



Aalborg Universitet

AALBORG UNIVERSITY  
DENMARK

**Abstract: Structural changes of the electricity market**

*Regulatory approaches under increasing shares of renewables*

Hasberg, Kirsten Sophie ; Morthorst, Poul Erik; Ropenus, Stephanie; Hedegaard, Karsten; Münster, Marie; Meyer, Niels I

*Published in:*

Det miljøøkonomiske råds konference 2010

*Creative Commons License*  
CC BY-SA 4.0

*Publication date:*  
2010

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Hasberg, K. S., Morthorst, P. E., Ropenus, S., Hedegaard, K., Münster, M., & Meyer, N. I. (2010). Abstract: Structural changes of the electricity market: Regulatory approaches under increasing shares of renewables. In *Det miljøøkonomiske råds konference 2010* De Økonomiske Råd.

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

**Take down policy**

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

## Abstract

# Discussion paper: Structural changes of the electricity market - regulatory approaches under increasing shares of renewables

Authors: Kirsten Hasberg (1), Poul Erik Morthorst (2), Stephanie Ropenus (3), Karsten Hedegaard (4), Marie Münster (5), Niels I. Meyer (6)

(1) System Analysis Division, RISØ DTU National Laboratory for Sustainable Energy, [khas@risoe.dtu.dk](mailto:khas@risoe.dtu.dk). Corresponding author.

(2) Systems Analysis Division, RISØ DTU National Laboratory for Sustainable Energy [pemo@risoe.dtu.dk](mailto:pemo@risoe.dtu.dk)

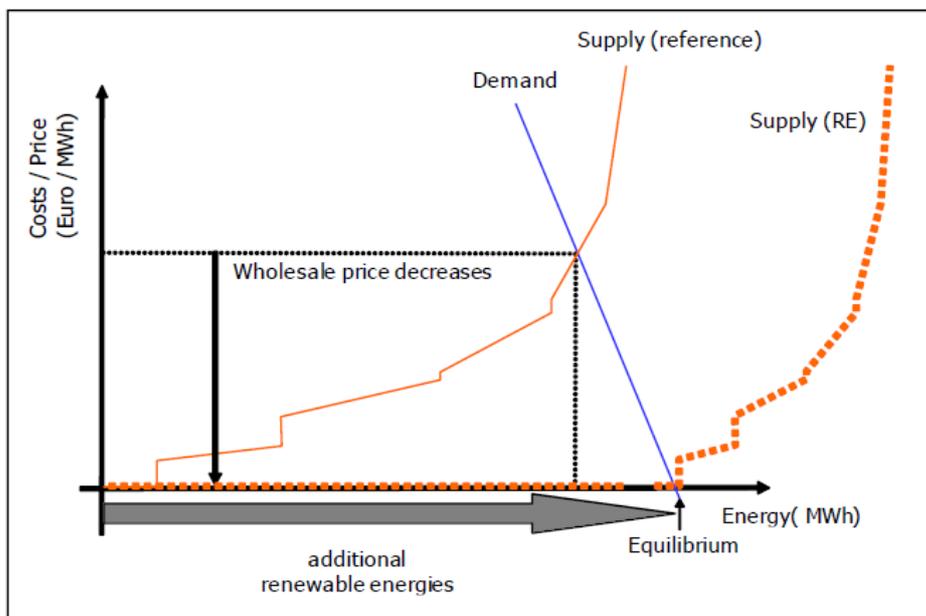
(3) Systems Analysis Division, RISØ DTU National Laboratory for Sustainable Energy, [srop@risoe.dtu.dk](mailto:srop@risoe.dtu.dk)

(4) Systems Analysis Division, RISØ DTU National Laboratory for Sustainable Energy, [khed@risoe.dtu.dk](mailto:khed@risoe.dtu.dk)

(5) Systems Analysis Division, RISØ DTU National Laboratory for Sustainable Energy, [maem@risoe.dtu.dk](mailto:maem@risoe.dtu.dk)

(6) Technical University of Denmark, DTU BYG National Laboratory for Sustainable Energy, [nim@byg.dtu.dk](mailto:nim@byg.dtu.dk)

The characteristics of renewable electricity production, namely close-to-zero marginal costs and fluctuating supply, results in an inherent problem: Lacking incentives for the provision of renewable electricity generation capacity. The electricity price is driven towards zero, when renewable production shares increase, as shown in the following diagram, driving down the revenue of electricity producers.



**Price formation in competitive markets.** Source: Bode 2008

This creates a dilemma: The incentive to invest in additional renewable installations decreases with increasing market penetration in liberalized markets. That is, the higher the share of renewables, the less profitable is the installation (of any generating capacity, not only renewable) – the ‘missing money’ problem.

A paradox situation results: With the current market structure, renewables are dependent on support schemes, also in the long run. This is contrary to conventional wisdom, where learning curves and technological development result in increasing competitiveness over time.

This paper discusses tendering schemes as a regulatory mechanism to ensure the provision of (renewable) production capacity.

Furthermore, the paper discusses the importance of demand response in creating a well-functioning electricity market. Especially the role of the “prosumer”, i.e. consumers with e.g. electric cars and heat pumps are considered.

Furthermore, a redefinition of the role of the Transmission System Operator (TSO) and Distribution System Operators (DSO) is discussed.

## **References:**

Bode, Sven. 2008. *Renewable energy and power prices - incentives to invest under different support schemes* Arrhenius - Institut für Energie- und Klimapolitik.

Boot, P. A. and van Bree, B. (2010): A zero-carbon European power system in 2050: proposals for a policy package. Energy research Centre of the Netherlands (ECN). Prepared for Roadmap 2050: A practical guide to a prosperous, low carbon Europe ([www.roadmap2050.eu](http://www.roadmap2050.eu))