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# POLICY BRIEF

## *Business Models in an Evolving Industry: the view of a former practitioner*

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### **Highlights**

- The electricity network business model that emerged during the liberalisation era is not optimal in the context of the current transformation of the electricity system. An evolution towards an “insurance-type” business model is necessary, where the network is remunerated on the basis of the services provided and not only on the ground of the physical investment performed.
- The present organisation of the wholesale market reflects a financial approach to generation and does not ensure the long-term signals necessary to induce the investments in the generation capacity needed to cover demand. In this context, the provision of ancillary services is an increasingly important outlet for non-subsidised electricity generators.
- Despite frequent claims, energy storage and demand response are two businesses that still struggle to emerge and prove their economic profitability.
- New business models based on the processing and exploitation of massive amounts of data on electricity generation, consumption and network usage are promising. Building on these data, innovative services can be developed and offer the optimisation of energy consumption and expenses, the management of local grids, etc.

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## Introduction

The developments following the decision by the European Union (EU) to introduce effective competition and reduce carbon emissions have led to profound changes in the energy sector, particularly in electricity. New business models have emerged and will continue to evolve in the coming years.

In this policy brief, we try to reflect on such evolution objectively and by taking history into account, since our electric systems were not created ex-nihilo by the layers of regulation that have accumulated for more than 20 years.

For the sake of simplicity, we address first the case of transmission and distribution networks. Then, we look at generation and supply. Finally, we consider other emerging businesses in the sector.

## Transmission and Distribution

Electricity transmission usually consists of high or extra-high voltage networks (225 and 400 kV), while electricity distribution covers medium and low voltage networks. However, a universal distinction between the two does not exist and some transmission networks also include voltage levels down to 63 kV, as in France.

The traditional business model set up for electricity networks is relatively simple and can be summarized as follows: cost coverage euro per euro for operational expenses (OPEX) and remuneration of the regulated asset base (RAB), generally evaluated as the net book value (differences exist in this respect, but the principle remains the same in all European countries, and even on other continents).

This leads to the fact that investments in capital (CAPEX) are remunerated on the basis of a weighted average cost of capital (WACC) established by the regulator, according to market rates and the debt structure. Generally, the WACC is higher than the rates available in the bond market, which explains

the interest of many investment or pension funds for such type of infrastructure.

Remunerating investments in such a way is perfectly adapted to the kick-off of the transmission and distribution activities during the unbundling of the formerly vertically integrated electric utilities. It is increasingly so when massive investment needs arise, as for instance due to the necessity to increase interconnections with neighbouring electricity systems or to integrate renewable energies. However, it also provides an incentive to over-invest, because by expanding the RAB the network operator can increase its remuneration and is able to pay more dividends to its shareholders.

To analyse the business models that can be applied in particular to transmission networks, it is necessary to consider some basic facts. An electricity transmission network provides its users with the capacity to transfer energy – in fact electric fields – from a place to another. Therefore, what is important is the MW made available and not the MWh delivered (to be fair, you could say that the delivered MWh is marginally relevant due to the variable costs related to the amount of energy transited over the network). The role of a transmission network is to physically connect generators and consumers and to enable the business of traders and aggregators; in this regard, the network provides valuable balancing services (primary, secondary and tertiary reserves).

Next to these basic facts, we must take into account the likely evolution of electric systems with the development of distributed generation, self-consumption, storage facilities, the creation of micro-grids and local loops, etc. Thus, the transmission network becomes the backbone to which local loops, some large power plants and a few industrial sites are connected.

Under these conditions, transmission networks are going to perform a backup and risk pooling function. Thereby, their business model should evolve towards that of insurance.



In any case, it does not seem sustainable for the networks to be remunerated solely on the level of investments made and not on the services provided. The recovery of costs and the remuneration of the network company should be structured in a way that clearly differentiate the incurred costs and depend on the achievement of a few main objectives.

The largest share of incurred costs are fixed and connected to the construction and maintenance of the infrastructure itself. Next, there is a variable cost linked to the energy transited on the grid and the resulting losses. Finally, there are costs related to the provision of balancing and congestion management.

The remuneration of the network should be based on the achievement of a set of objectives in terms of quality of supply, availability of some specific lines, optimisation of reserves and losses, and other measurable technical or financial output.

As a result, the business model profile becomes of the “insurance” type, with a network access ticket that covers the investment and maintenance costs of the network (including a share of productivity) and a remuneration that is indexed to the quality of service objectives (quality of supply, network availability, optimization of balancing costs, etc.). In particular, it is possible to design an initial fixed remuneration based on a reasonable WACC, representative of the bond market rates, which is applied to the infrastructure. Such remuneration is then adjusted within an interval depending on the achievement of the quality of service objectives (the achievement of the targets increases the remuneration of the network, while the failure to do so reduces the remuneration correspondingly).

In case of separation between the infrastructure ownership and the operation of the system, the solution proposed maintains its validity. On the one hand, there is an infrastructure business model based on an access ticket to the physical infrastructure and a remuneration based on the quality of supply

and the availability of the infrastructure – the interconnections for example. On the other hand, there is a system operator business model based on an access ticket to the electronic infrastructure and a remuneration based on system performance, as for instance the cost of balancing.

A similar approach can be adopted for distribution networks. Nonetheless, because of the current changes in the structure of our electric systems, particularly visible at the distribution level, distribution companies can develop new service offers as local balancing operators and potentially as micro-grid operators. If the competent authorities decide so, distribution companies could also become storage operators, managers of electric vehicle (EV) charging stations, or even managers of EV fleets.

## Generation and Supply

The evolution of the electric systems and the establishment of markets, although imperfect, have led to significant changes in the business models of generators and suppliers. One of the most important aspects underpinning these developments is the shift from an economic approach to a financial one.

Before the opening of the market, an economic approach based on long-term marginal costs made it possible to finance the generation investments needed to cover demand over time while recovering the incurred costs. It also allowed the adoption of long-term contracts, suitable for the flourishing of a productive industrial sector, reliant on the consumption of large quantities of electricity.

The establishment of so-called wholesale markets changed the world of generation while retail markets still do not really exist. Final electricity customers usually receive offers based on wholesale or generation prices; and in some countries they still face regulated tariffs.



Generators have several outlets for their output:

- Wholesale market;
- Ancillary services;
- Trading and retailing.

The wholesale market is in fact just a merit order dispatch that makes it possible to balance commercial portfolios the day before delivery or intra-day. The wholesale market is currently disrupted by two major malfunctions. First, the distortion in prices due to the subsidisation of some generators (e.g., renewables) or the application of price regulation to others (e.g., ARENH in France) undermines the level playing field. And second, the wholesale market, at least in Europe, remunerates exclusively energy and not power. The introduction of capacity mechanisms, which could be assimilated to a sort of planning based on guaranteed prices, is expected to mitigate this second malfunction.

The wholesale market only operates in the short term, because it is impossible to have real futures prices, due to the absence of any physical underlying in the medium or long term (in the hydrocarbon markets, for instance, a physical underlying is frequently available in the form of oil or gas storages or underground proven reserves). Only price hedging contracts or contracts for difference really make sense under such conditions in the medium and long term.

The provision of ancillary services, whose single buyer is generally the system operator, requires the specialisation of dispatchable generation units. The development of variable renewable energies, which are not controllable and unable to provide such ancillary services, will make the provision of services an increasingly important source of revenues for generators.

Suppliers currently compete mainly on price and, even more importantly, on the provision of additional

services, like the possibility to control consumption and billing through digital applications, energy efficiency and energy management solutions, aggregation of demand response, etc. It is not an easy business since all suppliers face the same wholesale price and the provision of services represents a financially weak part with respect to the total price of the delivered kWh. Successful suppliers actively trade on the wholesale market in order to balance their portfolio day-ahead.

## Other Businesses

The changes in the structure of electric systems, partly because of a greater interactivity between consumers and market players, will necessarily lead to the emergence of new businesses. They can initially be divided into three broad categories:

- Aggregation of consumption sites;
- Storage;
- Data processing.

Aggregators offer end customers the possibility to perform demand response and offer it in the markets for ancillary services (major industrial consumers are already actively participating to the provision of ancillary services). Aggregators also offer solutions for the management of the load curve and billing.

From a physical point of view, storage is a necessary complement to the uptake of non-dispatchable energy sources like wind and solar PV.

Data processing covers load and generation data and is based on the development of hardware and software to optimise electric consumption according to the energy needs, both at the domestic and industrial level (in a world more and more electric, the optimisation of energy consumption will be increasingly relevant). Companies offering solutions for data processing could also compete with system operators for the performance of local or global balancing of the electricity network.





One of the most important questions raised by these new business models is whether a sustainable model for aggregation and storage really exist or not. Indeed, despite the regular declarations and announcements, and despite the needs caused by the uptake of renewables, very few solid projects are spontaneously emerging. Among the reasons there are the availability of dispatchable generating units already connected to the grid, the fact that most of the grids, at least at the transmission level, are well meshed, and the level of feed-in tariffs for renewables, which incite their owners to maximise the injection of the electricity output into the grid.

Beyond the case of individual storage facilities linked to domestic PV units and in the absence of public subsidies, the only profitable business model today would be that of a regulated tariff for the use of storage facilities (this approach was once envisaged in France for demand response).

Finally, with regard to demand response, especially that provided by distribution network users and residential customers, it is essential to have a real measure of the response and avoid the use of conventional methods to estimate it. This is what happens today for industrial sites. Thus, it is better to wait for the full deployment of smart meters before developing demand response at the distribution level.

## Conclusion

From our analysis, four points clearly emerge:

1. In the current organisation of the European electricity sector, only regulated or subsidised business models are profitable;
2. The business models of electricity networks must evolve towards an “insurance” model, where the remuneration is no longer exclusively based on the RAB, but it depends also on the services provided;
3. The business models of storage and demand response (industrial or distributed, in the case of measurable offers through electronic metering) presently do not seem viable for the following, simple reasons: major malfunctions in the electricity market that do not provide long-term price signals for energy and capacity; feed-in tariffs for renewables that encourage the sale of electricity rather than its storage; and highly meshed electricity networks that do not incite neither storage nor demand response.
4. There are genuine opportunities in the massive processing of network, consumption and generation data, allowing the development of local loops, micro-grids and the competition between network operators for the provision of balancing services.

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