

Power distribution: contributing to the European energy transition

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Power distribution: contributing to the European energy transition



1. DSOs in Europe
2. Evolution of DSOs customers needs
3. New challenges for electricity distribution and the new role of DSOs
4. How can cables and the cable makers contribute to DSOs' challenges and the energy transition?



1

DSOs in Europe: diverse, reliable, neutral

2,400

electricity distribution
companies

260 million

connected customers

240,000

people employed

€400 billion

of investment by 2020

▪ Diverse

- Number and size of operational areas
- Number of customers
- Network characteristics
- Ownership structure

▪ Reliable

- High level of reliability and quality of supply

▪ Neutral

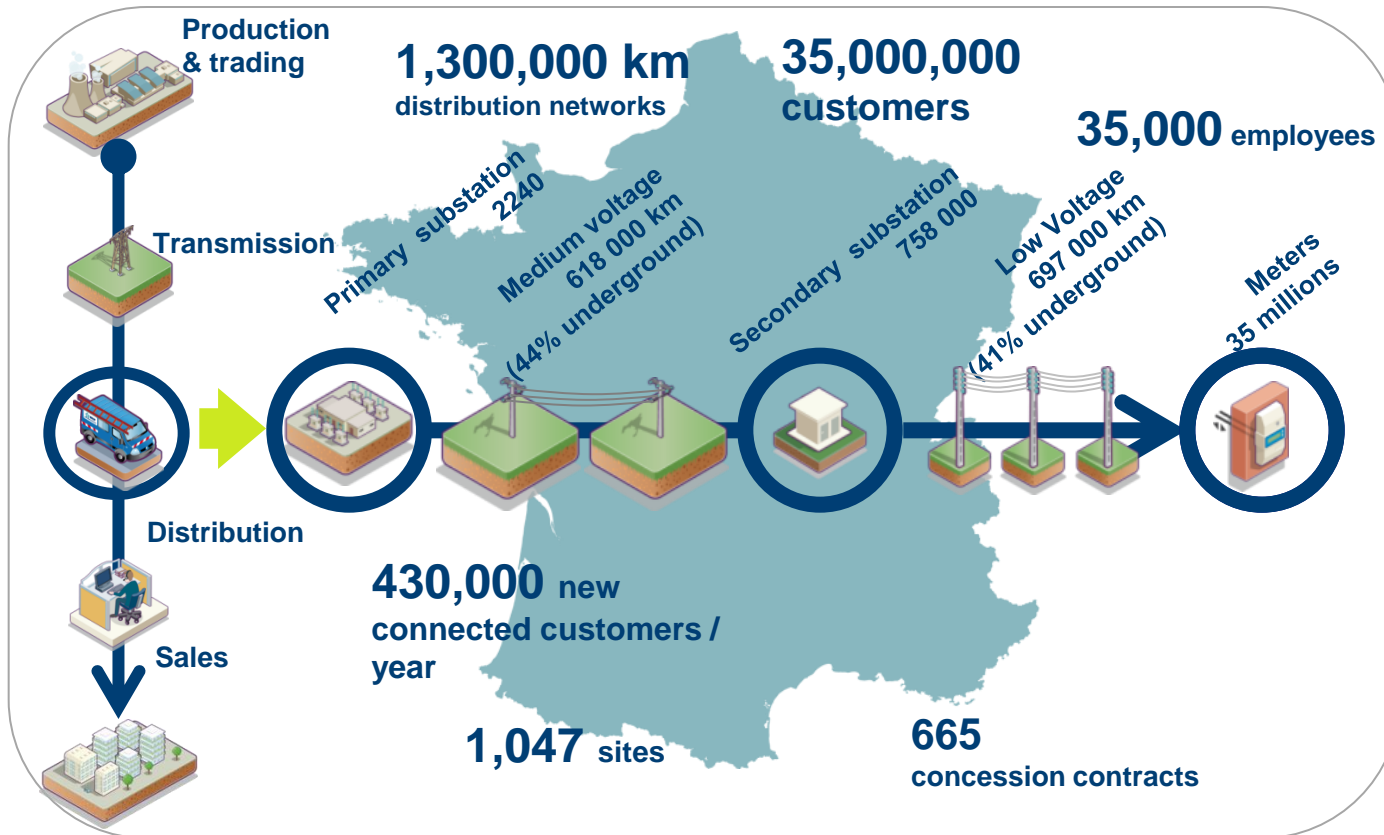
- Fully regulated companies
- Allowed revenue determined by national regulatory authorities
- Legal, functional and accounting unbundling

1

ERDF: one of the largest DSOs in Europe



ERDF is in charge of 95% of electricity distribution in France
ERDF is a fully owned subsidiary of EDF



Financial results:

- € 13.8 billion revenues
- € 3.2 billion investment
- € 3,6 billion EBITDA



2

Evolution of DSOs' customers needs



- **High quality of power supply:**
 - What: reduce the duration and frequency of interruptions, improve the voltage quality
 - Why : digital society
- **High quality of service:**
 - Simple and fast process for connection, shift of supplier, meter reading
- **Reduced bills**
 - Economic crisis: increasing number of 'fuel poor' customers
 - Fierce international competition: power price plays a major role
- **Societal concerns, carbon reduction**
 - Advice and assistance on energy efficiency
 - Integration of decentralised renewable energy sources in distribution networks
 - Charging of electric vehicles
- **Our customers are not only power consumers, but also generators and, increasingly, "prosumers"**

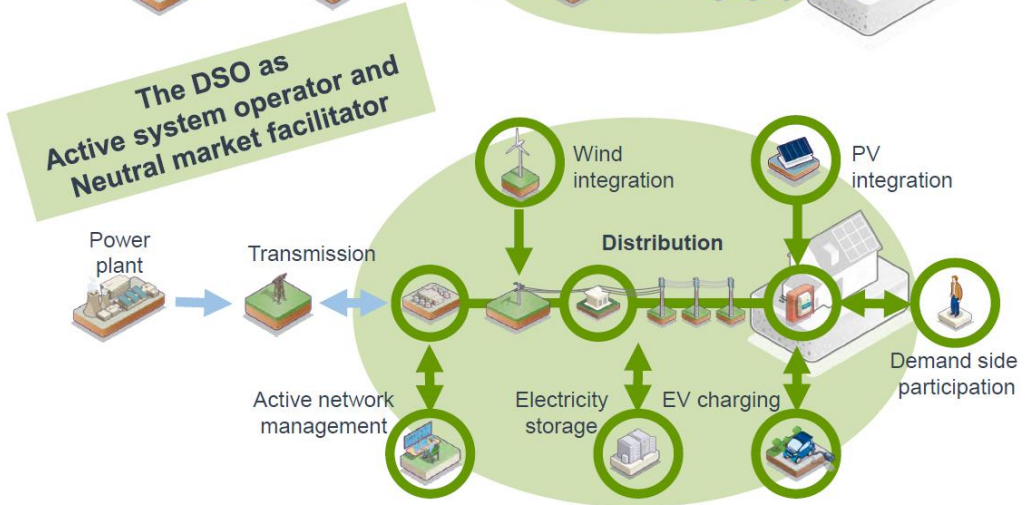
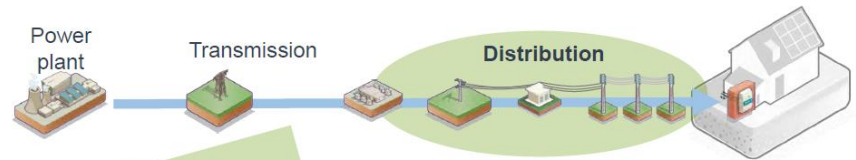
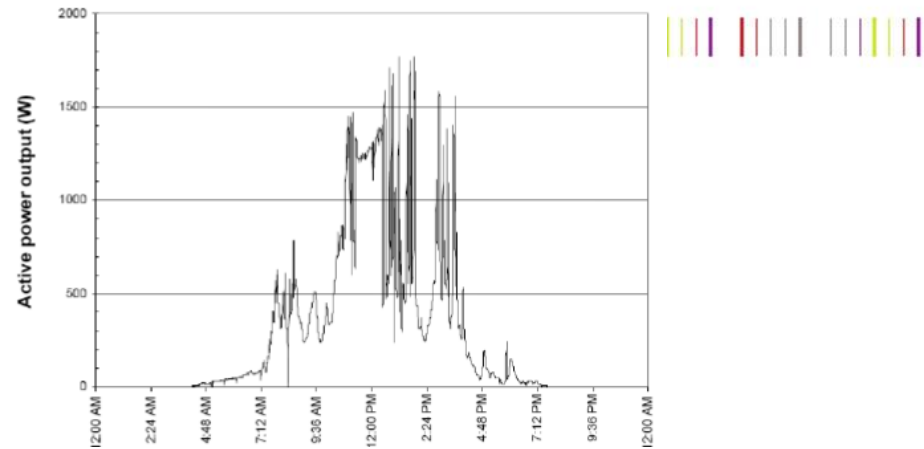
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What are the new challenges for electricity distribution?

- Decentralised generation (using renewable energy sources characterised by intermittency)
- Electric vehicles
- Active demand
- Decentralised storage

- Consumers become « prosumers »

- The system is becoming “unstable”
- Congestions may appear



3

What is the role of DSOs in the transformation of the energy system?



- DSOs' role will not fundamentally change
- DSOs will need to actively manage and operate smarter grids
- DSOs will implement the roll out of smart metering
- DSOs will become data managers



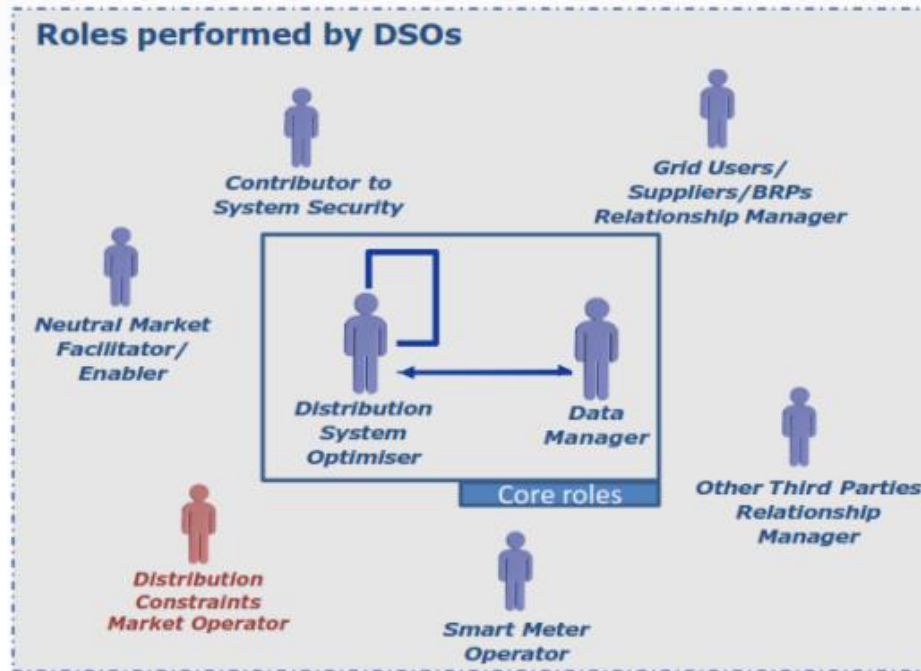
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Roles performed by DSOs



Optimise the development of the network using available levers (LV phase balance optimisation and/or network tariff structure)

Elaborate the multiannual Distribution network masterplan and manage flexibility call for tender to optimise network investments



evolving Role
NEW Role

Optimise works programs (TSO, Producers, and DSO works)

Optimise network operations in operational planning until market gate closure based on a schedule

Source: **evolvDSO** project

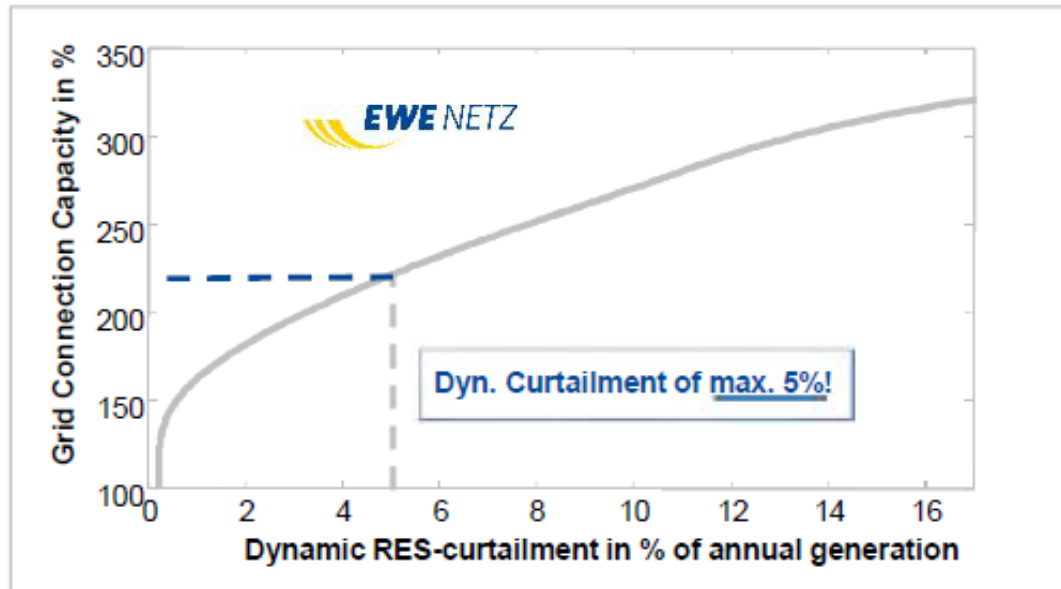


3

Active management of distribution system (1/5)



- New access options and planning methods (probabilistic approach)

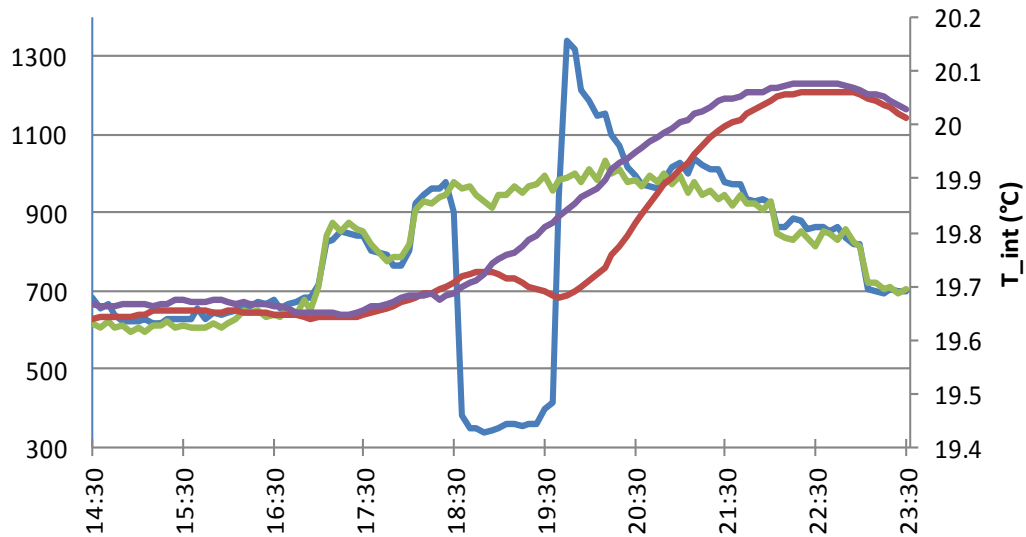


- Grid connection capacity for RES on DSO level could be doubled by using 5% DG-flexibility (EWE-Netz report)

3

Active management of distribution system (2/5)

- Load curtailment can create congestions on distribution networks:



- Load without curtailment
- Load with curtailment
- In-house temperature without curtailment
- In-house temperature with curtailment



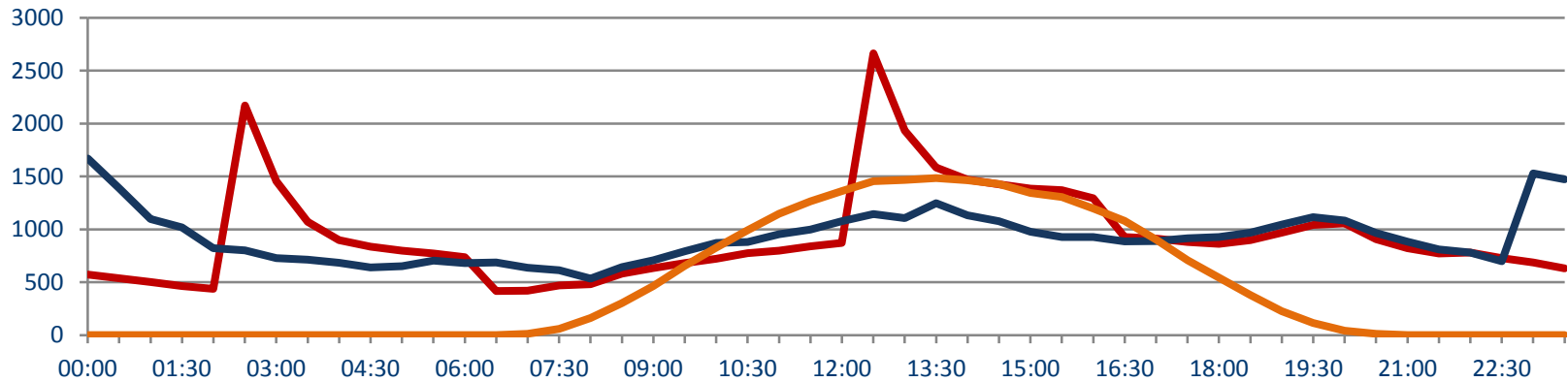
- DSOs have a role to play to enable the implementation of such services

3

Active management of distribution system (3/5)



- Local optimization of generation and demand: using PV to heat water



- Demand with "time of day" start of water heaters
- Reference demand
- PV generation



- An effective solution
- Need for a smart approach / active local system management



3

Active management of distribution system (4/5)



- DSOs will anticipate and control power flows linked to generation and demand response on their networks
 - Local demand and generation forecast
 - Load flow simulations and detection of congestions
 - Market based activation of flexibilities to manage congestions

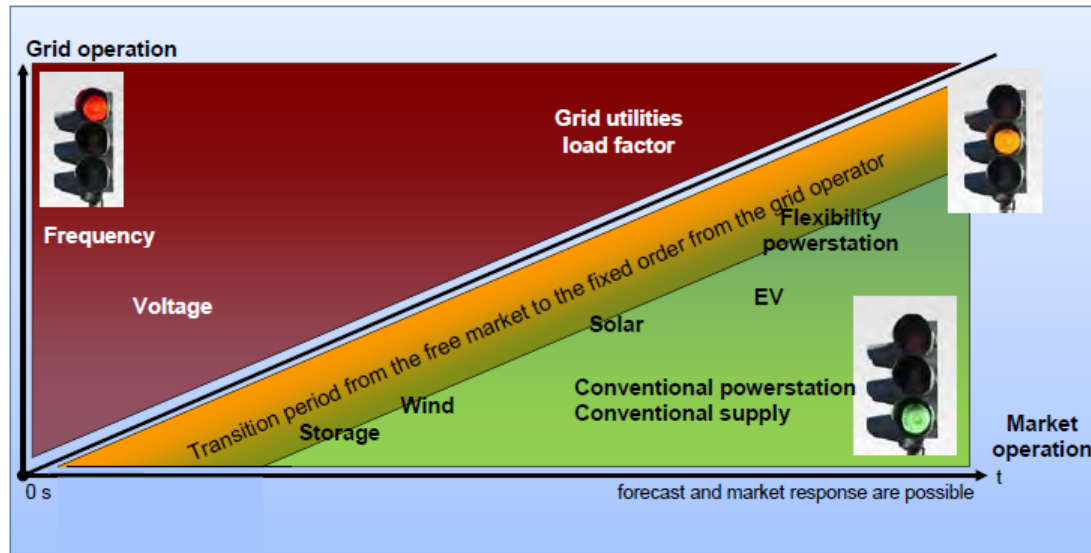


Figure 1: Traffic Light Concept

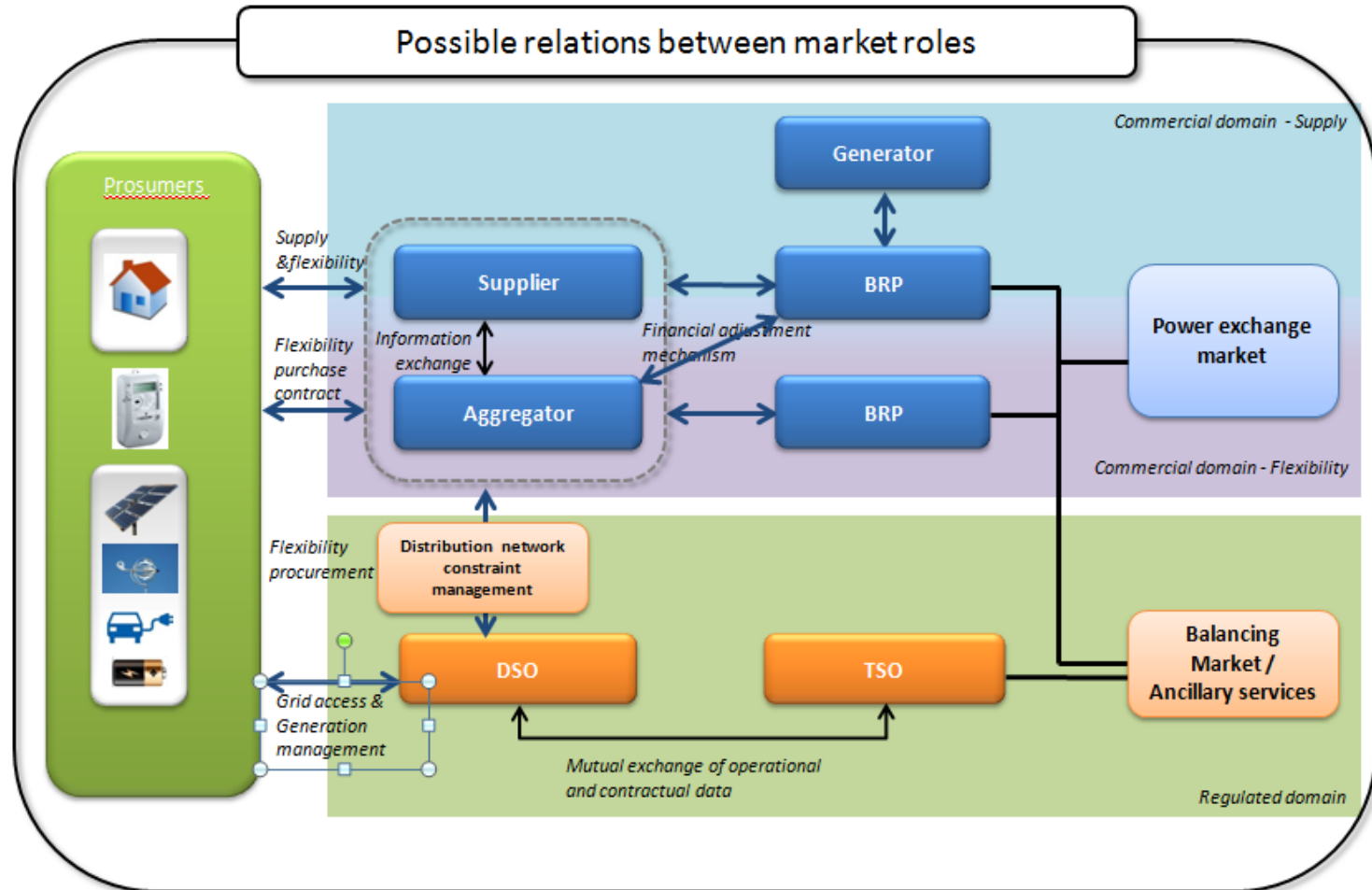
(Source: German Association of Energy and Water Industries (BDEW))

3

Active management of distribution system (5/5)



- EC Smart Grids Task Force – Expert Group 3 draft report on flexibilities

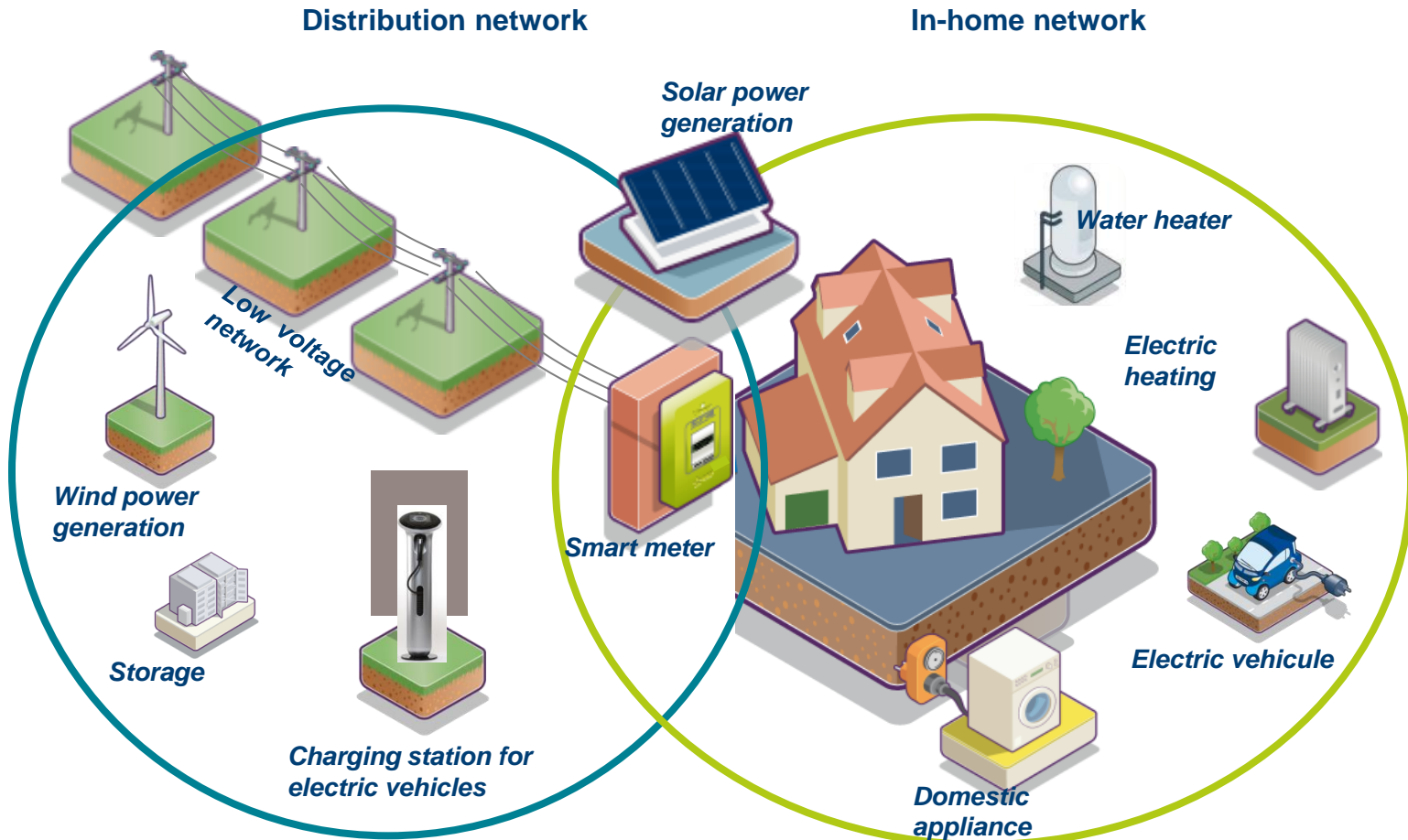


3

Smart metering: a major component of smart grids

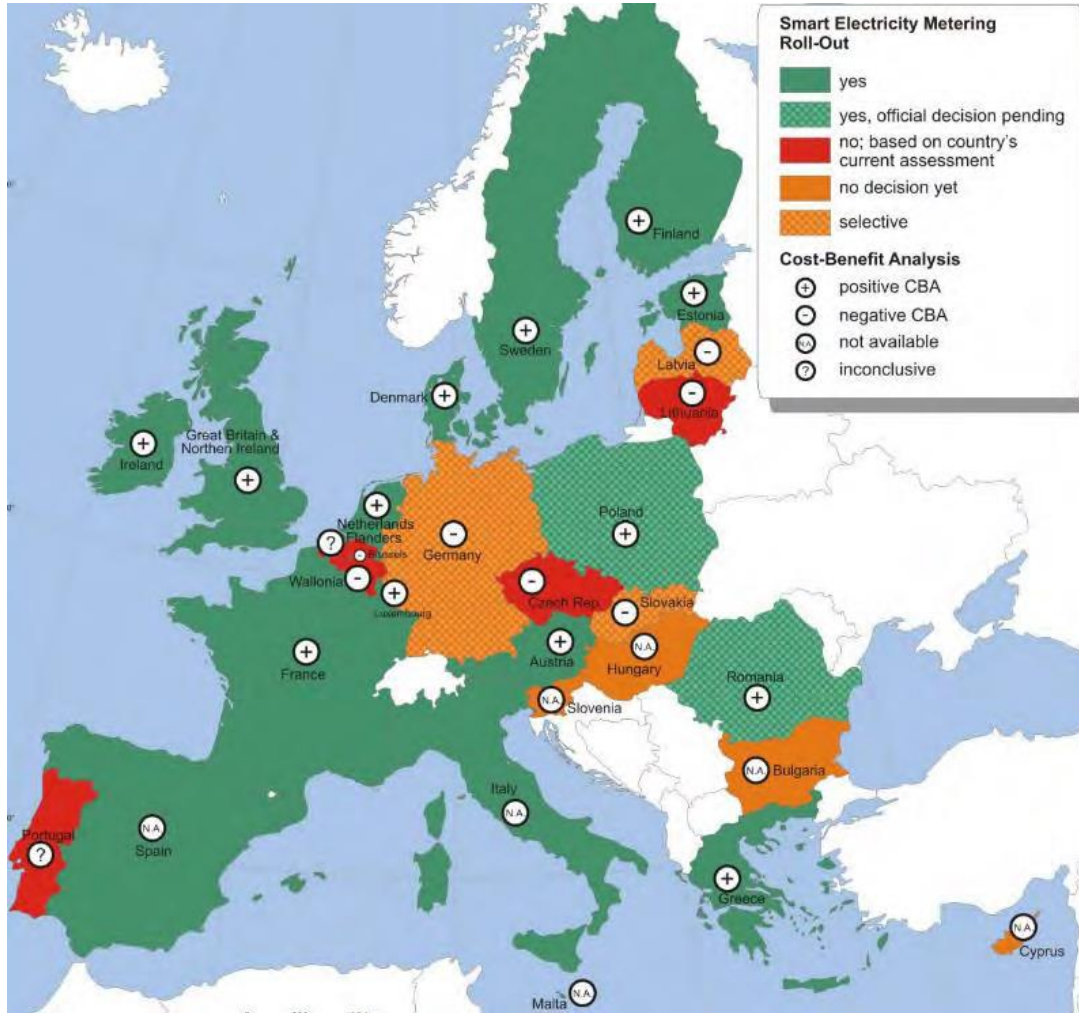


Smart metering is at the interface between the home and the distribution network



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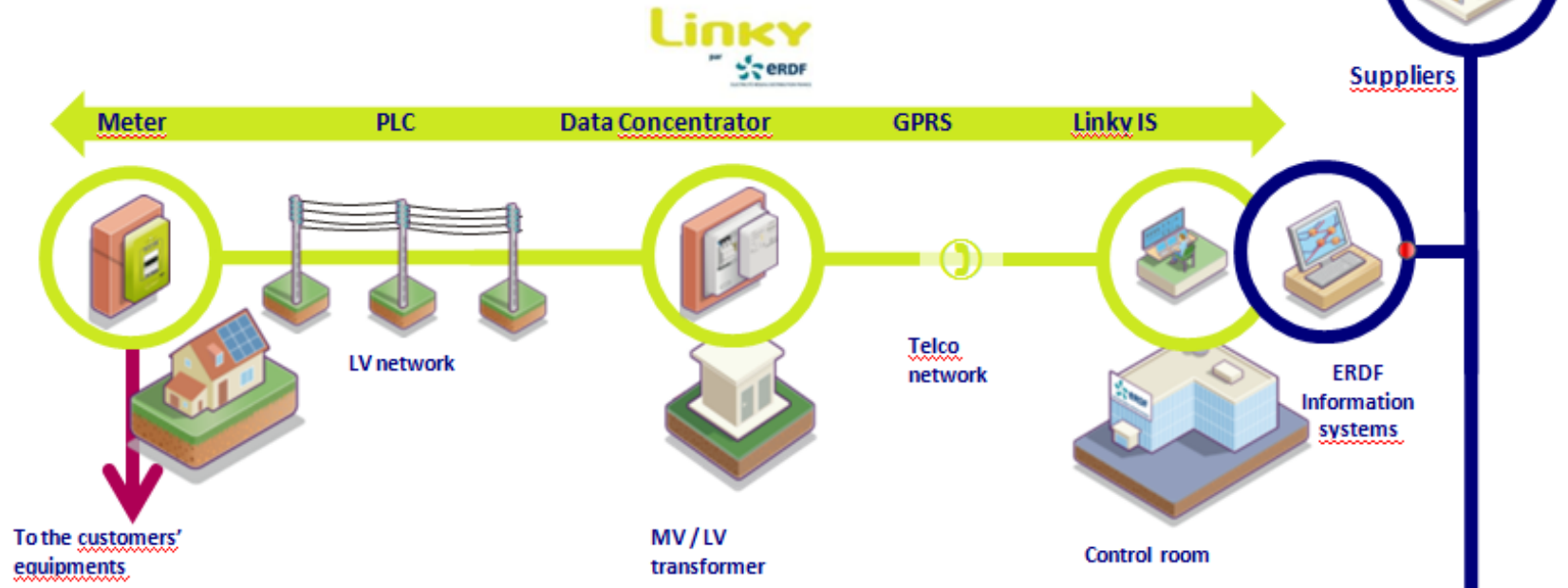
Smart metering: a major component of smart grids ⇒ European perspective



3

Smart metering: a major component of smart grids

Linky: ERDF smart metering project



||| **35 million meters**

➤ *A € 5 b project which will have no impact on network tariffs (costs covered by operational benefits)*

||| **INTEROPERABLE** (interchangeable equipments, standard communication protocols)

||| **2-WAYS COMMUNICATION**

3

DSOs new role as data managers



- Energy service providers will develop new innovative services based on metering data:
 - Metering data provided by smart meters: we enter the world of “big data”
 - New actors (load-shedding aggregators, virtual power plant operators, etc.) will develop services based on this data
 - Need for an easy and fast access to metering data
 - Data privacy is a key issue
 - Metering data belongs to customers and should only be given to market players with their consent
 - Cyber-security issue
- Several options for data management:
 - DSO as data manager
 - Third party data manager (example: DCC in UK)
 - Decentralised data management
- Advantages of the “DSO as data manager” option:
 - DSOs, as regulated entities, are used to act in a neutral and transparent way
 - DSOs also need these data to operate their network: non-DSO options imply higher costs due to the duplication of the data base



3

What is needed for DSOs to play a pivotal role in the energy transition?



- **Need for smart regulation**
 - Regulation should give a clear legal basis for the new role DSOs need to play
 - Regulation should enable DSOs' investments
 - €400 billion by 2020
 - Tariffs arrangements and levels that deliver an adequate return on investment
 - Long-term predictability
 - Regulation should foster innovation
 - Fair and cost-reflective tariffs
 - Situations where one group of network users would cover the costs generated by other groups of users need to be avoided (cf. net metering!)
 - Need for more capacity-based network tariffs
 - Effective TSO-DSO cooperation

- **Need for well trained employees**
 - New skills



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Thank you for your attention!

Questions?

