



### 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



### Services

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



### 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 <u>upstream</u> on the value chain to value flexibility
- New business models emerging <u>downstream</u> 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**

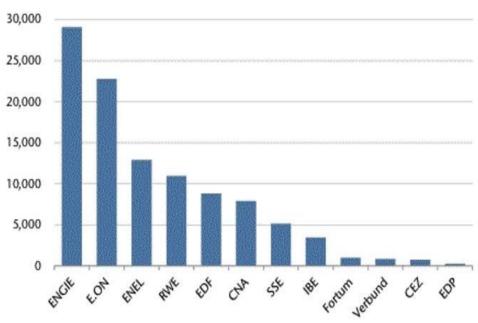
#### 18,00% 16.00% 14,00% 12,00% 10,00% 8,00% 6.00% 4.00% 2,00% 0,00% 2008 2009 2013 2014 2015 2010 2011 2012

— Utilities ROCE

Utilities WACC

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.







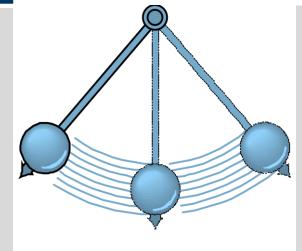
Which changes to market design to enable the energy transition and limit distortions?



# Adapting market design for the change of context and policy objectives

#### Context of the 2010s

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



### Context of the 1990s and early 2000s

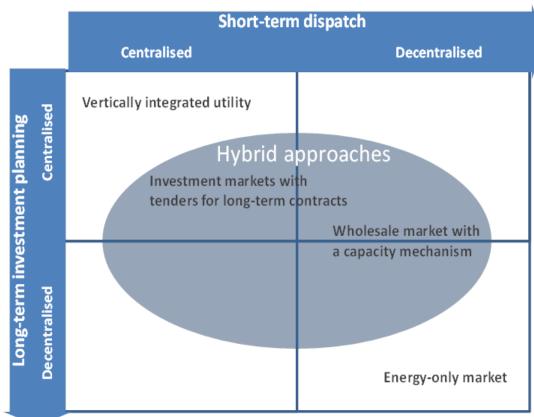
- Policy priority: focus on EU market integration
- <u>Technology</u>: dominance of variable costs technologies with economies of scale
- <u>Networks:</u> Optimization of use of pre-existing infrastructure
- Market: Focus on wholesale market (initially day ahead)
- Current European market model and regulatory 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?

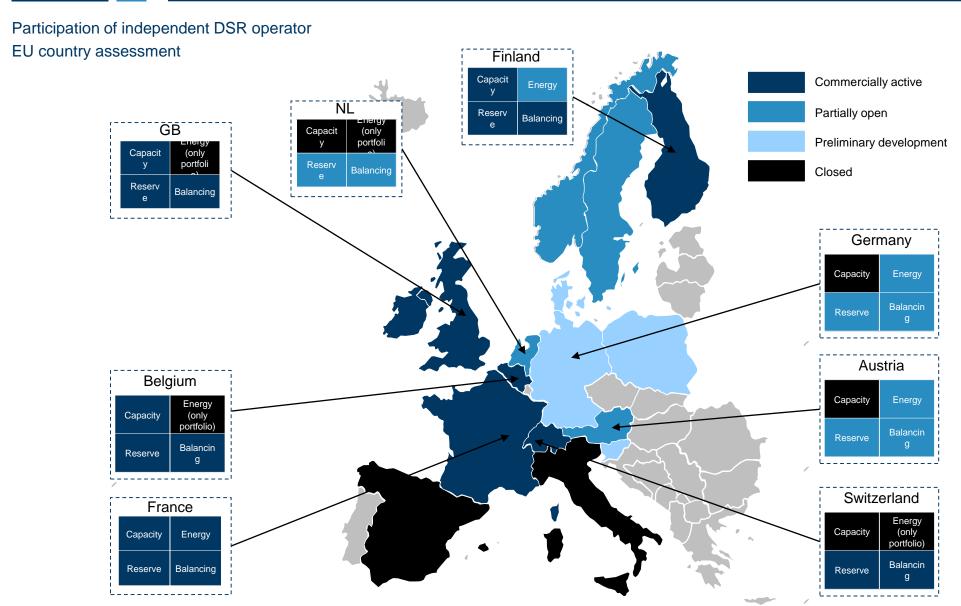
- Power prices are a decentralised coordination mechanism:
  - Short term Efficient dispatch of all generation units based on variable costs
  - Long term Signal retirement or new investment, trigger new entrants
- In practice, price signals are distorted by a range of additional mechanisms:
  - Most 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







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

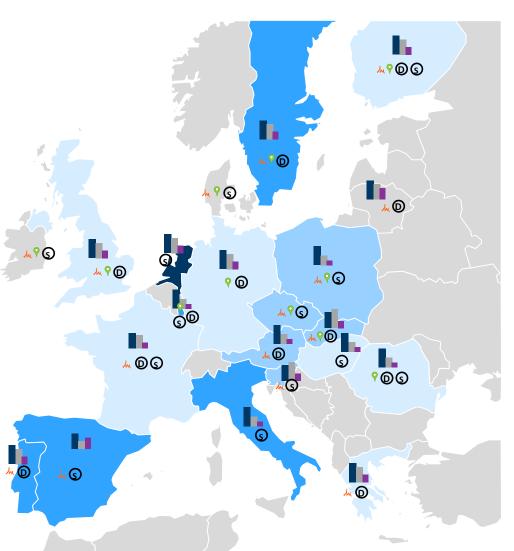
- The evolution of retail market design and the relevant price signals for consumers could be very different depending on the following drivers:
- Commodity vs. service pricing approach
  - The energy transition could transform the retail energy supply into a service-oriented good, rather than a commodity
- 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 autogeneration.

Prosumers attitude /engagement	Intense	Prosumer market with consistent retail/wholesale price	Prosumer market with grid and back-up flexible generation remunerated as infrastructure
	Low	Dichotomy between wholesale and retail markets	Market signals only relevant for intermediaries and suppliers
		Pricing and consumption of electricity	
		Commodity	Services





### 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")

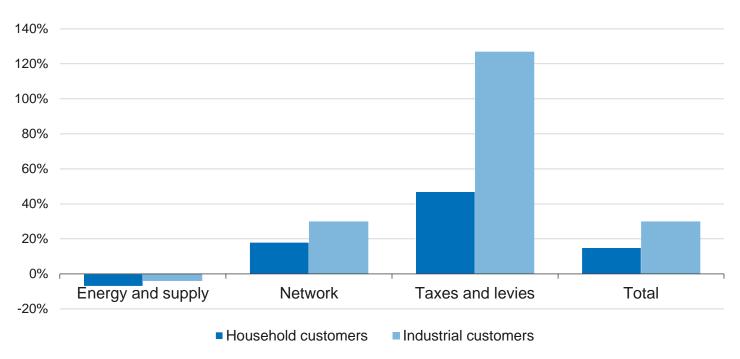






# Taxes and levies represent a growing share of the retail energy bill and create opportunities for arbitrage





- 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 constitute (VAT))





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

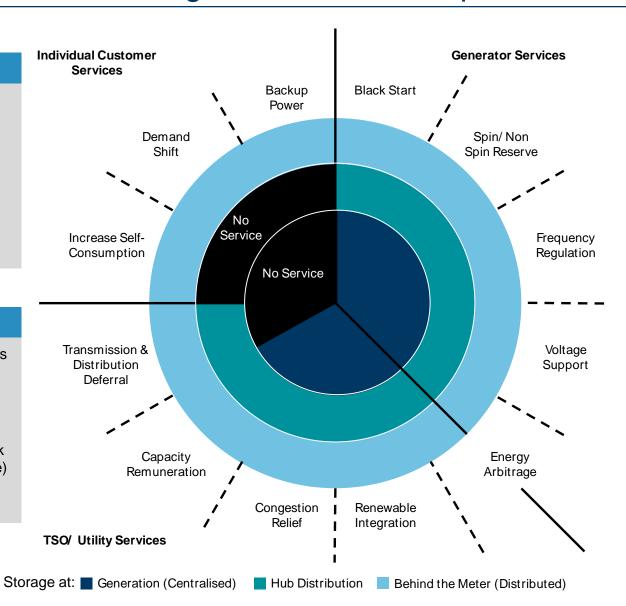
### Revenue potential for storage and demand response

#### **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

Generation & Transmission **Trading End User** Segment: Data Asset Type: Aggregator - I&C **Business** True DR1 Models: Aggregates a portfolio of a few large (>100kW) DR participants Generation<sup>2</sup> Storage Aggregator - Residential Optimiser Aggregates a portfolio of many small participants Aggregator - I&C Aggregates a portfolio of a few large (>100kW) storage assets. Aggregator - Residential Aggregates a portfolio of many residential energy storage systems. Aggregator - I&C NB-Aggregates small generation assets and runs in DR mechanisms Models can be Aggregator – Virtual Power Plant combined Aggregates small scale decentralised generation assets such as renewables, storage and conventional generation Generator – Buy Operate Own Purchase small scale generation assets and runs to obtain revenues from flexibility and capacity Developer Owns a storage technology and sells units to buyers through operate/service model without ongoing ownership Generator - Build Operate Own Owns / runs a storage technology using the units to provide revenues through flexibility, capacity and price arbitrage 10 Ancillary Specialist trading function that optimises the use of flexibility to provide optimisation services to generators and aggregators to ensure maximum revenue potential



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 <u>downstream</u> on the value chain centered on the consumers

# Downstream, utilities are moving toward the energy service company model

Energy service companie s

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

energy management products and

Aggregating customers

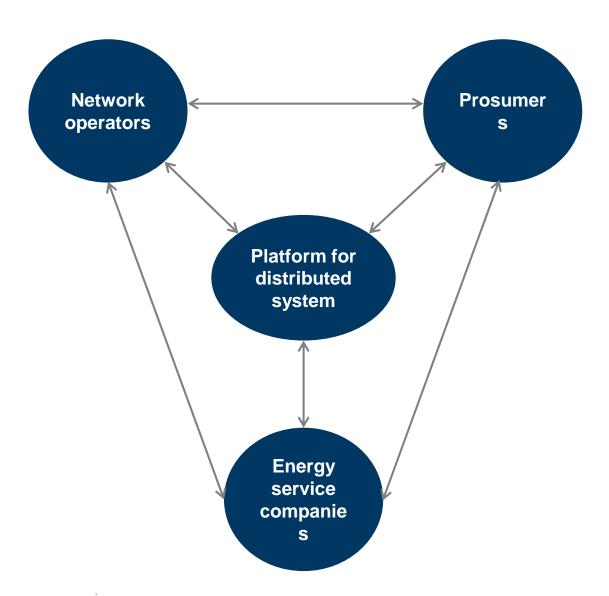
Offering energy value-added services

- Understand behavior patterns
- Increase customer awareness through products
- Identify incentives and technologies to increase customers' ability to manage energy bills
- 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
- Increase customers' participation and decrease transaction costs through aggregation, e.g in communities (municipal, community, commercial, non-profit)
- 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 "desoptimisation 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 <u>retail price</u> 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?
- TI. CE Finance some of the levies for renewables and possibly security of supply through general ARK budget as these are public goods; and

### Thank you for your attention

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