

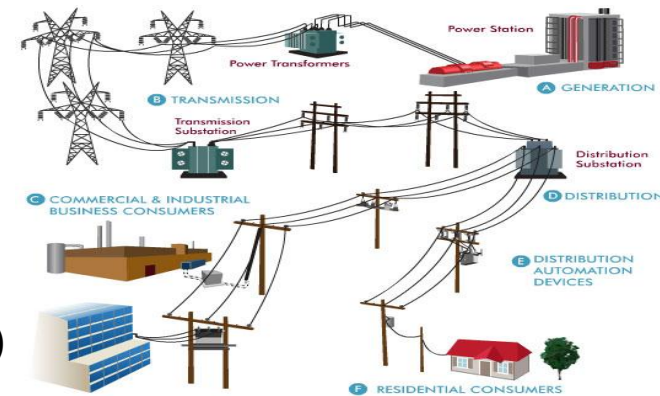


# *Análisis del marco normativo de las redes inteligentes en Europa*

## The European legal framework for smart grids

### Anita Rønne

- Faculty of Law, University of Copenhagen
- Member of the Energy Regulatory Authority (DK)
- Chair of the Valuation Authority for Wind Turbines (DK)
- Chair of the Danish Energy Law Society



Facultad de Derecho-Universidad de Chile  
**23 de octubre de 2013**

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# The European Union

- From 6 MSs - 1957
- to 27 MSs - 2007
- & 28 MSs - 2013



Dias 2



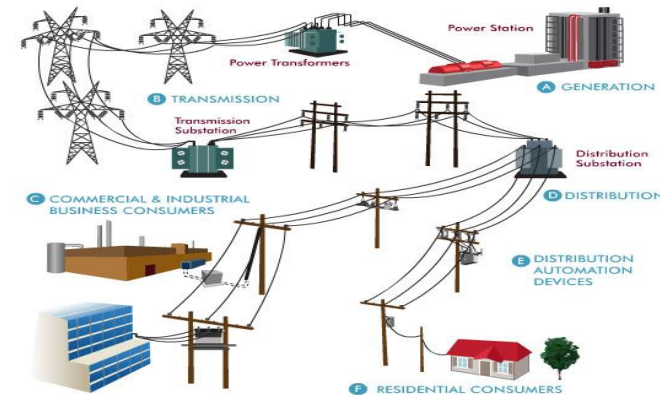
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## The European legal framework for smart grids

### Overview

- Smart grids - **What** are we talking about??
- **Why** are we talking about it?
  - Setting the Context
- Is there a **role for law**?
  - Legal Framework and New Measures
- Conclusions

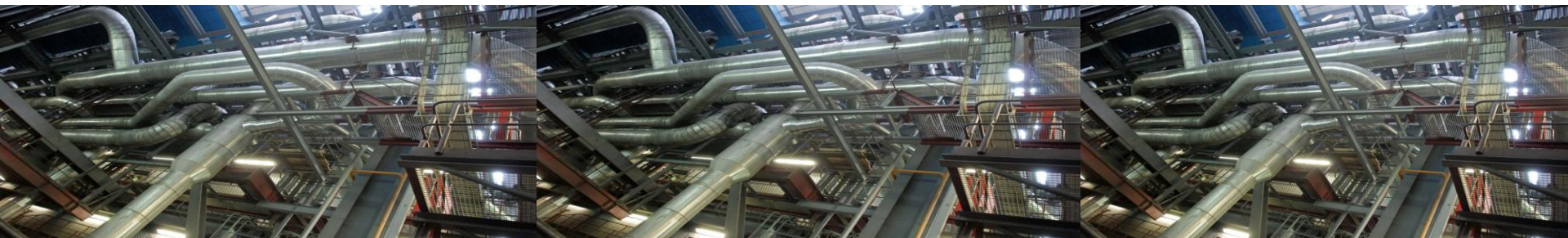




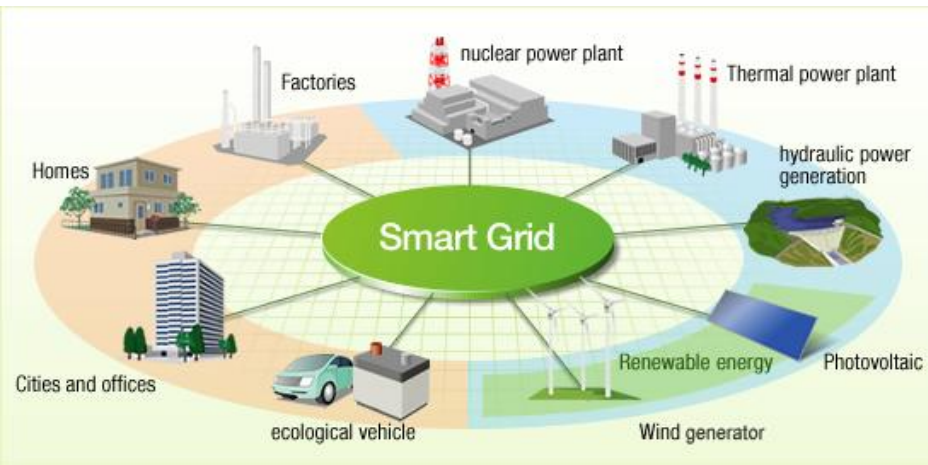
## Smart grids - What are we talking about??[1]

*"Electricity networks that can intelligently integrate the behavior and actions of all users connected to it generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies."*

Definition by the EU Technology Platform



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## What are we talking about?[2]

- means an upgraded energy network to which **two-way digital communication** between the supplier and consumer, **smart metering** and monitoring and **control systems** have been added.

### 'Smart metering system':

- means an electronic system that can measure energy consumption, adding more **information** than a conventional meter, and can transmit and receive data using a form of **electronic communication**.

*Cf. EU-COMMISSION RECOMMENDATION of 9.3.2012 on preparations for the roll-out of smart metering systems*



## Terminology

# Intelligent Energy Systems or smart Grids?



- No difference – synonyms
- The whole circle - from production, transmission, distribution to end-use

But different from smart metering

- just one element and technology



# Why are we talking about it?

## A Triple Challenge

### 1) Security of supply is threatened

high reliance of oil and gas  
-> politically unstable regions

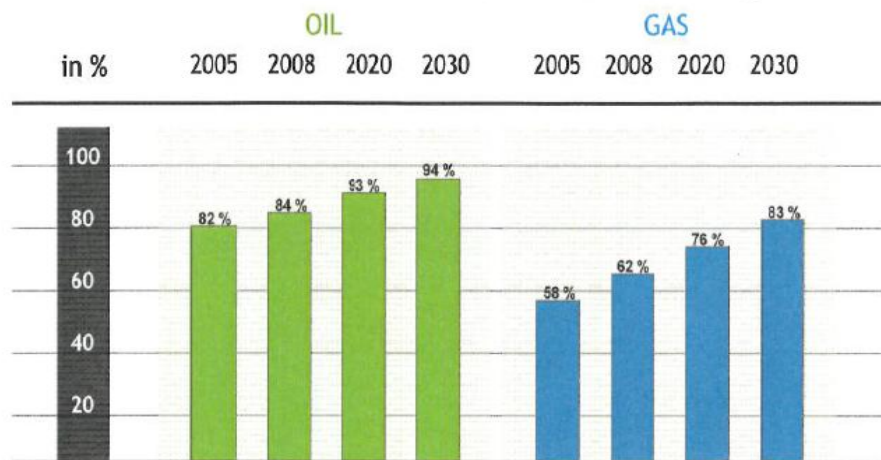
**Oil: 45% -> Middle East**

**Gas: 40% from Russia**

**30% -> Algeria**

### AS DEPENDENCE ON ENERGY IMPORTS IS LIKELY TO GROW

« Business as usual » scenario based on 2009 figures



Today, Europe imports more than half of the energy it uses. If nothing changes, our dependence on fossil fuel imports will rise by 2030.

Source: European Commission

### 2) Fluctuating oil prices

|             |       |        |
|-------------|-------|--------|
| 1988-2003   | 15-30 | USD/bl |
| 2007        | 55    | -      |
| 2008 – mid  | 140   | -      |
| 2008 – late | 40    | -      |
| 2013 -      | ~ 110 | USD/bl |

**Denmark only EU28 MSs that has self-sufficiency**

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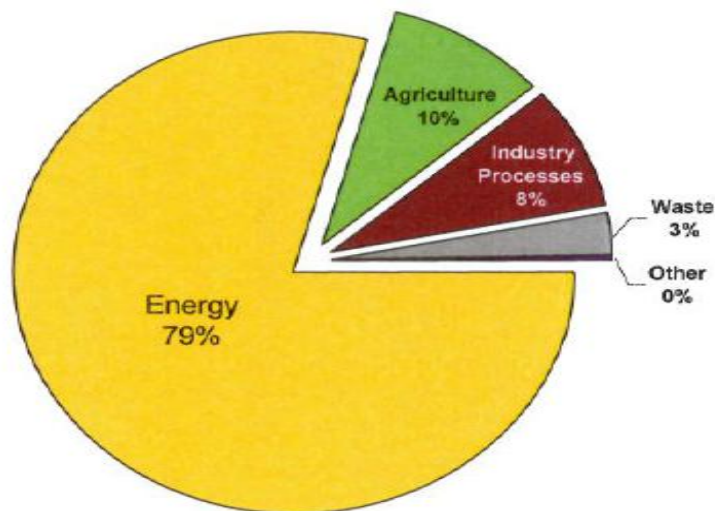


### 3) Climate Change concerns

Current pledges not sufficient to stay below 2° C

AND ENERGY USE IS A MAJOR SOURCE OF EMISSIONS

Share of greenhouse gas emissions in 2008







## Policy Developments

### European union:

- 20-20-20 by 2020
- 20 % reduction of CO2 emissions
- 20% binding renewable energy target (including a 10% RE in transport)
- 20% indicative target for improvement of EE

### Member states like eg.

#### Denmark:

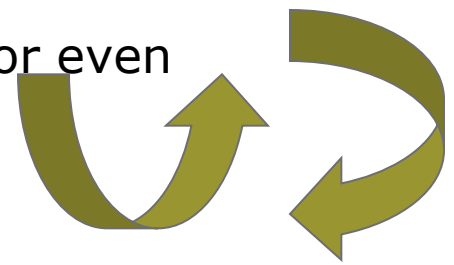
- independence from fossil fuels by 2050

#### By 2020:

- 35% RES of gross energy consumption
- 50% RES of electricity consumption will come from wind (today 25%)
  - Energy consumption will decrease by more than 12% in 2020 compared to 2006.

#### Germany:

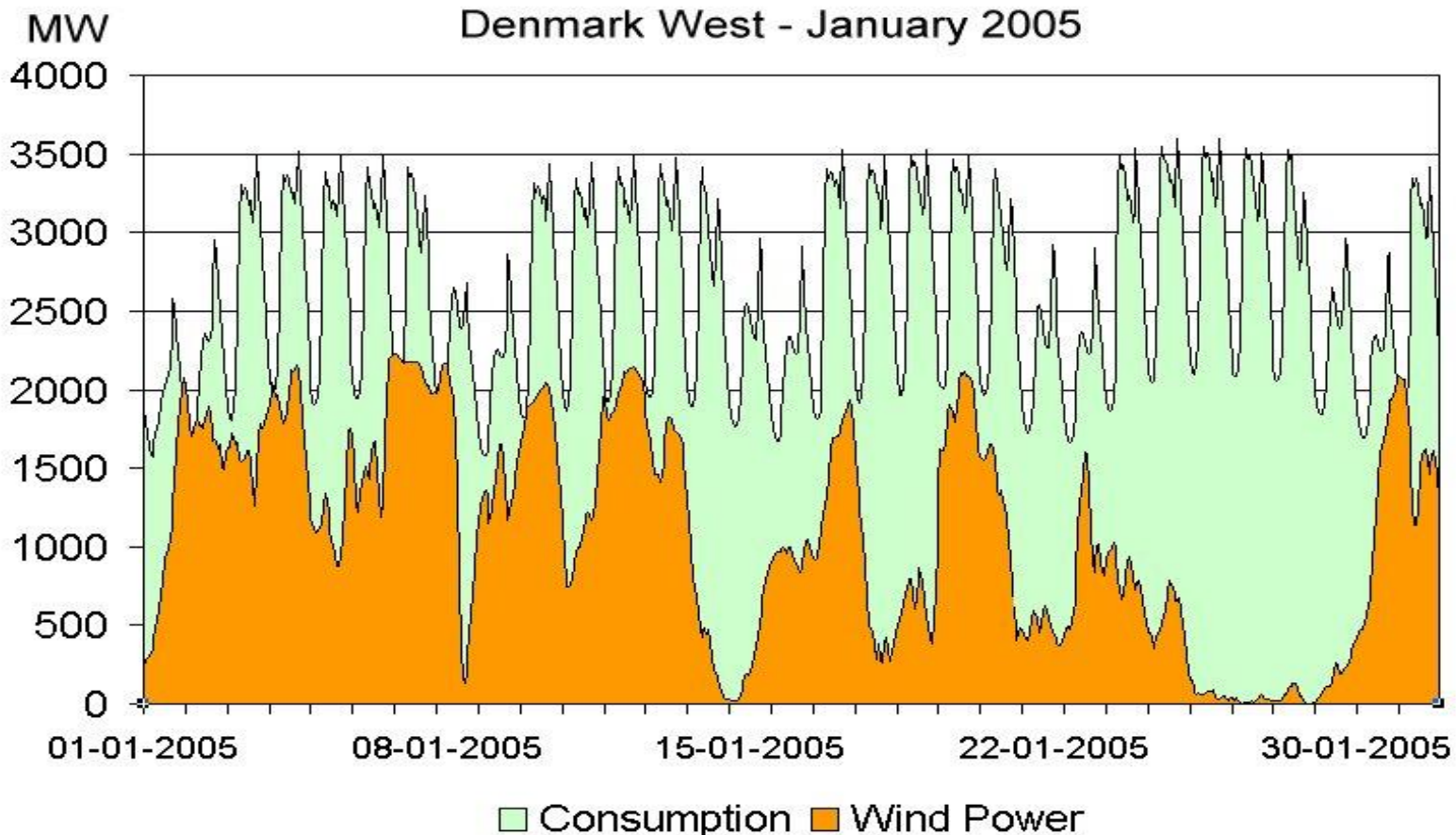
- In 2010 - 20:80
- In 2050 - 80:20 (or even 100:0)





## Key challenges for the grid/infrastructure!

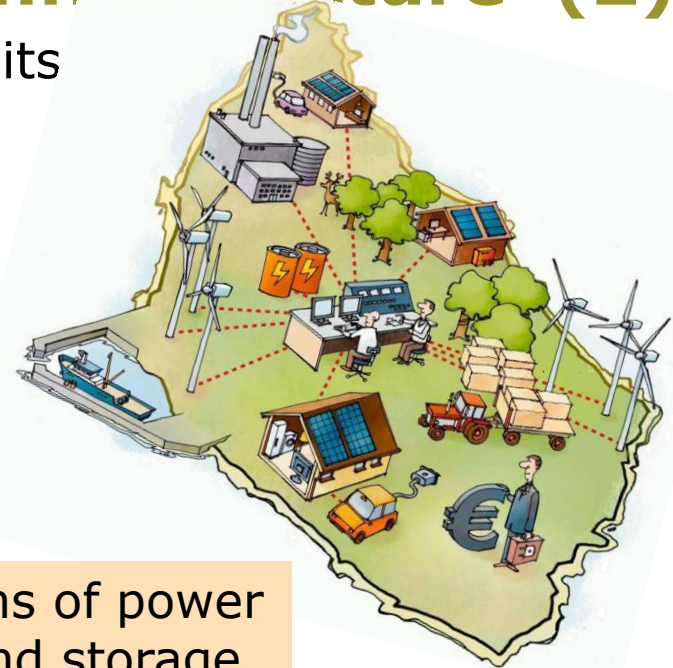
- Integration of substantial higher amounts of RES
- Implying more fluctuating energy – wind, solar
  - output varies according to availability of the resource





## Key challenges for the grid/infrastructure (2)

- Increasing number of smaller production units
  - From centralization to de-centralisation
  - Producer and consumer = prosumer
- Energy storage and linking new sectors like transport in the form of plug-in and electric cars
- **The keywords: FLEXIBILITY but also efficiency and \$\$\$**



- if a power system is sufficiently flexible, in terms of power production, load management, interconnection and storage, the importance of **the variability aspect is reduced.**  
(IEA Report, 2008: *Empowering Variable Renewables*)

Should renewable energy be integrated solely in the conventional manner it would **demand huge investments** in grid and electricity production capacity.

(DI Report 2010: *Intelligent Energy Systems - A White Paper with Danish perspectives*)



## So what has EU done?



### ➤ **New Policy and Action Plans:**

## **Roadmap for moving to a competitive low-carbon economy in 2050 - the EU Commission's Communication of April 2011**

- identifies Smart Grids as a key enabler for a future low-carbon electricity system
- facilitating demand-side efficiency
- increasing the shares of renewables and distributed generation
- enabling electrification of transport.

## **'Smart Grids: from innovation to deployment' - the EU Commission's Communication of 12 April 2011**

- announces a number of measures
  - monitoring Member States' progress,
  - establishing guidelines on key performance indicators
  - guidelines to define a methodology for the MSs' plans for implementation of smart metering systems, along with cost-benefit analyses.



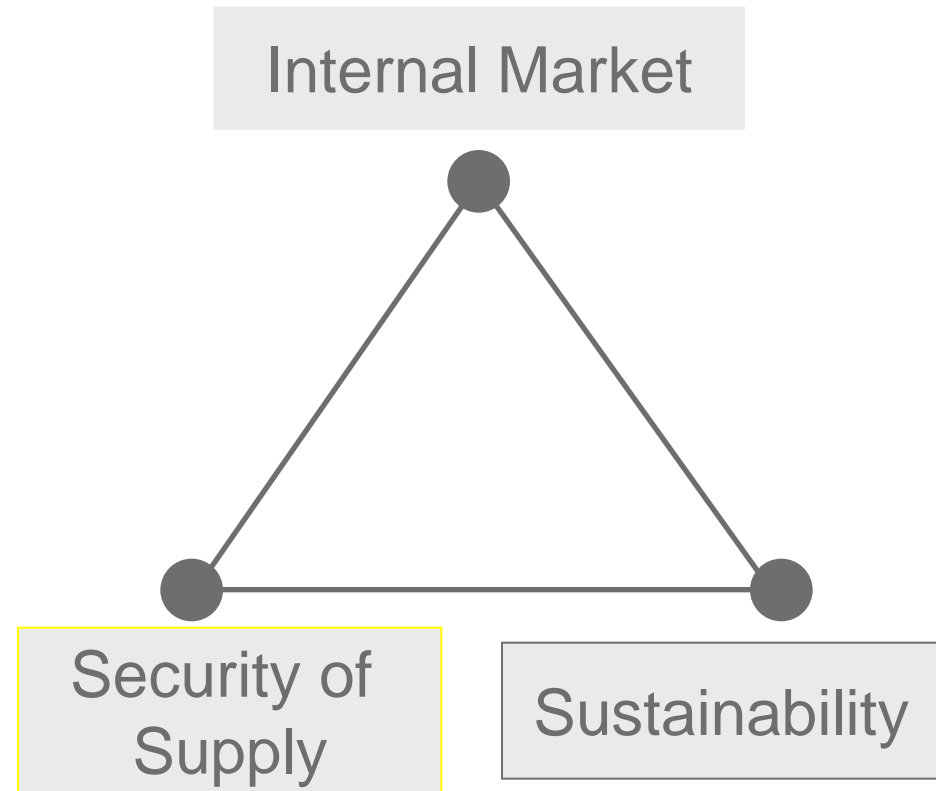
## Is there a role for law?

### New Treaty on the Functioning of the European Union

#### New Art. 194 on energy:

Union policy on energy shall aim, *in a spirit of solidarity*, to:

- Ensure the functioning of the internal market;
- Ensure security of supply;
- Promote energy efficiency and the development of renewable forms of energy;
- Promote the interconnection of energy networks





## Achieving liberalization through regulation

- A single and internal energy market without obstacles to the free movement of energy between MSs
- Three liberalisation packages of directives for electricity and gas
- **Electricity Directive 2009/72** – Overall aim
  - Common rules for generation, transmission, distribution of electricity
  - Rules for the functioning and organization of the sector,
  - Access to markets, operation of the system, tender procedures and granting of authorisations
  - Priority access for RES
- **Renewable Energy Directive 2009/28**
  - Covers all RES: bio, wind, solar, geothermal, ocean energy & hydro
  - Sets national binding targets for RE (overall 20%)
  - Some rules for achieving these targets
  - Requires reduction of administrative and regulatory barriers



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## And what about regulation of smart grids??

### Electricity Directive (2009/72/EC)

- **obliges** MSs to **assess** the roll-out of intelligent **metering systems** as a key step towards the implementation of Smart Grids
- to roll out **80 %** of those that have been positively assessed
- Smart Grids are also identified as a way for MSs to meet their obligations to promote e-efficiency
- Consumer **access to consumption and billing information**

### Energy Services Directive (2006/32/EC)

- calls for **metering** that reflects the final customer's actual energy consumption &
- provides **information** on actual time of use
- Obligation to **remove volume-based incentives** (to allow efficiency gains)

### Directive 2010/31 on energy performance of buildings

- Intelligent metering systems in **new buildings** &
- buildings that are subject of **major renovations**



## NEW Dir. 2012/27 (25 Oct 2012) on energy efficiency - to be implemented by MSs by 5 June 2014

- Includes **legally binding measures** to step up MSs' efforts to use energy more efficiently at all stages of the energy chain.
- **Legal obligation** to establish **energy efficiency** obligations schemes or policy measures in all MSs to drive EE improvements in households, industries and transport sectors.
- A **right** for consumers to **know** how much energy they **consume**.
  - **Obligation** for **individual** energy **meters**
  - **Ensure** accuracy & frequency of **billing** based on actual consumption
  - Appropriate **information** with the bill providing comprehensive account of current energy costs
- **Network tariffs** design to encourage offering services for consumers allowing them to save energy & **control consumption**





## So where does the regulatory need lie?

### Developing new standards

- ❑ Adopting technical standards for smart grids and meters
  - Interoperability of smart utility meters (electricity, gas, water and heat)
- ❑ Adopting technical standards for electric vehicle charging systems
  - Harmonisation needed to allow users to use the same charger for all electric vehicles and to be connected and operated all over Europe

### Provide Regulatory Incentives

- ❑ Need for a better demand response
  - To consume less at times of high wholesale market prices or when system reliability is jeopardised
- ❑ Time-differentiated electricity prices
- ❑ Need for cost savings e.g. in peak generation i.e. – allow network operator to earn revenues that are not linked to additional sales but based on efficiency gains



## So where does the regulatory need lie?

### Increase responsibilities & co-ordination

- ❑ A power system with high penetration of fluctuating energy sources requires special consideration for control and coordination of the overall system monitoring, protection and operation.
- ❑ Since an increasing part of the generation units will be located at the distribution level, a more active role should be allocated to the Distribution System Operator
- ❑ The Coordination of TSO & DSO should be increased

### Access to and protection of data

- ❑ The construction of an intelligent system hinges on data access in multiple directions and levels in order to operate effectively and efficiently
- ❑ Facilitate consumer access to energy data
- ❑ But also protect the exchange of private data of businesses and households



## **BUT there are still questions to be asked!**

- **How to ensure that investments are made?**
- **How to ensure that smart grid investment costs can be recovered?**
  - Should it be the energy supplier that initiate and invest?
  - Should it be provided by government subsidies?
- **How can additional services (such as balancing, demand response, energy retailing) be enabled?**
  - How to coordinate consumption and supply?
  - How to promote electrical storage e.g. use of electric cars?
- **How should the electricity tariff options be designed to facilitate these new market developments?**
  - Should new market and contract models be developed?
- **How to protect small customers that are not making use of these new market options?**



## Conclusions:

There will be a **Paradigm shift** in the ways in which energy will be produced and consumed in the future

*"The society of the future will **use energy intelligently**.*

*In the society of the future, we will use as little energy as possible through **energy savings**, and the energy we use will come from **renewable** sources.*

*Moreover, in the green and smart society of the future, our homes will be **low-energy homes**, perhaps even plus energy homes which generate more energy than they consume.*

*We will have **heat pumps**, and our **electric cars** will recharge over night when electricity prices are at their lowest.."*

Danish Energy Policy Report, 2009

BUT, but, but

there will also be an investment need

And there is only one to pay - the CONSUMER!



## Conclusions - A Paradigm shift

### Old Model

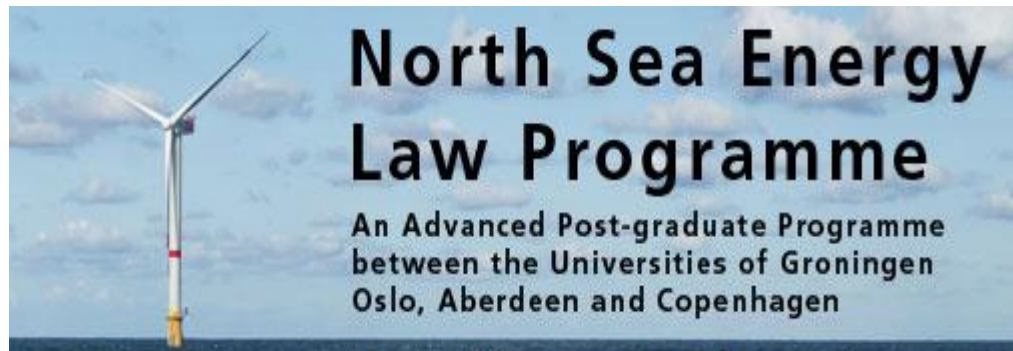
- Encouraged Consumption
- Fostered economic inefficiency
- Content with capital intensive, centralised power production
- Satisfied with burning dirty fossil fuels

### New Model

- Encourages conservation
- Fosters efficient use of electricity
- Promotes distributed small-scale power production
- Promotes and develop the use of alternative and renewable energy

Cf. J.P. Tomain: Steel in the ground, 2009

This will all require a legal response  
so there is indeed a role for law



GLOBAL CHALLENGES:  
ACHIEVING SUSTAINABILITY

International Sustainability Science  
Congress at University of Copenhagen  
22-24 October 2014

<http://sustainability.ku.dk/iarucongress2014>

**Thank you for your  
attention!**

**Anita Rønne**  
**Faculty of Law**  
**University of Copenhagen,**  
**Denmark**  
**[anita.ronne@jur.ku.dk](mailto:anita.ronne@jur.ku.dk)**

