

Liberalisation of the Danish power sector

Identifying key learnings

September 2020

Outline

- 1. Why liberalisation in Denmark?
 - Trend in Scandinavia and Europe
- 2. The Danish electricity sector year 2020
 - How to buy and sell electricity
- 3. Liberalisation of the Danish power sector
 - 1995-2020 timeline
- 4. Lessons learned
 - DK perspective
- 5. International perspective
 - Unbundling of transmission





The task ... and what it is not

- Liberalisation can be-a long and complicated process
 - Critical issues will be highlighted
 - Successes?
 - Challenges?
- It has shown challenging to prove the benefits of the Danish liberalisation but improvements will be indicated.
- The insights must be adapted to each of the partner countries
 - All countries are different!



Why liberalisation in Denmark?

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... establishment of the internal market in electricity is particularly important in order to increase efficiency in the production, transmission and distribution...





"

The purpose of the liberalisation was to create better conditions for competition, and thus to improve utilisation of production resources as well as to provide gains from improved efficiency in the operation of networks

The association of Nordic regulators: NordReg, 2006



Key features of the Danish liberalised power sector

UNBUNDLING: Transmission

Unbundling ensures that the transmission grid supports competition to the largest extent possible. Owners of generator capacity must not be able to limit competition by controlling the use of the transmission grid.

SHORT TERM market

Hourly dispatch according to marginal costs. Level playing field for all generation technologies. Demand can also respond to prices.

Existing long-term agreements, e.g. on import/export, have been removed

A fundamental transformation

The transformation will have winners and losers – and may require difficult compromises and transition agreements

 Before: Vertically integrated companies: Generation, distribution, sales

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Now: Unbundled setup with commercial units (generation and sales) and regulated monopolies (TSO and DSOs)

INTERNATIONAL COMPETITION

Competition ensures efficient dispatch, and least cost delivery of ancillary services.



The current Danish electricity sector







A small country with many DSOs

Regulation of DSOs does not provide a strong incentive for mergers.

However, the number of DSOs has been reduced from over 100 in year 2000, to 43 today.

DSOs are typically owned by users or municipalities



Key participants in the current market



change supplier or type of contract.

balance responsible.



Power

exchange

Nord Pool operates day-ahead and intraday markets. The day-ahead market results in hourly prices in each price area.



Four main markets





Energistyrelsen

Liberalisation of the Danish power sector

A special Danish owner structure: Bottom-up

Example of the historical set-up (1995)



The year 1996 was a tipping point...



- Are the monopolies as efficient as possible?
- A large international market can be more efficient than state-controlled planning!
- EU: Electricity is a commodity as any other product that must be traded freely
- Development in Norway and Sweden



Drivers for the Danish liberalisation

EU's internal market

Liberalisation in Norway and Sweden

- The EU's work on the European internal market, where also electricity was seen as a commodity that should be traded across borders.
- The purpose of the EU's internal market is the free movement of goods, persons, services and capital.

Liberalisation in Denmark

Major steps in the direction of open competition were taken by Norway in 1991 and by Sweden in 1994.







The DONG/Ørsted case

From state owned natural gas company to international offshore wind developer





Denmark: 33 TWh 23 countries: 2,900 TWh

Denmark alone is too small to have strong competition. 23 countries with the same day-head market provides very strong competition!





Key insights





Generator perspective



Traditional generation: Potential for export in dry years Wind and solar power: Efficient integration with Nordic hydro



The wholesale market





Consumers perspective Many passive consumers





Limited market share for new retailers



Competition may be limited by a high barrier to entry...

Challenges:

- Electricity is a standard product with limited interest from households
 - Economic benefit for a typical household (4,000 kWh/year): 20-100 €/year
- Is the competition with incumbent companies fair?
 - Legal unbundling is less restrictive than ownership unbundling

After 15 years: 62% of all electricity is sold to passive consumers (2018). They have stayed with their default supplier.

Regulator (2019)



Retail market

Development of retail market has been slow

By the end of 2020, all consumers will have a smart meter

- No need for estimated bills
 - Before the smart meters, the meter reading was yearly, but payment quarterly
- With remote reading of meter, consumers can now participate in demand response
 - Adjust demand after prices, e.g. with heat pumps, electric heating or electric vehicles.
 - Commercial products exist, e.g. for heat pumps





Security of supply: Adequacy



National perspective --

Denmark must have firm capacity to cover peak demand



International and market-based perspective -

- Acceptable to use cross-border transmission capacity to achieve high security of supply
- ENTSO-E now has an important role in continuously analyses of regional adequacy:
 - Short
 - Medium
 - Long term



Security of supply:

- Adequacy (generation and transmission capacity to cover peak demand)
- Security (the ability to withstand sudden failure of key elements



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International perspective

All countries are different!



- Low electricity demand growth
- Over capacity in 1999
- Well connected to neighbours
- Part of EU's internal market

Partner countries

- High electricity demand growth?
- Difficulties in financing new power plants?



General recommendations for first steps

 \mathbb{Q} Clarify goals to be achieved

L Unbundle transmission and generation: Independent TSO

All generation exposed to short term day-ahead prices

Create cross-border markets

Strong and active regulator



Transforming learnings

- Initial analyses of how to transform learning to partner countries
 - Egypt
 - India
 - Indonesia
 - Vietnam
 - China
 - Ukraine
 - South Africa

- How to get liquidity on day-ahead market
- Wind can sell on the wholesale market
- CHP is not must run
- TSO must have good tools for predicting wind and solar
- Start with wholesale market
- Increase cross border transmission capacity
- Accept transitional arrangements

Must be further developed in close cooperation with partner countries



Next steps

Interaction with partner countries and relevant stakeholders - What can be learned from a partner country perspective?



