

Market Code Consultation WS 5

Demand-side participation
Key roles and interfaces



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Prerequisites for the establishment of the market – example from Norway and the role of Munics

- Economic inefficiencies and lack of coordination in the Norwegian market
 - Inefficient management where municipalities were responsible for the local power balance (Norway at that point had 4,5 mill people and 435 municipalities)
 - The result in Norway was over-investment and thereby low prices
 - Investments and profits for the companies literally disappeared ‘straight into the ocean’
 - Excess power was exported to Sweden at a lower price than that paid by Norwegians
 - The Ministry of Finance, not the Ministry of Oil and Energy, realising that the industry was based on uneconomic principles and operations, therefore raised the question of efficiency.
- The challenge was to develop a model tailored to an industry and a commodity that was produced and consumed at the same time and that thus had special prerequisites and requirements.



Prerequisites for the establishment of the market – example from Norway

- First steps identified: Deregulation and Unbundling
 - One of the key tasks in most power sector reforms is the unbundling of the power companies. The Norwegian power sector prior to the Energy Act was dominated by one incumbent, vertically-integrated power company. It was therefore important to unbundle this into separate companies:
 - **Transmissions system operator** – owner of the main grid and also the national system operator. This needs to be regulated as a natural monopoly by the national energy regulatory authority.
 - **Distribution companies** – distribution to end-consumers at a lower voltage level
 - **Generation company** – taking care of the power generation. This could also be split in several companies
 - **Retailers (trading) company** – selling power to the end-consumers – could be part of either a distribution company or a generation company.
 - **Privatization – a potential tool, but no requirement**
 - Other Nordic countries started their deregulation process in the first parts of the 90's and essentially followed the same process. This was important to allow for an easy integration of the other countries into the Nord Pool market.



Unbundling vs Ringfencing

- The term **unbundling** is commonly associated with the separating **all the core functions** within a monopoly utility, into separate distinct legal business entities, with:
 - Separate Legal Entities, meaning the vertically integrated company is split into two or more different legal companies.
 - Therefore, not only a separate management team but also a separate Managing Director/Chief Executive Officer, Chief Financial Officer, and Board of Directors and Owners.
 - Separate management accounts and audited financial statements
 - Separate reporting to demonstrate adherence to the licensing requirements, including the revenue requirements that will be used for purposes of calculating tariffs.
- **Ring-fencing** = no legal separation with the same owner and part of the same company with:
 - Separate division with separate management team and Director reporting to the same Managing Director/Chief Executive Officer and Board of Directors.
 - Ring-fenced divisional management accounts (i.e. balance/income statement, etc).
 - Separate reporting to ministry/regulator to demonstrate the adherence to the licensing requirements, including the revenue requirements that will be used for purposes of calculating tariffs.
 - One of the key requirements as part of the implementation of the ringfencing will be to develop additional rules and enforcement of the license criteria for the different key roles.

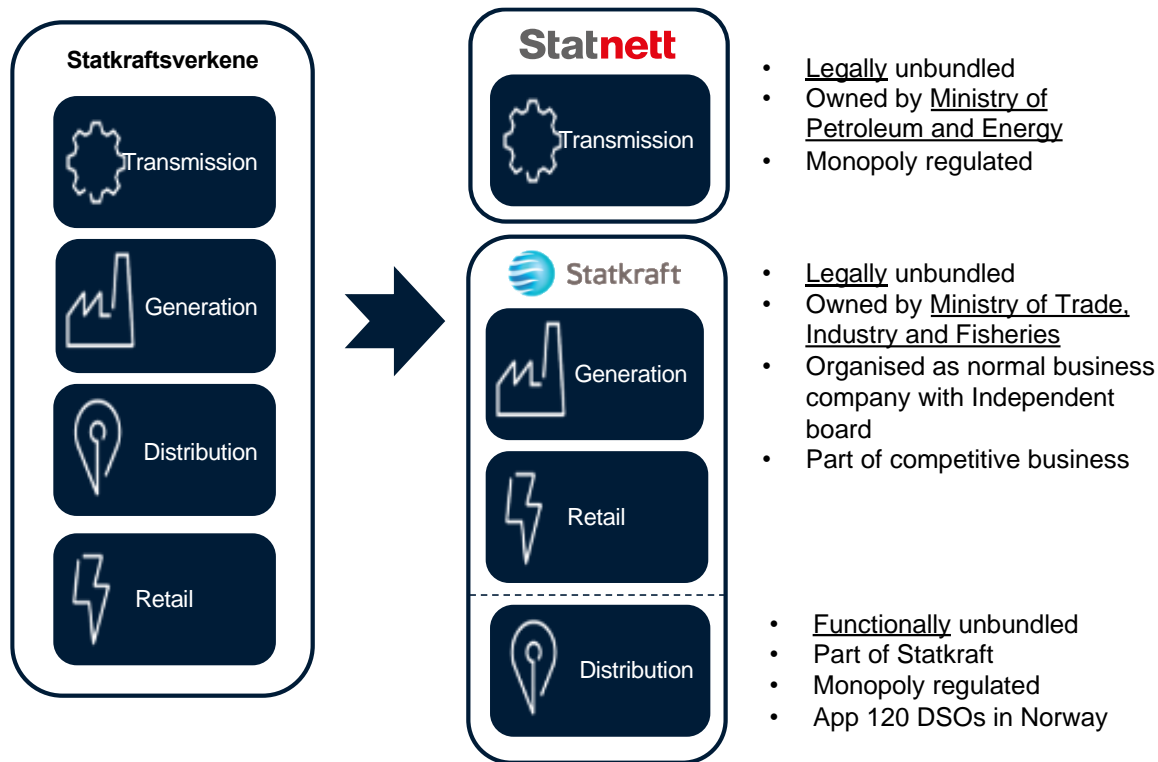


Unbundling vs Ringfencing

| Process | Ringfencing | Unbundling/Legal Separation |
|------------------------------------|---|--|
| Legal Status | <ul style="list-style-type: none"> Requires creation of different Divisions Divisions still part of Eskom. | <ul style="list-style-type: none"> New autonomous legal entity to be established Entity will not be part of Eskom |
| Employees | <ul style="list-style-type: none"> Remain as employees of Eskom However, allocated to different divisions | <ul style="list-style-type: none"> Employees no longer working for Eskom Employment will be with new entity created |
| MD & Board of Directors | <ul style="list-style-type: none"> Ringfenced business units all still accountable to one MD and Board | <ul style="list-style-type: none"> New Entity will have its own MD and Board of Directors Separate ownership from Eskom |
| Accounts | <ul style="list-style-type: none"> Assets, costs, revenues to be ringfenced for each division, but ownership remains with Eskom Management Accounts for each division, but only one set of Annual Financial Statement | <ul style="list-style-type: none"> Assets and systems to be transferred to new legal entity. Entity to have its own Management Accounts separate from that of Eskom |
| Interfacing | <ul style="list-style-type: none"> Interfacing between various divisions could be through internal arrangements Recovery of costs/charges between Divisions could be through internal transfers | <ul style="list-style-type: none"> Interfacing with Eskom business units must be contractual, same as with rest of market Recovery of costs is through invoicing and payment |



Unbundling – how was the this done (looking at “our” Eskom)?

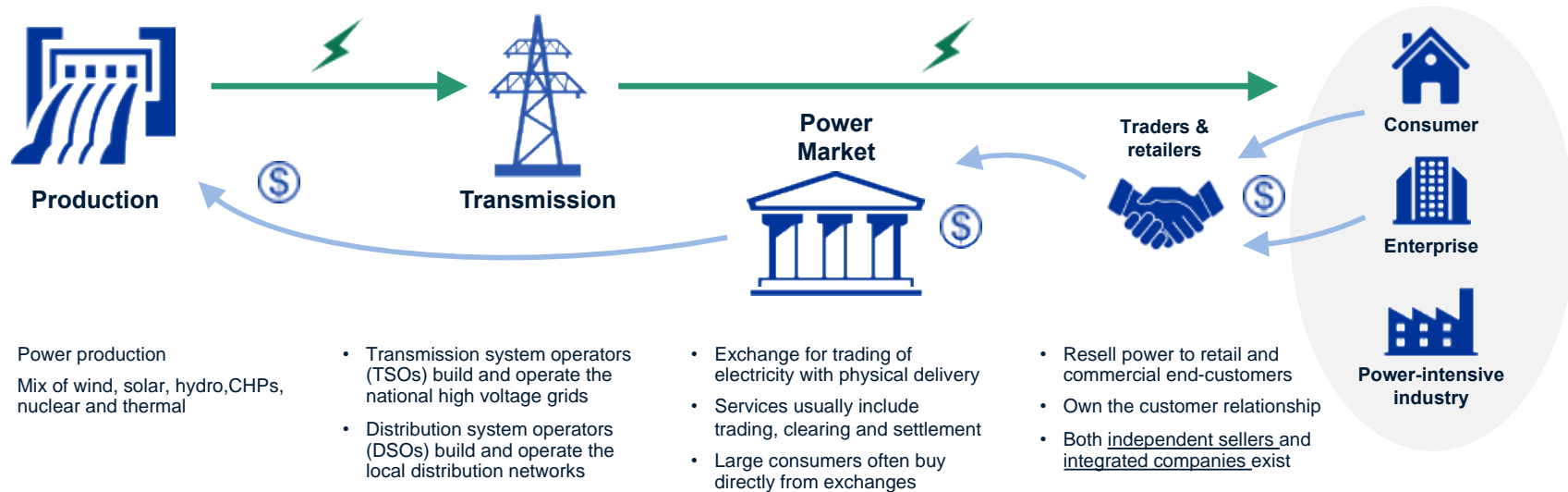


*** From 01/2021 there is a new legal requirement to fully unbundle the DSOs in Norway including rebranding**

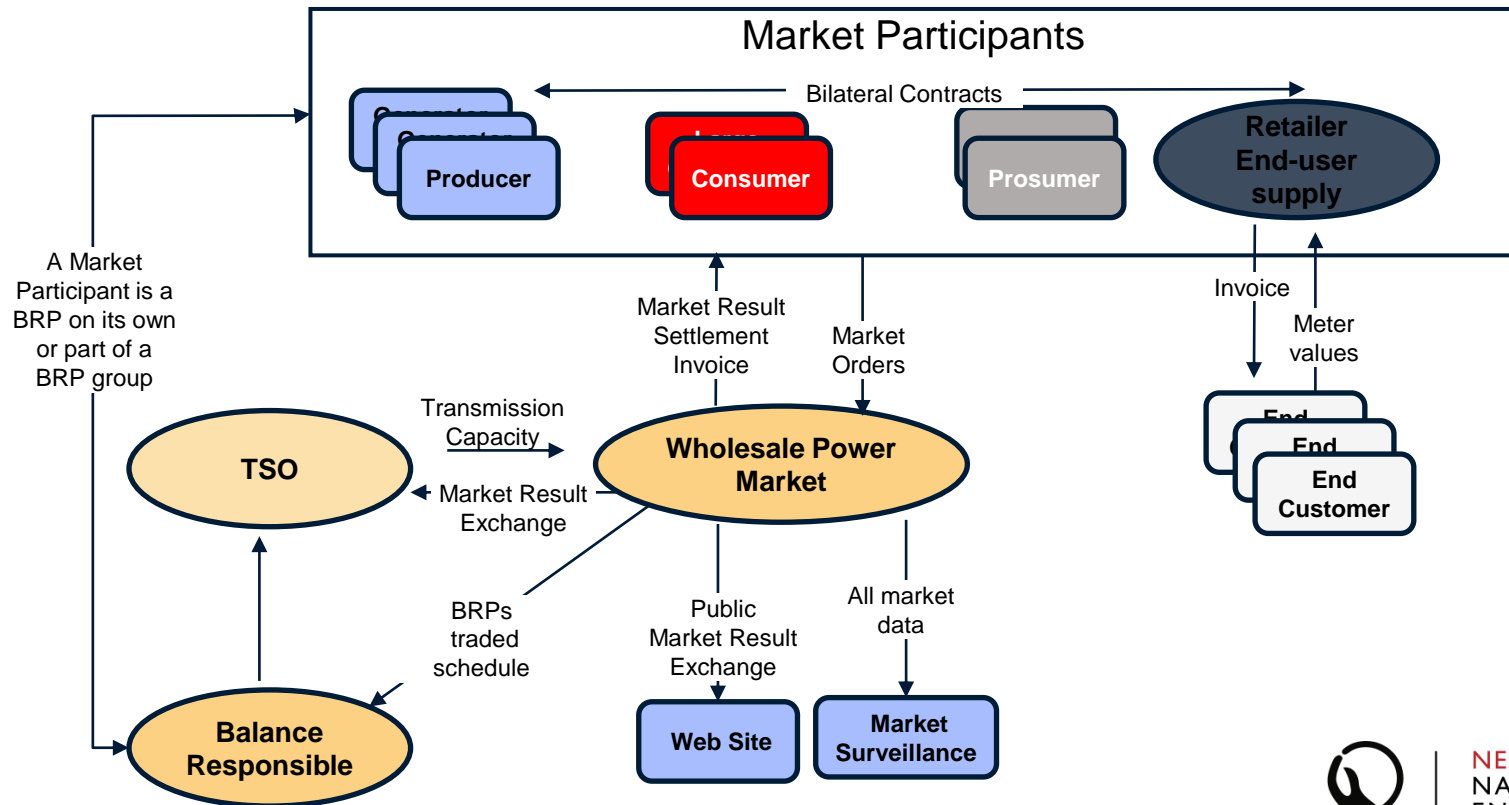


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Overview of the electricity value chain



Business Relations



(T or I)SO and DSO

In a competitive market, the SO makes sure that the system remain within the framework of the laws of physics, so that power reaches (technically) safely out to the consumers.

- ▶ Transmission Network Operator is responsible for physical operation function (owning, maintaining and expanding);
- ▶ System Operator function, including dispatching
- ▶ Provide connection to the transmission networks on non-discriminatory terms;
- ▶ Also (based on given license terms) may be responsible for
 - Define the conditions for becoming Balance Responsible Party
 - Implementing a coordinated capacity calculation processes in line with the requirements in the organized markets
 - Operate a Balancing Market Operator function

Distribution System Operator - owns, maintains, expands and operates its distribution system.

- ▶ DSO will provide connection service to all system users connected to the distribution networks on non-discriminatory terms
- ▶ DSO is responsible for reducing technical and non-technical losses in the distribution system



Market Operator

Market Operator is an independent company/body responsible for

- ▶ Make available all systems and interfaces required to operate the markets
- ▶ Receive Orders (bids and offers for buying and selling power) from market participants
- ▶ In self-dispatch markets; receive and process interconnection capacities from the TSO and other related information
- ▶ In central-dispatch markets; produce demand forecasts
- ▶ Conduct the required auctions and trading operations
- ▶ Send confirmation of trades including the allocated volumes and prices to the relevant market participants and TSO
- ▶ Publish the allocated volumes and prices
- ▶ Submit Credit Notes and Invoices to the relevant market participants and SOs according to the agreed timelines and settlement calculations;
- ▶ Enforce collateral requirements and payments for the relevant market participants according to the agreed rules and timelines;
- ▶ Fulfil transparency requirements and implement a market surveillance function



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Electricity Market Regulator

A competitive internal energy market cannot exist without independent regulators who ensure the application of the market rules.

- ▶ Regulator must be independent from both industry interests and government.
- ▶ Regulator must be their own legal entity and have authority over their own budget.
- ▶ National governments must supply Regulator with sufficient resources to carry out the operations
- ▶ Regulator can issue binding decisions to companies and impose penalties on those that do not comply with the legal obligations
- ▶ Electricity generators and energy suppliers are required to provide accurate data to regulators when necessary
- ▶ One alternative funding solution is to be funded via service fees from the market players



Market participants

Producers are responsible for power production.

- ▶ Producers have physical assets which can be used to generate electricity
- ▶ Producers represent the supply in the power markets

Suppliers buy power either directly from a producer, or through the market(s).

- ▶ In general, a supplier resells the acquired power to small and medium-sized companies and households.
- ▶ Preferably in liberalized markets each end-user can choose their preferred supplier and make a choice between different power contracts
- ▶ Suppliers bring demand to the market

Traders represent entities which own the power while the trading process is taking place.

- ▶ Traders do not necessarily own any physical power capacity
- ▶ For example, the trader may buy power from a producer and sell it to a retailer, or the trader may choose to buy power from one retailer and sell it to another retailer.
- ▶ Traders are vital part of the market participant mix and are in sign of healthy competition in the market



DSO – Distribution System Operator vs Retail companies

European definition of a DSO:

A Distribution System Operator (DSO) securely operates and develops an active distribution system comprising networks, demand, generation and other flexible distributed energy resources (DER). As a neutral facilitator of an open and accessible market it will enable competitive access to markets and the optimal use of DER on distribution networks to deliver security, sustainability and affordability in the support of whole system optimisation. A DSO enables customers to be both producers and consumers; enabling customer access to networks and markets, customer choice and great customer service.

DSO Roles and Responsibilities:

- Maintain distribution network resilience and security
- Support whole system stability
- Provide fair and cost-effective distribution network access
- Provide capacity in an efficient, economic, coordinated and timely manner
- Support whole system optimisation
- Enabling and facilitating competition in energy markets
- Provide and maintain systems, processes and data to facilitate markets and services

Principles of operation

- Ensures non-discriminatory and technology neutral: favouring solutions that provide the most optimal solutions rather than particular technologies;
- Uses market mechanisms that are fair, transparent and competitive, providing a level playing-field for providers of network services and providers of energy products / services in order to deploy the most efficient and effective solutions;
- Supports flexible and innovative solutions in responding to customer future requirements and in developing the network services they require, including enabling and facilitating innovation by others; and Delivers value to customers and communities.

European definition of a Retail company:

Retail companies buy energy from the wholesale market or directly from generators and arrange for it to be delivered to the end consumer. They set the prices that consumers pay for the electricity that they use. Allowing consumers to choose their retailer helps to keep pressure on prices and drives better customer service. It also promotes innovation in products and services.

So there exists a clear definition of what is the regulated monopoly (DSO) and the supply to end-consumers (Retail companies)

However...

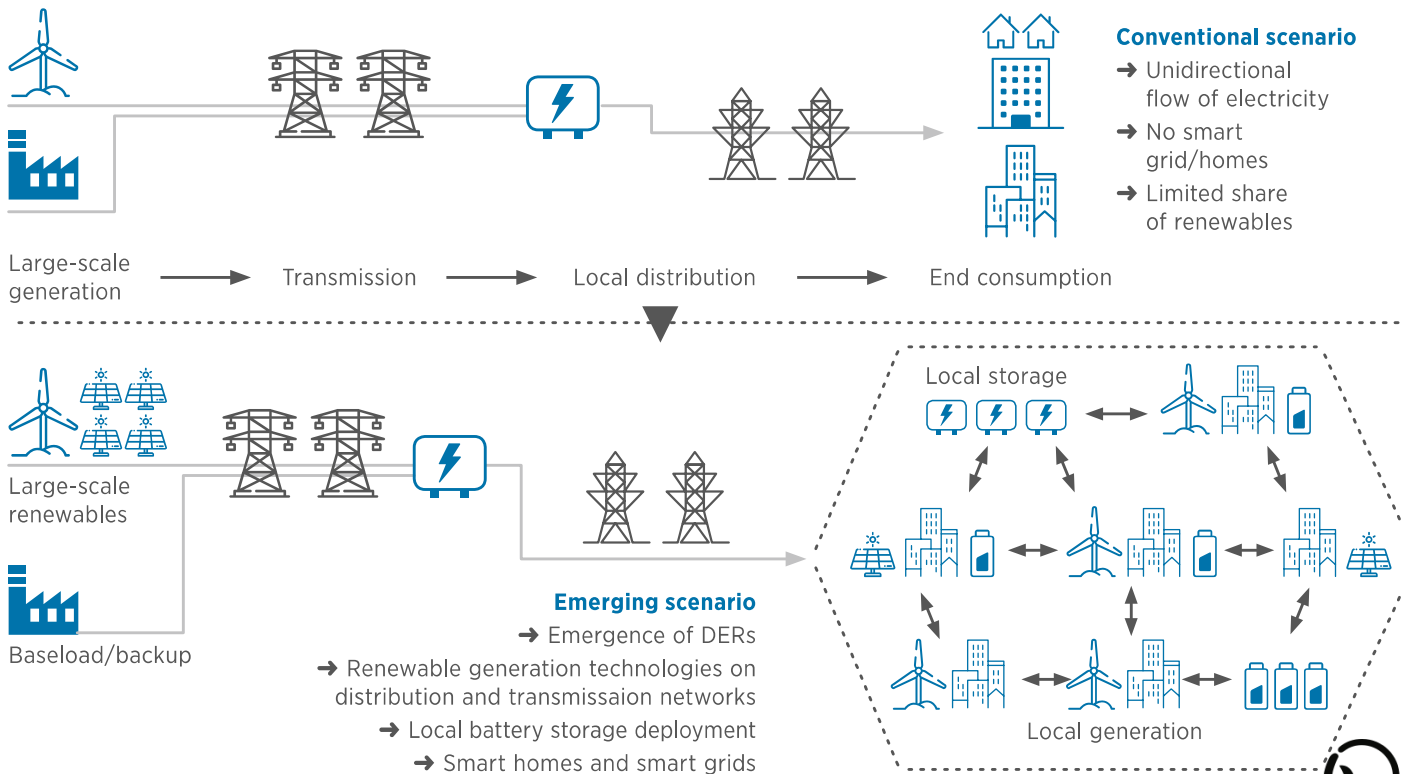
Since DSO income is regulated and the number of customers is given by the connection points in the distribution area, the incentive to participate in competitive market activities is limited. On the other hand, several grid and retail companies are co-operatively owned (vertically integrated), an arrangement which enable DSOs to participate in competitive activities on behalf of “their” retail company. Competitive market activities in this context is defined as participation in activities that intend to increase the production or supply part of the business, e.g. to attract new customers for the integrated supplier.

DSOs may participate in the competitive market in other ways, e.g. by selling services such as maintenance, or a stand-by unit in case of emergency, to other DSOs who are unable to do so. In addition, DSOs sometimes participate in other markets such as retail market for electronic products.



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The changing role of the DSO in the future



Source: IRENA (2019), Innovation landscape brief: Future role of distribution system operators, International Renewable Energy Agency, Abu Dhabi



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And another issue – The Power system structure is changing 180°

Global Drivers



Bottom-up Revolution

- From Central to Decentral
- From KWh to Services
- From Analogue to Digital
- From Fossil to Renewable
- From Manual to Machine Learning



Policy Drivers



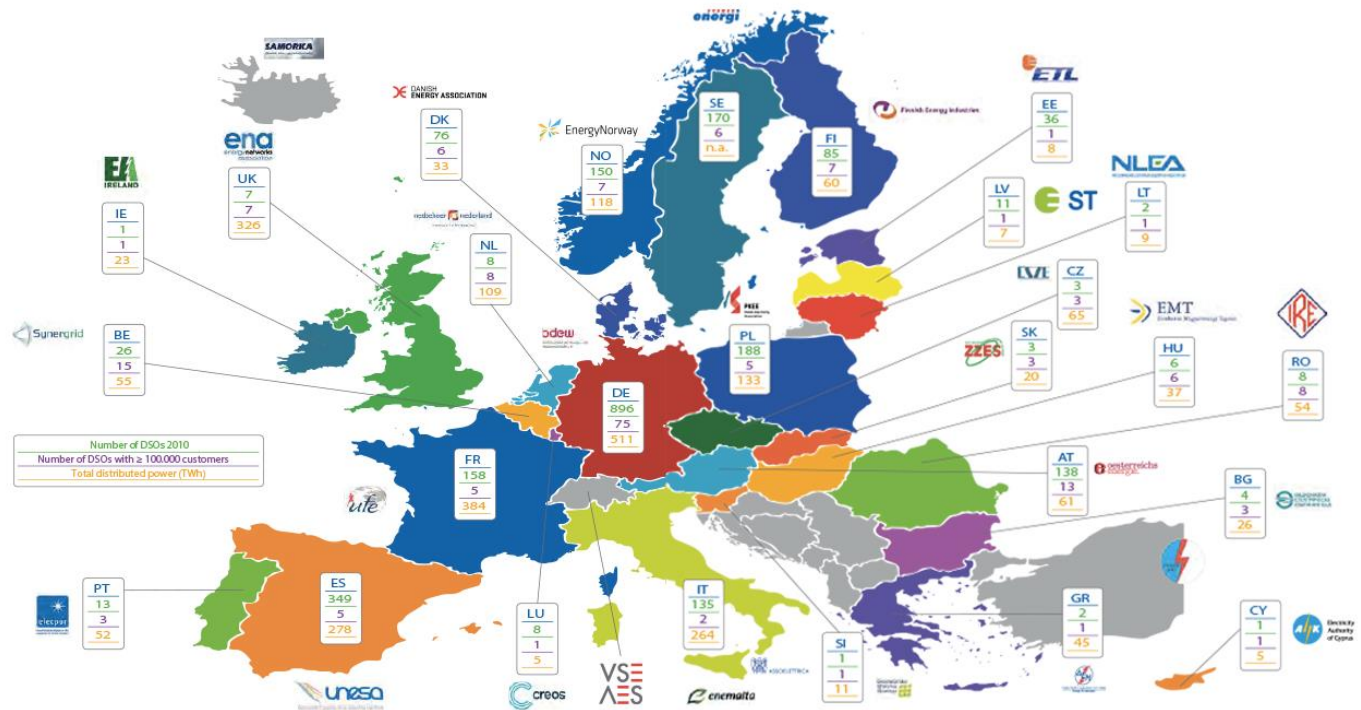
It is happening now!



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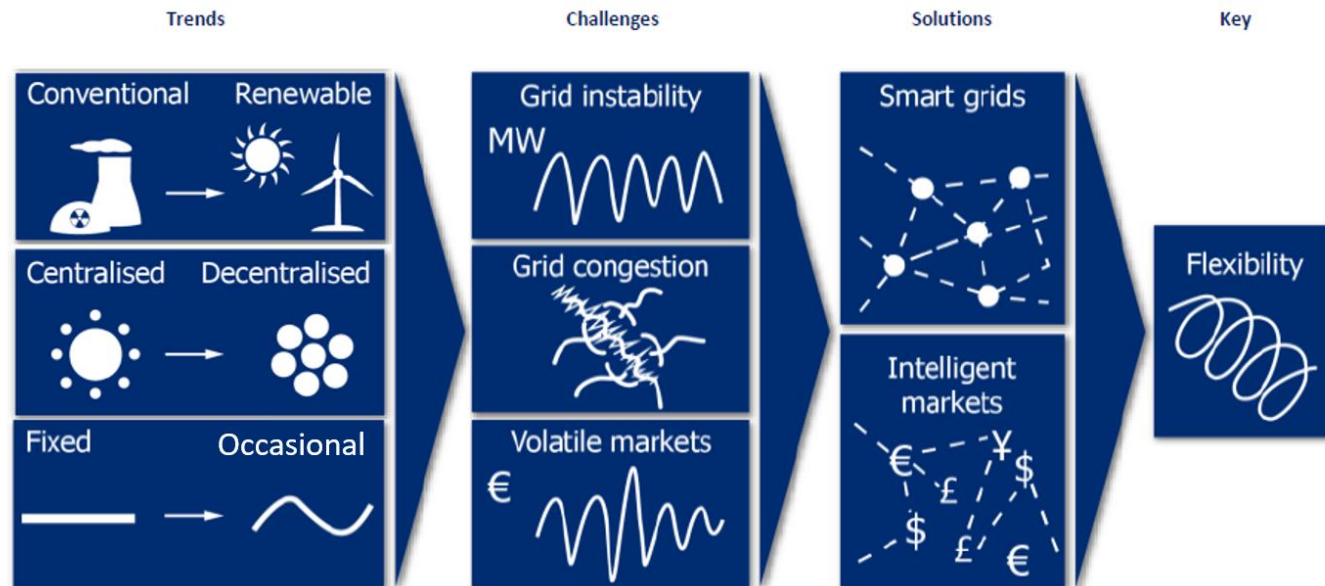
The structure – size matters also for the regulation and operation

- Europe: EUR 400 billion investments by 2020, 2400 DSOs, 260 million connected customers, 2700 TWh annually



Source: EURELECTRIC paper: Power Distribution in Europe – Facts and figures,
<https://www3.eurelectric.org/powerdistributionineurope/>

Trends are challenging the traditional power systems



New approaches – Retail markets

• Digitization of retail markets

- Hourly (or lower resolution) metering allowing for more control and access to real-time data
- Smart load steering (e.g. smart charging) in low-priced hours during the night
- Retailer would charge/heat in PH04 and avoids using power in PH09
- Price signals somewhat diluted due to grid tariffs (no incentive compatibility)
- More active consumer role – the role of the prosumer

EUR/MWh

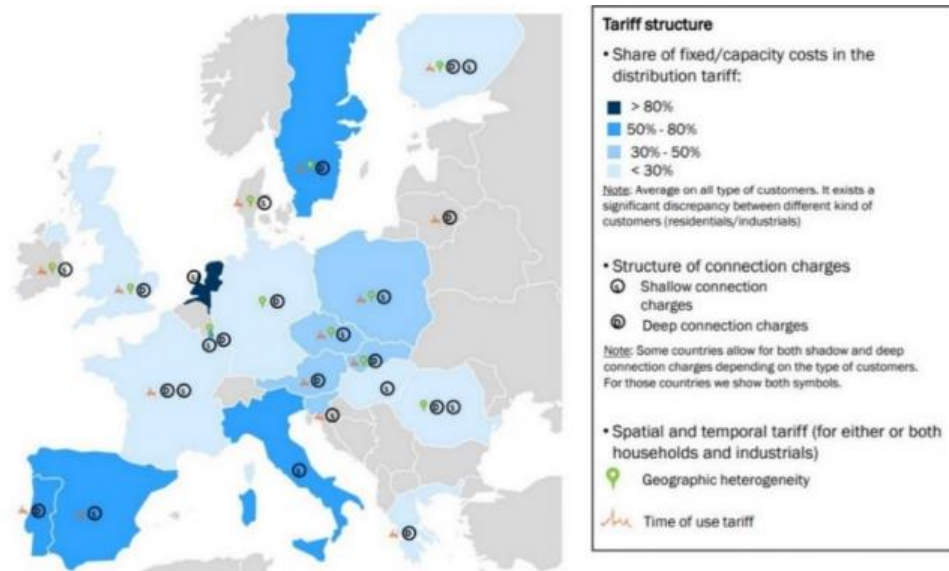
| 05-02-2021 | Oslo |
|------------|--------|
| 00 - 01 | 45,57 |
| 01 - 02 | 44,01 |
| 02 - 03 | 42,24 |
| 03 - 04 | 41,20 |
| 04 - 05 | 41,50 |
| 05 - 06 | 43,74 |
| 06 - 07 | 74,59 |
| 07 - 08 | 170,55 |
| 08 - 09 | 200,02 |
| 09 - 10 | 197,22 |
| 10 - 11 | 180,22 |
| 11 - 12 | 69,66 |
| 12 - 13 | 64,48 |
| 13 - 14 | 64,60 |
| 14 - 15 | 64,92 |
| 15 - 16 | 64,23 |
| 16 - 17 | 67,47 |
| 17 - 18 | 89,22 |
| 18 - 19 | 72,08 |
| 19 - 20 | 58,87 |
| 20 - 21 | 51,10 |
| 21 - 22 | 49,89 |
| 22 - 23 | 48,49 |
| 23 - 00 | 43,58 |



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New approaches – Grid tariffs

- New methods for calculating income framework for DSOs proposed by NRAs
- The DSOs needs to be allowed to move away from a “copperplate” view of their role to a more active market-based procurement of flexibility instead of “just building hardware”
- One solution being tried: Proposed higher fixed fee and lower variable fee (€/kWh)
- Aim is to better reflect cost structure of grid companies (high CAPEX/low OPEX)
- The whole key: getting access to (local) flexibility through market-based solutions incentivizing **all** potential providers through proper pricing regimes.



Cost recovery in Europe by Compass Lexecon (2016)



THANK YOU
FOR YOUR ATTENTION!

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