The Danish Energy System

- Developments and Plans

Energie-Effizienz made in Denmark
Ein Marktmodell als Beispiel für die Schweiz?
Bern, 9 September 2015

Peter Jørgensen, Vice President
Energinet.dk, Denmark

Draft agenda

- Introduction to Energinet.dk
- Green transition of the Danish energy system
- Balancing the electricity system
- Developing flexibility and retail markets
- Q&A

Energinet.dk – Danish TSO for electricity and gas

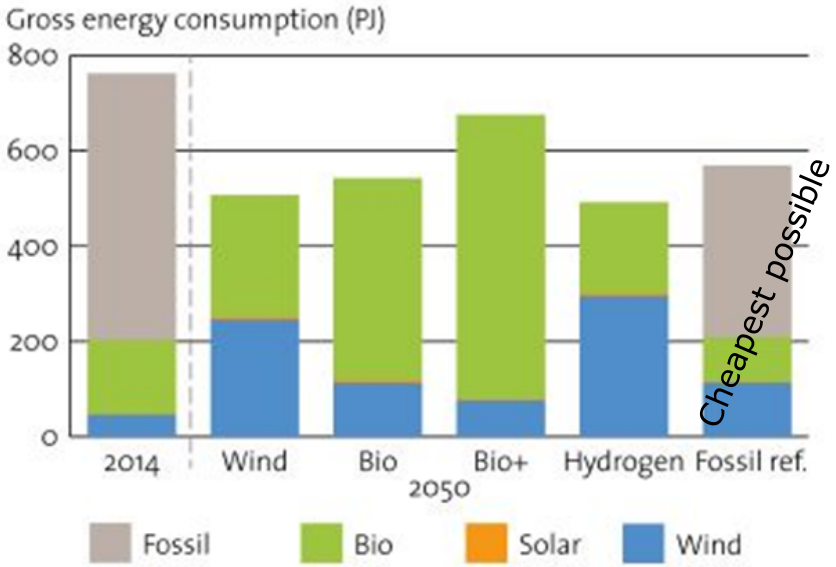
- Ensure short- and long-term security of supply
- Ensure well-functioning markets
- Own, operate, develop and maintain the transmission grids
- *State owned non-profit company – business cases based on socio-economic welfare criteria!*

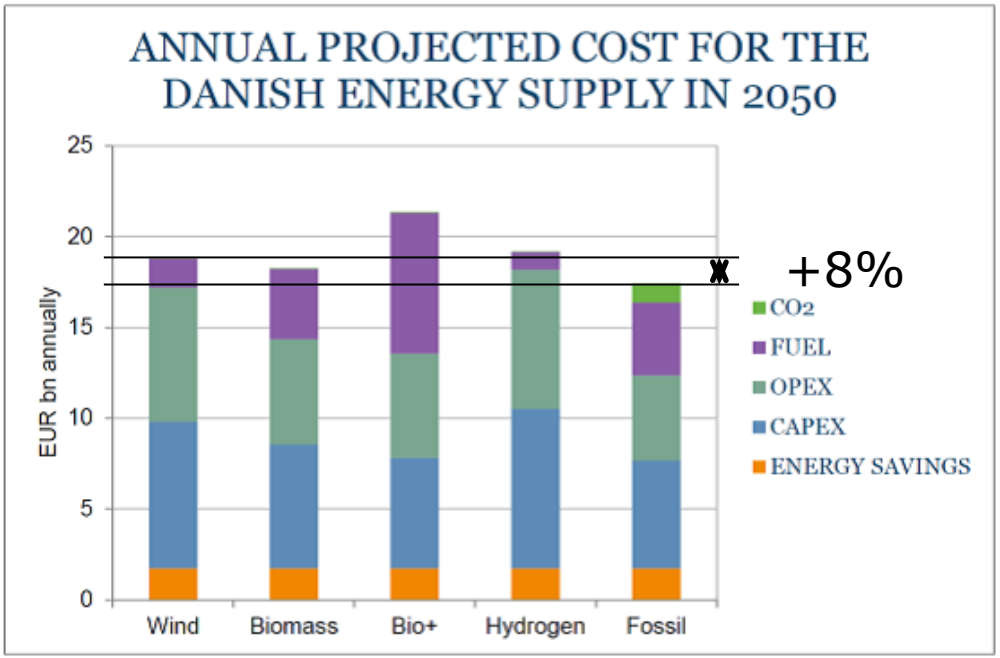
The energy system is changing

Europe is in the middle of a historic transition of the energy system - Denmark has a leading position

- 2020: Wind power will constitute 50% of the electricity consumption
- 2035: Electricity and heating systems must be fossil-free
- 2050: Denmark must be fossil-free

Costs for the Green Transition in Denmark

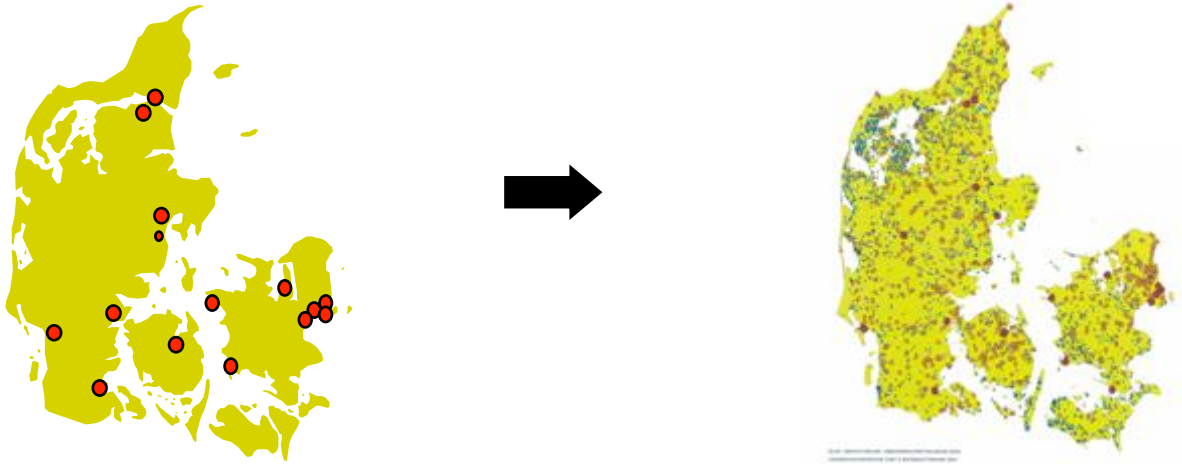




Source: Danish Energy Agency

Parallel developments

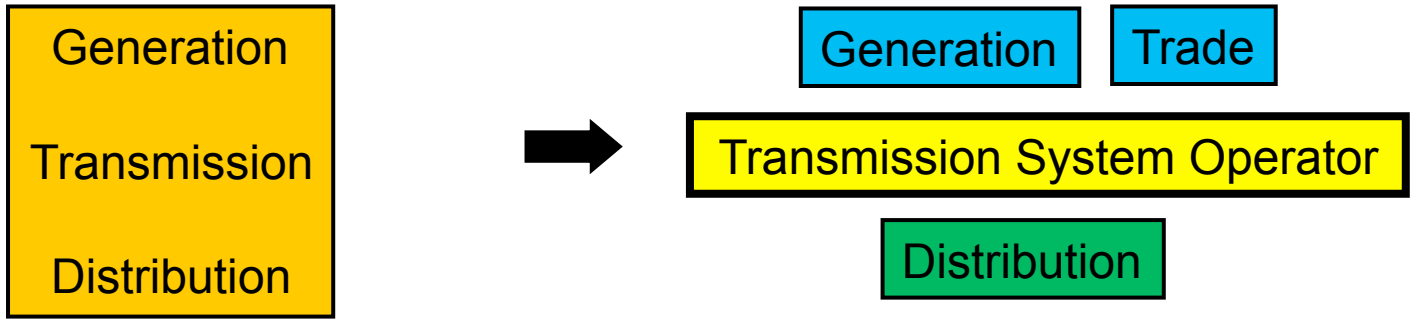
- towards renewable energy and open markets



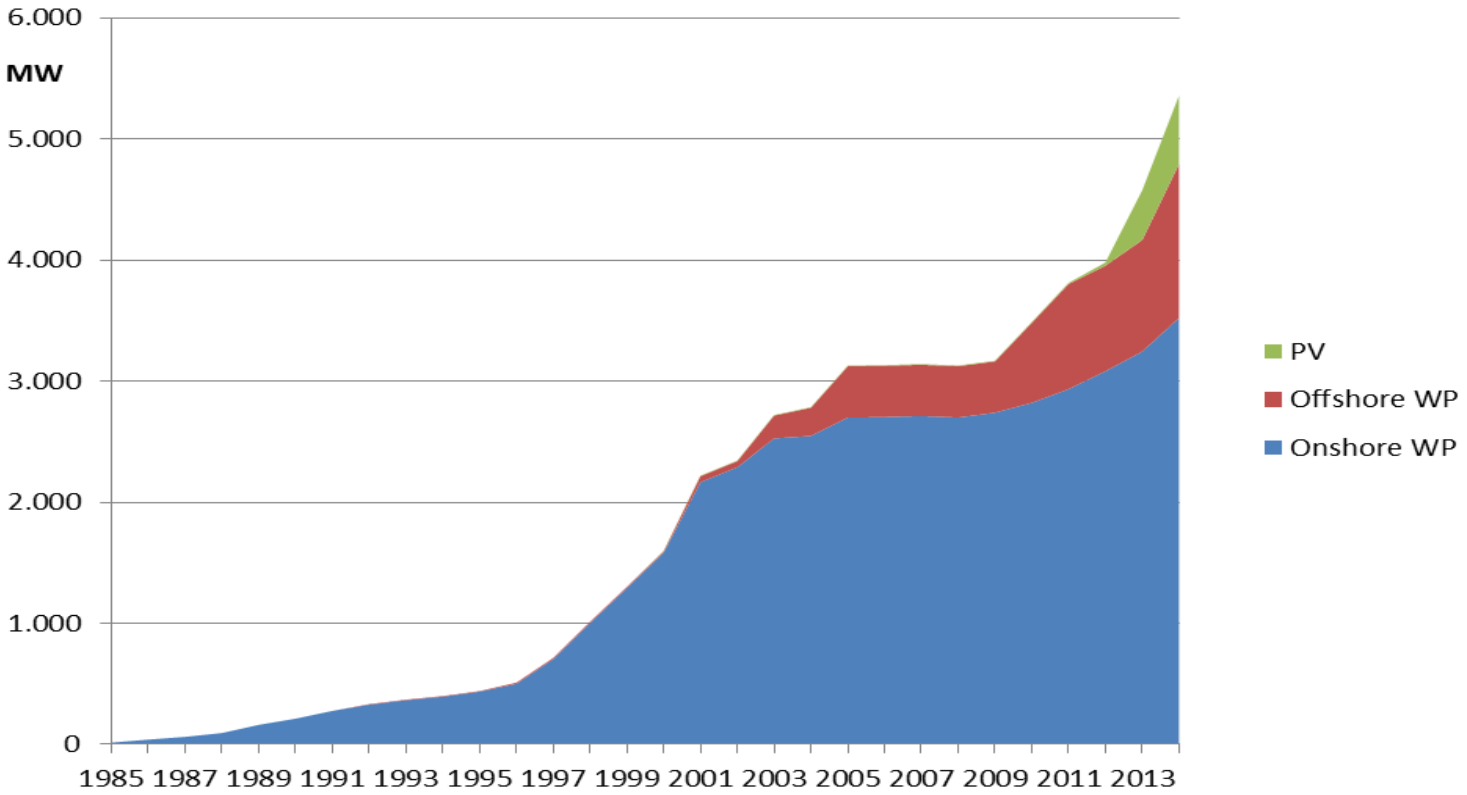
From primary coal fired to local CHP and wind power

2000

From vertically integrated monopoly to competitive electricity market

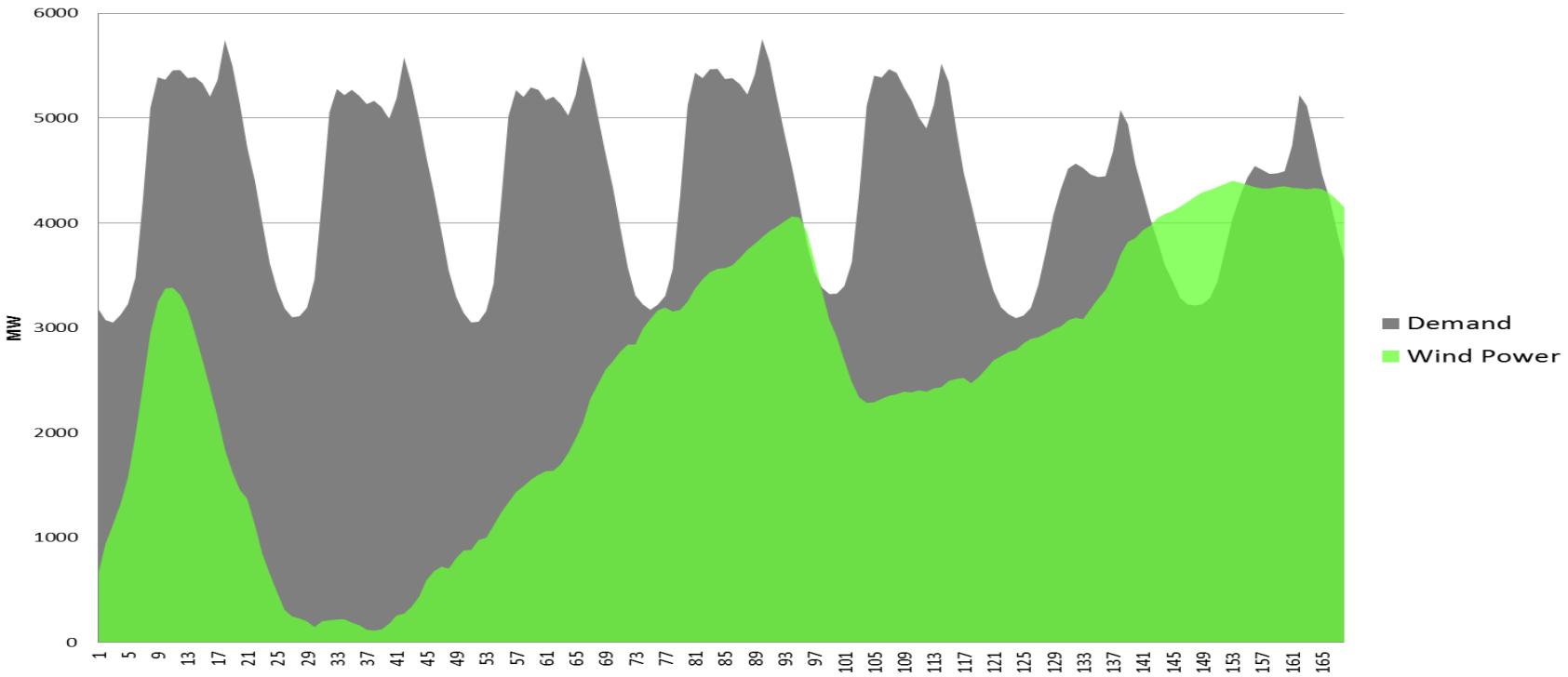


Development of Wind Power and PV in Denmark



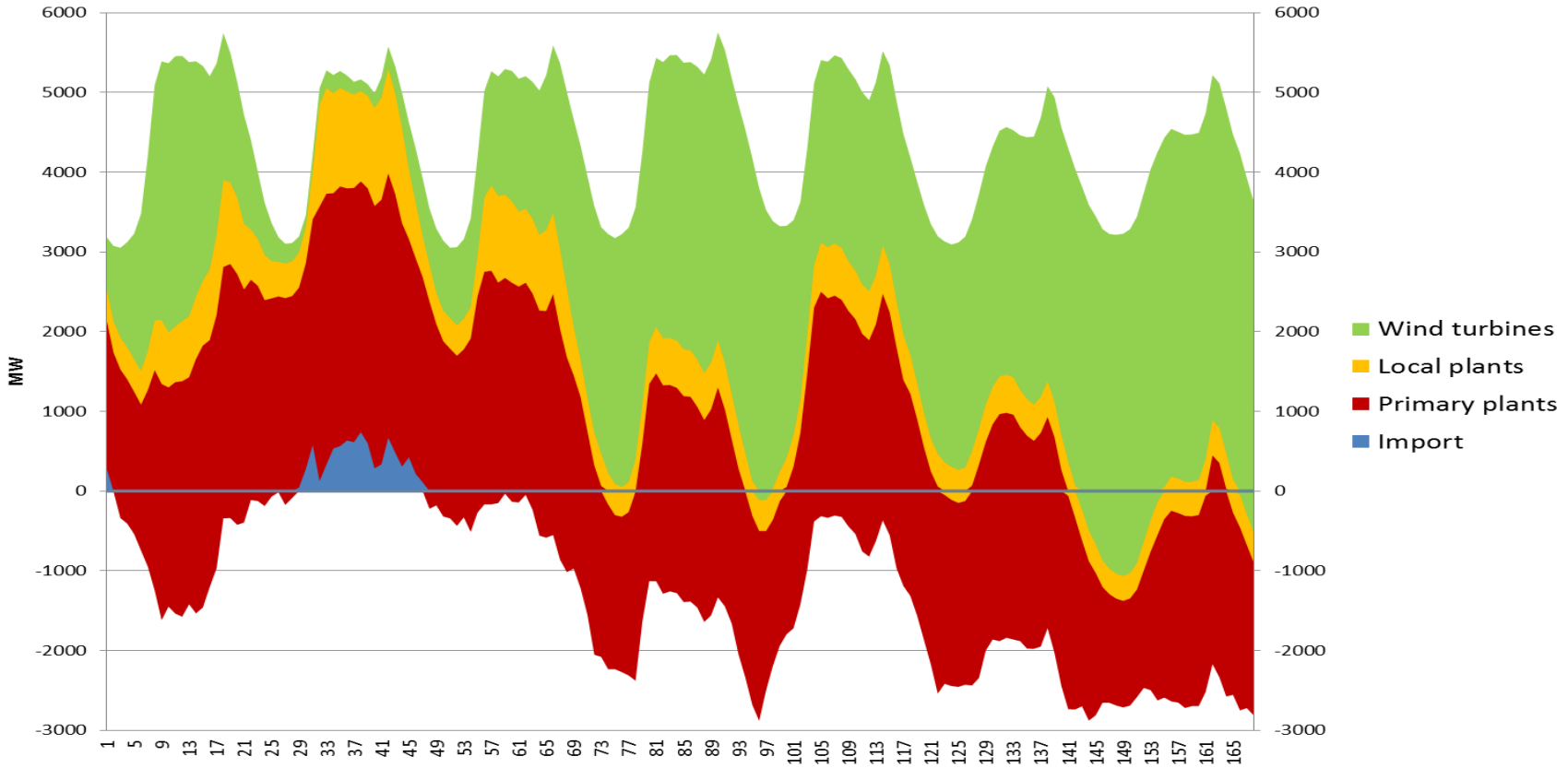
Wind Power/Demand in 2014 ~ 39%

One week in January 2014
- 57% wind power

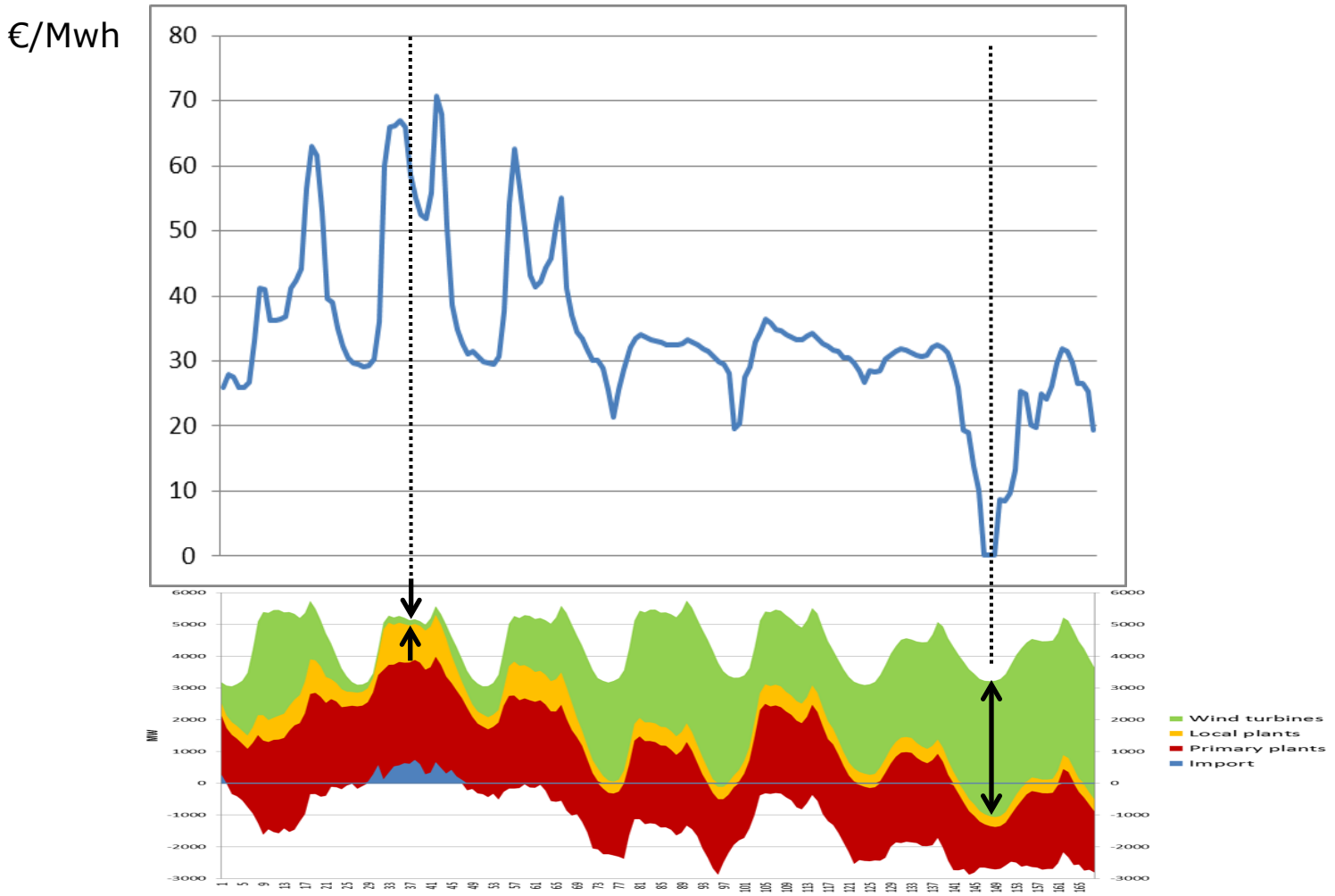


Flexibility in the electricity system

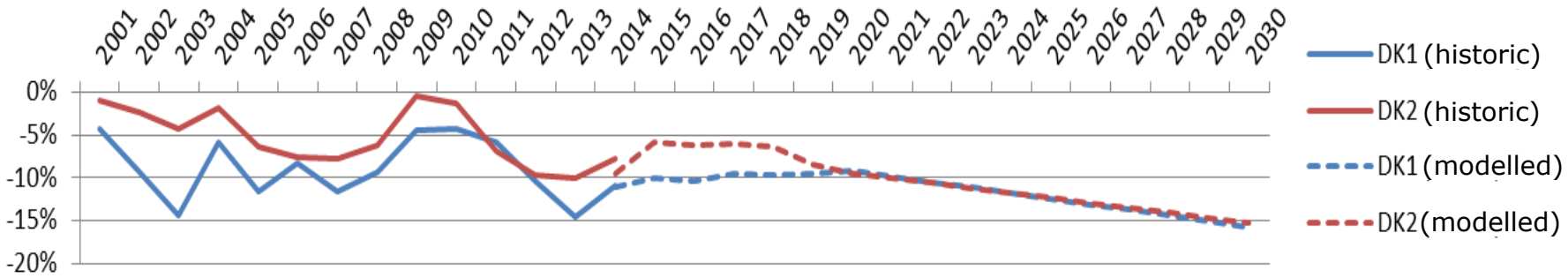
- hourly dispatch for one week in January 2014



Spot price, wind power and market dynamics



Relative market value of wind power



The relative market value of wind power is calculated as the average obtained market price for wind power relative to the average market price for electricity in a given period

Despite a substantial growth in wind power Energinet.dk only expects a minor reduction in the relative market value of wind power!

Means to increase the flexibility of the energy system

SHORT TERM

International connections

Cross-border markets

MEDIUM TERM

Smart Grid

Integration of electricity, gas, heat and transport

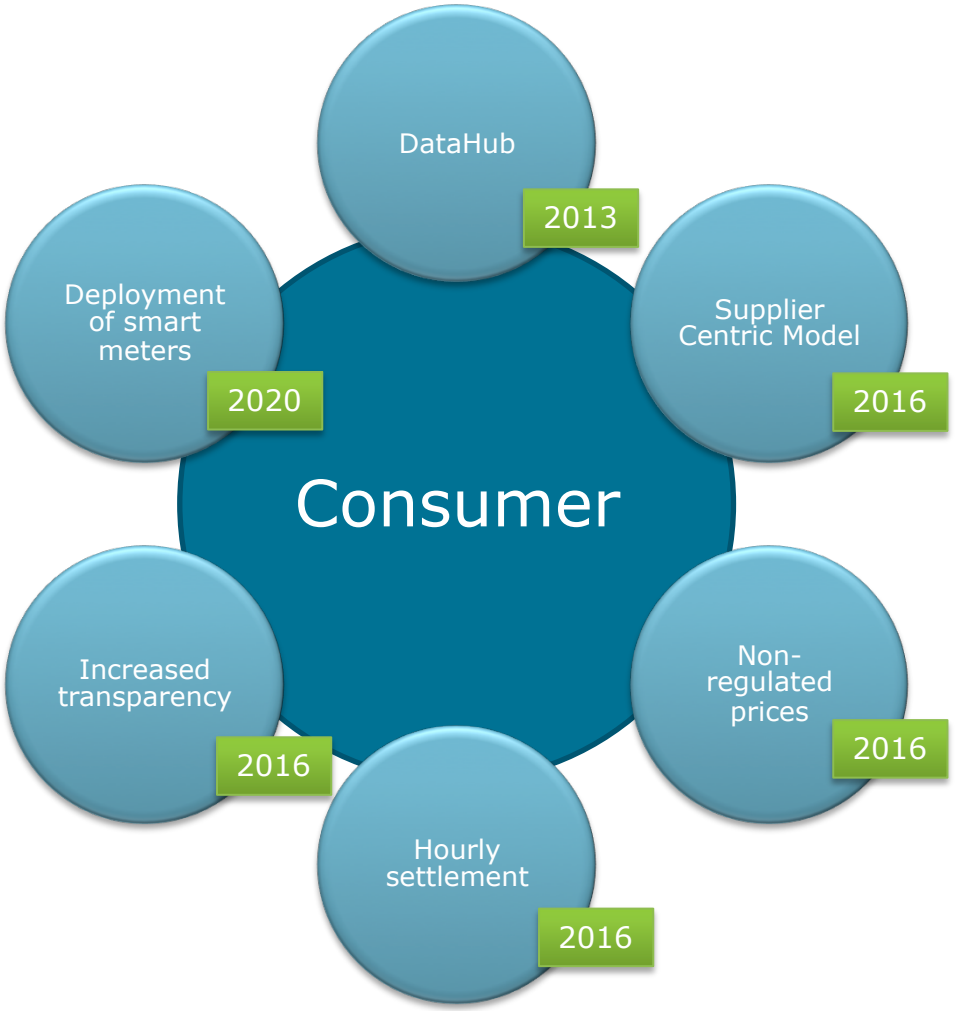
LONG TERM

Storage of wind power

Green gases

Development of the retail market

- Danish retail market liberalised in 2003
- Limited developments in the retail market so far
- Active consumers and flexibility increasingly important
- Many elements to support the development



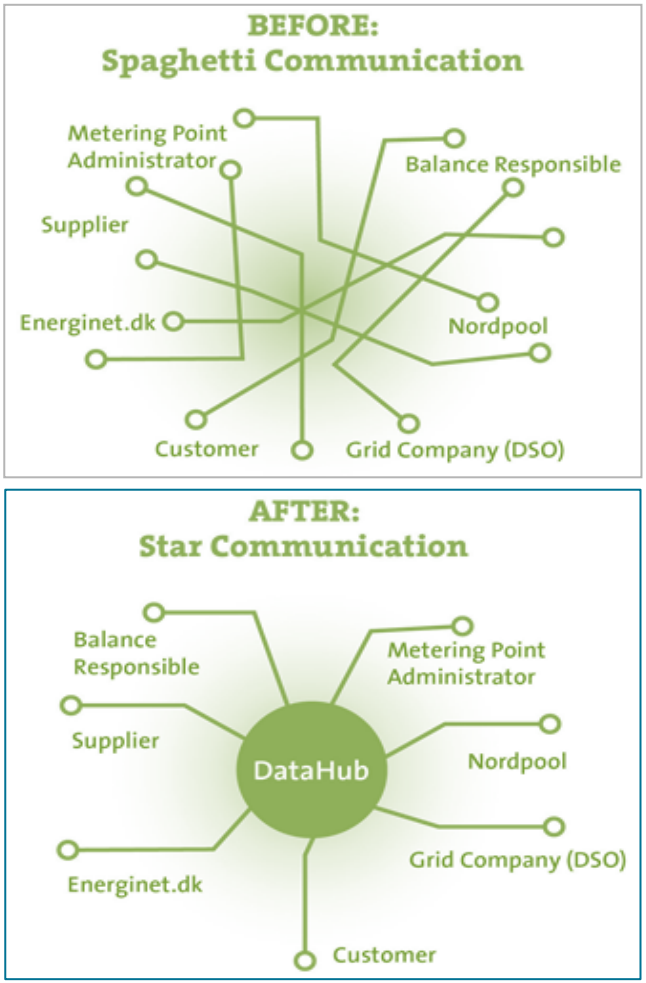
DataHub

- in operation since March 2013

Central data-register with all metering points

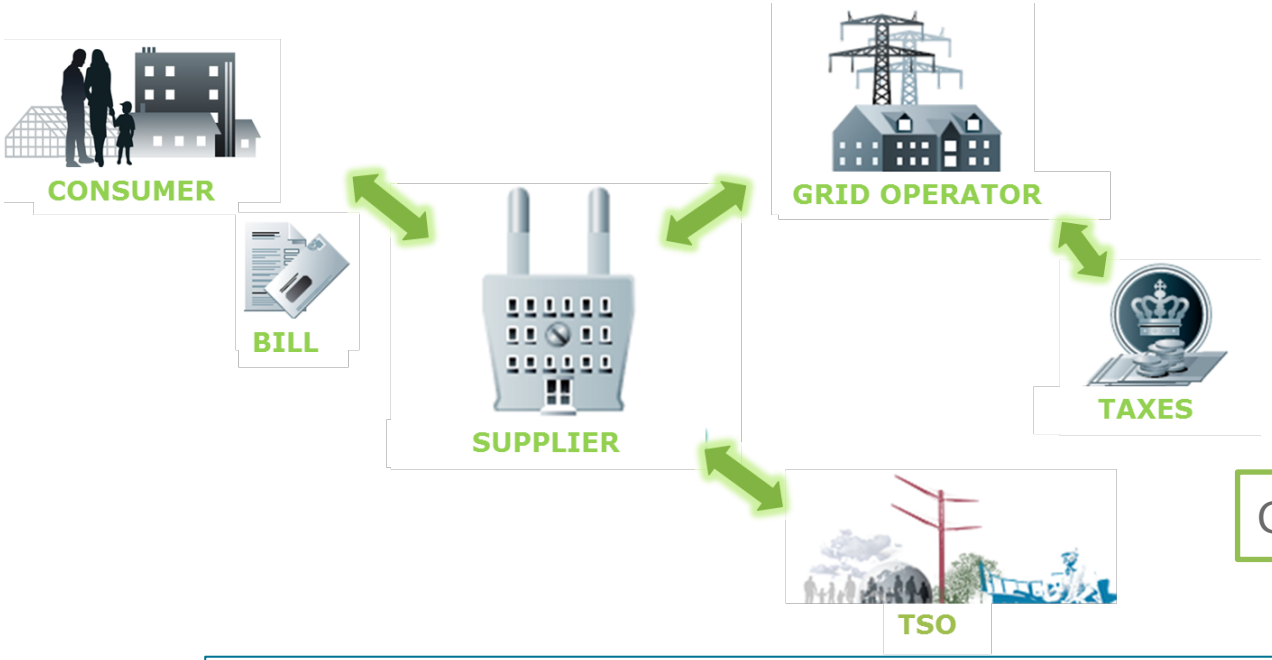
- Handles transactions and information exchange in the retail market
- Standardizes procedures and timeframes
- Facilitates change of supplier

Lowers entry barriers and enhances competition



Supplier Centric Model

A change of roles and responsibility in the retail market – supported by the DataHub



Go-live April 2016

- Consumers receive one combined bill
- Regulated prices are phased out
- Hourly settlement for small consumers is introduced
- Change of responsibility in the market

Resumè

An efficient and affordable green transition requires

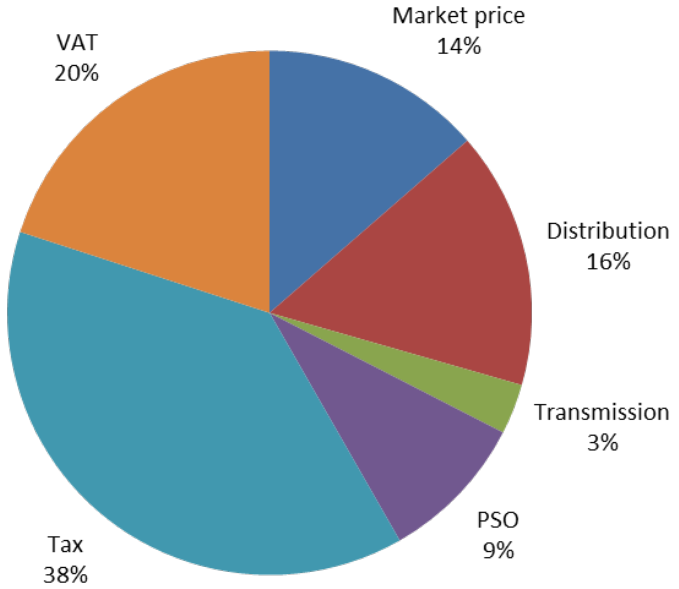
- A strong interconnected transmission system
- Efficient cross-border markets
- Coherent energy systems - electricity, heating, gas and transportation
- Increased flexibility in generation and demand - including active consumers and new business models in the retail markets


Thank you for your attention!
Read more at
energinet.dk

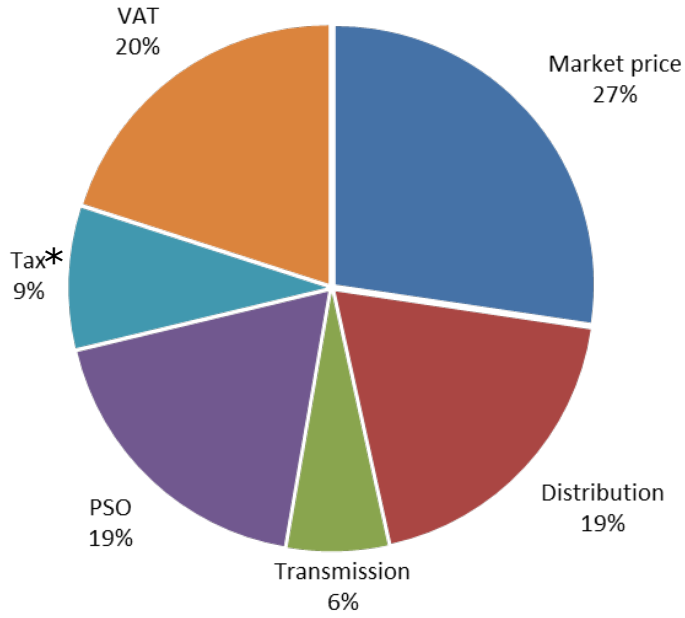
Consumer prices in Denmark

Jan 2015

House holds 4000 kWh/y



Industry 100.000 kWh/y

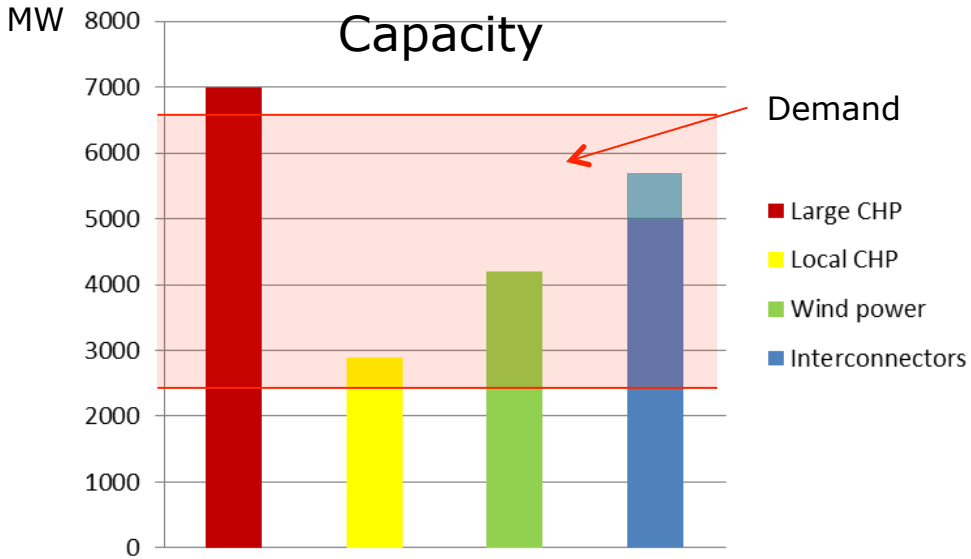


2.29 DKK/kWh~ 0.31 €/kWh

1.14 DKK/kWh~ 0.15 €/kWh

* 75% industrial processes

The Danish electricity system



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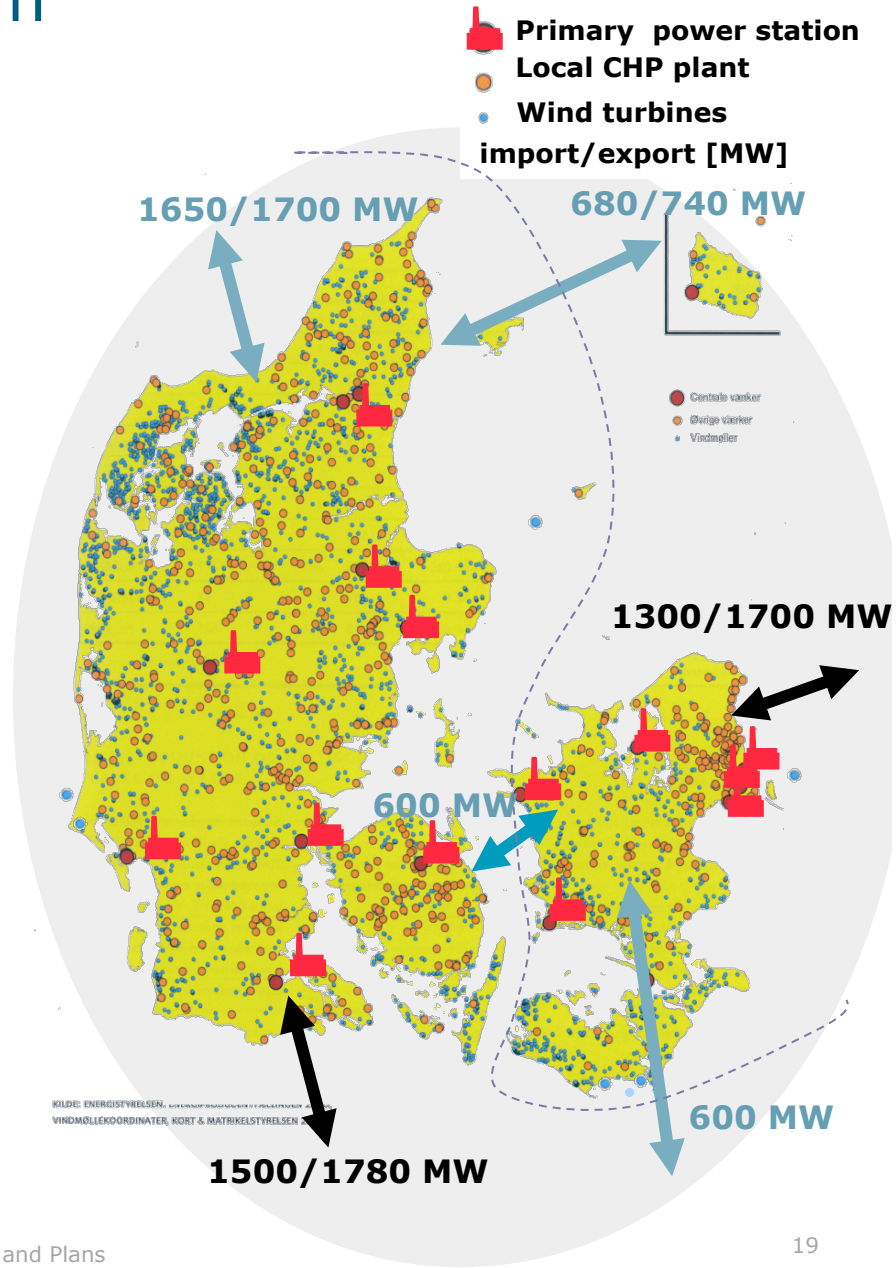
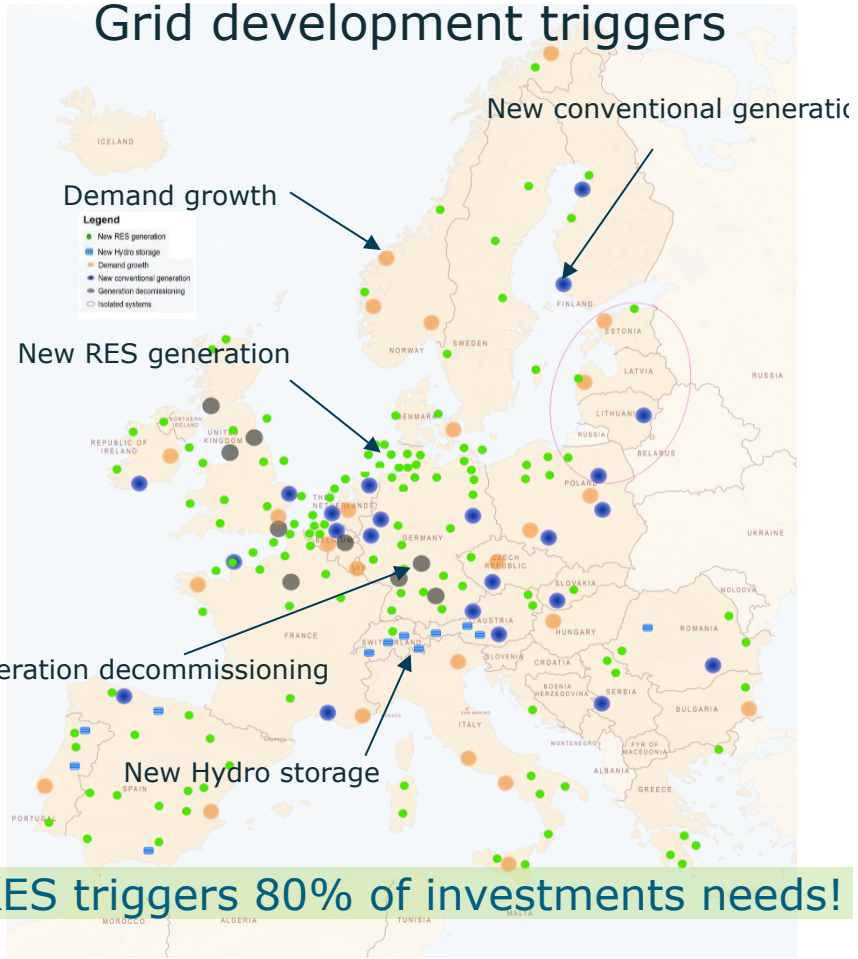


European - Ten Year Network Development Plan

Grid development triggers



RES triggers 80% of investments needs!

- a positive business case

€110-150 billions of investments in grid development of pan-EU significance by 2030

(1-1.5 €/MWh in wholesale power price)

Reductions from 2 to 5 €/MWh for bulk power prices by 2030

entsoe
Reliable Sustainable Connected

Large-scale investments - stable tariff