New business models in electricity markets

6th European Energy Forum
What business model for energy in Europe?

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FTI Consulting overview

Overview

- Global business advisory firm established in 1982
- c.4,000 staff across 24 countries
- Dedicated to helping organisations protect and enhance enterprise value

History & scale

- Established in 1982
- >US$ 1.5 billion revenues, NYSE listed
- >4,000 staff across 24 countries on six continents

Global reach

Services

- Five divisions:
  1. Economic Consulting
  2. Corporate Finance / Restructuring
  3. Forensic & Litigation Consulting
  4. Technology
  5. Strategic Communications

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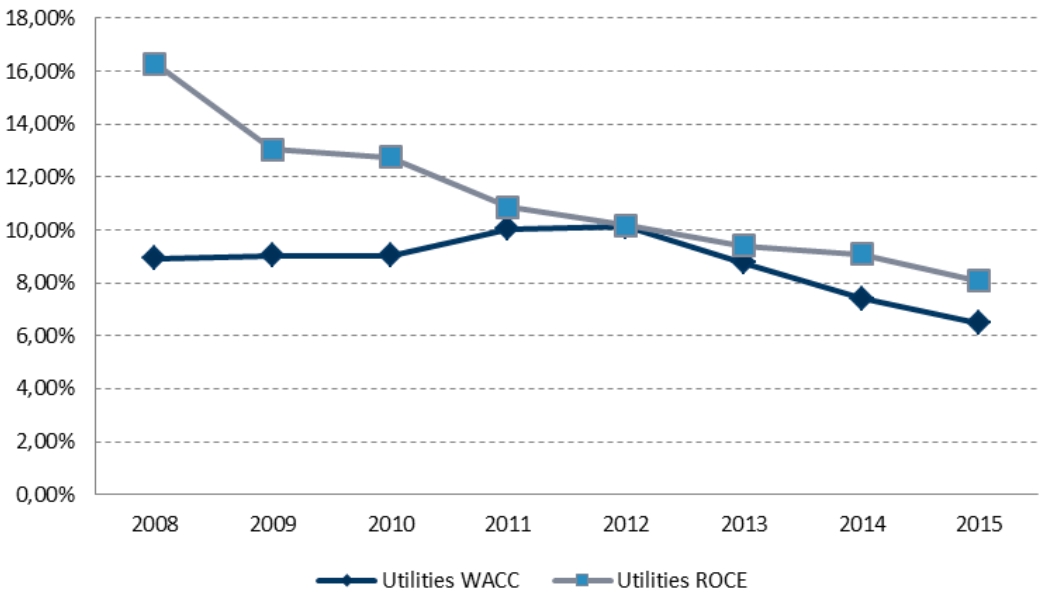
Outline

- Introduction: The death of the traditional business model of utilities in Europe
- Which changes to market design to enable the energy transition?
- New business models emerging upstream on the value chain to value flexibility
- New business models emerging downstream on the value chain centered on the consumers
- Conclusions

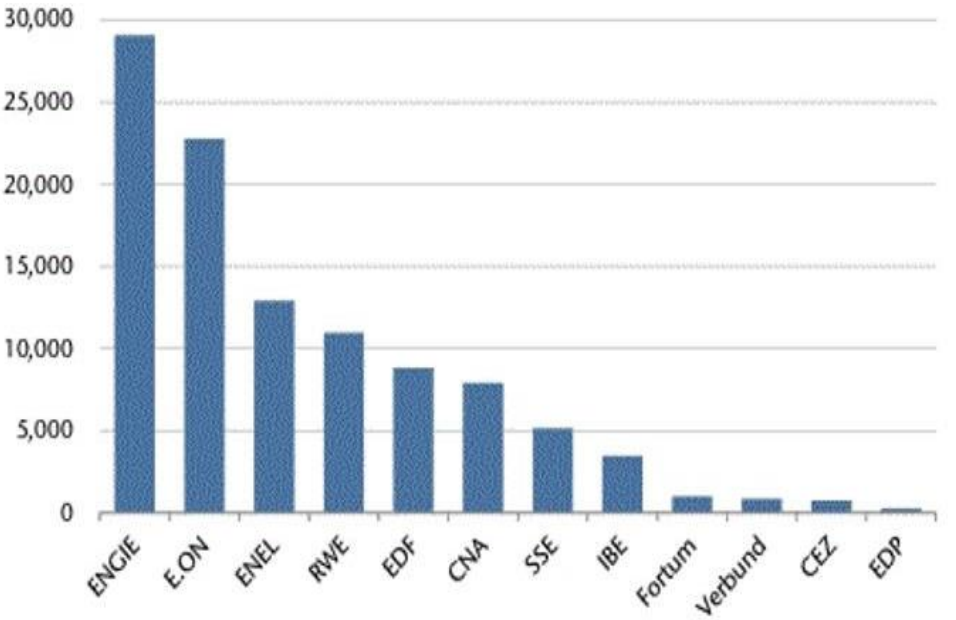
Introduction: The death of the traditional business model of utilities in Europe

ROCE and WACC for European utilities, 2008 to 2015



Source: FTI-CL Energy based on Exane data.

Utilities impairments since 2010 by company (€ m)



Source: Jefferies estimates, Company Data

- The profitability of the traditional business model of utilities has fallen in recent years, as margins upstream have collapsed following the drop in power prices.
- This led to > 100 Bn€ of impairments but it is not just a transitional trend as the market rebalances, but a structural issue that will undermine sustainably investment in generation.

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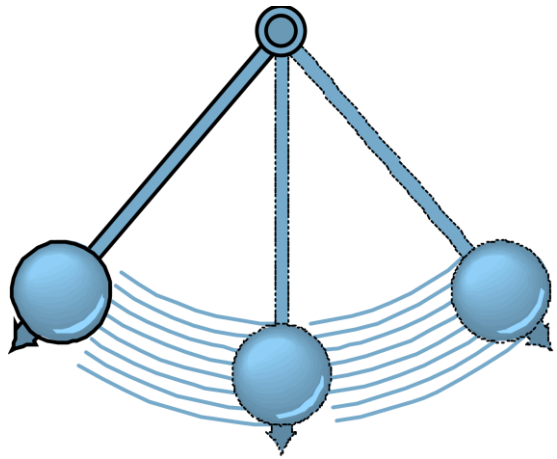
Which changes to market design to enable the energy transition and limit distortions?

Adapting market design for the change of context and policy objectives

Context of the 2010s

- Policy priorities: Decarbonization and security of supply
- Technology: growth of decentralised generation, storage (all capital intensive)
- Networks: Deployment of smart networks and technologies
- **Market: focus on consistency between retail and wholesale market**



Context of the 1990s and early 2000s

- Policy priority: focus on EU market integration
- Technology: dominance of variable costs technologies with economies of scale
- Networks: Optimization of use of pre-existing infrastructure
- **Market: Focus on wholesale market (initially day ahead)**

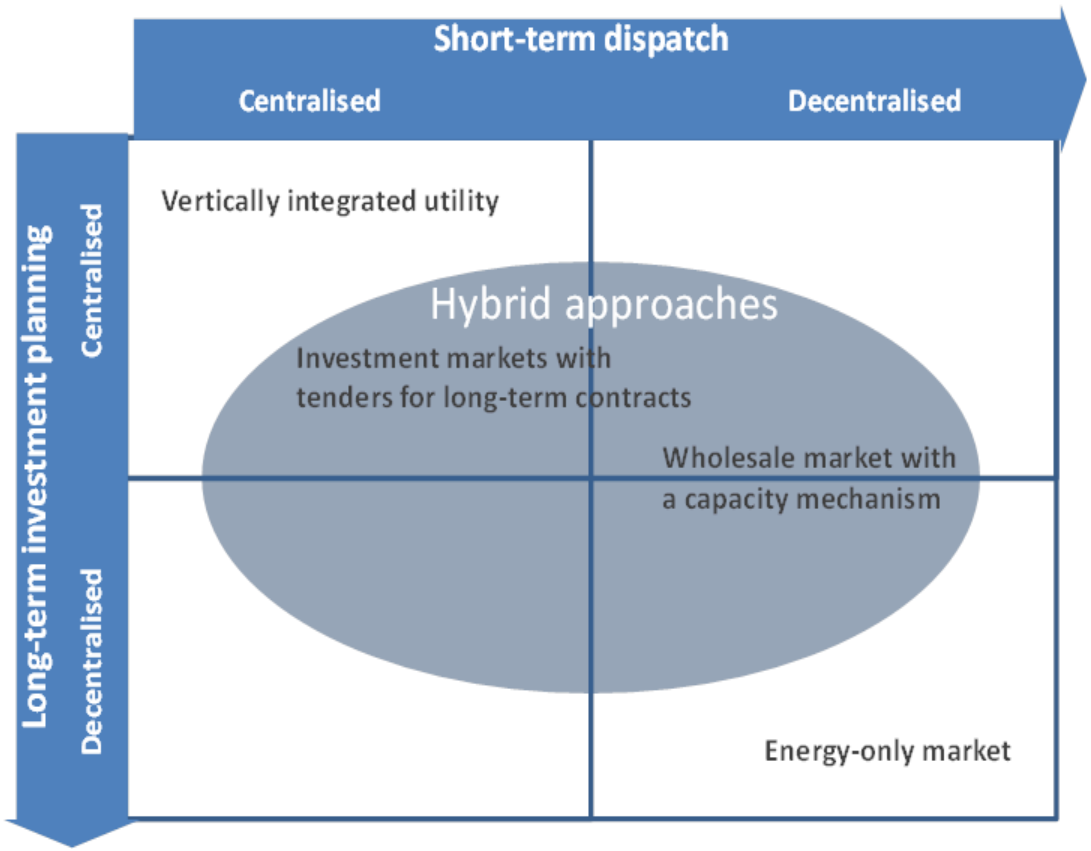
- **Current European market model and regulatory framework were designed in a different context**
- **Market design needs to evolve to address key issue of consistency between retail and wholesale markets, e.g. retail pricing, network charges, tax arbitrage opportunities**

Upstream (wholesale) market design: which signals / drivers of short-term dispatch and long-term investment coordination?

- **Power prices are a decentralised coordination mechanism:**
  - **Short term** – Efficient dispatch of all generation units based on variable costs
  - **Long term** – Signal retirement or new investment, trigger new entrants

- **In practice, price signals are distorted by a range of additional mechanisms:**
  - Most markets are hybrids with some form of regulatory interventions
  - Public intervention differs depending on objective, type of intervention and risk allocation

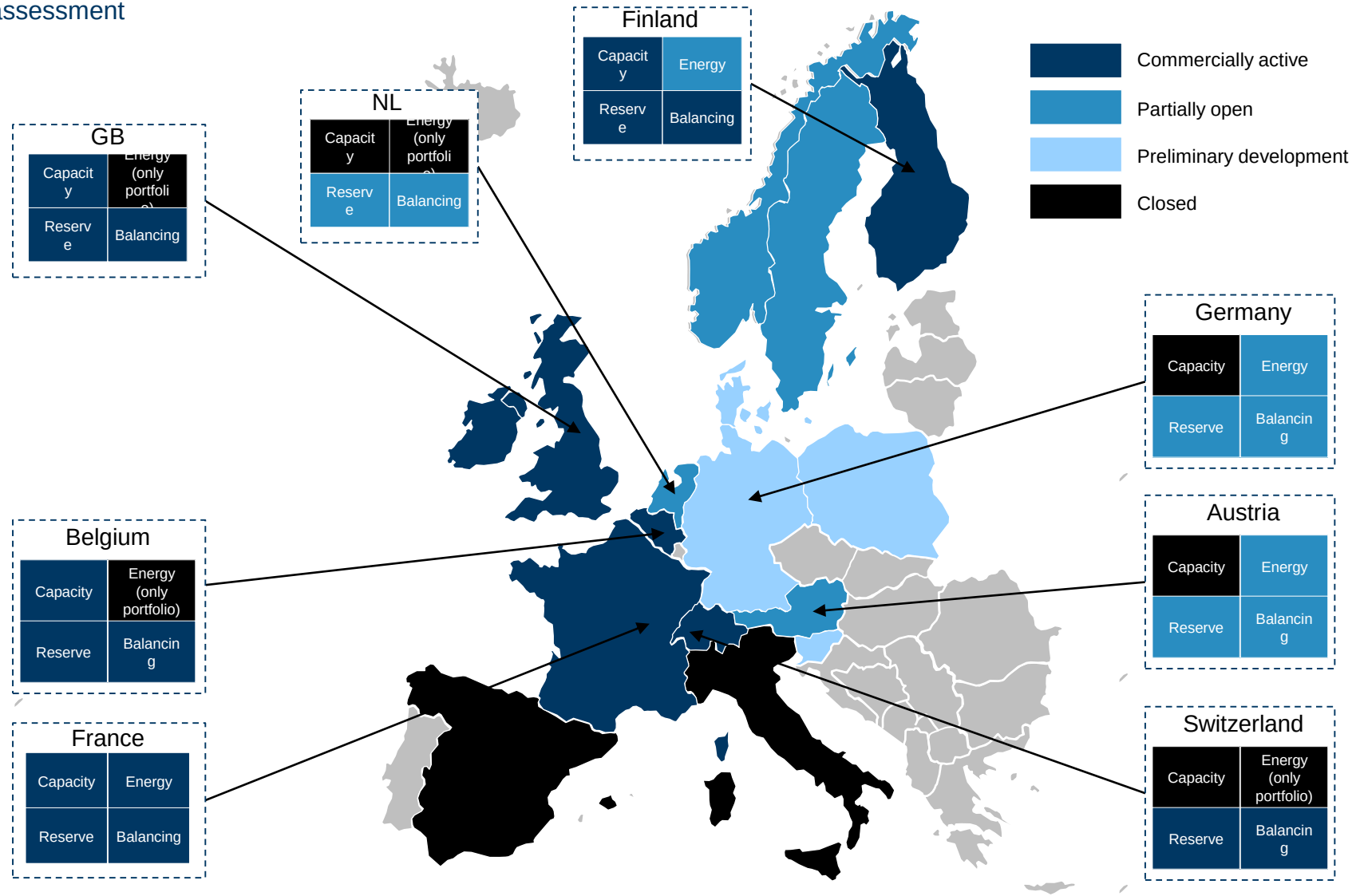
- **Key objective of sound market design is to limit distortions of price signals and establish sound coordination mechanisms for efficient system investment / operation**



In many countries in Europe still, aggregators do not have an adequate regulatory framework

Participation of independent DSR operator

EU country assessment



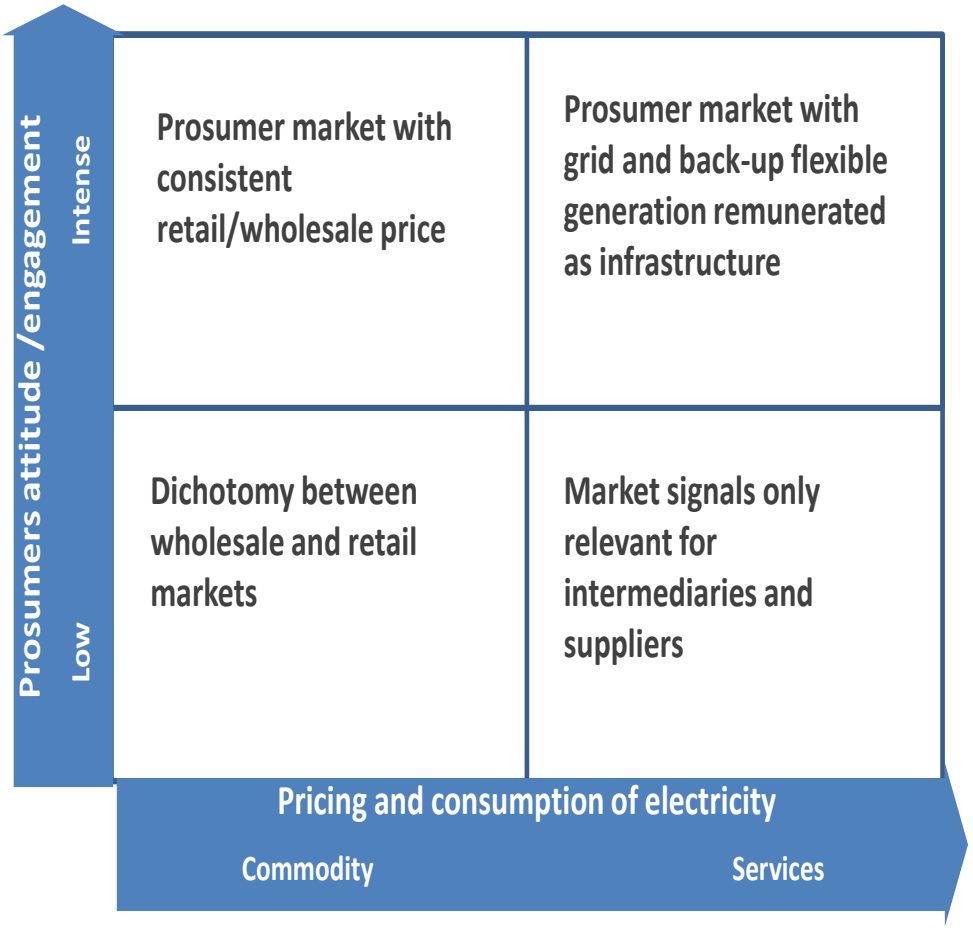
Source: SEDC, FTI-CL Energy

Downstream (retail) market design: which price signals for prosumers?

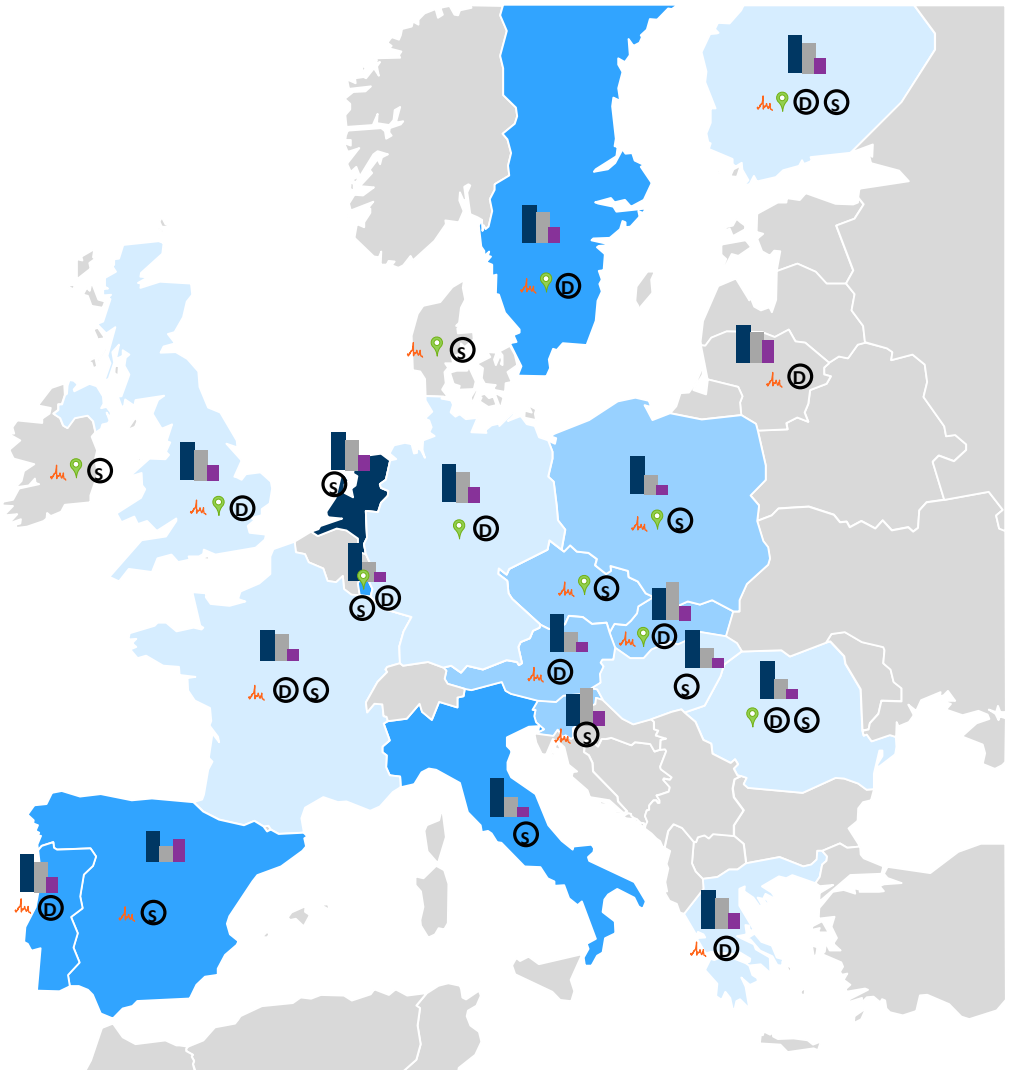
- **The evolution of retail market design and the relevant price signals for consumers could be very different depending on the following drivers:**

- **Commodity vs. service pricing approach**
  - The energy transition could transform the retail energy supply into a service-oriented good, rather than a commodity

- **Prosumer attitude /engagement toward electricity**
  - status and life-style;
  - the gamification of energy supply;
  - an "early adopter" attitude towards energy technology; and
  - the positive image associated with auto-generation.



Distribution network tariffs: a wide range of approaches in Europe



Network tarif structure

- **Fixed / variable part**
  - > 80%
  - 50% - 80%
  - 30% - 50%
  - < 30%

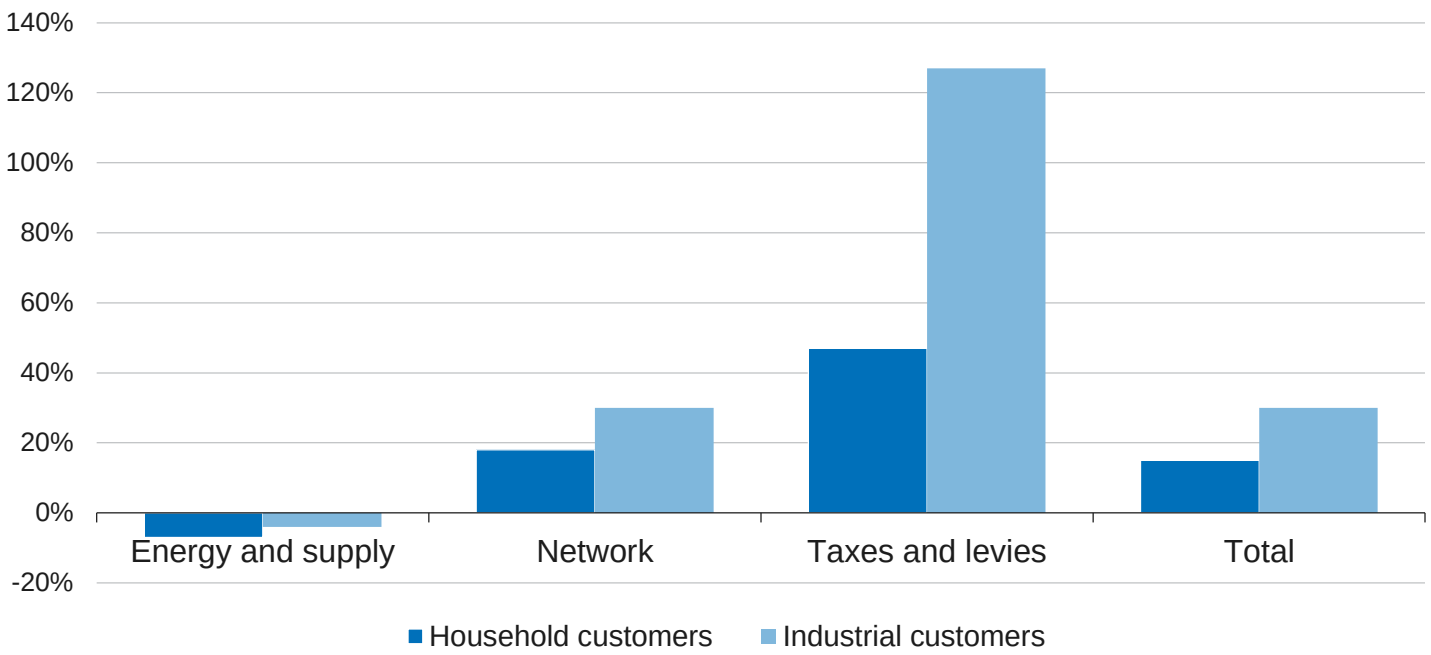
Note: average over all consumers' categories

- **Split of network costs between different users**
  - Résidentials
  - Small industrials
  - Large industrials
- **Connection charges**
  - Ⓢ "Shallow"
  - Ⓓ "Deep"
- **Tarif with time and/ or spatial differentiation**
  - Geographic differentiation
  - Temporal différentiation temporelle ("time of use")

Source: European Commission (2015), "*Study on tariff design for distribution systems*" https://ec.europa.eu/energy/sites/ener/files/documents/20150313%20Tariff%20report%20fina_revREF-E.PDF

Taxes and levies represent a growing share of the retail energy bill and create opportunities for arbitrage

EU 28 – Average power retail price, change between 2008 and 2014



- Levies to support energy transition (renewables, energy efficiency, etc.) create growing arbitrage opportunities between wholesale / retail markets, as well as unsustainable cross-subsidies between categories of consumers
- A radical rethink of energy taxation and funding for decarbonization is needed (e.g. finance some of the levies for renewables through general budget as these are public goods and reduce/remove taxes on production and raise taxes on electricity consumption (VAT))

Source : « Retail pricing for a cost-effective transition to a low-carbon power system *», Eurelectric (2016)*

New business models emerging upstream on the value chain to value flexibility

Monetizing flexibility in electricity markets – 5 key sources of value

Identifying the sources of opportunity

Capacity

- Load reduction & storage capacity is bid into capacity markets as a replacement for conventional generation
- Reducing the need for generation capacity requirements during peak demand hours

Reserves

- Providing modifications in electricity demand or supply to a TSO or energy supplier to provide additional ancillary services (e.g. frequency, voltage etc.)

Energy

- Wholesale market price compensation (Arbitrage)
- Providing/avoiding energy use at peak times

Network

- Active electricity management at the local level through demand adjustments or storage to
  - Limit capital investments in the network through peak avoidance
  - Reduced congestion and improve reliability

Environmental

- Optimising energy mix to reduce CO2 intensive electricity generation at peak demand periods
- Ensuring maximal efficiency from new and existing conventional generating assets through consistent running

Source: FTI Consulting Analysis, Enernoc Investor Presentations

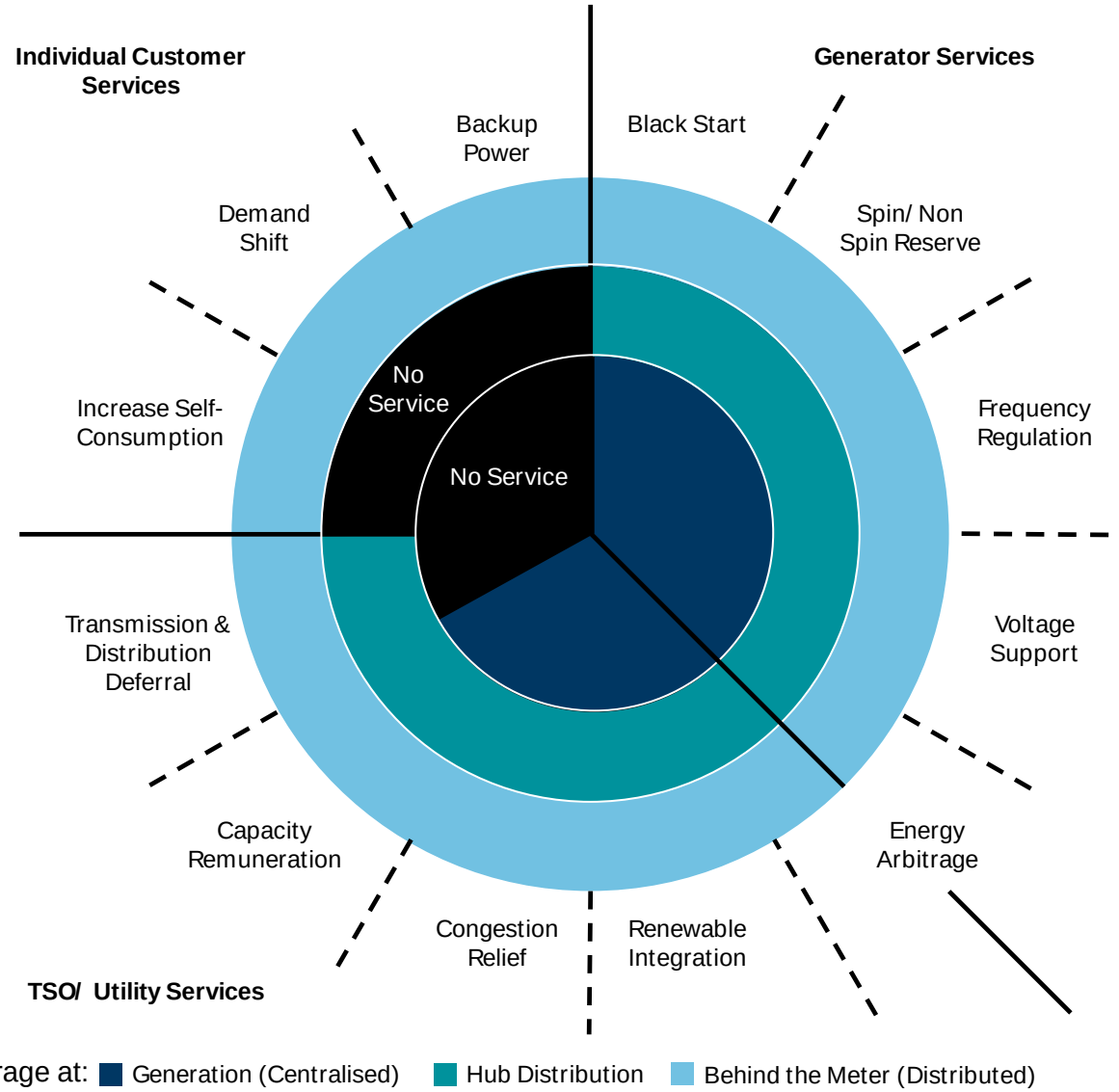
Revenue potential for storage and demand response

Energy Storage Revenue Potential

- From our analysis we believe energy storage has the potential to create revenue from:
  - 8 sources when located near centralised generation
  - 9 sources when located at a high volume electricity transmission hub
  - 12 sources when distributed behind the meter

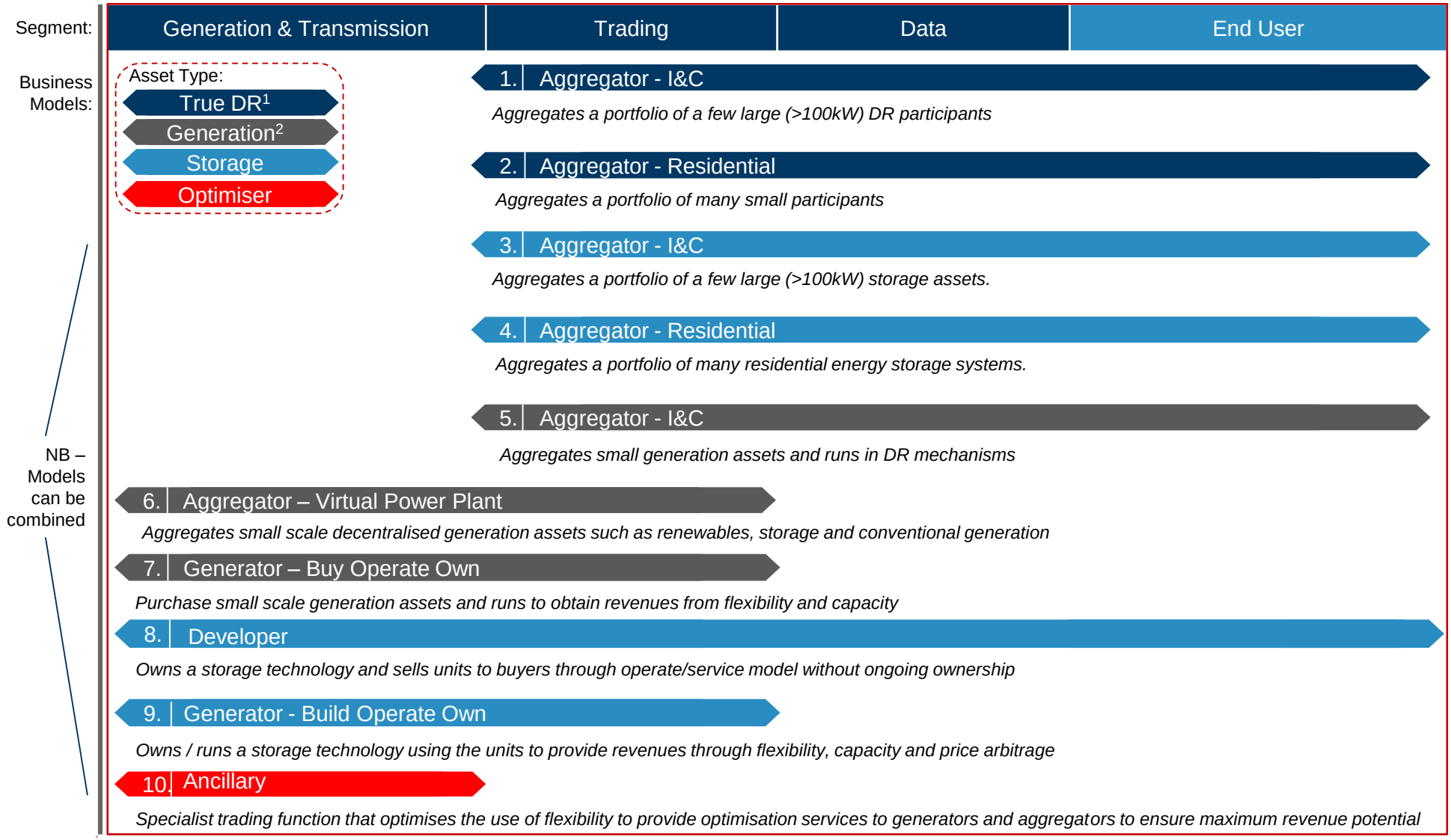
Demand Response Revenue Potential

- From our analysis we believe demand response has the potential to create revenue from a smaller number of applications than energy storage.
- However location is critical for demand response and therefore it can create revenue from 5 sources when placed in suitable locations within the network (including aggregated distributed demand response)



New business models are emerging to monetize distributed generation, storage, and demand response

Business model application to the value chain



Notes: 1) True DR is an actual reduction / shifting in consumption; 2) Generation from small capacity units (<10MW) that are "behind the meter" on-site at I&Cs / owned
Source: FTI Consulting Analysis

New business models emerging downstream on the value chain centered on the consumers

Downstream, utilities are moving toward the energy service company model

Energy service companies

Making demand management services as well as cleaner and more resilient power options available to all electricity consumers is core to all new energy business models.

Optimizing customer participation

- Understand behavior patterns
- Increase customer awareness through products
- Identify incentives and technologies to increase customers' ability to manage energy bills

Providing energy management products and services

- Provide bill management services
- Expand energy management services to small commercial and residential customers, e.g. building management systems, demand-response and energy efficiency programs, behind the meter distributed energy resources such as solar PV, micro-wind turbines and battery storage

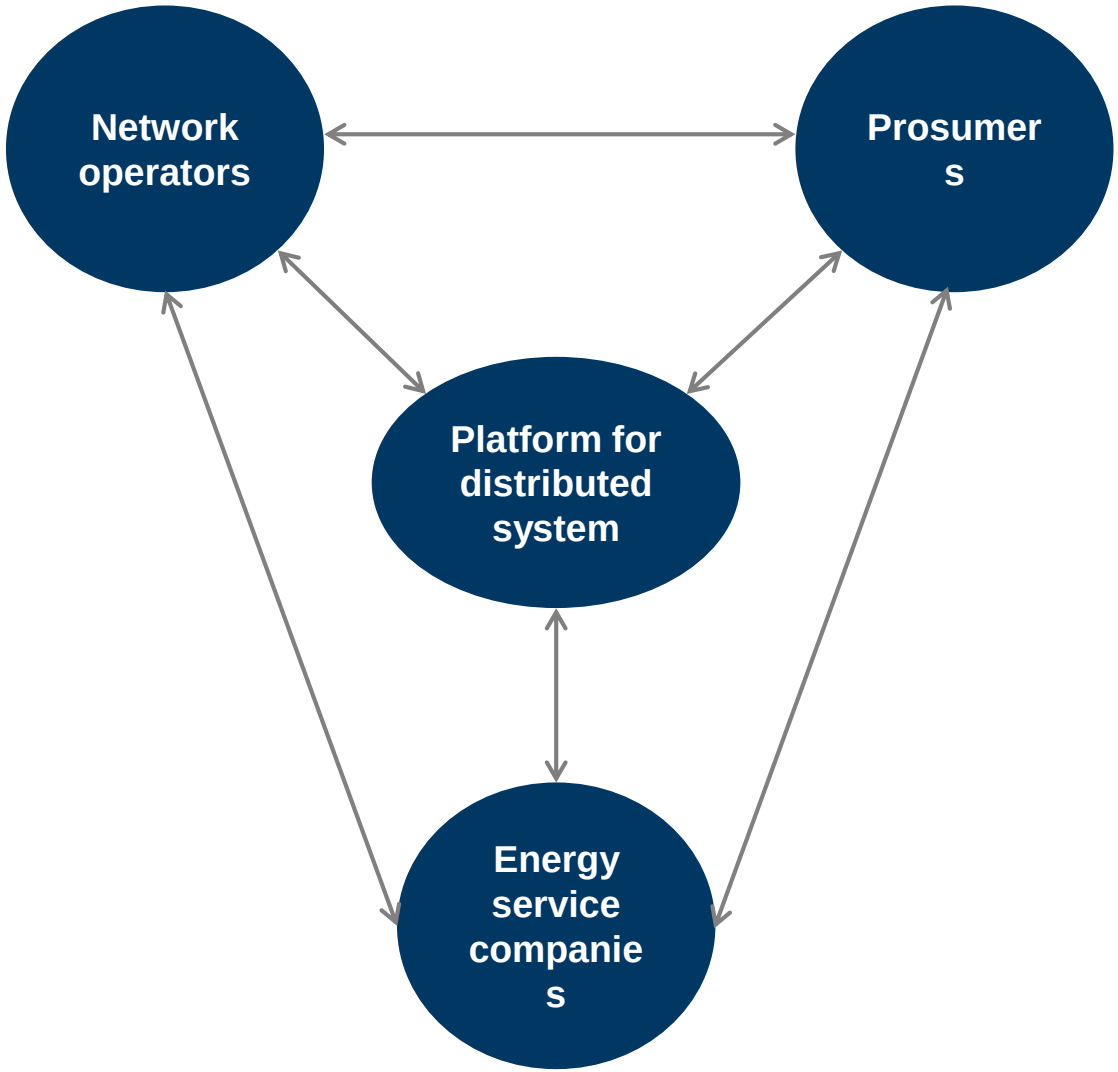
Aggregating customers

- Increase customers' participation and decrease transaction costs through aggregation, e.g in communities (municipal, community, commercial, non-profit)

Offering energy value-added services

- Support community and multi-family based renewal energy projects, e.g. sponsorship of micro-grid projects or community-based distributed energy generation projects
- Support "buy local" green power initiatives

New platforms are likely to emerge to coordinate distributed system operation, ESCOs, and prosumers



- Traditional role of network operators and utilities as system optimizers will need to be reconciled with emergence of new platforms
- Multiple platforms may co-exist / compete:
  - To capture value associated with system optimization of decentralized resources
  - To develop new services for active consumers (Prosumers)
  - To provide coordination signals for system planning and operations
- Key challenge is to limit “des-optimisation of energy system”

Conclusions

Conclusion: consistency across retail and wholesale market price signals is key

- **Three EU legislative packages in the 1990s and 2000s established the internal electricity market:**
  - Mostly focused on wholesale market integration; level playing field for large scale generators (e.g. harmonization of network injection charges, non discriminatory network access)
  - Recent policy interventions (support for RES, capacity mechanism for security of supply, etc.) undermine the ability of power prices to act as coordination signal on the wholesale market

- **Rise of prosumers and decentralized resources is a radical disruption that requires fundamental rethink of approach for market design:**
  - Auto producers / DSR use retail price as relevant benchmark for operation / investment
  - Key objective should thus be to ensure consistency across retail and wholesale market price signals:
    - Design market rules to avoid perverse incentives / opportunistic arbitrage (e.g. net metering, etc.)
    - This requires reform of: 1/network charges, 2/ levies and taxes on electricity

- **Network charges need to evolve in order to:** 1/ Reflect changing cost structure and increase weigh of fixed charge; and 2/ Provide geographically differentiated dynamic price signals for consumers

- **Energy taxation and funding for decarbonization: Time for a radical rethink?**
  - Finance some of the levies for renewables and possibly security of supply through general budget as these are public goods; and

Thank you for your attention

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