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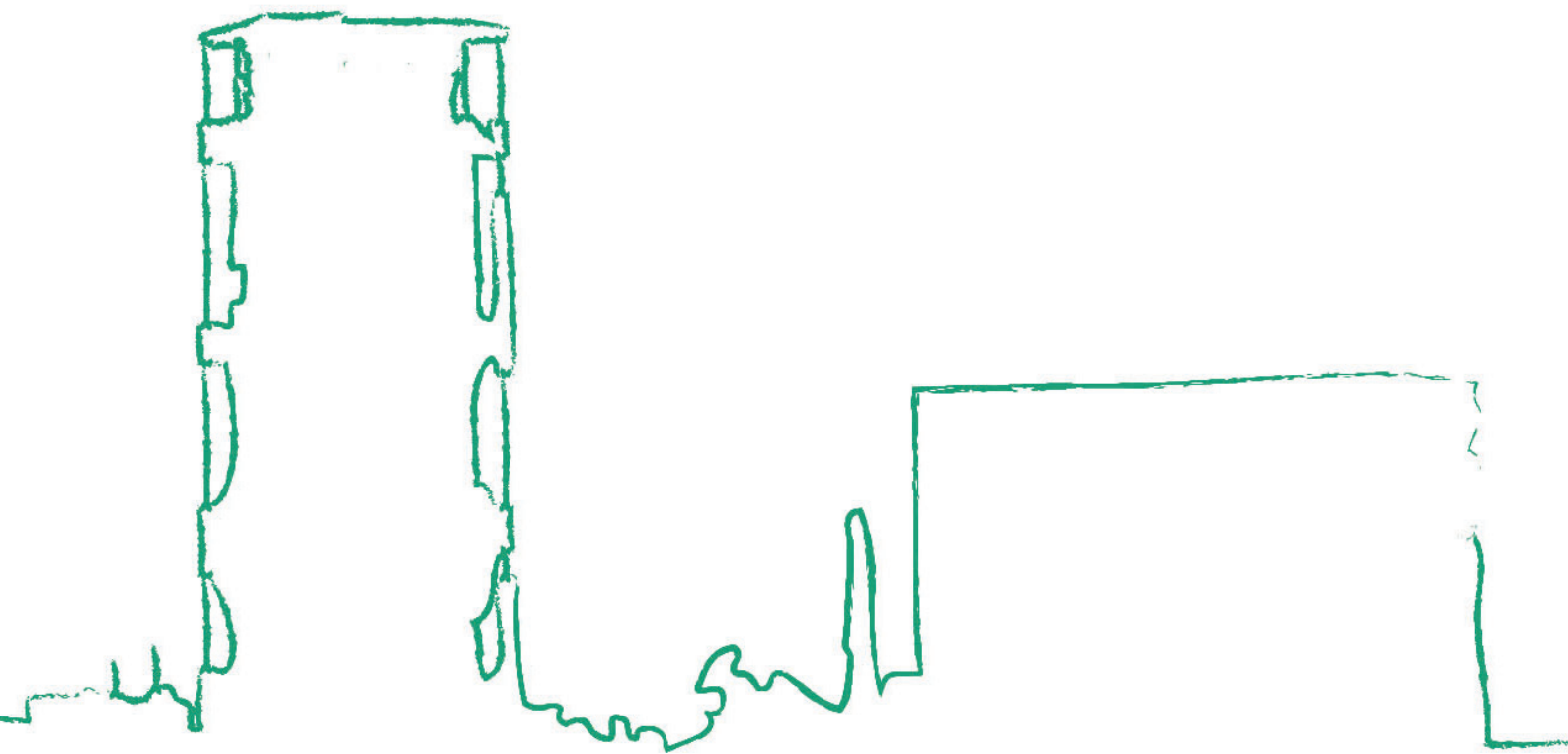
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into Cities' Planning Practices

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Climate for Change? Integrating Climate Change into Cities' Planning Practices

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- Wejs, A. & Cashmore, M. (2013) Constructing legitimacy for climate change planning: A study of local government in Denmark. *Global Environmental Change* [Submitted].
- Wejs, A., Harvold, K., Larsen, S.V., & Saglie I. L. (2013) Legitimacy building under weak institutional settings: Climate change adaptation at the local level in Denmark and Norway. *Environmental Politics* [Accepted].
- Larsen, S.V., Kørnøv, L. & Wejs, A. (2012) Mind the gap in SEA: An institutional perspective on why assessment of synergies amongst climate change mitigation, adaptation and other policy areas are missing. *Environmental Impact Assessment Review*, 33: 32-40.
- Kørnøv, L., & Wejs, A. (2013, in press) SEA screening of climate change plans: A story of non-compliant discretion. *Environmental Impact Assessment Review* [Accepted].
- Wejs, A., Sperling, K. & Kørnøv, L. (forthcoming) Klimaplanlægning – en ny udfordring i den lokale planlægning. I Arler, F. (ed.) *Bæredygtighed – Værdier, regler, metoder.* Aarhus Universitetsforlag [Climate change planning – a new challenge in local planning. In Arler, F. (ed) *Sustainability – Values, regulations, methods*, Aarhus University Press]

Preface

The PhD thesis is the result of a three-year PhD fellowship at the Department of Development and Planning at Aalborg University. The subject of the research is the institutional dynamics in the processes of integrating climate change into planning at the local level in Denmark. The thesis consists of five journal articles and a synthesis of these articles. This synthesis outlines the connections between the articles and presents my reflections on the methodological and theoretical approach and the overall contribution of this research.

The first time I became familiar with climate change as a phenomenon was when I as a 15 year-old in 1997 was ice climbing in a five metre wide meltwater channel on a glacier in Norway. Locals said the channel went all the way to the bedrock beneath the glacier, and these vertical meltwater channels appeared increasingly each year. Experts had told them it was caused by climate change, although for me at the time it provided an exciting experience rather than an insight into the natural as well as social issues related to the phenomenon. Ten years later in 2007 I again experienced the physical impacts of climate change, when I was scuba diving in Malaysia and witnessed coral bleaching. This is a phenomenon caused by higher water temperatures and ocean acidification due to increased carbon dioxide, which is a major threat to reefs' biodiversity systems.

While studying for my degrees in geography and environmental management I became familiar with the complexity of climate change, both as a natural phenomenon and a societal issue. The initial steps of my PhD research took shape when I, as an intern in Danish local government at Aarhus Municipality's Climate Secretariat, was puzzled by the challenges in coordinating climate change actions across departments in relation to the making of their initial climate change plan in 2008. During this time I gained an insight into the rules of the game of the political and bureaucratic process, both with regard to the municipal climate change effort and municipal work in general. Through this experience I was puzzled by different aspects of the organisational set-up of the climate change effort and the choices made by officials. During this period, I also involved myself in various national and international seminars and conferences related to climate change, where I gained initial information and insight into Danish municipalities' experiences of initiating climate change plans, the challenges facing them, and how they tried to overcome these challenges.

Climate change is a wicked issue characterised by high complexity and urgency, and it is my aim to shed light on this issue from a planning perspective with a personal intention to produce knowledge that is applicable in practice. I have valued the opportunity to conduct applied research and throughout my studies I have been engaged in linking research and practice. As a graduate student I organised a national student network to promote green initiatives at Danish universities and was the student representative on Aalborg University's Environmental Committee. As a PhD student I have represented an NGO at the United Nations' (UN) 15th Conference of the Parties (COP 15) in Co-

penhagen, organised and co-organised seminars for practitioners on climate change and strategic environmental assessment (SEA), and played an active part in public hearings on municipal spatial plans and climate change strategies. Currently, I am actively taking part in establishing a climate change network called ClimateLab involving universities and cities around the world with the aim of mobilising climate change action and innovative research. You will find some of these perspectives arising from this reflected in the thesis on the research question and to some degree in my position on the philosophy of science; I acknowledge the world's existence beyond our understanding and firmly believe that climate change is an actual natural phenomenon and that the actions of cities to combat and prepare for climate change matter.

Acknowledgement

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Dansk Resumé

Det er i højere grad byer end nationale regeringer, der går forrest i at handle på klimaforandringerne. Flere af disse byer udarbejder frivilligt klimaplaner til at forebygge og tilpasse til effekterne af klimaforandringer. Klimaforandringer er i litteraturen blevet analyseret som et multi-niveau governance felt, der opstår omkring internationale netværk. Til trods for byernes mange initiativer, viser den eksisterende forskning, at implementering af klimahandlingerne kniber. Årsagerne til den manglende implementering i praksis er i litteraturen begrænset til generelle forklaringer i litteraturen, og studier fokuseret på at forklare implikationer for klimaplanlægning på det lokale niveau er fraværende. For at forstå implikationerne, undersøger denne Ph.d. afhandling de institutionelle dynamikker, der påvirker integrationsprocessen af klima i planlægningspraksis på det kommunale niveau i Danmark. Integrering undersøges i relation til to perspektiver: integrering i eksisterende planer og processer, og integrering af klimaplaner som et nyt planlægningsområde i den kommunale administration. Der er således fokus på plan indhold og plan proces. Afhandlingen positioneres indenfor videnskabsteorien kritisk realisme og til at undersøge de institutionelle dynamikker anvendes ny institutionel teori med vægt på at studere institutionelle mekanismer i relation til at opbygge legitimitet for handling. Mekanisme begrebet kan hjælpe med at forklare, hvordan og hvorfor implikationer opstår, og legitimitetsbegrebet er nyttigt til at klarlægge de strategier embedsfolk bruger til at muliggøre klimahandlinger. Institutionel teori er historisk blevet kritiseret for dens vægt på, hvordan institutioner hæmmer handlinger i stedet for, hvordan institutioner som produktive fænomener letter handling. Nye positioner i ny institutionel teori fokuserer på betydningen af aktørers handlinger for institutionel forandring. Afhandlingen bidrager til denne videnskabelige debat med konceptuelle og empiriske diskussioner på struktur og aktør i relation til institutionelle mekanismer og legitimitet. Baseret på hovedsageligt kvalitative studier af planlægningsdokumenter og processer i kommuner i Danmark, præsenteres afhandlingens resultater i fem tidsskriftartikler. Artiklernes undersøgelsesfelter har udgangspunkt i tre planlægningsområder, der fungerer som værktøjer for integrering: klimaplanlægning, fysisk planlægning og strategisk miljøvurdering (SMV). Afhandlingen konkluderer, at kendetegnene for klima-governance formes lokalt gennem normative og kulturelt-kognitive mekanismer samt via strategier til at opbygge legitimitet i integrationsprocessen. Integration på tværs af sektoropdelte divisioner i den kommunale administration hæmmes af eksisterende strukturer, hvori embedsfolk må navigere og opbygge legitimitet for klimahandling. Potentialet for at bruge eksisterende planlægningsværktøjer udnyttes ikke til fulde, og klimaplanlægning betragtes i stedet som et eksplorativt område, hvor ildsjæle formår at lave muligheder for handling ved at etablere lokale netværk. Afhandlingen bidrager med viden om implikationer for den interne integrationsproces i kommuner. Den giver forklaringer på, hvorfor disse implikationer opstår, og hvordan embedsfolk forsøger at løse disse. Afhandlingen giver forklaringer på dannelsen af lokale netværk mellem kommuner og det lokale erhvervsliv og bidrager med et lokalt perspektiv på forskningsområdet på klima som et multi-niveau governance felt.

Abstract

Cities rather than national governments take the lead in acting on climate change. Several cities have voluntarily created climate change plans to prevent and prepare for the effects of climate change. In the literature climate change has been examined as a multi-level governance area taking place around international networks. Despite the many initiatives taken by cities, existing research shows that the implementation of climate change actions is lacking. The reasons for this scarcity in practice are limited to general explanations in the literature, and studies focused on explaining the constraints on climate change planning at the local level are absent. To understand these constraints, this PhD thesis investigates the institutional dynamics that influence the process of the integration of climate change into planning practices at the local level in Denmark. The examination of integration is twofold: the integration of climate change into existing plans and processes, and the integration of climate change plans as a new planning area into city administrations. There is thus a focus on plan content and plan process. The thesis is positioned within the philosophy of critical realism and to investigate the institutional dynamics new institutional theory is used with an emphasis on examining institutional mechanisms in relation to building legitimacy for action. The concept of mechanisms can help explain how and why constraints on action occur, and the concept of legitimacy is useful to clarify the strategies used by officials to enable climate change action. A long running criticism of institutional theory is the emphasis on how institutions constrain actions rather than act as productive phenomena that facilitate action. Emergent strands within new institutional theory emphasise the role of agency in institutional change. The thesis contributes to this scholarly debate through conceptual and empirical discussions about structure and agency in relation to institutional mechanisms and legitimacy. Based on mainly qualitative studies of planning documents and processes in city governments in Denmark, the thesis' results are presented in five journal articles. The articles' areas of investigation take as their point of departure three planning areas that serve as planning tools for climate change integration: climate change planning, municipal spatial planning and strategic environmental assessment (SEA). The thesis concludes that the characteristics of climate change governance are shaped locally through normative and cultural-cognitive mechanisms and strategies for building legitimacy in the integration process. Integration across sectoral departments in the city administration is found to be constrained by existing structures which officials have to navigate to create legitimacy for climate actions. The potential for using existing planning tools for climate change integration has not been fully exploited, and climate change planning is instead perceived as an explorative area, where institutional entrepreneurs create windows for action through the establishment of local networks. The thesis contributes knowledge on the constraints of the internal integration process in city governments. It provides explanations of why these constraints occur, and how officials seek to overcome them. The thesis provides explanations of the emergence of local networks between city governments and local businesses and it contributes a local perspective to the research area of climate change as a multilevel governance issue.

1.   Introducing the PhD Thesis

The overall title of this PhD thesis 'Climate for Change?' is a play with words around climate as a physical phenomenon and as social conditions. The thesis juggles with both interpretations of the term, where climate change as a physical phenomenon is a new challenge in spatial planning, whereas social conditions related to planning practices are to be changed to handle this challenge. Thus the sub-title 'Integrating climate change into cities' planning practices' relates to the social climate within city governments for integrating means and activities related to the physical phenomenon of climate change into planning practices.

The initiation of the PhD topic occurred as more and more cities in Denmark from 2007 onwards began to make voluntary climate change action plans. This emerging effort can be regarded as a reaction to the international focus on the issues of climate change, when proactive cities around the world began to reflect on and react to the international debate. In December 2009 Copenhagen hosted the United Nations Framework Convention on Climate Change (UNFCCC), which was particularly important because it also included the United Nations' 15th Conference of the Parties (COP15). COP15 was the fifth meeting between the parties of the Kyoto Protocol, and the Copenhagen summit had the purpose of including more parties in the agreement and for these parties to agree upon a climate change plan to replace the Kyoto Protocol when it expired in 2012. The summit had extensive international and national media coverage and because Denmark was the host of this summit, this increased the national attention to climate change and several voluntary activities were initiated prior to the summit. The summit is well known for having been unable to fulfill the high expectations of the outcome. Though one might expect that the disappointing outcome of COP15 would be reflected in the initiatives taken by Danish cities, the actual effects of climate change especially in terms of flooding have kept the issue alive on the political agenda on a national as well as a local scale.

The cities in the context of this PhD thesis are represented by municipalities and their approach to integrating climate change into existing planning documents and processes and to integrating their climate change plans into the municipal administration; throughout the thesis this two-sided process of integration will be referred to as climate change integration. This is of particular interest because climate change, as an issue affecting most sectors, calls for interdisciplinary coordination of actions. Municipalities are known as bureaucratic organisations with sector-divided departments effective at solving issues within their own profession, but they are not accustomed to working across sectors to the extent perceived necessary to act on climate change. Climate change integration has proved to be challenging in practice and is also reflected in the scholarly debate on cities' climate change efforts, but research on these challenges of integration at the local level is absent in the literature. Knowledge of the implications of

climate change integration is important to determine the characteristics of local climate change governance. This research focuses on the institutional implications and how efforts are made to resolve these implications, and it is approached from the overall research question:

> 'What are the institutional implications for integrating climate change into spatial planning processes at the municipal level in Denmark, and how do the municipalities seek to solve these?'

The research question is here presented to set the scope of the thesis, and is elaborated further together with the research aims and academic goals in Section 2. Climate change governance in this thesis is perceived more broadly than climate change integration, where integration is the activities related to including climate change in municipal spatial planning, and governance in this regard is the characteristics of this process that emerge around climate change integration and climate change planning. Climate change planning refers to the characteristics of the actual climate change plans and climate change means that may relate to mitigation and/or adaptation. Hence climate change integration is also distinguished from implementation, which includes carrying out the means and projects of the plans in practice.

My research interest lies within understanding climate change governance at the urban level as an emerging planning field, and creating knowledge that explores the implications of this field from a perspective that can aid practice. Climate change governance in this perspective is examined in its early stages, beginning with the process around climate change integration. To understand and explain the implications of the integration process, I take a new institutional theoretical position to investigate climate change integration through three planning areas: climate change planning, spatial planning and strategic environmental assessment (SEA), including the plan documents and the related planning processes. The PhD thesis is article-based and thus the research question and the areas of investigation are examined in five articles (presented in *Part IV Results & Analysis*):

- Wejs, A. (2013) Integrating climate change into governance at the municipal scale: An institutional perspective on practices in Denmark, *Environment and Planning C* (Submitted).
- Wejs, A., and Cashmore, M. (2013) Constructing Legitimacy for Climate Change Planning: A Study of Local Government in Denmark, *Global Environmental Change* (Submitted).
- Wejs, A., Harvold, K., Larsen, S.V., and Saglie, I. L., (2013). Legitimacy building under weak institutional settings: Climate change adaptation at the local level in Denmark and Norway, *Environmental Politics* (Accepted).
- Larsen, S.V., Kørnøv, L., and Wejs, A. (2012) Mind the gap in SEA: An institutional perspective on why assessment of synergies amongst climate change mitigation, adaptation and other policy areas are missing, *Environmental Impact Assessment Review* 33: 32-40.
- Kørnøv, L., and Wejs, A. (2013) SEA screening of climate change plans: A story of non-compliant discretion, *Environmental Impact Assessment Review* (Accepted).

Chronology of The Thesis

The thesis is structured in five parts: *I: Introduction, II: Research Design, III: Theory, IV: Results & Analysis* and *V: Conclusion. Part I: Introduction* is a detailed introduction to the topic of the thesis, including the state of the art, the research aim and questions, a brief introduction to the five articles, and a contextual introduction to the Danish climate change policy agenda. *Part II: Research Design* includes the positioning of the thesis within philosophies of science and the methodologies used throughout the thesis. *Part III: Theory* presents the theoretical considerations of the thesis and a synthesis of the theoretical development of the five articles. *Part IV: Results & Analysis* contains a brief introduction to the five articles before they are presented. *Part V: Conclusion* reflects on the research questions, outlines the contribution of the thesis and identifies new directions for further research.

PART I
Introduction

This part consists of *Section 2: Introduction* and *Section 3: The Danish Climate Policy Context*. The purpose of Part I is to introduce the background and relevance of the PhD topic 'Integrating climate change into cities' planning practices'. Section 2 presents the state of the art that leads to the research aims, academic goals and research questions. Section 3 introduces the Danish policy context on climate change based on the expected climatic changes for Denmark, the Danish planning system and the Danish climate policy agenda until 2012 on the national and local scale.

2. Introduction

This section introduces the overall research topic and aims of the thesis. The section starts by introducing the state of the art on cities' climate change planning efforts and the institutional implications found in the existing literature within this field. The state of the art leads to the research aim, academic goals and research questions of the thesis. The section ends by positioning the five articles within the research question and areas of investigation: climate change plans, spatial plans and strategic environmental assessment (SEA).

2.1 The State of the Art: Cities at the Forefront of Climate Change Policy Making

Climate change is widely recognised to constitute one of the greatest environmental, social and economic challenges faced in modern times. The United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) stress in their fourth assessment report, in 2007, that:

> 'Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level'

> (Bernstein et al., 2007: p.30).

The IPCC also finds that '[m]ost of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations.' (Bernstein et al., 2007: p.39). Policy responses to climate change require both mitigation to reduce future greenhouse gas (GHG) emissions and adaptation to prepare for climate impacts: '[t]here is high confidence that neither adaptation nor mitigation alone can avoid all climate change impacts' (Bernstein et al., 2007: p.65). Mitigation is to prevent climate change by reducing GHG emissions and adaptation is to prepare for the experienced and expected climate change impacts (Tompkins & Adger, 2005). Historically, there has been an international policy focus on mitigation based on the assumption that, by reducing GHG emissions, adaptation could be avoided. It was not until the IPCC's third assessment report, in 2001, that it was emphasised that climate change could not be prevented with mitigation only and that adaptation was unavoidable (Klein et al., 2007; Biesbroek et al., 2009; Adger et al., 2009).

At the global scale, cities' climate actions are evident, as 40-70 per cent of global anthropogenic induced GHG emissions originate from cities. Furthermore, climate impacts are, and increasingly will be, experienced at the very local level. More than half of the world's population lives in cities and may be affected by climate change (Rosenzweig et al., 2011). Following the urgency of climate change, it becomes evident

that these plans are being implemented in practice. Cities around the world have responded to the issues of mitigation and adaptation by developing plans and strategies to initiate action (Kern & Alber, 2009; Bulkeley, 2010; ICLEI, 2010; Tang et al., 2010, Lee & van de Meene 2012). 'Compared to national politicians, city leaders seem willing and able to take action to protect their cities against these threats and to help make a global difference' (Rosenzweig et al., 2010: p.910). Cities rather than national and international governments act on climate change and are so far the main actors in preventing and adapting to the climatic changes (Rosenzweig, 2011; Bassett & Shandas, 2010; Wheeler, 2008; Gustavsen et al., 2009; Kern & Alber, 2009; Bulkeley, 2010; Tang et al., 2010). These impacts are already being experienced and are expected to increase in the future (Pachauri & Reisinger, 2007). The responses to the challenges of climate change are, in particular, made by engaging in international and national networks and by preparing climate change action plans (Wheeler, 2008; Bassett & Shandas, 2010).

2.1.1 The Institutional Challenge of Climate Change Integration

Within the literature, climate change is a new and emerging field in local administration and planning practice and research (Lemos & Morehouse, 2005; Meyer et al., 2010; Bassett & Shandas, 2010; Measham et al., 2011; Wheeler, 2008). These climate plans often include both climate change mitigation and adaptation. Climate change affects most sectors that operate within adaptation: water management, infrastructure and the built environment, emergency management, agriculture and land use, and insurance, and within mitigation: energy efficiency, heating, electricity, transportation, carbon capture and storage (CCS) and behaviour. Initial evaluation of climate change planning practices shows that implementation of climate change activities is insufficient due to issues of institutional capacity in terms of coordination between different levels of government, sufficient knowledge among key actors, internal institutional dynamics of local governments, and human and financial resources (Bulkeley, 2010). Institutional dynamics characterise 'tensions within and between interactions' (Kooiman, 2010: p.232).

Previous research finds that success often relies on the role of agency, especially from individual champions, termed institutional entrepreneurs (Betsill & Bulkeley, 2006; Bulkeley, 2010; Bassett & Shandas, 2010; Bulkeley & Moser, 2007). Agency is often associated with terms like motivation, will, intentionality, interest, choice, autonomy, and freedom, and involves actors' ability to operate somewhat independently of institutional constrains (Battilana & D'Aunno 2009: p.45). Furthermore, engagement in international networks has been shown to contribute by means of gathering information, and it mobilises actors and resources and is considered to be important for climate change integration. The role of networks has led to a discussion in the literature of climate change as a multi-level governance issue (Kern & Alber, 2009; Amundsen et al., 2010; Betsill & Bulkeley, 2004, 2006; Bulkeley & Betsill, 2005, Bulkeley et al., 2012; Christopoulus et al., 2012; Gustavsen, et al., 2009; Urwin & Jordan, 2008; Kern & Bulkeley 2009). Governance in general describes the act of governing, and the scholarly debate covers a myriad of definitions involving key words such as rules, quality of systems, co-operation to en-

hance legitimacy and effectiveness, new processes, arrangements and methods (Kooiman, 1999).

Yet there is a paucity of in-depth studies of the intra-institutional dynamics in the integration process of climate change and the institutional mechanisms influencing climate governance at the local level, while Bulkeley (2010) in her review of urban climate governance finds:

> 'New research in the field suggests that there is a need to critically address the basis for the lack of capacity and the political conflicts that have been encountered locally, and that this may require the development of alternative theoretical perspectives.' (p.242).

Bulkeley here points to the need to investigate the implications of climate change integration at the local level, which is important to understand how climate change is governed in cities and to determine the implications of climate change integration at the local level. The cross-sectoral nature of climate change governance poses institutional challenges for the integration process because of the fragmentation of different agencies, utilities and the city administration agencies (Betsill & Bulkeley, 2007). This hampers implementation of climate change activities to be carried out in practice (Bhaskar et al., 2010). The implementation of climate change activities is also hampered by a multitude of institutional constraints and barriers. Hence there is a need for social science to help solve the multifaceted societal challenges that climate change makes more visible, urgent and complex (Agrawal et al., 2012).

Though local governments are at the forefront of climate change planning, it is also well documented that the existence of a variety of practical barriers to developing co-ordinated and cross-sectoral plans and securing their subsequent implementation is hampering implementation. The importance of the comprehensiveness of these plans is also the challenge in regard to horizontal and vertical co-ordination (Betsill & Bulkeley, 2006; Bulkeley, 2010; Kern & Alber, 2009; Uittenbroek et al 2012). Co-ordination across sectors is more difficult than within the individual sectors, for different sets of institutional rules tend to evolve in the departmental divisions (March & Olsen, 1989). Cross-sectoral climate change planning is essential if undesirable trade-offs are to be avoided and potential synergies exploited (Barker et al., 2007; Biesbroek et al., 2009; Larsen et al., 2012; Kok & de Coninck, 2007). The significance of formal and informal institutional rules has been emphasised as barriers to co-ordinated climate change planning (Næss et al., 2005; Adger et al., 2005). It has also been observed that within local government, climate change expertise often remains concentrated in environmental departments (Bulkeley, 2010), which makes cross-sectoral coordination within the organisational hierarchy of local government even more challenging because of a limited capacity to implement planning policies (Kern & Alber, 2009).

2.1.2 Climate Change and the Linkage to Spatial Planning

The cross-sectoral issue becomes even more challenging because climate change plans are carried out voluntarily. It is necessary to coordinate with other sectors to implement activities laid out in the climate change plans and to integrate climate change into existing planning areas, whereas climate change governance differs from traditional spatial planning:

> 'In terms of the different modes of governance for local authorities' climate change actions, the climate change agenda is bringing about a shift in the regulatory powers of local spatial planning, but it is also prompting greater integration with other interventions and across other scales through enablement and direct provision'

> (Wilson & Piper, 2010: p.119).

Climate change planning thus exceeds the traditional spatial planning approach by including more sectors and actors internally as well as externally in the municipal administration. In regard to integration of climate change into existing planning areas, several municipal sector-planning areas could be taken into consideration, such as transportation, natural habitats or river management. However, spatial planning encompasses many mitigation and adaptation actions: for example, the location of power facilities and green areas in both urban and rural areas. Furthermore, spatial planning as a comprehensive planning area can be seen as an institutional platform for coordination among the majority of municipal sectors and thus has a central role for cross-sectoral coordination. Spatial planning often involves a relatively long forward-looking time-span, which fits well with the long time-frame of climate change (Wilson & Piper, 2010).

Another institutionalised field related to spatial planning, and which also is comprehensive, is SEA. SEA is a legal requirement of the EU Directive 2001/42/EC of the European Parliament and the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (abbreviated to SEA Directive). SEA is the only regulative instrument within spatial planning that sets requirements in relation to climatic factors. Thus it has the potential to function as a formal planning tool for integration. SEA is an assessment of a plan or programme's likely significant environmental impacts in regard to:

> 'biodiversity, population, human health, fauna, flora, soil, water, air, *climatic factors*, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors'

> (EC 2004, Annex 1,f, own emphasis).

Furthermore, the SEA Directive places demands on the assessments to include synergistic and cumulative impacts (EC 2004). Thus the potential of the SEA Directive as a means for climate change integration is two-sided, embracing the potential to secure climate change integration across all sectors, and the potential to exploit synergies and

avoid trade-offs between mitigation and adaptation, as well as other environmental factors. The IPCC acknowledges the need to view and assess climate change measures in a broader sustainability context (Najam et al., 2003; IPCC, 2001: p.132). Several researchers within the field of planning and impact assessment also underline this exploration of synergies between climate change and other environmental policies; hence mitigation and adaptation may have different and conflicting goals and solutions in spatial planning (Hamin & Gurran, 2009; Wilson, 2010).

Although SEA is a regulative requirement, several scholars question its reliability in general because it involves discretion in terms of judgments and decisions based upon values and subjectivity (Wilkins, 2003; Wood & Becker, 2005; Kontic, 2000; Canter & Canty, 1993; Connelly & Richardson, 2005; Kørnøv & Thissen, 2000; Kjellerup, 1999; Marsden, 2008; Noble, 2004). The planners, it is noted, have significant autonomy and the capacity to make judgment and choices within SEA (Hilding-Rydevik & Bjarnadottiér, 2007), and their ownership of SEA becomes central for its effectiveness (Stoeglehner et al., 2009). However, despite the limits of SEA noted elsewhere, research specifically on the consideration of climate factors is absent, which necessitates assessment of its potential and actual role. This is especially relevant in regard to cross-sectoral integration and in order to exploit synergies and avoid trade-offs.

2.1.3 A Scandinavian Context for Investigating Climate Change Integration

This research takes its point of departure in a Scandinavian context with a primary focus on Denmark. Climatic changes may be serious in the northern hemisphere, with an increase in temperature that is twice the global average and major changes in snow and ice conditions, although the Nordic countries will probably experience less severe impacts of climate change than may be the case for the world's developing countries (Aall et al., 2012). Thus, the Nordic countries are often considered to have a high adaptive capacity in regard to planning (Juhola et al., 2012a; Aall et al., 2012). The Nordic countries are therefore expected to be a critical case for the learning process about the challenges of climate change and for the strategies to overcome these challenges (Aall et al., 2012). This research adds to the international and Scandinavian literature from a Danish context by critically addressing the implications of local climate change integration, and developing new theoretical perspectives within institutional theory and governance theory, thus recognising the need for social science (Agrawal et al., 2012) to aid the understanding of the complexity of the issues in climate change governance as an emerging field in practice as well as in theory.

2.2 Research Aims, Academic Goals and Research Questions

The thesis reports on research that investigates how Danish municipalities approach climate change integration into municipal planning and administration, in the absence of a national framework and with limited guidance or precedent. This research contributes with knowledge on the process of climate change integration by critically addressing local governments' plans and processes to integrate climate change. The thesis creates knowledge about the implications of climate change governance by the use of a

new institutional theoretical positioning to investigate the intra-institutional dynamics at the municipal level in Denmark and to understand and explain the institutional implications for climate change integration. This knowledge is largely absent in the literature, but is highly important to understand and build knowledge on climate change as an emerging governance field in city administrations and to develop theoretical perspectives that can inform policy processes and successful practices. The thesis achieves this by addressing the following academic goals:

- To examine the plan documents and processes used by city governments, and the institutional dynamics therein, to integrate climate change planning into municipal activities.
- To develop and test conceptual and analytical frameworks that draw upon new developments in institutional theory and integrate developments from across a variety of academic fields.
- To define a future research agenda for this emerging field of research and practice.

Having clarified the aims and goals of the research, it is possible to operationalize these into an overall research question with three sub-questions. The overall research question is as follows:

'What are the institutional implications for integrating climate change into spatial planning processes at the municipal level in Denmark, and how do the municipalities seek to solve these?'

The research question is divided into three sub-questions to clarify the areas of investigation.

1. How can the concepts of institutional mechanisms and legitimacy help to understand the challenges of climate change integration?
2. How are the concepts of structure and agency interlinked in the integration process of climate change?
3. How are different planning documents and processes used to aid climate change integration?

The first sub-question takes as a point of departure two new institutional concepts, institutional mechanisms and legitimacy, which are helpful in understanding and explaining the implications of the integration process of climate change. The second sub-question relates to the well-known criticism of institutional theory, the low profile of agency, which in the literature of cities' climate change effort is stated to be an important driver for climate change integration. The third sub-question looks into the use of climate change plans, spatial plans and SEA as documents and related processes for climate change integration.

The research question and the three sub-questions are analysed through the five articles that make up the analysis of the thesis and are finally examined as a synthesis of those

articles in *Part V: Conclusion*. The articles encompass elements of two or three sub-questions and have different areas of investigation: climate change plans, spatial plans and/or SEA. In the following, the articles are positioned within the research areas and contribution to answering the sub-questions.

2.3 The Articles' Positions within the Research Frame

In order to fulfil the research aims, goals and questions, the five articles shed light on the integration process of climate change with various elements of the sub-questions. The articles are briefly presented here in regard to their areas of investigation and their positioning within the frame of the research question and sub-questions. Figure 1 illustrates the five articles' positioning in regard to the main areas of investigation, together with their individual contributions to answering the sub-questions that all feed into examining the research question and provide new knowledge on climate change integration and governance.
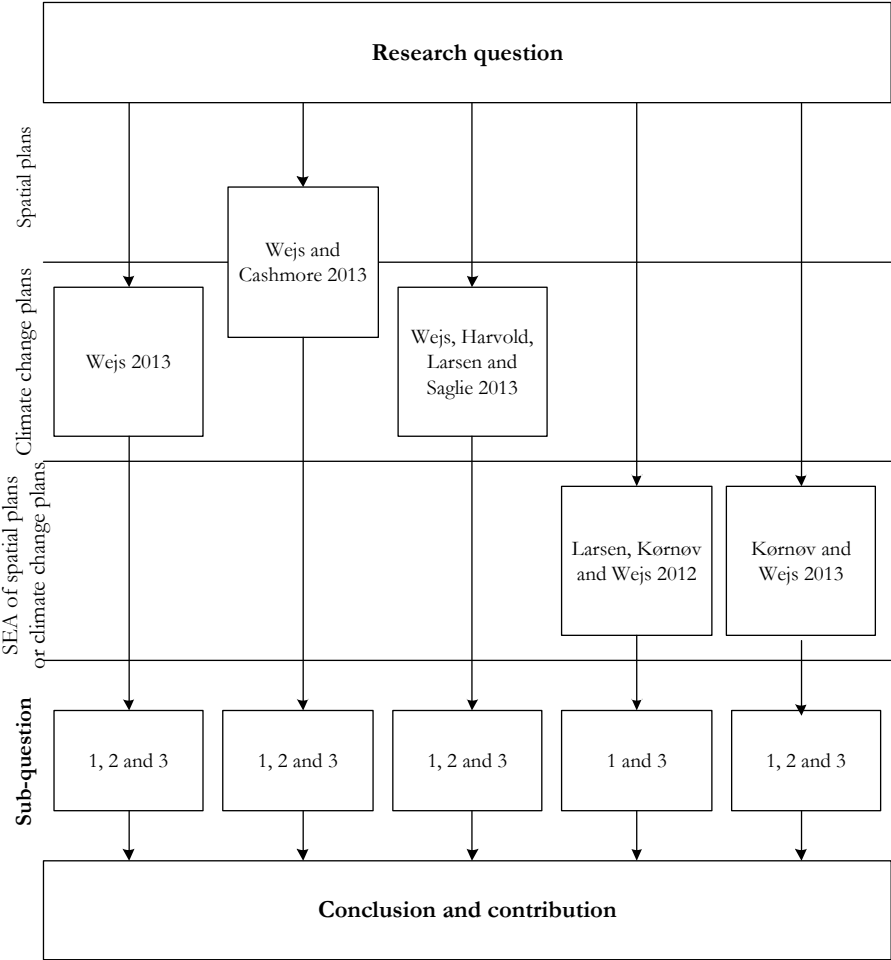
Figure 1: The positioning of the five articles in relation to the sub-questions and the areas of investigation.

The areas of investigation are climate change planning, spatial planning and SEA. Each article, together with the different elements of the sub-questions it addresses and its contribution, is briefly explained in the following.

- Wejs, A., (2013) Integrating climate change into governance at the municipal scale: An institutional perspective on practices in Denmark, *Environment and Planning C* (Submitted).

This is a comparative study of eight Danish municipalities' approaches to climate change planning. The article has a focus on climate change plans, the municipalities' different approaches to carrying out climate change planning and on explaining the reasons for these differences from a position in new institutional theory. The article elaborates on sub-questions 1, 2 and 3. It produces knowledge on approaches to climate change integration through the climate change plans, the role of institutional mechanisms for climate change integration and the influence of these mechanisms and existing structures on the legitimacy strategies used by institutional entrepreneurs as actors for integration.

- Wejs, A. & Cashmore, M., (2013) Constructing legitimacy for climate change planning: A study of local government in Denmark, *Global Environmental Change* (Submitted).

This is an in-depth study of the climate change integration process in a single case study of Aarhus Municipality. The areas of investigation are reflected threefold in the article in regard to the municipal spatial plan, the SEA of the municipal spatial plan and the climate change plans. The article contributes by examining sub-questions 1, 2 and 3 by critically investigating strategies to create legitimacy for climate change integration. The article contributes with in-depth knowledge on the interrelated dynamics between institutional mechanisms within structure and agency and how that influences legitimacy building in the integration process.

- Wejs, A., Harvold, K., Larsen, S.V., & Saglie, I. L., (2013) Legitimacy building under weak institutional settings: Climate change adaptation at the local level in Denmark and Norway, *Environmental Politics* (Accepted).

This is a comparative study between two Norwegian and two Danish municipalities on integration of climate change adaptation. The area of investigation is climate change adaptation plans and the process of legitimacy building for integration. The article contributes to examining sub-questions 1, 2 and 3 from a positioning in institutional and learning theory. The article explains the linkage between learning and legitimacy building in relation to structure and agency. This is with a focus on the role of institutional entrepreneurs in learning processes and thus in building legitimacy for integration.

- Larsen, S.V., Kørnøv, L. & Wejs, A., (2012). Mind the gap in SEA: An institutional perspective on why assessment of synergies amongst climate change mitigation, adaptation and other policy areas are missing, *Environmental Impact Assessment Review* 33: 32-40.

This is a study of integration of climate change in SEAs of Danish spatial plans and the potential of SEA as an institutionalised tool to integrate climate change across sectors. The areas of investigation are thus spatial planning and SEA. The article contributes by examining sub-questions 1 and 3 by exploiting SEA's potential as a regulative legitimised tool to aid climate change integration into spatial planning. Furthermore, the article contributes by highlighting the potential of SEA to avoid tunnel vision in climate change by taking possible synergies and trade-offs into consideration.

- Kørnøv, L., & Wejs, A., (2013) SEA screening of climate change plans: A story of non-compliant discretion, *Environmental Impact Assessment Review* (Accepted).

The authors investigate the legal aspects of SEA of climate change plans as voluntary plans and SEA's potential in viewing climate change in a broader concept of the environment. The area of investigation is climate change planning and SEA, and the article contributes to examining sub-questions 1, 2 and 3 by investigating SEA as a regulative tool to legitimise climate change plans as administrative planning documents, and how it is used and interpreted by actors in practice.

Having introduced the background and purpose of the thesis and the five articles' contribution in fulfilling this purpose by answering the research question through the three sub-questions, we will now turn to Section 3 and the context of the research area.

3. The Danish Climate Policy Context

This chapter introduces the contextual setting for the empirical grounding of the thesis in the context of Danish climate change policy. The chapter provides a brief overview of the projected climatic changes for Denmark, an introduction to the Danish planning system and national climate change related policies, and an overview of municipalities' climate change efforts and challenges.

3.1 The Expected Climatic Changes in Denmark

To provide an insight into the challenges planning faces in regard to climate change, a brief review of expected changes is given with a focus on the impact of increasing temperatures on precipitation and a rising sea level in Denmark, which are the two main challenges of the effects of climate change in Danish cities. The climate is defined as the average weather over a 30-year period, and climate change is changes within these periods. The IPCC defines climate change as: 'any change in climate over time, whether the change is due to natural variability or as a result of human activities' (IPCC, 2001: p.2). Global temperature over the last 100 years has risen by 0.7 degrees Celsius (IPCC, 2007), a phenomenon known as global warming. In Denmark the mean temperature has increased by approximately 1.5 degrees Celsius since 1870, which is about double the global rise in the mean temperature. Within the same period of time, the yearly precipitation has increased by approximately 100 mm (Drews et al., 2011). The expected sea level rise is perceived to be a maximum 1.05 meters on the coastline of West Denmark facing the North Sea. The expected increase in precipitation and sea level is given in Table 1.

Table 1: Expected climatic changes for Denmark, calculated as change compared to the period 1961-90 under three climate scenarios A2, B2 and EU2C[1] (Danish Government, 2008: p.15).

Scenario	A2		B2		EU2C	
Time period	2006-2035	2071-2100	2006-2035	2071-2100	2006-2035	2071-2100
Land						
Annual mean temperature	**+0.6°C**	**+3.1°C**	**+0.7°C**	**+2.2°C**	**+0.7°C**	**+1.4°C**
Winter temperature	+0.6°C	+3.1°C	+0.7°C	+2.1°C	+1.0°C	+2.0°C
Summer temperature	+0.5°C	+2.8°C	+0.6°C	+2.0°C	+0.7°C	+1.3°C
Annual precipitation	**+2 %**	**+9 %**	**+2 %**	**+8 %**	**0 %**	**0 %**
Winter precipitation	+8 %	+43 %	+6 %	+18 %	0 %	+1 %
Summer precipitation	-3 %	-15 %	-2 %	-7 %	-2 %	-3 %
Maximum daily precipitation	+4 %	+21 %	+5 %	+20 %	+11 %	+22 %
Oceanic						
Mean wind	+1 %	+4 %	+1 %	+2 %	+1 %	+1 %
Maximum water level on the west coast		+ 0.45-1.05 m				
Oceanic and Land						
Maximum storm strength	+2 %	+10 %	0 %	+1 %	+1 %	+1 %

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[1] Two IPCC climate scenarios are used in the Danish climate adaptation strategy, that is, scenarios A2 (medium-high) and B2 (medium-low) and a scenario based on the EU's aim that the global temperature should not exceed a rise of 2°C compared to pre-industrial times (EU2C). Calculated uncertainty in the temperature calculations in Denmark is 1.5°C for A2 and B2 scenarios and 0.7°C for EU2C. This means that the temperature increase in the three scenarios with 90% probability will be between 0.7°C and 4.6°C in 2071-2100 (Danish Government, 2008: p.15).

The current main challenges are associated with increased precipitation especially related to heavier and more intense rainfall and stronger storms. The latter may include storm surges and heavy rainfall causing flooding from rivers as well as the sea, which is challenging for the many cities located along the Danish coastline. These current and projected effects call for action at the national as well as local level. This is to be seen in relation to the Copenhagen Accord of the COP15 where 114 countries agreed on a global temperature rise of a maximum 2 degrees Celsius (UNFCC, 2012). If the global rise in temperature is to be kept below 2 degrees Celsius, a country like Denmark, according to the IPCC, has to reduce its emissions by 25-40 % by 2020 and by 80-95 % by 2050 (IPCC, 2007).

3.2 The Danish Planning System

Before introducing the national policies related to climate change mitigation and adaptation in Denmark, this section provides a brief introduction to the Danish planning system to clarify areas of responsibility between the national, regional and local levels.

The form of municipal government in Denmark is de-centralised in the sense that municipalities have a high level of autonomy. The spatial planning system has been characterised by a strongly decentralised division of tasks since Denmark reformed the public sector in January 2007. This reform abolished the counties and created five popularly elected regional councils. The former 271 municipalities have merged into 98 municipalities. This reform changed Denmark's spatial planning system, and the Planning Act has since 2007 delegated responsibility for spatial planning to the Minister for the Environment, the five regional councils and the 98 municipal councils (Østergård & Witt, 2007). The municipalities are now responsible for both town and countryside planning, and delegate the municipal spatial plan as the key plan for urban development and land use (Østergård & Witt, 2007). Municipalities make sector plans within the frame of the national sector plans and collaborate with utility companies on water resource planning, natural habitat plans, waste management, waste water and sewer management, and heating plans. The regional councils' role is reduced to preparing regional spatial development plans that describe a vision for the region and are closely linked with a business development strategy prepared by regional economic growth forums. The regions' role is therefore formally limited and, in regard to climate change planning, it is at the national and especially the municipal level that climate change planning is taken forward.

SEA is the one planning regulation that cuts across the authority levels. As mentioned in the previous section, SEA includes the assessment of climatic factors amongst other environmental factors and is to be carried out for all plans and programmes prepared or adopted by an authority (at national, regional or local level). The authorities have to carry out a screening procedure of the plans/programmes to determine whether they are likely to have significant environmental effects. If there are significant effects, an SEA is needed. For some defined areas, SEA is mandatory, as when the plan or programme sets the framework for future development consent of projects listed in the Environmental Impact Assessment (EIA) Directive or the Habitats Directive (Directive

2001/42/EC). For all the plans mentioned above SEA is mandatory. In regard to climate change plans that are conducted voluntarily, it depends whether the plan is considered as a plan or a programme and thereafter whether the screening shows it has significant environmental effects.

In the following section, the climate change related planning undertaken by 2012 at the national and the municipal level, respectively, is outlined to set the contextual scene for local climate change planning.

3.3 The National Climate Policy Agenda

Though there have not been any requirements for the municipalities to make climate change plans, there are a few policies of relevance to the national policy agenda on climate change. Climate change planning is a field still undergoing development, whereas this section outlines the policies in a chronological time-frame relevant for the investigations carried out in the thesis, that is, policies committed to or decided upon around the period 2009-2012.

3.3.1 National Policy Goals

Denmark's effort within renewable energy sources, especially in regard to wind, started in the 1970s, as a grass-roots counter-reaction to rising oil prices, nuclear power and pollution in general. Wind power, however, proved to be good business and is today also known as 'the Danish wind adventure' because of the success of the wind industry. Denmark has since 1985 had multiple energy policy agreements focused on renewable energy, especially on wind energy and district heating supplied by natural gas (The Danish Energy Agency, 2012) and has today the long-term goal of an energy supply that will be 100 per cent based on renewable energy by 2050. This goal is manifested in the national Energy Agreement of 2012, which also sets out activities required to reach this goal (Danish Energy Agreement of 22nd March 2012). It is worth mentioning that, until today, Denmark has achieved the goals in the previous energy agreements.

Denmark's achievements within renewable energy are also reflected in the country's international commitments. Denmark signed the Kyoto Protocol in 1998, and whereas the European Union (EU) committed to an 8 per cent reduction, Denmark committed to a 21 per cent reduction in GHG emissions in 2011 compared to 1990 (Ministry of Climate, Energy and Buildings, 2012a). Furthermore, whereas, to replace Kyoto, the EU Climate and Energy Package (finally adopted in April 2009) has a GHG reduction goal of 20 per cent in 2020 compared to 1990, Denmark has committed to this goal and also set a national target of a 40 per cent reduction in 2020 compared to 1990 levels (Ministry of Climate, Energy and Buildings, 2012b). Also on the international scale, the result of the COP15 was documented in the Copenhagen Accord of 2009 with the goal of a maximum temperature rise of 2 degrees Celsius compared to pre-industrial levels. The EU interprets this as meaning that the global GHG emissions in 2050 are to be reduced by 50-80 per cent compared to 1990 levels, including the industrialised coun-

tries to reduce 80-95 per cent by 2050 compared to 1990[2] (EC, 2011b). Denmark has committed to this goal, which is also in line with the Danish Energy Agreement of 22nd March 2012, and the long-term goal of energy supply in 2050 to be 100 per cent based on renewable energy.

In regard to adaptation, the national policy agenda has been much weaker. In 2008 a national 'Strategy for adaptation to climate changes' was published (Danish Government, 2008), but it was vague, contained no enforceable requirements and had a focus on ad hoc planning. However, in regard to the EU Directive 2007/60/EF on the assessment and management of flood risks, the Danish Nature Agency and the Danish Coastal Authority in December 2011 identified ten areas in Denmark with a significant risk of flooding from storm surges or intense rainfall events. For all ten areas, local authorities must make risk management plans and it is expected that climate change will be included in these assessments (The Danish Nature Agency, 2012a).

After the national election in 2011, there was a change in government from the Liberal and Conservative parties to a three-party government between the Social-Liberal Party, the Social Democrats and the Socialist People's Party. The adaptation effort has been strengthened as part of the government platform. By the end of 2013, municipalities have to prepare action plans for adaptation for handling especially intense rainfall (The Danish Nature Agency, 2012b). Furthermore, the Danish Planning Act was amended in 2012 in order for the municipalities to be able to set adaptation requirements in zoning plans (Task Force for Climate Change Adaptation, 2012). Because these changes on adaptation have come into force recently, they are not included in the investigations and the articles presented in this thesis. However, this regulatory development shows that climate change planning is a continuous emerging field in planning.

3.3.2 Voluntary Initiatives

While the national policies have mainly focused on converting energy production to renewable energy sources, the emerging development of climate change plans can to a certain extent be ascribed to incentives encouraging voluntary engagement. As mentioned in Section 1, Denmark hosted the 15th Conference of Parties of the United Nations Framework Convention on Climate Change (abbreviated to COP15) in Copenhagen, in December 2009. Prior to the COP15 a few voluntary encouragements were put forward by the Ministry of Climate and Energy (The ministry is today, 2012, called Ministry of Climate, Energy and Buildings). One was the announcement of 'Energy Cities', where the winners were highlighted at the COP15 as best cases. Another was the development of a 'CO$_2$ calculator', a voluntary tool for local governments to calculate their yearly CO$_2$ emissions covering the community as a geographical area in regard to mitigation, developed by the national association of local authorities, Local Government Denmark, and the Ministry of Climate, Energy and Buildings (KL n.d.).

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[2] This is based upon the IPCC's calculations that to keep the global average temperature rise below two degrees (450 ppm CO$_2$e), the world's GHG emissions are to be reduced by half by 2050 in relation to 2000 and based upon a world population of 9 billion in 2050 (EC 2011b).

A third initiative came from Denmark's largest NGO, the Danish Society for Nature Conservation (DN), which initiated the 'Climate Communities Campaign' where municipal mayors commit to reduce the municipality's carbon emissions by 2 or 3 per cent per year (DN n.d.). To date, 73 out of 98 municipalities have joined the campaign, which is still running. In addition, Local Government Denmark has, amongst others, hosted information seminars and workshops to strengthen knowledge-sharing and inspiration between the municipalities. In regard to adaptation, the incentives from the national level have been weaker, but the national adaptation strategy included the establishment of a task force to run an online portal of municipal experiences on adaptation. The task force has in 2012 also undertaken the duty to strengthen cooperation with municipalities and help to develop local action plans (Danish Nature Agency, 2012b).

3.3.3 The Danish Municipalities' Climate Efforts

The focuses of the national policies on climate change are reflected in the municipalities' efforts on climate change. A survey from April 2010 conducted by the Danish climate think tank Concito (2010)[3] shows that 66 per cent of the municipalities calculate their GHG emissions for the municipality as a geographical area and that 57 per cent have adopted goals to reduce emissions. 16 per cent of the municipalities in the survey have goals on carbon neutrality, 27 per cent have goals for 20-30 per cent reduction for the majority, by 2020, and 14 per cent have chosen other types of reduction goals, e.g., per citizen or per annum. In regard to adaptation, only 16 per cent have an adaptation strategy (Concito, 2010). However, when it comes to implementation of activities in practice, the picture looks less promising and the survey concludes: 'The general picture is that the municipalities' climate activities far from always match the relatively ambitious goals' (Concito, 2010: p.11, own translation). In regard to reducing GHG emissions, the municipalities prioritise their own operations to a greater extent than on the municipal geographical area (Concito, 2010). The survey finds a connection between knowledge, goals, concrete activities and the barriers experienced, whereas the perceived barriers and challenges are greater among the most ambitious municipalities (Concito, 2010), indicating that they have a larger experience and insight into the challenges of climate change integration. The barriers are financial resources, a lack of national framework regulation, lack of experience internally among staff, lack of internal political consensus, and lack of a qualified knowledge base. The survey also concludes:

> 'a comprehensive climate action is hampered by the fact that climate change planning transcends the municipal administrations, and therefore it is an organisational challenge for municipalities to work strategically with their climate action. The governance structure complicates the process, from determining the local climate impact to the planning of a holistic climate change strategy to the implementation of specific initiatives'

> (Concito, 2010: p.19, own translation).

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[3] The survey was a questionnaire sent to all 98 municipalities, of which 60 participated, widely distributed over the whole country (Concito, 2010).

The survey also finds that the majority of the initiatives carried out in practice lie within the authority of the Technical Administration and those tasks overlapping several administrations prove difficult to coordinate.

Summary of Part I

Part I has introduced the thesis by elaborating on the state-of-the-art related integration of climate change into cities' planning practice and the relevance of this thesis. The research topic has been focused by clarifying the aim and goals of this research and further focused by the research questions and the five articles' contribution to answering these questions. The policy context of the research's empirical setting, Denmark, has been introduced with the expected climatic impacts and a brief overview of the Danish planning system. The experienced climatic impacts show a temperature rise double the global mean and an increase in precipitation especially in terms of more heavy rainfall. Since the Danish structural reform in 2007, the municipalities have been the main authority responsible for preparing for climate change. The focus from the national government since 1985 has been on renewable energy, and ambitious mitigation targets have been set. Prior to the COP15 in Copenhagen, voluntary incentives were put in place to motivate the municipalities to reduce their GHG emissions, which is also reflected in the municipalities' goals on mitigation. In regard to adaptation, the national strategy from 2008 is not reflected in the municipalities' work, and until 2012 adaptation has not been prioritised nationally. However, in terms of both mitigation and adaptation, implementation is lacking, which may be explained by the structural challenges of cross-sectoral coordination. This underlines the importance of creating knowledge on the institutional dynamics related to the process of climate change integration and the mechanisms that cause challenges for implementation in practice.

PART II
Research Design

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This part consists of *Section 4: A Critical Realist Point of Departure* and *Section 5: Methodology.* The purpose of Part II is to elaborate on the positioning of the thesis within philosophies of science and how that is reflected in the methodological and theoretical considerations behind the research presented in the articles that make up this thesis. Section 4 explores climate change planning and the focus of the thesis on agency and structure within a critical realist positioning in philosophies of science. Section 5 presents the methodologies used throughout the research studies of the thesis.

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4. A Critical Realist Point of Departure

This section elaborates on the position of this thesis in philosophies of science. It begins by explaining why critical realism has been the point of departure for this research, followed by a presentation of the ontology (theory of reality) and epistemology (theory of knowledge) of critical realism and how it is reflected in the thoughts behind this research. A philosophy of science discussion of critical realism is a discussion that I deal in depth with in the thesis, rather than in the articles. My primary focus of the articles was to use theory on institutions to explain and explore practice of climate change integration, whereas I have saved the more abstract and conceptual discussions for the thesis. In the following I explain my position within philosophies of science and how this position is reflected in my methodological approach and my perception of some of the key theoretical concepts of the thesis. Lastly, the section introduces the inference modes and thought operations behind the methodology, before the methodology itself is outlined in Section 5.

4.1 Why Critical Realism

Roy Bhasker is the thinker behind critical realism and developed it in opposition to the empirical realism of positivism (Næss, 2012). The strength of critical realism is its inclusion of both natural and social science by its ontology (Bhasker, 2010). Critical realism embraces and encourages interdisciplinary research from the perception that a narrow disciplinary focus will leave out important knowledge of the world (Næss, 2012). Climate change planning is an interdisciplinary field where the core knowledge is on: the impacts of changes in land use and the built environment, the role of planning in processes forming and changing the physical environment, and the professional methods (Næss, 2012). Thus it is a philosophy that encompasses the interdisciplinarity and ambiguity of climate change planning and governance that may be difficult to place within one philosophy:

> 'Even those who see climate change as an urgent issue, for the most part, lack a framework for coherently integrating the finding of distinct sciences, on the one hand, and for integrating those findings with political discourse and action, on the other'

> (Bhasker, 2010: p.vii).

My interest in the institutional dynamics of climate change and how it is perceived and integrated into planning reflects strands mainly from two directions within philosophies of science, realism and social constructionism. Realism acknowledges that the world exists without our knowing, essential from the perspective that climate change has causal powers that result, in given circumstances, in, e.g., a storm surge leading to the need for rethinking resilience-building and emergency management. Furthermore, critical realism proposes a way of combining a modified naturalism with recognition of the necessity of interpretive understanding (Sayer, 2000). In regard to the latter, critical real-

ists are distinguished from other realists by the perception that social reality consists of two levels: structure and agency (Danermark et al., 2002). I use the concept of structure and agency in my investigations of how officials navigate in existing structures when integrating climate change. Hereby, I also recognise that the world is to some extent socially constructed. Social constructivism argues that our knowledge of the world is socially constructed, and a strong social constructivist even argues that the world itself is socially constructed (Buch-Hansen & Nielsen, 2005). It is recognised that language cannot produce, for example, natural hazards and flooding (Danermark et al., 2002; Sayer, 2000), whereas critical realism disagrees with strong social constructivism, but acknowledges that our knowledge is socially constructed:

> 'Things are a little more complicated regarding the social world for it is socially constructed and includes knowledge itself and it therefore cannot be said to exist independently of at least some knowledge, though it is more likely to be past knowledge than that of contemporary researchers'

> (Sayer, 2000: p.11).

Nevertheless, when researchers change perception, Sayer (2000) argues, it is unlikely that this change of perception will change the studied phenomenon significantly. Buch-Hansen and Nielsen (2005: p.85) find that critical realism can be considered as a moderate form of social constructivism that builds on a more inclusive ontology (elaborated in the following section). However, social constructivism is criticised for conflating structure and agency. Conflation refers to the way that structure and agency share characteristics of one another, meaning therefore that they cannot be distinguished as two separate entities (Leca & Naccache, 2006). Climate change governance is entangled in an intermesh of structure and agency in the context of municipal organisations leaning towards a social constructivist positioning. The municipal organisations consist of institutional structures within which municipal officials act; however, these actors are not conflated with the structures of the municipal organisations, thus they are individuals of different constituents of other social structures and possess their own causal powers (Archer, 2010). The distinction between agency and structure becomes even more essential in climate change planning. Here there is implicitly a perception that agency and structure have different causal powers, hence it would not make sense to make plans if you did not believe they would have an effect on inhabitants' actions, and on the other hand it would not make sense to conduct the plans if the actors were not able to influence the structure (Næss, 2012). For example, the selection of means to reduce GHG emissions involves an implicit expectation that these means have a certain effect in achieving a goal on carbon neutrality. Within interpretivism, including most social constructivist positions, there is an emphasis on interpreting and understanding and a rejection of causal explanations, generalisation and prediction. Critical realism's perception of causality seeks to encompass causal powers in the perspective of natural science as well as social science (Næss, 2012), which is shown in the philosophy's ontology and epistemological orientation.

4.2 The Ontological and Epistemological Orientation of Critical Realism

Critical realism has a weight on its ontological orientation and less on epistemology. In the following I will present the ontology of critical realism and in Section 4.2.3 I will relate this world view to how it is epistemologically reflected in the thesis, before the inference and thought operations of the thesis are presented in Section 4.3.

4.2.1 The Transitive and Intransitive Dimension

Critical realism distinguishes between two dimensions of science; the transitive and the intransitive. The intransitive dimension is an ontology that recognises the existence of reality without human knowing and is hereby in line with the realism thinking. The transitive dimension involves our knowledge of the world and hereby includes critical realism's perception of epistemology. The transitive dimension is characterised by the theories, paradigms, models, concepts, descriptions, data etc. available at a specific time in an open system (Buch-Hansen & Nielsen, 2005). An open system, as opposed to a closed system, is a multi-causal system in which causal processes may produce different results in different contexts (Sayer, 2000). A closed system may be explained with the example of a lab experiment where a limited causal process is investigated from the assumption that if X then Y (Buch-Hansen & Nielsen, 2005). In an open system, a myriad of mechanisms, understood as emergent powers (Danermark et al., 2002) or causal forces (Buch-Hansen & Nielsen, 2005) influence reality, whereas social reality in particular is much more complex. In regard to structure and agency, Danermark et al. (2002) argue that structures may constrain actors to such a degree that the world may be regarded as a partially closed system. This discussion of open versus closed systems can be further clarified from critical realism's perception of the world being stratified.

4.2.2 The Perception of a Stratified World in Three Domains

Critical realism not only distinguishes between the world and our experience of it (Cornell & Parker 2010), but also perceives the world as being stratified between the empirical, the actual and the real (Sayer, 2000; Danermark et al., 2002; Næss, 2012; Buch-Hansen & Nielsen, 2005) and outlined in Table 2. The empirical domain includes what we observe and experience, and can be investigated by, for example, observing actors' actions. I examine produced documents such as the climate change plans, spatial plans, SEA and minutes of meetings, and conducting interviews. The empirical domain tells how interviewees interpret a certain phenomenon. Social constructionism limits its attention to the empirical domain, and is explicitly found in discourse analysis, where actors' subjective view of the world is rendered (Leca & Naccache, 2006). Realism also includes the actual domain (Næss, 2012), which is the domain where events happen. Events are certain occurrences resulting from one or a multitude of mechanisms that together form the event (Danermark et al., 2002). For example, a political decision on making a municipal climate change plan may occur as a result of a broader societal debate on climate change, a flooding incident or both. The empirical domain includes our interpretation of events, while the actual domain includes the *actual* events, which may also happen without our knowing about them. The real domain takes the concept of

realism one step further and includes structures, mechanisms and causal potentials that may produce events in the actual and empirical domain (Danermark et al., 2002; Buch-Hansen & Nielsen, 2005).

Table 2: The three domains of reality (Leca & Naccache, 2006: p.630).

	The empirical domain	The actual domain	The real domain
Observations	////////	////////	////////
Events		////////	////////
Structures			////////

From the perspective of institutional dynamics in the integration process of climate change, institutions exists within the domain of the actual, hence some institutions are so 'taken for granted' that actors may enforce them without perceiving them as institutions (Leca & Naccache, 2006). Critical realism perceives structures as the fundamental basis of a phenomenon, and argues that these structures and mechanisms do not happen randomly, they are ordered in different levels or strata, which in principal are endless, but can be broken down to: social reality as in the top of the hierarchy, which is above the biological, that is above the chemical which again is above the physical strata (Næss 2012). A very simplified example being that carbon dioxide consists of one carbon atom and two oxygen atoms: C and O_2. Accumulation of CO_2 in the atmosphere has causal powers that cause global warming. Social reality is much more complex and structures are, according to critical realists, the result of past actions that pre-exist the actors. This is in opposition to social constructivism, which believes that structure and agency co-exist (Archer, 2010; Buch-Hansen & Nielsen, 2005).

4.2.3 Critical Realism on Maintaining and Changing Structures

Against this backdrop of the real domain, I investigate the underlying structures and mechanisms that result in constraining or enabling the integration of climate change. I do this within a critical realist perception of structures. Structures pre-exist actors and, to act, actors have to use the structures by either reproducing or changing the existing structures (Leca & Naccache, 2006). Reproducing an institution does not require any specific effort, but institutional change or the creation of new institutions does, so actors such as institutional entrepreneurs must then go beyond the existing routines (Leca & Naccache, 2006). Here we can return to the discussion of the open and partially closed system, in which social reality is at the highest stratum where an unnumbered amount of mechanisms are present, and there is a great capacity for change. However:

> '*Any human organisation – from a family household to a public administration… is an example of such a pseudo-closed system. They may be understood as the result of intervention by the higher strata both in other strata and in themselves, with the aim of creating some degree of regularity and predictability*'.
>
> (Danermark et al., 2002: p.186).

In changing institutions, actors have to use the causal powers of structures, and because structures are pre-existing, actors will have to build on the existing institutional logics, which are cognitive principles that are necessary conditions (Leca & Naccache, 2006) and relate to what is perceived to be legitimate, appropriate and orthodox (Scott, 2008). From this follows that mechanisms are context-dependent and that some mechanisms may be activated in one situation but not in another (Buch-Hansen & Nielsen, 2005; Leca & Naccache, 2006). Critical realists reject the idea that a causal power will always generate the same effect in different contexts. Actors will therefore have to use the causal powers of structures depending on the context, e.g., the organisational field they want to operate in, because a given action may be perceived as legitimate within one field but not in others (Leca & Naccache, 2006). An institutional entrepreneur who seeks to change structures will have to select structures that, depending on the context, will ensure that their causal powers provide legitimacy for the actions of the institutional entrepreneur.

4.3 Scientific Inference and Thought Operation

The concept of mechanisms in critical realism is also reflected in their interpretation of inference. Inference refers to different ways of arguing and drawing conclusions in research in order to link observations of individual phenomena with general concepts (Danermark et al., 2002: p.79). There are in general three conceptualised inference modes: inductive, deductive, and abductive inference, while critical realism adds retroduction as a thought operation. Deductions are non-ampliative and certain: given that the premises are true, the conclusion must be true (Schurz, 2008). Ampliative means extending or something that adds to what is already known. Deduction refers to testing of hypotheses and, by confirming or rejecting these, revising the theory tested (Bryman, 2008). In contrast, inductions and abductions are ampliative and uncertain, which means that even if the truth of the premises is taken for granted, the conclusion may be false, and is therefore subject to further testing (Schurz, 2008). Inductions and abductions can be distinguished by their different objectives. Both aim to extend our knowledge beyond observation, but in two different ways. An inductive approach aims at inferring something about the future course of events. In contrast, an abductive approach aims at inferring something about the unobserved causes or explanatory reasons of the observed events. That abductions cannot be reduced to inductions follows from the fact that inductions cannot introduce new concepts or conceptual models; hence they generate theory on the basis of the empirical findings (Schurz, 2008; Bryman, 2008). In contrast, some kinds of abductions can introduce new concepts, which

Schurz (2008) terms creative abductive inference, in contrast to selective abductive inference, which selects the best explanatory theory. From abduction it follows that if another conceptual framework had been applied the results might have looked different. The difference between deduction and abduction, then, is that deduction proves that something must be in a certain way, while abduction shows how something might be (Danermark et al., 2002).

Critical realism adds retroduction, which is not an inference mode but more a thought operation thus it is not attached to a specific way of conducting research. Drawing on the domains of the empirical and actual, researchers will have to uncover mechanisms in the real domain that cause events in the actual domain and experiences and observations in the empirical domain. This is necessary since we cannot see the structures, only their effects. Because structures and mechanisms cannot be directly investigated, critical realists add retroduction as a thought operation where the core is transcendental argumentation (Danermark et al., 2002). Transcendental means to seek to determine the conditions necessary for experience, knowledge or understanding, assuming that these conditions cannot be the object of experience. Events are, therefore, explained by postulating and identifying structures and causal powers that generate the specific event (Leca & Naccache, 2006).

Having introduced the inference modes, this PhD thesis was initiated during an internship in a Danish municipality. My puzzlement with their approach to climate change integration can be regarded as an inductive point of departure, which has then developed into an iterative process based on an abductive logic where the understanding of the phenomenon is pivotal. Following an abductive logic involves discovering conclusions from circumstances and structures that are not given in individual empirical data, whereas conceptual development plays an important role in understanding and explaining the phenomenon (Danermark et al., 2002). The conceptual development of this thesis has included retroduction as transcendental argumentations to examine the mechanisms and causal powers that arise in the integration process as actors navigate in the existing structures and seek to maintain or change structures. I have further developed a conceptual framework that included structures and causal powers in the real domain from a new institutional theoretical positioning; this, to a greater extent, included agency and focused on causal explanations of emergent institutional mechanisms in the integration process of climate change and strategies for building legitimacy for this integration.

Traditionally, specific types of methods are related to the inference modes. Induction often relates to qualitative research methods, and deduction relates to quantitative methods (Bryman, 2008). From a critical realist perspective, one should not commit oneself to a particular research method without taking the properties of the phenomenon investigated into consideration (Danermark et al., 2002). This thesis takes its point of departure in creative abduction and uses mainly qualitative research methods, but also draws on other studies in order to provide a deeper understanding of the phenom-

enon of climate change integration. Retroduction is reflected in the thesis as thought operations related to causality in the conceptual framework and in the data analysis. The methods used in this thesis are presented in the following section.

5. Methodology

In this section the methodologies used throughout the studies behind the articles are elaborated. Taking a critical realist point of departure, I examine the events related to climate change integration in municipal administrations and the mechanisms that have generated these events. Related to the methodology, this means that, in the empirical domain, I investigate the officials' perception of climate change integration through interviews and content analysis of documents. It is through the analyses of these data that I seek to reveal the actual and real domain. The section starts by looking at the linkage between the thesis and a case study research design. Next the methods are presented, and the section ends by reflecting on the ethical aspects related to the methods.

5.1 An Investigation of a Phenomenon Involving Elements of Case Study Design

The articles collected together in this thesis all provide knowledge of the perception of investigating a phenomenon from the interrelations between agency and structure on the assumption that these define the phenomenon of 'climate change integration into planning practices'. Yin (2009) finds that separate studies, while sharing the same research question, often use different methods, which can then later be synthesised. This type of study, Yin (2009) argues, may describe a case study design that include a mixed method research approach; that covers an approach that combines qualitative and quantitative techniques, methods, approaches and concepts into a single study (Yin, 2009). From this perspective, the thesis can be regarded as a case study including five embedded units of analysis documented in five articles. Within these five embedded units, I have used separate case studies in the individual studies. This type of case study design allows the researcher to address more complicated research questions and make a richer and stronger collection of data, which is an advantage in investigating a complex phenomenon. Thus it allows the researcher to examine the phenomenon from different perspectives and by different means (Yin, 2009). However, relying on different studies also weakens the internal validity of the thesis in regard to less transparent relationship between the applied methods and the conclusions. On the other hand, its external validity is strengthened so that the results can to a greater extent be generalised beyond the specific context (Bryman, 2008).

This interpretation of a case study may vary from the original perception of case study research, taking its point of departure from a single case or carefully selected cases, often with the aim of generalising. The initial purpose of the investigations documented in the five articles has been somewhat different from the aim of understanding the institutional dynamics in climate change integration. However Yin (2009, p.19) finds that case study research is also often used to explain causal links in real-life interventions, which here are the investigation of causal links between agency and structure in the integration process. This also reflects the ontological and epistemological positioning of

the thesis and my choices of theories. One interpretation of case studies, which is in line with the critical realism reflection, is that theory development is essential in the initial phase in order to determine which data are to be collected and strategies for analysing the data (Yin, 2009). Climate change planning is a new topic and the existing knowledge base on the process of climate change integration is relatively poor, and the study has therefore been characterised as an explorative study (Yin, 2009), where I use the logic of abduction and retroduction to develop new conceptual frameworks. This has been an on-going interrelated process between the theoretical positioning, the state of the art on climate change and the empirical observations in the embedded studies (elaborated in *Section 6: Theory*, Figure 2).

5.2 Methods of Data Collection and Analysis

Case study research may use a mixed method approach to understand and explain the phenomenon investigated. This research has used a variety of qualitative research methods supplemented with other investigations and is elaborated in the following paragraphs. The methods of data collection are described on an overall level across the articles, whereas more details are provided on the specific investigations in the individual articles.

5.2.1 Literature Studies

Literature studies have been carried out throughout the project period to obtain knowledge on institutional theory and stay up to date on research directly related to cities' climate change planning and governance. The literature study on the state of the art has been carried out during the project period. The main focus has been on cities' climate change integration and governance, whereas the literature study of SEA has been from the perspective of investigating SEA as a potential tool for climate change integration. The literature study had its greatest influence on the theoretical development, where the continuous review of the state of the art and the findings from the case studies clarified the need for refinement of the theoretical concepts in order to encompass the institutional dynamics in the integration process. I took an explorative approach to institutional theory, grappling with different approaches, as the different analytical frameworks in the articles show. I kept returning to the concepts of mechanisms and legitimacy and the interrelations between structure and agency, whereas attention has been paid to the ongoing criticism of the limited role given to agency in new institutional theory. I turned to new conceptions of new institutional theory and governance to incorporate the role of agency that I found in the climate change literature and in my case studies.

5.2.2 Content Analyses of Documents

Literature studies provide knowledge of the state of the art of the existing research, but to gain knowledge on current practice, content analysis of documents, such as plans and minutes of meetings, are useful. A content analysis is an approach that seeks to quantify the content in documents in terms of predetermined categories and in a sys-

tematic and replicable manner (Bryman, 2008), Appendix A is an example of such a content analysis.

In this research the content analyses have mainly been conducted in regard to covering certain topics with the purpose of identifying climate-related measures in the plans. In this regard, four samples characterise the content analysis of document studies for this thesis: a screening of municipal webpages, official planning documents, minutes of meetings and applications for the Energy City award. Documents appearing on the internet are a growing source of information (Bryman, 2008) and the Danish municipalities are to a great extent putting more and more effort into publishing and updating their webpages. Several plans are digitalised and the municipalities promote themselves in varies ways on their webpages. The 98 Danish municipalities' webpages were used to screen their climate change effort in terms of climate change plans and other climate information they publish. Besides the additional information on the webpages, the document studies consisted of official documents in terms of municipal spatial plans and climate plans accessible from the municipal homepages. A total sample of 48 climate change plans was reviewed. Furthermore, applications for the Energy City award were provided by the Ministry of Climate and Energy[4], and Aarhus Municipality provided internal minutes of meetings[5].

The investigation of the planning documents is characterised as content analysis carried out as structured document studies. The content analysis of the climate change plans collected all the means mentioned in the plans into categories in order to provide an overview of the means included and whether the municipalities included synergies and trade-offs between the means (see Appendix A). This analysis was elaborated with interpretation of sentence formulations in the planning documents to define whether the specific plan was subject to SEA according to the SEA Directive's definition of a plan and programme and the Directive's requirements on screening and SEA, see Table 3. The interpretation of meanings in formulations in regard to the legal compliance with the SEA Directive the validity of the study is important. Validity refers to 'the integrity of the conclusions that are generated from a piece of research' (Bryman, 2008: p.32). Therefore, two lawyers with expertise in the SEA Directive were contacted and interviewed specifically on interpretation of these formulations.

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[4] The applications included the municipalities' descriptions of the organisations of their CC work and the CC work to date. The Ministry's award was prior to the COP 15 and the first announcement took place in autumn 2008 with 13 applications, while the second announcement was in spring 2009 with 12 applications. In the first round the following municipalities applied: Albertslund, Egedal, Frederikshavn, Kolding, Copenhagen, Lolland, Middelfart, Samsø, Skive, Solrød, Sønderborg, Thisted and Aarhus. In the second round Albertslund, Egedal, Frederikshavn, Lolland, Thisted, and Aarhus applied again, and six new applications came from Middelfart, Frederiksberg, Herning, Kalundborg, Odense, and Ringkøbing-Skjern. The six Energy Cities are Copenhagen, Kolding, Skive, Herning, Albertslund and Aarhus.

[5] All minutes of meetings related to the spatial planning process of Aarhus Spatial Plan 2009-2030 are reviewed, including minutes of meetings from January 2006 to December 2009 on three levels: the Municipal Technical Committee, the steering group of the spatial plan and the project group of the spatial plan. The minutes are records of decisions and are used to get an insight into the process and to frame interview questions. The study was carried out in the spring of 2010 and is used in Wejs & Cashmore (2013).

Table 3: Scheme for defining whether the climate change plans were subject to screening or SEA according to the SEA Directive (used in Kørnøv & Wejs, 2013).

Plan	Goal or vision level	Activity level	Appendix 1, 2, 3 or 4 of the SEA Directive	Screening or SEA

Another content analysis was made of Aarhus Municipality's spatial plan, SEA and three climate change plans. A climate check scheme was developed to make a comparative study of the planning documents. An outline of the scheme is provided in Table 4. The climate means are listed in the left column and are checked with a cross (shown in the scheme for illustrative purposes) when the means are included in the respective plan. Remarks related to the specific means are made in the right column.

Table 4: Climate check scheme (used in Wejs & Cashmore, 2013).

CLIMATE MEANS	Municipal Spatial Plan 2009	SEA 2009	Climate Change Plans 2008-2009 2010-2011 2012-2015	Remarks
MITIGATION				
Reduction of energy consumption in buildings				
-	x		x x	
-	x	x	x x	
-				
Reduction of energy consumption in transportation				
-	x	x	x	
-	x	x		
-	x	x		
Redistribution of energy consumption to renewable sources				
-	x	x	x x	
-	x			
-	x			
CO$_2$ uptake through vegetation and water				
-	x	x	x x	
-				
-	x	x	x	
ADAPTATION				
-	x		x x	
-	x		x x	
-		x		

Another qualitative assessment was made of the minutes of meetings of the spatial planning process in Aarhus Municipality (specified in Wejs & Cashmore (2013)). The content analysis of these minutes was based on identifying when and in what situations climate change was discussed on the agenda. The date of the meeting, the subject discussed and the person making the statement were noted in a table and used as background information to form interview questions (used in Wejs & Cashmore (2013)). Yet, another qualitative assessment was made of applications for the national 'Energy City' award, provided by the Ministry of Climate and Energy in spring 2009, and this assessment was used as background information for case selection and forming interview questions (used in Wejs (2013)).

5.2.3 Participant Observations

Participant observation was carried out in two instances from two different approaches. One was a *complete participant* and the other was an *observer-as-participant* (Bryman, 2008). The complete participant role was in regard to an internship in Aarhus Municipality's climate secretariat from August 2008 to August 2009. This approach included complete involvement since the researcher was a fully functioning member of the social setting (Bryman, 2008). I deviated from the complete participant role in the sense that it was not a planned observatory study in regard to the research; nevertheless, this stay provided insight into the implications of the integration process of climate change. Because it was an internship, the product was a student semester report including an analysis of the stay and concrete assignments, which provided the research with initial notes and interpretations of the initial phases of the integration process in Aarhus Municipality. There is a risk of 'going native' (Bryman, 2008: p.411) or failing to understand situations (ibid: p.412); however, opportunities are also created in terms of getting to know people (ibid). Attention to these issues was taken into consideration and the fact that the actual study was conducted after the internship gave me a detached role as a researcher. Nevertheless, the stay increased the ecological validity of the research that relates to whether the social scientific findings are applicable to the natural social settings. This stay provided me with insights on the codes of conduct and on officials' perceived implications for climate change integration. It also made it possible to gain access to key interviewees and ask very explicit questions, so providing the research with very detailed knowledge (presented in Wejs & Cashmore (2013).

The observer-as-participant approach was applied in a session of integrating climate change in SEA screening at two environmental assessment seminars for Danish practitioners in Aalborg and Copenhagen in autumn 2011 (specified in Kørnøv & Wejs (2013)). By this approach the researcher is much more detached than a complete participant. The practitioners were aware of the researchers' role when hosting a session. In this setting the role was much more passive and mainly had the purpose of gathering information on the practitioners' interpretation of the SEA screening requirements in regard to climate change in a setting where they were free to ask the experts questions and interact in discussion with the experts and other practitioners. The discussions from both seminars were recorded and transcribed and subsequently analysed in regard

to practitioners' experience and perceptions on including climate change in SEA screening.

5.2.4 Qualitative Semi-Structured Interviews

The thesis contains a total sample of 33 interviews conducted in relation to my own empirical studies; 20 interviews in Wejs and Cashmore (2013), 11 in Wejs (2013) and 2 in Kørnøv and Wejs (2013). The qualitative interview form was used because of an emphasis on the interviewees' own perspectives and reflections. A quantitative approach would have a focus on measurement of key concepts and thus reflects the researcher's concern (Bryman, 2008) and does not to the same extent provide in-depth knowledge of a situation. The qualitative interview makes it possible to ask new questions, to make the interviewee elaborate, or to provide new information and the order of the questions can be changed. The qualitative interview has a more informal approach with the function of a conversation. This is an advantage when the purpose is to gain richly detailed answers (Bryman, 2008). All interviews are carried out as semi-structured interviews defined as 'an interview that has the purpose of gathering descriptions of the interviewee's life world in regard to interpreting the meaning of the described phenomenon' (Kvale, 1996: p.19, own translation). The life world in this research has been the interviewed person as an official in a municipal organisation and the phenomenon is the integration process of climate change.

Of the total sample of 33 interviews, five were conducted as telephone interviews. These were also prepared as semi-structured interviews in situations where the interviewee was hard to reach. For semi-structured interviews there are few differences in the responses in a telephone interview compared to in-person interviews (Bryman, 2008). There were no notable differences experienced between the telephone interviews and in-person interviews in this research in terms of the length and depth of the responses. It was the aim to conduct single person interviews with the purpose of creating a safe atmosphere for the interviewee to speak freely.

In a semi-structured interview an interview guide consisting of a list of questions is used to cover specific topics. The questions were not always followed in the order outlined in the guide, but were more or less always covered. The interview guide was prepared on the basis of the content analyses of documents and the link between the conceptual frameworks and critical realism. An example of a question included in the interview guide used in Aarhus Municipality was: 'When you were first employed in Aarhus Municipality, what thing(s) do you remember noticing?' and this question was followed up by the question: 'What did you find to be the most important to fit in?' These examples of questions relate to organisational culture and thus provided some basis information on the cultural structures that climate change would have to be integrated in. These structures have causal powers that may be visualised when they are exceeded and appear as situations where actions are perceived as illegitimate. The different statements were compared to provide a picture of a common municipal culture and also subcultures.

The interviews were transcribed and categorised in spread-sheets. The different responses were categorised according to each interview question with the purpose of investigating differences and similarities in the perceptions, and in this way to provide a differentiated platform of the responses for the analysis. This was also important in regard to strengthening the objectivity of the study in relation to my complete participant observer role previously in the case study of Aarhus Municipality. Respondent validation was used in order to corroborate or check initial findings. In Wejs and Cashmore (2013), follow-up interviews were held with key interviewees to confirm and elaborate on previous statements by the interviewee, and to update information on the climate change integration process since the previous interviews. Respondent validation was also used, as mentioned in Section 5.2.2, in regard to corroboration of interpretation of the SEA Directive.

5.2.5 Collaboration with Other Authors and use of Their Data

Collaborating with other authors has made it possible to compare results and include other results, referring to the embedded case study approach, which makes it possible to explore the phenomenon by a richer data collection and from more perspectives than would otherwise be possible (Yin, 2009). Collaborating with other and more experienced authors has expanded my empirical as well as theoretical insights. Through co-development of theoretical conceptual understandings, discussions and knowledge-sharing have contributed to a deeper understanding of climate change planning as well as being a researcher in general.

I have worked together with other researchers in regard to my own empirical studies (see Wejs & Cashmore, 2013; Kørnøv & Wejs, 2013). Working with other authors on my empirical data has strengthened the internal validity of this work, ensuring the integrity of the conclusions generated from the research (Bryman, 2008). Having more experienced researchers to analytically assess my work, and being able to discuss the findings with another researcher has improved the work. Furthermore, two of the five articles of the thesis are based either in part or solely on other authors' empirical work (see Larsen, Kørnøv & Wejs 2012; Wejs, Harvold, Larsen & Saglie, 2013). Wejs, Harvold, Larsen & Saglie (2013) draw on interviews conducted in three different studies, whereas I contribute with empirical findings in a Danish case. The article's purpose and theoretical frame was developed between the four authors at a three-day workshop at the Norwegian Institute for Urban and Regional Research (NIBR) in Oslo in the autumn of 2011. Larsen, Kørnøv and Wejs (2012) draw on a document study of the integration of climate change in 153 environmental reports of regional plans, municipal spatial plans, local zoning plans and sector plans supported by interviews. Larsen and Kørnøv carried out the empirical work, whereas I contributed to the analytical framework and the analysis of the interviews in collaboration with the other authors. Drawing on others' empirical work, from a critical realist positioning, strengthens the understanding of the phenomenon of climate change integration. However, in regard to Wejs, Harvold, Larsen and Saglie (2012), it also weakens the internal validity in regard to the less transparent relationship between the methods of the different studies. On the other hand, as

this study is based on previous studies and was initiated because of similar findings, its external validity is strengthened so that its conclusions to a greater extent can be generalised (Bryman, 2008).

5.3 Ethical Research Principles

Conducting research from a qualitative research approach often also involves ethical questions, which in this thesis have mainly been important in regard to the interviewees. Research ethics are a set of principles on how researchers should conduct their studies and use their data. This is important in order to respect and cause no harm to the participants; in this research this is mainly related to social harm that might be inflicted if certain information is released that should not have been, causing individuals to be treated differently or even discriminated against. Ethical research principles often include codes of conduct for good research practice. In Denmark there is no such regulation in regard to ethical principles in social science, but the Danish Social Science Research Council (2002) gives five guiding principles for ethical questions in social science:

1. The researcher must consider whether the specific research project is consistent with good scientific standards. The researcher must also consider whether dependence of any kind can affect the research work in violation of professional and ethical principles.
2. The social scientist should conduct the research in the interest of the people and communities who are the subject of research, and of other groups which may be involved in the research work and its results. The researcher must avoid inflicting unnecessary nuisance and inconvenience or unnecessarily violating the privacy of others.
3. The researcher responsible for the data collected or made available for research should not proceed to disclosure of that data in a form which permits identification of persons who are subjects of, or have contributed information to, the research.
4. The researcher should obtain the consent of those who are personally involved in the research. The researcher must make it clear that participation is voluntary.
5. The researcher should make his/her research available to the public and present it in accordance with general scientific principles and avoid distorted or incomplete representations.

(Danish Social Science Research Council, 2002, p.1, own translation)

Especially Principle 1 has been important in the case study of Aarhus Municipality, since I worked as an intern in the Climate Secretariat. In terms of quality of research, this means that I have insider knowledge of the process and some of the issues they meet in the integration process. This made it possible for me to ask specific and critical questions, so providing the research with very explicit knowledge on the perception of these issues. On the other hand, it has also been extremely important to assess and analyse the interviews critically to make sure that the analysis provides a balanced picture

of all the interviewees' perceptions and opinions. This has been achieved by categorising the interview answers pragmatically in a spread-sheet according to each interview question in order to visualise each interviewee's reflection on the same matter. Furthermore, a second author contributed to the article (Wejs & Cashmore, 2013) and participated in follow-up interviews, contributing with external and critical reflections.

Principle 2 has in this research been taken into consideration as general good practice. Communication prior to and after the interviews was mainly e-mail correspondence. Prior to the interviews, a request for an interview was sent by e-mail, stating the overall topic of the research and the purpose of the interview. At the interview, the interviewees were informed that the interview was to be recorded and that the interview was anonymous, and if I chose to quote the interviewee, I would ask for their permission beforehand. This was restated after the interview. The quotes were sent by e-mail in Danish and translated English versions for the respective interviewees to approve, and they had the chance to change their use of words as long as the meaning of the sentence did not change.

In regard to Principle 3 a number coding was used in two studies to ensure the anonymity of the interviewees. In Wejs and Cashmore (2013) each interviewee was assigned a number, which was used as citation in the article in order to show the variety or consistency of certain perceptions among the interviewees. Furthermore, a number coding was also applied in Wejs, Harvold, Larsen and Saglie (2013) when it was not possible to obtain consent for the interviews and we were thus depending on others' contacts. This leads to Principle 4, where consent for interviews was obtained informally by e-mail apart from in the article by Wejs, Harvold, Larsen and Saglie (2013), which was based on previous studies. The researchers therefore agreed to use a numbering system for the interviewees and the cities, and so consent was not obtained from the interviewees for this article. Principle 5 can here be interpreted as achieved through this thesis.

Summary of Part II

Part II has elaborated on the positioning of the thesis within philosophies of science and the methodologies used in the empirical studies. The thesis takes a critical realism strand and follows an ontology that recognises the existence of the world beyond human knowing, a realist positioning that, however, also recognises that human knowledge of the world is socially constructed. Critical realism argues that to understand and explain the real, as opposed to human experience and interpretation of the world, a researcher must examine the underlying structures and their mechanisms. This positioning is reflected in the thesis by a research focus on institutional mechanisms that arise between structure and agency in the integration process of climate change. Structures have causal powers which actors will have to use strategically in order to change these structures and integrate climate change into municipal administration. The thesis uses an abductive inference and also uses retroductive thought operations to link observable events of climate change integration to the mechanisms that have caused these events. Studying the phenomenon is pivotal in critical realism and thus one should not commit oneself to one particular research approach or type of methodology. The thesis can be regarded as an embedded case study using mixed methods, where I use qualitative studies and I also draw on others' studies. The thesis gains by elaborating on more empirical data from others' studies, and thus provides a deeper understanding of the phenomenon of climate change integration. However, this also means that the methodological approach is less transparent and consistent, and this may be regarded to be a weakness of the thesis. In regard to the empirical studies' generalizability and transferability, the thesis is an embedded case study, thus it depends on the individual studies. These are represented in the individual articles in *Part IV Results & Analysis*. Within the frame of critical realism the concepts of mechanisms and structures are fundamental and these concepts are also reflected in this thesis' theoretical strand, which will be elaborated in the following *Part III Theory*.

PART III
Theory

This part consists of *Section 6: A New Institutional Positioning as an Iterative Process*, and *Section 7: An Institutional Conceptual Framework*. The purpose of Part III is to explain the logic and theories behind the conceptual framework of the thesis. Section 6 provides a theoretical discussion of the concepts of agency and structure within the frame of new institutional theory and emerging theories herein. Section 7 presents a summation of the conceptual frameworks developed in the five articles. This framework draws on critical realism and emerging strands within new institutional theory and looks specifically at mechanisms and legitimacy as two key theoretical notions.

6. A New Institutional Theoretical Positioning as an Iterative Process

This section begins by presenting the logic of the development of the conceptual framework of the thesis; hence the framework has been developed through an abductive and iterative process, rather than a deductive process through testing one theoretical positioning. Subsequently, the concepts of governance and institutions are defined in relation to the thesis, followed by a discussion of the theoretical strand within new institutionalism. On the basis of the elaborated theory as an iterative process, outlined in this section, the following Section 7 presents a summation of the conceptual framework of the five articles.

6.1 The Logic of the Thesis' Conceptual Development

The conceptual development of the thesis can be gathered under the umbrella of theoretical perspectives on climate change governance, which I investigate with a point of departure in new institutional theory. The conceptual development is created from the logic of abductive inference and as an iterative dynamic process between theoretical perceptions within new institutional theory, empirical observations and state-of-the-art on climate change planning (illustrated in Figure 2). As mentioned in Section 4, through abduction it may be possible to understand unobserved causes or provide explanatory reasons for observed events by introducing new concepts or conceptual models. Through this iterative process, outlined in Figure 2, I developed conceptual frameworks to analyse and explain the institutional dynamics in climate change integration. In this process, new concepts were introduced from logic of creative abduction (Schurz, 2008). Introducing new concepts can be related to the thesis being carried out as an explorative study (cf. Section 5.1). As knowledge on climate change governance, especially at the intra-institutional level in local governments, is very limited, I found that I needed to make some conceptual modifications. These modifications are illustrated in Figure 2, as arrows between the state-of-the-art, the empirical observations and new institutional theory.

Elaborating this logic illustrated in Figure 2, the departure point of the thesis was my empirical observations of the integration challenges in a Danish municipality, and my curiosity in understanding these challenges and how the officials sought to solve them. New institutional theory has its strength in explaining these challenges. Nevertheless, during this iterative process it became evident that new institutional theory has its limits in including the role of actors. In addition, in the existing literature on climate change, institutional entrepreneurs showed to be one of the main drivers for integrating local climate change planning (cf. Section 2). However, the empirical observations also showed that, in many cases, existing structures challenged the integration process, as well as structures sometimes were exploited to enable integration. Consequently, the

concept of structure was not only a constraining factor in my findings, but the concept of agency and the enabling role of structures were also essential. Against this backdrop, I developed and re-developed new conceptual frameworks that encompassed the role of agency in new institutional theory to investigate and understand the institutional dynamics at the local level. A summation of these frameworks is provided in Section 7.
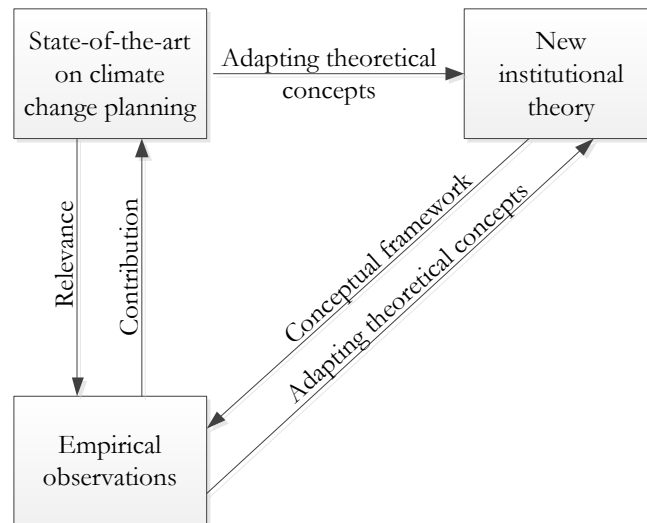
Figure 2: Interrelated process between the theoretical positioning, state-of-the-art and empirical observations.

Before elucidating the conceptual development it is helpful to show the linkage between the two concepts by defining governance and institution within the frame of the thesis. Furthermore, the scholarly debate on the definition of institutions is extensive and thus a definition in the scope of the thesis is needed.

6.2 Defining Governance and Institutions

The context of the theoretical approach is climate change governance, which was briefly introduced in Section 2. However, in regard to my conceptual framework, climate change governance is the overall concept in which I use institutional notions to explore the characteristics through a lens of climate change integration. Therefore, this section will further elaborate on the linkage between governance and institutions by defining the concepts within the frame of the thesis.

As mentioned in Section 2, governance in general often includes key words such as rules, legitimacy, effectiveness, new processes, arrangements and methods (Kooiman, 1999). Kooiman (1999) defines governance, stating that:

> 'All those interactive arrangements in which public as well as private actors participate aimed at solving societal problems, or creating societal opportunities, and attending to the institutions within which these governing activities take place.' (p. 70).

Within this definition, governance includes both public and private actors, societal problems and opportunities, and the internal processes of institutions. This is in line with the outset of the thesis by encompassing local governments and their partnerships with external actors, their approach as two fold between problems and solutions and the thesis' focus on the internal process of climate change integration. Furthermore, in Kooiman's (2010) later work, he defines interaction as:

> 'a mutually influencing relation between two or more actors or entities. In an interaction an action/intentional level and a structural/contextual level are distinguished' (p. 231).

This definition encompasses structure and agency, and hence provides the definition of governance with the concept of agency, without perceiving the two concepts as the same (cf. Section 4). This notion is important, hence critical realism perceives these two concepts as a dualism, as opposed to social constructivists that perceive the two concepts as indistinguishable. Furthermore, Kooiman (2010) finds that the social-political problem solving and opportunity creation, noted in the definition, are embedded in institutional settings.

However, institutional settings may mean various things, hence the scholarly debate on defining institutions is extensive. The scholarly debate on this issue is often related to the difference between institutions and organisations (see, for example, Heclo, 2008: pp. 46-66). One perception is that organisations and institutions are the same (see, for example, Dosi & Coriat, 1998: p. 4). Another is related to organisations as a subset of institutions, and institutions as a subset of cultural and social norms (Jepperson, 1991). A third also identifies institutions as 'the rules of the game' and organisations as 'players of the game' (North, 1991: p. 97). However, focusing on municipal organisations and the internal processes, I take a strand where organisations equal institutions. For this reason, I find Jessop's (2001) definition of institutions useful, which states:

> 'Social practices that are regularly and continuously repeated, that are linked to defined roles and social relations, that are sanctioned and maintained by social norms, and that have a major significance in the social structure.' (p. 1220).

Jessop (2001) relates institutions to repeated social practices supported by relations, roles, sanctions and norms. This definition allows various institutions to exist within one municipality, while similar institutions may exist in many different municipalities. Second, Scott (2008) also includes sanctions, norms and culture by defining institutions as consisting of three pillars: the regulative, the normative and the cultural-cognitive (See e.g. Table 7), and thereby also breaks institutions down to encompassing both formal and informal structures, for example, from what is legally required, to culturally legitimate practices. Within Scott's (2008) definition of institutions, I seek to encompass all three pillars in my investigations. SEA is the primary regulative mechanism I investi-

gate within the regulative pillar, thus requirements for climate change planning at the local level in Denmark, until today, have been absent. However, existing regulations may also influence the integration process by either supporting or constraining climate change integration. The normative pillar may be reflected in, for example, how different professional disciplines conceive and interpret particular societal issues differently. The cultural cognitive pillar, revealed as cognitive taken-for-granted practices and shared beliefs, is exposed in the municipal work culture or the culture related to a specific organisational profession or subunit (Scott 2001; Scott 2008).

The definitions of Jessop (2001) and Scott (2001, 2008) form the backbone of the thesis' understanding of institutions and I use the concept of institutions as indistinguishable with the municipal structures in which municipal officials act. From a critical realist perspective I add the understanding of material structure so for example a flooding incident can be the mechanism that initiate action for climate change. The role of actors and structures are now elaborated in the following section.

6.3 Emerging Strands within New Institutional Theory

The thesis takes a theoretical stand in new institutional theory from the perspective of having the intra-institutional processes in municipal organisations as the main area for investigation. Institutional theory has the potential to explain the mechanisms involved in the processes that shape the municipalities' different approaches. Thus it 'seeks to explain the difference between the formal structure and the actual processes in practice' (Mejlby et al, 1999: p. 147). The formal structures are, for example, the organisational hierarchy divided in divisions, and departments separated in professional disciplines, formally steered by elected politicians in the city council where practice, for example, includes formal procedures for processing and public hearings. The actual processes, however, may be more complex, involving norms and cultures that define the perception of legitimised practice and may be regarded as informal structures.

Institutional theory emerged in the 1950s and 1960s in parallel with the notion of open systems, which was introduced into the studies of organisations and transformed the existing approaches by emphasising the importance of the wider context of the environment (Battilana & D'Aunno, 2009; DiMaggio & Powell, 1991; Scott, 2008). Institutional theory, as opposed to organisational theory, proposes that actors' behaviours are determined by their need to be regarded as legitimate in their institutional environment (Battilana & D'Aunno, 2009). While theories of organisation neglect environmental influences on actors' decisions, institutional theory takes these influences into account by assigning a key role to legitimacy considerations in actors' decision-making processes (Battilana & D'Aunno, 2009). Where institutional theory introduced regulative and normative forces into the research of organisations, new institutional theory occurred during the 1970s and 1980s due to the recognition of the importance of cultural-cognitive forces (Battilana & D'Aunno, 2009; DiMaggio & Powell, 1991; Scott 2008). Hence, institutional theory is often referred to as the 'old' and the 'new'. Furthermore, new institutional theory has grown in popularity among social sciences and has devel-

oped in various disciplines and traditions. This thesis draws on strands within the sociological and political traditions, and ties thoughts from emerging strands herein that emphasise the role of agency in institutionalisation.

6.3.1 Scandinavian Institutionalism

A long-running criticism of new institutional theory is its limited capacity to explain the durability and mutability of institutions, and the debate on the importance of structure and agency (Battilana & D'Aunno, 2009). There has been a tendency to focus on how institutions constrain action, with much less work conducted on institutions as productive phenomena that facilitate action (Lawrence et al., 2009). Old institutionalism accounted for the concept of agency in creation of institutions and in institutional change, however, new institutional theory evolved with a focus on explaining organisational homogeneity and isomorphism (Battilana & D'Aunno, 2009; DiMaggio & Powell, 1991). These studies often implicitly assumed that organisations and individuals passively adapt to institutions (Battilana & D'Aunno, 2009: p. 36). Since the 1990s, new institutionalists have had a greater emphasis on explaining institutional change and the role of agency in creating change and, to some extent, returning to elements of old institutionalism. Nevertheless, the criticism of both old and new institutionalism is the overemphasis on how structures constrain agency and to ignore how institutions are created and maintained, and thereby present an oversocialised view of agency (Barley & Tolbert, 1997; Lawrence et al., 2009). This view is partly due to the fact that institutionalisation as a process is underdeveloped in new institutional theory (Barley & Tolbert, 1997). However, in the Scandinavian tradition for organisational and institutional studies and in new and emerging strands within new institutional theory, there is a larger emphasis on institutionalisation as a process. Scandinavian research within organisational and institutional theory has developed its own approach to institutional theory, and may be termed 'Scandinavian institutionalism' (Boxenbaum & Pedersen, 2009: p. 178). It has developed through network collaboration, initially with prominent American institutionalists such as James G. March, W. Richard Scott and John W. Meyer, which among others, resulted in the establishment of the Scandinavian Consortium for Organizational Studies (SCANCOR) in 1988, based at Stanford University[6]. SCANCOR was established to advance research and development in the area of organisational studies and to facilitate and support collaboration among scholars at Stanford University and in the Scandinavian countries (Boxenbaum & Pedersen, 2009; SCANCOR, n.d.). Scandinavian new institutional studies are more interested in studying intra-organisational dynamics than in the structuration of organisational fields, which is the main topic in the dominant new institutional literature (Boxenbaum & Pedersen, 2009). March (2003) explains this focus in the Scandinavian studies: 'Rather than telling us

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[6] I participated in a SCANCOR PhD course in Helsinki, August 2010, and had lectures by Professor W. Walter Powell, among others. During my visiting scholarship at Columbia University, I took time to visit SCANCOR at Stanford University and participated in one of their weekly seminars. Throughout my PhD, I have interacted and discussed various matters of new institutional theory with other Scandinavian PhD students affiliated with SCANCOR. It is evident that my work reflects a Scandinavian approach to organisational studies and, thus unintentionally, my interaction with SCANCOR affiliates may have influenced my thought development in my research.

something about organisations, they tell us something about how we might come to understand something about organisations' (p. 416). Thus, there is an interest in understanding how organisations perceive and interpret institutional pressure and how these affect everyday practice. There is an engagement in practice and research that combines institutional theory with practice-oriented literature (Boxenbaum & Pedersen, 2009). This approach involves a tradition for critically navigating between American and European traditions, in particular, which, as Czarniawsky and Sevon (2003) state:

> 'requires a great openness to other academic disciplines and further confirms a transdisciplinary character of organisation theory, with its roots in economics and engineering, but also with strong links to sociology, psychology, and anthropology.' (p. 13).

Scandinavian institutionalism produces knowledge of the complex processes that unfold internally in organisations and which were reflected in some of the American literature in the 1970s, but were ignored in favor of investigating field-level rather than intra-institutional dynamics (Boxenbaum & Pedersen, 2009).

The approach in this thesis has a Scandinavian foundation in regard to its intra-institutional focus, its practice-oriented approach and its combination of institutional theory with practice-oriented theory. The attention is process-oriented and draws on emerging strands within new institutional theory that emphasise the role of agency in organisational responses to institutional pressures and mechanisms in institutional change.

6.3.2 Actors and Agency in Institutional Studies

The traditional emphasis in new institutional theoretical work concerns the ways in which institutions constrain actions and proposes that institutions determine certain preferable forms of behaviour in order for actors' behaviour to be regarded appropriate and legitimate. This perception of agency was challenged when institutional theorists became interested in institutional change (Battilana & D'Aunno, 2009). Scott (2001) argues that if we recognise that multiple institutional systems interact, compete for attention, constrain some actors and enable others, a fuller picture of the dynamics is captured. The emerging strands within new institutional theory have started to place greater emphasis on process rather than structure through understanding the mechanisms by which agency is associated with institutional change (Battilana & D'Aunno, 2009; Boxenbaum & Pedersen, 2009; Czarniawska & Sevon, 2003). Hence, there is a need to 'reorient[s] these traditional concerns, [by] shifting the focus to understanding how action affects institutions' (Lawrence et al., 2009: p.1), and thus more fully encompass agency in institutional theory in order to investigate the role of agency in institutional change and institutionalisation of new areas, such as climate change.

The stronger process-oriented focus overlaps with structuration theory developed by Anthony Giddens in the 1970s and 1980s, as a reaction to the dualism in the social sciences between theories which are 'strong on action, weak on institutions' on the one

hand, and theories which are 'strong on institutions, weak on action' on the other (Arts & Van Tatenhove, 2006: p.23-24). In general, agency refers to individual or group abilities (intentional or otherwise) to affect their environment, whereas structure refers to context: the material and ideational conditions which define the range of actions available to actors (Arts & Van Tatenhove, 2006: p.23). Structuration theory can contribute to institutional theory in conceptualising the interrelationship between actors and their institutional environments. Giddens' perception of structures as 'dual' means that structures do not only constrain agency, but may also enable agency in the sense that certain knowledgeable actors are able to exploit existing structures in innovative and creative ways (Giddens, 1984). Agency and structure are understood as a duality rather than a dualism of two separate concepts, whereas decisions are neither the product of structure or agency alone: they are co-produced (Archer 2010, Hansen et al, 2013). Structuration theory provides a complementary framework for insight into processes, however, is criticised for conflating structure with action (Barley & Tolbert, 1997; Battilana & D'Aunno, 2009). During the 1990s, structuration theory has been subject to considerable criticism, particularly in regard to its emphasis on the subjectivist side of the duality of structure, as Giddens claims that structures only exist in human conduct and memory. With this position, structures are somewhat dissolved to actions, which is contrary to the ability of structures to produce constraints and be reproduced. In addition, it is also argued that if structure and agency are mutually constitutive, it is difficult to examine their interrelationship empirically (Arts & Van Tatenhove, 2006). Critics of structuration theory, such as critical realists, believe that structure exists independent of human agency, because structures are of a different order and logic (Arts & Van Tatenhove, 2006). From a critical realist perspective, Archer (1996) argues:

> 'Structures (as emergent entities) are not only irreducible to people, they pre-exist them, and people are not puppets of structures because they have their own emergent properties which mean they either reproduce or transform social structures rather than create them.' (p. 71).

However, both new institutional theory and structuration theory argue that institutions and actions are indistinguishable and that institutionalisation is best understood as a dynamic, ongoing process (Barley & Tolbert, 1997). I recognise that, to some extent, structure and agency are interrelated and may in some cases be difficult to separate, for example, a municipal official may have worked within a municipal department for many years and thus have a mind-set that follows the municipal structures without questioning these structures. However, in this regard, Arts and Van Tatenhove (2006) argue that it can be useful to use an 'analytical dualism' of agency and structure as opposed to a 'duality of structure', otherwise it is problematic to analyse actors on the one hand, and structure on the other (Arts & Van Tatenhove, 2006: p.24-25).

Giddens (1984) also accept the dualism of agency and structure in order to analyse one of the two at the methodological level (not in theory). Nonetheless, he adopts an agency centred analysis for the most part (Arts & Van Tatenhove, 2006). Additionally, some

critics of previous work on the concepts of agency and structure have either overemphasised how structures constrain action and neglect the role of institutional entrepreneurs, or overemphasised the role of institutional entrepreneurs, ignoring that all actors, including entrepreneurs, are embedded in an institutionally defined context (Battilana & D'Aunno, 2009; Lawrence et al., 2009). From the perspective that traditional institutional theory have a focus on structures, and structuration theory tends to be agency centred, there is potential to explore this dualism of structure and agency by investigating institutional dynamics from a balanced approach between the two theories. Applied to institutional theory, this dualism means that institutions shape people's practices that constitute and reproduce institutions (Battilana & D'Aunno, 2009: p.43).

One element of agency that has received particular attention is the notion of institutional entrepreneurs. The new strands in new institutional theory seek to provide a more balanced perspective of structure and agency without 'depicting actors either as "cultural dopes" trapped by institutional arrangements, or as hypermuscular institutional entrepreneurs' (Lawrence et al., 2009: p.1). Institutional entrepreneurs were noted, in Section 2: State-of-the-art, as individual champions that posses a certain drive by which they manage to leverage resources to create new institutions or to transform existing ones (Maguire et al., 2004). This is not ascribed to their individual qualities, but rather by their position within a set of social relationships and structures inside a broader institutional environment, which may influence how creative institutional entrepreneurs can be (Campbell, 2004). This is also noted by Battilana and D'Aunno's (2009) definition of institutional entrepreneurs: 'An actor's engagement with the social world that, through the interplay of habit, imagination, and judgment, can both reproduce and transform an environment's structures' (p.46). Furthermore, Crouch (2005) describes institutional entrepreneurs as individuals that:

> 'seek ways to do things which until now have been impossible. They cast around for elements of institutions that they could recombine in unusual ways at opportune moments in order to produce change'

> (Crouch, 2005: p.3).

Institutional entrepreneurs thus manage to use structures to create opportunities, and in regard to critical realism, they use the causal powers of structures. However, following Scott's three pillars of institutions, Campbell (2004) argues that these opportunities are not unlimited thus determined by structures, stating that:

> 'If an entrepreneur's institutional location limits the range of innovations that can be imagined cognitively… then it may also limit the range of innovations that will be normatively appropriate or legitimate.'

> (Campbell, 2004: p.75).

Furthermore, the possibilities for institutional transformation increase if new principles and practices are introduced. This change most likely occurs as an evolutionary, rather

than abrupt, process of bricolage, outlined as actors' recombination of locally available institutional principles and practices in ways that generate change (Campbell, 2004). This transformation of structures does not necessarily happen as a smooth and easy process; most likely, the institutional entrepreneurs will have to navigate between the existing structures and the causal mechanisms that occur in this process. This will appear as negotiation between actors, a puzzlement to agree upon and development of new institutional rules and norms which, through this process, will build legitimacy for action. This process is therefore also a learning process, and is necessary to create a new institutional platform within the existing institutional system (Scott, 2008).

Having explained the development of the conceptual framework as an iterative process, and elaborated on the theoretical background of the thesis, I will now turn to the conceptual framework of the thesis.

7. An Institutional Conceptual Development

This section outlines the conceptual framework of the thesis. The framework has been developed, as described in Section 6, as an iterative process through the investigations of the five articles. The conceptual framework presented here is a summation of the more analytic frameworks used in the articles. In this section, I draw on my position within the emergent strands of new institutional theory, including the concepts of agency and structure presented in the previous section. Against this backdrop, the following will focus on two concepts within new institutional theory, legitimacy and mechanisms, as useful analytical notions. Subsequently, the framework is presented in Section 7.2.

7.1 The Concepts of Institutional Mechanisms and Legitimacy

From a new institutional theoretical approach, I focus in particular on institutional mechanisms and the legitimisation of climate change integration. Integration is among the early stages of institutionalisation, in which examining mechanisms is helpful in explaining the institutional dynamics involved in this process:

> 'How and why does institutionalisation occur? An important part of the answer to these questions is to examine the mechanisms involved in creating and sustaining institutions. *Mechanisms* focus attention on how effects are produced.'
>
> (Scott, 2008: p.121, original emphasis).

Furthermore, Scott (2008) states that the 'how' and 'why' questions, to a wide extent, have been neglected in regard to explaining institutional effects. Mechanisms are defined within Scott's (2008) three pillars as coercive, normative and mimetic mechanisms. Empirically, the three mechanisms interact; however, they tend to originate from different circumstances (DiMaggio & Powell, 1991). Scott (2008) adopts the three terminologies from DiMaggio and Powell (1991), who define these in regard to isomorphic structures. Isomorphism is a process of homogenisation (DiMaggio & Powell, 1991: p.149), that is, a modification of organisational characteristics to comply with the surrounding and specific environment which the organisation is a part of. The concept of isomorphism is useful in explaining the occurrences of similarities across an organisational field; however, it has its limits in examining intra-organisational mechanisms in a situation of institutional change. Mechanisms are also defined by Scott (2008) as 'a delimited class of events' (p. 122), which is slightly different from the conceptual discussion provided in Section 4, where, according to critical realism, mechanisms occur from causal forces that may or may not result in events at the actual domain. Campbell (2004) interprets mechanisms as processes that are responsible for the causal relation between variables. In other words, mechanisms connect 'cause' with 'effect', and if we do not understand the causal mechanisms then we cannot say how one variable affects another variable (Campbell, 2004: p.63). This is in line with a critical realist understanding of mechanisms, and adding the concept of agency, actors, as well as structures, possess the

ability of causal forces. As mentioned in Section 4, according to critical realists, structures and actors possess different causal powers. In order to create legitimacy for climate change integration, actors will have to use the causal powers of structures strategically, meaning they will have to know how to act to bypass constraints. Understanding these mechanisms therefore sheds light on the processes responsible for institutionalisation.

The concept of legitimacy is important to institutional theory, hence it is based on the notion that to continue to persist, organisations such as municipalities must convince larger publics that they are legitimate entities worthy of support and therefore they must conform (or appear to conform) to the institutional norms of their environment. Legitimacy is therefore also a force that constrains change and rewards the adoption of widely used and accepted practices (Battilana & D'Aunno, 2009: p.35). In relation to the institutionalisation of a new area, it is important that this area is perceived as legitimate and that the actions of agency to promote institutionalisation are also regarded as legitimate. Thus, legitimacy in this thesis is in line with the definition of Suchman (1995), who states that:

> 'A generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.' (p.574).

Scott (2008) identifies legitimacy as derived from varies sources and differs depending on whether it is related to regulative, normative or cultural-cognitive structures. For the regulatory pillar, legitimacy is related to a normative belief in laws and regulations, thus confirming to rules creates legitimacy. Under the normative pillar, legitimacy is founded upon a belief in the appropriateness of certain societal norms, and is created through perceived social obligations. Legitimacy, under the cultural-cognitive pillar, is embedded in taken-for-granted codes of conduct, cultural practices and ways of knowing, whereas legitimacy tends to go unquestioned under routine circumstances. An element of legitimacy building for climate change integration is the fact that climate change planning oftentimes is conducted voluntarily. Given the lack of national guidelines, local action to adapt to the effects of climate change can be characterised as carried out in an 'institutional void' (Hajer, 2003). This void becomes even greater as climate change is a new area in planning; it is cross-sectoral and norms or traditions to support the integration of climate change across municipal departments and professions are non-existing. Legitimacy building is a necessity when acting in an institutional void, and Hajer (2003) finds that this is also a learning process for the parties involved when solutions are to be developed. Examining the mechanisms and the effort for building legitimacy for climate change integration as this institutional void is filled (Hoffmann, 2011) also provides knowledge on the initial characteristics of climate change governance at the local level.

By introducing agency to the institutional concepts of mechanisms and legitimacy, actors can routinely reproduce institutions without being aware that they are socially con-

structed. However, when actors move beyond this cognitive effort, it involves a more reflexive form of thought. This is necessary for actors to see contradictive information to the existing structures and see the potential for questioning taken-for-granted routines and assumptions, and finally the possibility for institutional change (Lawrence et al., 2009). When actors evaluate their actions, their understanding of context and structures evolve, which potentially leads them to challenge the existing governance structures (Hoffmann, 2011), and thus also involves a learning process. This strand of the role of agency does not neglect the concept of structures, as institutions are supported by mechanisms involving established laws, norms or codes of conduct. Thus, it requires actors with a drive to move beyond these taken-for-granted routines, and also involves political and cultural actions (Lawrence et al., 2009).

Now, having introduced the main concepts of the theoretical strand of the thesis, the thoughts behind the conceptual framework are presented.

7.2 Conceptual Framework

With the aim to provide a more balanced view on the dualism of agency and structures, institutional mechanisms are important to clarify how structures are either maintained or changed. Focusing on the mechanisms related to legitimacy building for the integration of climate change, it is possible to examine the institutional dynamics that constrain or enable integration. This is done from different angles in the articles presented in *Part IV: Results & Analysis*, whereas the conceptual framework in Figure 3 is a summation of the frameworks used in the articles.

Figure 3 draws on Scott's (2001, 2008) definitions of legitimacy in regard to his three pillars of institutions and Campbell's (2004) understanding of mechanisms. The concepts of agency and structure are added to Scott's pillars to visualise the importance of bringing in both concepts in an examination of institutional dynamics by focusing on institutional mechanisms and legitimacy. The figure consists of two overall horizontal levels: structure and agency. Structure is based on Scott's (2008) three pillars of institutions. Inspired by critical realism and emerging strands within new institutional theory, I added the concept of agency, and actors' ability to influence and change structures, specifically in regard to legitimacy building. However, my understanding of structure and agency is positioned within critical realism and thus I believe that structures pre-exist actors, while actors have to navigate within these structures and must use their causal powers to create legitimacy. Institutional entrepreneurs are actors that play an important role in regard to agency, and the mechanisms that arise between structure and agency when they seek to integrate climate change into planning practices creates an interesting analytical focus. The mechanisms are shown in the figure as double way arrows, thus illustrating an inter-dynamic process within and between the institutional pillars, and between structure and agency.
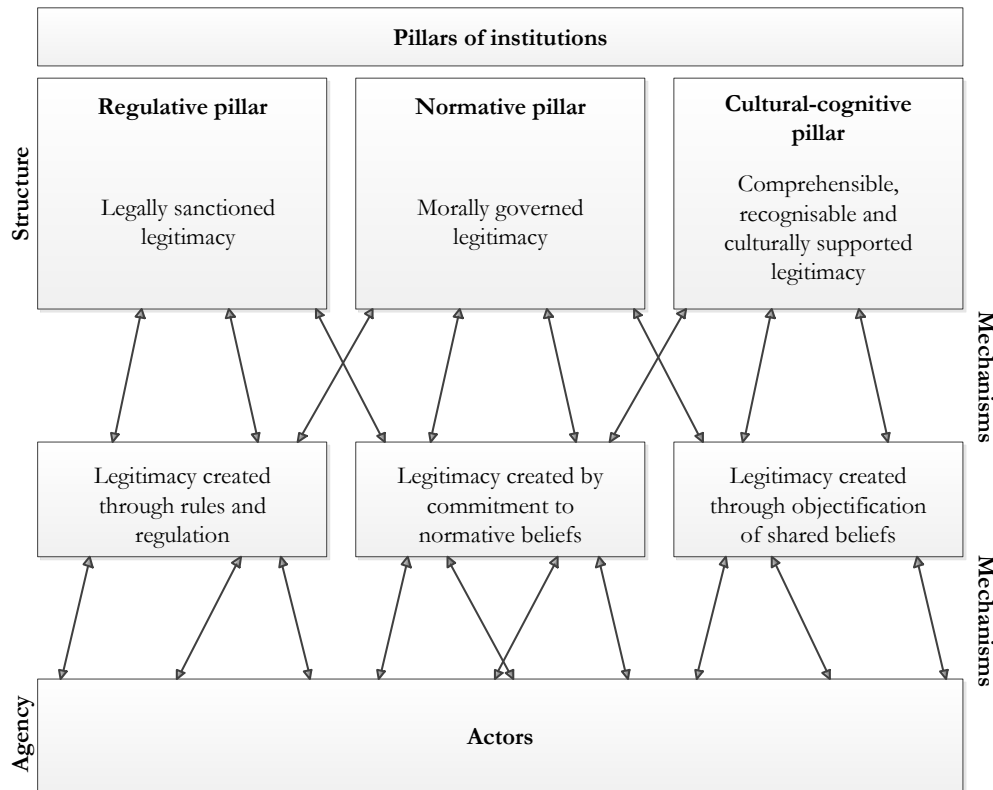
Figure 3: The conceptual framework of the thesis as a summation of the five articles.

In regard to the three pillars of institutions, the regulative pillar is investigated in the thesis, particularly regarding the SEA and compliance with the SEA Directive's demand for assessing climatic factors as a regulatory mechanism for climate change integration. Furthermore, existing rules and regulations related to climate change integration may constrain the process. As well, new regulations in the area may enable integration. The normative pillar and legitimacy created through commitment to normative beliefs include obligation to emerging voluntary agreements on climate change. However, in general terms, it also includes defining normative professional methods (DiMaggio & Powell, 1991). The cultural cognitive pillar and legitimacy created through objectification of shared beliefs involve the development of social consensus among actors concerning climate change planning and governance and the increasing adoption by other organisational units and actors on the basis of that consensus (Scott, 2008; Tolbert & Zucker, 1996).

The three pillars are not always easily distinguished and are often interrelated. Nevertheless, the weight of the three pillars and the weight of structure and agency are not evenly distributed among the analytical frameworks in the articles. In the following *Part IV: Results & Analysis*, the first three articles presented (Wejs, 2013; Wejs & Cashmore, 2013; Wejs, Harvold, Larsen & Saglie, 2013) have an emphasis on the normative and cultural cognitive pillars and aim at a balanced perception of structure and agency. The last two articles presented (Larsen, Kørnøv & Wejs, 2012; Kørnøv & Wejs, 2013) have an emphasis on structure and the regulatory pillar, where SEA as a regulatory mechanism for climate change integration is investigated. Larsen, Kørnøv and Wejs (2012)

have a mainly structural focus, whereas Kørnøv and Wejs (2013) also discuss the role of agency related to SEA. Section 8 will further introduce the articles and their individual focus in regard to the conceptual framework.

Summery of Part III

Part III has explained the logic of the theoretical development and theoretical considerations behind the conceptual framework of the thesis. I have explained the development of the conceptual model as an iterative process between the empirical studies, the state-of-the-art on climate change planning and governance and new institutional theory. Several concepts have been discussed and defined: governance and institutions, agency and structure, and mechanisms and legitimacy. These concepts have been discussed in relation to critical realism, Giddens' structuration theory and emerging strands within new institutionalism, including Scandinavian institutionalism. I argue for a more balanced perception between structure and agency than what is originally outlined in new institutional theory and structuration theory. Against this backdrop, a summation of the conceptual frameworks used in the articles has been outlined and shows the connections between the presented theoretical concepts which are linked to a critical realism perception of mechanisms and causal powers. The framework is developed from an outset in Scott's three pillars of institutions, and I added the concepts of actors and mechanism in regard to legitimacy building. The framework provides a more balanced perception of structure and agency in regard to examining mechanisms related to legitimacy building within an institutionalisation process.

PART IV
Results & Analysis

This part consists of *Section 8: Introducing the Five Articles* before the five articles are presented in Sections 9, 10, 11, 12 and 13.

Section 9 presents the article: Wejs, A. (2013) Integrating climate change into governance at the municipal scale: An institutional perspective on practices in Denmark. *Environment and Planning C* [Submitted].

Section 10 presents the article: Wejs, A. & Cashmore, M. (2013) Constructing legitimacy for climate change planning: A study of local government in Denmark. *Global Environmental Change* [Submitted].

Section 11 presents the article: Wejs, A., Harvold, K., Larsen, S.V., & Saglie I. L. (2013) Legitimacy building under weak institutional settings: Climate change adaptation at the local level in Denmark and Norway. *Environmental Politics* [Accepted].

Section 12 presents the article: Larsen, S.V., Kørnøv, L. & Wejs, A. (2012) Mind the gap in SEA: An institutional perspective on why assessment of synergies amongst climate change mitigation, adaptation and other policy areas are missing. *Environmental Impact Assessment Review,* 33: 32-40.

Lastly, Section 13 presents the article: Kørnøv, L., & Wejs, A. (2013) SEA screening of climate change plans: A story of non-compliant discretion. *Environmental Impact Assessment Review* [Accepted].

8. Introducing the Five Articles

This Section introduces the articles in relation to the conceptual framework presented in Section 7, before they are presented in Sections 9, 10, 11, 12 and 13. Some background information for the articles is provided in Appendix A, including a review of the content of the Danish municipalities' climate change plans. Moreover, Appendix B presents a book chapter on climate change planning as a new challenge in local planning practice by Wejs, Sperling and Kørnøv (forthcoming). Although this chapter is in Danish, it provides background information from a more practice-oriented perspective of climate change planning in Denmark.

Each of the articles contributes with reflections of the research question with different weights and emphasis on the theoretical elements outlined in the conceptual framework. In Section 7, the conceptual framework is a summation of the analytical frameworks used in the articles and it also reflects my positioning in critical realism with its understanding of mechanisms and duality of structure and agency. As mentioned in Section 4, critical realism is not reflected as the philosophy of science in the articles, hence the primary focus of the articles was to explain and explore the empirical reality of climate change planning and governance. Critical realism thus reflected in the articles through the concepts of mechanisms and structure and agency. This introduction to the articles elaborates on the different angles of the conceptual framework reflected in them, and delivers guidance for understanding the logic between the articles when they are presented individually in the following sections.

The first article presented, Wejs (2013), is a study of eight Danish municipalities' approaches to climate change planning and governance, as a new planning area carried out in an institutional void. The article uses an analytical framework based on different conditions in the decision-making processes. The article examines the mechanisms that have initiated climate change planning in the eight municipalities and explains how these mechanisms have influenced their approach to climate change governance. The article focuses on the normative pillar and how legitimacy is created on the basis of normative perceptions of securing local development and complying with existing planning procedures. It also focuses attention on the cultural-cognitive mechanisms that are activated in cross-sectoral coordination, when integration challenges existing taken-for-granted practices.

The second article presented, Wejs and Cashmore (2013), is an in depth single case study of Aarhus Municipality. It takes a point of departure in an analytical framework based on structure and agency in regard to the internal and external environment of the municipal organisation. The article aims at having a balanced perception of structure and agency, and seeks to outline the role of constraining and enabling mechanisms in the integration process. The article focuses on legitimacy building of climate change integration through the use of existing internal structures and through establishment of

new structures externally to the municipal organisation. Attention is primarily on the normative and cultural-cognitive mechanisms in relation to the spatial planning process and the climate change planning process, respectively.

The third article presented, Wejs, Harvold, Larsen and Saglie (2013), compares the integration of climate change adaptation in two Danish and two Norwegian municipalities. The article develops an analytical framework based on legitimacy building in relation to learning processes and thus has a normative and cultural-cognitive focus. The four cases are two municipalities that can be regarded as forerunners in climate change planning, and two municipalities that can be regarded as more conventional in their approach to climate change adaptation. The article is slightly more agency centred by putting attention on the role of agency of institutional entrepreneurs in initiating learning processes and creating legitimacy for climate change integration.

The fourth article, Larsen, Kørnøv and Wejs (2012), is a study of climate change integration in SEA reports of Danish spatial plans. The article takes a point of departure in SEA as a regulative mechanism for climate change integration from a mainly structural perspective. The implications of not addressing cumulative mechanisms in regard to synergies between mitigation and adaptation are discussed, as well as the synergies between these and other policy areas. Furthermore, the article explains the lack of synergies addressed in SEA practice from an institutional perspective, based on Scott's pillars to clarify which regulative, normative and cultural-cognitive mechanisms influence SEA practice on climate change integration.

Finally, the fifth article, Kørnøv and Wejs (2013), investigates the environmental and legal consequences of the SEA practice in regard to Danish climate change plans. The article takes a point of departure in the SEA Directive as a regulatory framework for investigation of Danish SEA practice of voluntary plans. It has a regulative and structural point of departure and considers regulative legitimacy of the climate change plans when they are not environmentally assessed. The article discusses agency, taking place through discretion in regard to normative and cultural-cognitive interpretations of SEA concerning climate change plans as voluntary plans. As well as legal and democratic consequences, herein lies the missed opportunity to use the broad environmental scope of SEA to avoid unintended environmental causal effects.

The concepts of mechanisms and legitimacy are reflected in all five articles in relation to the regulative, normative and cultural-cognitive aspects of institutions, and with different emphasis on the role of structure and agency in climate change integration. Having introduced the articles in relation to the conceptual framework, the individual articles are presented in the following sections. The findings are synthesised *in Section 14: Conclusion and Research Contribution.*

9. Integrating Climate Change into Governance at the Municipal Scale: An Institutional Perspective on Practices in Denmark

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10. Constructing Legitimacy for Climate Change Planning: A Study of Local Government in Denmark

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11. Legitimacy Building under Weak Institutional Settings: Climate Change Adaptation at the Local Level in Denmark and Norway

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12. Mind the Gap in SEA: An Institutional Perspective on Why Assessment of Synergies Amongst Climate Change Mitigation, Adaptation and Other Policy Areas are Missing

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13. SEA Screening of Climate Change Plans: A Story of Non-Compliant Discretion

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PART V
Conclusion

Part V sets out the overall contribution of the thesis, presented in two sections. *Section 14: Concluding Discussion* reflects on the research question and the three sub-questions. *Section 15: Contribution and Directions for Future Research* emphasises the main contributions of the thesis and points towards directions for further research.

14. Concluding Discussion

This PhD thesis has examined the institutional implications of climate change integration based on the concepts of structure and agency in relation to institutional mechanisms and legitimacy. These implications have been studied in relation to three planning areas: climate change planning, municipal spatial planning and strategic environmental assessment (SEA). Climate change integration has been examined in regard to both the contents of these planning documents and the planning processes behind the plan-making of these documents. This section starts by summarising the findings of climate change integration with regard to the plan documents and is followed by a concluding discussion on the processes of climate change integration. The concluding discussion ends with a reflection on the positioning of the developed conceptual frameworks of the thesis within critical realism.

14.1 What the Plan Contents Tell us About Climate Change Integration

This thesis has examined the content of Danish climate change plans and SEA reports of municipal spatial plans. The climate change plans and the SEA reports show a greater focus on issues related to climate change mitigation than on adaptation. In the review of 42 climate change plans, 24 included both mitigation and adaptation, 16 included mitigation only, and two included adaptation only. The same pattern is found in the content of SEA reports, as climate change is integrated into 57% of the SEA reports (corresponding to 85 of the 149 reports). Mitigation is integrated into 51% of the SEA reports, while adaptation is integrated into 14.8%, and only 12% of the SEA reports include both mitigation and adaptation. Moreover, synergies and trade-offs between climate change mitigation and adaptation measures are rarely mentioned in the climate change plans and SEA reports. However, 26% of the climate change plans and 9.4% of the SEA reports mention synergies in relation to other environmental factors (Larsen, Kørnøv & Wejs, 2012; Kørnøv & Wejs, 2013; Appendix A). The SEA provides the opportunity to secure a broad assessment of environmental effects; hence, the SEA Directive includes the assessment of cumulative and synergetic causal effects, which with regard to climate change would provide an assessment of possible future effects including mitigation, adaptation and other environmental concerns. However, since only one of the Danish climate change plans has been environmentally assessed through SEA, this potential has not been exploited (Kørnøv & Wejs, 2013) and with the emphasis on mitigation, there is a risk of tunnel vision focused e.g. on energy. For example, using agricultural land for energy crops may cause an increase in the import of the substituted crop, an increase in food prices and an increase in the environmental footprint.

The Intergovernmental Panel on Climate Change (IPCC) originally perceived mitigation and adaptation as two different approaches (e.g. Briesbroek et al., 2009), and this understanding also seems to be reflected at the national and local level. This is supported by Denmark's historical focus on renewable energy, which thus provides a more sol-

id platform for mitigation, whereas adaptation appears to be perceived as a new challenge. Furthermore, the original understanding of the assessment of 'climatic factors' in SEA was focused on local conditions (Larsen, Kørnøv & Wejs, 2012), and the change of focus to global issues does not yet seem to have extended to the tool in practice. The integration of climate change into planning through the use of SEA, as well as the integration of climate change plans into the municipal administration, may be seen as an institutionalisation process. The SEA Directive was implemented in Danish law in 2004; however, its demand for cross-sectoral coordination in a fragmented municipal organisation is constrained by existing procedures. There are possibly several reasons for this situation, which may be explained by normative and cultural-cognitive factors. These may together be part of the explanation for the lack of assessment of synergies and trade-offs in SEAs and climate change plans. Part of the explanation is also due to discretion and different interpretations of when a certain environmental impact is assessed as 'significant' (Kørnøv & Wejs, 2013).

Though this research shows that climate change is mentioned in an increasing proportion of SEA reports of spatial plans (Larsen, Kørnøv & Wejs, 2012), SEA is not used strategically as a regulatory mechanism for climate change integration or to create legitimacy for climate change integration. With regard to integration, it is the climate change plans that mainly fulfil the function of an integration tool. The gap between the climate change plans and the spatial plans and SEAs may be explained by the locating of the units responsible for the climate change plans elsewhere in the municipal administration, found in this research as often placed in the environmental departments (Wejs, 2013, supported by Bulkeley, 2010, CONCITO, 2010). SEA is the only planning tool today that makes requirements with regard to climate change. However, in this research another cross-sectoral area, Local Agenda 21 (LA21), has been indicated as being a potential tool for aiding integration (Wejs, 2013). LA21 has been mandatory since 2000 for municipal strategies and it can be included in municipal spatial planning strategies; although there are no set requirements to include climate change, the municipalities can choose to do so. This research indicates that municipalities that in the 1990s which were already involved in ambitious LA21 work today experience fewer difficulties in integrating climate change into these structures (Wejs, 2013). The success of these municipalities' efforts may be explained by the fact that they took advantage of the national incentives for LA21 at the time and became front-runners in this area, rather than doing it because LA21 today is mandatory. LA21 has its origin to a greater extent in stakeholder engagement in community-based projects (e.g. Aall, 2012), whereas in many respects climate change planning has an emphasis on areas related to spatial planning such as, for example, energy planning and flood risk assessments. It is doubtful that LA21 alone can aid integration, although these municipalities seem to have benefited from the structures created in relation to previous LA21 activities.

This thesis indicates that regulative mechanisms are experienced through the constraints of existing legislation rather than used as enabling mechanisms. Ambiguity about how to deal with climate change makes the spatial planners reluctant to integrate

adaptation in particular, but also mitigation, into the municipal spatial plan. This is related to the regulations laid out in the municipal spatial plans, where it is difficult to amend activities once they are first written into the plan (Wejs & Cashmore, 2013). The Danish Planning Act is very explicit on what to be included in the municipal spatial plan, and it is perceived to be a rigid platform for climate change planning. Climate change therefore seems to be regarded as an explorative field that needs to find its own grounding before formal integration into spatial planning can happen.

Without exploiting existing structures such as LA21, SEA or spatial planning, it seems that climate change governance is happening in an institutional void without any existing regulative or normative structures that support institutionalisation in practice. In the process of filling this void, intra-institutional dynamics in terms of normative and cultural-cognitive mechanisms influence the strategies to create legitimacy for integration.

14.2 Institutional Dynamics in the Process of Climate Change Integration

Cross-sectoral coordination and collaboration is especially challenging for the integration process. Normative and cultural-cognitive mechanisms occur at the meeting between the existing structures and the climate change unit responsible for climate change plan-making. The climate change unit, being a new unit dealing with a new and complex planning issue, has to establish a local understanding of municipal climate change planning, and communicate this strategy across the municipal departments. This task of defining climate change as a planning area without any national guidance seems in itself challenging. This complexity is further increased by the ongoing development of the local perception of climate change planning as climate activities are carried out in practice and capacity is built through learning and experience (Wejs & Cashmore, 2013; Wejs, Harvold, Larsen & Saglie, 2013). The climate change units act in an institutional void where existing procedures and codes of conduct relation to climate change are non-existent; therefore, they have to create new structures around climate change. These units are found placed in the technical or environmental departments, where cross-sectoral coordination is difficult because of the municipal division of professional departments with strong norms of vertical communication and weak norms of horizontal communication. When a climate change unit seeks to work cross-departmentally it cuts across the areas of authority of other departments; this act is perceived as inappropriate and illegitimate when officials unintentionally breach unwritten codes of conduct (Wejs 2013; Wejs & Cashmore, 2013).

Institutional entrepreneurs are found to be the main drivers for carrying this process forward and they push for climate change integration. These individuals also possess certain qualities and characteristics such as motivation and will, which is necessary to inspire excitement and generate momentum for their initiative (Garud & Karnøe, 2003). However, they also have a tendency to overstep cultural-cognitive shared beliefs and understandings within other departments, which leads to constraints on integration. Sub-cultures around professions involve different taken-for-granted knowledge in sepa-

rate departments where the parties involved may speak different professional 'languages', which causes a lack of common grounding and understanding (Wejs, 2013; Wejs & Cashmore, 2013). Perceptions in authority areas and agendas may differ, and in the worst cases create distrust between the parties (Wejs & Cashmore, 2013). This research has found that the intra-institutional dynamics between institutional entrepreneurs and the existing structures occur when these actors challenge the existing structures in pursuit of their aim of integrating climate change internally in the municipal administration. In this regard, it is particularly the normative and cultural-cognitive mechanisms that have implications for integration. To be successful, then, involves gaining legitimacy for new ideas and related initiatives (Garud et al., 2007). The existing structures are to a large extent found to constrain action, and institutional entrepreneurs therefore aim to navigate around these structures, or they seek to change them. The success of integration is dependent on building up a shared understanding of this new area: while the institutional entrepreneurs may challenge the existing structures, they also drive the creation of new structures through learning processes which involve internal actors as well as external knowledge and competences (Wejs & Cashmore, 2013; Wejs, Harvold, Larsen & Saglie, 2013).

The factors that seem to have been essential in enabling the activities of the institutional entrepreneurs are related to their ability to create windows for action. Such a window has in this thesis been highlighted by the institutional entrepreneurs' ability to establish local networks. Using a network approach based on exploratory concrete projects with local businesses, they are quick to demonstrate results as a way of creating legitimacy to kick-start partnerships (Wejs, 2013; Wejs & Cashmore, 2013). Funding for the activities is provided by businesses or through collaboration on funding applications. A few municipalities have even created local foundations together with the local businesses (Wejs 2013; Wejs, Harvold, Larsen & Saglie, 2013). Quick results help achieve legitimacy among the involved parties for collaboration on future projects, and the funding provides financial legitimacy for institutional entrepreneurs to carry their work forward. This also means that they are not in competition with other municipal interests, which may therefore avoid some of the structural constraints related to the financing of climate change activities. Through the success of external partnerships, they can build a narrative that society is already acting on this issue and hereby manage to bypass some of the internal constraints (Wejs, 2013; Wejs & Cashmore, 2013). This network- and project-based approach also seems to inspire enthusiasm among individuals internally in the municipal organisations, and thus the internal integration process is also based on the networks (Wejs & Cashmore, 2013). This approach is highly explorative in character and this seems to appeal to the characteristics of entrepreneurs.

In this thesis networks are found to be strongest when they are based around local partnerships, whereas commitments to voluntary national as well as international programmes on climate change are not used as actively. Rather than taking active part in these forums, the international networks are more often used by climate officials to reflect normative arguments that remind politicians on city councils of commitments

(Wejs, 2013; Wejs & Cashmore, 2013). This is contrary to the existing literature that describes these forums as network centres for knowledge sharing between policy makers and centres for multilevel governance (e.g. Betsill & Bulkeley, 2006; Bulkely & Betsill, 2005). This thesis finds that local networks play a much larger role than international networks in municipal climate change efforts. There are several reasons for municipalities to initiate these networks. One reason is that most GHG emissions origins from sources exterior to the municipal authority itself, and thus the involvement of local businesses may make them act on mitigation (Wejs & Cashmore, 2013). These networks are to a great extent created together with businesses and other local organisations, and they only to a limited degree involve citizens. This seems to be connected to local narratives on green technology and to the possibilities for local development by acting on climate change. Legitimacy is thus built through arguing for opportunities for economic development and green growth, which is a new economic perspective on the findings of other studies. Juhola et al. (2011) found that future cost savings with regard to adaptation were a normative mechanism for adaptation, and Compston (2009) found that climate change policies may cause negative impacts on economy and business. In the Danish context the discourse on renewable energy, especially with regard to wind energy, may explain the focus on green growth (Wejs, 2013; Wejs & Cashmore, 2013; Wejs, Harvold, Saglie & Larsen, 2013), which is also beginning to be reflected in regard to adaptation issues (Wejs & Cashmore, 2013).

This approach seems to be successful for achieving partnerships and implementing concrete projects in practice, and it is an approach that appeals to institutional entrepreneurs. However, this approach's link to spatial planning is vague, and there is a risk that climate change will develop into a separate field instead of being integrated and coordinated across sectors. In this regard, there is a need for structures to support and secure climate change integration across sectors. This may be even more important in cases where institutional entrepreneurs are not present. Climate change integration cannot rely on individuals in the long term, since these people might not stay in their positions, or retain legitimacy for their actions (e.g. Bulkeley, 2010). The cross-sectoral task of climate change integration is perceived to be very challenging (Wejs, 2013; Wejs & Cashmore 2013; Wejs, Harvold, Larsen & Saglie, 2013) and, on the basis of the findings of this thesis, it seems that for this process to be successful – meaning that climate change is integrated across the municipal sectors – the internal integration process must be prioritised in order to create a constructive learning process where a shared understanding of climate change planning is created across departments. The establishment of an internally shared understanding through learning processes has been shown to be especially important in reducing cultural-cognitive constraints and building a new culture around climate change governance (Wejs & Cashmore, 2013; Wejs, Harvold, Larsen & Saglie, 2013). The investigation of the SEA as a regulative mechanism (Larsen, Kørnøv & Wejs, 2012) and previous experience with LA21 (Aall, 2012) indicates that, by themselves, further legislation and planning guidance on climate change might not be sufficient: it is evident that climate change integration has to be a cross-sectoral issue,

and that the internal processes have to be prioritised and actively worked on for integration to actually be achieved across sectors.

14.3 A Reflection on Critical Realism and New Institutional Theory

To explore the institutional implications of this integration process, emergent strands of new institutional theory have been applied from the philosophy of science perspective of critical realism. These emergent strands place greater attention on the role of agency in the institutionalisation processes than traditional new institutional theory. Structure in this thesis is mainly investigated with regard to the social world and relies on Scott's (2001, 2008) three pillars of institutions: the regulative, normative and cultural-cognitive, and various mechanisms may occur in and between these pillars and between structure and agency. In addition, from a critical realist perspective, structures may also include the natural structure such as composition of materials, which allow natural incidents to work as mechanisms for initiating climate change planning. Though the main focus is on the social world, the thesis does not limit its analyses of climate change integration to the social world only; by using the concept of mechanisms it also includes the causal effects of the natural impacts of climate change for example the influence of a flooding incident on future planning practice. This is shown in, for example, Cases A and D (Wejs, Harvold, Larsen & Saglie, 2013) and the case of Aarhus Municipality (Wejs & Cashmore, 2013) which initiated climate change adaptation planning as a reaction to local flooding events caused by increased precipitation or snow. This is in line with Cornell and Parker's (2010) critical realist argument that, to explain climate change, an epistemology is needed that recognises the social dimensions of knowledge, but it also has to include an ontology that asserts the reality of the material dimension of the problems.

The concepts of structure and agency have been applied from a critical realist understanding, where structure and agency are interpreted as a dualism rather than a duality, which is the understanding in structuration theory. Where structuration theory holds that structures are the result of the present actions of actors, critical realists argue that structures pre-exists actors (Giddens, 1984; Archer, 2010; Mole & Mole, 2010). Within this conceptualisation lies a perception of structure and agency as having different causal powers. The use of the concept of mechanisms in relation to causal powers, and in combination with new institutional theory and legitimacy building, have been helpful in this thesis for creating a deeper understanding of the institutional implications of integration. This is especially with regard to examining the work of the institutional entrepreneurs and understanding how they come into conflict with the existing structures, how they use the causal powers of structures strategically to create legitimacy for action, and how they use their own causal powers to deviate from existing norms and cultures to inspire enthusiasm. From a critical realist perspective, this means that the analyses in the thesis move from the empirical domain towards the actual and the real domain. From a constructivist perspective, analysis occurs in the empirical domain with a focus on social discourses and perceptions of practices (Mole & Mole, 2010; Næss, 2012).

When investigating practitioners' interpretations of their experiences, it may be argued that elements of the analyses are mainly at the empirical level. However, in examining the mechanisms that cause these interpretations and affect actors' choices the analyses move away from the study of actors (Mole & Mole, 2010) to study the interaction between structure and actors which, because of conflation, is simply impossible from the perspective of structuration theory (Archer, 2010; Mole & Mole, 2010). Critical realism thus provides an ontology that makes it possible to study this interaction and to understand in greater detail the dynamics that influence institutionalisation processes.

As a researcher investigating climate change as an interdisciplinary field in planning, I find it important to position my research within a philosophy that encompasses both social and natural sciences. Moreover, the ontology of critical realism reminds us of the enormity of the unknown and unproven, and that the world may not correspond to our knowledge of it (Cornell & Parker, 2010). This is important for a researcher in avoiding epistemic fallacy; that is, a tendency to concentrate on areas of action that we have information about, and ignore those areas of which we are relatively ignorant (Cornell & Parker, 2010). It is also important, however, for our knowledge about climate change in relation to planning, which may change over time as understanding of the phenomenon grows. Spatial planning operates over relatively long time frames and will have to encompass both 'unknown' and 'unproven' future consequences in planning to prepare for climate impacts.

15. Research Contribution and Directions for Future Research

Based on development of the theory, the analyses in the five articles and the conclusions, this thesis contributes to existing research within at least two overall areas: a theoretical contribution based on the conceptual development of combining critical realism and new institutional theory, and a contribution to the research field of climate change governance. In both areas the thesis points to the direction for future research.

15.1 Combining Critical Realism and New Institutional Theory

On the basis of this conceptual framework, this thesis contributes to the further development of the emerging strands within new institutional theory by aiming at a more balanced perception of structure and agency. These emergent strands seek to bring agency back into institutional theory without denying institutional embeddednes, and seek to move beyond the notion of institutional constraints when examining the interactions between actors and institutions (Leca & Naccache, 2006; Lawrence et al., 2009; Mole & Mole, 2010). However, previous studies on institutional entrepreneurship have considered that institutional entrepreneurs need to disembed from existing structures in order to act, which is not coherent with institutional theory (Leca & Naccache, 2006). Critical realists' understanding of structure and agency as a dualism rather than a duality also has the potential to further contribute to the scholarly debate within the emerging strands of new institutional theory by providing an ontology that allows for a more balanced perception of structure and agency without the risk of conflation. From a critical realist perspective, institutional entrepreneurs are not to be considered as disembedded from structures, rather they use their knowledge of the causal powers of structures strategically. This thesis has examined the use of causal powers to create legitimacy for climate change action. The examination of the mechanisms that occur in the integration process and how these influence the strategies used to create legitimacy have allowed the analyses to reach a deeper understanding of the institutional implications and to explain the emergence of different approaches to local climate change governance. While works on critical realism consider that actors set structures in motion and develop powers of causation, they have not considered how actors can do this strategically. The thesis therefore contributes to the work of Leca and Naccache (2006) who emphasised the potential of combining organisational studies on actors' strategic actions with critical realism, which can make it possible to advance the understanding of these strategies. The thesis further contributes by emphasising the linkage between mechanisms and legitimacy, and how the occurrence of mechanisms influences the strategies for building legitimacy for action.

The conceptual framework of this thesis has been developed as an iterative process between the state-of-the-art, empirical studies and theoretical development. The articles show different aspects of the conceptual framework, which are presented as a summa-

tion in Figure 3. Due to this iterative process, the gathered knowledge from these frameworks, however, have not been tested as a united framework. Testing and further developing this framework in future research may contribute to institutional theory from a critical realist perspective by closer examining the underlying structures and advancing the knowledge on the mechanisms and legitimacy involved in processes of institutional change. With regard to climate change integration, such in-depth studies will create knowledge of climate change governance put in place by city governments, and it may potentially aid practice by delivering experience of how the issues are solved.

15.2 Cities' Climate Change Governance

Climate change governance at the local level has, as elaborated in the previous section, been investigated through intra-institutional dynamics based on combining notions of critical realism and emerging strands of new institutional theory. Against this backdrop, this thesis contributes to the research area of climate change governance by shedding light on the implications of the internal integration process in municipalities and providing explanations for the reasons behind these. This research is into an area that has been mentioned as a key challenge for implementation but not thoroughly investigated in the existing literature (see e.g. Adger et al., 2007; Bulkeley, 2010). Looking at the concepts of the mechanisms and their role in legitimacy building for climate change has been beneficial in understanding how local climate change governance is shaped by, on the one hand, the mechanisms that occur in the meeting between structure and agency and, on the other hand, the reaction of actors to these mechanisms.

This intra-institutional perspective has been examined in relation to climate change integration. This thesis finds that climate change integration and governance is without any strong linkage to spatial planning, and it seems to evolve as a separate field on the boundary of spatial planning. SEA being the legal platform to make this connection stronger is not fully exploited, which indicates that climate change is not assessed as being a 'significant' environmental impact. Explanations may be found within practitioners' discretion of potential significant future environmental impact. However, further research is needed to understand the process behind discretion and to explore the mechanisms that shape practitioners' interpretation in a SEA process. The intra-institutional perspective can be useful to create knowledge about practitioners' understanding of the SEA Directive in relation to their judgments on whether a plan or programme is subject to SEA and to their interpretation of when a possible future environmental impact is 'significant'. The characteristics of their considerations within this process may provide explanations for the absent assessment of climate change in practice and further contribute to the scholarly debate of SEA effectiveness.

Through an understanding of the intra-institutional challenges in climate change integration this thesis contributes with its findings of the role of local networks and its explanations of the occurrence of these networks. Climate change governance has, in the existing literature, been examined with regard to multilevel governance around interna-

tional non-governmental networks (e.g.; Bulkeley & Betsill 2005, Amundsen et al., 2010; Bulkeley 2010, Bulkeley et al., 2012). This thesis contributes to this research area, arguing that multilevel governance is also occurring at the local level. Municipal climate change units establish local networks based on partnerships with mainly local businesses, and also with other authorities, universities and non-governmental organisations based on a narrative of green growth and local development. Although the number of interviews is somewhat limited, and is sufficient to provide an in-depth picture of the implications of the integration process, further research is needed to provide a comprehensive study. This thesis builds on empirical work in Denmark, and these studies have an emphasis on climate change mitigation, as until now mitigation has had more attention than adaptation. However, attention to climate change adaptation is increasing in Danish planning practice and national incentives are being developed. In Denmark this practice started with the first climate change plans in 2007, it has increased since then, and it includes more attention to adaptation. There are therefore possibilities of studying the integration process around climate change adaptation, how it is linked to spatial planning and mitigation and whether structures established through the work on mitigation will aid the integration process for adaptation.

Similar studies may be carried out within Scandinavian countries that face similar climate impacts and have comparable systems of government to gain more knowledge of the characteristics of the mechanisms and strategies for legitimacy that influence the approaches to local climate change governance. The Scandinavian countries are perceived to be countries with high adaptive capacity (Juhola et al., 2012a) and may therefore be interesting as critical cases (Aall, 2012) for research on implications and possible solutions of climate change integration. Other studies could be carried out internationally on cities that face similar climate impacts but which have different systems of government to provide knowledge on whether different systems affect the approach to climate change integration – for example are the mechanisms associated with similar sources such as regulative, normative, cultural-cognitive and natural impacts? Or will different systems of governance and contexts generate different mechanisms? From this perspective, some interesting questions can be asked to enable comparisons to be made of the underlying mechanisms for integration, how legitimacy is created and how this shape local climate change governance. A further understanding of the institutional dynamics that occur in the integration process of climate change may aid practice to create better processes and increase implementation of climate change actions.

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Appendices

This section includes two appendices, *Appendix A: Characteristics of The Danish Municipalities' Climate Change Plans* and *Appendix B: Climate Change Planning: A New Challenge in Local Planning.* Appendix A provides some background information on the contents of the Danish climate change plans. Appendix B is a book chapter in a forthcoming teaching book in Danish. This book chapter is about climate change planning as a new challenge in local planning and provides some characteristics of climate change planning and tools to be used in practice such as scenario analysis and risk assessments.

Appendix A: Characteristics of The Municipalities' Climate Change Plans

An analysis of all publicly available Danish climate change plans provides characteristics of the goal-setting, contents and scope of the plans. This review included 42 plans of which 24 included both mitigation and adaptation, 16 included mitigation only and 2 included adaptation only. This shows that Danish municipalities to date tend to pay more attention to mitigation than to adaptation. The national focus on renewable energy may be a reflection of this finding, but it is also in line with international studies that point towards the greater focus internationally on climate change mitigation, explained in Part I as the mitigation-adaptation dichotomy. The goal-setting in the Danish climate change plans is broadly formulated in regard to carbon emissions for the years 2015, 2020 and 2030, e.g., 'CO$_2$ neutral in 2025' (Copenhagen Municipality), or 'Before 2010 climate change adaptation is encompassed in all relevant plans and procedures' (Brøndby Municipality). Furthermore, 35 of the 42 plans have sector-specific goals, e.g., 'CO$_2$ emission caused by energy use in private households shall be reduced by 2 % p.a. in the period 2013-2020' (Aalborg Municipality), which include specific measures to fulfil these goals. These plans can therefore be regarded as concrete action plans, as opposed to, for example, a vision. The measures in the climate change plans are outlined in Figures 12 and 13 in regard to mitigation and adaptation respectively.

In regard to mitigation, more than 50 % of the 42 plans include mapping of the CO$_2$ emissions from the municipal geographical area, various types of renewable energy (RE) sources, buildings, and transportation (see Figure 12). In regard to adaptation, fewer measures are included in the climate change plans. More than 30 % of the plans, however, include measures related to risk assessments of spatial areas, river management and wetlands, sewer systems, and green areas (see Figure 13).
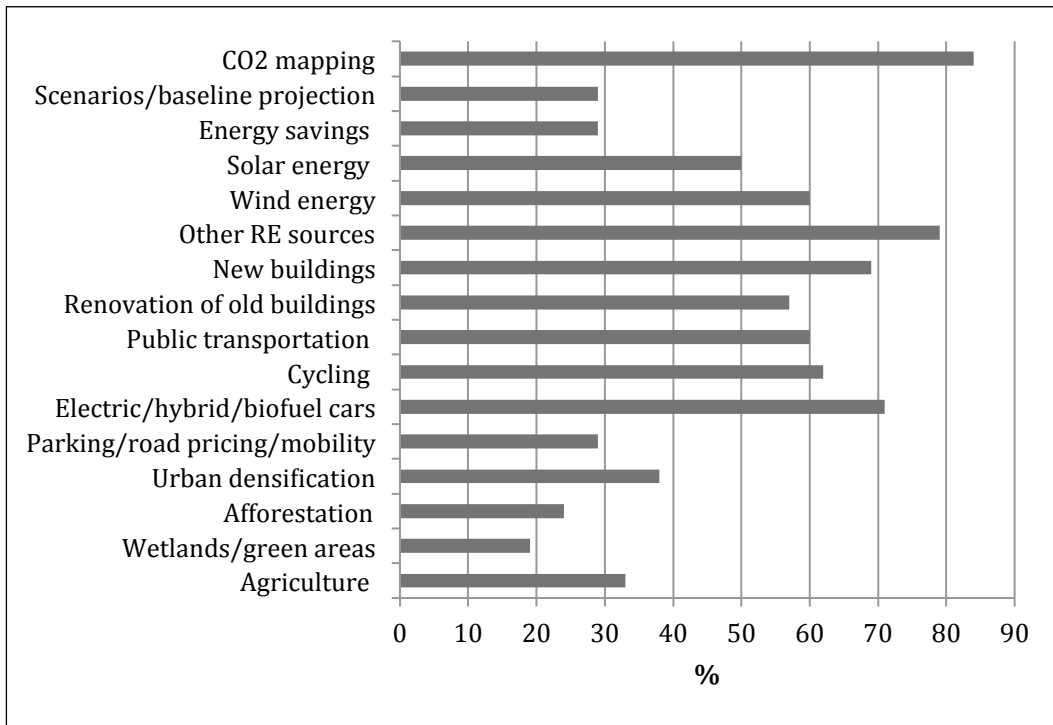
Figure 12: Mitigation measures in per cent of the 42 climate change plans reviewed.
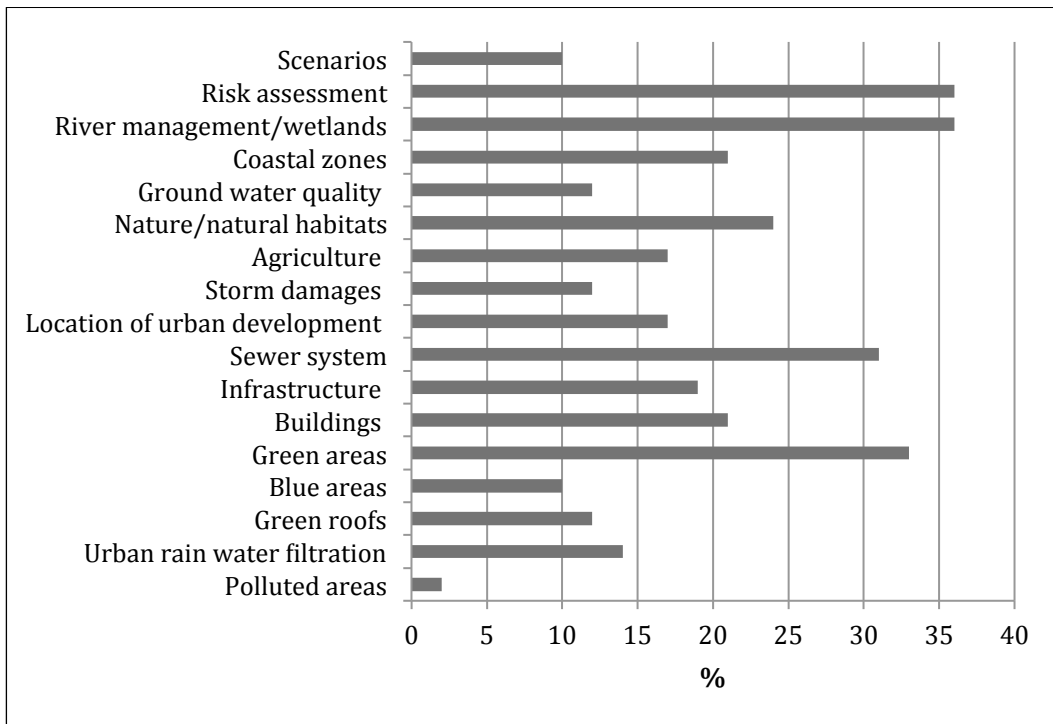

Figure 13: Adaptation measures in per cent of the 42 climate change plans reviewed.

Furthermore, the climate change plans rarely mention synergies and trade-offs between the climate change mitigation and adaptation measures. When they do, it is more often in relation to other environmental factors (see Figure 14). Synergies are often mentioned in relation to river basin management plans, natural habitat plans 'Natura 2000' and health issues.
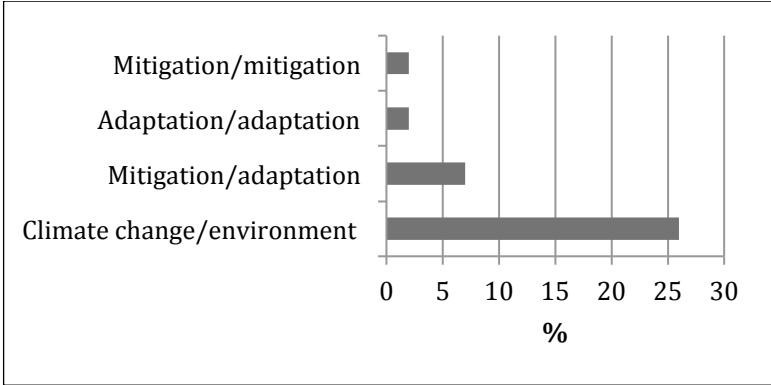

Figure 14: Synergies and trade-offs between climate change mitigation, adaptation and other environmental factors in per cent of the 42 climate change plans reviewed.

The climate change plans vary in regard to format and content, which may be a reflection of the fact that climate change planning is still a voluntary initiative and a new issue in planning. Climate change planning includes most issues of spatial planning, but it also exceeds the role of spatial planning. Some of the municipalities involve actors across the municipal organisation, as well as from other authorities, including utility companies, businesses, citizens and interest groups. Climate action involves actors from the local business community, coordination with efforts in other municipalities, integration of government initiatives, involvement in knowledge-sharing through international networks and more. Various initiatives flourish between different actors, where municipalities increasingly have an initiating and coordinating role, and where the climate change plans become the platform that brings together and coordinates the various activities. A specialised climate change unit, often situated in the environmental departments, often carries out this coordinating role.

Appendix B: Climate Change Planning: A New Challenge in Local Planning

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This appendix presents a book chapter included in a forthcoming teaching book in Danish which translated to English has the title 'Sustainability – Values, Regulations, Methods' edited by Dr Finn Arler, Aalborg University. This chapter deals with many issues also presented in this thesis, but focused more toward students and practice i.e. the chapter introduces and discusses tools such as scenario analysis and risk assessments.

The book (and the book chapter) is under final review at the publisher. The final draft of the chapter can be provided by the author on request.