IRENA
INNOVATION WEEK
solutions for a renewable-powered future

IRENA
International Renewable Energy Agency

DIGITALISATION AND DECENTRALISATION TRACK

THE NEW CONSUMER IN THE DIGITAL WORLD

Session overview

The growth of distributed electricity generation and storage technologies along with the widespread availability of "smart" devices have created new opportunities for consumers to engage in the energy transition and become more active players. As the speakers highlighted in the session, consumers are willing to take an active role in decision making, provided they can see the benefits and if automation makes it easy to react to price signals. New business models therefore are emerging that provide "ready-made" service for customers, enabling consumers to play an active role in the power sector and to unlock demand response. As the discussion showed, the payback that consumers need in order to engage their flexibility will depend on automation and "coolness".

The regulatory framework is crucial to harness the potential benefits arising from this evolving role for consumers. Consumer-owned distributed energy resources can support demand-side management, by facilitating load shifting and providing ancillary services to the distribution system operator. Allowing distributed energy resources to participate in energy markets and exposing them to wholesale prices, including ancillary market prices, will help to incentivise those resources that are able to offer flexibility to the system.

This session demonstrated that many such initiatives already exist to unlock demand-side flexibility. For example, in Germany, Sonnen is using small batteries with solar photovoltaics (PV) for demand management, providing balancing and congestion management services to the grid. The virtual power plant Next Kraftwerke is aggregating distributed energy generation to provide flexibility to the grid. However, regulation to enable fair remuneration of such services and to avoid free-riding is still missing.

Decentralised generation is still only a small share of total energy consumption, but it is valuable in engaging consumers in the energy transition in order to meet climate goals, and has great potential to grow. The session was moderated by **Michele Governatori (Head of Public and Regulatory Affairs, Axpo Italia, and President of European Energy Retailers)** and comprised four presentations followed by a panel discussion.

Presentation 1:
Smart meters and demand management in Finland

Ina Lehto (Senior Adviser, Finnish Energy) presented on how demand response is achieved in Finland, with smart meters and dynamic tariffs as key enablers.

- In Finland smart metering is fully rolled out, and 9% of retail consumers are exposed to dynamic pricing, based on the Nord Pool spot price. There is a direct connection between retail and wholesale prices.
- The Finnish system is unique because the whole value chain – from the wholesale market to the individual smart meter – is unbroken.
- The national transmission system operator provides a mobile app with hourly spot prices, which enables consumers to react based on the price signals (high or lower).
- For an effective demand response, automation and ready-made services for consumers are key.

Presentation 2:
Next Kraftwerke – virtual power plant and power trading

Jan Aengenvoort (Head of Communication & Market Research, Next Kraftwerke) presented on the Next Kraftwerke virtual power plant (VPP), which aggregates thousands of small power producers and consumers to valorise their power and flexibility on different markets. He said, "In a difficult regulatory environment in Germany, we can harvest some flexibility today from network power consumers!" The VPP schedules the production and consumption of distributed energy resources according to wholesale price signals.

- Live data – such as weather forecasts, aggregated flexibility from the platform, current pricing and forecasted pricing – are used to manage the VPP's assets through remote control.
- This service provides various benefits such as harmonising power supply and demand (by dispatching distributed energy resources according to current spot market prices) and providing ancillary services to the system.
- Consumers can save up to 30% of their electricity costs by being remunerated for providing services to the grid, usually through an aggregator that can control their energy resources and operate them based on forecasted energy prices and forecasted generation.

Presentation 3:
SonnenFlat and SonnenCommunity

Benjamin Schott (Director of Business Innovation, Sonnen) stated that "storage is the most important missing piece in [varable renewable energy's] higher adoption". He gave insights into two solutions applied by Sonnen: SonnenFlat and SonnenCommunity.

- **SonnenFlat** enables consumers to use behind-the-meter storage to help stabilise the grid in exchange for reduced electricity cost for consumers. SonnenFlat provides grid **services for transmission system operators in Germany.**
- **SonnenCommunity** is an electricity sharing platform – a nationwide, cloud-based, virtual power plant for peer-to-peer trading, with more than 3 000 batteries installed with 120 000 customers in the network. Members of SonnenCommunity are virtually and intelligently connected with each other and can trade their self-produced energy among themselves based on their battery's charging status and their consumption profile. This trading enables some community members to run 24/7 on 100% solar energy and to save up to 75% of their energy bill.

Presentation 4:
Trying to move consumers from analogical to digital mode in an emerging economy – the Brazilian experience

Luiz Augusto Barroso (Former CEO, Energy Research Office EPE) discussed the ongoing advances in Brazil to achieve a liberalised retail market and the many challenges in this process.

- Brazil faces many different challenges (compared to the European context) in engaging consumers as active participants. Brazil does not have a retail market for electricity, and consumers are forced to have their load contracted via long-term contracts. Spot prices are strongly driven by hydropower, and appropriate financial markets are non-existent.
- However, recent polls indicate that consumers are willing to take a more active role in decision making, and technology will be an enabler, and non-economic reasons may even accelerate implementation of distributed energy resources. The market design must be an enabler too: it needs to be adapted to allow for integrated convenience between centralised and decentralised resources. Adaptations must happen before the deployment of distributed energy resources starts.
- There is no one-size-fits-all solution, and Brazil is trying its own way. A bill to modernize the Brazilian electricity regulatory framework is being discussed in their Congress, after being discussed with the wider society via a public consultation in 2017. Its main goals are to increase incentives to efficient, decentralized decision-making with market signals to align individual and societal goals with individual risk management instruments.

Panel discussion

In addition to the presenters, the panel included:

» James Watson, CEO, Solar Power Europe

» Peter Stratmann, Head of Renewable Energy Unit, Federal Network Agency of Germany

» Junyan Liu, Professor-Level Senior Engineer, State Grid Corporation of China

Highlights from the discussion:

» **This is a proven concept with successful initiatives, but it is missing regulation support.**

- Many initiatives are successfully engaging consumers and prosumers in demand-side management and aggregating distributed energy generation, to provide grids with flexibility and many other services.
- Regulation is key to enable the available technologies to reap the benefits, to fairly remunerate such services and to avoid free-riding. In most of the markets, such regulation is still missing.
- Market design should incentivise the deployment of renewable energy generation in the entire power system, enable the participation of small actors as flexibility providers and enable a bankable market.
- Improving competition is challenging, especially as reliability and security of supply must be ensured.
- Innovation in grid fees is needed to cover the cost of the grid in a fair manner for all consumers while providing the right incentives for flexibility or peer-to-peer trading.

» **Consumer engagement is important in future power systems.**

- There is a trend towards community-owned projects, and a need for communities to be involved and engaged. It is important for communities to understand how the system works if the climate change challenge is to be solved.
- Consumer behavioural change is possible, and they are willing to change their behaviour if the benefits are clear. Automation, however, is a key enabler.