of transcribed interviews with key actors in contemporary strategic decision-making processes in the energy sector.

Learning from the properties of sense-making, the insight and research that I achieve and produce is influenced by my mental frameworks and my identity. The thesis is thus basically a personal account of how I perceive research, SEA, and the strategic decision-making processes in the energy sector. The personal influence is sought reduced by discussions with involved actors and other researchers, and influenced by reviewers of conference papers and journal articles. Despite possibilities for reducing the personal element, it is unavoidable and partly what makes research fulfil the criterion of interesting. The personal element is influenced by the social structures within which I engage, although it has been a priority to be continuously critical towards these.

Interviews		
Use in thesis	*Interviewed persons*	*Time*
Data on sense-making in the Ll. Torup case [8.1]	Svend S Dahl, DN Sigvald Fihl, Limfjordsvenner	Twice during 2010-2011
	Henriette Hansen, DOF and private	Summer 2010
Feedback and clarification of the gas planning [6.1 and 7.1]	Malene Hein Nybroe, senior project leader, Energinet.dk	Summer 2011
Insight and discourses on decision-making and environmental integration in Energinet.dk [10]	Vibeke Hørlyck, environmental coordinator Torben G. Nielsen, manager for the electricity division Steffen Østermark, chief economist Peter Jørgensen, manager in the electricity division Marian Petra Kaagh, responsible for EIA and SEA Lennart Johann Dahlquist, controller, business support Jens C. Hygebjerg, project manager Hans E. Kristoffersen, chief secretariat, management Dorte Vinther, development director Aksel Gruelund Sørensen, project manager	Summer 2011
Data in the experiment of how people are making sense of significance [8.1]	Anja Weis, Ph.D. fellow, AAU Christian G Simonsen, Energinet.dk Lotte L Andersen, Middelfart Municipality NN, professor, AAU Kristian Olesen, Ph.D. fellow, AAU Per Christensen, professor, AAU Sanne V Larsen, associate professor, AAU Stine Rabech Nielsen, Rambøll	Summer 2011
Meetings		
Use in thesis	*Persons participating*	*Time*
Validation of policy-planning article and insight in decision-making processes [6.1 and 6.2]	Kim Behnke, head of research and environment, Energinet.dk	4-5 times, 2008-2011
	Marian Petrea Kaagh, responsible for EIA and SEA, Energinet.dk	3 times, 2008-2011
	Stine Poulsen, Danish Energy Agency	Autumn 2011
Natural gas security of supply plan and SEA [7.1]	Malene Hein Nybroe, senior project leader, Energinet.dk, COWI consultants and the rest of the SEA team	3 times, 2008-2010
Kriegers Flak connection and environment [7.1]	Hanne Kortegaard Nielsen, Project manager and system analyst, Energinet.dk, et al.	Spring 2009
Windmill planning & SEA [6.1 and 9]	Rebekka Falk and Mette Cramer Buch, Danish Energy Agency	Summer 2010
Offshore oil & gas and SEA [9]	Katja Scharmann, Danish Energy Agency (telephone)	Spring 2011

Table 11: An overview of interviews and meetings and the use of these in the thesis. The numbers in square brackets refer to the chapter or subchapter in which the interview or meeting is referred to.

The insight into the energy sector has been 'formalised' through documentation by public material. In this regard, the thesis has similarities with Lund (2009) who in an action-oriented research approach substantiates insight and experience by use of a range of formal plans and other written material. The process of documentation has been a process of transferring 'tacit' knowledge gained by participation into 'explicit' knowledge with reference to an official framework of the activities in the energy sector. Thereby, the research is sought to fulfil scientific requirements of being testable and replicable. Where no official framework or interview possibility existed, the limits on documentation were limiting the use of insight in the investigations.

The insight in the form of memories, notes, working documents and emails have prior to publication undergone a process of being documented by formal reports, news articles, and other documents. This process has from time to time been difficult as some elements of strategic decision-making processes are not - and are not wanted to be - official. The official version is, however, necessary to present a reproducible account of the not-reproducible observations of the decision-making processes. An example of the official documentation can be found in the mapping of series of choices on energy infrastructure (Lyhne 2011a).

The documentation has when relevant included a process of getting feedback from the involved actors. The feedback has been a process of "cross-check our work through member checks and audit trails" (Janesick 2000, p. 393) that in practice depended on the actors involved and publication process. The feedback from the involved actors has been an open-minded dialogue about the findings or a possibility for commenting on draft texts. All empirical investigations have been given a direct feedback from the involved actors and the more theoretical ideas or general findings have been given an indirect feedback through conference discussion, etc. The feedback achieved has varied greatly with some relation to how important the research was to the persons. The feedback does, however, play an important role in the triangulation of methods and has in many instances given valuable supplementing information and improvements.

CONCLUDING COMMENTS

The methodological framework constitutes the final part of the trinity of the frame for the investigation. It provides criteria and designs that link the research approach and the conceptual framework with the empirical investigation in the following chapters. The methodological framework reflects the constructivism and change orientation of the thesis and outlines considerations on how these are treated in empirical studies. One of the articulated methodological issues is problems of retrospective accounts, which are problematic in a sense-making perspective and unavoidable in a thesis like this. The issue of retrospection is a recurrent consideration in the following chapters.

The framework furthermore outlines methods for data collection for the investigations in the following chapters. The investigations are primarily based on a triangulation of participatory insight, documentation through official documents, and review by involved actors. The triangulation reflects the qualitative orientation of the thesis and although some investigated aspects could have been supported by more quantitative investigations, the methods constitute a coherent approach to answering the research questions.

UNRAVELLING

CHAPTER 6

STRATEGIC DECISION-MAKING AS A SERIES OF CHOICES

CHAPTER 7

STRATEGIC DECISION-MAKING AS CONTEXTUAL INTERACTION

CHAPTER 8

STRATEGIC DECISION-MAKING AS HUMAN CHOICE

This part of the thesis are constituted by empirical investigations related to the aim of the Ph.D. project in assisting Energinet.dk and the energy sector in developing a meaningful way of applying SEA. It specifically relates to the research questions of "When in the development of Danish energy infrastructure are strategic decisions made that are potentially decisive for environmental aspects and how are these choices made?"

CHAPTER 6: STRATEGIC DECISION-MAKING

AS A SERIES OF CHOICES

> *Given the fragmentation of authority across multiple bureaus, departments, and legislative committees, and the disjointed stages by which actions coalesce into decisions, the traditional model of decision making is a highly stylized rendition of reality. Identification of any clear-cut group of decision makers can be difficult. (Sometimes a middle-level bureaucrat has taken the key action, although unaware that the action was going to be - or was - decisive.) The goals of policy are often equally diffuse, except in terms of "taking care of" some undesirable situation. Which options are considered, and which sets of advantages and disadvantages are assessed, may be impossible to tell in the interactive, multi-participative, diffuse processes of formulating policy. The complexity of government policy making often defies neat compartmentalization."* (Weiss 1982, p. 627)

Strategic decision-making at the policy-making level may be complex, diffuse, interactive, and defy 'neat compartmentalisation' as described in the quote of Weiss above. This chapter investigates exactly such decision-making processes in order to discuss SEA application.

The point of departure for this chapter is the indication found in the short review in subchapter 1.1 that the existing literature on SEA includes limited knowledge about how to apply SEA meaningfully in strategic decision-making in energy sectors and limited empirical understanding of 'decisive moments'. The chapter is the first of three investigations of the strategic decision-making processes in the Danish energy sector. It is based on the 'series of choices' model presented in the conceptual framework, and it is based on empirical data achieved through participation in Energinet.dk as explained in the research and methodological frameworks. Together with the investigations in the two following chapters, this chapter constitutes the basis for the third sub-question: "When in the development of Danish energy infrastructure, are strategic decisions made that are potentially decisive for environmental aspects, and how are these choices made?"

The investigation of strategic decision-making processes as series of choices is based on five contemporary cases of strategic decision-making investigated in the first subchapter and on the conceptualisation of strategic decision-making in Energinet.dk in the second subchapter. The answer to the sub-question is thus based on actual decision-making processes as well as a conceptual understanding made by one of the main actors in the strategic development of the energy sector. The investigations are primarily oriented towards strategic decision-making on energy infrastructure at the national level.

6.1 SEA BETWEEN POLICY-MAKING AND PLANNING

> *"The higher the level of the strategic action, the more complex the interplay of actors becomes"* (Bina et al. 2004, p. 58)
>
> *"While much of the early literature on SEA made little differentiation between application to each of [policy, plan and programmes], there is growing recognition of the need to consider different approaches and techniques for SEA of policies vis-a-vis SEA of plans and programs* (Nitz and Brown 2001, p. 330)
>
> *"[T]here is, arguably, an urgent need to apply the principles of environmental assessment to the major shifts that are occurring in energy production, and there are organisational openings where this is becoming accepted and practised. On the other hand, fundamental changes in the sector have undermined the relatively unified structures and purposes that would have facilitated the adoption of SEA for energy production in a more coherent fashion. Even where there is broad regulatory force behind the application of SEA, the public service background and ethos of SEA do not equip it well for engaging with the intricate workings of the new energy markets."* (Jay 2010, p. 3495)

The interplay at the higher level of strategic decision-making is at focus in this chapter. As Bina et al. state above, the complexity of this interaction increases with the higher level of strategic decision-making. Much literature on SEA has, however, focused on the need to separate strategic decision-making in levels rather than acknowledging the interaction. The aged quote of Nitz and Brown above even point at a growing recognition of considering policy-making and planning as two different setups requiring two different sets of approaches and techniques in SEA.

In the beginning of the Ph.D. project, efforts on pointing out strategic decision-making in Energinet.dk for SEA application were accompanied by frustration as it seemed not possible to locate ultimate decisions at either policy or plan level. Meanwhile many pivotal choices were made without preceding SEA processes, despite the SEA legislation that came into force in 2004. This frustration was the driver for this article.

Details on methods and data are found in the article as a supplement to the methodological framework in chapter 5, and the retrospective mapping is critically discussed in the postlude below.

PRELUDE: INTERACTION IN LEGISLATION AND LITERATURE

The main problem dealt with in the following article is that interaction between policy-making and planning in strategic decision-making complicates issues like assignment of responsibility for the decisions and the application of SEA. The interaction challenges SEA legislation and literature that is oriented towards segregated levels of decision-making, cf. the Nitz and Brown quote above. As a prelude to the article, the questions of who and when to apply SEA according to the Danish SEA legislation are introduced in the following. Furthermore, the prelude includes a short review of how - if at all - key works within the SEA literature describe and prescribe SEA in terms of the interaction between policy and planning.

Danish SEA legislation: The question of when and who

The Danish legislation on SEA prescribes that SEA must be applied in the preparation of plans and programmes, so that it can contribute to the integration of environmental considerations *during* preparation and adoption. The SEA thus has to be conducted prior to decisions on the final approval or adoption of the plan or programme in question (Executive order no 936 of 24/09/2009, §1, §3 and §6). The legislative requirement on when to apply SEA is thus limited to 'during' preparation of specific plans and programmes. As the article will show, policy-making and planning in the energy sector are ongoing and interactive activities, in which specific plans and programmes only are parts of an overall choice process; these plans includes choices, but each are not representing *the* overall decision. In such contexts, the 'during' concept risks having no precise fix point, which complicates the application of SEA.

According to the law, the authority of the planning in question is to determine SEA obligation, consult, announce decisions, and prepare the SEA report. The original Danish law on SEA from 2004 stated that the law applied to plans and programmes that were prepared by a public authority pursuant to legislative requirements. The present edition of the law is almost a direct translation of the EU Directive (Directive 2001/42/EC) and the Danish legislation has thus been added plans and programmes prepared by an authority for adoption through a legislative procedure by the Parliament or prepared with reference to administrative provisions (Executive order no 936 of 24/09/2009, §1, 3). The interaction between authorities in the process of developing and choosing options as investigated in the article brings these jurisdictional formulations to a head: Who is the authority when elements of the 'decision' is settled on by different actors in different forums and separate points in time?

As an elaboration of these legislative aspects, the interpretations on the question about whether Energinet.dk is obliged to do SEA is discussed in chapter 10, and the question of what decisions in the energy sector are SEA mandatory is discussed in chapter 9.

Interaction between policy-making and planning in SEA literature

The article builds upon the perception that the interaction between policy-making and planning is not notably dealt with in SEA literature, which instead follow the 'tiering' line of thinking suggested in article 4(3) of the EU Directive on SEA: " Where plans and programmes form part of a hierarchy, Member States shall, with a view to avoiding duplication of the assessment, take into account the fact that the assessment will be carried out, in accordance with this Directive, at different levels of the hierarchy". This perception of limited treatment of interaction in SEA literature is not substantiated in the article, and therefore a few key works in the literature is considered here.

Reporting on an early study on SEA application, Nooteboom (2000) defines that "Two environmental assessments are tiered to each other if they are linked to tiered decisions". Tiering of environmental assessments are therefore depending on the decision-making processes, which they are applied on, and these "may, or may not, have a formal linkage" (p. 152). Nooteboom states that "If decision-making about a particular project or activity takes place in several tiers, an earlier tier is, by definition, more strategic than a later tier" (p. 152). It is hierarchical assumptions like Nooteboom's, which the articles argue against. Nooteboom

acknowledge that there are 'grey zones' in which the tiering is uncertain, e.g. "as to whether a [policies, plans, or programmes] or a lower tier is the project consent decision" (p. 156).

In "Analysing strategic environmental assessment towards better decision-making" (Caratti et al. 2004), the interaction is not directly dealt with, but implicit in the ANSEA concepts' disregarding of formal hierarchies of decision-making. In Dalkmann and Bongardt's (2004) exemplification of ANSEA on transport infrastructure development, the interaction is apparently not found or not significant. The interaction is visible in the examples on strategic decision-making processes provided in Bina et al. (2004, p. 86), although the implications are not commented upon. "In Strategic Environmental Assessment in Action", Therivel (2004) sticks to an hierarchical, one-way understanding from policy to project, although she acknowledges that reality "is not so clear-cut" (p. 13), since decision-making skips stages, since confusion prevails whether a document is a plan or a policy, and since "'higher' or 'earlier' decisions depends on the 'lower' or 'later' ones" (p. 152). Glasson et al. (2005) note that in practice, tiers "are amorphous and fluid, without clear boundaries" (p. 342), and decisions "evolve in an incremental and unclear fashion" (p. 344), however, they still propose a traditional, hierarchical tiering of environmental assessments. Key SEA works seem thus to be unclear on the interaction as they reject the neat compartmentalisation of decision-making hierarchy and at the same time widely stick to a tiering understanding.

Within EIA and SEA literature, the view of decision-making as a series of choices seems rare, however, with some notable exemptions. After a review of conceptual approaches to literature, Teisman (2000) develops the idea of decision-making "as an intertwined 'clew' of a series of decisions taken by various parties". The ANSEA project basically regards decision-making processes as a series of choice opportunities (Dalkmann et al. 2004). Looking beyond environmental assessment literature, the understanding is found in many and diverge instances: The design of highways is seen to involve a series of choices that may affect the environment (The National Academies 2002); Nova Scotia’s 2009 Energy Strategy "makes a series of choices about how to deploy our limited resources" (Nova Scotia 2009); the scope of impact assessment is in a manual of project management defined as "action or a series of actions" (The Republic of Kenya 2009).

JOURNAL ARTICLE:

BETWEEN POLICY-MAKING AND PLANNING: SEA AND STRATEGIC DECISION-MAKING IN THE DANISH ENERGY SECTOR

Published in Journal of Environmental Assessment Policy and Management
Vol. 13, No. 3 (September 2011) pp. 1–23
DOI: 10.1142/S1464333211003912

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ABSTRACT

This article deals with the challenge of approaching decision-making processes through strategic environmental assessment (SEA). It is argued that the interaction between policy-making and planning in strategic decision-making processes is a neglected reason for problems with applying SEA, as legislation and guidance on SEA primarily approach either the policy or plan level. To substantiate the argument, the extent of interaction is empirically investigated. Four contemporary decision-making processes in the Danish energy sector are mapped as a series of choices. Fundamental changes with considerable environmental impacts are decided these years, often without preceding SEA processes. The mapping shows a profound interaction between policy-making and planning. In this interaction, public consultation, systematic environmental analyses, and transparency on alternatives are primarily related to choices of planning character. The findings lead to a discussion of the existing SEA guidance that is challenged in terms of adequacy of the guidance to approach the interaction.

Keywords: Strategic decision-making, strategic environmental assessment, energy sector, policy-making, planning, responsibility

INTRODUCTION

Despite more than a decade of application and research into SEA, integration of SEA into strategic level decision-making is still regarded a challenge (Sadler 2005). One explanation for the problems of integrating SEA at the strategic level may be underestimation of the interaction between policy-making and planning. In this interaction, policy-making frames planning and planning influences policy-making; political agendas and horse trades may, at the same time, be based on and frame technocratic calculations. SEA literature widely focus on policy-making and planning as distinct and separate levels of decision-making and treat the relations between these levels through the concept of 'tiering' (e.g., Therivel 2004). This article shows that it may not always be appropriate to treat policy-making and planning separately, and the concept of tiering may have to be refined.

This article presents an investigation of the nature of strategic decision-making processes based on the hypothesis that these are characterised by an interaction between policy-making and planning. A strategic decision-making process is understood as a series of choices that, as a whole, constitute a formal strategic decision. Progression in the series of choices is mapped to determine the extent of interaction. If the interaction is profound, it calls for considerations of how to approach such interaction through SEA.

The empirical data is composed of contemporary strategic decision-making processes in the Danish energy sector, in which strategic decision-making seems to be characterised by considerable interaction between political settlements, socio-economic calculations, geo-political interests, and technical assessments. This interaction may be a contributing factor to the rare application of SEA in the sector; only one formal SEA has been carried out since the Danish legislation on SEA became effective in 2004. Although SEA has been undertaking on a range of policies and plans within the energy sector (Jay 2010), SEA application in the sector is complicated by the importance of the private sector (Marshall and Fischer 2006) and the fragmentation of the sector (Jay 2010).

The Danish energy infrastructure is under major development as a result of a decline in domestic fossil fuels and political targets of 30 percent renewable energy in 2020 (Energinet.dk, 2009a). To exemplify the magnitude of consequences of decisions made within the sector, the 0.8 billion dollars electricity cable between Norway and the Netherlands disturbed 580 km of seabed including environmentally sensitive areas, required 9,000 tonnes of copper and 12,000 tonnes of lead for the cable, and it took 10 years to complete (EngineerLive 2009).

The mapping of strategic decision-making processes shows that the strategic level decision-making processes in the Danish energy sector are characterised by a continuous interaction between policy-making and planning taking place in windows of opportunities rather than formal approvals of plans and policies.

THE CHALLENGE OF APPROACHING STRATEGIC DECISION-MAKING

Strategic decision-making is what Slack (2009) terms a process of intervention. Policy-making and planning represent parts of a process of intervention (Slack 2009) and possess different characteristics. Inspired by Wood and Djeddour (1992) and Slack (2009), policy is here

defined as a set of objectives and a broadly stated course of action to solve perceived problems. The policy-making process is related to attributes like "diffuse" (Lynn 1987), "apparent disorder" (Lindblom 1968), and "change rapidly" (Therivel 1997, cited in Bailey and Dixon 1999). It is formed through political negotiations and power relations (World Bank 2010). Planning is understood as a more specific outline of a course of action, i.e., the implementation of policies (Slack 2009). Planned actions are deduced from described situations and expected achievements over given periods of time. Rational procedures and instrumental logic are dominant in planning as opposed to political decision-making (Bryson 2004). As summarised in table 12, planning and policy-making are thus conceptualised as two separate activities distinguished by differences in nature, order, and output.

	Policy-making	**Planning**
Nature of decision-making	Political - decisions as results of negotiations and depending on power relations	Rational - decisions as results of analyses and rational procedures
Order in decision-making processes	Policy-making as apparent disorder and unpredictable	Planning as sequential and predictable steps
Output	A set of objectives and broadly stated course of action	A specific outline of a coordinated course of action.

Table 12. Differences between policy-making and planning

During the last decade, SEA literature has increased its focus on decision-making with theorisations based on decision theory literature (e.g., Nilsson and Dalkmann 2001, Cherp et al. 2007, Kørnøv and Thissen 2000), with numerous investigations of how SEA is integrated into decision-making (e.g., Vicente and Partidário 2006, World Bank 2005, Nitz and Brown 2001), and with conceptualisations of SEA approaches (e.g., Sheate et al. 2001, Caratti et al. 2004). One of the challenges of SEA methodology in terms of decision-making is the 'paradox of timing' (Nooteboom and Teisman 2003) stating that impact assessments are either too late or too early: "It is too late because the relevant influential stakeholders already prefer a specific solution, and it is too early because the problem definition used in the assessment is always redefined during the decision-making process, resulting in an irrelevant assessment" (p. 288).

In this wealth of SEA literature on decision-making, planning and policy-making are often treated by distinct SEA methodologies and guidance. Institutions like the World Bank have been drivers of the development of the policy-oriented SEA (World Bank 2005) and the EU has maintained focus on the plan-oriented SEA through the EU Directive 2001/42. This distinction may derive from reservations about SEA at the policy level during the development of the SEA concept in European countries. In the development of the UNECE protocol on SEA, reservations about approaching the policy level were "political and institutional as much as procedural or methodological" (Sadler 2005, p. 5). Policy-oriented SEA and plan-oriented SEA have different forms (Morrison-Saunders and Arts 2004) and

"distinct methodological tasks" (Fischer et al. 2002 p. 170). In short, policy-oriented SEA approaches are characterised as simple and flexible (Therivel 1997, cited in Bailey and Dixon 1999). They take place less formally and with greater variability (Nitz and Brown 2001, Sadler 2005). Plan-oriented SEA approaches, on the other hand, are characterised as widely rational (Nitz and Brown 2001) and structured (Fischer 2003).

The interaction between policy-making and planning is to some extent considered in the concept of tiering in which a tiering of environmental assessments should follow a tiering of strategic actions (Therivel 2004). Tiering is widely understood as a hierarchy of decision-making in which "a higher, earlier tier influences a lower, later tier" (Nooteboom 2000, p. 152). It is argued that tiering "helps to concentrate on relevant alternatives" (Hildén et al. 2004, p. 527); that "foreclosure may be prevented, postponement of detailed issues may be permitted and assessments can be better scoped" (Arts et al. 2005, p. 1); and that tiering "could lead to better decisions and to more efficient resource allocation, since assessments would be conducted at the “right” timing and would feature increasing levels of detail, as needed" (Sánchez and Silva-Sánchez 2008, p. 516).

Especially within the last decade, the concept of tiering has been criticized for "its implicit assumption of a linear planning process [that] does not fit well with the dynamic nature of planning and decision-making in practice" (Arts et al. 2005, p. 1). Bina (2007) notes that "behind the hierarchical system evoked through [policies, plans, and programmes] and ‘tiering’ is a less coherent reality; one that EA theorists have appeared unwilling to engage with (at least until the late-1990s)" (p. 590). Time-lags (Hildén et al. 2004) and tiering taking place "in the reverse direction" (Gunn and Noble 2010, p. 5) contribute to a blurred picture of practice that does not correspond to the theoretical assumptions behind tiering (Hildén 2005). In line with these arguments, Fischer et al. (2002) propose a tiering framework that engages with the less coherent reality and note that: "Although the framework presents an inevitably oversimplified rational approach, it includes feedback mechanisms between the different tiers in order to reflect `real' decisionmaking, which might not follow a hierarchical and logical sequence of predetermined steps […] In reality, this often consists of a continuous interaction and negotiation process by different parties" (pp. 167-168). The investigation of the interaction between policy-making and planning in this article contributes to the debate on tiering in regards to the empirical understanding of the reality behind the theoretical assumptions.

One of many possible explanations of the interaction between policy-making and planning is to view the interaction as a result of the network society (Hajer and Wagenaar 2003) in which policy-making often happens in configurations that do not conform to the old formats (p. 8). Another break with old formats was introduced with the Garbage Can Model of decision-making (Cohen et al. 1972) in which decisions are made when independent streams of problems, solutions and participants collide in "choice opportunities" (p. 2). This understanding of decision-making emphasises that "Choices are frequently negotiated outside the context of explicit decision processes…" (March 1994, p. 226) The Garbage Can Model does not pay attention to the level of decision-making and does not rely on the formal systems of planning and policy-making. Therefore the model is of relevance when investigating the interaction between policy-making and planning.

ANALYTICAL FRAMEWORK AND METHOD

Inspired by Cohen et al.'s concept of choice opportunities and the ANSEA project (Jiliberto 2004), the analytical framework of this article is centred on a mapping of series of choices in strategic decision-making processes. This approach makes it possible to identify the policy-making versus planning character of each choice and thus determine the interaction between these in the progress of the investigated processes. Each choice constitutes a framework for the output of the decision-making process, and only choices with an environmental dimension are mapped. These choices are of special importance in terms of SEA, since each choice concludes a moment of influence; if environmental considerations are to be included, information about environmental consequences must be provided prior to the making of choices.

The approach is in line with the ongoing SEA implementation by one of the main actors in the Danish energy sector, the transmission system operator Energinet.dk. Energinet.dk implements the Danish SEA legislation from the point of departure that important strategic decisions with potential environmental impacts are often made in windows of opportunities rather than by a formal approval of a plan (Energinet.dk 2008a). As this understanding is based on insight into the sector, it supports the relevance of viewing strategic decision-making as a series of choices.

Each mapped choice is characterised in terms of its policy-making versus planning character using the characteristics given in table 12. The characterisation is added an examination of when key elements of environmental assessment methodology are conducted; i.e., public consultations, systematic environmental analysis, and considerations of alternatives. The intention is to clarify the point of departure for approaching the interaction through SEA.

The mapping and characterisation of the decision-making processes give indications of the extent of interaction between policy-making and planning and an overview of patterns of the current application of environmental assessment elements in this interaction. The analytical framework is illustrated in figure 17.

The mapping covers only a small part - a sequence - of ongoing decision-making processes in the energy sector. These sequences cover, in average, important choices made in a period of two years. The previous choices that provide the point of departure for the mapped series of choices are summarised as drivers. To be able to visualise the series of choices, the mapping is a severe simplification only illustrating who makes what decision in which order. The progress in the series of choices may therefore seem predictable and simple; however, the mapping would be very complex if non-decisions and contextual input were included. For practical reasons, the number of choices is limited to a maximum of five for each decision-making process, and these are subjectively identified as the most important choices in terms of environmental consequences of the strategic decision-making processes. No distinction is made between what is officially regarded as formal or informal decisions and both are included in the analysis.

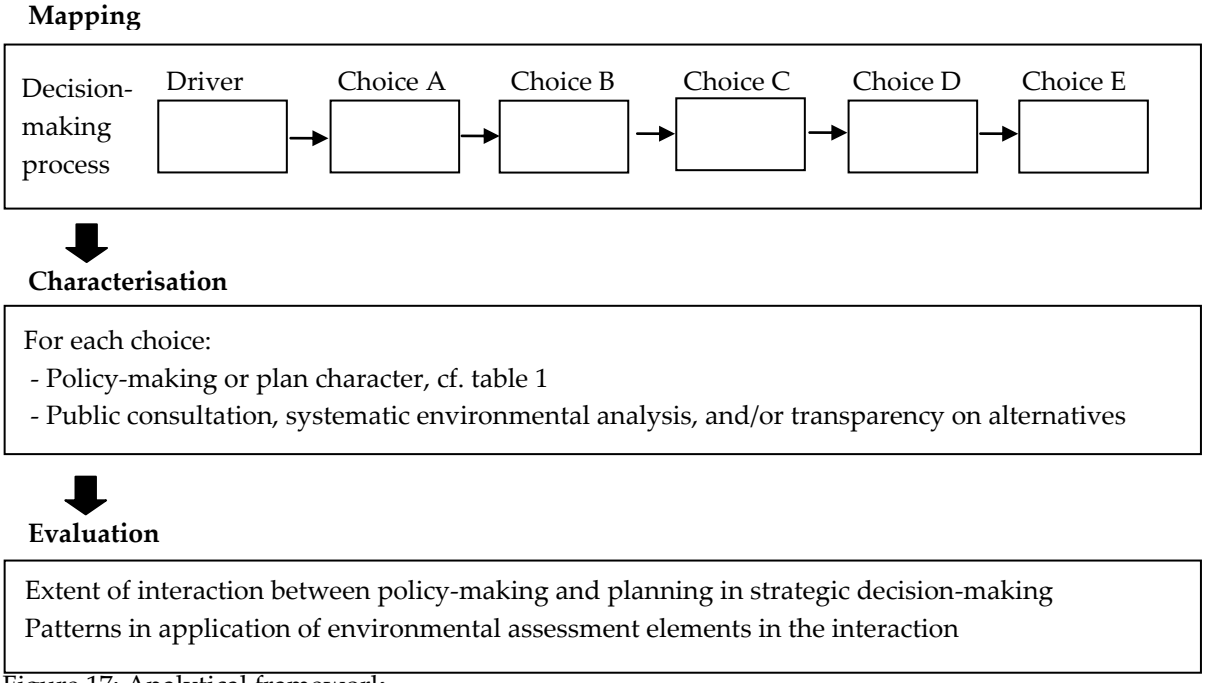

Figure 17: Analytical framework

The method for mapping the series of choices has been two continuous processes of 1) achieving insight and grasping progress and consequences by observation and participation, and 2) documenting the insight by review of publications and news media. Insight into the decision-making processes has been gained by participating in the meetings and internal communication of the Danish transmission system operator (TSO), Energinet.dk. Energinet.dk is responsible for the energy infrastructure planning in Denmark and, thus, plays a role in all the investigated decision-making processes. Energinet.dk is established as a state-owned institution with its own board and with the purpose of ensuring "efficient operation and expansion of the overall electricity and gas infrastructure" based on "coherent and holistic planning" (Energinet.dk 2005). The participation has involved more than 70 meetings and numerous informal conversations at different levels in the organisation in the period from August 2008 to July 2009. The meetings included section and division meetings, planning, management orientation and public consultation. Most of these meetings included information about the investigated decision-making processes or relevant information about the energy sector. Since the beginning of the participation, the insight has, to the extent possible, been documented by the analysis of publications from ministerial agencies and news media articles. These publications have primarily been reports, plans, and press releases, which have primarily been published by the Ministry of Environment and the Ministry of Climate and Energy. In the effort of documenting insight, political decisions have been problematic, since these have a tendency of being communicated without transparency in terms of underlying political horse trades and bargaining.

The mapping of the processes has been discussed with representatives from the Danish Energy Agency and Energinet.dk to validate the understanding of the progression and the importance of the choices made. This informal review has reduced the potential bias of a subconscious tendency of making the result match the hypothesis of interaction between policy-making and planning. It has, furthermore, given other perspectives on the relevance

and the order of the included choices and the logic between these, which has helped reduce another bias: "People seem to see past events as much more rationally ordered than current or future events, because retrospective sensemaking erases many of the causal sequences that complicate and obscure the present and future" (Starbuck and Milliken 1988, p. 36).

FOUR CONTEMPORARY DECISION-MAKING PROCESSES IN THE DANISH ENERGY SECTOR

The mapping covers four contemporary decision-making processes related to Danish energy infrastructure: 1) The National Test Centre for Windmills, 2) The Offshore Wind Action Plan, 3) The Natural Gas Plan '09, 4) The Kriegers Flak Interconnection. The processes represent different scales and types of energy infrastructure, different approaches to the development of infrastructure, and different drivers of the development. Also the extent of environmental considerations varies between the decision-making processes, both formally and informally. Since the processes are contemporary, they in part reflect the global economic crisis, the political attention to renewable energy and climate change, and the decrease in fossil fuel resources.

All decision-making processes constitute a framework for the future development consent of a spatial area and are therefore likely to be within the requirements of the EU Directive on SEA. Furthermore, the Danish regulation requires environmental assessment of government proposals (Elling 2005), which in part applies to the policy level of the decision-making processes. The processes are visualised in figure 18 followed by an elaboration of the mapping.

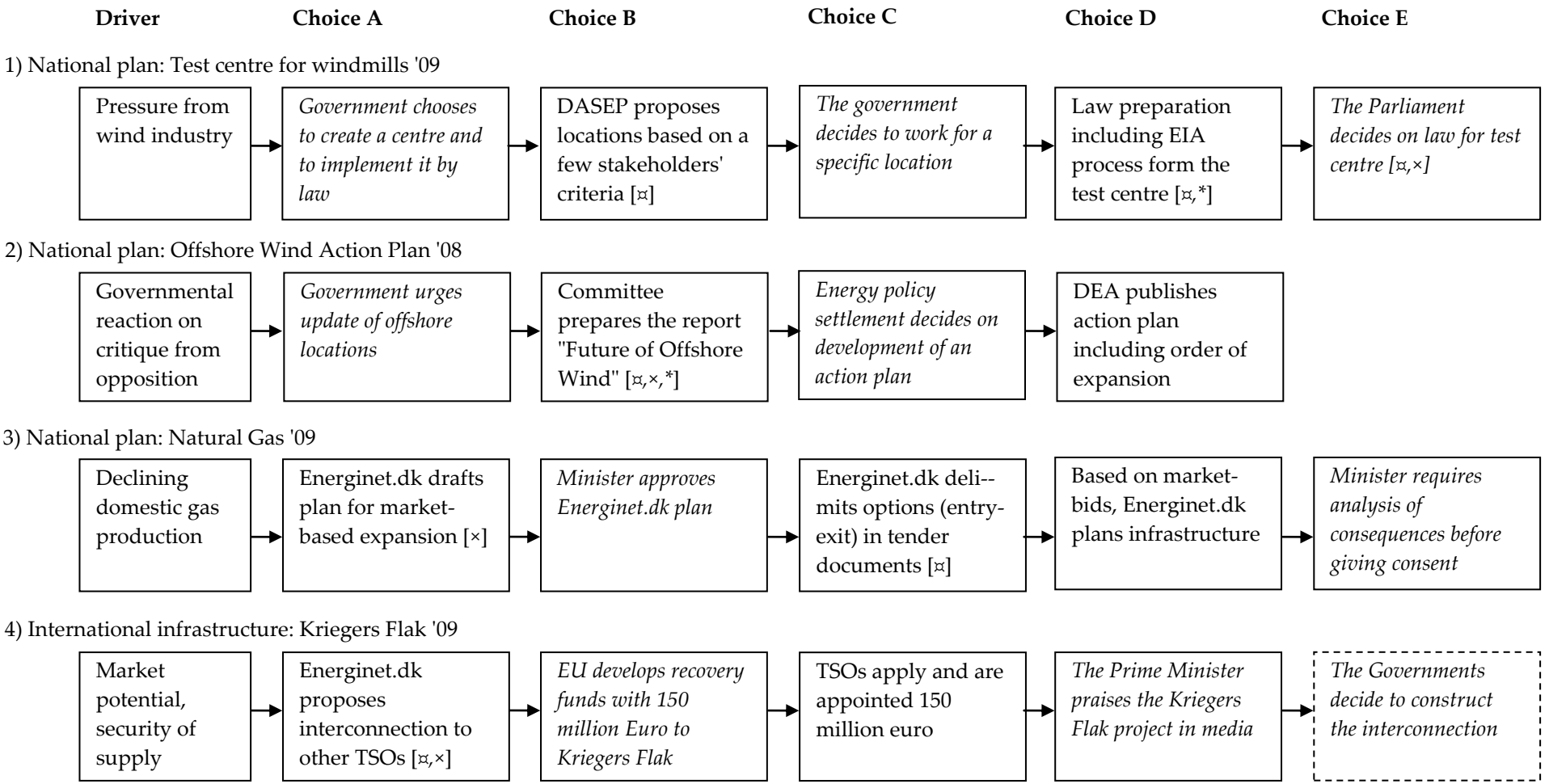

Figure 18: Mapping of strategic decision-making processes on energy infrastructure as series of choices. Boxes in italic font style represents choices with policy-making character, and boxes in normal font style represents choices with planning character. Choices that include public participation are marked by [*], transparency on alternatives [¤], and systematic environmental analysis [×]. The choice in the dashed box is not yet made, but expected. 'Government' covers decisions at different governmental levels.

1) The National Test Centre for Wind Turbines

[A]: The Danish wind power industry is a powerful actor in Danish politics. Organised in the partnership MEGAVIND, it has strongly argued for the development of offshore wind turbine technologies as a necessary means of keeping the leading position in offshore wind energy (MEGAVIND 2008). In 2009, the Government's Economic Committee acceded to the wind industry's interests and chose to establish a test centre by law (DASEP 2009b).

Characterisation: The Economic Committee is constituted by the Government's ministers, and it prepares the Government's economic policy. The choice of making a test centre must therefore be seen as a part of the policy-making. The choice involved no public consultation or transparency of alternatives, although the choice initiated and framed a certain intervention.

[B]: Following the Economic Committee's choice, the Danish Agency for Spatial and Environmental Planning (DASEP) initiated a screening process for suitable areas. Actors related to the wind power industry as well as a wind research institution were consulted in terms of criteria for location. The consultation ended up with four criteria concerning average wind speed, distance to housing, international spatial restrictions, and area size. DASEP screened the entire country in accordance with these criteria and ended up with 14 potential locations. These areas were examined, and only one area was termed suitable (DASEP 2009b).

Characterisation: Based on systematic analyses, the choice of suitable areas is of planning character. In this case, the planning seemed to be hurried as the public was not consulted, and environmental considerations were reduced to certain spatial restrictions and distance to neighbours. The test centre was to be placed in a national protected forest that had to be cut down to create optimal wind potentials. Although some alternative locations were presented, there was limited transparency of how the criteria were chosen and what was included in the examination of the 14 areas.

[C]: Based on the DASEP proposal for location, the Economic Committee chose to work for a test centre at the suggested location, which the Minister of Environment publicly announced. Shortly after this choice was made, a scoping consultation document for the following environmental assessment of the law proposal was published. The document included a description of the test centre in general terms, including the location, and an invitation to a public meeting near the location (DASEP 2009c).

Characterisation: The politicians' early choice of a certain location was likely driven by the wind power industry's condition that it would support this specific location if it was ready for testing within a certain, short time period (Danish Wind Industry Association 2009). Months later, DASEP published a brief minute of the assessment of the 14 areas that also involved environmental considerations. The public were neither informed nor involved in the choice of the location. The scoping consultation was characterised by opposition from a strong NIMBY (Not In My Back Yard) movement, and many comments concerned the location and alternatives rather than the project (DASEP 2009d), although the location in practice was settled by the Government's public announcement of the location.

[D]: The law proposal and the EIA were produced within two months. The EIA was made by the regional environment centre and based on judgements by experts, e.g., on the presence of bat species in the area.

Characterisation: The choices made in relation to producing the law proposal and the EIA were characterised by systematic analysis and scientific knowledge and were thus of planning character. No alternatives were treated in the environmental assessment besides the 0-alternative. The consultation process seemed to be led by a strategy of aiming at as little awareness as possible: The 11 days scoping consultation period covered a one week autumn leave, the consultation period for the EIA report was intended for the Christmas period (DASEP 2009e), and the initial press meeting was announced within hours at a location several hours away from most NGOs and news media (Danish Ministry of Environment 2009). Due to inputs in the consultations, the location of the test centre was moved some hundred meters (DASEP 2009f), and other minor changes were made.

[E]: Encouraged by the public's criticism, a considerable parliament debate took place prior to the adoption of the law. The test centre was part of a broad energy settlement, and the adoption of the law therefore required a broad support for the centre. Parties of the settlement required a detailed environmental analysis of two alternative locations prior to settling the agreement. These analyses were debated and the alternatives were found inappropriate. With a minor delay compared to the time schedule, the law was adopted with stronger restrictions on the construction and operation of the centre, e.g., on the extent of tree felling.

Characterisation: The adoption of the law was characterised by political bargaining on environmental issues reflecting differences in political profiles. Representatives of the public presented their views to the Technical and Environmental Committee. As a standard practice, the official political discussions on the centre and its alternatives were broadcasted; however, the key negotiations were presumably made in the corridors.

2) The Offshore Wind Action Plan

[A]: Denmark has a long tradition of creating possibilities for wind energy development, and offshore wind has been part of the Danish energy production since 1991 (DEA 2005). In 1997, a national plan for offshore wind power production was made (DEA 1997), and a national plan was again on the political agenda in 2005 as part of the Government's energy initiative (Danish Ministry of Transport and Environment 2005). The initiative included a decision to update previous analyses of locations for future offshore wind power. The Committee for Future Offshore Wind Power Sites was appointed with the commission of making a technical report on sites for the development of offshore wind turbines.

Characterisation: The political choice of developing offshore wind was a policy change triggered by a severe criticism of the Government's decision of cancelling the expansion of offshore wind capacity in 2001. The political choice was not transparent in terms of presenting alternatives. Environmental benefits seemed to be a central reason for the choice, but apparently the discussion did not include negative impacts. Furthermore, the choice included specific directions for the Committee's work that had to emphasise economic efficiency and streamline administrative procedures (The Committee for Future Offshore Wind Power Sites 2007).

[B]: The Committee analysed the Danish waters for potential areas, taking a range of interests into account. Based on the analyses, the Committee pointed at seven main areas (The Committee for Future Offshore Wind Power Sites 2007).

Characterisation: The choice of areas was of planning character as it was based on systematic analysis and rational procedures. A strategic environmental assessment was made of the Committee's report on future offshore wind power sites, since it constituted a frame for development (DEA 2008a). The SEA report included no other alternative than the 0-alternative, and only alternatives of cable technology were described in the Committee's report. The public consultation led to a sensitivity analysis of the Committee's report (DEA 2008b).

[C]: A political settlement over energy policy in 2008 formed the choice of developing an action plan for offshore wind (DEA 2008c). A new site was included in addition to the Committee's report, and the politicians changed the order of the development of the sites (DEA 2008a).

Characterisation: The political choices were the results of a political bargaining of the content of the energy settlement. The choices were not transparent in terms of presenting alternatives besides the political suggestions, and the choices were apparently made without systematic environmental analysis.

[D]: Shortly after the settlement, the DEA prepared the Offshore Wind Action Plan based on the Committee's report and with an order of establishment of the specific locations (DEA 2008a).

Characterisation: The preparation of the action plan was coordinated with electricity infrastructure planning; it involved an update of the Committee's report on economy and integrated the political choices of the settlement. The changes were transparently described, but as the plan was primarily a reproduction of the Committee's report, it neither involved consultation nor environmental analyses. There was no official SEA screening of the significance of the changes that were made after the SEA process.

3) The Natural Gas Plan '09

[A]: No new major national energy infrastructure for transmission of natural gas has been constructed in Denmark the last ten years, as the system has been of adequate capacity for the transport and export of domestic natural gas resources. The domestic resources are, however, running out, and this creates a new situation with a projected need for import of natural gas. Therefore, Energinet.dk initiated the planning of natural gas infrastructure and proposed the use of the Open Season approach (see De Joorde and Van Oostvoorn 2006) to let the gas actors' demand for capacity influence the location of new gas transmission pipelines (Energinet.dk 2009b).

Characterisation: The planning of natural gas infrastructure was a continuation of earlier analyses of economic, social, and environmental consequences of potential gas infrastructure developments (Energinet.dk 2007a). The analyses had not included public consultation, and only a summary was made publicly available. The analysis included several development alternatives in the expansion of the infrastructure. AN SEA process of the planning was

initiated, but it was cancelled due to the consequences of the economic crisis (described below).

[B]: In 2008, the Minister of Climate and Energy accepted Energinet.dk's proposal of an Open Season process (Energinet.dk 2009b).

Characterisation: The Minister's acceptance of the market-based approach to the development of natural gas infrastructure signalled a political endorsement of the change in the planning procedure and a political strategy of including the natural gas system in the future efforts related to climate change mitigation and the introduction of biogas. No official considerations were given on how a market-based approach would influence the decision-making process, including how and when environmental concerns were to be included. Likewise, no public consultation was made and no transparency was presented in terms of considering alternative approaches.

[C]: To structure the Open Season process, Energinet.dk delimited the bidding options to certain corridors in the tender documents (Energinet.dk 2009c).

Characterisation: The delimitation of options was based on technical and market-based analyses and was thus of planning character. The delimitation was decisive to the potential environmental impacts, but it included no transparency on how environmental considerations were integrated. The public was not consulted in the delimitation of options in the tender documents, and the reason for the choice of options was not explicated.

[D]: The 2009 Open Season process was influenced by the global financial crisis as the developers of a promising project on a gas tube from Norway to Sweden and Denmark chose to "suspend further project activities due to increased commercial risk combined with the global economic developments that have given an uncertain view on future gas demand" (Energinet.dk 2009d). Based on the biddings on the remaining options and a socioeconomic analysis, Energinet.dk chose to work on an expansion of the capacity towards Germany (Energinet.dk 2009e).

Characterisation: The choice and the reason for the project were publicised, but no public consultation was made. The consultation only involved market actors. The expansion towards Germany was included in the previous environmental analyses, and no new analysis of environmental consequences was made before the EIA.

[E]: The Minister required a detailed analysis of consequences for natural gas producers before giving the final consent to the capacity expansion (DEA 2010b). The analysis was made, and the consent to proceed was given.

Characterisation: The natural gas and oil producers in the North Sea are powerful players in the Danish policy-making on energy. Therefore, the Minister seemingly wanted to be sure of the consequences for these actors before giving the final consent to the development. The political focus seemed to be on financial and stakeholder interest rather than environmental consequences.

4) The Kriegers Flak Interconnection

[A]: The Kriegers Flak area is divided between Sweden, Germany and Denmark, and all countries have plans on offshore wind power plants in the area. In 2009, Energinet.dk started

analysing the potential benefits of combining the wind power plants to utilise the cables for transnational electricity transmission in periods with little wind energy production, and to test technologies for offshore transnational electricity grids. Cooperating with the Swedish and German TSOs, Energinet.dk analysed the potentials and implications of the interconnection and prepared the ground for a choice of a technical solution (Energinet.dk 2009g).

Characterisation: The proposal of the Kriegers Flak interconnection was of planning character and involved environmental considerations at an early stage. Alternative locations of offshore wind were considered in the offshore wind process, so the Kriegers Flak proposal only dealt with alternatives in terms of interconnection possibilities and cable technology. No consultations were made on the environmental considerations, but the analysis was publicised.

[B]: Due to the global economic crisis, the European Commission and Parliament launched a European Economic Recovery Plan with funds for major energy infrastructure projects (European Commission 2009a). Among a wide range of funds to infrastructure projects, EU allocated 150 million euro for transnational infrastructure in Baltic and Kriegers Flak areas.

Characterisation: A political decision to counteract the crisis thus interfered with the development of the Kriegers Flak interconnection and sped up the efforts. No assessment of environmental impacts or consultation was made of the EU Recovery Plan despite the plan's support to projects with considerable environmental impacts: "The urgency of the economic crisis calls for the fastest possible action, in line with the conclusions of the European Council. This means there has not been time for an impact assessment" (European Commission 2009c, p. 3). Furthermore, the applicants were urged to act in a hurry and be prepared to make considerable investments in the projects by the end of 2010.

[C]: The TSOs applied for the recovery funds and became the only candidate in the pool for the 150 million euro (Bülow 2009). Therefore, the commission could not reject the interconnection, but negotiate it.

Characterisation: The choice of applying for the funds was based on an analysis of the possibilities to speed up the process. By applying for recovery funds, Energinet.dk limited the time for environmental analyses and design optimisation in terms of environmental impacts.

[D]: Shortly after the Commission's allocation, the Danish Prime Minister praised the allocation of funds to the Kriegers Flak interconnection in the media (Information 2009) and in a parliament committee (The Danish Parliament 2009). He stressed that the Government would make the necessary initiatives to establish the interconnection and that it had to be done quickly to achieve the EU funds.

Characterisation: Thus, in principle, the Prime Minister made the choice of establishing the project, before Energinet.dk's analyses were concluded. The EU funds and the Prime Minister's praise made it unlikely that the project was abandoned due to environmental considerations. This principal decision was made without consultation and without systematic environmental analysis.

[E]: The political approvals of the entire project have not been made, but the expectation is that the Danish and German Governments decide on their parts of the interconnection in 2010.

INTERACTION BETWEEN POLICY-MAKING AND PLANNING

The characterisation of the choices is summarised in table 13. All of the four strategic decision-making processes are characterised by a high alternation between policy-making and planning. The analysis indicates that it is within planning and not policy-making that alternatives in terms of infrastructure locations are considered, that public consultation is carried out, and that environmental aspects are considered. Policy-making seems to put a time pressure on the progress, as seen in the cases of the test centre and Kriegers Flak processes.

Interaction between policy and planning	High interaction in all four series of choices (three and four shifts between policy-making and planning out of four possible shifts)
Public participation	Conducted prior to choices of planning character in two out of four series of choices. Two decision-making processes are without public participation.
Transparency on alternatives	Limited range of alternatives considered in all series of choices. Except from one instance, consideration of alternatives are related to choices of planning character
Environmental analysis	Two series of choices included systematic and detailed environmental analysis related to choices of planning character. The other two series included minor considerations on environmental analysis, also related to choices with planning character.

Table 13. Summary of the analysis

The results of the mapping are in line with Buckley's (2000) description of practice in the 1990s: "State and national governments, however, can, and commonly do, still adopt economic and industry policies, budgets, and legislation, and enter into international agreements on trade, investment, defence, intellectual property, and so on with little or no formal environmental assessment, and little or no opportunity for public consultation by their citizens and electorates except through informal political protest and lobbying" (p. 209).

SEA IMPLICATIONS OF THE INTERACTION

The profound interaction between policy-making and planning relates to SEA literature and practice in different ways and challenges some of the existing norms and understandings. Although the empirical evidence for the interaction only covers four decision-making processes, the challenges are relevant to consider in terms of their potential influence.

Firstly, the interaction challenges the relevance of focusing on either policy-making or planning in SEA application and literature. The study shows that it may not make sense to treat these levels separately, as both levels in a dynamic interaction form the development in question. The obvious need to approach choices at both levels in one process urges consideration of whether existing SEA methodologies are appropriate: Simple and less formal policy-oriented SEA approaches may be appropriate for the choices of policy-making character; however, these approaches will most likely be of less relevance to the choices of

planning character compared to plan-oriented SEA approaches. Similarly, the plan-oriented approach may not be flexible enough to approach the choices of policy-making character. Therefore, neither the policy nor the plan-oriented SEA methodologies seem adequate for approaching the interaction.

Secondly, the study contributes empirically to the discussion of tiering by showing that the progression of choices at strategic level does not follow the decision-making hierarchy, but is constituted by interaction between policy-making and planning choices. The widely held assumption of a linear planning process should therefore be considered replaced by an assumption of a continuous interaction. SEA reports that typically provide the frames for what should be included in lower level environmental assessments, may therefore also have to include suggestions for higher level decision-making and assessment processes, including "diagonal tiering" (Arts et al. 2005, p. 3) to decisions in other sectors.

Thirdly, the interaction makes it difficult to determine who has the responsibility at what stage in the series of choices. To keep a sense of perspective and enhance continuity in the integration of environmental considerations, it is relevant to consider whether it would be possible for a single actor to assume the overall responsibility for SEA application throughout the strategic decision-making process. Policy choices are not under the auspices of Energinet.dk, which therefore does not seem an appropriate candidate. Policy-makers are not aware of the early choices in planning induced interventions. It may, however, be possible for policy-makers to require SEA application and continuity of sequences of the decision-making processes.

Fourthly, the interaction may make it difficult to approach the 'early stages' of decision-making when the "maximum opportunity occurs to gain environmental leverage on alternatives and options from a SEA perspective" (Sadler 2005). The study shows that a range of actors make formal and informal choices of environmental significance in the development of energy infrastructures, which are likely to make it difficult for a single actor to identify the early stages. A manager within the energy sector explained the difficulties of determining the right time for SEA application with emphasis on the inertia of the process: "It is like we are seated in a high-speed train and through the window we see a sign saying 'SEA process', but it is too late to press the stop button".

In the mapping, the choices are presented as political settlements, reports, committee task, etc., and not as a "plan" or a "programme". Thereby the choices often avoid attention in terms of environmental assessment requirements, as also concluded by Boothroyd (1995). In 2009, the Danish legislation on SEA was reformulated by broadening plans and programmes to "documents". The coming years will show how this formulation will work in practice, and to what extent it will cover the choices identified in the mapping.

The study shows that public participation, transparency of alternatives, and systematic environmental analyses are conducted in relation to a limited amount of choices, primarily of planning character. This practice constitutes a point of departure for approaching the interaction through SEA, as the practice indicates the existence of competences and experiences at the planning level. The ongoing SEA implementation in Energinet.dk is likely to improve the practice at the planning level, and due to the profound interaction, it may very well enhance the application of SEA among policy-making actors in the sector.

CONCLUSION

This paper has shown that strategic decision-making processes in the Danish energy sector are characterised by a profound interaction between policy-making and planning that challenges the application of SEA. In the series of choices that form energy infrastructures and related environmental consequences, planning choices based on systematic analyses alternate with policy-making choices based on bargaining and horse trades. Public participation, transparency of alternatives, and systematic environmental analyses are conducted in relation to a limited amount of choices, and primarily related to choices of planning character.

The findings represent a number of challenges to existing SEA literature and practice, including questions of whether it is possible to develop an SEA methodology which is able to approach both policy-making and planning characters; how to assign responsibility when responsibility continuously changes hands in the progress; how to identify early stages when no actor has an overview of the informal choices; and how to tier the environmental assessment process when the progress does not follow the decision-making hierarchy.

The mapping will serve as an input to SEA implementation in the Danish energy sector. In an international perspective, more studies are needed to determine how widespread this interaction is in strategic decision-making processes. The study in itself may constitute an empirical input to discussions on how to approach strategic decision-making processes through SEA and how to increase the influence of SEA.

Acknowledgements

The author would like to thank Energinet.dk for support and comments on an earlier draft of this paper, and two anonymous reviewers for their comments.

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POSTLUDE: EXPLORING QUESTIONS RAISED

The article raises more questions than it answers, which also was the intension. Some of the questions relevant for this thesis are: How important are the biases of the retrospective accounts? What can be learned from the article in terms of the conceptual framework of this thesis? What do the findings and implications indicated in the article mean for SEA application? These questions are discussed in the following.

THE BIASES OF RETROSPECTIVE ACCOUNTS

The article shortly mentions the bias of retrospective accounts with reference to Starbuck and Milliken's (1998, p. 36) point that the retrospect "erases many of the causal sequences that complicate and obscure the present and future". The dominance of interaction is, however, a recurrent picture as it is also supported by other cases in Energinet.dk like the Cable Action Plan (Energinet.dk 2009a), which was required by a political settlement, sketched by Energinet.dk, framed by policy-makers, developed by planners in Energinet.dk, adopted by policy-makers, and implemented by Energinet.dk and the regional system operators. Similar analysis could be made on the Lille Torup natural gas storage re-leaching and expansion (Environment Centre Århus 2010).

A problem in the retrospective construction of decision-making processes as series of choices relates to how the article maps series of choices as isolated progressions: Langley *et al.* (1995) criticises the assumption that decision-making processes can be viewed in isolation from one another. Instead they argue that "strategic decision processes are characterized more by their interrelations and linkages than by their isolation" (p. 264). The article is showing the interrelations between policy-making and planning processes within the same decision-making process, but it is subject to the critique as it isolates decision-making processes on a specific issue from decision-making processes on other issues. That other processes are influential is implicit in the context of political "horse trades" (Therivel 2004, p. 11), and the interactions has in Denmark been expressed in the political agreement on the Great Belt Bridge, the support of which has been argued to be 'paid for' by motorways in Northern Jutland (Kristiansen 2002). Another example is the location of a hospital in mid Jutland, the support of which has been argued to be 'paid for' by a motorway to west Jutland (Andersen 2010). The political horse trades on energy infrastructure has not been articulated and therefore not described in the article.

A counter-critique to Langley et al.'s criticism on isolation can be found in Weick's pragmatic understanding of learning. Commenting that decision-making is a retrospective construction of a history, Weick (1995, p. 184) argues that "Retrospective decisiveness erases those false starts and dead ends. Although all of this erasing may look like distortion, it is actually nothing but learning in reverse". Learning requires simplicity of the complex, and isolation of specific processes is therefore needed to learn from decision-making of the past. Furthermore, learning from the literature, studies based on retrospective construction and isolation of specific processes has given much insight in the nature of decision-making, see e.g. Nutt (1986).

INPUT TO THE CONCEPTUAL FRAMEWORK

The mapping of formal decisions seems especially relevant for showing how problems and options are modified and influenced during decision-making processes. The clarity of the progression of formal decisions in neat boxes is, however, no more than a deceiving and tempting presentation, since each decision is "an almost transcendent, peaceful, but brief, moment of order between the chaos of the formation […] and the chaos of the implementation […]" (Orton 2000, p. 231)

The interaction between policy-making and planning has similarities with the iterations between stages of developing options and selection of options in Mintzberg et al.'s (1976) conceptualisation of non-programmed decision-making processes: The mapping seems to show a tendency of the actors at planning level to suggest options and the actors of the policy-making level to evaluate and decide on an option that frames subsequent development of options. Contrasting the independence of solutions and problems in the Garbage Can model, the reconstructed cases seem to be solution-oriented, e.g. the decision-making process on the test centre in Østerild, which was oriented towards the centre as a solution rather than the problems of development and testing in the wind industry. If the process was problem oriented, the alternatives may have been more radical to include e.g. technical or regulatory solutions. Similar conclusion is found in Nutt (1986, p. 414): "Most decision processes were found to be solution centred, which seemed to restrict innovation, limit the number of alternatives considered, and perpetuate the use of questionable tactics". The solution-oriented tendency in this and Nutt's study is likely partly due to the retrospective approach, however, it may also be due to focus on the later parts of decision-making processes in which the development in question has been named and conceptualised. Prior to this stage, streams of solutions, problems and participants may be more independent. The development of the National Test Centre for Windmills was not transparent for the public until the idea and location for the centre was settled. When the public learned about the process, it was thus in a solution-oriented mode rather than problem-oriented. The latter would have opened up the complex problem definition of what kinds of testing is needed, for which technologies, and what locations are adequate.

Similar to the series of choice model, Cyert et al. (1956) propose to understand decision-making as a series of "program steps from inception of the problem to selection of a consultant" with "subprograms" (p. 245). They find that "the reasons for switching from one subprogram to another were either the proved inadequacy of the first one or a redefinition of the problem" (p. 246), and note that other reasons can be imagined. The cases in the article can be seen as subprogrammes in a bigger perspective of problems in play in energy politics. Furthermore, the EU-funding in the Kriegers Flak case may be seen as a slight redefinition of the 'problem', since the EU funding strengthens the time pressure aspects of the problem.

The relevance of 'decisive moments' and 'decision windows' are reflected in the actors' utilisation of e.g. the opportunity of getting EU support within a certain time frame. Similar conclusion is found in a study on transport infrastructure in Finland, in which Valve (1999) concludes that possibility for achieving EU funding leads a group of actors to emphasise the temporal opportunity: "The groups that stressed the necessity of the new investment schemes, in turn, pointed out that lengthy reconsiderations might cause a loss of a historical opportunity to develop the transport system" (p. 139).

The unexpected decisions found in the series of choices could be argued to represent 'interruptions' in the actors' sense-making. These 'interruptions' change the line of thinking in the process as they force the involved actors to diagnose and create meaning of a new situation, e.g. when the Prime Minister unexpectedly settled on a strategy on Kriegers Flak in the media.

Summing up, the overview perspective in the continuum of strategic decision-making processes thus has the potential of revealing and partly explaining the progress of decision-making, hereunder the actors involved and the series of choices that constitute what at a first glance seems to be ultimate decisions. Finally, the unexplained developments in the series of choices clearly point at a need to understand the contextual interaction and the social processes behind these developments.

WHAT DO FINDINGS AND IMPLICATIONS MEAN FOR SEA IMPLEMENTATION?

To broaden the implications of the interaction pointed at in the article, the findings are in the following elaborated in terms of what the choices in the series involve and related to an article by March (1987) on design of information systems in equivocal contexts. This leads to a discussion of the possibilities of targeting unpredictable decisions.

The article shows that potentially decisive decisions are made by different actors in interaction. As an emphasis of how the choices in figure 18 set the context for future decisions, figure 19 shows examples of what the choices settle upon. The range of environmental possibilities and alternatives are decreasing in the progress of decision-making without broad discussion on the decisive choices.

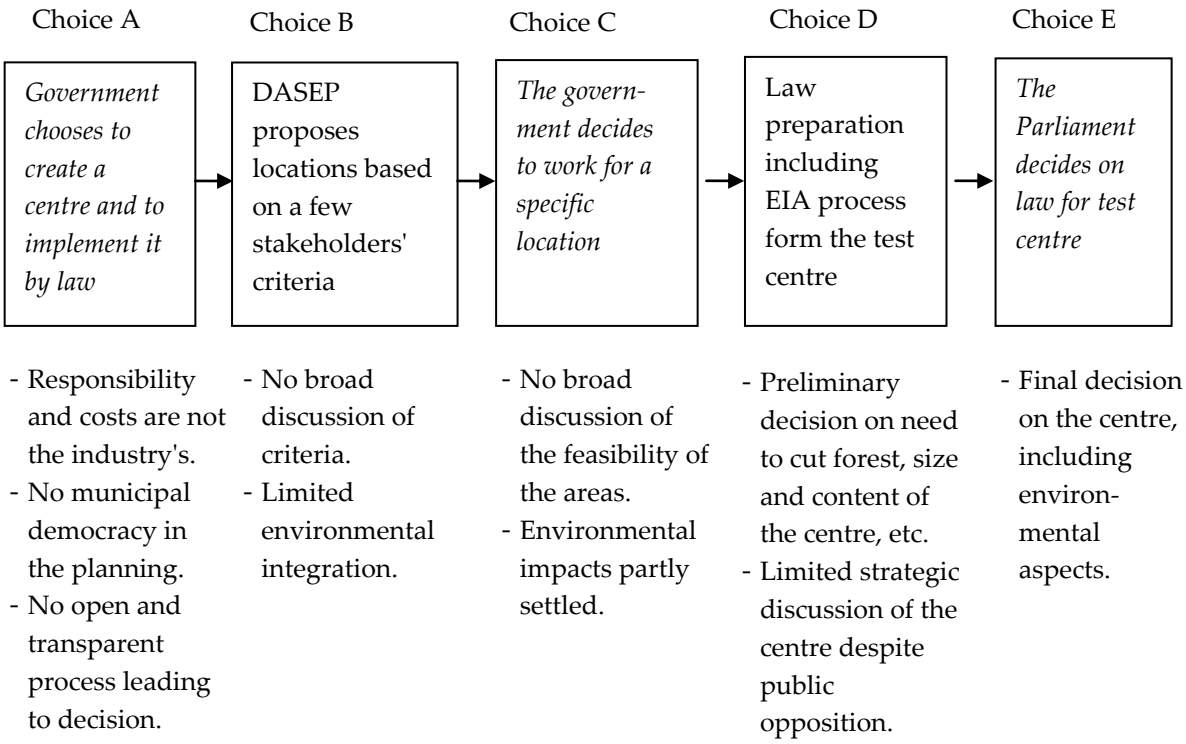

Figure 19: Environmentally decisive choices in the decision-making process on the National Test centre for Windmills '09 and examples of the consequences of the decisions. (Based on the journal article)

The profound interaction between policy-making and planning as well as unpredictable developments challenge the ability of SEA practitioners to influence decision-making. In an article on design of information systems, March (1987) emphasises the challenge of providing input in such unpredictable decision-making processes: "The conclusion is simple: one can design an information system around a precise, static decision structure, and for many elementary decision problems in organizations that is a good idea. But the more difficult and more important task for information engineering involves the design of a system for an imprecise, changing decision structure. The relevant question is: how do you construct an account when you do not know when that account is going to be used, or by whom, or for what purpose, or in what context" (p. 163). Although some tendencies of predictable structures can be found in the article, e.g. in the use of committees, the article also shows the variety and changing decision structure from one case to another. In this context, SEA risks being an "add on assessments" as termed by Emmelin and Lerman (2005, p. 180). March discusses ways of dealing with imprecise and changing decision structures and proposes that "At least in principle, it is possible to imagine designing a system for knowledge generation and dissemination that explicitly identifies the probable decisions to be made, prior knowledge about them, and the marginal expected return from various alternative knowledge instruments, given that structure" (1987, pp. 163-164). Based on experiences within science, journalism and education, March states that "In each of these cases, however, it is clear that the ex ante linkages among the expected uses of information in making decisions, its generation, and its actual uses are rather loose" (1987, p. 164).

Within SEA literature, a similar idea of predicting and controlling decision-making has been proposed in the ANSEA project (Dalkmann et al. 2004), which has been criticised for its assumption of permanent rules and possibility for identifying 'decision windows' in the SEA process: "However, this "tailoring" of SEA to fit the planning process also faces certain limitations. Even the 'tailor-made' SEA or ANSEA presume that it is possible to establish a priori rules for a planning process. However, in practice planning rules are often changed during the process, with important decisions possibly taken at any time, not necessarily at specified 'windows'" (Cherp et al. 2007, p. 630). Discussions within Energinet.dk, see the following section, reflect both an interest in predicting such windows of opportunity for influence and a doubt about the possibilities in practice.

An alternative to prediction is rapid response. Therivel (2004) states that "it is vital that the SEA process keeps pace with the decision-making process, which is often very rapid" (p. 160). The characterisation as rapid is also true for the energy sector as expressed in the high-speed train metaphor by a manager in the energy sector in the quote in the following section. As an alternative route to the idea of predicting decision-making, Therivel argues that to keep pace, it may be necessary to disregard "techniques that take much time, require much data, require data that are comprehensive and not just partial snippets of information, and rely on the skills of busy specialists" (p. 160). This route is based on the assumption that it is possible to respond when a decision-window is realised and before it closes, which may be difficult due to Danish requirements on consultation periods.

6.2 STRATEGIC DECISION-MAKING PROCESSES IN ENERGINET.DK

> *"In order to explore further the uptake and potential of SEA within the energy sector, it is worthwhile to turn to the electricity transmission and distribution industry. This is partly because grid networks, by their very nature, must be operated in a strategic manner. The physical infrastructure of a grid system is diffused over a large geographical area, is designed to connect points of supply with demand, and must be managed in an integrated fashion. Development of a grid must take into account changes in the mode and location of generation and in the pattern of demand, including over the long term. Moreover, grid systems are associated with a number of environmental concerns of the kind that environmental assessment seeks to address."* (Jay 2010, p. 3492)
>
> *"It has all the time been - and still is - the attitude in Energinet.dk that SEA shall not be an empty paper work. SEA shall enter into the decision-making processes at a time and with content that makes SEA an active element. That ambition has been difficult to get materialised since there are many stakeholders and processes connected to Energinet.dk's activities, which are not organised with an eye to accommodating an SEA procedure."* (Behnke 2010, translated)

In line with the quote of Jay (2010) above, Energinet.dk's decision-making on energy transmission networks are seen as highly relevant entry-points in the exploration of SEA in the energy sector. The relevance are increased by the ambitious attitude on SEA in Energinet.dk, cf. the quote of Behnke. In a European perspective, several other TSOs are working with strategic environmental assessment. Among these are the Italian TSO (Terna 2006), the Portuguese TSO (REN 2009), the British TSO (Nationalgrid 2009), and the Belgian TSO (Jay 2010). Some of these TSOs are in a similar stage of implementation as Energinet.dk with similar considerations, although possibly with other motivations for implementing SEA: In the case of Terna, implementation of SEA is driven by a motivation of using SEA to unblock social opposition by increased public participation (Ecorys 2010).

The following investigation of the conceptualisation of strategic decision-making processes in Energinet.dk is the second part of the unravelling of strategic decision-making by use of the 'series of choices' model. The investigation covers Energinet.dk's conceptualising strategic decision-making processes, which has been part of efforts of formulating an SEA policy in the company. Whereas the investigation in the previous subchapter focused on the interaction between policy-making and planning, this investigation focuses on the processes internal to Energinet.dk. The following investigation is thus a 'zooming in' on the planning part of the previous investigation. Strategic decision-making processes, which Energinet.dk are part of, are complex due to the number of private actors and authorities involved, the interrelation with other sectors, the scale and impacts of the developments, and a variety of technological options. Furthermore, the institutional setup was from the beginning of the SEA policy formulation not clear in terms of the sharing of responsibility between Energinet.dk and the Danish Energy Agency.

CONCEPTUALISATION OF STRATEGIC DECISION-MAKING PROCESSES AND SEA

In the following, Energinet.dk's conceptualisation of its strategic decision-making processes and SEA is presented and discussed. Energinet.dk's conceptualisation is an important part of understanding strategic decision-making processes in the Danish energy sector as it reveals how one of the main actors at the strategic level in 2010 interpreted these processes and its own role. The conceptualisations are in the following critically discussed with point of departure in literature on SEA and international experience.

Energinet.dk's conceptualisation of its strategic decision-making processes is related to the different discourses within Energinet.dk on the company's obligations on SEA, which are described in chapter 10. Of the four identified discourses, the following conceptualisation should is a product of the discourse termed the 'idealistic discourse'. Therefore, the conceptualisation should not be seen to reflect a homogeneous organisation, and arguments and elements of the conceptualisation is disputed by organisational members. The conceptualisation is primarily driven by an interest in targeting SEA when decisions are actually made. Involved in the authoring were the manager of the research and environment section Kim Behnke, the key person in the existing EA-work on the electricity transmission infrastructure, a key employee in the natural gas division conducting the pilot SEA, and me as an 'internal' Ph.D. fellow. The conceptualisation is furthermore formally adopted by the management board as appendixes to the 2008 and 2010 Strategy Plans.

The methodology is a triangulation of participatory insight, text analysis, and feedback discussions with two of the key actors on SEA implementation in Energinet.dk. Insight into the thoughts behind the conceptualisation is gained through co-writing the published appendixes to the strategy plans and through participation in decision-making processes in Energinet.dk. Due to the co-writing, the following investigation is partly a critical reflection on Energinet.dk's and my personal understanding of strategic decision-making processes and SEA at these points in time. The analysis of the reports made it possible to check for consistency between the conceptualisation and the content and formulations in the SEA and strategy reports. Two key actors on SEA implementation in Energinet.dk read and gave comments to a draft on the following text. The feedback increased the validity of the investigation, provided a basis for sharpening arguments as well as the presentation of the company's motivation and thoughts behind SEA implementation.

Presentation of the conceptualisation

The approach to SEA in Energinet.dk is characterised by omission of two of the formal planning documents, Strategy Plan and System Plan, from the scope of SEA. The argument for this choice is "that the strategic decisions are not made by these legally required publications, but with strategic decisions on concrete infrastructure initiatives" (Energinet.dk 2008a, p. 1). The omission of legally required plans at first seems in contrast to the legislation on SEA, however, the key aim of Danish legislation as well as the EU Directive is to influence decision-making (e.g. article 2 in Directive 2001/42/EC), and therefore it is more adequate to apply SEA on planning documents that are decided on by the management board prior to the legally required plans. Energinet.dk thus intends to apply SEA when decisions are made rather than in formal plans that are summarising decisions. This understanding has been

approved by the Ministry of Climate and Energy, the Energy Agency, and the Agency of Spatial and Environmental Planning (Energinet.dk 2010a). The approach is, however, not straightforward, and for instance in the case of the Cable Action Plan, the political pressure for action did not leave time for an SEA in the planning process: Following the political settlement in November 2008, Energinet.dk was given at deadline of March 2009 to deliver the comprehensive cable action plan. This deadline was agreed upon with a view to the time needed for the technical analyses, but time for the SEA procedure was not included (Gellert 2008). The window for influencing the decision among strategic options in this planning process was thus too short.

Energinet.dk's focus on the concrete infrastructure initiatives may be problematic since there is little opportunity for a holistic overview in the SEA process. The SEAs may thus be defective in terms of synergies and cumulative aspects. The overview may be obtainable for well-oriented employees in Energinet.dk, but it is most likely difficult to communicate the overview in consultations. The choice of targeting SEA to the individual projects thus seems to be a trade-off between overview and decisive moments. The alternative approach of targeting the legally required plans also include weaknesses: The pilot SEA was applied on the natural gas security of supply plan - not strategic decisions on concrete infrastructure initiatives - and the process showed that it was not easy to comply with the requirements of article 9 in the EU Directive on the information on the decision as no formal decisions on options have been made after finalising the SEA report. The corresponding document stated "There is in the plan not yet made decisions on which of the described alternatives should be implemented. The plan thus constitutes only a preliminary background for the further work towards a choice of concrete expansion of the gas supply network" (Cowi 2010, p. 4).

In targeting strategic decisions on concrete infrastructure initiatives, Energinet.dk has "special focus on preparing SEA in the strategic decision-making process, which precede initiation of major infrastructure projects" (Energinet.dk 2008a, p. 2). In the work on the conceptualisation following the 2008 formulations, these preceding processes were specified not to include the management's informal probing of interests and possibilities at other transmission system operators (TSOs): "These probings take place on a superior level without actual decisions, why SEA is not relevant. The SEA process is getting relevant, when concrete strategic decisions are being made" (Energinet.dk 2010a, p. 3). Although the probings do not include 'actual decisions', it is clear that these 'probings' play a decisive role for the strategic development of infrastructure as they create and delimit the options in play. The probings therefore constitutes a controversy between interest in initiating SEA in the early decision-making processes and interest in informality and room for manoeuvre in a competitive environment between TSOs, which would not be possible with application of SEA. The 'probings' are most likely also too transient and without sufficient firmness for a meaningful application of SEA, and other tools than SEA therefore seem needed for a integration of environment at this level of decision-making in Energinet.dk. As indicated in the article in the previous subchapter, the probings may be motivated by competition between TSOs, by market signals, by technical needs for increased capacity or security of supply, and other drivers. Following the probing phase, the decision-making process and SEA application in Energinet.dk is conceptualised as visualised in figure 20.

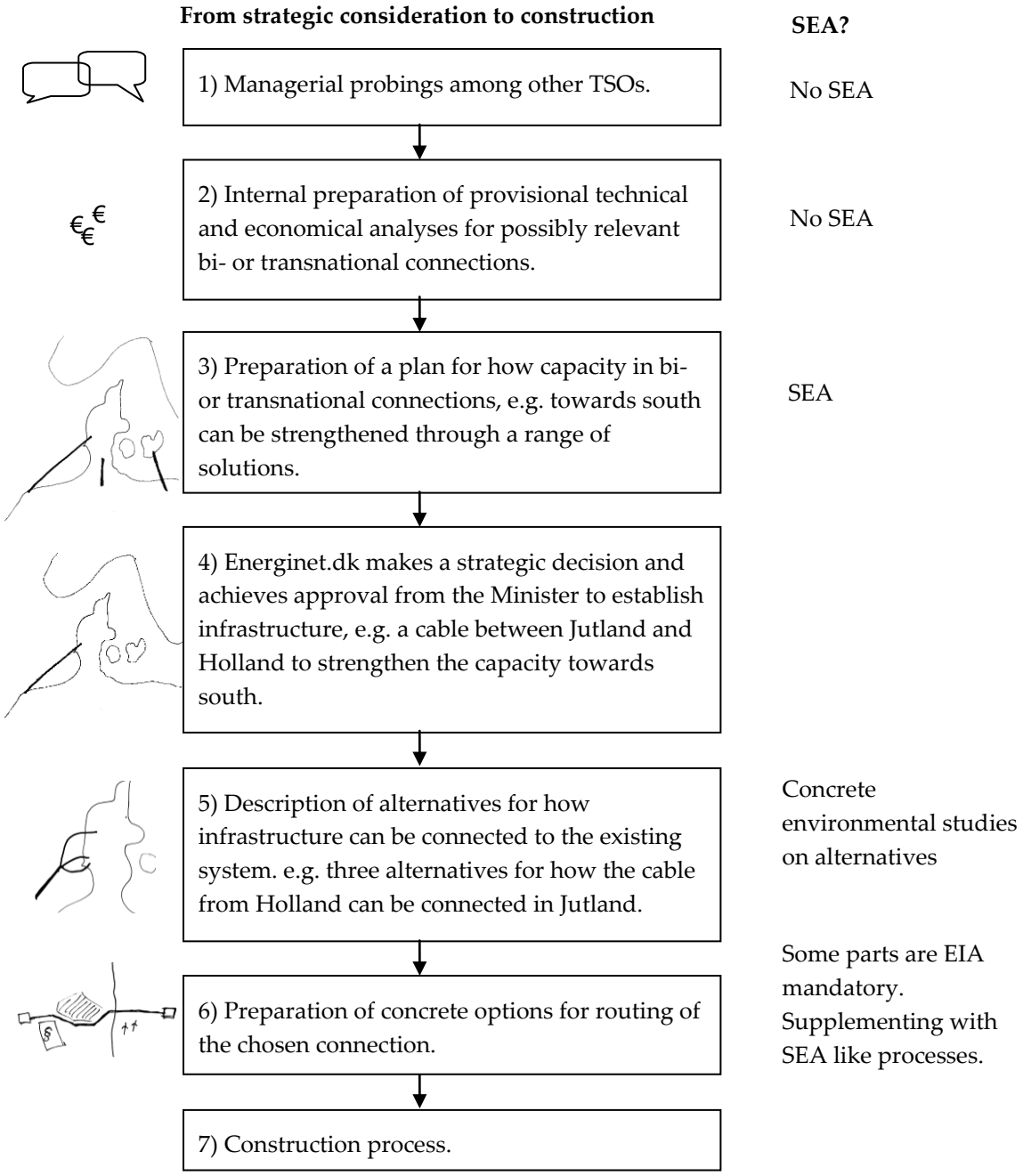

Figure 20: Decision-making from strategic considerations to construction in Energinet.dk and the relevant stages for SEA (Energinet.dk 2010a, p. 6).

The provisional analyses that are made in interaction with the probings among other TSOs are also not conceptualised as within the scope of SEA. Choices made at this level are argued to be too insubstantial: "SEA is not part of this phase as it involves a plurality of analyses and considerations of which the most never is carried out" (Energinet.dk 2010a, p. 6). Environmental considerations seem minor compared to economic and technical aspects in decisions at this level, and like the probing level, there seems to be a need for strengthened environmental concerns by other tools than SEA: The provisional analyses hardly involves frames for development consent and are not decided upon without further elaboration. When these provisional analyses are concreticised into planning documents at the third level in

figure 20, SEA is argued to be relevant "since the planning forms the basis for decisions" (p. 6). As an example of a decision at this level is a decision of establishing transmission connection to neighbouring areas (e.g. Norway, Sweden, or Germany) without considering concrete routes, but considering pros and cons of the possible connections.

At level four in figure 20, the planning document accompanied by SEA leads to a strategic decision, e.g. on a specific connection. This decision is subsequently concretised into more detailed alternatives, e.g. on how to connect the decided connection to the existing system. The investigation of alternatives is in Energinet.dk accompanied by environmental studies to supplement the following EIA of the specific parts of the solution. The EIA regulation enters into the process when the infrastructure is at the project level and proposals for routing of the infrastructure are made. At this level, the decision concerns details on e.g. routing and technology of offshore and on-shore cables and constructions like transformer stations. Prior to the recent change of the Danish legislation on EIA in 2010 (Executive order no 1510 of 15/12/2010), electricity cables were not EIA mandatory. Furthermore, the authority on energy infrastructure is divided between authorities, which seems to impede a treatment of the development in its totality: Infrastructure on land is under the auspices of the Ministry of Environment, whereas energy infrastructure off-shore is under the auspices of the Ministry of Climate and Energy. To deal with these two obstacles to a broad assessment, Energinet.dk used an SEA-similar procedure to consult and assess environmental impacts of cable projects.

Besides the decision-making process initiated by probings with other TSOs, the conceptualisation also includes decision-making processes that follow from political decisions and instructions as pointed out in the article on interaction between policy-making and planning. In cases where political decisions are specific on what should be done, the range of strategic options to be considered on in Energinet.dk is reduced rather. In terms of SEA responsibility, it is notable that Energinet.dk regards environmental assessments of infrastructure that are imposed on Energinet.dk as the responsibility of ministries following the Prime Minister's Office's Circular no 159 of 16/09/1998 and Executive order no 936 of 24/09/2009, and SEA is therefore in these cases not to be initiated by Energinet.dk (Energinet.dk 2010a).

A second interaction in the strategic decision-making in Energinet.dk is the interplay with the planning in the formalised cooperation of TSOs termed the European Network of Transmission System Operators for Electricity (ENTSO-E). In interaction with national TSOs, ENTSO-E develops a Ten-Year Network Development Plan (TYNDP) that point at needs for strengthening the European transmission network (ENTSO-E 2010). As a curiosity to the efforts on applying SEA at strategic level, ENTSO-E has decided that no SEA should be made on the TYNDP, since it is not basis for any decision and it is not made by an authority (Francescato et al. 2010). The TYNPD seems, however, to play a significant role in influencing the infrastructure initiatives in each TSO and EU initiatives on these. Furthermore, the TYNDP is required by EU trough the third internal energy market package (European Commission 2010b). According to Kremlis from the DG environment, the DG has informed the European member states that TEN energy initiatives should undergo SEA (Kremlis 2011). In this way, the TYNDP has to relate to SEA disregarding who is preparing the plans.

A third interaction in the strategic decision-making in Energinet.dk is the interplay with the EU financial aid to energy networks, which includes considerable amounts of money. In this

EU system, SEA is a formal part of the procedures, as the proposal submission form for community financial aid (European Commission 2009a) requires applicants to consider whether "the action results from a plan or programme falling within the scope of the SEA Directive". The form specifically asks into cumulative effects and for explanations for not applying SEA. Thus, there is a pressure from the EU system to consider SEA in funding-seeking strategic decision-making in Energinet.dk. The European Commission furthermore becomes a more direct policy-making role in terms of energy infrastructure, e.g. by their "Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network" (European Commission 2010b). The criteria for assigning potential infrastructure status as European interests (European Parliament 2011a) have despite importance apparently not been assessed.

The outlined interactions with the external context and the consequences for SEA application is further investigated in the following chapter.

DISCUSSION OF ENERGINET.DK'S CONCEPTUALISATION

Energinet.dk's conceptualisation of strategic decision-making and SEA in the company involves a range of interesting elements. In the following, the conceptualisation is discussed in terms of the nature of strategic decisions and the potential difficulties and benefits of applying SEA as conceptualised.

The conceptualisation has a dominating emphasis on isolated, specific infrastructure developments as contrasted by a holistic conceptualisation of the development of the Danish energy infrastructure. This characteristic is partly caused by the competition between Energinet.dk and other TSOs on strategic possibilities for profitable interconnections. Energinet.dk therefore has to seize the opportunity when it arises rather than await a holistic planning process, and transparency may further hinder the company's competitive ability, see also the discourses on the role of SEA in chapter 10. The British TSO has a similar understanding of major plans only summarising decisions. Jay (2007, p. 77) reports that: "licence holders tend not to assign clear planning functions to SYSs [Seven Year Statements], but to see them as essentially descriptive documents. Officers typically refer to a SYS as a ‘snapshot in time’ of the state of a network, which indicates no more than the constraints and opportunities for development". The SYSs are also omitted by the TSO from the range of legally required plans that are SEA mandatory, but in contrast to Energinet.dk this omission is based on the understanding that plans are not setting framework for development consent, since the British TSO is obliged to connect consumers and producers to the grid regardless of its plans. Jay challenges this understanding by arguing that " a SYS does set ‘a framework for development consent’ in the sense that it provides guidance to the wider industry about the preferred locations for system development, in a way that is analogous to a spatial plan indicating preferred patterns of land use to private developers" (p. 79). A similar reasoning could be made on Energinet.dk's plans, although the consumer and producer orientation - with the exception of offshore wind power plants - seems weaker at strategic level.

The focus on actual decisions on specific infrastructure developments can be argued to give SEA a reactive rather than proactive role in the sense that it is strongly related to actual

decisions and 'decisions' can, cf. the conceptual framework, often only be identified in retrospect and the formal decisions may be late in a series of decisive choices.

The portrayed levels of decision-making in Energinet.dk's decision-making process can be interpreted as sub-programmes (Cyert et al. 1956, p. 245), in which each level constitutes sub-programmes that in various extents are programmed: The strategic level decision-making includes variation in mode, actors, and content and is thus likely non-programmed. At the lower levels, decision-making is programmed by e.g. EIA-legislation and organisational procedures. Seeing the levels in the figure as sub-programmes indicates the priority on environmental issues in the strategic decision-making: First tactical, cooperative aspects are considered in level 1 without SEA, then economic and technical aspects are considered in level 2 without SEA, and then environmental aspects enter in level 3. According to Behnke (2011), this view on the relation between financial, technical and environmental aspects is widely in accordance with the procedure in the company. Environment is thereby not central to the development of strategic developments, but something that has to be cleared after tactical, technical and economic aspects have formed the development.

The intension to apply SEA on level three is most likely faced with challenges of creating a relevant public 'decision' document on this level. Judged from a year of participation, Energinet.dk does not have a tradition for actual planning documents at this level that show overview of options; decisions seem to be made on socio-economic calculations or internal notes on possibilities, see also subchapter 6.1. This characteristic is not only true for Energinet.dk, but also other actors in the energy sector: The political decision on the test centre in Østerild was seemingly made on internal notes in ministries rather than by an actual planning document. Thus, the success of SEA depends, in accordance with the argument of Fischer (2003), on the possibility for making new structures in the organisations' decision-making as part of the implementation of SEA. Structuring the decision-making to fit SEA may be challenged by the path dependency of the existing routines and the existing expectations to the flow of decision-making that would be interrupted by a more than three month long SEA procedure. As described above, the cable action plan is an example of an externally induced time pressure that in practice prevented SEA application. This example emphasises the need to clarify the consequences of SEA legislation on schedule and progress for other actors. Time pressure is not only a problem in the energy infrastructure planning, but also in transport planning: Despite a university's scheduling of making decision aid for a potential Kattegat connection, the Danish Minister of Transport stated that the decision aid should be ready before the scheduled date and that he would work for a quicker process (Pauli 2011).

The intensions of reducing overlap between SEA and EIA in Energinet.dk seem to have resulted in a 'very strategic' orientation of SEA: EIAs are made on routings of transmission lines and to avoid overlap, SEA thus has to be targeted a level of decision-making prior to any mentioning of routings. As seen in the figure above, SEA is therefore settled on a level where connections are described abstractly and without genuine spatial frames, which is at the edge of the scope of the EU Directive on SEA. A similar strategic emphasis is found in Nooteboom (2000), who comments that "The way to consider highly strategic environmental alternatives, is probably to apply SEA to the levels where they are still considered to be realistic options" (p. 159), which is before the stage in which an option in principle is settled upon. In the case of Energinet.dk's infrastructure planning, it seems that strategic

interventions are driven by interest in a specific infrastructure option, and other options can therefore only be said to be relevant prior to development of the specific energy infrastructure. The SEA approach in Energinet.dk risks being without the expected influence as it aims at targeting strategic decisions on specific infrastructure and these decisions are not formally made before the business case of specific infrastructure shows a firm benefit for the society. Energinet.dk's SEA approach seems thus to target formal decision moments and not the range of informal choices made prior to and shaping the formal decision.

The conceptualisation in Energinet.dk does not seem to acknowledge the relevance of applying SEA to the input that Energinet.dk gives to the political decisions in the interaction. The political input is e.g. planning documents as seen in the article in the previous subchapter, but is also scenario work like the "Energi 2050 - Vindspor" report (Energinet.dk 2011a), which illustrates the strategic aspects of the power grid development to realise the political vision of independency of fossil fuels in Denmark. The responsibility for conducting SEA at such political input is discussed in chapter 6.1. Applying SEA on political input risks being unfortunate if the input is not basis for political decisions. Furthermore, political decisions in the energy sector seem made on a range of political input from a range of actors, and the range of input can hardly be assessed as a whole; as an example, the Government's Energy Strategy 2050 was besides Energinet.dk's Vindspor analysis preceded by an energy strategy made by the Danish Engineer Association, an analysis made by a consultancy company, and a strategy made by the Danish Industry Association. Finally, the Government's Energy Strategy 2050 does not constitute decisions, but forms the point of departure for adopting laws on subjects, which a majority of the Parliament supports. Thus, the governmental strategy may be a more relevant document for applying SEA than the previous input - in accordance with the formulations of the SEA Directive; "during the preparation of a plan or programme and before its […] submission to the legislative procedure" (article 4). Similarly, the Offshore Wind Action Plan described in the previous subchapter was not only based on the work of the Committee for Future Offshore Wind Power Sites, which was subject to SEA, but also based on a concurrent work of the Electricity Infrastructure Committee, which was not subject to SEA. The development of the Offshore Wind Action Plan reveals another challenging character for the application of SEA: The priority of locations are seen as a continuous update to adapt to societal developments, and the priorities of the Committee report have been changed two times in the following two years due to developments in assumptions (DEA 2010a). These changes were not screened for significance in terms of the SEA Directive's article 3.3.

Finally, the target of the SEA implementation in Energinet.dk seems optimistic. It is described as "to make environmental considerations a systematic part of the strategic decision-making process and secure that strategic decisions are made on a qualified and informed basis. Environmental aspects will thus be an equal part to economic and technical aspects" (Energinet.dk 2008a, p. 1). This statement is interesting in two respects: A) it is optimistic in terms of the consequences of implementing SEA, and B) it points only at a few aspects of SEA methodology and do not mention e.g. participation and transparency. The aim reflects high expectations to SEA of being able to provide a balance between economical, technical and environmental aspects in decision-making, which, as presented in appendix B on SEA, may be too optimistic. The systematic integration in itself does not require consultations or formal reports, and the formulation therefore provides room for integrating environmental

considerations in other ways than by an SEA process following the formal procedure, meanwhile applying the formal SEA procedure with transparency on strategic decisions when the strategic decision-making in Energinet.dk is formal and of less competitive disadvantage. Examples of such systematically consideration of environmental impacts of a strategic issue without a public participation process is Vattenfall's assessment of CO_2, which, however, has been published (Eriksson et al. 2006).

SALAMI-SLICING OF STRATEGIC DEVELOPMENT?

In the perspective of holistic planning, Energinet.dk's approach of applying SEA on individual infrastructure developments can be seen as a matter of "salami-slicing" (Sheate 2003, p. 345) an overall plan for infrastructure development. At the project level, salami-slicing has been used as a term for a tactic of splitting projects into sub-projects to avoid thresholds or opposition:

> *"Salami-slicing refers to the practice of splitting an initial project into a number of separate projects, which individually do not exceed the threshold set or do not have significant effects on a case by case examination and therefore do not require an impact assessment but may, taken together, have significant environmental effects"* (European Commission 2009b, p. 5).

According to the European Commissions report on the application and effectiveness of EIA, the salami-slicing were recognised by the member states, and it was related to issues of considering cumulative impacts and thresholds on when EIA is mandatory to changes and extensions to projects.

Apparently, the concept of salami-slicing has not yet been a discussion on strategic level, which may be due to an assumption of strategic level planning and assessment as holistic and as a way to avoid salami-slicing (see e.g. Agreco Consortium 2006). Salami-slicing at strategic level could be a practice of splitting up a holistic planning of developments into a number of individual development initiatives. It seems that such practice would have similar tactical potentials as at the project level in terms of the significance threshold in the EU Directive on SEA and in terms of reducing public awareness and opposition towards comprehensive and costly developments. For Energinet.dk the argument could be that the portfolio of energy infrastructure initiatives in its whole is too overwhelming for a range of actors in terms of economical and environmental consequences, why Energinet.dk would benefit from slicing the salami into individual developments. Although it seems that Energinet.dk's practice of individual infrastructure development is more guided by an interest in using SEA actively than by salami slicing, the avoidance of a holistic planning seem favourable to the company. Some actors articulate the magnitude of the total investments in interconnections in efforts of putting these on the agenda (see e.g. Blarke 2009). Energinet.dk's SEA approach targeting individual infrastructure initiatives will most likely be closer to the moment of decision-making than SEA applied on the company's formal plans. However, this SEA approach risk facing similar salami-slicing issues as the project level EIA, e.g. in overview of cumulative impacts.

CHAPTER 7: STRATEGIC DECISION-MAKING

AS CONTEXTUAL INTERACTION

> *"Organizations today face an increasingly turbulent external environment, which is characterized as uncertain, ambiguous and populated by equivocal cues that result in discontinuous rather than evolutionary change. […] Greater uncertainty can lead to confusion and an over-cautiousness that paralyses organizations and their managers into inactivity. Alternatively, ignoring complexity can lead to misplaced over-confidence where decision-making is undertaken with important cues being rejected as they do not conform to existing mental models"* (Wright 2005, p. 86)

A meaningful way of applying SEA on non-programmed strategic decisions must also be meaningful within the extreme situations such as the increasingly turbulent environments with equivocal cues described by Wright above. This chapter focuses on strategic dynamics around the strategic decision-making in the Danish energy sector to clarify what characterises such strategic dynamics and to investigate what the dynamics means for SEA application and how the team conducting the SEA reacted to these changes.

The investigation makes use of the 'contextual interaction' model described in the conceptual framework as an in-between the two extremes of the continuum of perspectives on strategic decision-making. The model thus includes both elements of overview and elements of the detailed choices made throughout the process. The investigation is thus part of the testing of the relevancy of the contextual interaction model and the continuum of perspectives on strategic decision-making.

7.1 STRATEGIC DEVELOPMENTS AND FRAMING OF ALTERNATIVES IN SEA

The following investigation of strategic decision-making processes by use of the contextual interaction model is focused on how alternatives are selected and presented. This framing of alternatives at strategic level is highly depending on the strategic dynamics internal as well as external to a company. The framing of alternatives is both a concern in the decision-making as well as in the SEA process, which makes framing of alternatives an entry point for investigating the relation between SEA and strategic decision-making.

Besides a mapping of strategic dynamics that is giving overview of the interaction, the contextual interaction model is in the following also used to shed light on the details of decision-making: What involved actors perceive as relevant alternatives depends on how they make sense of "what the policy issue is about, what kind of problems are related to it, and which policy instruments are available" (Valve 1999, p. 126) and whether they perceive earlier commitments as constrains or as issues to be reopened for discussion.

As mentioned in the methodology chapter, the investigation is based on triangulation of methods of participation in the process giving insight and impressions, distanced factual documentation of the developments, as well as feedback and input from participants.

PRELUDE: THE NATURAL GAS SECURITY OF SUPPLY PLANNING

The investigation in this chapter focuses on a specific contemporary strategic decision-making process, namely the natural gas security of supply planning. This planning was in 2008 selected for a pilot project on SEA in Energinet.dk and the process therefore provides an interesting opportunity for relating SEA and strategic decision-making in the energy sector. It should be noted that the SEA pilot is not in fully in line with Energinet.dk's intension of applying SEA when decisions are made, since the focus is the statutory and annual plan rather than the decisive moments of infrastructure developments; the SEA pilot was conceptualised with point of departure in the legislative formulations prior to the emphasis on strategic initiatives. This brief prelude is an addition to the short introduction to the security plan in the article below.

Energinet.dk is by law responsible for Denmark's security of supply of natural gas. To ensure the security, cooperation with national as well as international actors is necessary. Among these are gas producers, gas storage facilities, consumers and organisations responsible for security of supply in nearby countries. The annual consumption of natural gas in Denmark is around 4 billion Nm3 per annum and the domestic production is declining (Energinet.dk 2009i).

The annual natural gas security of supply plan must account for the security of supply during the previous year and for how it will be ensured one and ten years ahead. Furthermore, it must account for how security of supply is maintained in emergency supply situations. Security of supply is defined as "in the event of full or partial interruption of the supply to the Danish market, the supply of uninterruptible consumers must, as a minimum, be maintained for: 3 days during particularly cold periods, which, on average, occur every 20 years and 60 days during a normal-temperature winter" (Energinet.dk 2009i).

Although the planning is annual, it is influenced by a range of changes that may lead to a characterisation as non-programmed. As an example is the introduction of renewable gasses into the transmission system and the third EU liberalisation package in 2009 that created a new cooperation body termed the European Network of Transmission System Operators for Gas (ENTSO-G). This body will influence the relative independency of Energinet.dk in terms of the strategic development of the Danish gas sector. The package furthermore influenced the regulation on security of supply towards a more regional scale, which may lead to cross-boarder cooperation. (Energinet.dk 2009i).

The natural gas security of supply planning is complex due to the international scope and the many actors with many interests and worldviews involved. In this perspective, "[t]he formulation of alternatives is not only a technical problem. Environmental assessments function as arenas where interpretative struggles about the planning problem and existing freedom of action take place (Valve 1999, p. 140). Although interpretative struggles also are important in a Danish energy sector context, these are not part of the following investigation.

JOURNAL ARTICLE:

HOW STRATEGIC DYNAMICS COMPLICATE THE FRAMING OF ALTERNATIVES IN AN SEA PROCESS: THE DANISH NATURAL GAS SECURITY OF SUPPLY PLAN

Impact Assessment and Project Appraisal (under review)

Lyhne, I, Aalborg University, Denmark

ABSTRACT

Unpredictable and complex developments challenge the application of strategic environmental assessment (SEA) e.g. in terms of timing, prediction, and relevance of the content of the assessments. Especially strategic level decision-making processes involving a range of actors on unstructured problems seem to be characterised by unpredictable and complex changes. Despite apparent implications, explorative investigations about how unpredictability influences SEA application in practice are rare, especially empirical investigations of how practitioners react on contextual changes.

This article aims at shedding light on contextual influences and reactions to such influences by a case study of the specific SEA process of the Danish Natural Gas Security of Supply Plan. Special emphasis is given to the framing of alternatives in the SEA process, since alternatives are directly related to the contextual developments. Based on a participative approach, strategic dynamics are mapped and the reactions and concerns in the SEA team are outlined and discussed.

Keywords: Strategic decision-making, alternatives, strategic environmental assessment, energy

INTRODUCTION

> *Environmental assessment must continually adapt to emerging trends, such as changing economic and environmental conditions, new technologies, developments in jurisprudence, and evolving public expectations.* (CEAA 2010, pp. 5-6)

Decision-making at strategic level has been described as complex and unpredictable, e.g. by de Bruijn and ten Heuvelhof (1999) in a multi-actor setup and by Deelstra et al. (2003) in the context of large projects. De Bruijn and ten Heuvelhof have found that a multi-actor decision-making process "typically jumps from one partial decision to another, each of them being 'locked into place' for a shorter or longer period" (p. 181). Such partial decisions are made in arenas "characterised by a specific mix of political, financial and/or economical, legal and scientific rationalities" (p. 181), where the role of the different rationalities varies between processes. Therefore, they argue, the agenda can change continually and the speed of the progress varies. This description seems to share characters with Lindblom's (1968) description of public policy-making as 'apparent disorder', the Garbage Can model (Cohen et al. 1972) and Mintzberg et al.'s (1976) structure of unstructured decision-making processes. In practice, unexpected developments may be reason of delays in infrastructure development processes like the Nord Stream project, the Russian Sakhalin-II project, and the East Siberia-Pacific Ocean oil pipeline (Mortished 2008).

To the extent decision-making processes indeed are unpredictable, inflexible impact assessments tools are argued to be of limited use for decision-making (Kørnøv and Thissen 2000; Lyhne 2011a). Kørnøv and Thissen argue that "impact assessors can only deal effectively with the dynamics and unpredictability of decision processes if they adopt a flexible, adaptive and learning approach themselves. If they do not, they run the risk of writing a thorough report based on an initial but fixed problem formulation, only to find out after a while that the policy agenda and issues have changed significantly in the mean time, as a consequence of which a well researched report remains unused and ineffective" (p. 198). To reduce the risk of ending up with a report of little use, contextual awareness and adaptation is generally pointed at as important in SEA application. Hilding-Rydevik and Bjarnadóttir (2007) point at a relationship between context sensitivity and success of SEA implementation and Hildén and Jalonen (2005) argue that in cases where strategic decision-making is dominated by social struggles, "flexibility and sensitivity to context is a key to successful SEA" (p. 170).

One of the aspects that may change due to the dynamics of decision-making processes is the relevancy of proposed alternatives. Framing of alternatives is the selection of a specific set of alternatives in a given setting by a group of persons responsible for the content of SEA. In strategic and ambiguous settings, several different framings may be relevant and the framing thus widely depends on the persons involved and their insight into the planning and its context. The framing of alternatives is argued to be a central part of the SEA tool (Noble 2000) and it is influencing the efficiency of the SEA process (Arts and Lamoen 2005). Learning from decision-making theory, the framing of alternatives constitutes an information filter in terms of the range of alternatives included in the decision basis made for decision-makers. Cyert et al. (1956, p. 246) assign such a filter "a large influence over the decisions the [managers] can

and does reach" and find that in non-programmed decision-making, the search for alternative courses of action is one of the most important processes in decision-making. Kahneman and Tversky (1979) empirically show how specific framings of options influences people's judgement and choice of options. In the SEA process, choice and framing of alternatives influence e.g. how the impacts are understood; "environmental impacts often appear most easily as distinctions between the alternatives" (Valve 1999, p. 140).

At a strategic level, unpredictability and dynamics may pose major challenges to the framing of alternatives in SEA practice in efforts of avoiding an outdated SEA report. The question is: How is adaptation done in practice? How do SEA practitioners react to concrete instances of dynamics and unpredictability? How do strategic dynamics influence decisions made by the employees that decide on the content of SEA reports? These questions are in line with the stated need for empirical research into the potential of SEA to adapt to different decision-making process (e.g. Brown and Therivel 2000).

EMPIRICAL STUDIES ON THE FRAMING ALTERNATIVES IN STRATEGIC DYNAMICS

Whereas much SEA literature prescribes models and methods for how to adapt to strategic decision-making (e.g. Dalkmann et al. 2004), research empirically showing how complexity and unpredictability influence practice and is handled by practitioners in SEA processes is scarce.

Desmond's (2007) study of Irish practice is one of the few exemptions. Based on review and interview, she identifies a range of problems in the framing of alternatives: "Procedurally, there was a lack of guidelines for identification of alternatives […]. Institutionally, there was a lack of experience within authorities in the development of alternatives. […] Legally, time and resource limitations put severe constraints on identification of alternatives" (p. 267). These identified constraints relate to practice in general and may be amplified in cases of high strategic dynamics.

In a study of a Finnish infrastructure planning, Valve (1999) points at the influence of power structures and political aspects in the framing of alternatives. She further comments that "It may be unclear [to the actors] what choices the assessment should shed light on" (p. 125). This unclearness seems to amplify the political struggles over the framing. In cases of high strategic dynamics and unpredictability, the actors may be forced to make a stand and act on a highly ambiguous basis.

The influence of contextual developments on the framing of alternatives is indicated in Partidário and Coutinho's (2011) story about the decision-making process of the Lisbon new international airport; several framings on possible locations have been proposed during the long history of the airport development and in a number of instances contextual developments have influenced the framing of alternatives.

CONTRIBUTION AND RESEARCH QUESTIONS

This article aims at shedding light on the influences of strategic dynamics and unpredictable developments on SEA processes through a case study of a specific SEA process of a strategic planning process. The specific planning process is the preparation of the Danish Natural Gas

Security of Supply Plans (NGSSP) of 2008, 2009, and 2010 made by the Danish transmission system operator Energinet.dk.

Special emphasis is given to the framing of alternatives in the SEA process, since the framing of strategic alternatives is directly related to the dynamics of the context. The investigation thus empirically shows how the contextual developments influenced the decisions made by the team of employees responsible for the SEA content and how the team reacted. The research questions are:

- What kinds of contextual changes influence the framing of alternatives in the SEA process of the NGSSP?
- How are the contextual changes handled by the SEA team and what are the reasons for changing the framing of alternatives?

METHOD AND STRUCTURE OF THE ANALYSIS

The investigation is based on a triangulation of methods. The point of departure is participatory insight, which is supported and contested by document analysis of public documents and feedback from an involved participant. The feedback was given by email and through semi-structured interviews in June (Vinther 2011) and August 2011 (Nybroe 2011)

The participatory insight is gained by participation in the SEA team, hereunder in meetings and reviews of drafts in the SEA process on the natural gas security of supply plan (NGSSP). The SEA team meetings took place twice in the autumn of 2008 and twice in the summer/autumn of 2009. Besides the meetings, a range of decisions were made by email correspondence. The team that undertook the pilot SEA consisted of two consultants, three employees of the gas division in Energinet.dk, and the author of this article as a Ph.D. fellow. The tree employees of the gas division were key persons in the development of gas infrastructures and they thus coordinated the planning and SEA processes. The SEA was a pilot project on SEA implementation in Energinet.dk. Other people were included in an ad hoc basis, and experiences from the process were disseminated through two internal workshops with participation from relevant sections in the organisation. Insight in the strategic decision-making processes is increased by participation in other meetings and internal communication in Energinet.dk, see Lyhne (2011a) and Kørnøv et al. (2011).

The following analysis of the natural gas security of supply planning is chronologically structured. The analysis of the framing of alternatives is focused on the planning process, the SEA process, contextual changes and Energinet.dk initiatives. The investigation has similarities with the narrative investigation of Cyert et al. (1956) of observing a business decision, although the following investigation is limited to the framing of alternatives, or more precisely, to what Cyert et al. term "substantial alternatives" (p. 247) as compared to "procedural alternatives".

The following mapping of developments shows a clear-sightedness of retrospection that does not reflect the ambiguity and complexity of the process as it appeared to the SEA team when it unfolded. The simplicity of the mapping has been a compromise between reproducing complexity and making the mapping accessible to the reader and only the major and

influential developments are therefore included. Furthermore, the arrows in figure 21 indicate linkages and not direct cause-effect relations, since filters and delays blur these linkages.

INTRODUCTION TO ENERGINET.DK AND THE NGSSP

Energinet.dk is the Danish transmission system operator on electricity and natural gas. It is an independent public undertaking owned by the Minister of Climate and Energy. Energinet.dk is by law obliged to prepare an annual plan for the security of supply of natural gas, cf. circular no. 884 of 21/08/2006. To uphold the security of supply standard, the plan may include frames for new natural gas transmission infrastructure and it is therefore to be considered in terms of the Danish legislation on SEA.

The investigation covers the process of preparing the natural gas security of supply plan for 2008 and onwards to the plan for 2010. Part of this planning process is also described in (Lyhne 2011a). Preceding the planning in 2008 are a number of analyses of possibilities for expansion of the natural gas transmission system, which among other things has been expressed in a public debate initiative on the strategic options (Danish Ministry of Environment and Energy 2001a), EIAs of an offshore gas pipe to Poland (Dong 2001) and related onshore gas infrastructure development (Danish Ministry of Environment and Energy 2001b), a circular (no 16 of 25/01/2002) on an east-west expansion of the transmission system, and the Nord Stream gas connection from Russia to Germany (DEA 2006). Gas storage infrastructure has been developed in a parallel process to the transmission infrastructure development. It has included development of two gas storage facilities and considerations of a third. The Ll. Torup storage facility has concurrently with the period analysed in this study been subject to a re-leaching and expansion of gas storage project started in 2007 (Energinet.dk 2007b).

Despite many years experience of natural gas security of supply planning, the dynamics at strategic level make the planning of natural gas infrastructure in the period of 2008-2010 an unstructured decision-making process, since it has "not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists in the organization" (Mintzberg et al. 1976, p. 246).

THE STRATEGIC DEVELOPMENTS AND FRAMING OF ALTERNATIVES

An overview of the contextual developments and influences on the SEA process is provided in figure 21 and figure 22 and 23 show the maps of alternatives presented in the SEA scoping report in 2008 and in the SEA report in 2010, respectively.

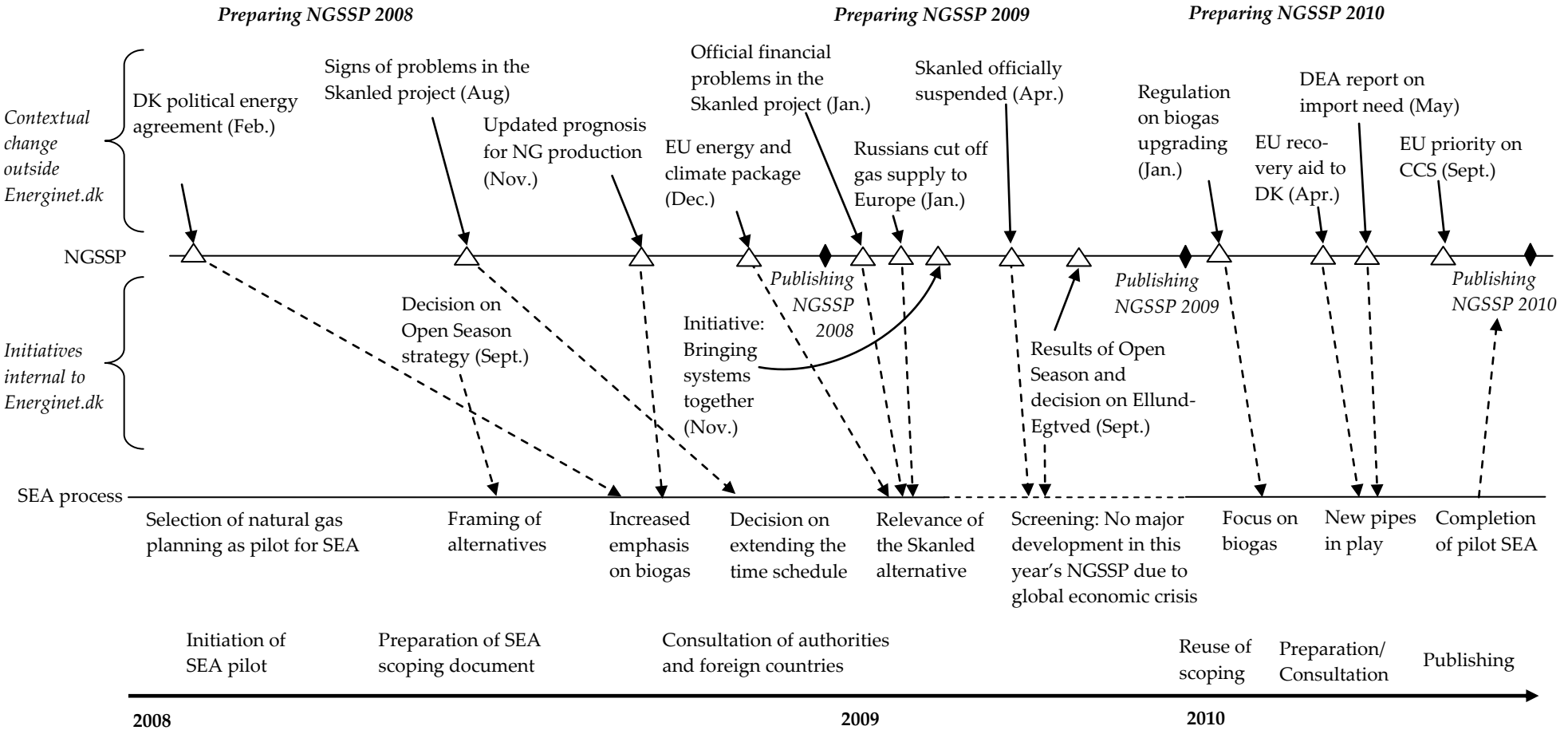

Figure 21. Development of natural gas security of supply plans in Energinet.dk with influences of external and internal activities and the relation to the SEA. Stippled arrows symbolise influence on SEA process and other arrows symbolise influence on planning process.

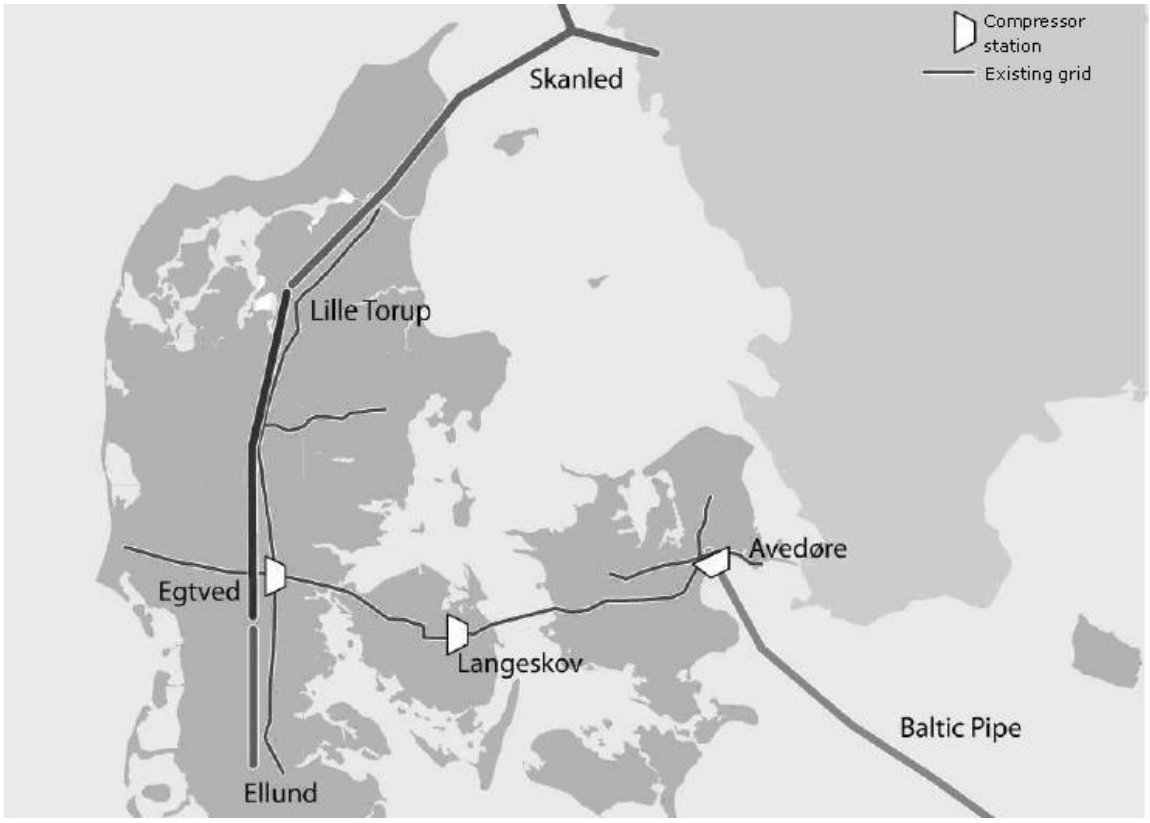

Figure 22. Map of alternatives presented in the SEA scoping report on Energinet.dk's NGSSP'08. The map shows the Skanled Connection to Norway and Sweden, the Egtved-Ellund connection to Germany, and the Baltic Pipe connection from Avedøre to Poland (Energinet.dk 2008d).

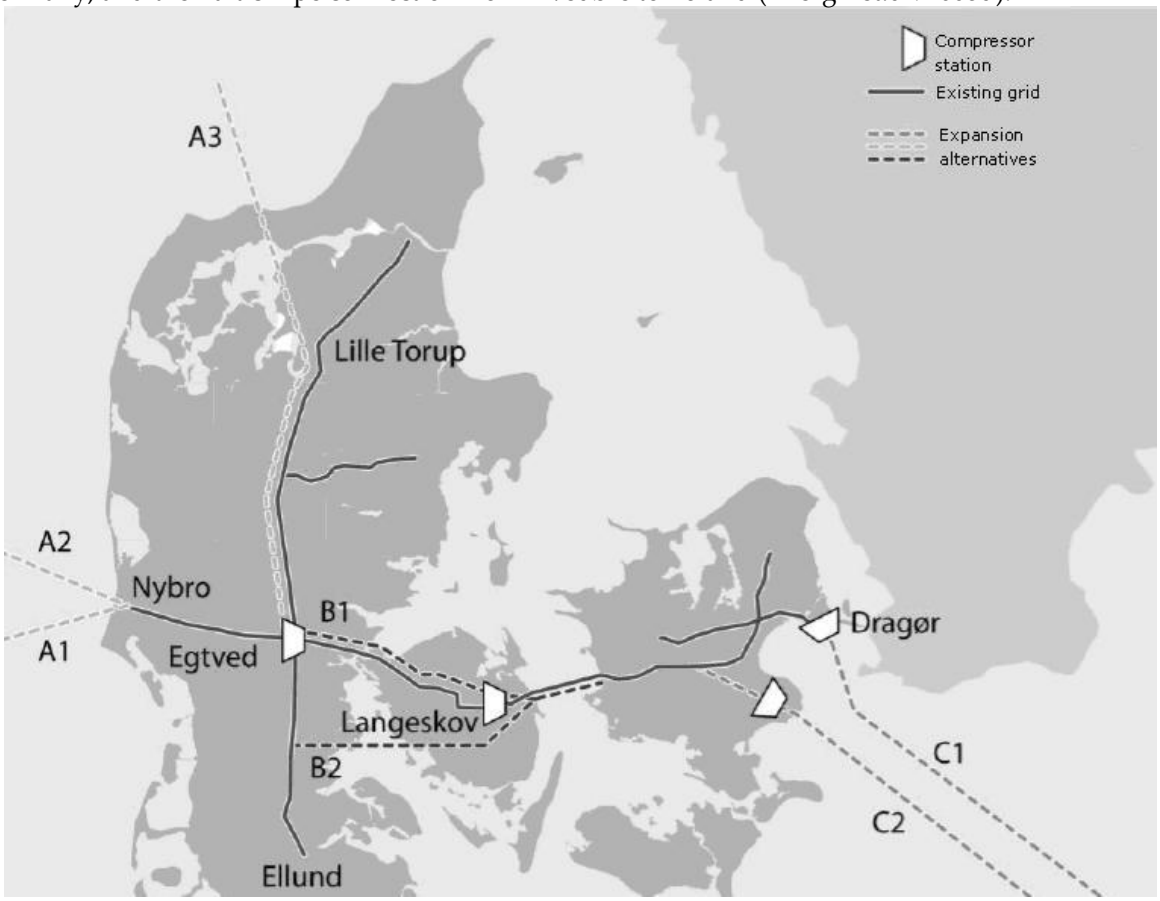

Figure 23. Map of alternatives presented in the SEA report on the NGSSP10. The map shows three alternatives for connecting to Norwegian gas (A1, A2, A3), two alternatives for strengthening the domestic grid (B1, B2) and two alternatives for connecting to Poland (C1, C2) (Energinet.dk 2010g).

THE SEEKING START IN 2008

In order to gain experiences on SEA, Energinet.dk decided to use the natural gas security of supply planning as a pilot SEA application. The natural gas planning involved different options for infrastructure development, and since no infrastructures were decided upon at this point in time, the perception was that application of SEA had the potential to influence the planning. Furthermore, the legislatively required Natural Gas Security of Supply Plan was within the scope of the EU Directive (2001/42) as it in principle constituted frames for development; it was argued that Energinet.dk hardly could develop the infrastructure otherwise than what was described in the document. Furthermore, the plan included formulations of international infrastructures that without doubt would lead to significant environmental impacts. The aim of the SEA application was, besides gaining experiences with SEA, to systematically consider environmental effects of the infrastructure developments in play in the planning process.

In 2008, it was evident that the Danish natural gas resources in the Nord Sea within a couple of years no longer was sufficient for covering the consumption of natural gas, why a future need for import was evident. Therefore the NGSSP involved several thoughts of linking the national natural gas network to the Norwegian gas network, the European mainland gas network, and the Scandinavian gas network (Energinet.dk 2008c).

In the beginning of 2008, a political settlement on biogas was made that included an increased subsidy to biogas. This gave biogas a more prominent role in the long term planning of gas security of supply, and made it more relevant to deal with biogas as an alternative in the SEA. Biogas transport in the transmission network was still faced with uncertainty on the relevance and techniques for gaining the necessary quality for transport and the SEA team therefore chose not to mention biogas explicitly in the SEA scoping.

The first draft of the SEA scoping report was prepared during the summer and based on the infrastructures mentioned in the natural gas planning at this point it time, it framed the alternative developments as a zero-alternative and five different international infrastructure developments: A strengthened connection to Germany from Egtved to Ellund, the Skanled infrastructure to Norway, the Baltic Pipe infrastructure to Poland, the Baltic Gas Interconnector (BGI) between Germany, Sweden and Denmark, and a new connection to the Nord Sea termed Europipe II.

During the summer, the Gas Division in Energinet.dk prepared an Open Season approach (see De Joorde and Van Oostvoorn 2006) for strengthening the planning of new infrastructure by bids and contracts with market actors on natural gas transport capacity prior to development (Lyhne 2011a). The market orientation in the Open Season process made it clear that major infrastructure developments were not separable; a Baltic Pipe connection was not relevant without connection to the Norwegian gas resources. Therefore, the second draft of the scoping report combined Skanled and Baltic Pipe into one alternative and Europipe II and Baltic Pipe into another. The idea behind Europipe II was to make use of the existing pipes to the gas resources in the Nord Sea as the free capacity of these pipes was increasing with the decline in production. These pipes were, however, privately owned and concerns were raised about fees for gas transport through these pipes. Therefore, the Europipe II was excluded from the scoping report of the 2008 plan. Furthermore, the BGI was not found realistic. With only one possibility left for connecting Norwegian gas resources with East Europe, the final

SEA scoping report (Energinet.dk 2008d) therefore included a) a zero investment alternative with other fuels, b) a minimum alternative with expansion of the Egtved-Ellund connection meeting the consumption of gas, c) a 'main alternative' including establishment of Skanled and Baltic Pipe as well as an upgrading of domestic gas infrastructure, see figure 22. The scoping report was sent to domestic authorities for consultation and to Germany and Sweden, since the plan was expected impacted these countries.

In the autumn of 2008 the economic problems in the Skanled project became increasingly evident among the partners. The insight of being a partner lead the SEA team in Energinet.dk to choose to await the development of the Skanled project to avoid ending up with an outdated SEA report: "We saw that the projects were being suspended and then an SEA did not make sense anymore" (Nybroe 2011). The original SEA deadline was postponed beyond the 2008 NGSSP, and the ongoing SEA process was suspended until the status of the Skanled was less ambiguous.

In November, the Danish Energy Agency (DEA) published an updated five-year prognosis (DEA 2008d), which amplified the decline in domestic natural gas production. The decline again brought biogas into the planning and SEA discussions.

THE SUSPENSION OF SEA IN 2009

The European Commission reacted on the global financial crisis by presenting the European Economic Recovery Plan (European Parliament and Council 2009), which was granting Community financial assistance to projects in the field of energy. This programme allocated 150 million euro to the Baltic interconnection and Skanled/Baltic Pipe. Despite the strategic decision of what connections to promote in the Commission's programme, it was exempted from the Commission's regulation on impact assessment: "The urgency of the economic crisis calls for the fastest possible action, in line with the conclusions of the European Council. This means there has not been time for an impact assessment" (European Commission 2009c, p. 3). The European Parliament and Council not only disregarded its requirements on their own proposals, they also pressured member states to speed up and get projects constructed fast: "They [member states] shall, in particular, make every effort to expedite the administrative procedures and authorisation, licensing and certification procedures to be fulfilled by the projects' promoters" (European Commission 2009c, pp. 19-20). In Denmark, this pressure led to an advancement of the Kriegers Flak offshore wind power plant, see Lyhne (2011a), without considering an SEA screening of the changes in the Offshore Wind Action Plan. In terms of the NGSSP, the relevance of the Skanled and Baltic Pipe options increased.

Despite the EU grant, the Skanled project was suspended in April due to economic problems (Norwegian Ministry of Petroleum and Energy 2009), which were due to decreased interests for transmission through that route. The suspension made the Baltic Pipe irrelevant, so the only alternative left was the Egtved-Ellund connection. In the autumn of 2009, Energinet.dk's management board followed the Open Season results and decided to work for an expansion of the connection to Germany (Brabo 2010). Based on the Government's pointing at a need for importing natural gas in 2007 (Danish Government 2007), Energinet.dk therefore initiated an EIA process in the late 2009. The decision was made independently of the annual NGSSP plans, why the SEA pilot did not approach it.

The Energinet.dk initiative of bringing energy systems together, which was initiated in the end of 2008, became part of the NGSSP process in 2009. The initiative led to considerations on the role of natural gas as regulation power, replacing individual gas furnaces with heat pumps or district heating, and use of natural gas and biogas in the transport sector. These aspects were not determined relevant by the SEA team to enter the SEA of the infrastructure development in the NGSSP, since the consequences for the infrastructure were too ambiguous to present and discuss.

Biogas was increasingly discussed due to the DEA's prognosis of a biogas potential of 25 % of the gas consumption in 2009. Sweden and Germany had allowed biogas in the natural gas transmission system, and the EU Directive 2003/55/EF stated that member states has to provide access for biogas producers to the system. (Energinet.dk 2009i)

Since the decision to establish the Egtved-Ellund connection was made prior to the plan, the NGSSP09 was not seen to include any decisions that set frames for development consent. Therefore, the SEA team judged that the 2009 plan was not falling within the scope of the EU Directive and an SEA was not made. According to a project manager in Energinet.dk a condition for the Minister's approval of the Egtved-Ellund connection was that Energinet.dk reconsidered the options for a connection to Norway (Nybroe 2011). This reconsideration became evident in the framing of 2010.

The Russian-Ukrainian conflict on gas supply emphasised the relevance of multiple supply areas and storage facilities. The Russian cut of gas supply in January 2009 led to a proposal by the commission of a new decree for emergency prevention and response (European Parliament and the Council 2009), which put up requirements on capacity that entered into force in 2010. The regulation required security of supply in N-1 cases, where the biggest supplier is dropping out, and in a Danish context this urged a supplement to the supply from the Danish part of the Nord Sea.

THE NUANCED FRAMING IN 2010

In January, a regulation on biogas upgrading plants and quality was issued to pave the way for the first commercial biogas in the transmission system (Energinet.dk 2010d). It was expected to lead to injection of biogas into the transmission system in the end of 2010, and biogas therefore became highly concrete in the planning for development of the transmission system. The SEA team determined biogas relevant for the SEA process and included it as a strategic aspect to consider. The focus on upgrading biogas led to broader discussions on renewable energy gasses, e.g. including hydrogen made from wind power. These renewable energy gasses were determined not to be relevant in the SEA process, since they were not of immediate realisation.

In April, the European Commission announced that Energinet.dk was allocated 100 million euro of the recovery plan grants to expansion of gas infrastructure (Energinet.dk 2010e). The EU funding would cover half of the decided investments of the expansion of the Egtved-Ellund connection. Whereas the bidding in the Open Season process only made a compressor station economically viable, the recovery aid made it viable expand the capacity with another gas pipeline. The new pipeline was seen as a 'project' and not a 'plan' and was therefore not

subject to an SEA process. The pipeline was to be located parallel to the existing pipe to minimise environmental impacts and an EIA was made.

In May 2010, the DEA published a report on the expansion of infrastructure for future import of natural gas (DEA 2010). It identified a need for a connection to the Norwegian natural gas resources and it recommended further investigation of solutions for import from Norway. Moreover, the report pointed at the possibilities for using gas fields in the Nord Sea as gas storage. The thoughts were reproduced in the NGSSP10 and in the SEA, but without a throughout treatment in the SEA, since the formulations was not regarded as constituting decisions.

During 2010, focus on carbon capture and storage (CCS) increased due to EU priority on CCS, which e.g. was expressed by the Commission's support to large-scale demonstration projects (Europe rapid 2010). CCS was therefore mentioned in Energinet.dk's planning, but not in formulations that made the SEA team regarded it relevant to be included in the SEA of the NGSSP, despite possibilities for using the transmission system for transporting CO_2. CCS is by many seen as a 'hot potato' in Danish politics, and the inclusion in a public institution's planning could result in a politically charged situation.

The decided expansion of the Egtved-Ellund connection made it relevant to expand the system towards Norwegian resources without constructing any connection to Poland, although the Norwegian-Poland transmission still was the intension. The framing of alternatives in the NGSSP and SEA work was formed into three parts: Expansion of the system towards the Norwegian gas resources (new concept compared to Skanled), expansion of the east-west connection in Denmark, and a new connection to Poland (previous termed Baltic Pipe). Each of these parts included alternatives as seen in figure 23. Compared to the NGSSP08, the NGSSP10 opened up for more varieties for connecting to the existing system, and the suspension of Skanled gave room for rethinking connections to Norway. The alternatives were primarily technically motivated rather than environmentally motivated, except the C2 alternative of avoiding the Copenhagen area, which was environmentally, economically as well as technically motivated.

Compared to the variations of alternatives mentioned in NGSSP10, the alternatives in the SEA report were less but more specified, e.g. only mentioning two compared to three connection possibilities into the Nord Sea from Nybroe (A1 and A2). The specification was based on pragmatic and communicative reasons arguing that it was not relevant to assess more than the mentioned alternatives; more alternatives would hamper comparison. The framing of alternatives was influenced by the EIA made on natural gas infrastructure in 2001 (Danish Ministry of Environment and Energy 2001b) and the related permissions, since Energinet.dk had an interest in easing the permitting process. As an example, the Dragør connection was included due to an existing permission: "In the alternative with limited quantity for export to Poland, the export compressor can presumably be placed on the area in Avedøre, which is zoned in the existing EIA permission" (Energinet.dk 2010f, p. 77). Thus, a path dependency of alternatives was visible. The onshore expansion of capacity was motivated by model operations and the routes were partly motivated by considerations to the approval process (B1) and considerations to security of supply (B2).

The NGSSP10 included thoughts on integration of biogas in the gas supply with upgrading of the quality of biogas prior to injection and transportation in the transmission system. The

transmission system was seen to play a role in optimising the use of biogas in power plants with higher efficiency and to other purposes. In the SEA, the biogas potential were translated into one of the benefits of expanding the gas transmission infrastructure, however, biogas issues did not influence the framing of alternatives; knowledge about biogas generation in different areas of Denmark was seen as still too ambiguous to suggest alternatives e.g. alternative routing of pipes covering areas with high production or high potential of biogas.

The scoping report from 2008, which had been in hearing in Denmark, Germany and Sweden, was point of departure for the 2010 SEA report, which was in hearing in the autumn of 2010. The SEA report as well as the NGSSP10 was published in December 2010.

DEVELOPMENT IN THE FRAMING OF ALTERNATIVES

The development of alternatives in figure 24 shows how changeable the set of relevant alternatives was in the NGSSP process. The changes in alternatives are partly reflecting a learning process among the participants in the SEA team, but they also indicate the contextual dynamics that made solutions relevant and irrelevant. In the 2008 process, SEA played a role of facilitating identification of what infrastructure developments were to be seen as relevant alternatives. The framing process in 2008 ended with an understanding of alternatives being mutually dependent, why these were coupled into a main alternative. In 2010, the SEA framing played a role of determining the most realistic alternatives among the alternatives provided in the NGSSP. This role was partly motivated by the pragmatic consideration that it is neither relevant nor beneficial for the reader of the SEA report to judge a very wide range of alternatives. Except these roles, SEA only had a minor influence on the planning process, which also is indicated in figure 21 in which the arrows of influence are directed towards the SEA process and not to the planning process. This is in line with Nooteboom's (2000) conclusion that "The question as to what a decision is about, and which types of alternative are feasible at that level, is in the first place determined by the decision-making system and the proponent, and not by the environmental assessment process, nor by environmental assessment legislation" (p. 159).

The investigation reflects the difficulties in framing relevant alternatives in a SEA process. Valve (1999) proposes that "alternatives are relevant if they deal somehow with the most significant choices related to a decision" (pp. 125-126), while acknowledging that actors may disagree on what these choices are and that in practice alternatives are constructed through negotiation. The relevance of assessing alternatives in the case of NGSSP is, however, clear. Hvidtfeldt and Kørnøv (2003, p. 23, translated) propose that "Alternatives are judged to be of particular relevance in situations of political uncertainty or disagreement about what is the best solution; in situations of comprehensive changes in land use or location; in situations of very big investments, comprehensive intervention in the existing and comprehensive technological changes, or in situations of irreversible decisions". According to the project manager in Energinet.dk, the main criteria in the selection of alternatives in the NGSSP SEA was A) their strategic character - as opposed to alternatives relevant in an following EIA process; B) the likelihood of an impending decision on the specific infrastructure determined by their history; C) other considerations, e.g. on market developments and potentials (Nybroe

2011). Despite these broad criteria, the alternatives concerned, besides from considerations to biogas, only infrastructure connections.

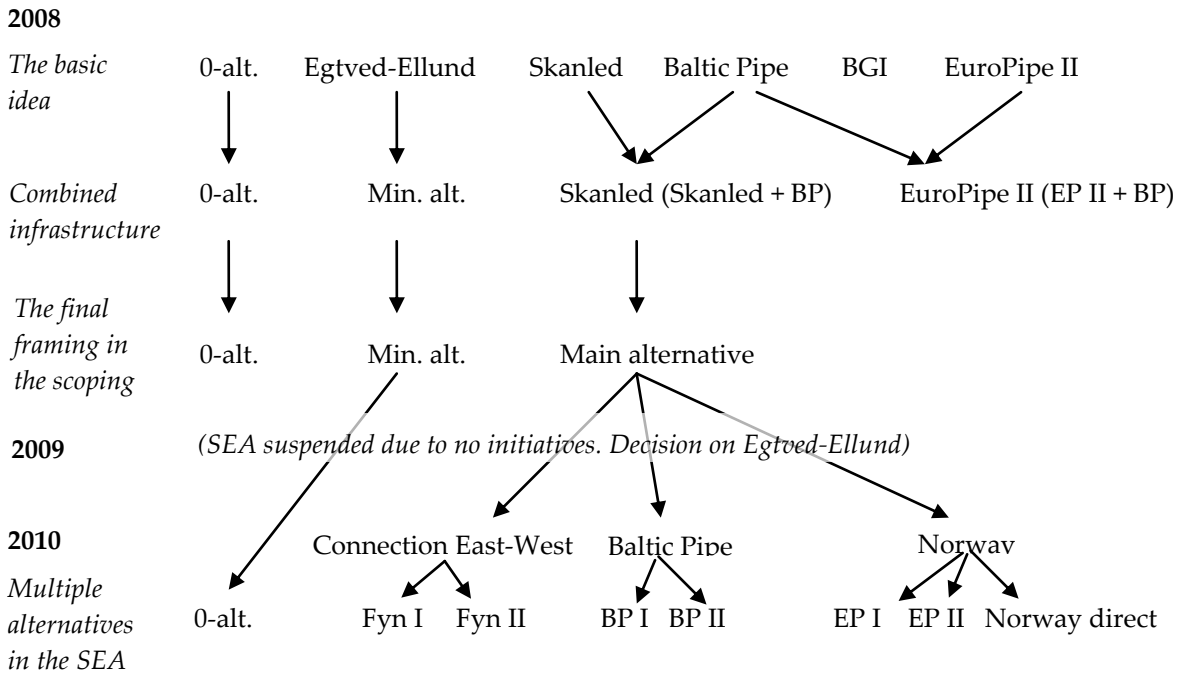

Figure 24. The development in the framing of alternatives in the SEA of NGSSP 2008-2010.

SEA literature does not include advice specifically concerning the question of framing alternatives in cases of unpredictability and strategic dynamics. Sadler (1996, p. ii) points at "appropriate timing in initiating the assessment so that the proposal is reviewed early enough to scope for development of reasonable alternatives" as one of the necessary ingredients to the effective application of environmental assessments. The NGSSP represent a type of strategic decision-making processes in which 'early enough' is diluted due to alternatives being in play for a range of years. As the manager in Energinet.dk remarks: "Baltic Pipe has for instance been in play for 15 years now… It is a dynamic long-term process". Rather than being early enough, the key challenge of framing alternatives in SEA application is deciding the relevance of the alternatives in play by a judgement of e.g. the likelihood of an impending decision. The problem of the investigated SEA process was to catch up with the contextual developments.

The decision-making in Energinet.dk problematises a 'tiering' of alternatives from the planning level to the project level: In the NGSSP process projects like the Skanled and the Egtved-Ellund connection developed 'on their own' regardless of the overall planning efforts. A manager in Energinet.dk expressed the problems in terms of SEA application as: "It is actually very difficult to incorporate environmental considerations at an early stage. The world is just not put together so that when we are planning infrastructure connections, we are facing the entire range of options and then narrow the scope… It often happens in bilateral cooperation; it happens in an entirely different way in reality" (Vinther 2011).

As the investigation shows, the natural gas security of supply planning - and thereby the SEA of it - is developed in interaction with many contextual aspects: Changes in related initiatives, technology development, actors' interests, and politics all have effects on the decisions made on the content of the NGSSP. The decisions related to the framing of alternatives were e.g. highly influenced by the unexpected economic development. The 'problem' of the NGSSP therefore seems to be characterised by what Cyert et al. (1956, p. 247) describe as "a whole series of "nested" problems": Natural gas planning a problem of security of supply, but also a problem of market interests in capacity, a problem of predicting energy politics, a problem of determining potentials in biogas, etc.

Strategic decision-making in the natural gas infrastructure development in this period seems thus to be out of Energinet.dk's control. Instead strategic decision-making on natural gas infrastructure have similarities with a 'commons' (Hardin 1968) in the sense that a range of actors have a stake in it, but no one controls it and it may not end up with an optimal solution for any actor. The character of a commons may be part of the explanation of a range of non-decisions (Bachrach and Baratz 1962), e.g. on the use of transmission system for transport of CO_2 as part of a CCS system. To the extent the process has such a characteristic, responsibility for SEA application also risk becoming a 'tragedy of the commons'.

The consultations of authorities and the public did not provide much input to the framing of alternatives; either the comments articulated political aspects, e.g. on the use of natural gas in the future, or EIA-related aspects, e.g. on what to assess in a detailed assessment process. The minor relevance of the comments lead to disappointment in the SEA team in terms of the role of the SEA and doubts about whether it is possible to frame and articulate alternatives so that a fruitful discussion is gained.

REACTIONS AND REASONS

The investigation of the SEA pilot shows that motivations for proposing and changing the framing of alternatives stem form national politics, financial developments, geo-politics, market developments, and other actors' activities. Furthermore, the investigation shows that the framing may be influenced by path dependency and by the insight among the employees involved in the framing. The reactions and reasons are summarised in table 14.

The reactions and reasons depicted in table 14 indicate a tendency of keeping alternatives within the planning discourses of Energinet.dk rather than using the developments to suggest new alternatives. As an example, biogas, which was not a legally required concern for Energinet.dk was not specifically framed as an alternative in the SEA report.

Contextual change	Implication on planning	Reaction in SEA and the reason why
Economic changes	Suspension of plans on infrastructure expansion	Suspension of SEA process, since the planning no longer includes frames for projects with significant impacts
Economic changes	Attention to EU funds for infrastructure	Inclusion of funded infrastructure due to an increased likelihood of a decision on establishing these infrastructures
Changes in political priorities	Increased subsidy to biogas increases the role of biogas in the long term planning	Due to uncertainties about quality, biogas was not explicitly mentioned in the SEA scoping.
Changes in other actors' planning	DEA prognosis on a considerable potential of biogas increases the relevance of biogas	Biogas was included in the SEA as a strategic aspect to consider, but not as an alternative as biogas was seen to play a minor role in the years to come.
Changes in geo-politics	Uncertainty about gas supply from Russia leads to minor concern about security of supply	Increased focus on supply from Norwegian gas fields.
Changes in market signals	Limited need for infrastructure in market bids	Realisation of the interdependency between the alternatives.

Table 14. Strategic developments, their implication on planning, the reaction by the SEA team and the reason for this reaction.

Framing of alternatives as a iterative process

Deelstra et al. (2003) investigate the use of research in decision-making on large projects and conclude that "[r]esearchers are forced to cope with the dynamic character of decision-making" (p. 522). They advocate for a stepwise adaptation to the strategic dynamics, which, they argue, make it possible to provide knowledge that "may generate new insights and views for the involved actors, thus changing their perceptions and problem definitions" (p. 522). As it developed, the SEA process of the NGSSPs of 2008, 2009, and 2010 can be seen as a stepwise adaptation to strategic developments, however, this adaptation exceeded the schedules of the annual formal plans.

Similar to Deelstra et al., De Bruijn and ten Heuvelhof (1999) point at the challenge of timing in unpredictable decision-making. They argue that "[t]he idea that research can be restricted to a single moment in the decision-making process ignores the unpredictable nature of decision-making, which makes it uncertain whether sufficient time will be available for the research required. If the actors see a chance to undertake actions to support their interests during the research phase, they will do so" (p. 183). This may question the flexibility of national SEA legislation, which in Denmark requires an 8 weeks public hearing period. The project manager in Energinet.dk, however, comments that the length of the SEA process is not a major problem. Instead, she points at the distinction between 'project' and 'plan', e.g. when projects precedes plans (Nybroe 2011).

CONCLUDING REMARKS

> *"Prospective decisiveness gets derailed over and over by unexpected events and unanticipated consequences of initial actions"* (Weick 1995, p. 184)

Unexpected developments and strategic dynamics complicate the framing of relevant alternatives. This study reveals a comprehensive dynamics at strategic level in a period of three years of the Danish natural gas security of supply planning. According to a project manager in Energinet.dk, the strategic developments analysed in this study were not more influential or comprehensive than previous years; "In my view, the variation is normal. It changes from year to year" (Nybroe 2011). There is thus no indication that the challenges of framing of alternatives on strategic level will be less in the years to come. The practice of framing alternatives at this level therefore needs to learn how to adapt to these changes and to gain flexibility in the assessment process.

The study indicates that in some types of planning it may be relevant to balance the current focus in SEA literature on targeting decision-windows (e.g. Dalkmann et al. 2004) with a longer term perspective of acknowledging organisational learning and considering the use of the SEA reports in a longer perspective. Due to strategic dynamics, certain strategic alternatives in the natural gas planning may in some periods be relevant and in other periods be irrelevant. Considering what alternatives have been in play in a historical and general perspective may therefore be a relevant supplement to focusing on the details of a specific decision window; in decision-making process in a context strategic dynamics, SEA application may benefit from being attentive to the history of developments as well as the decision window in question. Knowledge about environmental impacts of certain solutions from SEA processes may thereby play a more extensive role in the organisational learning and infrastructure development processes. In the case of the NGSSP SEA, the final report ended up being part of the basis for future decisions on the assessed infrastructure and not as such focused on a specific decision. In retrospect, the SEA could have been applied on the framing of alternatives in the Open Season process, which lead to a ministerial decision on a certain infrastructure. Instead, the SEA report of the 2010 NGSSP most likely will be part of the basis for framing alternatives in future Open Season processes.

In contrast to the SEA literature outlined in the introduction, the findings on decision-making in this article show that decisions in the planning and SEA processes are widely reactive to changes in the context. As a consequence of this reactive character, the influence of SEA is reduced to a few minor instances. The article is thus in line with Kørnøv and Thissen's argument that impact assessors need to adopt a flexible and adaptive approach and Hilding-Rydevik and Bjarnadóttir's emphasis on the importance of the context. The contribution of the article to the field is an enhanced empirical understanding of how contextual changes influence the planning and SEA processes at strategic level.

Acknowledgements

The research documented in this paper is supported by Energinet.dk by co-funding the Ph.D. project "Strategic Environmental Assessment and the Danish Energy Sector". Thanks to Malene Hein Nybroe and Dorte Vinther, Energinet.dk, for insight and constructive comments on the investigation.

POSTLUDE: CONSIDERATIONS ON FLEXIBILITY

> *The flexibility which allows SEA to adapt to complex planning, policy-making and decision-making processes is essential if SEA is to be an effective tool which promotes sustainable development* (CSIR 1996).

The article centres on the issues of flexibility and adaptation of SEA to the contextual dynamic. As pointed at in the CSIR report above, flexibility is argued to be essential for effectiveness of SEA. The concept of flexibility is broadened in the following by discussing flexibility of legislation and flexibility of organisational routines on SEA.

The EU Directive on SEA does not include prescriptions that hinder flexibility: There are no demands for the length of environmental reports, of the time needed for conducting the assessment. It does, however, include formulations like "appropriate time frames" that allow "sufficient time for consultations" in line with the Aarhus Convention from 1998. The Directive furthermore prescribes procedures for formal consultations of affected member states. The main constraints to a flexible SEA approach are thus the consultation requirements. This can be seen as a trade-off between consultation and flexibility, which SEA practitioners have to deal with. In the SEA of the NGSSP, the consultation of member states on the scoping report was made in the beginning of 2009 before the economic recession that led to suspension of infrastructure developments and made the SEA irrelevant. It was only by chance that the consultation of the scoping was appropriate for the 2010 SEA as the recession and EU financial recovery aid could have led to alternatives and needs, which were not part of the 2009 scoping report.

The Danish legislation has translates 'appropriate time frames' into eight weeks for the public consultation. This was in line with the existing norms and legislation on spatial planning. The adequacy of eight weeks for strategic decision-making in dynamic context has not been publicly debated and added the consultation of the scoping report as well as the time needed for assessing and writing, the SEA cannot be conducted faster than in three months. As the article shows, a range of unpredictable developments can take place within three months and the appropriateness of scoping report and environmental report thus depends on the character of the changes in the context in the three months period.

Besides legislative requirements, flexibility depends upon how SEA is applied in organisations. Energinet.dk took a step towards flexibility by deciding to approach pivotal decisions when they are made rather than their formal plans. An orientation towards formal plans would impede the timing and scope of the SEA in terms of the development decisions made in an organisation. Flexibility is also depending on openness to learning in organisations as settled routines may not leave room for new forms of developments or new needs for applying SEA. In the case of non-programmed strategic decision-making, decisions will per definition have new elements and flexibility to these new characters is therefore important. Finally, flexibility relates to the ability of identifying what SEA should be flexible towards. If new developments are not identified, SEA will not be applied at all. The issues of perception and how we make sense of stimuli are in focus in the following chapter.

CHAPTER 8: STRATEGIC DECISION-MAKING

AS HUMAN CHOICE

> *"However, not only is EIA an aid to project authorization decision making, decisions are made at every stage of the process, from screening out those projects where EIA is not necessary, through the identification of significant impacts, to the choice of alternatives and mitigation measures and on to the project authorization stage and beyond […] Decisions are made by the developer, their environmental and planning consultants, the competent authorities and all the consultees in the process"* (Weston 2000, p. 185).
>
> *"Framing is problematic because it leads to different views of the world and creates multiple social realities. Interest groups and policy constituencies, scholars working in different disciplines, and individuals in different contexts of everyday life have different frames that lead them to see different things, make different interpretations of the way things are, and support different courses of action concerning what is to be done, by whom, and how to do it"* (Rein and Schön 1993, p. 147).

Strategic decision-making is constituted by a myriad of choices like the choices involved in environmental assessments as Weston outlines in the quote above. These choices are highly influenced by how the actors involved make sense of stimuli. Different views and multiple social realities can be seen as "problematic" as in the quote by Rein and Schön above, but the different views may also be an opportunity, e.g. in trying to make a holistic assessment of environmental impacts.

This chapter has point of departure in the choice circles model, which is developed and presented in the conceptual framework. It is here used for its potential to explore the choices made in strategic decision-making and the potential for increased understanding through knowledge about how persons create meaning of situations and options in order to settle on a decision. The chapter investigates choices and sense-making in two complementary ways: An experiment is used for basic insight into how we make sense of a fictional case and an actual decision-making process in the energy sector is used to investigate choices and sense-making in a real-life context.

Central in environmental assessments are the concept of significance. Significance is indeed a concept that in practice is highly influenced by how people view the world and how they use experiences to make sense of information. Therefore, significance determination is in this

chapter investigated in terms of how people diagnose information and create stories about what choices are about.

Related to the choice-model, SEA can be seen as formal framework for creating a story of what is going on in line with Weick et al.'s (2005, p. 415) argument that "Sense-making … is about continued redrafting of an emerging story so that it becomes more comprehensive, incorporates more of the observed data, and is more resilient in the face of criticism". It will undoubtedly provoke authority employees to argue that similar to sense-making theory, SEA "is not about truth and getting it right" (p. 415). Truth is complicated when acknowledging the constructed nature of SEA reports and their representation of complex impacts. In this perspective, the aim of SEA would be to create a plausible story of what significant impacts may be expected and the plausible ways to treat these impacts. SEA can also be seen as what Brown (2003) describes as "convention-governed sense-making narratives" in which the developed narratives or SEA reports are characterised by the dominant - and not always appropriate - conventions. Brown (2003) critically shows how authorities are using "various forms of verisimilitude in order to bolster their authority". Vlaar et al. (2006) have a more positive view on formalisation as a means to deal with problems of understanding in interorganisational contexts.

SEA is thus a formal framework that facilitates choices in all four circles of the choice circles models. Especially the screening and scoping stages have a character of enacting stimuli of the development to be considered and bracketing and labelling events in order to create a story of what is at stake and what is going on. At the same time SEA is a framework for making latent "disruptions" or "shocks" visible through a formal procedure requirements; by requirements on considerations on possible types of impacts and consultations, latent conflicts and uncertainty, among other aspects, may become visible and articulated and thereby urging action.

The use of the choice circles model in this chapter intends to challenge existing SEA literature in terms of its focus on accuracy rather than plausibility as argued by Weick; on how to set up a team for an SEA process and whether it is possible to set a team that notice more events and creates more relevant stories; on the use of checklists and routines when strategic situations are ambiguous; on the orientation to formal procedures when decisions are made throughout the process.

8.1 MAKING SENSE OF SIGNIFICANCE

> *"Since environmental impact assessment (EIA) is concerned primarily with significant environmental impacts, the concept of impact significance deserves to be defined and applied rigorously"* (Duinker and Beanlands 1986, p. 1).

Literature on decision-making and sense-making includes a range of investigations and conceptualisations of how people make a choice. The literature on SEA is, however, sparse on the details of socio-psychological aspects of human choice. This subchapter sheds light on these aspects through an experiment on SEA of a specific choice situation. The analytical framework of the experiment is focused on how people determine significance, hereunder what they notice and how they create meaning of the stimuli. As argued by Duinker and Beanlands in the quote above, significance is a key aspect that deserves attention. Prior to the journal article on this experiment, some ideas about significance and socio-psychological aspects in SEA literature are presented.

Since the choice model was not published prior to submission of the journal article on the experiment on sense-making, the article does not refer to the choice model. The experiment is, however, in line with the choice model and as such an experimental testing of the model for explaining practice.

PRELUDE: SEA LITERATURE ON HUMAN CHOICE

The SEA literature includes some more or less implicit insight and claims on the socio-psychological aspects of how we make sense and continuously making choices. Steinemann (2001, p.11) emphasises that subjective evaluations often determine alternatives before objective and rigorous analyses are made. She does, however, not describe how such subjective evaluations are made.

Insight and claims are also found in SEA literature that emphasises the structural aspects that restricts - or concentrates - noticing and the design of options. As an example, Arts and van Lamoen (2005) use their experience to put forward an argument that the structural elements of the planning process concentrate the sense-making to increasingly narrow scope of reality. According to Weick (1995, p. 98), the "inability to extrapolate from current actions and to foresee their consequences" trigger sense-making, and these inabilities are central challenges in any assessment process. In considering climate change in the SEA of the river basin management plans in Denmark, the Ministry of the Environment decided "based on an argument of an inadequate knowledge base" (Larsen and Kørnøv 2009, p. 291) that climate change would not be taken into consideration in the first generation of RBMPs. In this instance, the Ministry's seemed to find it impossible to extrapolate in a way that were in accordance with the Ministry's norms of good practice. The making sense of climate change was thus formally short-circuited in what has similarities with what Weick (1993) terms a collapse of sense-making.

Learning from the conceptual framework, significance determination may be related to mental frameworks and priorities among the persons that are determining significance.

Mental frameworks are constituted by people's profession, schooling, norms, and other societal influences in interaction with individual's identity. It may furthermore be seen as an act of what Weick terms belief-driven sense-making. Here, people deals with beliefs related to the future by articulating expectations and reducing the variety in beliefs that are thought to be relevant, variety in what is noticed, and variety in what is prophesied.

The focus on how we make sense of significance is motivated by an understanding of significance as one of the most critical components in SEA. Sadler (1996, p. 118) points at this critical role in terms of effectiveness: "Evaluating the significance of environmental effects is perhaps the most critical component of impact analysis. The interpretation of significance bears directly on project approvals and condition setting. […] In sum, the attribution of significance continues throughout the EIA process, from scoping to EIS review, in a gradually narrowing “cone of resolution” in which one stage sets up the next". Despite the importance of significance, the understanding of how it is determined in practice is still shrouded in mystery. The experiment does not provide answers to everything about significant determination; rather it provides insight in some aspects in a given context.

JOURNAL ARTICLE:

How do we make sense of significance? Findings from a laboratory experiment on an SEA case

Submitted to Journal of Environmental Management

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Abstract

Determination of significance is widely recognised as an important step in strategic environmental assessment (SEA) processes. Especially the screening and scoping stages are important since the SEA largely depends upon how these activities are practised. The prescriptive literature and guidance on significance determination is comprehensive within the field of SEA, whereas descriptive and explorative studies of how we go about making sense of actions to determine significance are few.

This article makes use of sense-making theory to shed light on the process of determining significance. Focus is on the first encounter with a description of a strategic choice and thus the initial determination of significance. A laboratory experiment is designed and conducted to investigate how persons make sense of a specific SEA case to determine significance in a screening and scoping of the case.

The findings reveal patterns in the test persons' sense-making, including important differences in the way individuals screen and scope in an assessment context. These patterns concern what we notice, how fast we frame the choice, and when we are critical about the provided information. Recognising that the early stages of SEA are inherently dominated by sense-making provides a basis for reflections on practice and has implications for how to set up a team for SEA screening and scoping.

Keywords: Sense-making, significance, strategic environmental assessment, screening, scoping

INTRODUCTION

Significance is a central concept in strategic environmental assessment (SEA), since significance formally is the threshold that prompts assessment processes in the screening stage and the threshold for including impacts and alternatives in the scoping stage. Informally, however, assessment of significance occurs throughout the SEA process and the following implementation, when decisions are made on what to include and investigate, how and at what level of detail, and finally if and how results of decisions (e.g. mitigation measures for significant impacts) are implemented in practice. Significance also plays an important role in regulations on SEA, e.g. in the scope of the EU directive on SEA (article 1 of the EU Directive 2001/42/EF) and in the Directive's instructions on public involvement, the content of the environmental report and monitoring. This article focuses on significance determination in the early stages of SEA; screening and scoping.

To guide the significance determination, the EU Directive includes significance criteria that concern the characteristics of the effects, the area to be affected as well as the plans and programmes in question. Significance is, however, not further defined in the Directive and significance is argued to be one of the elements in the Directive, which "many lawyers and environmental assessment practitioners will be employed for many years in sorting out" (Thérivel 2004, p. 33). Canter and Canty (1993) reported that out of 2,346 cases concerning the US National Environmental Policy Act between 1970 and 1990, half were raising the issue of significant impacts. Other authors have pointed at fundamental difficulties in handling significance, e.g. Kjellerup (1999) in a Danish legal context.

Despite the importance of significance in environmental assessment procedures, the concept is rarely defined in environmental assessment literature (Weston 2000, p. 193) and there is no international consensus on the concept (Canter and Canty 1993). Furthermore, significance is described as one of the limitations of environmental assessment procedures (Tullos 2009). Significance has been described as dynamic, contextual, political and uncertain (Wood et al. 2004) as increased knowledge among involved actors, change of actors, development in actors' preferences and values, and societal developments may all influence perceptions and conceptions of significance in a given context. The contextual character is emphasised by Lawrence (2007b, p. 778) who points at the fact that "perceptions vary among populations and sectors of society regarding which impacts are positive and negative, and to what degree".

Research shows that the initial meaning we assign to information and events can be very influential on the following process; Gawronski et al. (2010) refer to a large body of research that shows that people's unconscious evaluation of events can be "relatively rigid and difficult to change" (p. 683). In a SEA context, this means that our initial sense-making is important for the entire process as it unconsciously may hinder openness towards new information and other actors' opinions.

SIGNIFICANCE DETERMINATION IN EA PROCESSES

EA literature provides a manifold of checklists, criteria, procedures, and thresholds to guide significance determination (e.g. Wood 2008, Lawrence 2007b, Thérivel 2004, Thompson 1990). The literature also encounters a suggestion for inserting more “common sense” in the

assessment of significance (Ross et al. 2006) – however, without clarifying and reflecting upon differences in sense-making and thereby the non-existence of a uniform and shared common sense. Despite the manifold of thresholds and criteria, determination of significance is argued to involve "an element of judgement" (Thérivel 2004, p. 134), "subjective decisions" (Wood et al. 2007, p. 810), "personal opinions", "discretion of the decision-maker" as well as intuition (Canter and Canty 1993, p. 291). The process of determining significance has therefore been described as "subjective, normative and value-dependent" (Lawrence 2007a, p. 759), manipulatable (Wood et al. 2007), anthropocentric (Duinker and Beanlands 1986), contentious (ADEAT 2002), imprecise, context-dependent, political, and complex (Lawrence 2007a). The range of adjectives seems to be an indicator for how difficult significance determination is to grasp.

The clash between the importance of significance and the complexity of significance determination has given rise to critical questioning of the concept (e.g. Lawrence (2007b), of the team determining the significance (e.g. DTEA 2002), the process of determining significance (e.g. Wood et al. (2004)), the timing and role of significance determination in practice (e.g. Nielsen et al. (2005) and Christensen and Kørnøv (2011)), and the trade-offs between priorities in significance determination in a developing country context (Rajaram and Das 2011). Few studies have dealt with how people in practice identify significance and very few - if any - have investigated what happens when SEA practitioners in their first encounter with a case try to make sense of information in order to determine significance. In an environmental impact assessment (EIA) context, Weston (2000) argues that "[m]ost research in EIA decision making has focused on the project authorization process and not the crucial decisions made at the earlier stages of screening and scoping" (p. 185) and Wood (2008, p. 23) points at a "paucity of research that critically examines and reflects upon the way in which significance is evaluated and communicated".

The few studies of significance determination practice reveal elements of how we determine significance. By studying British local authorities, Wood et al. (2004) divide respondents into two profiles: People either demonstrated "a smooth, gradual and incremental appraisal of significance" or demonstrated a step change response "punctuated by sharp changes in relation to the size/scale of the proposal" (pp. 1 and 13). Wood et al. furthermore show that significance determination practice had no direct relationship with government guidance thresholds. The minor importance of official thresholds and checklist is also supported by the finding that only 2% of the local authority practitioners regarded checklists as the single most effective approach in screening practice (Wood and Becker 2005, p. 358). In a study of practitioners' balancing of precaution and efficiency in EIA scoping in the UK, Snell and Cowell find a tendency of scoping issues in rather than excluding these due to the concern of legal challenges and thereby enlarging the environmental statements (Snell and Cowell 2006).

Besides the British findings, significant determination processes in an environmental assessment context is under-researched (Snell and Cowell 2006). We still do not know the details of what happens when we as SEA practitioners or researchers are presented with some kind of action and asked to determine whether SEA must be applied and what impacts and alternatives are significant. Insight into similar processes can be found in other fields of study and the fields of socio-psychology and cognition seem especially relevant for shedding light on the first preliminary significance determination. Within these fields, sense-making

theory has gained increased importance in the last decades with its focus on how people "construct what they construct, why, and with what effects" (Weick 1995, p. 4).

AIM AND CONTRIBUTION

Whereas prescriptive and technical literature on significance determination dominates literature on SEA, this article has an exploratory approach to significance determination. The article investigates and reflects upon how to improve SEA by paying more attention to the sense-making, thus emphasising the social and cognitive elements of assessment - compared to the technical. The aim of the article is to uncover how we notice and make sense of information in order to determine significance. In contrast to Wood et al.'s (2004) retrospective investigation of significance determination, the aim is to uncover the process as it unfolds. For this purpose, a laboratory experiment is designed to investigate how SEA practitioners and researchers make sense of information and determine significant impacts and SEA relevance. The experiment is aimed at the very early sense-making, at what happens the first time we see a text.

The research questions that are guiding the article are:

- What patterns can be found in the way SEA practitioners notice cues and frame information in their process of making sense of a strategic choice?
- How do such patterns influence significance determination?

Since significance determination is a complex process, the investigation will not find universal patterns, but tendencies in a context. The article discusses these tendencies in terms of inspiration for improvements in practice. Due to the complexity of significance determination, clear answers may require comprehensive studies, which are not the purpose of this article; the aim is to draw attention to the initial significance determination processes and show tendencies and implications based on a minor group of test persons.

The study is a part of a research project on SEA and strategic choices in the Danish energy sector (see Lyhne 2011a), and the experiment is using a hypothetical but realistic case of a strategic choice in the sector.

In the next section, the article unfolds sense-making theory, through which an analytical framework is developed. We then present the design of the experiments, before setting out the findings of the research. The article concludes with reflections and ideas on how to acknowledge the sense-making taking place at the early stages of SEA.

INSIGHT FROM LITERATURE ON SENSE-MAKING

> *"[P]eople find themselves thrown into ongoing situations and have to make do if they want to make sense of what is happening [… They] do not have a stable representation of the situation: Patterns may be evident after the fact, but at the time the flow unfolds there is nothing but arbitrary fragments capable of being organized into a host of different patterns or possibly no pattern whatsoever"* (Weick 1995, p. 44)

Karl E. Weick's theory of sense-making describes human sense-making as a social process of continuously enacting events, extracting cues from these events and retrospectively making plausible stories (Weick 1995, p. 18). Sense-making literature is focused on how people make sense of stimuli; people "sort through prior cues, label them and connect them, which often result in plausible stories that are good enough to keep going" (Weick 2001, p. 237). Mental frameworks, identity and articulation are important elements in the process of reducing multiple meanings and generate a locally plausible story (Weick et al. 2005, p. 414), but it is not a clear-cut process: Starbuck and Milliken (1988, p. 49) argue that "people have to have numerous sensemaking frameworks that contradict each other. These numerous frameworks create plentiful interpretive opportunities - if an initial framework fails, one can try its equally plausible converse". Frames serve the function of separating signal from noise and the filtered information, Starbuck and Milliken argue, "is less accurate but, if the filtering is effective, more understandable". New situations or contexts constitute a challenge to the use of frames; Kaufman & Smith (1999, p. 165) argue that "when frames are transferred from one set of circumstances to another, an imperfect match may prompt solutions that do not respond to actual needs or conditions".

To improve practice, Weick argues that it is less productive to follow the advice from behavioural decision theorists that are focused on errors, misperceptions, and irrationalities of humans. Instead, he suggests to "look at the filters people involve, why they invoke them, and what those filters include and exclude" (Weick 1995, p. 57).

Sense-making literature is concentrated on equivocal situations and therefore "built out of vague questions, muddy answers, and negotiated agreements that attempt to reduce confusion" (Weick 1993, p. 636). In this context, Weick emphasises the close relation between sense-making and organising: "people organize to make sense of equivocal inputs and enact this sense back into the world to make that world more orderly" (Weick et al. 2005, p. 414). In a SEA context, practitioners organise the information and inputs around e.g. impacts and enact this sense and order back into the society through reports and technical summaries.

Equivocal situations are accompanied by equivocality of terms. Jackson and Dutton (1986, p. 34) conclude that "simple labels do not have simple meanings" when investigating how people understand the concepts of 'threats', and 'opportunities'. They elaborate: "The rich set of attributes attached to these cognitive categories suggest that the simple labels of threat and opportunity represent shorthand addresses for complex assumptions about issues so categorized" (p. 34). Weick emphasises the inevitable inaccuracy of terms we use to describe events: "People pull from several different vocabularies […] to focus their sense-making. […]But all of these words that matter invariably come up short. They impose discrete labels

on subject matter that is continuous. There is always a slippage between words and what they refer to. Words approximate the territory; they never map it perfectly. That is why sensemaking never stops" (Weick 1995, p. 107). This continuous improvement of labelling and understanding what we are dealing with necessitates flexibility in the SEA process to reformulate and reconsider elements like the significant impacts.

Details of the process of sense-making are illustrated in figure 25. Weick describes sense-making as a process initiated when people are experiencing discrepancies and equivocality in their on-going sensing; they are 'disturbed' (the stippled box). They first look for reasons to resume to action in frameworks or cause maps. These frameworks may be "Institutional constraints, organizational premises, plans, expectations, acceptable justifications, and traditions inherited from predecessors" (Weick et al. 2005, p. 409). If no reasons are found, they label and notice cues in order to generate plausible stories. If these stories seem to be adequate, they are retained as guidance for future action and interpretation. The figure is simplified and does therefore not show the numerous cycles and interaction between the elements of the process.

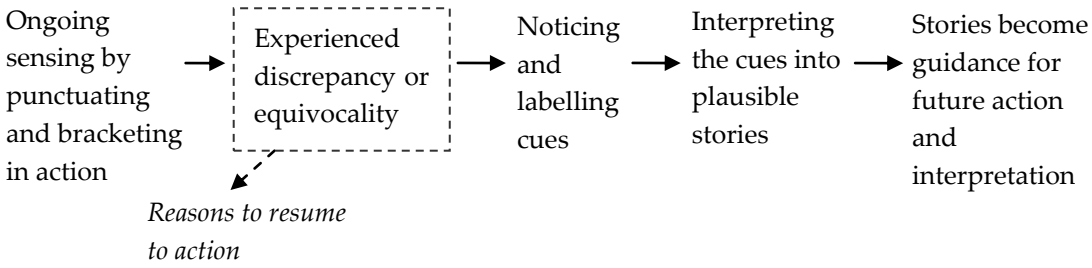

Figure 25: The process of sense-making (adapted from Weick 1995).

Studies related to this field have indicated that informal sensing techniques play an important role in how managers become aware of significant problems and "that managers tend to ignore the indicators when they are formally reported" (Lyles and Mitroff 1980, p. 116). Starbuck and Milliken (1988) report studies that have shown that "some stimuli are more available or more likely to attract attention than others" and "the characteristics of perceivers, including their current activities, strongly affect both the availabilities of stimuli and the abilities of stimuli to attract attention". According to Watzlawick, Weakland, and Fisch (1974), blind spots are found in all mental frameworks and the blind spots prevent people from solving some problems. Furthermore, Bargh (1982) argues that part of our attention to stimuli is managed by automatic and involuntary processes which "can either facilitate or inhibit active attentional processing" (p. 425).

Learning from sense-making literature, we - as SEA practitioners and researchers - need to acknowledge that we cannot fully control what we notice and what we do not notice, the words we use are never accurate, and our initial interpretation may be rigid. Sense-making literature may provide the insight that is needed to better understand and improve how we read signals of importance and frame problems/opportunities (see Woodside 2000).

COMBINING SENSE-MAKING AND SEA SCOPING IN AN EXPERIMENT PROCEDURE

Although the conception and use of 'significance' differ between sense-making and SEA literature, significance plays an important role in both fields and it thus becomes interesting and relevant to relate these fields in order to translate the two research questions into a specific experiment and analyses of how test persons make sense of significance.

The first research question about how SEA practitioners notice cues and frame information in their process of making sense is translated into analyses of *what the test persons notice and when they notice it* and *how the test persons frame the case.* We know from SEA experience that different people point at different impacts in scoping processes, but sense-making leads to questions like: How is our determination of significance influenced by what and when we notice elements? Is it possible to identify patterns and profiles in how we notice and can we improve our noticing? The second research question about how patterns in noticing and framing influence significance criteria are part of the analysis of the patterns.

To answer the research questions, SEA procedures and the insight from sense-making theory are combined in an experiment procedure. Thus, the processes of reading a text in order to determine significant environmental impacts, SEA relevance, and relevant alternatives are combined with the illustration of the process of sense-making above. In order to achieve insight into when test persons notice elements, the experiment includes a reading-discussing-reading sequence. This sequence may furthermore reveal patterns in how communication on the significance determination may influence the significance determination process. The experiment procedure is presented in table 15.

In order to achieve empirical and ongoing insight into significance determination, steps of test persons' reflections on their significance determination process (steps 5, 6, and 8) are added to the experiment procedure. Contrary to the rest of the experiment, these reflections do not provide ongoing but retrospective data about the test persons' sense-making of the case. The reflections do, however, play a role in verifying the data and interpretations made in this article. The analysis of sense-making is thus based on the underlining of words and sentences done by the test persons while reading the text as well as the transcription of the recording of their speaking aloud of thoughts and reflections during the process.

Learning from Weick's recipe of "How can I know what I think until I hear what I say?", a confrontation of interesting statements made by the test persons is furthermore added to the experiment. The intention of this confrontation is to make the test person elaborate on interesting elements such as mental frameworks or individual sense-making processes. The number of confrontations per test person is limited to three.

Step	Task	Sense-making literature
1	An SEA practitioner [A] reads a text and during the reading underlines and comments upon what is especially interesting/useful for understanding (interruptions for clarification if needed)	Noticing and labelling of information in the enactment of the case.
2	[A] is asked to explain what she/he noticed (retell the text). ([A] is not informed of the following stages to avoid dominance of interpretation at this stage)	Retrospective account of the noticing of cues, labelling of information and potential beginning of a story of what the case is about.
3	[A] is asked to determine possible significant environmental aspects	Creating stories of what is significant.
4	[A] is asked how she/he would go on: Is EA needed, what analyses, alternatives and measures are especially important?	Creating stories by searching for experience with relevant incidents.
5	[A] is asked of her/his idea about why she/he noticed the specific cues and whether the noticing had a personal touch	Retrospective reflection on the noticing process by the test person (steps 1 and 2)
6	[A] is asked of her/his idea about why she/he pointed at the specific significant environmental aspects	Retrospective reflection on the stories created (steps 1 and 4)
7	Before concluding, [A] re-reads text to confirm his/her understanding (with a new pen colour)	A test for a changed perceptual framework due to the thoughts in steps 4-6 and more detailed knowledge about the experiment
8	[A] is asked about potential changes in understanding caused by the second reading in step 7.	Retrospective reflection on potential changes and the reasons for these.
9	[A] is confronted with statements uttered during the experiment.	Confrontation of statements may give reactions in line with Weick's recipe of "How can I know what I think until I hear what I say?"
10	As a recapitulation [A] is asked about reflections on and learning in the experiment.	It may give indications of how the test persons think about their sense-making process

Table 15: The steps in the experiment process and their relations to sense-making literature.

METHODOLOGY AND SET-UP OF THE EXPERIMENT

The experiment is simply described by one of the test persons when making sense of what the experiment is about: "I get a text, which I read. And meanwhile I read it, thoughts pop up in my head and I speak these aloud, so that you can follow my thoughts, when I read the text and underline it".

The experiment is inspired by Thomas, Clark and Gioia's (1993) study of hospital managers that aimed at identifying linkages between the "strategic 'sense-making' processes of scanning, interpretation, and action" (p. 239). In a case-scenario methodology, they provided test persons with scenarios and asked a series of questions regarding diagnosis.

Our design has been developed through internal testing and by use of a test person. This has helped formulate the text in a manner that minimised doubt among test persons as to the meaning of "unimportant" formulations of the text. The design and presentation of the experiment aim at being reproducible, so that everyone is able to follow the steps and get comparable results.

EXPERIMENT SET-UP

The cutting-edge research and strategic planning at Energinet.dk inspire the case of the experiment. It is thus a realistic case for the coming years of strategic energy planning. The case is formulated so that test persons most likely will recognise elements without being familiar with the situation. The formulation of the choice is sought to be abstract to encourage strategic considerations, but the preparation of the text showed a need for including concrete characteristics and examples to help test persons grasp what the (non-programmed) situation is about.

The set-up of the experiment is:

- A number of EA/SEA researchers and practitioners are test persons ('variable' mental frameworks). These are selected to reach a variety in the test persons' backgrounds and occupational positions, see considerations below.
- The case text (as 'controlled' and limited stimuli) of a realistic energy storage choice is presented to the individual practitioner. The text is presented below.
- Each test person does the experiment in isolation and the interviewers only interact during the test persons' sense-making of the information if clarification is needed. Furthermore, the interviewers aim at being neutral to reduce the influence on the test persons.
- Before the experiment starts, the aim, duration and content of the study are explained to the test persons. They are instructed to continuously speak out loud, underline words in the text, which they regard as important for understanding, and explain thoughts and underlining during the reading of the text. To enhance trust and informality, it is emphasised to the test persons that their performance will not be graded or evaluated and that there are no trick questions.

- The process is audio recorded, subsequently transcribed, and given to the test persons for possible comments.

Two 'interviewers' observe the test person. One of the interviewers guides the process, interrupts the test persons' sense-making if clarification is needed, and asks questions in the steps below. If the test person does not speak aloud, he/she is asked about thoughts and actions with questions like "Why did you underline that word? What do you mean by…? You seem to ponder upon something?" The other interviewer writes down statements made by the test person used in step 8, see table 16 below, to foster reflection by the test person in line with Weick's "how can I know what I think until I hear what I say?" recipe. If necessary, only one interviewer can conduct the experiment, but our experience is that more nuances and precision are gained by being two.

Due to resource limitations, the number of test persons is set to nine. The selection of test persons has aimed at a variety in job positions, expertise in relation to the information/professional field of expertise, and educational backgrounds, see table below.

	Non or little familiarity with SEA	Very familiar with SEA
Very familiar with the energy case	Lotte, NN, Christian	Per, Stine,
Little familiar with the energy case	Kristian	Martin, Sanne, Anja

Table 16: Test persons in the experiment.

The variety is intended to make differences in mental frameworks more explicit. Furthermore, the variety is intended to reflect that environment professionals are not the only ones who conduct a SEA scoping on developments. In practice, the selection of test persons has resulted in a distribution of four university-based SEA researchers and practitioners, one consultancy-based SEA practitioner, one university-based energy planner, one municipality-based energy planner, one company energy planner, and one university-based urban planner.

THE CASE TEXT

The case, which the test persons are presented with, is shown in box 1 with accompanying notes on the considerations on the formulations and content. The text is one A4 page in total and includes one table.

The ideas behind the text are to give a somewhat likely strategic choice related to a need. To make it immediately understandable, the case description is composed as a 'problem-solutions-characteristics-implications' sequence. The need, the selection of technologies, and the implications are described in a way that is a bit provocative and uncertain as to make it interesting to all test persons. For instance, the need for storage is specified as a single, large figure. A variety in content is sought so that it involves technical descriptions, a table with numbers, as well as concrete examples of implications. Locations known to the test persons and easily understandable examples are provided to facilitate personal relations and similar experiences.

Strategic choice of storage of renewable energy

The high share of renewable energy (like sun, wind, and wave energy) in the future energy system makes it necessary to store large amounts of energy. 100 % renewable energy is discussed, of which windmills must constitute at least half. The periods between substantial wind speeds may last for weeks and sudden changes in weather can impact the stability of the electricity system. Therefore, the need for storage involves long-term storage and storage technologies with a short reaction time.

The need for storage has been estimated on the basis of the longest period with surplus of wind energy which amounts to 100,000 MWh. The need is, however, dependent on other initiatives within intelligent control of the electricity network, consumer behaviour, development of other storage technologies, etc.

A plan for the future energy system involves a strategic choice of storage possibilities. The Government's experts have determined that three technologies will be relevant in Denmark:

- "Compressed Air Energy Storage" (CAES) in which energy is stored as compressed air below soil layers of various depths. Turbines convert the pressure into electricity.
- "Energy islands" in which energy is stored by pumping up water into big reservoirs. The technology utilises the difference in potential energy between two water reservoirs of different heights, and energy is obtained by use of turbines.
- "Hydrogen storage" in which energy is stored by splitting water into hydrogen (and oxygen). Energy is obtained by fuel cells.

All possibilities have been tested and discussed among specialists. Different characteristics of the three technologies are specified in the table:

Storage technology	**Storage period**		**Capacity per facility**	**Efficiency**	**Investment cost**
	[Sec]	[Month]	[MW]	[%]	[$/kWh]
CAES	X	X	100-1000	75-80	Approx. 100
Energy islands	X	X	100-	80-85	Approx. 100
Hydrogen storage	X	X	10-1000	60	Approx. 500

Geographically, the technologies are different. The energy which can be stored in energy islands depends on the area and the height of the plants. Among others, a proposal has been made to close the Limfjord in one end and put up turbines for utilising height differences, or to establish wind power plants on a ring of embankment, creating a short distance between production and storage of energy. CAES and hydrogen can be established as gas storages in underground soil layers, but a proposal to use artificial air cushions just below surface has also been made. Underground storage of air and hydrogen requires only minor facilities on the surface, and there are several places in Denmark with suitable underground.

In relation to other sectors, hydrogen storage involves a dimension of being storage for hydrogen cars. The existing natural gas network may furthermore be relevant as a transport network. In terms of research, Denmark is a frontrunner in the development of fuel cells, and the area is mentioned as a possible new wind energy adventure. The oxygen which is split from the water with the hydrogen can be utilised by the industry. The energy islands can be combined with dams and road connections, and a dam across for instance Horsens Fjord would create a large reservoir.

Box 1: The case description presented to the test persons.

EXPERIENCES AND BIASES

Speaking out loud has generally not been a problem in the experiment, although some test persons had an initial tendency to read all text aloud and other had a tendency to forget to speak out loud. Guidance during the experiment has therefore been necessary, although kept to a minimum not to interfere with the sense-making process.

A recurring event was that the test persons bemoaned the fact that they did not know what to emphasise before they had read the whole text and knew what it was about. One of the test persons expressed it like this: "I can very well speak aloud, but I do not want to speak aloud without having something to speak about, so I just have to see, what it is all about". By insisting on and explaining the interesting aspects in exactly this process, the test persons acknowledged this and agreed on proceeding. Trust and openness have been sought by carefully explaining the purpose and by meeting the test persons at their working place at a place they found comfortable.

The filter between what is said and what is thought was evident in the experiment, for instance in sentences like: "I just have to consider what want to underline". The filter was expected, as it is not 100 % possible to speak aloud all thoughts.

The set-up of the experiment includes limitations in comparison with a 'real-life' situation among people being presented to a case like this. One of the limitations is the test persons' simplification of the information in terms of the sender; in the experiment some test persons' sense-making of the case was explicitly influenced by their relation to and assessment of the interviewers: "When it comes from you, I trust the correctness of the text".

The answer to the question of noticing (why noticing this?) often became a relative question of whether colleagues or other relations would do the same. The comparison group differs from person to person and is thus not easily analysable.

A main critique of the experiment is that it is on an individual basis, whereas sense-making in practice is taking place in a social interaction between people. The individual basis is chosen to make the data simple and analysable; if two or more people were brought together, it would be impossible to concurrently access their thoughts as they unfold. The interaction experiment is therefore seen as a very relevant extension to the individual experiment.

RESEARCH FINDINGS

The results of the three analyses are presented and discussed in the following subsections. The overarching findings from this experiment suggest the following:

1. There are substantial differences in notifying and significance determination between first and second readings of text
2. Personal and professional experience can only partly explain the difference in significance determination
3. Framing of the case varies depending on familiarity and practical SEA experience: The older and/or more practically experienced, the faster and more firm framing

WHAT WE NOTICE AND WHEN WE NOTICE IT

The underlining made by the test persons is aggregated in the addendum and the aggregation shows tendencies of the first reading being primarily oriented towards the concrete details and examples mentioned in the text, whereas the second reading is primarily oriented towards establishing the context and the alternatives. This observed difference between the first and second reading of the text could be summarised as follows:

- In the first reading the test persons focus on the technological aspects of the case, while
- In the second reading the test persons take a more critical position, start asking clarifying questions and make critical evaluations of the nature and implications of the strategic choice and involving technologies.

In the first reading, the underlining thus concerns the specific technologies presented (e.g. "Compressed air energy storage"), the concrete examples of the implementation ("Closing the Limfjord in one end", "artificial air cushion below the surface"), and the windmill context (which is seen as the driver of the 'problem'), whereas the underlining in the second reading concerns the strategic context (underlining "strategic choice" "high share", "wind, solar and wave", "store large amounts of energy"), the strategic alternatives to the presented technologies ("intelligent control of electricity system", "consumer behaviour", "other storage technologies"), and clarifying puzzling information, e.g. "The oxygen can be utilised by the industry", "Government experts have identified").

The analysis of the underlining shows that the highest scoring phrases are: The windmill context ("of which windmills must constitute at least half" by 7 out of 8 test persons) and the radical implementation example of hydro turbines ("closing the Limfjord in one end" by 7 out of 8). A common basis for the test persons' sense-making seems to be: Windmill targets and implications for the fiord, which may be due to a practice of relating to something known (both well known in Denmark).

Among the lowest scoring phrases are "strategic choice" (1 out of 8 test persons) and "Government's experts have identified" (oral by Anja and NN), which may be surprising. The text was, however, introduced as a strategic choice, for which reason it may not have seemed relevant for the test persons to emphasise it.

Concrete examples of implementation of technologies seem to play an important role in the test persons' sense-making; These are emphasised by a high share of test persons ("closing the Limfjord in one end" by 7 out of 8; "artificial air cushion below the surface" by 5 out of 8; "The existing natural gas network as transport network" by 5 out of 8).

Much focus is on the spatial implications of the technologies, and three test persons even emphasise these in both the first and second readings. This double emphasis indicates a new meaning of the spatial aspects after questions on impacts and alternatives.

In the second reading, the underlining reveals, as opposed to the first reading, a critical position towards e.g. the strategic choice, the size of the need, government experts and the technologies put forward. Some examples of critical stances among the test persons in their sense-making are shown in table 17.

The strategic choice including premises	Stine: "When it is this strategic level, I think it would be relevant to know the premises in terms of the projections and the expectations to the development" NN: "It looks like a text from a geography school book, which not yet has acquainted itself with the newest developments" and "It is a pure non-interdisciplinary technical approach. … It is a fascination paper"
Size of the need	Martin: "How big is the uncertainty of this number: Is it 100,000 MW or is it 250,000 MW or is it actually only 10,000?" NN: "I do not know who it is that has estimated the storage need to 100,000 MWh. And I do not know the period… It really has to be clarified". Anja: "This time I noticed that the need is dependent on initiatives. And then I thought: 'Well, have they made calculations on that? What are the prognoses for consumption in 50 years for instance?"
Government experts	Per: "That there actually is a conspiracy behind it [Government expert determines technologies]" Martin: "I think it is appropriate to question whether the Government's experts are right or not. Without saying that they are wrong" Christian: "Some people just follow the experts' advice. In that respect, I am - because I work here [in the sector] and have experienced who so-called experts may be - aware that the experts also have an agenda and a political angle on such issues"
Solutions/ technologies	Kristian: "If they say that a decision is made and that this is what they want, then it influences the possible solutions - or at least the alternatives, which can be chosen" Anja: "[Wind mills on a ring of embankment] Then I think it becomes such a hard-core engineer project, where the focus is more on the project than the energy" Martin: "The positive aspects of investment costs in terms of export is not calculated"

Table 17: Examples of critical stances among test persons during second reading.

The addendum shows instances where words or sentences were underlined in both first and second readings. Besides new structures of understanding imposed in the steps in between, the double underlining may indicate development in how the test persons label and understand these elements. This is when Weick argues that words never map elements perfectly and sense-making never stops.

The findings indicate that if significance determination through screening and scoping in SEA should secure reflection and critical stances, time is required for revisit the text.

TEST PERSONS' REFLECTION OF THEIR NOTICING PROCESS

In terms of the first and second readings, four of the test persons show awareness of their approach to the case description. Per comments that "by the first reading I try to establish the structure and by the second I patch it up, where I have overlooked something or maybe redefine something, because you would see that some other things go on in the text". A similar approach is described by Martin: "What I actually do is that I make an overview by first quickly reading the text through and then go deeper into it afterwards. That is how I work, really. Also ordinarily". Anja underlines her educational background in terms of a specific approach to the case: "I immediately think: 'Where is the problem and where is the solution' when I read things". Christian explains his way of remembering the content: "Then I have some specific elements that I look for, which means that I… I would not say that I memorise, but I remember the essence. Maybe remembering the content more than the meaning of the text. Also because when the text is processed several times, it may be that it is another meaning that you make of the text than the first time you read it through". For Lotte, emphasis on elements seems to be part of the process of creating meaning. She comments, "You underline it to understand what kind of technology we are talking about".

Asked about new meanings in the second reading, Anja comments "It did not change my attitude towards it, because somehow, I got it in the first reading, I think". Sanne describes a more open role of the second reading: "When I read things again, then what I focused on in the first reading, I do not have to focus on again, which means that other aspects turn up". The difference in critical stance between first and second readings is explicitly reflected on by Martin: "What I do in the beginning is actually that I accept the premise about the future electricity system, which makes it necessary to store big amounts of energy. … Others may say "We need a discussion about this, before I go on".

The experiment shows a tendency for critical stances to depend on the professional background, so that energy planners are critical towards the correctness of the energy problem and solutions, whereas the environmental managers are critical towards the environmental implications and the need for the energy infrastructure. Similarly, the urban planner is not critical towards the correctness, but concerned about spatial issues. Having experience within both the case field and SEA can change the framing of the case during the sense-making process. As a person with insight into energy aspects, Lotte initially focused on these, however, after questions related to environmental assessments, she changed her framework of understanding. One of her comments was on the following reflection: "In the first reading, I was most concerned about the technique, and now I thought about it in relation to environmental assessment".

Whereas experiences and knowledge play an important role in understanding the text, the noticing of elements to be interpreted by use of experiences play a similarly important role: Martin is puzzled that despite working with green infrastructure and green export, he did not notice these elements in the text in the first reading. He argues: "I think it is characteristic that it is the lower sentences, where you are missing some things", but also comments that his

skipping may be related to the fact that it is something he knows about. Similarly, he argues that his limited knowledge of energy technology restricts his sense-making of the case: "[Solutions] which I cannot relate to because I am not an expert in this field". Thus, he argues, "It is a matter of believing in it". Stine has another approach to what she does not know; she continuously puts up questions for a range of elements, which she is not familiar with, and points at a range of elements, she would have to investigate more in detail. Still, in terms of alternatives she refrains from giving suggestions, as she finds it too technical.

In their reflection upon how they notice and determine significance, the test persons bring other parameters forward than experience and knowledge:

- *Talking out loud triggers sense-making*

  Kristian comments that his own speaking about alternatives and impacts made him notice the descriptions of initiatives and consequences in the text in the second reading: "Either it was you who said it or we talked about it. And then I noticed it, when I read it the second time". Before that, he did not realise that they were mentioned. His sense-making thus becomes a "How can I know what I mean until I hear what I say". Similar insight comes from Anja, who, when asked what she has learned, comments on the effect of speaking out loud: "I am aware of it [the information], but when I have to express it, you also become more attentive to it".

- *Concrete examples are help*

  Kristian especially notices the concrete examples in the text. On the closing of the Limfjord he comments: "It is a concrete proposal for a solution, which actually gives a better picture of what it is all about… If I was to remember something from this case in two weeks, it is probably that".

  The closing of the Limfjord resembles a 'shock' in Lotte's sense-making: "Closing the Fiord! That is like "okay!" I especially notice that one, because that has indeed an environmental impact… It is absolutely absurd!"

- *Accessibility to numbers – compared to written text – varies*

  The different ways of communicating information in the text clearly influence what the test persons notice. Especially the numbers in the table are less accessible to some of the test persons. Anja skips the table and explains: "Then there is such a typical engineer table, and then I think, "That is a bit boring and skip it. With MWh and efficiency, which I do not think of as of special importance for me to understand the whole [..,] I actually also skipped the table the second time and I did actually not notice that I did so". The unawareness indicates the importance of the structures Anja imposed on the text in the first reading. Also Sanne skips the numbers and by reflecting on this, she comments, "Maybe I am not such a number-oriented person". Lotte, on the contrary, uses the information in the table to compare the technologies leading to a prioritisation of them.

- *Local knowledge play a role*

  Identity based upon local knowledge seems to play a role in what the persons relate to. Asked about unique aspects in her noticing, Sanne points at her relation to Aalborg, close to the Limfjord: "I am after all a local. It is not sure that a person from Zealand [other part of Denmark] would think like that".

Further, the experiment reveals some underlining and significance determination which cannot be rationally explained by the test persons. Instead, the test persons implicitly refer to 'feelings' or 'intuitions'. Martin explains that he did not find the technologies important to him in the beginning; "For me to understand what this is about, it was actually not that important". He later describes his choice of what is important as a feeling of what is useful; confronted with the meaning of numbers, he argues: "it is not something that I feel in the moment that I have any use for. Not right now. It may be that I return to it later". Noticing thus becomes a guess - a "feeling" - rather than a rational exercise. Lotte does similar non-rational underlining: "Now I underline that wind mills must constitute half of it. I do not know why I did it, but I did". Later, when underlining a sentence, Lotte comments: "I just felt like underlining it". Confronted with that comment, she elaborates, "I guess it is something about… In order to remember the text, you often underline numbers, for instance".

HOW AND WHEN WE FRAME THE TEXT

The experiment provides an empirical demonstration of the variety of how and when we frame the case. The variety is presented in table 18 as identified dominating frames supported by quotes from the transcription. The set-up of the experiment makes it possible to indicate the influence of the framings on the test persons' significance determination and how fast the case is framed by the test persons.

Person	**Framing**	**Quotes**	**Influence on significance determination**	**Time for expression**
Per	Complex systems cause conflicts and are not needed - and nature is not the problem.	"[T] his about when the wind is blowing and the water is running, etc. - that is a problem in this context. And that we somehow are assigned to the vagary of nature again, which we have been free from in a couple of hundred years due to all that coal we have been able to dig up" and "the big systems, which are created by the society, will always be based on exploitation of the nature"	No doubt about the need for applying SEA. Focus on nature and land-use in terms of impacts. Focus on low-tech alternatives.	1 min.
Stine	How to get a smooth authority approval process	"I would at least consider [storage] in terms of geography and the legislation, which we need to make sure to comply with in this regard" and "It has big importance for me as a consultant: Who [authorities] do we need to contact and at what point in time?"	SEA not automatically necessary, but depending on authorities	1 min.
Christian	Societal relevance of the technologies	"The bigger environmental impact [the infrastructure] has, the bigger opposition it will get" and "What is more important than the costs is the political for the different technologies, because in the end, it will be expensive".	SEA should have been done before delimiting to three technologies	1 min.

NN	Inadequate solutions to energy system planning	"It is some gigantic solutions and therefore it is also some unpleasant solutions, when other much more simple solutions exist" and "I am completely stuck in the understanding that this is not good solutions. And there is no reason to use these."	Critical stance on the choice. Arguing for a range of alternatives	3 min.
Sanne	Initiatives are unpopular among locals	"I think 'actors' - locally - who have to live on top of a storage. […] I think [public participation] is one of the interesting [aspects of planning], so of course I notice that"	Focus on impacts on local citizens	5 min.
Lotte	Synergies' potential	"There are many discussions about biogas from the agriculture and if it was possible to creative incentives, so that the agriculture actually produced some biogas and the natural gas network was utilised, then that would be intelligent" and "It could be smart if it was possible to exploit the air and hydrogen [from underground storage] near contaminated sites. Then it was possible to purify the site immediately"	Positive potential among significant effects	7 min.
Martin	Valid determination of technologies	"Some of the things I did not underline were the specific technologies, which I in the first round was a bit unconcerned about, among others because I had trust in the validity of the Government experts' assessment.	Initial refraining from suggesting alternatives	14 min.
Kristian	A planning task	"It may be that there is a planning approach over it [my suggestions]: How do these energy initiatives relate to the rest of society?" and "You will have to investigate if there are different conditions different places in Denmark"	A spatial focus in terms of significant impacts	14 min.
Anja	The big picture	"I think more holistically than in the detail… That is what I found interesting… I think 'Well, have they remembered to include everything? Are there other solutions? What is the thread in this? What is most important and what is not important for me to create a coherence in this'"	(Not noticeable)	22 min.

Table 18: Dominant framings of the case generated by the test persons with specification of the time of the first expression.

How we frame the case is related to who we are and what we do: Stine and Kristian explicitly refer to their profession; Lotte refers to the projects she is working on at the time of the experiment; Per and NN relate to their experience and professional opinions. The framings in table 18 thus reflect how the test persons mirror themselves in the case.

The influence of the framings on the significance determination concerns the 'content' aspects such as the type of alternatives and impacts, but also 'process' aspects such as refraining from suggesting alternatives due to limited knowledge and disputes on the timing of the SEA. The experiment shows that the framing of the case is not a straightforward and linear process and the influence varies over time: Noticing 'storage', Anja initially suggests that the case is about carbon capture and storage. In line with Starbuck and Milliken's "if an initial framework fails, one can try its equally plausible converse", she quickly realises its incorrectness and instead suggests an energy storage framing of the case.

Some of the test persons are aware of the framing and its influence. Per for instance explains, "I am used to looking at nature as a good on its own, which very often is in difficulties due to the conflicts that follow these types of systems, which are built up". He shows awareness of his frame of understanding: "That would probably be what I am primarily looking for". He argues that the conflict frame may be the reason why he did not notice the sentence with 'Government's experts'; "If you were more political scientist than I am, then you may have seen it as the first thing, where it for me is a bit lower in the food chain". Per comments that his frame of big infrastructures with negative consequences is a "fundamental model of thought", which he has used since the '70s: "But I do think that it to a wide extent is reasonable, since it reveals some internal conflicts…. If I could not find things in the text, which the system expects, then I probably would be left high and dry and say that this text was more or less meaningless and not interesting".

When we frame the case varies considerably: Some test persons develop a specific framing on what the text is about within few minutes, whereas other test persons never seem to create an overall framing. The two test persons with an age over 50 and a professorship were quick (NN and Per within three minutes) to assign a specific frame to the text. Also the EA practitioners from the consultancy company and the Danish TSO quickly assigned a specific framing to the text. Relevant experience thus seems to lead to quick framings of the text. The energy researcher (NN) comments on the text that "I immediately see what this is all about. And then you may say that I have been trapped by my first impression. But I do not think that there were anything else other than I was a little more annoyed the second time, because I think some things are missing and that it is a wrong focus". Later, he explains the influence of his framing as: "I meet this text with the prejudice that these are bad storage technologies. And that it is top-down storage technologies. And that entails that I have to make a special effort to see the positive aspects in the text. What I have not really done." NN does, however, defend his framing "It is obdurate, however, it is reasoned obduracy… There is no reason to use more time on this; it is bad solutions".

NN's quick framing can be seen as the automatic and involuntary processes that inhibit active attentional processing as Bargh pointed at: NN acknowledges that he is completely stuck in a certain framing of inadequate solutions and that he was not able to go beyond that framing to see positive aspects of the technologies. NN's framing thus delimits openness in his sense-making of the technologies. Automatic and involuntary processes seem to work the other way around for Kristian in noticing certain elements as funny, since they facilitate active attention to these elements: By what seems as automatic processes, he finds the implication of a new wind adventure funny and the extra attention to this element creates reflections on the previous information.

At the same time, NN and Per's quick framings reduces irrelevant stimuli, whereby more attention can be given to the impacts and alternatives that their framings consider as relevant. Fast and firm framings based on familiarity with the case can thus be an instrument to gain a discussion and openness towards alternatives on a higher level of sophistication than among persons that are not familiar with the case.

Based on the experiment, the test persons' familiarity with the energy sector and the familiarity with preparing an assessment seem to be two important dimensions of when and how significance is framed. Table 19 suggests four personal profiles of significance determination within these two dimensions.

	No or low familiarity with SEA	Very familiar with SEA
High level of familiarity with the energy case	**Relating** (Lotte, NN)	**Settling** (Per, Stine)
Low level of familiarity with the energy case	**Seeking** (Kristian)	**Arranging** (Martin, Sanne, Anja)

Table 19: Profiles within the dimensions of familiarity with preparing SEA and familiarity with the energy case indicated by the experiment.

The 'relating' profile found several associations and potentials in the energy case without a certain quick frame on what should be assessed: Lotte relates cues in the text with a number of experiences she has gained in her profession. The 'seeking' profile recognised few elements in the text and did not identify a specific frame for understanding the case: Kristian explicitly stated that he emphasised the implementation examples, because they appeared 'funny' to him. The test persons familiar with similar cases and with preparing SEA were quick to settle the case in terms of what it was about and how to proceed. These persons are grouped in a 'settling' profile. The 'arranging' profile found aspects to assess, but did not have the technical insight to develop a specific frame for the energy case.

The experiment findings indicate that a high level of familiarity with the energy case may be both a pitfall and a benefit in terms of significance determination: People that are very familiar with the energy case make a fast framing that precludes information and at the same time focus their attention on what is (assumed to be) the most important elements. Similarly, a low level of familiarity may mean a more unstructured and slow process, but at the same time a critical stance on the basics of the provided information and openness towards other perspectives on the problem.

The suggested profiles seem to relate to how much is noticed during the first reading versus the second one. Kristian in the seeking profile and Sanne and Anja in the arranging profile do not realise during the first reading that the initiatives mentioned in the text can be seen as alternatives, which may be due to less familiarity with the energy case. Kristian also realised during the second reading that he did not notice the need for long-term storage during the first reading. These two aspects were both noticed by the more experienced test persons (although not underlined). In a discussion following the experiment, Kristian coins the difference: "I imagine that when NN or Per reads it, they more heavily relate it to their working field […] whereas I had to read it through to understand what it is about".

CONCLUSION AND RECOMMENDATIONS

In this article we have explained the main ideas of sense-making theory and proposed that sense-making is a central activity in significance determination in both screening and scoping stages of SEA. Sense-making theory provided us with a theoretical and methodological approach to conceptualising and investigating sense-making involved in test persons' determination of significance.

The experimental research has, due to the low number of test persons, no ambition of making comprehensive and general statements about sense-making in SEA processes. The research is meant as an input to the reflection on the social processes that take place initially and continually during the SEA process. Its strength lies in the empirical demonstration of how we make sense in these processes.

In the following, we will firstly highlight four main findings of the experiment, and secondly discuss implications of these findings for how we perceive and practice significance determination in SEA.

The first main finding is that the test persons' sense-making processes supplement ideas and concepts within decision-making. Kørnøv and Thissen (2000) disputed the idea that 'more information leads to better significance determination', and the experiment shows instances where the test person developed a firm frame in the very beginning of the reading of the case regardless of the remaining information. Simon (1947) proposed the idea of 'satisficing' and the experiment shows instances in which test persons are satisficing their need for information in order to get on with the process.

The second is that individual SEA practitioners and researchers differ significantly from each other in not only what is determined significant, but also in what is noticed and labelled prior to the choice of significant impacts. They differ in what elements they notice, how they label the elements, what they consider as significant information and what implications it should have for the further assessment process.

The third is that professional background and education are far from the only factors decisive for what we determine as significant. The experiment e.g. shows that age and experience play a role: The older and/or more experienced, the faster and more firm framing takes place. The experiment thus demonstrates that determination of significance relies upon a much more complex pattern involving factors like professional background, interest and age/experience.

The fourth is that the experiment reveals a notable difference in what the test persons notice during the first reading compared to the second reading – with the second reading supporting a more critical position and questioning approach. The experiment furthermore shows widespread awareness among the test persons of how they approach a text. Still, some of them are surprised that they missed important information during the first reading, which indicates that we should be more critical about what we notice.

The article underlines that the individual engaging with the SEA text is not objective and passive, but is a sense-*maker*. The text is not 'transmitted' and received fully by the individual. Instead we experience the test persons as constructing stories of meaning, which involves 'negotiations' between the SEA text and the individual in the reading process and even 're-creation' of elements in the text.

As a consequence of the outlined findings, sense-making is a mandate of significance determination. The question is then how we can approach our sense-making in a way that is beneficial for significance determination processes? How can we use this insight to develop a better appreciation of the link between information and significance determination? Three suggestions are provided in the following: Recognition of and reflection upon own sense-making, frame awareness in team-setting, and reconsideration of guidance and good governance.

RECOGNITION OF AND REFLECTION ON SENSE-MAKING

As presented, the experiment shows a tendency of test persons being more critical during the second by questioning premises and the intention of the text. Wood and Becker (2005) propose a frame-reflective approach to counteract similar problems: "To limit the problems associated with screening errors, further guidance should seek to raise awareness of the existence of frames amongst practitioners and encourage a frame-reflective approach to screening decision making" (p. 367). They picture "frame-reflective practitioners" who actively question the basis of their assumptions and the subsequent implications, but they do further advise how it can be done in practice.

Insight into how we make sense like the insight the test persons gained through the experiment may be a means to be aware of assumptions. Similar to the experiment, an open dialogue with colleagues based on a comparison of what is noticed and what is found significant in a given case may provide a basis for increasing our awareness of our blind spots and rigid framings.

TEAM-SETTING FOR SCREENING AND SCOPING

The findings emphasise the importance of setting a team with different profiles and familiarity with the case. Furthermore, the findings indicate that differences in background, age and experience are needed if we want a more heterogeneous and holistic perception of the case. Awareness of the frames we employ in team-setting may thus make it possible to reduce 'blind spots' and enhance a broader perspective on impacts and alternatives. Insight into frames in an organisation may therefore be important knowledge when organising SEA processes and aiming at better quality of the SEA process. Even on an individual level, it may be relevant to consider who would supplement my frame and notice what I expect he/she not to notice in this case.

The different levels of sophistication of the framings identified in the experiment calls for consideration of familiarity to the case when setting the team. The higher level of sophistication plays an important role in distinguishing between significant and non-significant impacts and alternatives, and sophisticated framings may thus be a necessity to avoid that too many impacts and alternatives are scoped in rather than excluded. At the same time, less familiarity with the case may be needed to question what more firm framings take for granted. The significance determination may thus in practice benefit from openness at different levels of sophistication, so that both basic assumptions and advanced issues are critically questioned.

It may similarly be relevant to consider sense-making processes in the public consultation. DTEA (2002) argues that making the process of significance determination "more explicit, open to comment and public input" would be an improvement of the practice. Public consultation is an opportunity to bring a large number of mental frames into the screening and scoping process and careful consideration to the sense-making process may provide an opportunity to articulate elements that are not noticed or not labelled.

GUIDANCE AND GOOD GOVERNANCE

Guidance on SEA involves a range of checklists on screening and scoping based on targets and thresholds. To enhance accuracy, it has even been proposed to treat significance through a scientific approach (Stamps III 1997) with 'precise' thresholds for when impacts are significant. The limited reference of thresholds in the test persons' sense-making indicates that thresholds do not play a role at this early stage. Experience seems to play a far larger role. Thresholds and targets may rather be used as retrospective legitimacy for the choices made during meaning creation. In this way, the findings support the American practice of avoiding significance thresholds (Slotterback 2011).

The experiment also paves the way for a discussion of good governance. As an example, the IAIA best practice principles state, "the [EA] process should result in full consideration of all relevant information on the affected environment, of proposed alternatives and their impacts" (IAIA 1999). The experiment findings urge a re-consideration of such formulations, as the meaning of 'full consideration', 'all relevant information', and 'affected environment' differs from person to person and from profile to profile. To acknowledge the constructionism and complexity inherent in sense-making, the best practice principle could instead focus on the openness and ways of interaction during the process.

Overall, the recommendations underline the need to notice and recognise significance determination, have conversations in interactions about its nature and role, and make significance determination an object of both social and institutional learning.

Acknowledgement

We acknowledge with thanks the assistance of the test persons. We would also like to thank Pernille Sylvest Andersen and the two anonymous referees for their valuable comments on an earlier draft of this paper. Finally, we would like to thank Energinet.dk for support to the PhD project within which this experiment was made.

ADDENDUM: EMPHASISED ELEMENTS

Overview of underlining made by test persons. 1 symbolises first reading, 2 the second reading.

Element noticed	Per	Martin	NN	Kristian	Anja	Sanne	Stine	Lotte	Christian
Strategic choice of storage possibilities		2		2					
High share of renewable energy	1	1+2						2	1
Sun, wind, and wave energy	1					2			
Store large amounts of energy	1							2	1
100 % renewable energy							2		1
Of which windmills must constitute at least half	2	1		1	1	1	2	1	1
Sudden changes in weather	1	1							1
Stability of the electricity system				1					1
Need for storage		1			1				
Long-term storage				2				2	1
Storage technologies	1	1						1	
Short reaction time	2	1		1				1	1
The need for storage	1	1						1	
Estimated … period with surplus of wind energy					1			2	1
Amount to 100,000 MWh			1					1	1
Other initiatives		1+2		1	2				1
Intelligent control of the electricity network	1			2	2	2		1	1
Consumer behaviour	1	1		2	2	2			2
Other storage technologies		1			2			2	2
Strategic choice of storage possibilities	1	1						1	
Government's experts have determined	2	2							1
"Compressed Air Energy Storage"	1	1				1		1	1
Compressed air below soil layers				1			1	1	
Of different depth								2	
"Energy islands"	1					1		1	1
Pumping water into large reservoirs				1			1	1	
Difference in potential energy								1	
Between two water reservoirs								2	
Different height … use of turbines						2		1	
"Hydrogen storage"	1					1		1	1
Splitting water to hydrogen (and oxygen)							1	1	
Fuel cells				1				1	
Table: The entire table			1				1		
Table: Energy Islands	2							1	
Table: Storage period column						1			
Table: Efficiency column	1			2					

Table: App. 500 ($/kWh)				2				1	
Geographically, the technologies are different	1			1+2	1			1+2	1
The area and the height of the plants	1							1+2	
Closing the Limfjord in one end	2	1		1	1	1	1	1	1
Height differences		1						1	1
Wind power plants on a ring of embankment	1	1				2		1	1
Short difference between production and storage		1						1+2	1
In underground soil layers				1		1	1+2	2	1
Artificial air cushions just below surface	1	1		1			1	1	1
Underground storage	1	1							
Only minor facilities on the surface	1	1		1				2	1
More places in DK with suitable underground		1		2				1	2
Storage for hydrogen cars	1	1						2	1
The existing natural gas network … as a transport	2	1		2			1	1	1
Denmark is a frontrunner	1	1							
Fuel cells								1	1
Mentioned as a possible new wind energy adventure	1			1		2	1	2	2
Oxygen … can be used by the industry		2					2		
Energy islands can be combined with dams and roads	1			1				1	1
Dam across Horsens Fiord would create a large reservoir				1			1	1	1

POSTLUDE: ELABORATION OF CENTRAL ASPECTS

The article only presents a part of the data, which the experiment provided about the test persons' sense-making. Among the aspects that are not included in the article are the details of the test persons' use of criteria (which and with what outcome) and the details of critical stances to the information about the case (what is questioned, by whom and when). The intension is that these aspects will be published in another journal article.

This postlude elaborates on the journal article in terms of the importance of how teams are set and on the use of checklist. Furthermore, the article is used as a point of departure for discussion SEAs as plausible stories and SEA application as a nursing practice in line with Weick's writings.

THE IMPORTANCE OF SETTING A TEAM

The article points at the question of whether it is possible to set a team in a way that the risk of not noticing important elements is reduced and so that non-significant elements are scoped out. The importance of setting a team is pointed at e.g. by Drucker in a management context. He emphasises the unique characteristics of every team and the relevance of viewing teams as tools:

> *"Teams, in other words, are tools. As such, each team design has its own uses, its own characteristics, its own requirements, its own limitations. […] Which team to use for what purpose is crucial, difficult, and risky decision that is even harder to unmake. Managements have yet to learn how to make it."* (Drucker 2009, p. 75)

Drucker argues that the ability to set a team will become more important in the future: "The ability to diagnose what kind of team a certain kind of knowledge work requires for full effectiveness, and the ability, then, to organize such a team and integrate oneself into it, will increasingly become a requirement of effectiveness as a knowledge worker." (Drucker 2009, p. 202). In a sense-making perspective, setting a team thus becomes a meta-diagnosis: A diagnose of who is diagnosing what and in what ways. This requires a good knowledge about the team candidates' way of making sense.

With the insight from the experiment it would be possible to set up teams with test persons that would A) notice similar information and create similar stories, B) notice different information and create similar stories, C) notice similar information and create divergent stories, and D) notice divergent information and create divergent stories. Whereas option A and D seem generally known, little awareness seems to be on option B and C.

USE OF CHECKLISTS

The experiment reveals a limited explicit orientation to objectives and plans in the test persons' sense-making of significance. The experiment thus points at two aspects: A) Checklists are important if these connections are wanted; B) Without checklists, persons are open to the provided information and checklists would have directed this openness to specific aspects.

Sense-making literature includes a range of warnings against routines and checklists in ambiguous and complex environments with vague questions and muddy answers. Weick (1989) quotes a poem by Robert Graves to emphasise the risk of thinking in clearly structured ways without a continuously criticism to these:

> *He is quick, thinking in clear images;*
> *I am slow, thinking in broken images.*
>
> *He becomes dull, trusting to his clear images;*
> *I become sharp, mistrusting my broken images.*
>
> *Trusting his images, he assumes their relevance;*
> *Mistrusting my images, I question their relevance.*
>
> *Assuming their relevance, he assumes the fact;*
> *Questioning their relevance, I question their fact.*
>
> *When the fact fails him, he questions his senses*
> *when the fact fails me, I approve my senses.*
>
> *He continues quick and dull in his clear images;*
> *I continue slow and sharp in my broken images.*
>
> *He in a new confusion of his understanding;*
> *I in a new understanding of my confusion.*

The findings of the article are thus an interesting input in the debate on checklist as it shows what happens when persons are not using such standardised formulas. The study thus opens up a new experiment-based approach to significance determination that e.g. could involve an experiment of two representative groups of test persons determining significance on the same choice, one with a checklist and one without.

PLAUSIBLE SEAS?

Weick (2009, p. 9) uses the notion of 'cartography' as an explanation of the existence of an infinite number of plausible maps of the reality. Conducting an SEA can be seen as making a map of the reality that is as good as our resources permit, however, it will never be perfect and it may not be judged as correct or accurate by others.

Weick tells a story of how a military unit uses a map to find their way as an elaboration of the map metaphor. During a military manoeuvre in Switzerland, a Hungarian reconnaissance unit was sent into the Alps. Heavy snow made the unit loose their orientation. When they got back, the lieutenant of the detachment asked them how they found their way, which leads to Weick's point:

> *"We considered ourselves lost and waited for the end. And then one of us found a map in his pocket. That calmed us down. We pitched camp, lasted out the snowstorm, and then with the map we discovered our bearings. And here we are. The lieutenant borrowed this remarkable map and had a good look at it. He discovered to his astonishment that it was not a map of the Alps, but a map of the Pyrenees"* (Weick 1995, p. 54)

In an SEA perspective, the point of the story is that although SEA reports are constructed and likely flawed representations of the world, an SEA report can guide the environmental considerations in the action following a strategic decision; the descriptions do not have to be precise to fuel considerations on environmental aspects in decision-making on plans or programmes. A similar point is made by Starbuck and Milliken (1988, p. 40): "one thing an intelligent executive does not need is totally accurate perception". This is where Simon and Weick use the concepts of satisficing and plausibility, respectively. Furthermore, the belief in the correctness of an assessment may in itself animate SEA practitioners to bring environmental aspects onto the agenda and reach a more environmentally friendly planning regardless of whether retrospect may show that the SEA 'map' was flawed.

Weick's praise of being active and use actions to make sense of what is going on can be argued to be in line with and in contrast to the ideas behind SEA: An imperfect map may be good enough for act of a public consultation process and the acting in consultation process may help SEA practitioners getting a better understanding. On the other hand, relying on an imperfect map when consenting developments may contrast the precautionary principle, e.g. if an authority abandons possibilities for adapting to a better understanding. In the consenting of Energinet.dk's releaching of the natural gas storage plant in Ll. Torup, see subchapter 7.1, the Environment Centre Århus acknowledged uncertainty about the content of heavy metals in the underground salt and rather than relying on limited knowledge and expectations in their consenting, they therefore made the consent requirement dependent on the actual concentrations in the future discharge: "Continuous analysis of the brine must be made during discharge in order to document that the composition of the brine after dilution is not significantly different than the composition of the salt water in Lovns Bredning" (Environment Centre Århus 2010, p. 291, translated). This imperfect map made it possible to act and to adapt to a future better understanding of the impacts.

SEA APPLICATION AS A NURSING PRACTICE

The ongoing task for SEA practitioners of having an eye for developments that may be SEA mandatory seems analogue to the practice of a nurse as told by Weick. The nurse is, during her routine activities, noticing and bracketing cues in the streams of events and inputs that surround her in an ongoing making sense of the patients' well-being. Weick narrates:

> *"During her routine activities, the nurse becomes aware of vital signs that are at variance with the "normal" demeanor of a recovering baby. In response to the interruption, the nurse orients to the child and notices and brackets possible signs of trouble for closer attention"* (Weick et al. 2005, p. 411).

The nurse is trying to create meaning of some signs that is not what she expects. This process is guided by the nurse's mental models that lead her to notice and understand specific cues and (temporary) ignore others. The bracketing of cues eventually leads her to label the baby's signs, and thereby replacing ambiguity with simplicity so that the hospital system can start treating the baby. Analogous to the nurse, SEA practitioners notice and bracket signs about developments or impacts that we are not sure whether to include in our impact assessment. Replacing the baby with an environmental impact, Weick's story would be:

> During our impact assessment, we become aware of signs of environmental impacts that are not easily labelled by our experiences. In response to this interruption, we orient to this impact and notices and brackets possible signs of significance for closer attention.

Sense-making thus takes place when we have no experience or no labels for a certain event or 'thing' and thus have to create meaning of what it is and how it fits into our mental frames for conducting assessments. The 'baby' could also be a new or ambiguous kind of development that we feel may have significant impacts or values that we have not experienced before. The experiment above is an example of how the 'baby' is labelled and signs are bracketed in order to make sense of significance.

8.2. CHOICES AND SENSE-MAKING IN AN EA OF A GAS STORAGE

The aim of the following investigations of the environmental assessment process on the development in the natural gas storage project in Ll. Torup is to show empirically how actors diagnose information and create stories based on these in a real life context. The focus is thus on the details of human choice, cf. the conceptual framework. The choices made in the environmental assessment process are to different extent non-programmed as the persons interviewed in some instances expressed that the decision situations were new to them.

The following investigations involve a short-term and a long-term period of time. The long-term study seems typical within sense-making literature, as many articles are made on historic data or longitudinal participation (see subchapter 5.2). The short time frame is expected to make it possible to show nuances and to direct changes in persons' sense-making to the social processes taking place at the public consultation meeting. Information about these processes is relevant for the arrangement of public consultation meetings and in terms of how we communicate at these meetings. It is, however, a snap-shot of an ongoing sense-making process and organizing activities among all involved actors, and it may be difficult to explain the changes taking place, as these are part of a complex web of interacting processes. The short term investigation was presented and discussed at the AESOP conference in 2010 and published in the selected proceedings (Lyhne 2010). In terms of the choice circles model, the short-term investigation aimed at exploring:

- Sense-making in real life context, especially making sense of whether information is known or new.
- The nuances of sense-making in a specific and time-limited public meeting.

The long-term investigation is made a year after the public consultation meeting in the short-term investigation. It has point of departure in the short-term investigation and sheds light on what happens afterwards to the senses made during the public meeting. It furthermore puts light on how actors interpret and act on a major change in the consenting process. In terms of the choice circles model, the long-term investigation aims at exploring:

- How a significant change influence sense-making and choices among actors
- The relation between diagnosis and choices in practice

INTRODUCTION TO THE LL. TORUP GAS STORAGE

The Ll. Torup gas storage facility is situated in central Jutland and it has been in operation since 1987. Energinet.dk owns and operates the natural gas storage facility, which consists of seven cavities at a depth of 1,270-1,690 metres leached in a salt dome. The caverns are 200-300 metres high with a diameter of 50-65 metres. In 2008, Energinet.dk started planning for a re-leaching the existing caverns and an increase in storage capacity by new caverns. The plan for re-leaching and leaching of new caverns has an expected time frame of 25 years for completion (Energinet.dk 2009j).

Despite significant strategic implications such as the national security of supply and the relation between storage and the need for new gas connections, the gas storage expansion is staged as an infrastructure project at EIA level. The planning process involves a wide range of documents and authorities: EIA and environmental approval by Aarhus regional

environment centre, municipal plans by Viborg Municipality, permit from the Energy Agency, and approval by the Minister of Climate and Energy. Besides the authorities, a range of actors in the area are engaged in the processes. The local actors are primarily fishermen, residents, owners of summer cottages, and nature NGOs. They are organised through a few resource-strong persons that have used considerable efforts in trying to stop or significantly change the process.

Following the public consultation meetings in 2010, including the one investigated, the gas storage re-leaching project changed character: In September 2010, the plan for storage re-leaching and expansion was changed to only include a re-leaching of the existing caverns. According to Energinet.dk (2010i), the cancelling of the expansion was due to changes in the premises for the gas storage expansion with reference to the major changes in infrastructure developments described in subchapter 7.1.

According to Buus (2009), struggles about the Fjord are not new to the inhabitants around Hjarbæk Fjord. In the 1950s, the need for a transport connection crossing the Fjord increased a conflict between fishermen, who wanted a bridge to keep the flow of water into the Fjord, and the farmers, who wanted land reclamation. In 1960, after years of struggle, the government decided on a dam solution that could control water height in the Fjord. In the following decades, oxygen depletion and a worsening of the environmental quality were evident, and the fishermen and nature organisations struggled to open the dam in the 1970s and 1980s. The problems in this period were according to the locals also caused by the original leaching of the natural gas storage in Ll. Torup. In 1991, the dam was opened and the salt water re-entered the Hjarbæk Fjord. 20 years after, the local inhabitants are part of new struggles; the farmers fight against the water river basin management and the fishermen and nature organisations fight against Energinet.dk's interests on re-leaching and expanding the natural gas storage with discharge of the salt into the Fjord. The investigation thus concerns and area and population with a history of disputes on interests.

APPROACH AND DATA COLLECTION METHODS

The short and long term investigations have a range of similarities in terms of persons and data collection methods, but they also differ, e.g. in terms of approach and point in time. The short-term investigation was conducted during spring and summer 2010 and it is primarily based on interview and observation. The long-term investigation is made in the spring and summer of 2011 and it is primarily based on interviews. The approach and data collection methods of the two investigations are presented and discussed below following a description and considerations on the interviewees, who are common for the two investigations.

The interviewees

The interviewees were found by searching the media for persons that publicly expressed their sceptics about the project and the EIA. A variety of opinions were sought and partly achieved by representatives from local fishermen, from a regional organisation of a national nature NGO, and from a regional organisation of a national bird NGO. These representatives provided a good basis for using a snowballing technique to identify other relevant interviewees for coming studies. The interviewees were all knowledgeable of the case and

engaged in being critical of the development. Their opinions and interpretations are likely to have influenced this investigation to reflect a critical view of the planning process as compared to more 'neutral' actors. The long term investigation balances the opposition to the project with an interview with a manager from the gas storage branch of Energinet.dk.

The interviewees were linked in the sense that they had read each others' statements on the project. They were furthermore all included in the list of experts, which the Fjordvenner organisation relied upon in their opposition to the project development. One of the interviewees was a key profile in this organisation and the two other interviewees were quite anonymous; one of the anonymous interviewees described his role as "I have a minor role [in the network], since I have no strong attitude to the project". These linkages partly constitute a bias towards a certain angle on the process, but they also constitute a possibility for validation of statements on the organisation and its opinions. The mix of heavily involved and distanced persons is furthermore thought to give a more nuanced picture of the process and the interaction between involved actors.

The efforts of making my intensions with the interview clear for the interviewees were complicated by the setup of the Ph.D. project as it is partly funded by Energinet.dk that owns the gas storage company that has initiated the re-leaching of the caverns. My affiliation may, on the other hand, also have given an increased interest in my project as the persons then had an opportunity for a dialogue with an "insider" in Energinet.dk.

Investigating sense-making in a short period of time

The investigation is based on a sense-making framework in accordance with the conceptual framework. It frames the investigation of how participants at the meeting change their understanding of aspects in relation to the environmental assessment, see table 20. The analytical framework is expected to show how and to what extend the participants' sense changes at the public consultation meeting. This information is intended to make it possible to discuss what influences participants' sense-making process, and constitute a point of departure for investigations of under what circumstances, sense-making is taking place. Given the complexity of the sense-making processes taking place in such a public consultation meeting, the information may, however, be a blurred picture of a high number of evolving senses on equivocal stimuli.

The investigated meeting is the specific public consultation meeting of the Ll. Torup planning process held at Viborg Musiksal, May 3rd 2010 at 7pm. About 200 people were present, including representatives from 3 regional environment centres, the natural gas storage company and the Danish Energy Agency. Among the audience were representatives from the Danish Society for Nature Conservation, Danish Ornithological Association, fishermen and city council members. Two peaceful happenings against the planning were taking place at the entrance and a protest banner were decorating the room of the meeting, see figure 26.

Figure 26. The investigated public consultation meeting on the Ll. Torup gas storage project

The investigation covers a minor part of the participants' sense-making concerning the project. Their sense-making about the project is assumed to start when the participants realised that their enacted information about the project seemed not in accordance with their expectations and experiences, e.g. when impacts are bigger than what is acceptable. Their sense-making process was initiated when the participants' noticed the planning ideas for the first time and continues throughout the re-leaching to following activities. The focus of this investigation is delimited to the development in the persons' sense-making processes from before the meeting to after the meeting. The analytical framework include aspects that the participants are expected to have made sense of and encompass both technical or physical aspects as well as persons' understanding, see table 20.

Sense about	*Before the meeting*	*After the meeting*
The project		
Societal need for the project		
The basis for the project		
The consenting process		
Environmental impacts		
Agency choice of alternatives		
Other peoples' understanding and values		

Table 20: Analytical framework for the investigation of development in senses during the public consultation meeting.

The investigation is based on a triangulation of the methods of interview, document analysis and observation. The document analysis covered statements about the project in news media and web pages, since such statements were assumed to have an influence on the sense-making among the actors. National and local newspapers, ministerial news letters, and private homepages about the project were analysed for information about the case. Search words were names of the impacted areas, words related to the planning, and names of the authorities and key persons involved in the process. The output was an overview of opinions and an insight in who cited whom. The document analysis constituted a part of the basis for developing interview questions and for interpreting observations and interviewees' statements.

Three full interviews were made on the day of the public consultation meeting. Two interviews were made in the homes of the interviewees to encourage a relaxed and confidential atmosphere, and the third at the venue of the meeting. The interviews during/after the meeting had character of being conversations and continuations of the interviews before the meeting. I emphasised that they would be given the possibility to comment on or reject my use of their statements prior to publishing. Furthermore, I conducted the interviews like conversations taking notes in stead of recording the conversation in order to encourage a relaxed tone. Thus, the quotation may not be 100% accurate, however, the formulations are approved by the persons afterwards and thus an acceptable representation of what they were likely to say in this situation and still stand up

for. To make the topic of sense-making easier to understand, I used the words 'perception' [opfattelse] and 'understanding' [forståelse] in the communication with the interviewees. Furthermore, I focused on their concepts and what they found interesting rather than using the analytical framework slavish. The interview questions in "everyday" language were of the character: What do you make of the EIA report? What do you expect to hear about at the meeting? Did you hear something new at this meeting? Did it change your understanding of the project or its impacts?"

The investigation relied on the participants for realising developments in their sense-making during the meeting. The short talks during and after the meeting were likely too short for the participants to reflect on their sense-making, since a huge amount of information was given at the meeting and the project involves a complex of consequences and characteristics. The nuances of sense-making may therefore have been more apparent if the interviewees had more time to reflect on their sense-making. Time and reflection may, on the other hand, attribute sense-making developments to the meeting that took place after the meeting. It might be that sense-making on the dialogue at a meeting late in the public participation process primarily may take place after the meeting.

The findings from the document analysis and the interviews were supported by an observation of the public consultation meeting on the Ll. Torup case. The observation included noticing who was speaking, how the audience reacted, what arguments were used, and how opinions of specific issues were developed (if possible). The observations were noted and some were discussed with participants at the meeting.

Investigating sense-making in a long period of time

The long term investigation is a follow up of the investigation of the public consultation meeting. The same actors are approached to investigate their sense-making and choices during almost a year in the period of June 2010 to May 2011. At the time of revisiting the interviewees, the authorities were about to approve the re-leaching part of the original plan.

Like in 2010, the actors were visited in their homes to encourage an open-minded conversation. Unfortunately, it was only possible to interview two of the three actors visited in 2010, since one of the interviewees were overloaded with work. Another of the interviewees had been less into the process than expected which required adaptation of questions during with the interview. Contrary to the investigation in 2010, a sufficient level of trust was built to record the interviews.

The interviews were made with a structure of initially asking into passed events and the details around these to create an account of the events and only thereafter asking into the interviewees' opinions and interpretation of "why so?" This sequence made it to some extent possible to understand and ask into the basis for the opinions and interpretations and thereby to approach the interviewees' sense-making process. The interview approach is in this respect inspired by Ward and Wright's (2009) investigation of sense-making in the Channel Tunnel Rail Link development. Their interviews focused on the "most pivotal events that shaped the project" and the constructed stories around these events. The Ll. Torup interviewees were presented to the reporting on the conversations in 2010 and the reporting was used as a checklist in the conversation on their subsequent changes in understanding and actions. The

analytical framework in the short-term investigation is used to structure the analysis in this investigation as well.

The interviews were presented as follow-up meetings to gain insight into how actors were creating meaning of the process since the public consultation meeting. Like the first meetings, the interviews were staged with a clear interest in improving practice based on the knowledge gained.

Four primary issues guide the questions raised in the interviews:

- *How the actors describe the development since the public consultation meeting* (What are the most important events? What is the opinion on these and what actions are taken?). This issue is intended to provide for insight in what cues the interviewees have selected as part of the diagnosis and the creation of stories about the process.
- *How the actors describe the development in their own understanding in relation to table 20*. This issue is intended to reveal changes in their understanding, which the actors are able to identify. Potential changes are used as a platform for asking into the actors' perception of what caused these changes and what the consequences are.
- *How they look at other actors' sense-making of the project and its impacts - and potential developments in these*. This comparison issue is intended to reveal concerns about identity and nuances in the interviewees' own sense-making. It may furthermore give rise to questions into potential changes.
- *How they see the interaction with the authority in the development process.* This issue has point of departure in the trench war understanding of the meetings in 2010. How did the interaction change after the public meetings ended? What has really influenced the involved actors' attitudes?

As an addition to the investigation in 2010, a manager at the developer, Energinet.dk, was interviewed about his sense-making of the process and choices in the process. These interviews are guided by three primary issues:

- *Causes of the decision of changing the project.* The intension of this issue is to reveal the developments in understanding that led to the changes and a possibility for asking into these changes in the development. This issue is furthermore a balancing point of view of the meaning created by the non-governmental actors on the change.
- *Information and knowledge put forward by the public actors that add to the understanding of the project and its impact?* This issue is intended to reveal what kind of changes the developer reflects upon and articulates.
- *Changes in the understanding among the public.* This issue is intended to be a possibility for having another view on the responses given by the non-governmental actors.

The interviews were made in a passive manner, letting the interviewees speak freely about the process. The purpose of this strategy was to let the interview persons speak about things that they found interesting and relevant when explaining the process for a research purpose. The interview strategy was thus based on the assumption that the interviewees mention the things they find important in the interview context and not something else. My impression of the interviews is that the interviewees did not deliberately hide, exaggerate or distort information, but described the developments in a frank manner reflecting how they saw it. In

a single instance, the interview strategy gave rise to an expression of minor bewilderment about my passivity and the lack of a more structured interview. A main weakness of the interview strategy is that it is difficult to determine, when a topic is drained for relevant stories: When the interviewee is talking, he or she may get sudden associations to other topics, and it is difficult to determine whether the interviewee had finished the first topic or was just reminded of another important thing to tell.

The interviews have been transcribed and edited, which has involved removal of swearwords and translation from dialect to standard Danish. The editing has aimed at keeping the original understanding, although some nuances in the meaning of the words most likely have been lost. Similarly, some nuances may be lost in the translation to English. The interviewees have been given the chance to comment on the draft versions of my interpretations and conclusions, however, the feedback was minor and only supporting my understanding of their sense-making of the developments and concerns.

FINDINGS ON SENSE-MAKING DURING AND AFTER A PUBLIC MEETING

The findings of the investigation are summarised in figure 27 as the developments from $sense_1$ during the public meeting to $sense_2$ and in the year after to $sense_3$. The developments visualised in the figure is in the following elaborated with reference to the interviews. The interview persons are in the following termed SCHOLAR (DN representative), ORGANISER (a key person in the Fjordvenner network), and MANAGER (a manager in Energinet.dk).

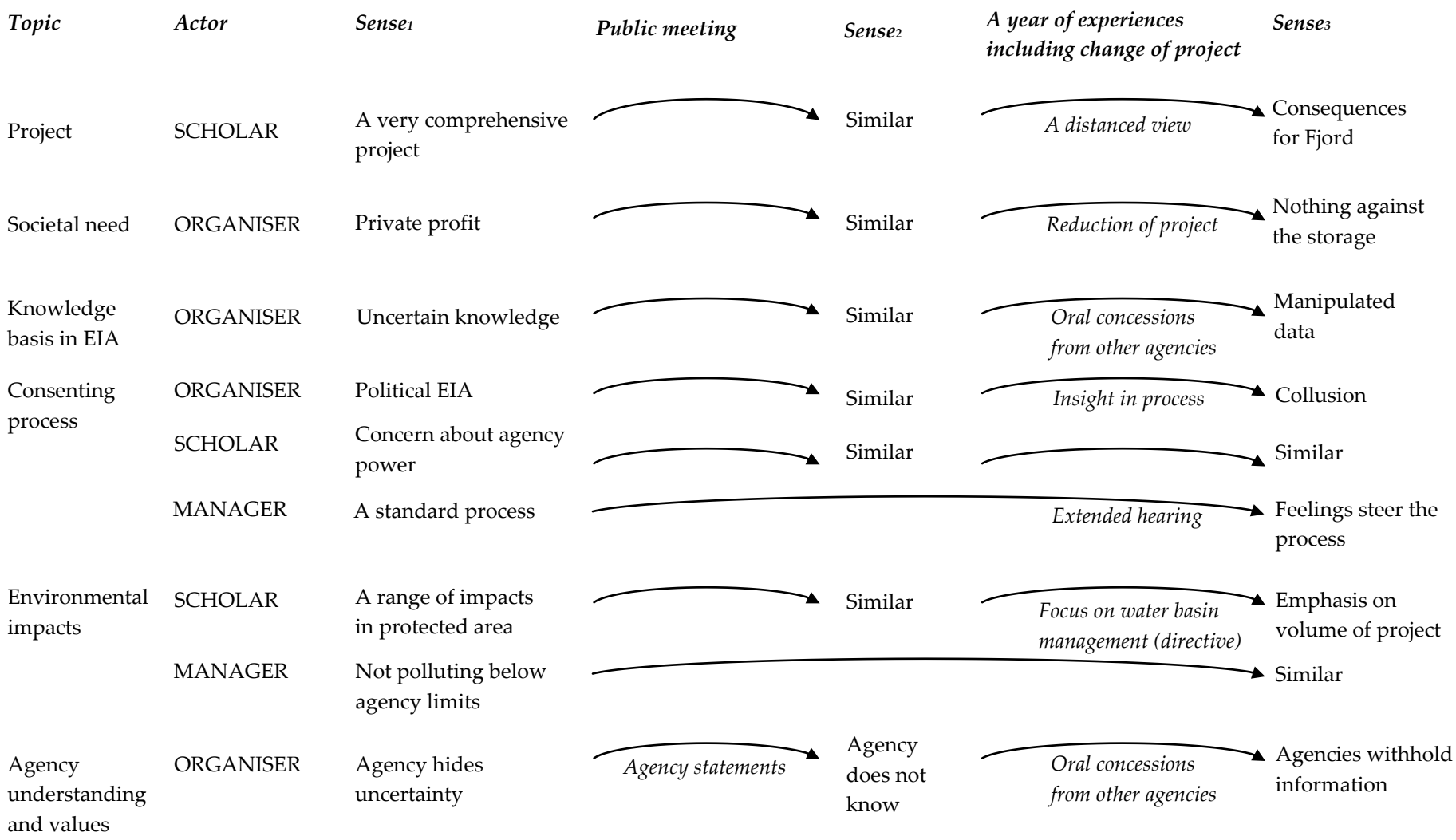

Figure 27: Development in sense-making among the local actors SCHOLAR, ORGANISER and MANAGER during a public meeting and in the following year.

During the public meeting

During the meeting, the interviews and observation revealed that most senses were stable as it was possible to identify only a few developments in the interviewee's sense-making. These developments were primarily related to other actors' values and knowledge about the basis for the project.

In terms of the sense-making on the project, the societal need for it, and the environmental impacts, the interviewees seemed settled on a specific sense, which did not change during the meeting. A reason for this may be a perception among the interviewees of a continuous avoidance of answering questions among the authorities: One of the interviewee's complained: "I am upset that they [the environment agency] do not answer the questions". An example of an avoided question was a question about the Environment Centre Aarhus' reason for selecting the laboratory test of the salt content for the EIA report which showed the smallest concentration of heavy metals compared to other tests. After the meeting, ORGANISER specifically stated: "No new [relevant] information about the consequences were put forward at the meeting" and the EIA report was still labelled "political". Looking beyond the interviewees, some participants at the meetings did, however, utter changes in their understanding of the planning. A participant, for instance, started a comment on the planning with: "I think I have become wiser about the operation phase tonight".

In terms of the societal need, ORGANISER doubted the societal benefit of the extra capacity of the natural gas storage facility: "The extra capacity of the caverns has the purpose of earning money and not a necessity for the society". An explanation of the need for natural gas storage by a representative from the Danish Energy Agency seemed not to influence this interpretation.

In terms of other actors' values and understanding, the answers from the Environment Centre Aarhus seemed to develop the interviewees' sense-making. Prior to the meeting, the interviewees had created a story of the environmental centre declining the alternatives without considering these fully. The decline of a pipeline for wastewater discharge in Kattegat was mentioned by an interviewee as a "not substantiated choice". During the meeting, the interviewees seemed to realise that the environmental centre had a professional judgement as basis for their decisions and based on this professional judgement, it had considered it outside the possible demands to Energinet.dk. Another development in sense-making was bracketed by one interviewee in emphasising that the environmental centre at the meeting clearly admitted that they - despite the clear formulations in the EIA report - did not know the amount of heavy metals in the caverns. The sense made on the environmental centre's understanding was made in a context of appraisal of local experience; Organiser argued: "We know more about the local characteristics since we live here, and we experienced the impacts from the leaching of the caverns decades ago".

The sense-making among meeting participants seemed widely based on news media. This was evident since several actors pointed at the same "mistakes" in the EIA report and used very similar arguments. A later examination of the consultation comments showed a template for commenting and similar formulations in a number of the comments opposing the EIA report.

In the period after the public meeting

The interviews a year after the public meeting show a development in the persons' senses that is strongly influenced by Energinet.dk's change in the consent application. Whereas the investigations of the public consultation meeting in 2010 did not reveal noticeable changes in senses in a range of categories, most senses are modified a year after, see figure 27.

The interviewees' sense-making of the project has developed due to the reduction of the size of the project in Energinet.dk's application. They have bracketed changes in the size and discharge amounts of the reduced project application. The project is, however, still described by SCHOLAR as "a big industrial project" and by ORGANISER as "unacceptable". The numbers involved in the change are of a size, which according to SCHOLAR means that people are not able to grasp the size of it: "It would not have made a difference whether it was eight million tonnes of salt during ten years or 17 tonnes during 25 years. You can't relate to it anyway". During the interview, SCHOLAR described that his way of looking at the project has changed from focusing on the untreated wastewater to focusing on the use of the Fjord: "What is my objection against it - or has eventually become my objection - is probably more the use of the Fjord area as a dumpsite". This development in sense-making may follow from a more distanced view on the case with comparison to other development projects.

SCHOLAR and ORGANISER seem to acknowledge the societal need for the project. ORGANISER states: "We have nothing against the expansion of the gas storage facility. But we don't want the waste in the Fjord. It must be extracted as a raw material, which can be used in the Danish industry or for de-icing salt". This acknowledgement differs from the interpretation in 2010, in which ORGANISER described the project as a company activity made for profit. This development in sense-making may be related to an increased focus among the Fjordvenner on the alternative use of the salt; they started framing the extraction of the salt for industrial use as a positive thing since, they argued, involves local employment. It seems that Fjordvenner has realised that they may not be able to stop the maintenance of the storage facility and ORGANISER therefore actively staged other solutions. SCHOLAR compares the re-leaching project to the windmill test centre in Østerild and the ministerial plans on storage of nuclear waste. He argues that these projects are all more or less needed for the society, however, the "three projects which are so huge, that they will cause stir no matter where they are placed".

In terms of the interviewees' understanding of the basis for the project, ORGANISER repeatedly comments on "so many flaws" in the EIA. He refers for instance to what he sees as flaws in the information about the original leaching of the caverns, the content of the salt in the cavern, and the status of the Fjord. ORGANISER's sense-making of the basis for the EIA seems to have developed from uncertain knowledge about impacts in 2010 to manipulated information: "They [Environment Centre Aarhus] do not write that it [the discharge in the Fjord] is harmful despite they know it. The Environment Centre Ringkøbing has written that Hjarbæk Fjord and Lovns Bredning cannot tolerate more xenobiotic substances". This development in sense-making seems to be due to greater insight into the evidence behind the EIA report and growing mistrust to the authorities, see the discussion below. MANAGER interprets the discharge as the same per mille as the existing water and as original sea salt with original content of metals. He therefore emphasises that "if you don't pollute, you

cannot be imposed extra expenses" and that alternative uses of the salt also would annoy many people.

In terms of the consenting process, released information about the expenses made by Energinet.dk on the maintenance prior to formal approval leads to a development in the interviewees' sense-making. SCHOLAR expressed his (new) understanding: "It almost sounds as if Energinet.dk has had a prior approval, because you don't invest 90 million kroner in preparing work, and then afterwards expect a rejection". His opinion on relevant solutions is therefore limited to a treatment of the discharge: "What I think would be progressive [from the opposition's point of view] … would be to require BAT [Best Available Technology] on the discharge. As long as they will not extract the salt for industrial use, it has to go somewhere." He uses an analogy to indicate his opinion of what he interprets as special treatment of the re-leaching project: "You could use the picture that if Nobel [salt extraction company] in Mariager had two tonnes of a faulty salt product, which they wanted to get rid of, could they then get permission to drive it to the Vildsund dike and tip it in the Fjord?". He supplements this argument by questioning whether the gas storage facility in Ll. Torup would have been granted permission to be created by discharge in the Habitat area if it was established in 2011. SCHOLAR furthermore indicates that it may be a deliberate tactic to decrease the project to reduce the opposition: "The big public opposition will be difficult to re-engage", and he comments: "It would have been embarrassing for Energinet.dk if they get the permission to both projects and then afterwards have to say that they will not need it". SCHOLAR is thus concerned whether the consenting environmental centre is able to stop the process if the discharge exceeds the limits: "Is there willingness to intervene against the project if problems appear? Because then they have probably spent a quarter of a billion". He underpins his doubt by stating that the environmental centre may not have a choice: "It will then become a political matter […] because the next stage is that it will become a law like in Østerild".

ORGANISER has similarly focus on the political part of it. He is of the opinion that Fjordvenner has disclosed a "collusion" between Energinet.dk and the former Minister of Environment, Troels Lund Poulsen: "There are some correspondence which is not in accordance […]. We have explored that by using our right to access to documents. It is clear to us that somebody is lying. We have asked Troels Lund, but he did not want to answer us. But he will, when they [other persons in Fjordvenner] take the case further. Then we present it to the Ombudsman".

MANAGER comments: "It is feelings among the citizens that steer this process" referring to the extra meetings and involvement of a range of actors. He seems to feel that the process is a waste of time, since "the Minister [of Climate and Energy] has acknowledged that we must be allowed to maintain the storage". The opposition to the project was not expected by Energinet.dk, since there were no stir among about the storage prior to the application. The manager explains: "We have a good relationship to our neighbours that lives on top of the caverns". In terms of the EIA, he disapproves the questioning of the basis of the decision: "Everything is examined. It has been consulted with the expertise" referring to the authorities, the consultancies, and the monitoring before, during, and after any discharge activity. He comments the hesitation among municipalities for the final approval: "This process has been a little too much about feelings" and "it has been a matter of politics". He seems to disapprove

the compliant attitude in the environmental centre of prolonging the public consultation: "It seems like the opposition's motivation increases when extra meetings are made and the process is prolonged". In what seems an effort of balancing the negative view on the process, he comments: "It is a victory for the democracy that there are people that engage in this without personal benefit".

In terms of the types of environmental impacts, SCHOLAR's sense has not changed: "It is the same things, which are discharged". The perception of the volume of the substances to be discharged is, however, changed: "Those numbers that is written in it [the EIA report] - it took a long time for me before I realised the real size of these. You know, when it is all summarised and then added some worst case scenarios with some elements, which have naughty names, but are quite harmless in the conditions they are found." Due to the public debate on the river basin management plans, SCHOLAR and ORGANISER put the impacts in this new context. SCHOLAR points at the difference in scale: "People discuss water plans and concurrently they discuss discharge from such a big industrial project like this. That is in the same area, where people discuss whether to remove a minor damming of a small stream somewhere!" The river basin management plans will likely not have direct impact on the re-leaching project, SCHOLAR argues, but the re-leaching may impact the decision of when the targets for the basin must be fulfilled. ORGANISER furthermore uses an analogy to the impacts on the Fjord of a societal cost of a highly polluted area on shore remaining after an industrial plant name Collstrup was closed: "Consider the costs in terms of the Fjord: Take a look at the Collstrup-case! Out on the Fjord it is harder to measure."

In terms of the authorities' understanding and values, ORGANISER is convinced that the authorities know more than they show. He supports this conviction with the above mentioned inconsistency between what Environment Centre Ringkøbing write and what Environment Centre Århus assess on the tolerance level. His interpretation of the agencies has thus evolved from a critical lack of knowledge to a deliberate and critical withholding of knowledge. Asked about the environmental centre's unwillingness to respond to answers, SCHOLAR state: "I think it is because they are afraid that if they start to say "Listen, it may be like that", then they will unravel their argumentation", implicitly referring to a risk of reduced respect around the environmental centre's work. ORGANISER furthermore criticises Skive Municipality for being passive in the process despite impacts on the municipal's areas. He suggests that it is due to a 30 million kroner subsidy to photovoltaic panels on the municipal buildings: "It is so rotten. That is why they keep a low profile".

ORGANISER's sense-making of the role of the authorities seems to have evolved towards increase mistrust with a continuous dissatisfaction with the responses he get: "You are ignored if you have any specific questions that 'hit'. They try to ignore us all the time". He describes the authorities' situation as a deadlock: "They don't want to answer, because it will damage their case no matter what they answer. If they answer yes to one question and no to another, they will contradict themselves". This seems to have led him to the radical interpretation that "[t]he only way in which you get something out of a public servant is to threaten him with newspaper publicity". He reflects on the reasons for this passive attitude by stating that "they are highly educated, but they don't have background knowledge about the case".

DISCUSSION

The basis for the discussion is limited by the setup and method applied in the investigation of the persons' senses. A more strict focus on the topics during the interviews and more persons may have facilitated a better picture of developments in senses in the process. The findings do, despite the limitations, give insight in real-life processes of environmental assessment consultations, which is interesting in terms of the project aim and conceptual framework.

The findings above a in the following discussed in terms of how sense-making seems to differ during a consultation process, the relation between enactment and diagnosis circles of the choice circles model, and implications for practice.

Indication of more developments in sense-making of impacts when less is known

The few developments in sense-making among the participants seem to be due to the investigation being "late" in the process. The investigated meeting was held three months after the EIA report was first published and after two other public meetings were held. The stories created on the report therefore have had plenty of time to gain strength before the investigation. The interviewees referred to several changes prior to the meeting. As an example, two interviewees mentioned their change of sense in regards to the data about the content of the salt: The environmental authority revealed that the EIA report was partly based on data from a 20 years old sample of the salt in the caverns rather than a new sample. As the age of the sample was not mentioned in the EIA report, the interviewees had assumed that new samples had been made. The new information changed attention from the uncertainty about the content to the inadequacy of old samples. The interviews indicate that the biggest changes in the interpretations of the project takes place when little information is known about the project. Or described otherwise; the more the interviewees know about the project, the smaller changes is likely to take place in their senses of the project. This relation is symbolised in figure 28 in which the investigated public meeting would be placed where the curve is nearly horizontal.

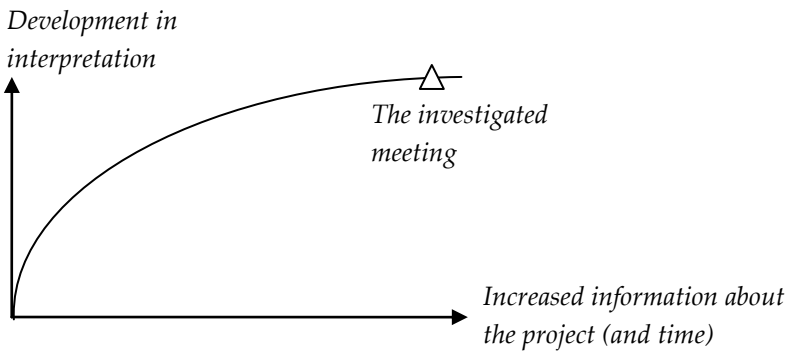

Figure 28: Relation between knowledge about the project and the development in the interpretation about the project.

The figure is supported by a reflection by SCHOLAR on how he had created meaning of the environmental assessment:

> *"In the beginning I focus on details and re-calculate their numbers to look for e.g. a factor ten mistake. Thereby I focus on things "that are too flawed". It is an effort of demolish the logic and arguments in the report. Later, I get a better overview of the report and get the impression that the most significant point of criticism are covered, for instance in the description of operation phases in the environmental approval."*

The investigations indicate that for knowledgeable persons, senses related to factual information is settled prior to senses about other actors' values, which may be due to how accessible the different information is to the persons.

In terms of the dialogue at the public consultation meeting, the figure could be used to argue that a typical short question-answer sequence is relevant in the early sense-making among participants when the participants are trying to get a grasp about the project. Later in the sense-making, a public meeting with no more than a few questions per person may, however, not be a relevant forum for reaching a level of detail in the dialogue between the knowledgeable participants and the environmental centre that would develop the actors' sense-making. An interviewee at the Ll. Torup public meeting directly commented the insufficient time for "decent explanations".

The major change of project application influences sense-making among interviewees in a few respects. Many characteristics remain the same, why the appertaining senses among interviewees do not change: The change regards the size of the project and amount of discharge to the Fjord, but the project and amounts are still more comprehensive than the interviewees accept. Instead, the change leads to sense-making on the reason for changing the project. As an elaboration of figure 28, the minor development in sense-making following the change of the project could be symbolised as a similar curve in continuation of the first curve; a major change would initiate developments in sense-making, which over time again would develop into smaller changes.

The EIA process as sense-giving rather than sense-making

The dialogue at the meeting was often characterised by different framings by participants. Differences in framings e.g. concerned the environmental impacts: The regional environment centre framed the question of mercury as "it is only 2 kg compared to the average intake from the sea to the fjord on 100-800 kg", giving the impression that the impact is minimal compared to the natural conditions. One of the participants counter-framed the impact as "1 kg is one too much", referring to the protected status of the Fjord. Furthermore, the environmental centre spoke about the impacts with point of departure in their proposed limits for heavy metal concentrations on the wastewater content in the environmental approval whereas the opposing actors spoke about the impacts with point of departure in the uncertainties in the knowledge about concentrations of heavy metal in the salt to be re-leached. The amount of salt in the discharge was similarly framed by the environmental centre as grams per litre whereas other participants used a metaphor of an incredible number

of lorries loaded with salt every day. Such carefully formulated framings of impacts are in the sense-making literature discussed by Gioia and Chittipeddi (1991) as "sense-giving", see chapter 4.2. They define sense-giving as "the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality." (p. 442). The concept of sense-giving inspired Maitlis and Lawrence (2007) to introduce "sense-giving contests", which in cases like the Ll. Torup hearing meeting seems like a relevant concept. The sense-giving contests at Ll. Torup just only seem to cause modest developments in sense-making among participants. The sense-making literature does not seem to provide solutions to how to handle sense-giving contest, which also have to be context dependent.

Intertwinement between diagnosis and enactments

In line with the conceptual framework, the investigation shows interaction between diagnosis and enactments - or interpretation and action - in the sense that diagnosis of situations influences actions and actions influence the diagnosis: If SCHOLAR had chosen to engage more in the process, he might have diagnosed the situation more like ORGANISER with frustration about the lack of answers on questions - and opposite; if ORGANISER had not diagnosed his efforts as successful, he might have put less effort in influencing the authorities; ORGANISER's diagnosis of the EIA report as worthless evolves with continuous questioning into the information basis.

The investigation thus gives a basis for supporting the choice circles model by arguing that how actors diagnose stimuli thus depends on their enactments (e.g. what they bracket from stimuli in the media influences their diagnosis of the problem) and that diagnosis influences what they regard as relevant actions (e.g. diagnosis of a public discussion leads ORGANISER to require meeting on municipal approval).

The events, which the interviewees point at in their description of the process following the public meeting, are Energinet.dk's change in the application for development consent, an audience for the Planning and Environment Committee of the Parliament, and the municipal endorsement process of the project. These events as well as the interviewees' diagnosis and actions are visualised in figure 29. In general, both interviewees described the development since the public consultation meeting as stagnant, since they most of the time were awaiting actions by the authorities; ORGANISER complained that: "What has happened is that we have waited for a long, long time […] to get responses on our 97 requests and comments", and SCHOLAR does not hesitate to state that: "Nothing has happened" in a disappointed tone, when asked about developments since the meeting, although he shortly after refers to Energinet.dk's change in the consent application.

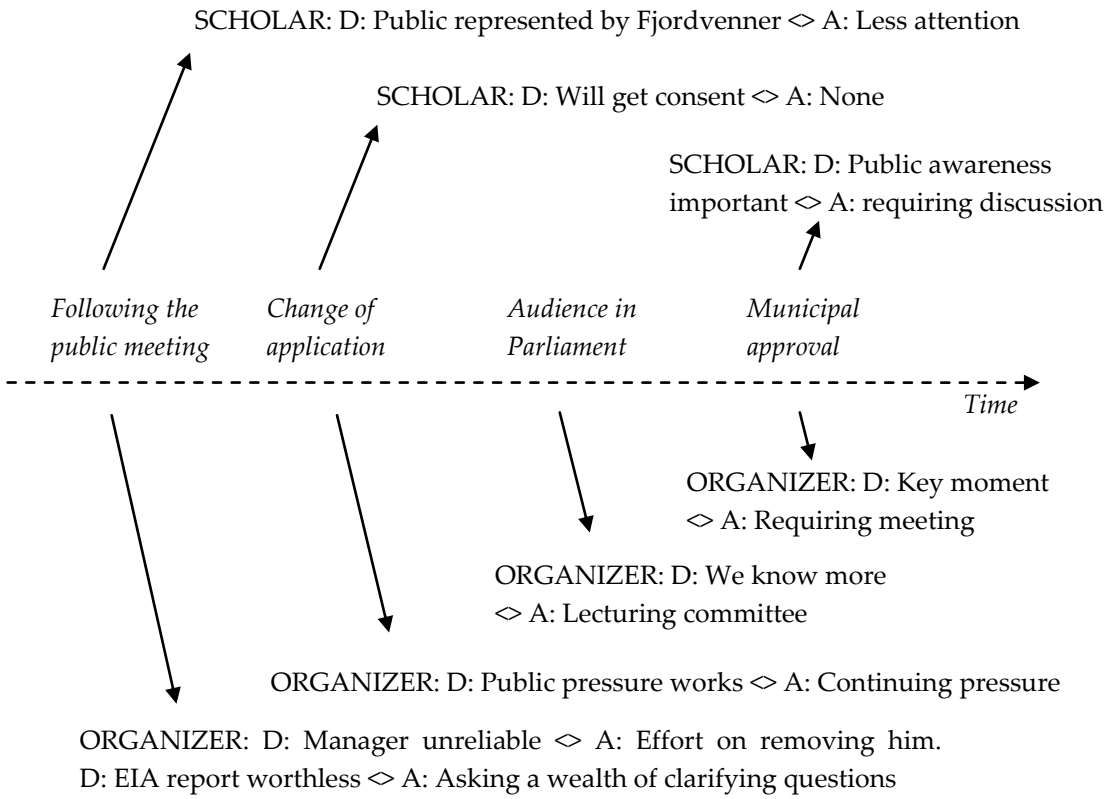

Figure 29: Relations between diagnosis [D] and actions [A] on specific events in the gas storage development process.

In the period following the public meeting, SCHOLAR seemed to diagnose the development as democratic balanced between the public opinion at Fjordvenner and the authorities; "I think the public opinion on this project is well represented by Fjordvenner". Therefore, he saw little need for him to engage in the process, and he prioritises other matters. In contrast, ORGANISER - as one of the central persons in Fjordvenner - diagnosed authority employees as "untrustworthy" and the EIA report as worthless; "It is not worth the paper it is printed on. There are SO many flaws in it". The diagnosis of the EIA report as worthless seemed to evolve during a continuous process of asking into details about the information behind. ORGANISER confronted the Ministry of Environment with contradictory statements by an agency manager in an attempt to get him sacked. The following dismissal of the manager is interpreted by ORGANISER as a consequence of his confrontation.

Energinet.dk's change of application is diagnosed by SCHOLAR as a negative development; "That may be the worst thing that could happen […] because then Energinet.dk will get consent for the re-leaching, since the public debate will run out". This despondent diagnosis was accompanied with no actions by SCHOLAR; "I have not even looked at the new municipal planning amendment and environmental approval". ORGANISER diagnosed the change in application as partly due to the public pressure; "We celebrate it […] It was the pressure that arose concurrent with the government initiative of significantly changing the Danish heat system". This diagnosis seemed to support ORGANISER's faith in the possibilities for changing the process and give rise to continued actions.

Fjordvenner's audience for the Planning and Environment Committee of the Parliament was interpreted by ORGANISER as an opportunity to inform the politicians about the consequences of the project; "We knew much more than they did; they did not know anything about it to be honest".

The municipal planning approval process is diagnosed by SCHOLAR as an opportunity for putting the re-leaching process on the agenda. Through the municipal's Green Council he assisted a colleague in requiring the project on the agenda of the municipal's Green Council in which the municipality is represented with employees involved in the approval process. The agenda-raising action was, however, accompanied by modest expectation by SCHOLAR; "It will not have a major influence, but it is also to make the municipality or the municipal council aware that there is someone noticing that a project like this is in an approval process in the municipality". ORGANISER diagnosed the municipal approval process as an opportunity for influencing the local politicians; "Then we immediately requested a meeting with the mayors in Vesthimmerland and Viborg, because we wanted to influence them. And they agreed on meeting us."

Implications and further questions

To the extent the investigation confirms the assumed potential of sense-making it opens up for a range of questions to be studied: Would it be beneficial to differentiate the dialogue with the public depending on their insight, since the insight seemed to influence the level of detail on which changes in sense-making takes place? Weick argue that sense-making and identity are intimately linked, and it is therefore interesting to ask: Are people adopting an identity of being part of the opposition developing a common sense of the project? Are the membership of the opposition decreasing people's critical stance towards information and meaning shared in the opposition? When is sense-giving a legitimate activity?

One of the interviews led to considerations about how to improve the dialogue in the consultation process. SCHOLAR argues that making the scoping consultation public would fulfil a need for letting feelings and opinions come forward at an early stage; "Village idiots and organisations would be allowed to bring forward their opinions… You wouldn't have to be objective. You would be allowed to bring forward assumptions". Besides a more open dialogue that would constitute better opportunities for developments in sense-making among actors, the early dialogue could be an advantage for the Environment Centre: "Then the Environment Centre […] would have been prepared on the potential major points of criticism […] and would be able to say "Listen, we have been presented to these things before, and we have taken them into account in the widest possible way". The early dialogue may furthermore give an obviously wanted possibility for the locals and NGOs to discuss and develop alternatives and measures before these are determined by the finished EIA report.

SPIN-OFFS

CHAPTER 9

SCOPE OF THE LEGISLATION

CHAPTER 10

DISCOURSES ON THE ROLE OF SEA

As spin-offs to the investigations of strategic decision-making processes, this part of the thesis articulates the scope of the SEA legislation and discourses on the role of SEA in the energy sector. These two topics have been key issues in the process of applying SEA in Energinet.dk and in the Danish Energy Agency. The spin-offs are interlinked with the empirical investigations and the change agent approach as ambiguities about scope and role of SEA have been main troubles in the considerations on how to apply SEA in a meaningful way. The spin-offs are furthermore strengthening the answers to the research question of how to apply SEA in the Danish energy sector.

CHAPTER 9: SCOPE OF THE LEGISLATION

ON PLANS AND PROGRAMMES IN THE ENERGY SECTOR

> *"The SEA definition of plans and programmes … is more reliant on the interpretation of other terms e.g. "authority", "required by legislation, regulatory or administrative provisions", which at least in the short terms is likely to lead to uncertainty. This perhaps reflects the greater complexity of the types and nature of plans and programmes across the EU, compared with projects"* (Sheate et al. 2005, p. 5).
>
> *"Since the SEA Directive was entered into force, a most frequently asked question has been "whether the plan and programme at stake should be subject to SEA process or not". This question is supposed to be resolved by the SEA Directive itself and its Guidance. Yet, due to the unclear interpretation provided by the SEA Guidance, the diversity of decision making types among different Member States and the different industrial sectors, the application of it to plenty of cases remains unclear"* (Gao 2006, p. 129).
>
> *"The meaning of 'set the framework for future development consent' is not defined in the Directive, but also an important provision needing interpretation. … Land use plans are a particularly clear example that contain criteria for determining what kind of specific development can take place. Others may be far less clear, and in such instances there will be a need to consider carefully (on a case by case basis) whether the framework for development consent is set"* (Marsden 2008, p. 218).

As depicted in the quotes above, the formulations in the SEA Directive are ambiguous. Ambiguous formulations may, as Sheate et al. indicate, be necessary to reflect the variety of contexts across Europe, however, the ambiguous formulations also constitute a hurdle for SEA adoption in specific contexts as pointed at by Gao. Marsden argues that the meaning of the Directive is less clear in other sectors than the spatial planning and this chapter will outline ambiguities in terms of the Danish energy sector.

This chapter presents an exploration of the meaning of the formulations in the EU Directive on SEA that are decisive for whether a plan or programme falls within the scope of the Directive. Contemporary plans and programmes in the Danish energy sector are then analysed based on this exploration. The aim is to present a preliminary overview of which plans and programs within the energy sector falls within the requirements of the SEA legislation. The chapter is part of the basis for answering the sub-question of "How should SEA be applied in order to approach the characteristics of strategic decision-making in the energy sector?".

9.1 INTERPRETATION OF THE SCOPE OF THE SEA DIRECTIVE

This subchapter relates the plan and programme documents in the Danish energy sector to the scope of the EU Directive on SEA. First, the section presents the interpretation of the three aspects that are central for the determination of whether plans and programmes are within the scope of the EU Directive on SEA, namely the meanings of 'plans and programmes', 'framework for development consent', and 'authority'. Then, the width of the European Commission's interpretation is related to the range of plan and programme documents in the Danish energy sector, which may be environmentally decisive, cf. the definition of environmentally decisive in subchapter 4.2.

The investigation of the scope of the Directive is primarily based on the European Commission's guidance on the implementation of the Directive (European Commission 2003) supplemented by rulings by the European Court of Justice. Gao's (2006) framework is used as inspiration for the investigation of plan and programme documents in the Danish energy sector. The analysis is discussed with Kim Behnke from Energinet.dk and fragments of the analysis are discussed with representatives from DEA and the Danish Nature Agency as a preliminary validation of the arguments made.

MEANING OF 'PLANS AND PROGRAMMES'

The interpretation of 'plans and programmes' is based on characteristics rather than titles of documents as "documents having all the characteristics of a plan or programme as defined in the Directive may be found under a variety of names" (European Commission 2003, p. 5). 'Strategies' or 'reports' may have the characteristics needed to be within the scope of the SEA Directive. According to Kremlis from the DG environment, the scope of the Directive in terms of the not legislatively required plans has been point of departure for 7 infringement cases (Kremlis 2011).

A main characteristic is that the documents must be required by legislative, regulatory or administrative provisions, cf. article 2 in the Directive. These types of documents include voluntary plans that become the basis for an authority's execution of duties. In a Danish context, the coverage of voluntary plans was initially not covered, but it was included following a letter of formal notice of infringement from the European Commission in 2008. Voluntary plans are not further defined in the Danish legislation, the Commission's guidance argues that such "voluntary plans and programmes usually arise because legislation is expressed in permissive terms, or because an authority decides to prepare a plan on an activity which is unregulated" (European Commission 2003, p. 9). Whereas legislative and regulatory provisions seem quite clear, administrative provisions are to be interpreted depending on the "[e]xtent of formalities in its preparation and capacity to be enforced" (p. 9). The Commission's guidance comments that: "Administrative provisions are by definition not necessarily binding, but for the Directive to apply, plans and programmes prepared or adopted under them must be required by them, as is the case with legislative or regulatory provisions." (p. 9). This leaves a question of the threshold for the 'capacity to be enforced', e.g. in terms of agreements between actors. Administrative provisions are described as "formal requirements for ensuring that action is taken which are not normally made using the same

procedures as would be needed for new laws and which do not necessarily have the full force of law" (p. 9).

Another main characteristic is that plans and programmes must set a framework for future development or impact a Natura 2000 site. Plans and programmes that only "summarise what has already been set out" (European Commission 2003, p. 47) are not within the scope of the SEA Directive. Further exclusion criteria are minor geographical coverage, minor modifications, and defence or financial purposes.

The plans and programmes must frame one or more 'projects', cf. article 3 and the preambles of the Directive. The SEA guidance states that "The word 'project' should be interpreted in a way which is consistent with its use in the EIA Directive" (European Commission 2003, p. 12), and it thereby covers construction and installation works as well as "other interventions in the natural surroundings" (article 1 on the EIA Directive). A basic requirement of 'projects' in the EIA Directive is that at some point "a form of development consent" must be put in place (Sheate et al. 2005, p. 4) meaning a "decision of the competent authority or authorities which entitles the developer to proceed with the project" (article 1 of the EIA Directive). The SEA guidance refers to a judgement by the European Court of Justice that stated that the Directive has a wide scope and a wide purpose. The SEA guidance therefore suggests that the determination of whether an act is to be considered a plan or a programme falling within the scope of Directive 2001/42/EC should have a wide scope, and that a yardstick may be "the extent to which an act is likely to have significant environmental effects" (p. 6). The SEA guidance goes as far as to suggesting that: "It may be that the terms [plans and programmes] should be taken to cover any formal statement which goes beyond aspiration and sets out an intended course of future action" (p. 6). A revision of the Danish legislation in 2009 broadened the scope from framework for projects to framework for "projects or land use" in line with the other interventions in the scope of the EIA Directive.

Finally, plans and programmes must be subject to preparation and/or adoption by an authority, or preparation by an authority for adoption by Parliament or Government through a legislative procedure.

MEANING OF 'SET FRAMEWORK FOR DEVELOPMENT CONSENT'?

Central in the determination of what plans and programmes are within the scope of the EU Directive on SEA is the formulation "which set the framework for future development consent of projects" used in article 3, paragraph 2a and 4. Plans and programmes are SEA mandatory when they set a framework within paragraph 2a, and must be SEA screened if they are within paragraph 4. This distinction is, however, not central for the interpretation of the phrase. Furthermore, the following review of the Directive and the related guidance does not further explore the definition of a 'development consent'.

In annex II to the SEA Directive, 'framework' is mentioned in relation to criteria for determining the likely significance of effects: "the degree to which the plan or programme sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources". The Commission's guidance comments that the illustrative list of frames on location, nature, size, etc. is "indicative and not exhaustive" (European Commission 2003, p. 11).

The meaning of "set the framework" is not further specified in the Directive, but the Commission's guidance elaborates on the formulation:

> *The meaning of 'set the framework for future development consent' is crucial to the interpretation of the Directive, although there is no definition in the text. The words would normally mean that the plan or programme contains criteria or conditions which guide the way the consenting authority decides an application for development consent* (European Commission 2003, p. 10).

This elaboration of the phrase is thus based on loose terms ('normally') and other undefined phrases such as "guide the way". Whether particular criteria or conditions set the framework is therefore to be assessed in each case as "a matter of fact and degree" (European Commission 2003, p. 11): Some factors that is constraining development may have a significant influence on future consent and other, especially trivial or imprecise, factors may have no influence on the granting of consents. The Danish guidance from 2006 is emphasising this point: "The critical point is, whether a planning document has a character or a content that in general provides a framework for future development consent" (Danish Ministry of Environment 2006, p. 8, translated). The critical point thus both relates to the specificity of the frame and how binding the frame is. The interpretation of frameworks is to be settled by court decisions in The European Court of Justice and national courts.

In addition to the types of frames mentioned in the annex II of the SEA Directive, the guidance on the SEA Directive furthermore specifies the meaning of criteria and guidance by examples (European Commission 2003, pp. 10-11):

- Limits on the type of activity or development which is to be permitted in a given area.
- Conditions which must be met by the applicant if permission is to be granted
- Preservation of certain characteristics of the area concerned
- Location of subsequent development
- Allocation of "financial or natural (or possibly even human) resources" conditioning "in specific, identifiable way how consent was to be granted (e.g. by setting out a future course of action (as above) or by limiting the types of solution which might be available)."

The guidance furthermore provides examples of plans and programmes in other directives that are likely to set frames for future development consent (pp. 48-49):

- Waste management plans identify suitable disposal sites or installations and they "appear to set the framework for development consents of waste disposal installations". Plans that set criteria for suitable disposal sites and/or delegate this task to lower tier plans "also seem to set the overall framework for subsequent development consents and should therefore also be covered by the SEA Directive. Thereby delegation of task also becomes a framework.
- River basin management plans may and may not be SEA mandatory and the "answer will depend on the contents in each case" in terms of whether they set framework for future development consent.

Important for Energinet.dk's approach of not approach formal plans, but pivotal decisions when they are made (see subchapter 6.2) is the formulation in the EC guidance that plans and

programmes that only "summarise what has already been set out" (European Commission 2003, p. 47) are not within the scope of the SEA Directive.

MEANING OF 'AUTHORITY'

The meaning of authority is especially relevant for energy sector decision-making, since TSOs may be within this definition. The discussion of Energinet.dk and its possible status as authority are part of the discourses in chapter 10.

In the SEA guidance, the authority concept is part of the formal conditions which plans and programmes need to fulfil in order to be covered by the Directive. These formal conditions primarily relate to the process of being "formally adopted by an Authority" (European Commission 2003, p. 8). Rulings by the European Court of Justice have given the meaning of authority "a large scope":

> *It can be defined as a body, whatever its legal form and regardless of the extent (national, regional or local) of its powers, which has been made responsible, pursuant to a measure adopted by the State, for providing a public service under the control of the State,"* (European Commission 2003, p. 8)

The meaning of 'public service' is not further defined, and according to Gao (2006) the interpretation of whether a private company's activity is for the company's "own purpose" (European Commission 2003, p. 8) or a public service differs across countries.

9.2 OVERVIEW OF ENERGY DECISIONS IN TERMS OF THE DIRECTIVE'S SCOPE

The range strategic decisions that are made in the Danish energy sector by adoption of documents similar to the plan and programme concept of the SEA Directive is in the following analysed in terms of the above interpretation of the scope of the Directive. The section is thus a preliminary screening of plans and programmes in the energy sector without a detailed, jurisdictional interpretation of whether the plans and programmes set a framework.

Summarising the wide interpretations in the previous section, the SEA legislation covers all documents that:

- Set out a framework (a wide understanding, e.g. including limiting the solutions available) for future developments that at some point requires permission to proceed.
- Are adopted by an authority (including bodies made responsible for providing public service) or adopted by Parliament or Government through a legislative procedure.

The judgement of 'setting framework' not only includes 'traditional' frames for physical projects, but the wider interpretation in line with the European Commission's guidance, which also includes conditions for allocating resources.

Furthermore, the scope involves a criterion of significant environmental impacts of the developments. The significance is not included in the following analysis, since it requires a deeper insight in the role and legislative basis for the documents. Significant impacts are likely when dealing with decisions at strategic level. Similarly, the judgement following paragraph 3 in the Directive is omitted.

The analysis of the energy sector documents is summarised in table 21, which relates the content of the documents to the interpretation of setting framework and scope of plans and programmes. If both criteria of are fulfilled, the documents should have been at least screened for SEA. The authorities' practice is included by an analysis of whether the documents have officially been screened for SEA.

The analysis includes a bias in the fact that the decisions formulated in the documents may have been made prior to the adoption of the plan. The documents in the analysis are therefore to be seen as *examples* of documents that could be relevant in terms of SEA legislation.

The categories of plans and programmes are inspired by Gao (2006, pp. 226-243) and the overview of Danish documents is based on an examination of the homepages of Energinet.dk, DEA, and the Danish Ministry of Climate and Energy.

Types of decisions on energy	**Examples in a Danish context**	**SEA legislation**		**Practice: SEA screening?**
		Adopted by authority?	Setting framework?	
National policy-making				
Comprehensive energy and climate change packages	*"Energiforlig af 21 februar 2008"* A Parliament settlement which includes targets for consumption and RE, increased subsidy, tax changes, etc.	Yes: Elements are adopted by the Parliament through a legislative procedure, e.g. act no. 1392, 2008.	Yes: Conditions for replacement of windmills (neighbour ownership) and legalising district cooling projects.	No. (EAs according to a separate circular from 1998, but both regulations should apply)
	"Bedre integration af vind" A Parliament settlement from 2009 which includes initiatives on use of heating element	Yes: Elements are adopted by the Parliament through a legislative procedure, e.g. act no. 722, 2010.	Yes: Criteria for ownership of the heating elements are changed.	
	"Grøn Vækst 2.0" A Parliament settlement from 2010 which includes initiatives on biomass	Yes: The elements within the settlement are adopted by the Parliament through a legislative procedure, e.g. act no. 1502, 2009.	No: The closest is agreement on supporting the transmission of biogas through the natural gas transmission network.	No. (EAs according to a separate circular from 1998)
Strategies	*"Energistrategi 2050"* Government strategy from 2011 on the future development on energy	No: The strategy is adopted by parties, but not decided through a legislative procedure	No: The strategy includes frames for new constructions and subsidy, but the frames are only proposals.	No.
The implementation of Kyoto-related mechanisms	*"National allokeringsplan for Danmark i perioden 2008-2012"* A plan for how Denmark will live up to Kyoto protocol and the EU burden-sharing agreement	Yes: The national allocation plan is adopted by the Parliament in 2008 after approval by the European Commission, cf. executive order no 348, 2008	Maybe: Depends on whether the plan delimits new activities in the way that new activities must be allocated quotas as part of the consent procedure.	No.
Energy reduction	*"Strategi for reduktion af energiforbruget i bygninger"* Government strategy from 2009 which includes suggestions for reducing energy consumption	Yes: It is adopted by ministries	Maybe: Although it includes criteria for new buildings, the criteria seem only to be suggested.	No.

Ministries				
Implementation of EU targets	*"National handlingsplan for vedvarende energi i Danmark"* Plan from 2010 showing how the EU Directive on renewable energy is fulfilled	Yes: It is adopted by the Ministry of Climate and Energy.	No: This plan is not seen as including new decisions, but summarising initiatives	No.
Energy storage stockpile, and strategic reserves	*"Handlingsplan for en mere energieffektiv indvinding af olie og gas i Nordsøen 2009-2011"* Action plan made by DEA in 2009 to reduce energy consumption in gas and oil extraction	Maybe: Depending on interpretation of the degree of which the plan guides the consenting.	Maybe: Depending on the interpretation of the degree to which the plan set frames for development consents.	No.
	"Conditions regarding pre-investigations offshore" Made by DEA in 2008 to cover oil and gas activities	Yes: It is adopted by DEA	Yes: It put up conditions for investigations, e.g. on coordination with other activities.	No.
Energy exploration, mining, and production activities	*"Fremtidens havmølleplaceringer - 2025"* Basis for action plan for locations of offshore wind power made in 2007	Yes: It adopted by the DEA.	Yes: The action plan shows where wind power can be placed and in which order.	Yes.
Nuclear waste storage	*"Forstudier til slutdepot for lav- og mellemaktivt affald"* Basis for decision on narrowing potential locations for nuclear waste	Yes: It is made by an Ministerial working group and decided upon by the Parliament	Yes: It is basis for a decision on possible locations for nuclear waste	No.

Energinet.dk				
Energy research, development and demonstration	*"Plan for udmøntning af PSO programmet ForskVE i 2011"* A plan for allocation of research funds made by Energinet.dk in 2010.	Yes: approved by Energinet.dk and DEA	No: (depending on interpretation of "resources" and the criteria). The plan includes criteria for allocation of research funds, but these are not a framework for consents	No.
Energy transportation and distribution activities	*"Strategy plan" and "System plan".* Plans made by Energinet.dk biannually	Yes: These are adopted by Energinet.dk/DEA	No: Although the plans include descriptions of developments, the decisions on these developments are made separately, prior to the plans	No.
Energy supply plans	*"Gas i Danmark"* Natural gas security of supply plan made by Energinet.dk in 2010	Yes: It is adopted by Energinet.dk in accordance with Executive order no. 884, 2006 and no 1464, 2005.	Yes: It is basis for decisions on infrastructure developments.	Yes.
Plans for electricity grid	"*Kabelhandlingsplan - 132-150 kV"* Plan for cabling the electricity grid	Yes: It is adopted by Energinet.dk	Yes: It e.g. set frames for dimensioning of new infrastructure	No.
Infrastructure development	*(Planning document not yet made)* Energinet.dk development of infrastructure	Yes: It is adopted by Energinet.dk after preceding approval by DEA	Yes: It frames the possible routes.	No. (Intended)
Technical regulations	*"Technical regulation 3.2.5 for wind power plants with a power output greater than 11 kW"* Regulation made by Energinet.dk in 2010	Yes: It is adopted by Energinet.dk	Indirectly: The regulation is basis for type approval in terms of standards on e.g. tolerance for voltage drops, but and this type approval is a condition for consent	No.

Municipal planning				
Municipal energy plans and climate plans	*"Helhedsorienteret energipolitik for Thisted Kommune"* Strategic energy plan in Thisted Municipality from 2009	Yes: It is adopted by the municipality as a basis for the management of duties	Yes: It e.g. settles that at latest in 2025, all new municipal building must comply with a certain energy standard.	Yes.
	"Status og plan for varmeforsyningen i Rebild Kommune" Heat plan made by Rebild Municipality in 2010.	Yes: It is adopted by the municipality	Yes: It settles that new local spatial plans outside district heating areas must include criteria on certain energy standard for the houses.	Yes. (Determined not to set 'frames')
	"Klimaplan for Solrød Kommune 2010-2025" Climate plan made by Solrød Municipality in 2010	Yes: It is adopted by the municipality	No.	No.

Table 21: Analysis of documents made by authorities in the Danish energy sector in terms of the scope of SEA legislation.

The table includes examples where no official planning documents exist, which impede SEA application in relation to these planning processes. Implementation of SEA in Energinet.dk may lead to public planning documents on specific infrastructure initiatives. In the case of the extraction of hydrocarbon, a change in the legislation (act proposal no. 141, 2011) would make it possible to prioritise uses of the subsoil and thereby give rise to a planning document. SEA legislation may thus give more attention to the strategic documents with which decisions are made.

In a few instances, the examples of plans and programmes are act proposals subject to environmental assessments according to the Prime Minister's Office's Circular no 159 of 16/09/1998. In such instances, two environmental assessments should be made as both set of rules should be complied with (Email correspondence with Gert Johansen from the Danish Nature Agency, March 25, 2010). The analysis of the plans and programmes in the energy sector thus calls for a review of the extent of overlap between the two regulations on environmental assessment to avoid unnecessary work.

Whereas the examples of plans and programmes in the table cover four instances of SEA screening, they also cover a range of instances (six) in which the plan or program in question according to the author's judgement following the interpretation of the European Commission's guidance should have been screened or subject to a full SEA. An example of such an instance is the nuclear waste storage planning document that narrows the possible

locations of nuclear waste. Parliament settlements are another important instance as they undoubtedly are decisive for environmental impacts. The lack of screening in these instances may be due to deliberate ignorance, unawareness, or misinterpretation of the legislation among employees in authorities. Unawareness has often been referred to in my informal discussions with authorities. According to a lawyer within the energy sector, plans that despite demands are not assessed cannot be lawfully enforced and if employees were aware of this interpretation, SEA would most likely be applied to a wider extend, since no employee would risk being responsible for a legally invalid plan.

The scope of plans and programmes in terms of what they set a framework for is discussed by Gao (2006). He outlines four types of energy plans and programmes in relation to the SEA Directive (pp. 256-257): 1) Habitat-type - energy policies or plans relating to habitat sites; 2) EIA-type - energy policies or plans framing EIA projects (e.g. wind); 3) Quasi-EIA-type - energy policies or plans framing EIA-similar projects (e.g. wave energy); 4) Non-EIA type - energy policies or plans on e.g. institutional reforms, energy efficiency regulation, energy R&D, financial subsidies or non-financial supports for energy activities, etc. In terms of the latter category, Gao (2006) argues that subsidies are unlikely to be granted without conditions on how, and he therefore conclude that subsidy schemes may be within the scope of the legislation. It is, however, whether such subsidy plans can be seen to set out a framework for future developments. In a Danish context, the degree to which this type of plans and programmes set a binding framework for future developments seems limited.

As an example of the EIA-type, the Cable Action Plan made by Energinet.dk which includes frames for projects, e.g. on the location; "Five new 400/132 kV stations are established: KYV, RIN, HSK, AMV and TEG" (Energinet.dk 2009h, p. 49, translated). As described in subchapter 6.1, part of the frames set in this plan dependent on the frames given by the political order to make this plan and the SEA application is therefore not straightforward. The main substance of the Cable Action Plan is a range of technical analyses on the dimensioning of the system and its components: Load analyses on intact grid and situations with different failures in the grid are made for a range of scenarios and each cable section is evaluated in terms of transmission capacity (Energinet.dk 2009h, p. 43). The load analyses show how much power is running through each wire in the different scenarios and short circuit analyses are used to control whether the existing material, like circuit breakers, are dimensioned in such way that they are to be able to be part of the new structure. How SEA is to be integrated into this type development of frameworks for development consent seems unexplored in SEA literature, however, a meaningful solution is needed.

An example of the non-EIA type of energy PP is Energinet.dk's plan for the allocation of funds in the ForskVE research programme, which allocate resources according to a set of criteria. The programme is, however, likely not within the scope of the legislation as it does not exclude available solutions, and it does not directly provide a binding framework for consents. In the technology development programme ForskEL, Energinet.dk has in 2010 and 2011 applied an environmental assessment procedure (Energinet.dk 2011b) to enhance environmental considerations. Energinet.dk is thereby proactive in terms of possible future environmental assessment requirements following possible new interpretations on the Directive's formulations.

In the quasi-EIA type category are e.g. photo-voltaic, solar thermal, and wave energy activities, which are not part of the annexes of the EIA Directive. Plans and programmes that set out a framework for such activities may, however, be within the scope of the article 3 (4) of the SEA Directive due to the wide interpretation of 'projects' following from the interpretation in the EIA Directive. The degree of 'bindingness' and the question of significant environmental impact determine whether such plans and programmes are within the scope.

Besides Energinet.dk, the above list does not include plans and programmes made by non-governmental actors which have been made responsible for a public service. This does not exclude private actors with public responsibilities from conducting SEAs and, as an example, the Swedish Vattenfall has voluntarily used SEA to raise a debate on CCS in Sweden (Eriksson et al. 2006). In a Danish context, the question of which actors are responsible for a public service within the energy sector still needs to be answered to clarify the scope of the EU Directive on SEA in a Danish context; Companies that e.g. achieve a status as a company with a public service obligation on energy supply in accordance with the Act on electricity supply (no 516 of 20/05/2010) may e.g. be within the scope of the SEA Directive. Such companies may e.g. be regional electricity supply companies that owns and develop the regional grid, currently without attention to SEA.

OVERLAP BETWEEN PLAN AND PROJECT

The energy infrastructure development may involve implications in terms of the distinction between 'project' and 'plan'. Some of the areas of potential overlaps between the EIA and SEA Directives pointed at by Sheate et al. (2005) are found in the above list of energy plans and programmes:

- Potential overlap where large projects are made up of sub-projects, so that the large project can be treated as one large project in terms of the EIA Directive or as a programme of sub-projects in terms of the SEA Directive. A similar overlap is found in the infrastructure development in Energinet.dk as depicted in the conceptualisation in subchapter 6.2.
- Potential overlap where project proposals require amendment of land use plans before application of development consent. This is also the case in Energinet.dk's infrastructure development that for some parts requires amendment to the municipal land use plans.
- Potential overlap where plans set binding criteria so that projects complying with these must be given consent. This is case in the pre-investigation of oil and gas offshore until a legislation that makes it possible to decline applications is entering into force (act proposal no. 141, 2011). In this case, SEA is not applied.

The ambiguity in the distinction between 'project' and 'plan' is in Denmark shown in the fact that the planning and decision on the national test centre for windmills in Østerild was by the Ministry of Environment interpreted as a 'project', despite the formulations in the act on the test centre directly stated that "The purpose of the act is to set a framework for the establishing and operation of a national test centre for major windmills in an area at Østerild…" (paragraph 1 in Act no. 647 of 15/06/2010, translated). Following the test centre at Østerild, a more holistic planning for development of similar test centre was made, and this planning was by the authority judged to be subject to the SEA Directive requirements.

The development of extraction of oil and gas in the Nord Sea is done according to plans made by the operators and approved by the DEA. An example is the plan for expanding the infrastructure in the Halfdan Nord East field made by Mærsk Oil and Gas which was approved by the DEA in 2009 (Danish Ministry of Climate and Energy 2009). Although the new infrastructure is made within the frames of the existing EIA consent, the development plan may be another overlap between EIA and SEA regulation, if the approval by the ministry of the plan is interpreted as an adoption. Indeed, the approval frames size, area, and resources.

OVERLAP BETWEEN SECTORS

As it appears from the list, the energy sector planning is related to other sectors like the agriculture and building sectors. This intertwinement with other sectors may constitute a challenge for the scope of plans and programmes and the scope of the specific assessments. Does the natural gas security of supply plan e.g. have to include the transport sector as transport policy may increase the need for biogas as a fuel in the future? If so, how does the natural gas plan relate to alternatives for transport needs? Another cross-sectoral plan is a possibly upcoming national action plan for charging spots for electricity vehicles: This plan would indeed be crossing the borders of the transport and energy sectors as well as the spatial planning. Similar questions may rise in terms of the energy sector's intertwinement with the financial sector (import/export, jobs), the agriculture sector (biomass), etc. By nature of the intertwinement, this is not only a problem for the energy sector, but the overlap necessitates a coordination of SEA application between sectors.

The government platform for the Danish Government elected in September 2011 (Danish Government 2011) includes references to planned documents, which are relevant to consider in terms of SEA legislation. These documents also have cross-sector elements.

- A "climate plan" (p. 28).
- A "climate act" (p. 28).
- An "energy agreement" (p. 29) including expansion of renewable energy, hereunder wind power.

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CHAPTER 10: DISCOURSES ON THE ROLE OF SEA

TIMING AND PUBLIC PARTICIPATION

> *"With an additional cost of up to 20 billion kroner is it thought-provoking that the decision to sink the high voltage network has not been subject to a broader political debate, which the public could participate in. […] When is the overall, cross-disciplinary, societal weighing made from which the Minister and Parliament Committees can make decisions with such big economic consequences?"* (Professor Lotte Jensen, in Vestergaard 2009, translated)

Besides fulfilment of legislative requirements, SEA plays different roles in different context. The role may among other things differ between being proactive or reactive to strategic decisions and between having a central role in decision-making or being a minor add-on to existing tools. Discourses on the role of SEA and public participation in the Danish energy sector are part of a broader societal debate, which is exemplified by the quote of Lotte Jensen above. SEA application in the Danish energy sector will most likely be affected by and affect some of these discourses.

This chapter explores the discourses on the role of SEA and the role of public participation in SEA, which has been prominent in the collaboration with energy sector actors in this Ph.D. project. The analysis of discourses of the role of SEA encompasses the issue of responsibility, which has been investigated in a legislative perspective in the previous chapter. The analysis of discourses on roles is furthermore related to the choices made in the empirical investigations on timing of SEA and framing of alternatives. The investigation of discourses on SEA is an exemplification of the complexity and importance of discourses when applying SEA in new context.

The first discourse analysis concerns discourses identified in Energinet.dk on the role of SEA in the strategic decision-making. The second discourse analysis concerns the role and timing of public participation in the strategic decision-making. The second analysis reveals discourses claiming difficulties in making the public interested in strategic questions. Therefore, this analysis is added an analysis of the character of consultation comments in some of the investigated contemporary strategic decision-making processes in the Danish energy sector.

Discourses are related to decision-making in the sense that discourses reflect the interests of actors involved. Durning (1995) refers to conceptualisations of decision-making as a "system of competing discourse coalitions and their struggles to 'control shared meanings' and to gain

acceptance of their framing of a policy issue" (p. 103). The following analysis of discourses could therefore be seen as another 'unravelling' of strategic decision-making processes, but the following discourses are on another level: The previous empirical investigations concerns the strategic decisions on plans and infrastructure developments in the energy sector, whereas the investigations in this chapter concerns aspects of how SEA of such strategic decisions are to be applied.

Discourse is here understood as the claims and views on something held by one or more actors, and in contrast to the ongoing element of sense-making presented in chapter 4.1, discourses are in this section treated as entities of a rather fixed and formal nature. It is, however, interesting that discourses are created by people to make sense and to influence, and discourses are influencing how people make sense of events and how people act: "In other words, discursive practices give rise to a multitude of experiences, some of which are translated into expectations or rules of action through the development of various discourses (Helms Mills and Mills 2010, p. 65). Weick (2009) states that discourses can function as a justification for actions, why they may be difficult to change. Discourses are closely related to the conceptual framework presented in chapter 4, and forms a link between formal elements and socio-psychological processes.

The investigated discourses also relates to the change agent approach as insight in discourses may be a basis for improving SEA application, e.g. by proactively recognising and engaging with similar upcoming discourses. Such insight seems central to change agent approaches, see chapter 3. A general experience in the interaction with practice in the Ph.D. project is hesitation to apply SEA among actors in the energy sector. Discussions on SEA often become a debate on interpretation of whether an energy plan or programme required by legislation and set up frames for development consent. The discourse analysis approach applied in this chapter is emphasising that actions are related to interpretations. Runhaar (2009, p. 203) stresses that "The method is based on the premise that the way people talk is not a neutral reflection of our world, identities, and social relations, but rather plays an active role in creating and changing them. The discourses on the role of SEA are thus important for understanding past, current, and future actions on SEA application.

10.1 DISCOURSES ON THE ROLE OF SEA

In terms of SEA application, discourses can be seen as a part of a "professional struggle between a spatial planning tradition and profession and the emerging environmental professions" (Emmelin and Lerman 2005, p. 179). Despite the importance for SEA implementation, discourses seem seldom investigated in SEA literature. In examining SEA and transport planning, Hildén et al. (2004) find that "Different views of planning lead to very different interpretations of what the assessment can and should be about, what they should deliver and whether SEA as a whole is a justified means" (p. 521). These different views may stem from differences in educational and professional background, organisational position, etc. Hilding-Rydevik (2001) points at the importance of discourses and storylines for integration of sustainable development in spatial planning. Another notable exemption is Runhaar (2009), who is investigating how SEA contributed to decision-making through influencing discourses on specific issues. Adopting a power perspective, he viewed decision-making as "a system of competing discourse coalitions and their struggles to 'control shared meanings' and to gain acceptance of their framing of a policy issue" (p. 200).

The following investigation of discourses has point of departure in my participation in Energinet.dk. Energinet.dk is an organisation with more than 400 employees with different background and interests. How employees in Energinet.dk think Energinet.dk should use SEA therefore forms several internal discourses. The discourses play an essential role for the Ph.D. project, since discourses that ascribe SEA a passive role in Energinet.dk may impede Energinet.dk's benefit of the Ph.D. process; an active approach would give more possibilities for input from the Ph.D. project to Energinet.dk's work than a passive approach.

The discourses partly have point of departure in the relation between SEA and the legislation that frames Energinet.dk's activities. This relation is complex as it involves several sets of legislation, interpretation, and praxis through court judgements. The discourses in Energinet.dk have been driven by different interpretations of the legislation, and they are in the following termed the 'idealistic' discourse, the 'jurisdictional' discourse, the 'strategic management' discourse, and the 'external consultant' discourse. The presentation of the discourses is based on participation in meetings and notes on the internal communication in Energinet.dk. The presentation of the discourse is subjective as many other nuances of discourses could be presented, however, the validity of the proposed framing is strengthened by discussion and integration of comments to an draft version of the analysis by Kim Behnke, Energinet.dk. The different discourses are presented in terms of their stance and arguments on the role of SEA, Energinet.dk's SEA obligation, and when SEA should be applied. A summary of the discourses are shown in table 22.

The analysis is based on insight from participation which has been challenged and supported by a survey among key persons in Energinet.dk as part of an internal review of how environmental considerations are integrated in the company. The 10 interviews conducted in this review was transcribed and synthesised into a report and the conclusions and quotes were validated by a commenting by the interviewees. The aim of this review was to 'mirror' the organisation and to facilitate an internal platform for a critical reflection on its practice. The names of the persons quoted in the discourses are anonymised to protect the persons from public criticism as the interviews were made in another context.

FOUR DISCOURSES ON THE ROLE OF SEA IN ENERGINET.DK

The 'idealistic' discourse emphasises that the aim of the Directive and Danish legislation on SEA is inclusion of relevant environmental information into decision-making. This discourse is indirectly drawing on sustainability thinking in line with the Brundtland Commission's equal emphasis on economic, social and environmental issues. This emphasis is accompanied by a pragmatic stance on the scope of the legislation, which is seen as second to the aim: The most important thing is to include environment where it is relevant and the legislation is just a minimum requirement to facilitate or directly support this process. The nuances in the formulations in the legislation e.g. on the scope on plans and programmes are therefore not central in this discourse on SEA implementation. The reasoning in terms of Energinet.dk is that Energinet.dk is by law required to do a planning for future infrastructure development, and regardless of what authority approves the planning, it is SEA mandatory: "Expansion in pursuance of (1) [new transmission grids and material changes to the existing grids] shall, prior to commencement, be illustrated in a plan outlining the future transmission capacity requirement " (Act on Energinet.dk, §4, 2). With the idealistic nature, the discourse goes beyond the plan concept to approach the moments of decision-making to increase the potential influence of SEA. Thus, all strategic decisions with significant environmental consequences are to be preceded by an SEA.

Discourse	*'Idealistic'*	*'Jurisdictional'*	*'External consultant'*	*'Strategic management'*
Main focus	Apply SEA when it is environmentally relevant	Legally correct implementation	Transparency by SEA application	Room of manoeuvre - apply SEA when it is appropriate in a tactical sense
Energinet.dk's SEA obligation	Energinet.dk is legally required to do planning prior to construction of infrastructure, and this planning is therefore SEA mandatory.	All actions in Energinet.dk require permission from other authorities, therefore is Energinet.dk not authority.	Energinet.dk is to be understood as an authority since it is a public owned company.	Energinet.dk is developer and cannot both be developer and authority. Therefore not obliged to do SEA.
Application of SEA in Energinet.dk	SEA at every strategic decision with significant environmental consequence	Only when required by other authorities	All major plans and programmes	Doing SEA when it is appropriate for doing business, i.e. to avoid problems

Table 22: Discourses on the role of SEA in Energinet.dk

The 'jurisdictional' discourse emphasises that Energinet.dk as a state-owned institution must implement the legislation on SEA correctly regardless of the potential effect of other ways of

implementing the legislation. An employee is emphasising the importance of adhering to the rules of the game:

> *"[i]t is important that we know the rules of the game. That means what is the difference between EIA and SEA? What is our role [in terms of these]? […] That we know our role in terms of our obligations may be the most important element in how we integrate environmental concerns. […] Where the authorities are requiring it, we must apply SEA and where they do not require it, we shall - with good reasons - not apply SEA".*

Allocating man-power on tasks than potentially is not jurisdictionally required could be criticised by other actors. A main phrase in the jurisdictional discourse is that Energinet.dk needs permission from other authorities for all construction activities and therefore cannot be understood as an authority itself. The discourse includes an analogy of comparing Energinet.dk to the organisation Dansk Supermarked (a Danish supermarket association), who plans for locations for new supermarkets, but relying on others' permit to realise the planning. It is maintained in this discourse that SEA should be carried out by the authority. Therefore, Energinet.dk should not do SEA unless it is required by other actors.

The 'external consultant' discourse emphasises that since Energinet.dk is a state-owned company and created to serve the society's needs, its actions ought to be transparent. This discourse is founded within the good practice for public organisations, which state that "The public sector builds on values like openness, democracy, legal rights, integrity, neutrality, legal capacity, and loyalty. […] Authorities and employees thus have a common responsibility for respecting the public sector's basic values in execution of tasks and delivery of services to citizens" (Personalestyrelsen, KL and Danske Regioner 2007, p. 5, translated). Administrative law is made to secure "that citizens are involved in the administration's decision-making process, so that they can influence the basis of the decisions that are made above them" (p. 5). The 'external consultant' discourse is thus criticising the tactical reasoning of interpretation of SEA legislation in the 'strategic management' discourse. SEA is in this discourse seen as part of the administrative obligations of a public organisation, and Energinet.dk is therefore to follow the formulations in the act of approaching plans and programmes.

The 'strategic management' discourse is emphasising the need of the strategic management to have room for manoeuvre in negotiations with other actors at a strategic level without requirements on transparency and several months of assessment processes. The room for manoeuvre also concerns the conflict between competition and transparency. The discourse claims that publishing information at a strategic level could give other actors a tactical advantage. One employee described this problem as:

> *"The challenge is that there are things that you don't want to share, because of the negotiating position; there are some strategic concerns in it"*

The strategic management discourse is connected to an identity perception of Energinet.dk being developer of infrastructure, and it is therefore argued that according to administrative law, Energinet.dk cannot be both a developer and an authority that approves the development. A manager argued that "Like a Supermarked we cannot both develop and

approve our new supermarkets". This discourse therefore disputes the 'idealistic' discourse of targeting the strategic decisions that are potentially decisive for environmental consequences. Instead, seemingly ambiguous formulations in legislation should be interpreted in favour of the room for manoeuvre in the tactical play between TSOs. SEA is therefore to be applied when it is appropriate for the business, e.g. in cases where SEA can be used for improving the public discussion and to decrease public opposition at EIA level, supporting the legitimacy of the decision or in cases where it benefit the cooperation with other actors. A similar motivation is found in Valve (1999) who argues that the Finnish Ministry of Transport in a given case applied EA "to convince the audience and other financiers that environmental matters are taken care of and that the decision-making is carried out in an appropriate manner" (p. 139).

DISCUSSION: IMPORTANCE OF DISCOURSES

The discourses on the role of SEA have similarities with the discourses related to EIA in Scandinavia decades ago as reported by Emmelin and Lerman (2005): Is SEA a constraining procedure or a necessary structure for integration of environmental considerations? Is SEA based on a too rational understanding of decision-making? Is SEA guided by too many explicit requirements? Emmelin and Lerman also found support for what is termed the strategic management discourse above: "There are indications that the formal participative elements in both spatial planning and EA are increasingly seen as a hindrance to strategic decision making" (p. 188). Furthermore, the discourses relates to the tension of strategic decision-making between "weighting and daring" (Larsson and Emmelin 2007, p. 3), between the rational deliberative and intuitive approaches to decision-making. Supporting the findings of previous studies, the discourses identified in Energinet.dk may thus be relevant as stereotypes for other strategic development context that may be useful in preliminary identification of discourses in other organisations.

The importance of discourses on the role of SEA seems indirect in Jay (2010, p. 3495) who comments that "There is clearly a difference of emphasis in the weight given to these Belgian and UK documents in planning decisions, which results in one coming under the terms of the SEA Directive, and the other not." In Britain, the National Grid has settled on the discourse that their plans do not set frames for future developments, since the grid operator is obliged to provide connection to any customer regardless of their plans: "[T]he transmission companies have no ultimate control over the connections that are made to the system (of either generating plant on the one hand, or distribution and supply on the other). The transmission licence holders are under a statutory obligation to provide a connection to their networks for any customer who requests one, regardless of how well this may or may not coincide with optimum network development" (Jay 2007, p. 77). The loss of control is according to Jay a result of the privatisation in which the "'unbundling' of the industry into independent components has made has made electricity networks into largely reactive businesses in which customer behaviour" (p. 78). Although Energinet.dk is able to do more active business, a discourse of 'no full control' could be expected in Energinet.dk, since Energinet.dk and other grid companies are obliged to provide connection to producers and consumers of electricity (§20 in Act on electricity supply, no 516 of 20/05/2010).

Based on the interpretation of SEA Directive in the previous chapter, a central question seems to be whether Energinet.dk or the Ministry is 'responsible', when Energinet.dk's plans for expansion have to be approved by the Ministry of Climate and Environment. The answer to this question is decisive for, who is responsible for the application of SEA. The European Court of Justice argues in a judgement on the case of British Gas (ECJ 1990) that not only bodies which has been made subject to authority, but also bodies which has been made subject to "control by the state" or assigned "special powers beyond those which result from the normal rules applicable in relations between individuals" (European Commission 2003, p. 8), so the ministerial approval of Energinet.dk's plans seems not to prevent status as a responsible body. The question of authority is thus a question of whether Energinet.dk has "special powers". Energinet.dk has access to loan from the Ministry of Finance (paragraph 14), it has legislative rights to charge consumers for sustain security of supply, collect information, require operation or shut-down of power plants (paragraph 8, 27a and 27b in executive order on electricity supply, no 516, 2010). Energinet.dk therefore has special powers, and therefore seems to be a body made responsible for a public service. In a similar tone, the Rigsrevisionen (the National Audit Office of Denmark) stated in 2004, that Energinet.dk's activities predominantly would be authority execution activities associated with the state's ownership of the transmission network and system responsibility (Rigsrevisionen 2004)

The discourses seem to disregard the formulation of the EU guidance on implementation of SEA (European Commission 2003) on "subject to preparation and/or adoption by an authority" (p. 5). This formulation means that Energinet.dk even without authority status must do SEA on documents that set frames if the approval by the Ministry equals an adoption. If Energinet.dk thereby falls within the scope, the crux of the matter is whether Energinet.dk should apply SEA on its own initiative or await authorities to require it: The question is whether application of SEA is part of working "on behalf of the authority" (European Commission 2003, p. 8), or it needs a specific order from the authority. Similar question is related to the documents that set frames and are adopted through legislative procedures by the Parliament or Government.

The change agent approach would a first glance make use of the above "clarifying" arguments in efforts of forcing through the "correct" understanding. Although, the arguments are highly relevant in the discussions, the discourse development in organisations like Energinet.dk is a more complex process with a range of interests and considerations. The clarifying arguments therefore are up against more powerful interests and the change agent approach may therefore use a wider perspective than the legislation itself. It is important to keep in mind, that the change agent is - despite own beliefs - not more right about how things should be or above other actors in terms of legitimacy; the interpretation of the relation between legislation and decision-making is open for discussion and different understandings.

The discourse development in Energinet.dk is furthermore more dynamic than outlined in this chapter. Like the framing of alternatives in the natural gas security of supply planning, discourses are influenced by contextual dynamics; external changes may make dominant discourses irrelevant, why they quietly dissolve; other changes may make divergent views in a "discourse' periphery" (Asplund and Hilding-Rydevik 2001) gaining influence. As a means to generate change, Asplund and Hilding-Rydevik (2001) point at storylines: "A storyline that

gains common accept may have a redeeming role in situations where it is otherwise is difficult to reach a decision or action" (p. 19, translated). In Energinet.dk, storylines on SEA have been generated in the public appendix to the company's Strategy Plan. Although they have been important input in the discourses, they have not gained the redeeming role.

The growing awareness of SEA in the Danish Energy Agency may be an important driver in the clarification of responsibility and roles in the Danish energy sector. A jurisdictional clarification in the agency would besides the Agency decision-making also make the rules of action easier to clarify in Energinet.dk.

10.2 DISCOURSES ON PUBLIC PARTICIPATION

> *"[…] Serious theoretical and methodological difficulties, including those related to the selection and framing of 'problems' and 'options', the treatment of deep uncertainties and the impossibility of aggregating in analysis the divergent social interests and value judgement which govern the prioritisation of the different dimensions of 'sustainability' […] render futile any attempt to develop an 'analytical fix' for the problems of appraisal. In this light, systematic public participation is recognised not just as an issue of political efficacy and legitimacy, but also as a fundamental matter of analytical rigour"* (Stirling 1999, p. 111)

> *"Increased opposition towards big, planned windmills onshore causes a range of municipalities to either limit their windmill plans, to postpone them, or skip new onshore mills. In less than eight months, the number of opposing citizen groups, which has joined the Organisation of Neighbours to Giant Windmills [Landsforeningen Naboer til Kæmpevindmøller], increased from 40 to more than 90. The objections cause more and more politicians to tremble in their boots.* (From 2011, translated)

The previous analysis indicated that transparency and public stir is a concern in the strategic decision-making in the Danish energy sector. In the following, focus is on discourses on public participation.

Public participation in the strategic development of the Danish energy sector is interesting in many respects. Two are indicated in the quotes above, namely that public participation is relevant in non-programmed strategic decisions-making characterised by uncertainties and multiple of interests and that public opposition is blooming in the Danish energy sector despite political attention and use of resources to smooth the infrastructure development process.

This section thus views public participation from two angles: The discourses found through interviews in Energinet.dk in connection with an internal clarification of how environmental concerns are integrated at strategic level in the company and the content of public consultation comments in two contemporary strategic developments of infrastructure. The persons are anonymised to protect the persons from public criticism as the interviews were made in another context.

Due to the general opposition and the status as a public owned company, Energinet.dk is focused on the public participation process and careful about fulfilling legislation and involving 'relevant actors' on an early stage. The following discourses are therefore widely concerned with whether the public should be involved further than the legislation requires.

DISCOURSES IN ENERGINET.DK

The discourses on public participation in Energinet.dk especially relates to when public participation is relevant in the strategic development of infrastructure, which is related to the questions of what makes sense for the society and what is the public interested in. Figure 30 shows the opinions among persons in Energinet.dk that were put forward as part of the internal clarification of how environmental issues are considered at strategic level, see the methodology chapter. The two dominant discourses (three out of ten persons) are that the public participation has to be about an issue that concerns the public and that the public participation should be done prior to a final decision on a specific option. The discourses of public participation in the early internal economic and technical analysis and in the preparation of a plan that outlines options are in line with the SEA legislation (article 6, in the preparation of plans and with appropriate time frames) and therefore not further described.

Appropriate time for public participation	**Number of employees**
On early internal economic and technical analyses	2
On the preparation of a plan that outlines options	3
After a decision has been made	1
On concrete issues that concern the public	3

Figure 30: Distribution of employees within discourses on when and on what planning stages (see figure 20, p. 144) public participation is relevant in the strategic development of energy infrastructure in Energinet.dk (n=10)

The discourse of having public participation and hearings after a decision is made is partly reasoned by consideration to competition and partly to avoiding 'unnecessary disturbance' in the society. The former is described by a manager in Energinet.dk as: "The challenge is sometimes that there is information, which we do not want to share, because it is about negotiating position and there is some strategic in it; which way are we going. And there are some competitors out there, which have other interests". The latter is described by a manager as: "We should not go out and say: "What do you think of this?" if it is not likely that it is realised". The question of when projects are likely to be realised is then interpreted as in principle not before the Board of Energinet.dk has approved a project.

The discourse of focusing public participation on concrete issues is described by a manager as "If you want to go into dialogue with neighbours and citizens, then it probably has to be quite concrete. [Early in the strategic development] you may get into dialogue with Greenpeace or WHO or organisations like that. But if you want to get in contact with neighbours, then it is [in the routing of infrastructure], where it is more concrete". Another employee argues that "It would be a very difficult communicative solution, since how is the individual committed to have a look on how, for instance, the capacity towards South is expanded. You need a special interest in that".

These discourses on public participation widely differ and efforts on developing a meaningful SEA application have to approach these in order to develop a meaningful practice on SEA. The doubts on public participation on a strategic level of decision-making

are not unique for Energinet.dk: Information discussions with other authorise indicate similar discourses. Common for the discourses in Energinet.dk is interest in a demonstration of a societal benefit of public participation at the strategic level. The following brief investigation of public consultation comments is an input to such a demonstration. The analysis uncovers the range of energy related issues commented on and it is - despite interesting perspectives - widely delimited from an actor analysis of who says what.

PUBLIC CONSULTATION COMMENTS

Comments from the public in two environmental assessment processes on infrastructure developments are analyses in appendix D. These processes are the National Test Centre for Windmills in Østerild and the Offshore Wind Action Plan that also were part of the investigation in subchapter 6.1. The comments are summarised and discussed in the following in order to shed light on what the public comments concern. This is an input to discuss relevance of public participation in the strategic level in the Danish energy sector.

The analysis shows that consultation comments in both processes concentrates on three main categories:

- The decision-making process, hereunder how the planning is made, how the public participation is made, disputes on the legitimacy of the intervention, and critical comments on the documentation, hereunder defects and appropriateness of the data used for the assessment.
- The energy needs and technology, questioning societal benefit, relevance of the initiative and suggestions on other alternatives, as well as critical comments on the scope of planning
- Impacts of infrastructure on humans and nature, hereunder neglected or underestimated impacts.

In the Offshore Wind Power Action Plan, the affected municipalities and the wind power companies criticises the documentation behind the assessments and the ambiguity around assumptions and criteria in the decision-making. Values are in some comments very explicit. In terms of energy needs and technology, the consultation comments are primarily related to the spatial characteristics of the windmills, e.g. Region North Jutland that is concerned about visual impacts. The comments primarily concern the design and the location of windmills, suggesting other alternatives. Furthermore, the comments point at the interrelatedness of windmills with the energy system in a national as well as international perspective. The impacts of the infrastructure is in the comments primarily related to maritime safety, tourism, fishery and fish stocks, habitat areas, and cumulative effects. The positive impact of development of wind power on the greenhouse gas emission is widely acknowledged, like the expansion offshore rather than onshore. The responses to the consultation comments by the committee in charge of the plan widely refer to the EIA process, but the comments also leads the committee to reconsider distance to harbour, knowledge from the offshore wind demonstration programme, and cost estimates (DEA 2008b).

The analysis of the consultation comments on the EIA report of the National Test Centre in Østerild shows that the comments concern a range of energy-related topics. Concerning the decision-making process, the comments criticised the choice of the location, the public

participation, the legitimacy of the way the test centre was chosen, the documentation of the process and basis, and the disregarding of the previous planning. Concerning the energy sector's needs and testing of technology, the consultation comments concerned the relevance of the test centre, the ambiguity on the requirements of the centre, the location in Østerild versus other places for wind testing, and the societal benefit. The public consultation comments have been influenced by an increased organisation of the public opposition, why most of the individual comments therefore contained similar issues and arguments.

Discussion of the comments

The cases show that despite the tool (EIA of the Østerild test center and SEA of the offshore wind plan), strategic considerations are brought forward. This has also been the case in the Ll. Torup case, see subchapter 7.1. The investigation thus indicates that it is a general character of energy infrastructure development that the affected people are disputing strategic aspects such as the societal need, legitimacy and documentation of the need. Research is used politically to criticise the basis of the environmental assessments, but rather than being constructive the cases indicate that it is done in an effort of impeding the decision-making process.

Comparing the consultation comments from the two cases, it is evident that the number of comments and essence of the comments widely differs: The Østerild case is conflicting with the interests of a range of local people and nature NGOs, why their concerns dominate and the comments are critical to the decision-making as well as the ambiguity or lack of information. In the offshore wind location case the comments represent a broad range of actors including neighbouring countries, and concerns about visual aspects and documentation dominate among the comments. Whereas public comments to the offshore wind plan is more about the scope of the planning and system boundaries, the comments to the Østerild centre is about secrecy and ambiguity in the decision-making process.

The debate and comments in the cases reflects a weighting between local and national/global interests, which seems typical for energy infrastructure development; the infrastructure is benefitting the society and harming the individual which is affected by the infrastructure. This is often termed NIMBYism (Not In My Back Yard), however, the Østerild comments were wider framed than a simple individual protection of land and economic interests.

The brief analysis suggests that the public are commenting a wide range of relevant issues that potentially can improve the process. Two aspects seem, however, to hinder a constructive process: The relevant comments widely stem from direct personal interests, which may not be as direct in more abstract strategic decision-making processes, and the public efforts of commenting is not made to advance the process and the assessment, but to stop the infrastructure development. These two aspects must be dealt with before public participation becomes truly contributing at strategic level in the energy sector.

SYNTHESIS

CHAPTER 11

ELEMENTS OF A MEANINGFUL WAY OF APPLYING SEA

CHAPTER 12

LOOKING OUTWARDS AND FORWARD

This chapter synthesises the findings of the previous chapters, hereunder the empirical findings and the relevancy of the frameworks. The synthesis constitutes the answer to the overall research question presented in the introduction.

CHAPTER 11: ELEMENTS OF A MEANINGFUL WAY

OF APPLYING SEA

> *"SEA should not be an empty paper-activity. SEA must enter the decision-making processes at a time and with a content that make SEA an active element. This ambition has been difficult to get materialised, since there are many stakeholders and processes connected to Energinet.dk's activities, which are not organised with an eye to accommodate SEA procedures"* (Behnke 2010).

The aim of the thesis was to explore strategic decision-making as an element of assisting the Danish energy sector in developing a meaningful way of applying SEA at strategic level. 'Meaningful' in the sense that application of SEA should be an active element in strategic decision-making as Behnke describes above and be a way to improve consideration of environmental aspects. As the title of this chapter indicates, the collaboration with actors in the energy sector during the three years has not resulted in a final and definitive way of applying SEA. It has, however, identified important elements of a meaningful way and these elements will be outlined in this chapter.

The first subchapter outlines how the mysterious non-programmed, strategic decision-making processes during the Ph.D. project have been unravelled and how the findings of the thesis add to the understanding of these processes. The thesis has provided a platform for discussing when and how strategic decisions are made and what the possibilities are for approaching these decisions through SEA processes. The subchapter furthermore outlines and discusses the growing amount of experiences - both in Energinet.dk and the Danish Energy Agency - with SEA during the project period.

The second subchapter synthesises the experiences with the frameworks developed in this thesis. This includes a critical discussion of the relevancy and potential of the research approach, the conceptual framework, and the methodology in terms of the empirical investigations. The second subchapter thus deals with the meaningfulness of the frameworks in investigating strategic decision-making and SEA application.

Together the two subchapters presents the answer to the overall research question of "What do a combination of a change agent research approach and a conceptual combination of decision-making and sense-making provide of insight into how SEA can be meaningfully applied in the strategic decision-making processes in the Danish energy sector?" The chapters do not include recommendations, but they present a concentrate of the most important experiences and findings in the thesis. The listing of the most important experiences may be a

relevant inspiration for the future work in the sector and inspiration for actors within the fields of SEA or decision-making. Besides being a constructive input to the process of applying SEA in the strategic decision-making of the energy sector, the elements of a meaningful way also provide directions for further collaborative research and for continuation of the learning process on how to apply SEA in this and similar contexts. These directions are outlined in the following chapter.

11.1 FINDINGS ON STRATEGIC DECISION-MAKING AND SEA

The point of departure for this thesis was limited knowledge about how non-programmed, strategic decisions were made in the Danish energy sector. Furthermore, the state of the art pointed a limited empirical understanding of 'decisive moments' in decision-making processes. To add to this limited knowledge, the research question of "When in the development of Danish energy infrastructure are strategic decisions made that are potentially decisive for environmental aspects and how are these choices made?" has in this thesis been explored through empirical studies of contemporary strategic decision-making processes. The findings from these studies are presented below.

WHEN AND HOW STRATEGIC DECISIONS ARE MADE

First of all, the empirical investigations support the preliminary experience-based postulations of strategic decisions being made outside formal systems and having a non-programmed character. The investigations into decision-making on major energy infrastructure reveal a minor role of the formal plans, since pivotal decisions are made prior to these. This is e.g. the case in Energinet.dk's infrastructure planning and in the case of the National Test Centre for Windmills where technical reports and informal political choices in practice are delimiting the range of options in play prior to formal documents. In terms of the non-programmed character, the investigations shows how developments internal or external to organisations create novel and unexpected situations for which no previous experience provided a perfect match for the decision situation. The natural gas planning is an example of this where the SEA team had to develop a new set of alternatives in novel situations created by contextual dynamics. The empirical investigations furthermore support the iterative and cyclic understanding of strategic decision-making, which the conceptual framework outlined with reference to Mintzberg, March and Weick. Such iterations are e.g. found in the natural gas security of supply planning with iterations on the framing of alternatives or in the reconsiderations on the need for storage in the Ll. Torup natural gas storage case.

Secondly, the empirical investigations make it clear that a range of strategic decisions have been and are made without systematic environmental consideration, public participation, and transparency on alternatives. At the point of finalising this thesis (November 2011) only three strategic decision-making processes have been subject to SEA during the first seven years of SEA legislation in Denmark, whereas three other SEA processes are being conducted.

Thirdly, the investigations reveal insights of different level of details in when and how non-programmed strategic decisions are made:

- The investigation of strategic decision-making as series of choices reveals that decisions on major energy infrastructure a made in an interaction between policy-making and planning. Whereas much literature assumes a hierarchy of decision-making in which policy decisions frame planning decisions which frame project decisions, the investigation suggest that this simplified hierarchical model is misleading at a strategic level of decision-making.
- The investigation of strategic decision-making as contextual interaction reveals that the strategic context can be very dynamic and influence strategic decision-making in a number of ways. The investigation of the Natural Gas Security of Supply Plan thus shows how the natural gas planning was influenced by the financial crisis, EU recovery aid subsidy, new Danish political settlements, technological and regulatory development, Russian politics, etc. The dynamics of the strategic context emphasises the need for adaptability of the decision-making process.
- The investigation of strategic decision-making as human choices reveals patterns in how we create meaning of information and how meaning and actions are interlinked. The experiment on significance determination shows the importance of how we notice information and frames a text whereas the investigation of the EA of the Ll. Torup gas storage shows developments in senses in practice and how these influences actions. These investigations call attention to sense-making processes as an important element of strategic decision-making, since the way we make sense of stimuli determines our perception of for instance strategic options and what decisions are to be made.

Fourthly, the thesis shows empirically how strategic decision-making in the Danish energy sector is constituted by interaction among a variety of ways of making decisions. These ways differ among other things in terms of what is the basis for decision-making, how political the decision-making is, and how predictable the process is. The most influential ways of strategic decision-making in the development of major energy infrastructure identified in this thesis are:

- International politics in EU, e.g. in major financial support to the Kriegers Flak interconnection. This EU support was decisive for environmental aspects, since it changed the Danish priority on the locations for offshore wind and put up a pressure by deadlines that reduced the possibilities for applying SEA prior to important decisions on the project.
- National political negotiations in the Parliament, e.g. on the location of the national test centre in Østerild. This choice was decisive for environmental aspects, since it located the centre in a major forest.
- A competitive environment with among TSOs, e.g. strategic probings on transnational connections. Such initial agreements may be decisive for environmental aspects, since they determine what option is focused on.
- Technical planning of infrastructure in Energinet.dk, e.g. analyses of the load analyses in the Cable Action Plan. The assumptions and delimitations of such technical analyses may delimit the options in play and thus be decisive for environmental aspects.

The list is by no means exclusive, but it builds on a considerable share of the recent strategic decision-making processes on major Danish energy infrastructure developments in the last

three years. The list should be added interdependency, since for instance the Offshore Wind Action Plan was dependent on the Cable Action Plan, which again was dependent on the political negotiations. With these characteristics, the energy sector strategic decision-making is in line with Weiss' (1988) description of policy-making as interactive, multi-participative, and diffuse processes. The nature of the strategic decision-making processes on Danish energy infrastructure may thus be better characterised as policy-making than planning.

Strategic decision-making in the Danish energy sector thus seems to be a distinctive mix of competition between Energinet.dk and other TSOs on new energy connections, a prominent actor like Energinet.dk that is an independent, state owned company, a wide range of political instructions and settlements, major private energy companies, and international influences from especially EU and international organisations like ENTSO-E.

These findings on when and how non-programmed strategic decisions are made lead to the answer to the fourth sub-question of how SEA should be applied in order to approach the characteristics of strategic decision-making in the energy sector, which is presented in the following.

HOW SHOULD SEA THEN BE APPLIED TO BE MEANINGFUL?

The point of departure for this thesis was limited knowledge in SEA literature about how SEA can be applied in the strategic decision-making in energy sectors. As argued in the introduction and in the quote by Behnke above, the application of SEA in the energy sector is not straightforward. Some elements of a meaningful way of applying SEA in the sector are, however, identified in the thesis and discussed in the following. The main elements are:

- Orienting SEA towards formal plans is not adequate.
- The approach of targeting pivotal decisions on specific infrastructures may be relevant, although this approach is not without drawbacks
- SEA must to be applied in a way that can adapt to strategic contextual dynamics, which with short notice can change the premises of the decision-making radically.
- Compromises with early public involvement may be a meaningful preliminary solution to enhance application of SEA in competitive environments
- Setting the team for an SEA must consider sense-making profiles to reduce the risk of not noticing relevant strategic options and to enhance quality of significance determination

First of all, the empirical investigations put up a strong argument for the inadequacy of orienting SEA towards formal plans and programmes in the energy sector. A range of formal planning documents in the sector has character of summarising decisions rather than constituting a decision.

Energinet.dk's approach of targeting SEA to pivotal decisions on specific infrastructure developments may be a relevant substitute for the orientation to plans and programmes. The approach is based on the acknowledgement that the company's strategic decision-making is project-oriented rather than plan-oriented. Energinet.dk's approach has been passively approved by the Agency of Spatial and Environmental Planning, and it is therefore a feasible option for other actors in the sector. Energinet.dk has not yet demonstrated in practice whether it is possible to bring an SEA of an individual infrastructure into a fully strategic

discussion that includes comparison with other options. Special attention to this issue is needed to avoid salami-slicing of strategic developments.

The empirically identified strategic dynamics challenge the ability of SEA to respond to comprehensive contextual developments. Using the jargon of Christensen and Kreiner (1991), the premises on which the SEA process is initially designed may need multiple revisions during the SEA process due to contextual developments. Nooteboom and Teisman (2003) similarly point at the risk that impact assessments may be too early, since "the problem definition used in the assessment is always redefined during the decision-making process". The SEA literature suggests to handle contextual developments by predicting decision-making processes and the related contextual developments (Dalkmann et al. 2004) or to apply SEA in a flexible way that makes 'rapid responses' possible (Therivel 2004). The unpredictable character of some of the developments identified in this thesis suggests that the prediction of developments only to some extent is possible. Rapid responses seem highly needed in instances like in the Parliament policy-making or in strategic probings among TSOs. In these instances, decision-makers will most likely not await a longer assessment if they perceive the situation to be highly beneficial in terms of their interest. In the extent it is possible, prediction of developments may thus be needed in order to prepare a decent basis for decision-making and for involving relevant actors prior to this kind of decision-making. Therefore, a mixture of adaptability and prediction seems adequate for SEA application in the Danish energy sector. The strategic dynamics even leads to concerns about the adequacy of legislation on SEA: The investigation of the natural gas security of supply planning questions whether the legislatively required eight weeks of public consultation is feasible in a dynamic strategic context. In instances, unpredictable contextual developments changes the relevant alternatives significantly in shorter periods than the eight weeks, and the public consultation could therefore be repeated over an over again in trying to keep up with new decision situations.

The competitive environment and the strategic dynamics *in practice* seem to reduce the interest in SEA application at strategic level: The discourses identified in the thesis point at inappropriateness of transparency in strategic negotiations and hesitation towards public debates on infrastructure plans when there is a risk that these may not be implemented. A compromise with the SEA aim of early public involvement may be a pragmatic way to increase application of SEA and meaningful in terms of improving environmental considerations in strategic decision-making. Without transparency and public consultations, SEA elements like systematic environmental considerations seem easier for the actors to integrate at a strategic level, and the public may instead be involved when transparency is no longer a problem. Such compromises are, however, not without drawbacks, and lack of public involvement may result in public dissatisfaction and opposition towards the strategic decisions and the following infrastructure developments. Furthermore, lack of public debates on a strategic level may hinder the development of more radical alternatives (Lund 2009).

A meaningful application of SEA does not only involve adjustments of the SEA tool, but also adjustments in the strategic decision-making. Energinet.dk's targeting of SEA to pivotal decisions necessitates that a planning document is made for these decisions in order to provide a point of departure for SEA application. SEA may thus have a role of creating new official documents, new routines, and a new transparency. In SEA literature, this role is

described as the ability of SEA to 'structure' decision-making processes (Fischer 2003). How this role is reflected in practice in the Danish energy sector is not yet clear, as the number of SEA applications is modest. The investigation of the natural gas security of supply planning indicates that SEA application leads to a new document that outlines the potential decisions in the entire natural gas security of supply report. Present SEA processes furthermore indicate that commission reports become a more decisive status by being *the* document on which SEA is applied.

The discussions of how SEA is meaningfully applied in the Danish energy sector are related to the discussions of what are the aims of SEA and how SEA is done effectively (Cashmore et al. 2009, Stoeglehner et al. 2009). The trade-off between early public participation and application of SEA in competitive environments emphasises that in practice it is most likely not possible to achieve all aims of SEA. Although both are important in the Danish energy sector, the development of SEA has to start somewhere, and application of some SEA elements in the strategic decision-making process may give rise to application of other elements. This successive implementation is also related to the discussion of ownership of SEA application, which is argued to be a prerequisite for effective SEA application (Stoeglehner et al. 2009). The frames for the empirical investigations in this thesis role support the development of ownership through a critical friend role. The meaningfulness of these frameworks is discussed in the following subchapter.

11.2 MEANINGFULNESS OF THE FRAMEWORKS

This subchapter presents the answers to the research questions on the relevance of the change agent within the field of SEA and of the conceptual combination of decision-making and sense-making. The main conclusions are:

- The change agent research approach is rewarding in terms of relevancy of the research and demanding in the combination of change and research
- The change agent may be a medium for a critical interdependence between research and practice
- Sense-making theory is a relevant supplement to the insight in SEA literature about how decisions are made
- The combination of disciplines and models into a continuum of perspectives is a relevant approach to consider synergies and complementarities of insights into how decisions are made.

MEANINGFULNESS OF THE CHANGE AGENT APPROACH

The investigation of the three collaborative and co-funded Ph.D. projects reveals that acting as a change agent is a demanding task as it requires the researcher not only to be a researcher that plans and conducts research, but also to be a social agent that interacts with relevant actors as well as negotiates interests in the research with partners on issues like objectives and content of the research. If the researcher manages this double role and the social setup of the

research both involves strategic interdependence as well as room for manoeuvre for the researcher in a kind of organisational autonomy, the change agent approach can be a rewarding process for the involved actors. In this way, the change agent approach can enhance relevance of research concurrently with a critical stance to the practice studied.

This Ph.D. project shows the relevance of staging a change agent in a context like the Danish energy sector in order to facilitate change: As an independent resource person, I was to an increasing extent approached with questions from practice on SEA application by among others the DEA. In this way, I became a sparring partner that to some extent facilitated development of SEA practice.

The experiences of doing change agent research in this Ph.D. project reveals a range of difficult choices during the process. Among these are issues of how to influence actors in the energy sector and whom to approach, which required considerable attention. These choices will likely become less demanding as the researcher is gaining more experiences of being a change agent, and expectations to the output of this type of research should therefore reflect how experienced the researcher and the partners are in making use of this kind of research collaboration.

The considerations of how to influence the actors in the energy sector is related to considerations of how to create research that bridges theory and practice. Based on the researcher's and partner's experience, this bridge is staged as a critical interdependence in which theory provides critical input to practice and practice provides critical input to theory. A change agent research approach with access to insight in the strategic interdependence and autonomy in the research seems a highly adequate medium for this critical interdependence.

The critical friend role in this Ph.D. project has widely been an informal and internal approach rather than a confronting approach using public media to enhance practice. The latter would most likely have given a formal progress in the energy sector, but my judgment was that an external pressure would have increased the risk that actors would perceive SEA as yet another administrative burden rather than a meaningful tool that is able to strengthen strategic decision-making. It would furthermore most likely not have opened the amount of doors for further cooperation and the frankness and insight accessed in this project. The public debate is, however, important and one of the tasks following this thesis writing is to use Danish public media disseminate experiences and start public debates on SEA practice in the energy sector - in a critical friend way and if possible by co-writing with involved actors.

MEANINGFULNESS OF THE CONTINUUM AND COMBINATION

The state of the art showed a fragmented understanding in SEA literature of how strategic decisions are made. The fragmentation of insight in different disciplines and theoretical models is argued to make it difficult to see synergies between these. Therefore, theories of decision-making and sense-making were combined into one model and this combination was included in a conceptual framework that portrayed strategic decision-making as a continuum of perspectives with varying levels of detail.

The thesis shows how theories of and research on decision-making are enhanced by insight from sense-making theory. The relevance of the combination of decision-making and sense-making as well as of the continuum has been tested through the empirical investigations. The

main question discussed in the following is whether the conceptual framework has been successful in creating synergies or the results are no more than complementary understandings of strategic decision-making processes: Did I only merge two theoretical fields or did I create a new insight based on the insights of the combination?

The potential synergies of the continuum relate to how the different levels of perspectives support and add to each other:

- The overall level is the patterns that show what the details of decision-making results in at an overall perspective. In a company, this level would equal the boardroom that has the overview of progress and the overall decisions on new efforts. This level would be the typical entry point for application of SEA. At this level, social processes are simplified and aggregated to be able to gain an overview of these.
- The detailed level is the processes that cause the overall patterns. In a company this would be the clerk offices or the factory floor. This level is the micro-practices that convert the overall ideas into actions. This level determines what SEA application includes and leads to. At this level, social processes are nuanced and complex.

More concretely, the continuum has in this thesis lead to instances where the insight from one model is enhanced by insight from the other models and thereby creating synergies in the understanding of how decisions are made:

- What in the series of choice investigation seems a 'defect' SEA practice in the natural gas security of supply planning is explained by the more detailed perspectives in the contextual dynamics model and in the insight in sense-making revealed through the choice circles model.
- The choice circles model may seem without direction and a never-ending iteration. The investigations by use of the contextual model and the series of choice model show the patterns of how choices progress into a development of energy infrastructures.
- The investigations based on the choice circles give insight into how practitioners determines significance of a choice as well as how participants in a specific environmental assessment process made sense and acted upon events and information. These insights add to the understanding of the framing of alternatives in the natural gas security of supply planning process.

There is no doubt that the continuum and the combination of theories of decision-making and sense-making can be improved, however, the indications of synergies and complementarities support the meaningfulness of combining models and disciplines.

CHAPTER 12: LOOKING OUTWARDS AND FORWARD

WHERE TO GO FROM HERE?

> *"Time [for discussing SEA] is right precisely because the current economic crisis presents an opportunity for SEA practitioners to reflect on whether we are doing things well, making a difference to decision-making and enhancing sustainability of proposed development plans, programmes or policies"* (Dusik and Sadler 2011)

The research presented in this thesis is part of a comprehensive amount of research and reflection on SEA and its role in strategic decision-making processes. The ideas and findings of this thesis have been part of these reflections at conferences like the IAIA special conference "SEA implementation and practice: Making an impact?" quoted above. It is therefore relevant to relate the findings of this thesis to the reflections and research on SEA made by other actors.

Looking outwards and forward, this chapter relates the thesis to contemporary considerations on the way forward for SEA by outlining what these findings suggest for future practice and research on SEA. The chapter is divided into two main aspects, namely visioning SEA as a strategic tool and suggestions on the way forward for research on SEA.

12.1 VISIONING SEA AS A STRATEGIC TOOL

> *"I have a dream… A model of SEA which takes in lessons learned from existing practice, but is still open to innovative and novel practice"* (Tetlow 2011)

In line with Tetlow's vision, the development of SEA should be balanced between existing practice and innovation. The use of sense-making in this thesis is an example of an innovation, which is combined with lessens learned from decision-making literature. The use of sense-making aims at increasing understanding of strategic decision-making in order to strengthen SEA's role as a strategic tool. The vision of SEA as a strategic tool seems especially relevant in the Danish energy sector, in which the content of the existing SEA reports resembles an EIA. The experience on assessments at an EIA level in the sector seems thus to have inspired the practice on SEA. In the following, both the timing and content of SEA is discussed in terms of a vision of SEA as a strategic tool.

The demonstrated strategic dynamics and interaction in the strategic decision-making processes support the increased focus on SEA as an adaptive, flexible, strategic, and continuous process. As evident from the IAIA special meeting on SEA, there is a general agreement of developing SEA as a tool that forms developments rather than provides reactive assessments. This visioning is not new as elements of it were proposed a decade ago (e.g. Kørnøv and Thissen 2000), however, the growing amount of experience of low influence of SEA on strategic decision-making is interpreted to support the need for developing SEA as a strategic tool. Energinet.dk's approach on targeting pivotal decisions when these are made rather than the summary of these in formal plans is a suggestion for enhancing the flexibility of SEA in strategic decision-making.

Whereas this project has brought forward insight in the relation between SEA and strategic decision-making, the challenge of how to form SEA procedures to make the adaptive and continuous process possible still is an unsolved issue. Some inspiration may be found in the Portuguese guidance that is proposing a strategic process with focus on critical factors for decision-making (Partidário 2007). This guidance has even been applied on electricity grid planning, however, it may need adaptation to the Danish context. The choice circles model developed and applied in this thesis gives rise to concerns of how the present procedures and practice of SEA is able to approach complex interactions and iterations in the strategic decision-making of the Danish energy sector.

One of the unresolved issues of all approaches oriented towards strategic decision-making is to identify the appropriate time for giving input to decision-making. Some literature, e.g. the ANSEA approach, suggests that it is possible to predict moments of decision-making, whereas other literature, e.g. the Garbage Can Model, suggests that this is hardly possible. Acknowledgement of the demonstrated interaction between policy-making and planning and the strategic dynamics is a step towards understanding strategic decision-making and thereby increase the possibilities for developing SEA as a strategic tool.

According to George Kremlis, the Head of Unit for cohesion policy and environmental impact assessments in the EU's DG environment, the strategic character of SEA is also at the agenda in DG environment (Kremlis 2011). As a keynote on the IAIA special conference, he

revealed that the EU - due to member states opinions - has rejected the idea of merging the EIA and SEA Directive. The idea has been fuelled by the confusion around the two tools and their overlap in procedures and scope, but the differences between strategic and project level decision-making are, however, recognised to be too considerable to merge the two tools (see e.g. Nilsson and Dalkmann 2001). Instead, Kremlis revealed thoughts about covering policies and legislative proposals in the SEA Directive, although he argued, SEA is still in its infancy and it is too thus early for amendments. The interaction between policy-making and planning identified in this thesis is a strong advocate for expanding the Directive to include policy-level in order to have better possibilities for approaching the interaction. With a more comprehensive empirical basis, research on this interaction therefore seems a relevant input to the considerations in the DG environment.

This thesis has been devoted to process issues, and considerations on the content and environmental implications have been sparse. Process and content are, however, related and forming SEA as a strategic tool gives possibilities to give environmental boundaries a more prominent role: Research shows that the current developments on Earth are exceeding the 'boundaries of change' and the 'carrying capacity' of the Earth and especially the Earth's capacities on nitrate, biodiversity and GHG is often mentioned as widely exceeded (United Nations 2010). As a consequence of this, frustrations on content issues are visible in the discussion of SEA effectiveness. At the IAIA special conference, Riki Therivel expressed her frustration in statements like: "SEA does not have teeth!", meaning that decision-makers are not obliged to follow the recommendations of the SEA report. Other EU legislation like the Habitat Directive has a more direct influence on decision-making as this Directive does not allow developments unless integrity of the protected area is sustained. The only "teeth" SEA has are public pressure and societal responsibility, which more often than not are heterogeneous entities pointing in diverging directions, e.g. when local employment and growth are contradicting biodiversity targets. The role of SEA is, however, not to have teeth on its own, but in a timed and appropriate way to bring in the teeth of other environmental regulation and objectives relevant for the proposal.

SEA AS A STRATEGIC TOOL IN THE DANISH ENERGY SECTOR

The increasing focus and application on SEA in the Danish energy sector will over time spread to stakeholders and processes connected to the strategic development in the sector. In this way, the sector and the SEA procedures will eventually adapt to each other, so that legislation will be fulfilled. Time will show to what extent SEA becomes an active and meaningful tool in the strategic development of the sector. This thesis provides a platform for developing a meaningful practice on SEA at strategic level by input to the discussions on SEA in the sector:

- For the timing of SEA in strategic decisions-making processes, the thesis accounts of how the recent strategic decisions were made and provides elements of a meaningful way of applying SEA in the Danish energy sector.
- For the discussion of the range of decision documents that should be considered in terms of SEA legislation, the thesis provides an initial list of plans and programmes.

- For the discussion of the role of SEA, hereunder public participation and transparency at strategic level, the thesis outlines discourses identified in Energinet.dk and demonstrates strategic concerns in public consultation comments.
- For practical issues of improving quality of environmental assessments, this thesis provides insight in the importance of mental frameworks, experiences, and how to set a team for SEA application.

Whether SEA will become a meaningful strategic tool in the energy sector largely depends on ownership among key persons in the years to come. It furthermore depends on the stakeholders' ability to development solutions to how to apply SEA in competitions between TSO and how to approach the interaction between Parliament, Ministries, and Energinet.dk. Another main hurdle for SEA application in the sector is increasing use of political settlements in the Danish Parliament (Frandsen 2008), which do not seem to fall within the scope of SEA: "There are no rules for political settlements, but a political settlement is a text, which some political parties have agreed upon" (The Danish Parliament 2011). Political settlements are without doubt environmentally decisive and they mark a short-coming in the scope of SEA. If political settlements were within the scope, they would furthermore constitute a practical challenge as new solutions are introduced and decided upon overnight.

SEA application in the energy sector also faces considerable challenges in terms of increased EU regulation. In order to ensure sufficient and timely development of infrastructure, the European Commission (2011) requires member states to specify elements of EA procedures such as "the conditions under which an alternative is considered as satisfactory" and it opens up for a possibility for overriding strong environmental protection instruments such as the Habitat Directive (92/43/EC) and the Water Framework Directive (2000/60/EC) if certain conditions are satisfied. Also new technologies challenges SEA application: As an example the increased focus on shale gas and shale oil extraction bring in technologies which potentially have considerable impacts on the environment and for which limited previous European experiences exist. Furthermore, a recent EU report (autumn 2011) comments on severe flaws in the environmental regulation of these technologies (European Parliament 2011b).

12.2 SUGGESTIONS FOR RESEARCH ON SEA

The studies and findings in the thesis open up for a range of interesting research areas. The most important research needs and areas suggested by this thesis are outlined below. These areas reflect interests and concerns about the stability of the conclusions in the thesis, e.g. in terms of delimitations.

Insights in decision-making processes are both important for the more theoretical development and understanding of decision aid tools and for the application in practice. How and to what extent we articulate decision-making is important for the benefits of SEA in practice. The change agent approach and the critical friend role have been relevant in the articulation in the Danish context, but the means and ways in which decision-making is articulated is an important area of research that links up to discussions about aim and effectiveness of SEA. Like any other field, there is a slippage between our models and the phenomena to which they refer, and the better our models of strategic decision-making reflect the processes in practice, the better possibilities we have for improving tools like SEA.

The relevance and potentials of the use of sense-making theory in the fields of planning and impact assessment has been acknowledged at conferences, but the potentials are still to be demonstrated in practice. The thesis has opened up some of the multiple ways in which sense-making theory can be useful for understanding SEA and strategic decision-making in theory and research, but in terms of practice, more experiences and research are needed in order to achieve a fundament on which to base advice for practice. Among the possible directions for sense-making research are studies that bridges empirical insight from organisation and management literature with application of tools like SEA. In this way it would be possible to draw on a vast amount of research already being done. One of the urgent suggestions which the thesis leads to is to broaden the study of sense-making from a widely individual level in the thesis to a social and interactive level. This broadening is important for understanding the social interaction and thereby strategic decision-making.

Sense-making theory may furthermore pave the way for an increased meta-methodological awareness among SEA researchers: How we make sense of problems and information in out studies is important for our findings and the possible uses of the research. Sense-making is thus inherent in current debates on how we should do research and how to engage with practice. Sense-making seems to favour constructivist elements, but it may in any field of study be an eye-opener on the importance of enactments, labelling and the stories created during the research process.

The field of SEA seems to evolve in a range of directions, and SEA literature includes articles that relate SEA to an almost infinite range of different theories. Some theories are overlapping and other theories are contradicting, however, these theories and their implications are seldom related. Although the use of new theories out is relevant in order to increase understanding of SEA, it should be balanced with efforts of combining theories to reduce the present fragmentation and theoretical confusion. A practice of better relating new theories with the existing knowledge in the field may be a more acceptable way of promoting a 'combining agenda', which authors like Herbert Simon have been advocates for; LEGO bricks are only fascinating when their possibilities for combining and creating a bigger picture are explored.

Combination of theories is to some extent a trade-off between details and overview. If a combination is to make use of the insights from a range of theories, it most likely has to make compromise the details of each theory in order to be simple enough to communicate and operationalise. It would be interesting to combine the proposed choice circles model with theories of power, politics, learning, and institutional change, but including these into one model seems an extremely difficult task and may lead to more confusion than simplicity and overview. The combining agenda may therefore play a role as a discipline-focused exercise that is supplemented with a cross-disciplinary relating. This cross-disciplinary relating is relevant, since the process perspective on strategic decision-making in this thesis is only one among a wide range of relevant perspectives that is needed to increase the understanding of strategic decision-making.

Inherent in the combining agenda is the possibility for criticising and supporting concepts that are widely taken for granted in the literature. A concrete example is the 'window of opportunity' concept that often seems to be used as a tangible and fixed unit that is possible to identify in reality. A sense-making perspective would contradict the tangible and fixed use of the concept by emphasising that such 'window' is potentially destructive way of simplifying the complexity and dynamics of ongoing social processes. Sense-making theory would emphasise that such 'windows' - if relevant to use this concept - must be enacted and perceived by actors both in research and practice. Sense-making theory may even argue that all social interaction is decision-windows and some are selected by decision-making researcher in order to retrospectly explain their understanding of the progress. Such a critique could be the point of departure for bringing the concept beyond the current problems of application.

INSPIRING AND LEARNING FROM STUDIES ON STRATEGIC DECISION-MAKING

A way forward for the research on SEA in the Danish energy sector could be to relate the findings to other research on strategic decision-making processes in a Danish context. This comparison would reveal whether the Danish energy sector is a unique context for SEA application or whether insight can be gained from and transferred to other sectors. If the coming experiences in Energinet.dk with targeting SEA to pivotal decisions reveal better possibilities for applying SEA in strategic decision-making, it will be interesting to consider the relevance of this approach in other sectors and at other levels of decision-making. An outline of the relevance of relating insights to other Danish contexts is indicated in the following.

Among the relevant research on strategic decision-making in Denmark is research on policy-making. Some of the interesting studies are the studies made by Albrekt Larsen and Gould Andersen (2004), Lund (2000), and Flyvbjerg (1991). Albrekt Larsen and Goul Andersen aim at revealing power relations in the Danish policy-making by analysing decision-making processes in bigger political reforms. They argue that the decision-making processes are fast, centralised, and opaque and that policy-making is a matter of counting to 90 to get a majority in the Parliament and a trial & error process due to limited time for preparation of policies. Some of the investigated energy infrastructure decision-making processes support the description of fast, centralised, and opaque decision-making, e.g. the Østerild Test Centre. On the other hand, the investigations picture a wide range of actors involved in shaping the

future of the energy sector. Albrekt Larsen and Goul Andersen (2004) furthermore argue that government officers due to the fast decision-making must prepare for possible developments to have analyses ready when politicians ask for information. This is in line with the rapid responses described by Therivel (2004).

In his investigation of energy policy in Denmark, Lund (2000, p. 249) points at an interaction similar to the findings of this thesis: "Official energy objectives and plans have been developed as a result of constant interaction between parliament and public participation, in which description of new technologies and alternative energy plans have played an important role". Comparison to Lund's investigations may provide new angles on perception of choices in decision-making: "For a period of 25 years, Danish energy policy has been formed as a result of a process of conflicts… [in which] public participation, and hence, the awareness of choices has been an important factor in the ultimate decision-making process" (p. 249)

In a study of a municipal planning process, Flyvbjerg (1991) portrays decisive activities as taking place outside the formal system similar to the findings of this thesis: "The decisive activities are thus often not to be found in the development of objectives, policies, legislation and plans or in public participation and formal political processing in relevant political assemblies. On the contrary, they are found prior to any formulation of targets, policies, legislation and plans, in what could be termed the genesis of planning and policy-making, and after the formal political decision-making, in the implementation of the plan and the policy" (p. 19, translated). Despite a focus on municipal planning, Flyvbjerg's study may be an inspiration for how to understand and approach strategic decision-making.

Thus, the suggested ways forward for research within SEA and strategic decision-making are to play closer attention to how we articulate decision-making and how we make sense of our research, to increase empirical studies of sense-making and increase critical combinations of insights from different disciplines and to exchange insight from other contexts. These ways forward may reduce the amount of mysterious and dark stretches of decision-making and thus support the development of SEA as a strategic tool.

APPENDIXES

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APPENDIX A: DANSK RESUMÉ

Denne afhandling udforsker strategiske beslutningsprocesser i den danske energisektor for at diskutere, hvordan strategisk miljøvurdering (SMV) anvendes meningsfuldt. Aktuelle beslutningsprocesser om større energiinfrastrukturer er gransket for at identificere, hvornår og hvordan miljømæssigt afgørende beslutninger tages i interaktionen mellem adskillige aktører. Disse beslutningsprocesser indebærer ofte situationer, som de involverede aktører ikke har oplevet før, hvilket er en særlig udfordring for anvendelse af SMV, som ikke er beskrevet i den eksisterende SMV-litteratur.

I disse år gennemgår den danske energisektor omfattende forandringer i politikker, infrastruktur, teknologier, aktørsammensætning og lovgivning. For at undgå utilsigtede miljømæssige effekter eller tabte muligheder for miljømæssige forbedringer i disse omfattende forandringer er det nødvendigt, at miljømæssige aspekter overvejes i den strategiske beslutningsproces.

Formålet med SMV er at integrere miljømæssige overvejelser i udarbejdelsen og vedtagelsen af planer og programmer med henblik på at fremme en bæredygtig udvikling. Litteraturen om SMV trækker på teorier om beslutningstagning, men indtil videre indebærer SMV-litteraturen en begrænset viden om strategiske, ikke-programmerede beslutninger og hvordan denne type af beslutningstagen udfordrer anvendelsen af SMV.

Viden om, hvordan strategiske beslutninger tages er fragmenteret i discipliner og modeller. Afhandlinger tager fat i denne fragmentering ved at udforske synergier i at kombinere modeller med forskellige detaljeringsniveauer i et kontinuum af perspektiver på strategisk beslutningstagning. For at styrke en begrænset indsigt i detaljerede socio-psykologiske processer indenfor SMV introduceres teori om meningsdannelse, og indsigt fra teorier om meningsdannelse og beslutningstagning er kombineret for at øge forståelsen af, hvordan vi skaber mening af beslutninger, og hvordan disse meninger interagerer med vores valg. Afhandlingen henter i denne henseende inspiration fra værker af James G. March, Herbert A. Simon og Karl E. Weick.

Kontinuummet af perspektiver danner en ramme for udredningen af strategisk beslutningstagning i den danske energisektor. Aktuelle tilfælde af energiplanlægning og -projekter er analyseret, og afhandlingen afdækker, hvordan politikdannelse og planlægning interagerer og tilslører spørgsmål om ansvar og timing af SMV; hvordan dynamik på strategisk niveau komplicerer formulering af alternativer i en SMV-proces for gasinfrastrukturplanlægning; hvordan praktikeres afgørelse af signifikans af miljøpåvirkninger i et strategisk valg er karakteriseret af uklarhed og variation Disse empiriske konstateringer højner den teoretiske forståelse af den strategiske, ikke-programmerede beslutningstagen.

Som sideeffekter til undersøgelserne af strategiske beslutningsprocesser italesætter denne afhandling spændvidden af SMV-lovgivningen i forhold til, hvilke planer og programmer i energisektoren der er - og kan være - omfattet af krav of SMV. Diskussionerne af spændvidden og SMV-værktøjets rolle har været centrale emner i processen med at udvikle et standpunkt i forhold til SMV i to af de vigtigste statslige organisationer i den strategiske udvikling i den danske energisektor, Energinet.dk og Energistyrelsen.

Afhandlingen er baseret på en forandringsagent-forskningstilgang og denne måde at gøre forskning på er undersøgt og diskuteret i forhold til relevansen og potentialerne af den i en SMV-kontekst. Baseret på tre empiriske cases er forandringsagenttilgangen fundet givende, men også en krævende tilgang. På linje med forandringsagent-tilgangen reflekterer afhandlingen en tredobbelt ambition i ph.d.-projektet:

- At facilitere at der udvikles en SMV-praksis gennem interaktion og involvering af aktører i undersøgelserne
- At kommunikere erfaringer til andre danske og internationale aktører
- At bestride antagelser i SMV-litteraturen og foreslå videreudvikling af hvordan beslutningsprocesser forstås.

Afslutningsvist præsenterer afhandlingen en skitsering af relevansen af kombinationen af forandringsagent-forskningstilgangen og det konceptuelle kontinuum af perspektiver i forhold til at opnå indsigt i strategiske beslutningsprocesser. Derudover skitserer konklusionen elementer af, hvordan SMV kan foretages på en meningsfyldt måde i de strategiske beslutningsprocesser i den danske energisektor. De vigtigste konklusioner er:

- En kombination af discipliner og modeller i et kontinuum af perspektiver på strategisk beslutningsprocesser udgør et stærkt udgangspunkt for at øge forståelsen af, hvordan beslutninger tages.
- Teori om meningsdannelse er et relevant ramme for at øge indsigten i, hvordan vi skaber mening af informationer, hvilket er afgørende i forhold til, hvordan vi opfatter strategiske valg og afgør hvilke alternativer, der er relevante.
- Den forandringsagenttilgang, der anvendes i projektet, er et relevant medium for en kritisk indbyrdes afhængighed mellem teori og praksis som samtidig fremmer mere bæredygtige beslutningsprocesser.
- Empiriske cases viser, hvordan strategiske beslutningsprocesser i sektoren er karakteriseret ved en udpræget interaktion mellem politikdannelse og planlægning i en yderst dynamisk kontekst.
- The nævnte karakteristikker udfordrer anvendelsen af SMV i særdeleshed i forhold til timing og fleksibilitet. Det er ikke formålstjenligt at orientere SMV mod formelle planer. I stedet kan en tilgang med at målrette SMV afgørende beslutninger om specifikke infrastrukturer være relevant, selvom denne tilgang ikke er uden ulemper.
- Kompromiser med tidlig involvering af offentligheden kan være meningsfyldt i konkurrenceprægede miljøer blandt organisationer, der udvikler energiinfrastruktur.

APPENDIX B: STRATEGIC ENVIRONMENTAL ASSESSMENT

This appendix introduces and defines SEA as used in this thesis. The introduction includes the basics of SEA as well as the claimed benefit and the criticism of the tool. Furthermore, the appendix shortly addresses the questions of the importance of context and what is needed for SEA to work. A main argument is that SEA is only a structure, which actors may be able to use in their interests.

THE BASICS OF SEA - IN THEORY AND PRACTICE

The SEA literature includes a variety of definitions of SEA, hereunder aims of SEA (see e.g. Partidário 2003, Therivel 2004, and Petts 1999). Common elements of the aim of SEA are protection of the environment, promotion of sustainable development, transparency and public participation. These aspects are in part reflected in the Directive on the assessment of the effects of certain plans and programmes on the environment, which aims are "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development" (article 1). The variety of definitions of SEA often includes the elements of systematic process, evaluation, integration, early stage of decision-making, public participation, documentation and alternatives. A preferred definition of SEA in this thesis is:

> *"a systematic, decision aiding procedure for evaluating the likely significant environmental effects of options throughout the policy plan or programme development process, beginning at the earliest opportunity, including a written report and the involvement of the public throughout the process"* (Sheate et al. 2001, p. 7)

SEA enters the development of strategic interventions at the policy, plan, or programme level. The policy-level is not included in the EU regulation, but in UNECE's Kiev protocol on SEA. In Denmark, the policy-level is subject to environmental assessment through a separate circular. The relation between decision-making and SEA also is described in many varieties. Figure 31 is a reproduction of Marshall and Fischer (2006, p. 282), which emphasise the relation between issues to be addressed, a tiered SEA system and basic stages of strategic planning. Despite their focus on "corporate planning", the model is similar to many other representations of strategic planning. The figure is added consideration of sustainability issues inspired by (Therivel 2004, p. 15).

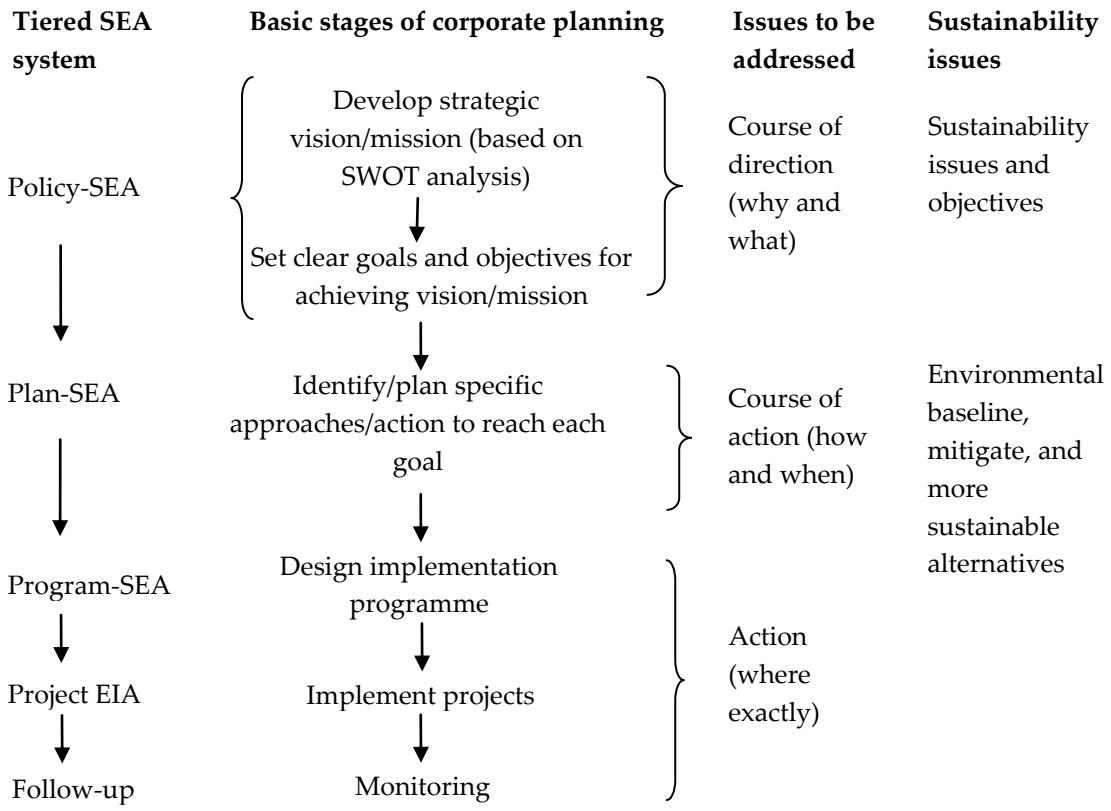


Figure 31. Basic strategic planning model and SEA (Marshall and Fischer 2006, p. 282)

CLAIMED BENEFITS AND CRITIQUES OF SEA

Inspired by Stinchcombe and Gibson (2001), some benefits and critique on SEA claimed in the literature is outlined in table 23. The claimed benefits are implicitly compared to a situation without SEA elements, e.g. without consideration of a broad spectre of environmental consequences. These benefits may therefore not apply in situations, in which this element is already there or not relevant. The benefits relates to the process and content of decision-making on interventions as well as institutional aspects.

The presented critiques of SEA would also be true for a range of other tools. Despite the wealth of normative assumptions and implicit opinion in the SEA literature, SEA is basically no more than a structure, which people may use for different purposes. Included in these purposes are actions that in a sustainability framework would be termed "misuse" or "green-washing". This is a general character of tools, and it is e.g. also pointed at by O'Brien (2000) in terms of risk assessment. According to O'Brien, risk assessment is a means in which actors "can add on their wants at the expenses of wholes (e.g. whole communities and countries, or seventh generation from now) without appearing to doing so. Risk assessment lets them appear simply "scientific" or "rational"" (p. xviii). SEA reports are not 'objective' accounts and even the rational assessment process is "malleable" (Stinchcombe and Gibson 2001, p. 367) in the sense that actors can manipulate it for in their own interests.

Benefits of SEA	**Critiques of SEA**
Improvement of the basis for decision in terms of environmental impacts	Boundaries to human's rational behaviour, as described in subchapter 4.1
Proactive approach to environmental issues	Comprehensive and rational legislative requirements in complex and dynamic context
Considerations on a broad range of environmental issues and interaction between these issues	Institutional and political resistance
Increased public participation at strategic level	Assessment is not as 'objective' accounts as the rational process indicate
Increased transparency	
Setting a framework for project-level activities and assessments (tiering)	
Increased awareness on environmental issues and a structure for inclusion of environmental concerns	

Table 23: Extract of claimed benefits and critiques of SEA in the literature (Stinchcombe and Gibson 2001, Therivel 2004, pp. 14-19)

Within SEA literature, the increased focus on decision-making theory has revealed a range of limitations and critiques to the rational model on SEA process. Many decades ago, Witte and Mintzberg, among others, have shown the inappropriateness of understanding decision-making as a linear progression of stages, however, the SEA process is still conceptualised so. Kørnøv and Thissen (2000) point at aspects that contradicts the rational decision-making model, e.g. norms, cultures, and habits. Approaching formal information system more generally, Starbuck and Milliken (1988, p. 42) comment that "Formalized information systems often try to make up for inflexibility by providing extensive detail, so they bog down in detail and operate slowly: Irrelevant detail becomes noise, and slow processing makes the data outdated."

Politics and power are other aspects that are problematising SEA. SEA processes may be a means in a political game. If SEA results are against a political initiative, the SEA may be given less attention and less weight in decision-making.

A range of the criticism on SEA is related to the importance of context when discussing SEA; despite wide use of SEA and the claimed benefits, SEA may not be a relevant tool in all contexts. Authors like Hilding-Rydevik (e.g. Hilding-Rydevik and Bjarnadóttir 2007) are prominent advocates for context awareness.

AN SEA context is in an abstract and simplified version composed of tasks, tools, actors, interaction and structures. Concepts like "tiering", "quality", "effectiveness" seem often to be abstractly described without proper regards to contextual circumstances and that the meaning of the concepts depends on the people involved. Some of these concepts have proven beneficial in some context and of no use in others.

WHAT IS NEEDED FOR SEA TO WORK?

Bartlett and Kurian (1999) argue that "Writing about EIA has been guided by assumptions and models that have been implicitly assumed rather than explicitly and systematically explored, formulated, or articulated" (p. 415). Examining literature on EIA they point at 6 implicit models for how EIA is understood to work, the influence it has, the meaning attributed to it:

- The rational and apolitical information processing model with a 'decisionist' view of policy-making;
- The symbolic politics model, in which EIA may be "merely symbolic …an iterative mechanism for creating meaning… [or] a technique for the duplicitous legitimation of the exercise of power by the powerful" (p. 418).
- The political economy model, in which the demand for EIA arises as a function of markets, and EIA primarily influences "through the way it alters financial opportunities, risks, and constraints" (p. 419).
- The organisational politics model, in which EIA may change the internal politics of an organisation by harnessing "the natural pluralism and adversariness of specialised agencies and conflicting interest" (p. 421). Power and politics are part of this model, which do not include external forces.
- The pluralist politics model, in which the influence of EIA "lies in the way it works to open up a closed agency patter of decision making" (p. 422) to other actors, e.g. by increased participation. The EIA process is conceptualised as "a process of negotiation, bargaining and compromise among organised groups" (p. 423).
- The institutionalist model, in which the influence of EIA lies in the change of rules, procedures and culture of an organisation.

In this thesis, SEA is understood to work through all Bartlett and Kurian's models, although the political economy model seems to have minor relevance. The models are highly interlinked, why it e.g. does not make sense to focus on the politics models without including the institutionalist or symbolic models. EIA thus work by processing information, by creating meaning, by internal as well as external reforms in organisations, and by changing rules and cultures.

Hilding-Rydevik and Bjarnadóttir (2007) argue that "it seems that certain contexts are receptive to tools when … the political will, the organisational commitment, the professional skill and learning motivation, already exist" (p. 673-674). It should be noted that these elements are not pre-requisites to the introduction of SEA, but determining how receptive contexts are.

Based on the models, and the claimed benefits and criticism described above, the following aspects are in this thesis seen as central for SEA to have an influence on the practice (cf. the normativity in the change agent approach):

- Willingness among organisational agents to change existing practices and viewpoints and to use resources to introduce a new structure which potentially weakens or benefits their personal and organisational interests (practitioners as well as decision-makers).

- Interest among external actors in strategic issues and willingness to use resources to participate.
- The ability for integrating SEA procedures in the legislative context in which an organisation operate.

APPENDIX C: EXISTING AND PRELIMINARY MODELS IN THE COMBINATION OF DECISION-MAKING AND SENSE-MAKING

This appendix presents a review of literature on efforts of combining decision-making and sense-making into one model. This review is used in chapter 4.1. Related to the efforts of combining the two disciplines, the appendix furthermore presents preliminary models that were part of the development of the conceptual framework in subchapter 4.2.

EXISTING EFFORTS OF COMBINING DECISION-MAKING AND SENSE-MAKING INTO ONE MODEL

Boland (2008) argues (with reference to Herbert Simon's "Sciences of the Artificial" (1969)) that "the higher-order or metalevel constructs of design science and design thinking" (p. 61) brings together the objective, analytic decision-making discipline and the subjective and constructive aspects of sense-making. In a design process, Boland argues, people initially make sense of the situation which is followed by decision-making on materials, functionality, etc. "[D]esigning plays the closure of decision making off against the openness of sensemaking" (p. 62) in a balance between the enactment and creation of stories in sense-making with a formal system of deadlines and decision-requirements. Design is "a continuing source of challenge to our sensemaking and decision-making capabilities […] because of its central underlying belief [...] that things can be other than they are". (p. 62). Boland does not elaborate on what he means by "higher-order or metalevel constructs".

Choo (1998) proposes a bridge between decision-making and sense-making in his book of The Knowing Organisation in which he conceptualises sense-making as a process that precede decision-making. Choo's point is that by "holistically managing its sensemaking, knowledge building and decision-making processes, the Knowing Organization will have the necessary understanding and knowledge to act wisely and decisively" (p. 1998, p. 319). Combining the three processes, he argues, gives a richer explanation of information use in organization.

Ericson (2010) presents "an attempt to furthering out understanding of strategic decision making by moving beyond decision making, adding the dimension of sense…" (p. 132), focusing on emotion-related interpretative processes. The "add-on" of sense-making to decision-making is visible in arguments like "decision-makers become sense-makers when involving in framing an interpretation and understanding that provide guidance to action…" (p. 137). The add-on understanding of sense-making clearly contradicts Weick's understanding of sense-making as an ongoing and never-ending process. Decision-makers therefore do not *become* sense-makers; they *are* sense-makers.

Seligman (2006) studies sense-making within an innovation-decision process to develop a "behavioral process understanding of adoption" (p. 118). In discussion technology adoption, he argues "adoption itself does not take place as a single decision, but rather as a series of sensemaking cycles causing perceptions of the technology to change until apparent adoption or rejection actions are performed." (p. 110). He argues that "Sensemaking helps us to examine the adopter's mental processes, providing a lower-level view of adoption. Whereas other approaches focus on the adoption decision and its antecedents and consequences,

sensemaking focuses on the adopter herself, i.e. her mental frameworks, and the antecedents and products of those frameworks. The sensemaking perspective provides a look under the hood, if you will, of the adopter's mental engine." (p. 110). Seligman argues that stages of decision-making can be viewed as a series of sensemaking cycles, which may explain curiosities in decision-making. Seligman 'translate' stages of an innovation-decision process (Rogers 1995) as sense-making processes.

Lipshitz and Strauss (1997) suggest, in a Naturalistic Decision-making framework, that decision-making begins with sense-making of a situation. They propose a heuristic for coping with uncertainty that is based on a proposition that "Uncertainty in the context of action is a sense of doubt that blocks or delays action" (p. 150). They argue that people can 'fail' in making sense of a situation, so that decision-makers respond to an inadequate understanding of the situation (p. 159). They find that decision-makers "cope with uncertainty adaptively, matching different types of uncertainty with different coping strategies..." (p. 160). Therefore, they argue, decision support system should be expanded beyond the standard (rational) procedure for coping with uncertainty to support elements of their proposal for a heuristic that includes sense making.

Greitzer and Podmore (2008) propose an integrated naturalistic decision-making model that is widely similar to the above depicted sense-making process. Their model emphasises the role of mental models in understanding what is going on and in selecting response. Training by this model will include "experiences and instruction on cues, patterns, mental models, and actions" (p. 5) that will enable people to perform well in novel situations.

Wright (2005) combines decision-making and sense-making in practice by focusing on scenarios as a sense-making tool rather than decision-making tool. Wright regards the relation between decision-making and sense-making as an "almost simultaneous relationship" (p. 90), and he proposes scenarios to overcome the retrospective nature of sense-making. Scenarios can stimulate "prospective sensemaking" (p. 87). Wright argues that adopting a scenario outlook and sense-making capacities "are said to enhance the abilities of the inductive strategist. Through this, managers are more open to the unexpected and are able to construct meaning from uncertainty and ambiguity, laying the foundations for transformational strategizing." (p. 86).

These existing efforts are summarised in table 24.

Author(s)	Relation between decision-making and sense-making	Conclusion
Boland (2008)	Cannot easily be combined	Design reconcile the diverging qualities of decision-making and sense-making
Choo (1998)	Sense-making precedes decision-making	Richer explanation of information use. Holistic managing of information use processes will make it possible to act wisely and decisively.
Ericson (2010)	Sense-making is an add-on to decision-making	Increased understanding by a broadened conceptualisation of strategic decision-making
Seligman (2006)	Stages of decision-making are series of sense-making cycles	Explaining curiosities of decision-making. "A look under the hood" in understanding mental processes of the adopter
Lipshitz and Strauss (1997)	Decision-making begins with sense-making of a situation - failing sense-making cause failing decision-making	Decision support systems should be added an initial sense-making element
Greitzer and Podmore (2008)	Naturalistic decision-making is depicted as a sense-making process.	Sense-making may help people perform well in novel situations
Wright (2005)	Almost simultaneous relationship.	Enhance strategising through better sense-making capacities among individuals.

Table 24: Overview of existing studies that combine decision-making and sense-making and their aims.

PRELIMINARY MODELS IN THE COMBINATION IN THIS THESIS

The combination of decision-making and sense-making in a process perspective on strategic choices is not straightforward. The process of reaching an adequate model is explained in this appendix to be transparent on the basis and development of the choice circles model. The development of the model has been structured by an exercise of including sense-making in a standard model of decision-making and vice versa. This exercise leads to the in-depth understanding of differences and synergies that is needed to fully combine the two disciplines as concurrent processes in one model.

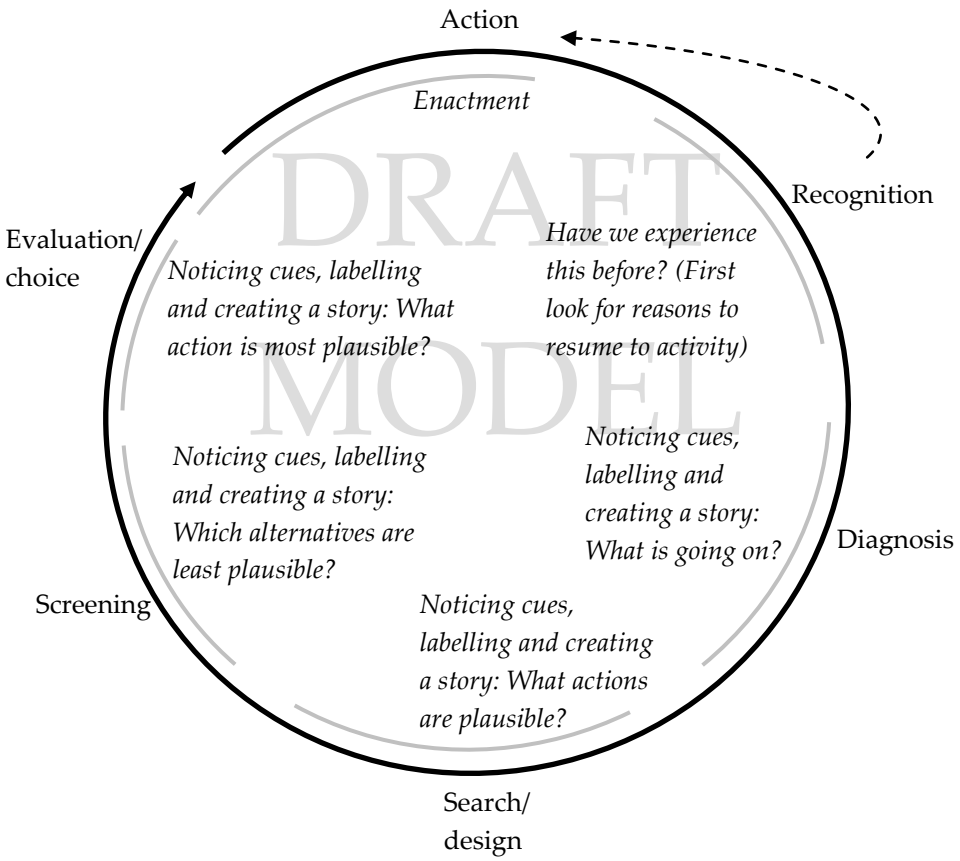


Figure 32: Sense-making (italic) included in a strategic decision-making model

The inclusion of sense-making into decision-making, see figure 32, depicts each phase of decision-making as cycles of sense-making, similar to Seligman (2006). This model may explain some of the processes involved in searching for alternative action, how infeasible options are eliminated and how people choose between alternatives. A hypothetical choice process on SEA and non-programmed decisions following this model:

> Organizational members face novel ideas for development. They first relate it to their experience to see if any routines would do (reasons to resume). Then they diagnose the stimuli of information (noticing cues, labelling and creating a story) to determine what is at stake. The diagnosis leads to search for and design (noticing cues, labelling and creating a story of plausible solutions) of options for

whether and how an assessment should be initiated for the novel ideas for development. The developed options are iteratively evaluated in terms of its appropriateness (interpretation of stories in terms of situation and identity) as a basis for choosing a satisficing option.

The model is, however, not true to sense-making theory, since enactment cannot be equalled the understanding of 'action' in theories of decision-making, and since the processes of noticing, labelling and creating stories get artificially fragmentised rather than a continuous process. Furthermore, the model makes sense-making a highly deliberate and sequential process of deliberate choosing, which is not in line with Weick's writings of sense-making as an ongoing, vague, and conscious/unconscious process. The model seems, however, to be an adequate combination in its depiction of recognition and diagnosis of stimuli, and theories on decision-making may be a help to understand sense-making in an overview perspective, e.g. the importance of coincidence and temporal aspects.

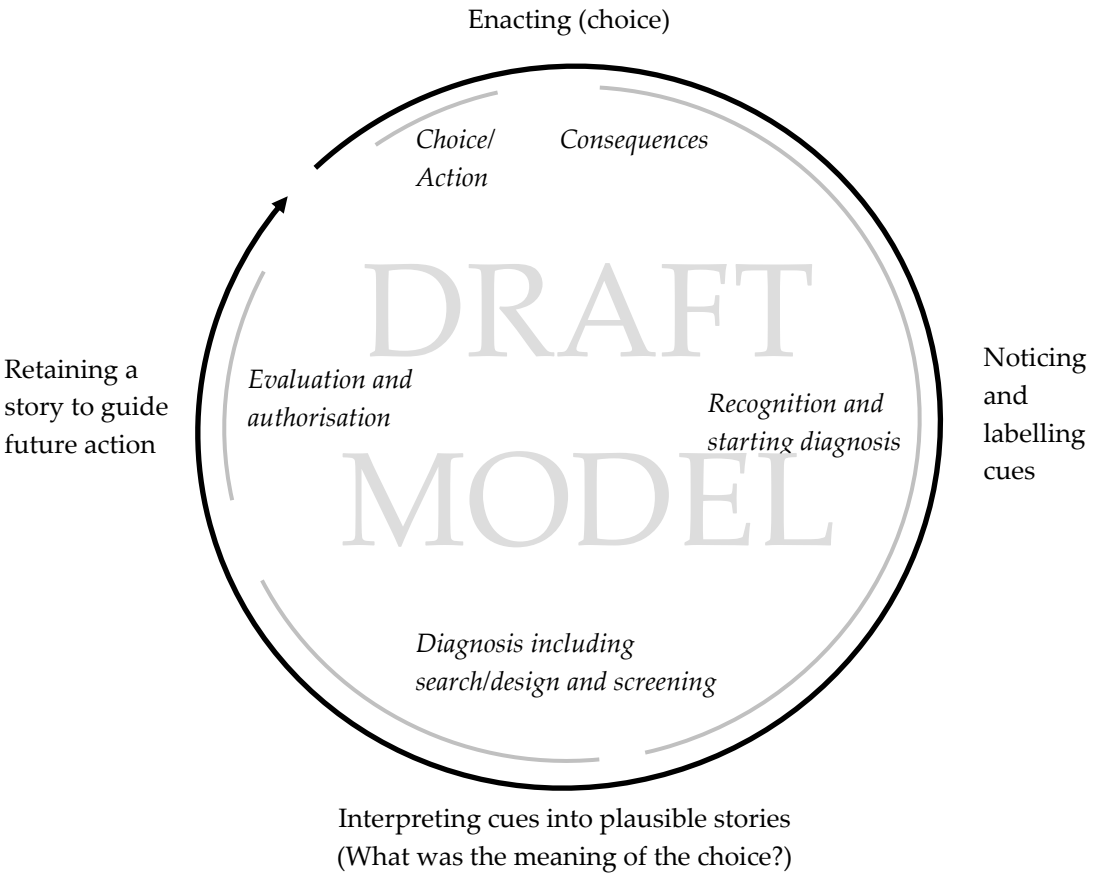


Figure 33: Decision-making (italic) included in a sense-making model

The inclusion of decision-making into a sense-making model, see figure 33, is inspired by Greitzer and Podmore (2008) and Weick (1995). The benefit of the model is the continuity in the process of sense-making. Furthermore, the model emphasises the importance of diagnosis by stretching it to cover enactment, noticing, labelling and interpretation. A hypothetical choice process on SEA and non-programmed decisions following this model:

> Organizational members face novel ideas for development. They talk to the people that develop the ideas (enactment) and as they hear about the ideas, they first look for reasons to resume to their activities. If this is not an option, they reformulate what they think is most important of what is said in using their own words (bracket, labelling, categorising). During and after the talking, they consider whether and how an assessment should be initiated for the novel ideas for development. In this process they compare (interpret) their experience and knowledge (mental frameworks) to characteristics of the ideas (cues retrospectively noticed). They consider options (stories), and settle on the most relevant in terms of their situation (plausible in terms of identity).

The main critique seen from the decision-making point of view is that choice is separated from the search/design and evaluation routines and placed as a point of departure of the process. Furthermore, the diagnosis, search/design and screening routines are conflated into a single process. The conflation could, however, emphasise the cyclic nature of these aspects (see the original illustration in Mintzberg et al. 1976). Furthermore, choice is becoming an output rather than a deliberate action.

A main problem of these preliminary models is that they do not properly deal with Boland's ontological questioning of whether choice and action are input or output. The problem is approached by proposing choice as the centre of recurring circles of enacting, diagnosing, search/design, and settling on an option, see figure 14 in the conceptual framework.

APPENDIX D: ANALYSIS OF CONSULTATION COMMENTS ON ENERGY DECISIONS

This appendix presents the analysis of public consultation comments, which is used in chapter 10.

Few SEAs have been made at the national strategic level in the energy sector and the analysis is therefore added a strategic case that has been subject to EIA, namely the national test center for windmills, cf. subchapter 6.1. The investigation is not limited to comments on specific environmental impacts, since the comments also reveal concerns about decision-making and technical aspects of energy development.

The review process applied in the following is similar to a grounded theory approach (Charmaz 2000) or an emerging coding in content analysis (Stemler 2001) in inductively coding data in the cases to label categories of comments and comparing between the cases. Notes from reading the comments have been iteratively categorised to reflect the essence of the comments. The creation of categories has taken synonyms of concepts and similar meaning of groups of words into account. Furthermore, it has been an aim to make the categories mutually exclusive. Reliability is enhanced by a control of the coding after a two month period. The control included a new grounded categorisation process with minor deviations in the categories. The validity of the review is enhanced by participation in the public consultation meetings on energy infrastructure development in Ll. Torup and Østerild, as well as insight from participating in meetings in Energinet.dk. Detailed notes from the meetings have been matched with the review of the comments, and the matching has led to better understanding of the intension of the formal comments as well as an increased understanding of what are primary and secondary concerns.

The data for the review is written, formal comments received by the authorities in three cases. In the chosen cases, these comments have been accessible at the authorities' homepages in full transcription and with a summary note made by the authority. The investigation of the debates on energy issues thus does not include the informal and verbal debates, but only the written and formal comments. The investigation of energy debates may therefore not reflect the spontaneous and unreflective questions and overemphasise the selected and carefully formulated issues.

Debates on energy issues in SEA processes on energy plans

At the national level, the two finished SEA process (in March 2011) are Energinet.dk's SEA of the Natural gas security of supply plan 2010 and DEA's SEA of the locations of offshore wind power plants.

The consultation of the SEA of Energinet.dk's report Gas in Denmark resulted in 8 responses from public authorities (Cowi 2010). Focusing on the energy related comments, one comment questioned Sweden's interest in a long term Danish supply of natural gas and another comment questioned whether Denmark has enough bio-products to cover both power plants' use of biomass and the production of biogas. Both comments were directed to the natural gas planning: "This does not concern the environmental assessment, but the natural gas security of supply plan" (p. 4). In the scoping consultation, the comments primarily related to the determination of significant environmental aspects, except from the argument by the Swedish Boverket for inclusion of an alternative of liquefied natural gas transported by ship. The

comments show insight in the problems of the planning and a concern for an adequate development of the gas infrastructure. The limited debate seems to support concerns among employees in Energinet.dk about lack of interest and involvement at strategic level, which also is found in Boothroyd (1995).

The consultation of the SEA of DEA's location of offshore wind power (DEA 2007a, b and c) resulted in a range of hearing comments which are shown in table 25. The planning of locations for offshore wind power was a long process in which the SEA was rather late, cf. subchapter 6.1. This may be part of the explanation for the well-formulated and seemingly qualified consultation comments. The comments are widely in accordance with expectations in the sense that the nature NGOs advocate for nature interest, the industry advocates for low costs, the foreign authorities point at cumulative impacts, and the Danish authorities defend their interest.

In terms of decision-making, the affected municipalities and the wind power company criticise the documentation behind the assessments and the ambiguity around assumptions and criteria in the decision-making. Values are in some instances very explicit. In terms of energy needs and technology, the consultation comments are primarily related to the spatial characteristics of the windmills, e.g. Region North Jutland that is concerned about visual impacts. The comments primarily concern the design and the location of windmills, suggesting other alternatives. Furthermore, the comments point at the interrelatedness of windmills with the energy system in a national as well as international perspective. The impacts of the infrastructure is in the comments primarily related to maritime safety, tourism, fishery and fish stocks, habitat areas, and cumulative effects. The Danish nature protection NGO points at the need to consider impacts of climate change on the offshore wind development. The positive impact of development of wind power on the greenhouse gas emission is widely acknowledged, like the expansion offshore rather than onshore. The consultation comments by the committee widely refer to the EIA process, but the committee decides to reconsider distance to harbour, knowledge from the offshore wind demonstration programme, and cost estimates (DEA 2008b).

Categories	**Topics**	**Debate point and example of reference**
Decision-making	Choice of location	Should not prohibit future areas of environmental priority (A20) Assumptions are not adequate - cost are underestimated (B1) Criteria should be reconsidered due to new knowledge from offshore wind demonstration programme (B6) and to include distance to harbours (A42) Less priority on specific areas until more knowledge about consequences (B20-21) Challenge legitimacy of more wind power and infrastructure (B44-46) Praising that previous locations are deselected due to bird interests (B29)
	Participation	Encouraging broad participation and local views (A30) Deadline and information for consultation is not sufficient (C2) Interest in more detailed dialogue by Dong (B11) and fishing association (B26)

	Values	Inappropriate that the area offshore wind is only 1/12 of bird protection area (A41) Climate changes are a much bigger threat for species than offshore wind (A42) Visual impacts does not outweigh increased costs (B12) More emphasis needed on "soft values" as e.g. local image and qualities (A31) Positive on development of offshore wind in order to reduce CO_2 emission (A22)
	Documentation	Material is not sufficient for a qualified assessment (A12) and decision-making (A30) Contrasting evidence on visual impacts (A42) and impact on certain species (A48) No documentation for nature values in areas (B3) and estimation of costs (B2) Visualisations inadequate due to low reference height (A19) Need for coordination of knowledge on impacts from concerned countries (C26)
	Other Planning	In line with regional R&D venture on energy (A38) Must be coordinated with developments in other countries (A40)
Energy needs and technology	Design	Pattern, type, size, number, and marking should be adapted to landscape (A33) Locations close to coast should be abandoned (A22) or better designed (A31) in terms of visual impact and tourism Grid connection should be made as underground cables (C33) Pointing at connection synergies by combining parks (B13) More flexibility on criteria on distance to shore and capacity (A42, A45)
	Alternatives	Proposing conflation of four locations in one farther from the coast (A38) Proposing reconsideration of deselected areas (A42), specifically the Læsø alternative due to possibility for connection to Sweden (A48) Proposing location at Lysegrund (B8) and a location to replace Anholt location (B28) Proposing other priority among areas due to distance to appropriate harbours (A43) Open door possibility for wind farm development should be retained (A46) Opposing specific locations due to importance for fish stock and fishery (B28) Argument for specific testing area (A36) and for more locations (A41)
	Scope of planning	A need for a North-European perspective on the expansion (B14) Need to consider consumption and market to estimate cost of offshore wind (B15) Urge for consideration of consequences of electricity grid development (B35)

Impacts of infrastructure	Human activities	Inconvenient to locate windmill plants in areas of intense sailing and ferry routes due to risk of collision and related environmental pollution (A12) Concern about the consequences of fishery (A26). SEA should include impact of erosion of sea bead and changes in material flows on fishery (A31) Need for considering cumulative effects on transboundary effects in general (C3) Visual impacts in terms of locals and tourism (A31)
	Impact on development	Need for considering the impacts of climate change on the development, e.g. change in wind resources (B24)
	Impacts on nature	Should consider potential for positive impact on biotopes and fish stock in the design of fundaments (A20) Should consider impact of electromagnetic fields around cables offshore (A20) Need for considering connections between habitat area (B21) and for documenting possible impacts on bird migration routes (A31) Need for considering cumulative effects on transboundary effects in general (C3) and of specific areas (C26)

Table 25. Energy related consultation comments on the report on locations of future offshore wind (DEA 2007a, b and c). "A31" refers to page 31 in DEA (2007a), "B2" to page 2 in DEA (2007b), etc.

Debates on energy issues in EIA processes on project development

The consultation comments to the test centre in Østerild are investigated in the following. It is an extreme case in terms of environmental impacts, secrecy in decision-making, time pressure on the EIA, and uncertainty about the infrastructure and its impacts.

The Test Centre in Østerild has received a lot of attention in the media due to the controversial location in a larger forest also categorised as a major silent area in the departed county planning. Furthermore, the local residents and the NGOs concerned about the nature in the area have been successful in involving experts on controversial topics. The attention is at the formal level expressed through 140 consultation comments on the EIA and 155 consultation comments on the law proposal. The public scrutiny of the act and EIA revealed mistakes in the noise calculation, which meant that a act for amendment of the act with renewal of parts of the EIA had to be adopted in the Parliament. The amendment of the act with related EIA is not examined, since it is assumed that the energy related issues are similar.

Much of the written comments from the consultation relates to the short period in which the EIA was made in. DASEP was under political pressure to finish the EIA in a short time, and they did in practice not have adequate possibilities for examining the area (few months in winter). In the investigation of the debate on energy issues, these defects in the EIA are only interesting as a reflection of the character of the decision-making process on energy infrastructure. The investigation therefore does not include these defects, but focuses on the debates related to 1) decision-making on energy, 2) energy technology and needs, and 3) impacts of energy infrastructure.

Table 26 show that the consultation comments on EIA of the National Test Centre in Østerild concern energy issues within a range of topics. Concerning the decision-making process, the comments criticised the choice of the location, the public participation, the legitimacy of the way the test centre was chosen, the documentation of the process and basis, and the disregarding of the previous planning.

Concerning the energy sector's needs and testing of technology, the consultation comments concerned the relevance of the test centre, the ambiguity on the requirements of the centre, the location in Østerild versus other places for wind testing, and the societal benefit. As an example a comment criticise the ambiguity on information about constructions at test centre, e.g. measuring equipment.

Finally, the comments concerning the impacts of this new infrastructure, the comments concerned the restrictions on human activities in the area and the impacts on humans and nature. These comments especially related to the unknown character of the infrastructure, since these infrastructures are the first of its kind: How is it possible to calculate noise when the specification of the source is not known and not limited in detail? The uncertainty on the impacts fostered especially frustration of the people living in the area. These concerns seem to reflect a tension between opening for flexibility for development of environmentally friendly technology and prediction of impacts and abatement measures to protect the environment. Neither of the extremes may be optimal. The concerns about the windmills may be a reflection of concerns about uncertainty and ambiguity in the knowledge about impacts on human and nature of energy infrastructure.

Some of the concerns in the public debate were changed during the project development. The relation between concerns and changes has not been systematically investigated, but it seems that the debate has played a role in raising awareness and political pressure. Concerns about the large amount of tree-cutting were followed by a significant reduction in tree cutting; a professional dispute on the noise calculations was followed by a renewed EIA; a professional criticism of the decision-making was followed by an expert consultation. Other concerns e.g. about the silent area and the bat occurrence, were not followed by changes.

Categories	**Topics**	**Debate point and example of reference**
Decision-making	Choice of location	Incomplete screening of potential areas without debate on criteria (p. 2) Area not pointed at by Wind industry (p. 2) Choice of criteria for screening - why not distance to wind industry and existing infrastructure (p. 16)
	Public participation	No or incomplete answers to petition of access to documents (p. 2) Public participation phase has been shorter and less comprehensive than normally in the municipality (p. 9) Secrecy prior to decision on location (p. 15) Material made public shortly before meeting (p. 15)
	Legitimacy	Decision by construction act, not planning system, to disregard legislation? (Hovsøre and national park was decided with planning system (p. 18) Adequacy of expropriation for industrial constructions (p. 18)

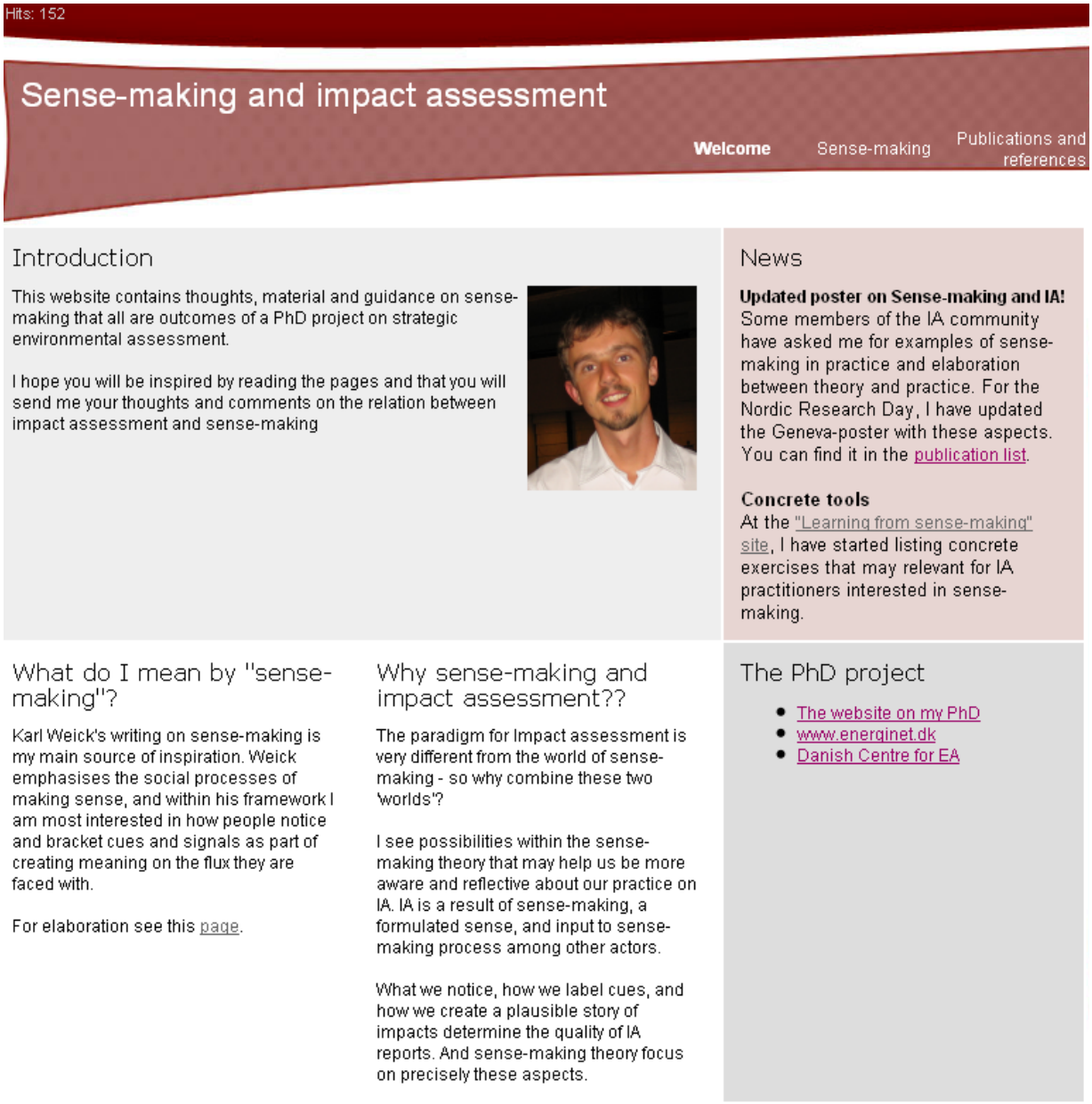
		Inadequacy of existing legislation/circulars/schemes for a new kind/size of construction - test windmills (p. 361)
	Documentation	Lack of documentation for deselection of alternatives (including at sea/border) (p. 2) No documentation for expenses by placing the centre at sea (and no comparison to expenses on-shore (p. 23) Need for independent review of technological and research potentials (p. 227)
	Previous planning	Contradicting Government's committee report on windmill planning on-shore (not disturbing areas like Østerild) (p. 505) Contradicting Ministry's committee report on serie-0 mills on land (p. 507)
Energy needs and technology	Relevance of test centre	Facilities for wind testing and development important for climate efforts (p. 10) and employment (p. 321) Criticising that it is crucial that the test centre is located in Denmark (p. 443)
	Ambiguity on requirements	Ambiguity on information about constructions at test centre, e.g. measuring equipment (p. 361) Criticising ambiguity in the statements of the wind industry on their spatial needs (distance, turbulence, roughness) (p. 398)
	Østerild location	No documentation on soil/underground and possibilities for constructing 250 m high mills (p. 274) Economical burden of grid connection (p. 322)
	Alternative places for testing	More relevant contextual conditions at sea for offshore windmills (p. 23) Criticising perception of possibility for testing off-shore on-shore (p. 746) Why one big area - indications that each wind company wants their own (p. 274) Should fulfil interest in less distance to other infrastructure and companies (p. 28)
	Societal benefit	Should add local visitor/information centre (p. 10) No safeguarding of continued Danish benefit of energy test centre (p. 739) Risk on loosing public support (p. 746) Is it fair that society a forced to suffer due to industry needs (p. 32) Lack of documentation on local employment (p. 15) and criticism of assumption of a benefit for local area (p. 453)
Impacts of infrastructure	Human activities	Limitation of developments in wind field (p. 2) Lack of information of safety zones when mills are not safety approved (p. 4)
	Impact on humans	How to calculate noise when source is not known (p. 276) Background noise reduced by forest cutting (p. 4) Lack of assessment of low frequency noise (p. 31) Lack of knowledge about health impact of light (p. 277)

		Why allowing visual impact of commercial logos (p. 276)
	Impacts on nature	Lack of documentation on assessment of low bird collision risk (p. 5) Criticising knowledge about bird behaviour at windmills of this size (p. 749) Criticising knowledge about wild animals behaviour in noise and light (p. 6) No visualisation of appearance of test centre at night (p. 2) Operation should be limited in nature sensitive periods (p. 510) Criticising that amount of forest cutting depends on not finished measuring (p. 635) Criticising assessment on bats in wing span (p. 750)

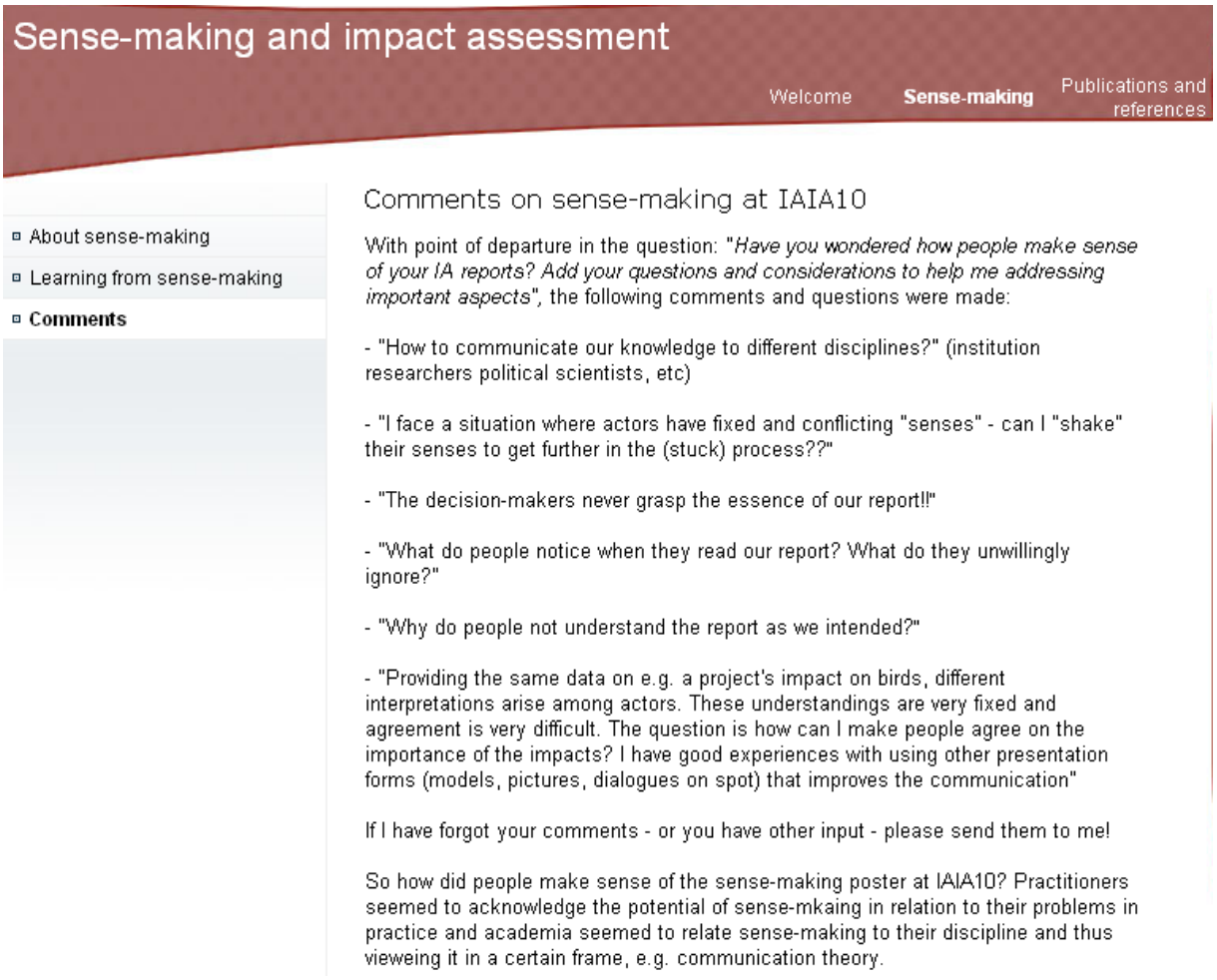
Table 26. Energy related consultation comments on the national test centre in Østerild (DASEP 2010)

APPENDIX E: SCREENSHOTS OF MY WEBPAGE ON IMPACT ASSESSMENT AND SENSE-MAKING

This appendix presents screenshots of my sense-making webpage, referred to in chapter 3.2.



Screenshot from www.bricksite.com/sense-making. Notice that the page has 152 unique hits (October 2011). Updates on the website have been announced through an email list primarily made at the IAIA'10 conference in Geneva, where I presented the topic at a poster.



Second screenshot from the webpage. The reproduction of the comments to the poster at the IAIA'10 is aiming at encouraging debate and relation to practice.

APPENDIX F: OVERVIEW OF MENTIONED RULES AND REGULATION

The following regulations of the energy sector are mentioned in the thesis:

- Executive order no 1464 of 19/12/2005. Bekendtgørelse om anvendelse af naturgasforsyningsnettet og planer for det fremtidige behov for gastransmissionskapacitet. [Executive order on the use of the natural gas supply grid and plans for the future gas transmission capacity requirement]
- Executive order no. 884 of 21/08/2006. Bekendtgørelse om varetagelse af naturgasforsyningssikkerheden. [Executive order on safeguarding natural gas security of supply]
- Executive order no 348 of 9/05/2008. Bekendtgørelse af lov om CO_2-kvoter [Executive order on act on CO_2 quotas]
- Executive order no 224 of 16/03/2009. Bekendtgørelse af lov om Energinet.dk [Executive order on act on Energinet.dk]
- Executive order no 516 of 20/05/2010. Bekendtgørelse af lov om elforsyning [Executive order on act on electricity supply]

The following regulations on the environment and environmental assessments that also apply to the energy sector are mentioned:

- Circular no. 159 of 16/09/1998. Cirkulære om bemærkninger til lovforslag og andre regeringsforslag og om fremgangsmåden ved udarbejdelse af lovforslag, redegørelser, administrative forskrifter m.v. [Circular on remarks to proposals for bills and other government proposals and on the procedure on preparation of bills, accounts, administrative regulations, etc.]
- Executive order no 936 of 24/09/2009. Bekendtgørelse af lov om miljøvurdering af planer og programmer [Executive order on act on environmental assessment of plans and programmes]
- Executive order no 1510 of 15/12/2010. Bekendtgørelse om vurdering af visse offentlige og private anlægs virkning på miljøet (VVM) i medfør af lov om planlægning [Executive order on assessment of the effects of certain public and private projects on the environment (EIA) pursuant to the act on planning]
- Habitat Directive (92/43/EC): Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
- Water Framework Directive (2000/60/EC): Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

APPENDIX G: DECLARATIONS OF JOURNAL CO-AUTHORSHIP

Co-author statements are required by Ministerial Order in connection with submission of Ph.D. thesis: " With reference to Ministerial Order no. 18 of 14 January 2008 regarding the Ph.D. Degree § 12, article 4, statements from each author about the Ph.D. fellow's part in the shared work must be included in case the thesis is based on already published articles."

Two journal articles included in this thesis have been co-authored:

- 'Change agents in the field of strategic environmental assessment: What does it involve and what potentials does it have for research and practice?
- How do we make sense of significance? Findings from a laboratory experiment on an SEA case.

Article title: **'Change agents in the field of strategic environmental assessment: What does it involve and what potentials does it have for research and practice?**

Place of publication: Journal of environmental assessment policy and management

List of authors: Lone Kørnøv, Ivar Lyhne, Sanne V Larsen, & Anne M Hansen

Ph.D. fellow: Ivar Lyhne

Contribution: Overall, Ivar contributed with 25 % of the text in the article. More detailed, the extent of the Ph.D. fellow's contribution is assessed on the following scale:

A. Has contributed to the work (0-33%)

B. Has made a substantial contribution (34-66%)

C. Did the majority of the work independently (67-100%).

Declaration on the individual elements	Extent (A, B, C)
1. Formulation in the concept phase of the basic scientific problem on the basis of theoretical questions which require clarification.	A
2. Planning of analyses and formulation of investigative methodology, including choice of method and independent methodological development.	B
3. Involvement in the analysis or the specific investigation.	B
4. Presentation, interpretation and discussion of the results obtained in article form.	A

Signature, Ph.D. fellow

Signature, co-authors

***Article title*: How do we make sense of significance? Findings from a laboratory experiment on an SEA case**

Place of publication: Journal of Environmental Management (not published)

List of authors: Ivar Lyhne and Lone Kørnøv

Ph.D. fellow: Ivar Lyhne

Contribution: Overall, Ivar contributed with 75 % of the text in the article. More detailed, the extent of the Ph.D. fellow's contribution to the article is assessed on the following scale:

A. Has contributed to the work (0-33%)

B. Has made a substantial contribution (34-66%)

C. Did the majority of the work independently (67-100%).

Declaration on the individual elements	Extent (A, B, C)
1. Formulation in the concept phase of the basic scientific problem on the basis of theoretical questions which require clarification.	B
2. Planning of analyses and formulation of investigative methodology, including choice of method and independent methodological development.	C
3. Involvement in the analysis or the specific investigation.	B
4. Presentation, interpretation and discussion of the results obtained in article form.	B

Signature, Ph.D. fellow

Signature, co-author

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An overview of rules and regulation mentioned in the thesis is found in appendix B

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