

**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS
COMPETITION COMMITTEE**

Working Party No. 2 on Competition and Regulation

Executive Summary of the Hearing on Radical Innovation in the Electricity Sector

Annex to the Summary Record of the 63rd meeting of Working Party No 2

19 June 2017

This Executive Summary by the OECD Secretariat contains the key findings from the discussion held under Item III of the 63rd meeting of Working Party No. 2 on Competition and Regulation on 19 June 2017.

More documents related to this discussion can be found at www.oecd.org/daf/competition/radical-innovation-in-the-electricity-sector.htm

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Executive Summary of the Hearing on “Radical Innovation in the Electricity Sector” held at the 63rd meeting of Working Party No. 2 of the Competition Committee of the OECD

By The Secretariat*

From the discussion at the roundtable, the delegates’ and experts’ written submissions, several key points emerged:

1. The stimulus for the innovation that is disrupting the electricity sector is the rapid expansion in renewable electricity capacity, much of which is from small scale decentralised sources. There are a number of drivers behind this growth including the effectiveness of incentives created by environmental policy, rising electricity prices, and falling input costs. This is helping the world towards meeting the commitments made under the Paris Climate Agreement, however the intermittent nature of renewable generation is creating a challenge which threatens to increase the cost of energy for consumers and hence to obstruct the energy transition towards a low carbon economy.

The current disruption of the market begins with the appearance of renewable energy, much of which is decentralised in its nature. Traditionally power stations were small in number, large in size, powered by fossil fuels, and heavily reliant on a huge grid to send their electricity over long distances. In contrast, renewable generation is often small-scale, and distributed or scattered across a region. They include photovoltaic solar panels that households may install on their roof, or that farms and businesses might install on their land, as well as small wind turbines, small hydro-kinetic units, and small biomass, biogas, and geothermal energy generating units.

There are a number of drivers behind the growth of renewable distributed energy. Firstly, environmental policy has provided strong support for increasing the share of renewable electricity capacity, not only through centralised generation (fixed-tariff power purchasing agreements, PPAs) but also through consumer level initiatives such as net metering and feed-in tariffs, which have been important incentives for those considering becoming prosumers. Secondly, rising electricity prices have made it more attractive for consumers to begin generating their own electricity, both to reduce the quantity they purchase from the grid and in order to sell to the grid at a higher price. Thirdly, the cost of photovoltaic technology has fallen substantially. More generally for developing countries, small scale distributed generation is an attractive solution where the grid infrastructure is not in place to transport energy from centralised power stations into people’s homes

However, the variability of renewable power sources such as solar and wind, be they distributed or otherwise, creates an intermittency problem that poses a challenge for the market. As renewable generation increases this challenge gets bigger by the year. Solar panels, for example, generate electricity approximately 10-30% of the time, i.e. during daylight hours on sunny days. Where solar and wind generation add significant capacity,

* This Executive Summary does not necessarily represent the consensus view of the Competition Committee. It does, however, encapsulate key points from the discussion, the delegates’ written submissions, and the panellists’ presentations.

over the course of a day this can have a big effect on the capacity the grid requires from other sources. As the share of renewables grows each year, the grid will need an increasingly large capacity that will be largely unused while renewable sources are generating. This underutilisation will have an efficiency cost, since it means grid operators need to invest in increasing the network's capacity so that peak demand can be covered and blackouts avoided. The investment in these capacity markets inevitably inflates consumer bills.

2. To address the intermittency issue and reduce costs for consumers, OECD countries are rolling out smart meter technology that allows consumers to monitor the energy they use. They are also increasingly moving towards adopting dynamic pricing that enables consumers (or third parties) to use the information generated by smart meters to help change behaviour and reduce costs. It is this dynamic pricing in wholesale and retail markets that is creating the business case for investment in a wide range of innovative business models.

Since the share of intermittent generation capacity is growing, the demand for non-intermittent generation, and the price of electricity are each becoming increasingly variable over the course of the day. These larger price swings mean consumers and retailers need more information on how usage changes over the day. Smart meters are therefore being rolled out in many OECD countries. Clarifying the consumers property right to their data in these meters, and hence their ability to easily share that data with third parties, is an important way in which to stimulate competition. It allows firms to identify consumer usage patterns and to offer products and price packages that either fit their existing pattern of use, or help them to change their pattern of use to obtain better value.

The increase in price swings throughout the day are also leading to dynamic retail pricing becoming more popular, for example in the US, New Zealand, Norway, and Estonia, and in the European Union where it will become mandatory from 2020 onwards for all firms to offer consumers an option to choose a dynamic price plan. Indeed, Spain and Denmark have already adopted dynamic pricing tariffs as a default option from which consumers need to opt-out of if they wish to pay a higher premium tariff that insures them against price variation. Whether or not consumers pay dynamic prices, or insure themselves against them, the variation in wholesale prices is gradually creating a stronger business case for a range of innovative business models that seek to help balance the market, and hence to profit from the avoided investment in inefficient underutilised capacity.

3. There are a wide range of innovative business models that are seeking to balance markets in more efficient ways. Which of these models will thrive remains unclear; however, it seems likely that one or perhaps a combination of these models will soon disrupt the traditional retail market.

One possibility is that business models that increase interconnectedness will thrive. These businesses might disintermediate supply chains and connect us directly, allowing users to sell the energy that they do not use (or attach little value to) through digital trading platforms, like an Airbnb for electricity. However, it would be important in such platforms to ensure that the costs of using the grid infrastructure and the costs of managing grid congestion are factored into the price.

Alternatively, firms might invest in ultra-high voltage direct current interconnections between the alternate current electricity grids. This could facilitate trade with those located in distant locations. However, another possibility is that business models that

facilitate the localisation of electricity markets might prosper. These models might allow consumers and local communities to become self-sufficient by generating, storing and trading their own electricity, enabling them to cut their costs by going off-grid.

In either case, as the Internet of Things develops and connectivity within the home grows, business models in which residential consumers become increasingly responsive to the changing price of electricity are likely to become more popular. This might involve the consumer responding themselves by setting their smart appliances (and electric vehicles) to respond to their dynamic tariff, or outsourcing the management of this response to a third party electricity service provider or demand aggregator.

Most likely, some combination of models involving demand response, storage, and trading will emerge to help governments negotiate the energy transition in the smoothest possible fashion.

4. Regulation needs to be proactive in facilitating entry and innovation, while at the same time remaining neutral between the different types of innovative business model that are emerging, and neutral when creating capacity markets. Regulators and Competition Agencies meanwhile need to watch carefully for signs of strategic entry deterrence by incumbent retailers and grid operators.

To facilitate innovation, regulators need to be proactive in putting in place the infrastructure that is required for innovation to happen. For example, smart meters to record data, the ability for consumers to easily share their data with third parties, and the default of a dynamic pricing tariff for consumers that do not actively choose to insure themselves against price variability.

Proactive regulation is also required to help facilitate new entry. For instance, setting up regulatory sandboxes to test the appropriate framework for innovative new business models has been successful in financial markets and is now spreading to energy markets as well (see Ofgem). Entry into the generation market can also be helped by providing prosumers with the right to two-way access to the distribution grid, and recognising that they do not require the same regulatory framework as large centralised generators, but rather a proportionate approach that is based on the risks that they create. For example, this should not include prosumers submitting demand forecasts to the network operator, or meeting universal service obligations.

At the same time, regulation needs to be competitively neutral, and must therefore avoid picking a favoured innovation and supporting it at the expense of rival innovations. For example, this includes refraining from: a) providing subsidies to residential demand aggregators; b) restricting access to wholesale and balancing markets; and c) setting up restrictive capacity markets that effectively subsidise coal generation.

Given the disruptive potential of this innovation, strategic entry deterrence by incumbent retailers and grid operators is also a risk. This means structural separation needs to be maintained between the natural monopoly of grid operation and the emerging competitive markets for storage, demand response and peer-to-peer trading. It also means maintaining a vigilant eye on the use by incumbents of industry codes as a means to block or delay changes that facilitate disruptive innovation (for instance moving to half-hourly settlements, or the authorised sharing of consumer data).