

EURACTIV

Event Report | Apr. 2023

Power grid flexibility

Supported by  **smartEn**
Smart Energy Europe

<https://eurac.tv/9Wqz>





Power grid flexibility

Event Report | Apr. 2023

<https://eurac.tv/9Wqz>

With electric cars and heat pumps deployed on a massive scale across Europe, many fear black-outs as a result of the additional stress they cause for local power distribution networks.

Mitigating this risk requires a more flexible electricity system and closer coordination between grid operators to unlock flexibility at the European level, energy experts say.

In this special report, EURACTIV looks into local grid flexibility solutions and how they could be further promoted across Europe.

Contents

EU eyes 'billions' worth in flexibility from local electricity grids	4
Grid operators call for greater transparency on household electricity use	7
The next energy crisis will be local. How do we prevent it?	9



EU eyes 'billions' worth in flexibility from local electricity grids



By Frédéric Simon | EURACTIV.com



The EU market for demand-side flexibility is still in its infancy and driven mainly by solar self-consumption in southern European countries like Italy, Spain and Portugal, said Lucinda Murley, a senior analyst at consulting firm LCP Delta. [Greens MPs / Flickr]

As Europe shuts down its remaining coal power plants and turns away from volatile gas for electricity generation, it is also losing key flexible power supplies that can be switched on at the last minute to keep the lights on during peak hours.

To replace those, the European Union hopes to tap into what many

consider the cheapest fuel of all – [energy efficiency](#) technologies, or the fuel that isn't burned.

Chief among them is demand-response solutions allowing households to manage their electricity consumption.

"There is a lack of non-fossil flexibility, such as demand

response and storage," [said EU energy commissioner Kadri Simson in a speech at the 2023 summit of SmartEn](#), a trade association promoting demand-side flexibility technologies.

"These solutions directly compete with gas-fired generation and thus reduce our dependence on it," Simson said at the event,

held on Wednesday (19 April). They are also “a crucial enabler” for wind and solar power, which are expected to be used to meet EU climate goals, she added.

The energy crisis triggered by Russia’s war in Ukraine has highlighted the urgent need to replace fossil fuels in power generation, Simson underlined.

But contrary to coal and gas, wind and solar are non-dispatchable sources of electricity, meaning they need backup from other flexible energy sources to keep the grid in balance, or else [the European Union could face blackouts](#).

And with growing numbers of electric cars and heat pumps deployed across Europe, “the next crisis might be local” because of additional stress put on the power distribution grids at the local level, said David Villa, the executive director of SmartEn.

According to Simson, the EU’s daily flexibility needs are expected to increase by 133% between 2021 and 2030 because of the switch to renewables. “And comparing 2050 to 2030, a further increase on average by 250% is needed in the EU,” she added.

Demand-side flexibility covers a wide range of technologies like electric vehicles that can store energy and recharge at night when power is cheapest, digitally-connected appliances in buildings that can be controlled remotely, and solar panels coupled with home batteries, which can inject

electricity back into the grid when demand is highest.

According to an industry study published last year, if those technologies were deployed to their full potential, EU consumers could save more than €71 billion on their electricity bills every year.

The study found that it would also reduce the need for renewable electricity curtailment by 61% before the end of the decade, bringing more clean energy to consumers without having to install additional wind and solar farms.

Market still in its infancy

However, the EU market for demand-side flexibility is still in its infancy and driven mainly by solar self-consumption in southern European countries like Italy, Spain and Portugal, said Lucinda Murley, a senior analyst at consulting firm LCP Delta.

“It’s not wide scale yet,” she explained, saying the challenge is integrating national markets currently operating separately. “There are literally billions of euros in these markets that are accessible for demand-side flexibility”, but which are not being tapped yet, she told participants at the event.

The European Commission is aware of the challenge and has urged EU countries to rapidly implement the 2019 electricity market directive, which opens up the bloc’s wholesale power market to companies offering demand response services.

“In many member states, demand response is still lacking this access to wholesale markets contrary to the requirements of the Clean Energy Package”, which entered into force in 2019, Simson told event participants.

Brussels [tabled a further reform of EU electricity market rules last month](#) to accelerate the process, requiring EU countries to define national objectives for demand-side response and storage. The draft law also enables grid operators to launch auctions for electricity demand reduction at peak hours, which will be open to flexibility services.

New EU right to energy sharing - and saving

In addition, the proposed reform introduces a new right to energy sharing for consumers that makes it easier for households to self-produce electricity using solar panels, share the surplus with neighbours and feed the electricity back into the grid as part of so-called energy communities.

However, the industry believes more can be done to unlock demand response from local power grids.

Michael Villa, the executive director of Smarten, welcomed Commission’s plans to extend an obligation to slash electricity demand by 5% during peak hours. The measure, [introduced during the energy crisis last year](#), will be made a permanent feature of the EU’s electricity market design

under the Commission's proposal, which still needs approval from EU member states and the European Parliament.

But Villa believes this 'peak shaving' mandate should not only be assigned to transmission system operators (TSOs) managing high-voltage power lines but also to distribution system operators (DSOs), which manage the low-voltage cables connected to individual homes.

TSOs already provide a wide range of so-called ['ancillary services'](#) to keep the grid in the balance every 15 minutes, and Villa says DSOs should also be allowed to participate in those markets to unlock flexible resources at the local level – such as solar panels, electric vehicles and home batteries.

"In Ireland, for example, it is the DSOs which are beating the peak, not only the TSO," Villa told EURACTIV.

According to Villa, the EU's new "right to energy sharing" should also be broadened to include energy-saving services instead of focusing only on small-scale renewables like solar rooftops. This would allow whole neighbourhoods to monetise their flexibility while helping to keep the broader electricity system in balance – a concept Villa calls "district energy self-balancing".

But tapping into the potential of local flexibility is challenging and requires close coordination with small grid operators at the local level to ensure a smooth process when it comes to procurement and activation of flexibility services.

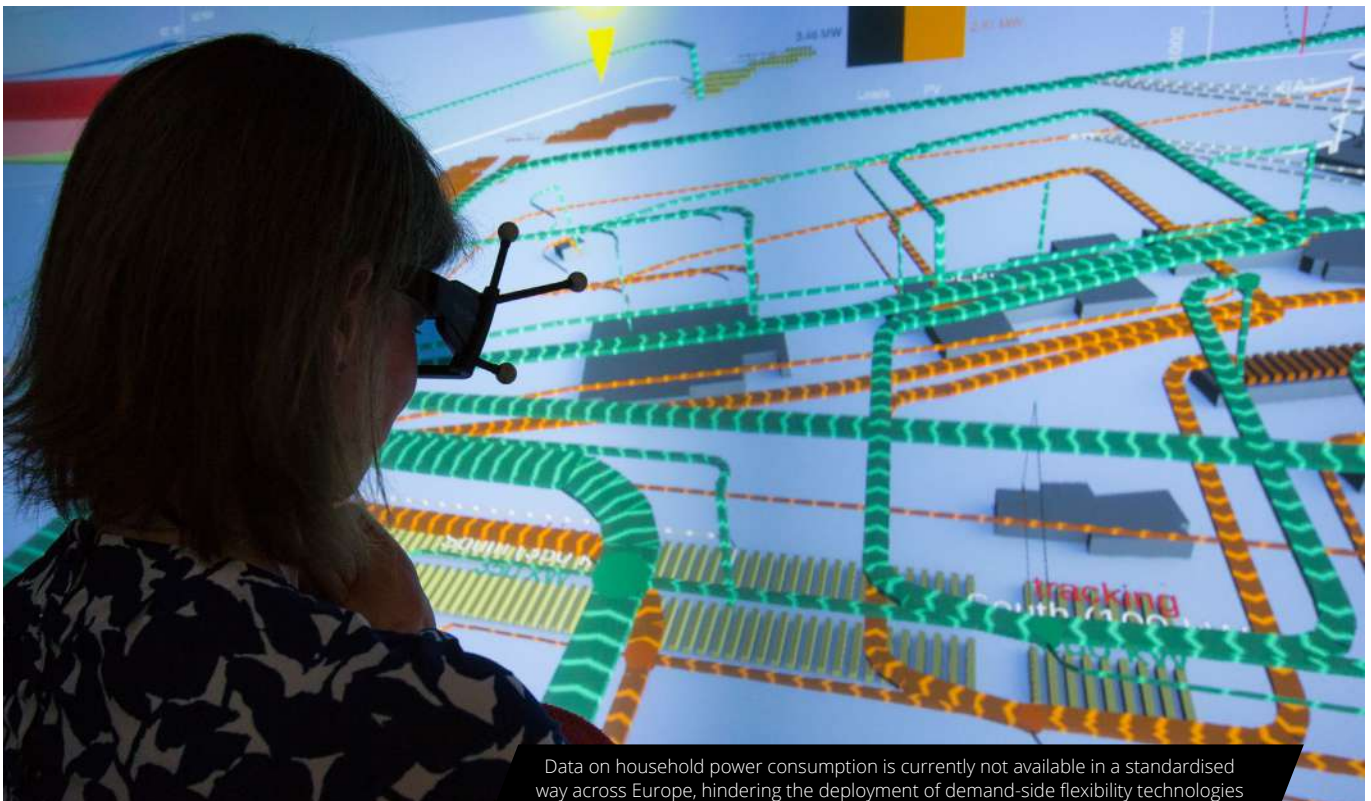
In Germany alone, there are 865 DSOs – all with different technical requirements for connections with the high-voltage grid, said Moritz Lauster from Viessmann, the German heating appliance manufacturer.

Digitalisation is seen as a critical step to unlocking local flexibility, and the European Commission presented an action plan last year to digitalise the energy system.

Grid operators call for greater transparency on household electricity use

By Frédéric Simon | EURACTIV.com

Languages: [Deutsch](#)



Data on household power consumption is currently not available in a standardised way across Europe, hindering the deployment of demand-side flexibility technologies that could slash consumer bills. [National Renewable Energy Lab / Flickr]

Power network operators are calling for greater transparency regarding electric cars and heat pumps connected to the grid in order to reinforce the EU's network where necessary and tap into the potential of energy savings from households.

For the transmission system operators (TSOs) overseeing high-voltage lines in Europe, the main challenge in the coming years is to reinforce the grid in order to connect growing amounts of renewables.

"We have to build a lot to integrate new energy coming from onshore and offshore wind as well as solar PV," said Chris Peeters, the CEO of Belgian TSO Elia.

But since solar and wind are not programmable on-demand – or 'dispatchable' – energy sources, Peeters warned that the electricity grid will become "increasingly inflexible" in the future because of growing amounts of intermittent power coming from renewables.

As households increasingly turn

to electric cars, solar rooftop and heat pumps, the local power grid is also coming under growing stress, raising the risk of widespread blackouts.

As such, TSOs are looking for ways to tap into the flexibility potential coming from individual households or neighbourhoods.

"It's our role to unlock flexibility wherever it's coming from," Peeters told last week's energy summit organised by smartEn, a trade association promoting demand-side

flexibility technologies.

But in order to do this, TSOs need transparent access to data about energy generation and consumption at the local level, Peeters said. And that data must be available ideally at 15-minute intervals – the standard unit for intra-day trades on the EU's wholesale electricity market, he added.

"I would be happy to have a data hub" that gives information "as close to real-time as possible" on electricity generation and consumption everywhere on the electricity network, Peeters told participants at the event on 19 April.

A matter of trust

However, data on household power consumption is currently not available in a standardised way across Europe, Peeters said, calling for greater consistency in data sharing practices across the EU.

For TSOs, the issue boils down to trust and the reliability of information provided by distribution system operators (DSOs), which have direct access to energy consumption and generation data from individual households – when they agree to share it.

This data needs to be available in a transparent way so that DSOs can participate in the EU's wholesale energy market and make profits by monetising the flexibility provided by households – whether by selling their excess solar production or by storing power in the batteries of their electric cars.

"Can we really trust those new market participants?" asked Taavi

Veskimägi, the CEO of Elering, the national Estonian grid operators for gas and electricity. To enable this, he said DSOs must provide real-time metering data to TSOs "so that they really do what they promise".

The grid flexibility potential of DSOs is huge. According to a 2022 industry [study](#), EU consumers [could save more than €71 billion](#) on their electricity bills every year if demand-response technologies were deployed to their full extent.

However, most of these technologies rely on smart meters allowing households to change their electricity consumption and generation patterns based on external signals.

And here, the [European picture is quite patchy](#), with Nordic countries, Italy and Spain reaching a penetration rate of almost 100% for smart meters while others like Germany and Belgium have zero.

This is a concern for the electricity industry, which says smart meters are a must if European households are to take part in the electricity market and reap the benefits of selling their flexibility to the grid.

Information granularity

Another key question for TSO and DSO coordination is what kind of information they need in order to unlock the energy saving potential of local power sources.

And here, perspectives differ. "From our point of view, we don't like to go behind the meter," said Veskimägi, the CEO of Elering. "We don't want to get into such level of detail because the complexity becomes too large – we couldn't manage on a real-time level" the

amount of data coming from individual appliances, he said.

Jukka Ruusunen, the CEO of Finnish grid operator Fingrid, agreed, saying "we don't need to put sub meters in every home and every appliance".

But Peeters differed here, saying DSOs and TSOs need to have access to detailed information on household consumption. "We don't want aggregate data because it's a moving target," he said at the event. "If you say you aggregate heat pumps, we need access to data from that entity," he said.

While Peeters agreed that TSOs do not need detailed information about every appliance in every home, he did however single out one exception – electric cars, which consume greater amounts of electricity and could destabilise the power network if all were to recharge at the same time.

For electric cars, Peeters called for greater transparency so that TSOs have full visibility on charging times during any given day.

"Otherwise, I would stop at the meter," he said.

PROMOTED CONTENT

DISCLAIMER: All opinions in this column reflect the views of the author(s), not of EURACTIV Media network.

The next energy crisis will be local. How do we prevent it?

.....

By Daniele Andreoli and Jon Ferris | Enel X Global Retail and LCP Delta



[chayanuphol / Shutterstock]

Why do we need flexibility? The growth of distributed generation is disrupting the traditional approach to distribution network planning. It's no longer about building to meet peak demand. Instead, local grids are struggling to accommodate times when generation exceeds their hosting capacity.

Jon Ferris is Head of Flexibility and Storage at LCP Delta, and Daniele Andreoli is Head of Flexibility Solutions at Enel X Global Retail.

Adding to the challenge is the electrification of heat and transport, which is changing existing demand patterns and making forecasting more difficult. However, it also

presents an opportunity to respond to price signals and control demand.

Traditionally, system operators have been incentivised by regulation to prioritise capital investment in the grid, but continuing this approach would require doubling the size of the network at huge costs to consumers and at a pace too slow

to keep up with demand.

This is causing mounting frustration among developers who face congestion and delays in connecting new housing, industry, generation, and storage.

Without addressing these issues, the next energy crisis could be local, with consumers unable to install heat pumps or charge EVs, and developers prohibited from connecting new generation or storage while existing renewables are paid to be curtailed.

How much progress has been made?

The implementation of the Clean Energy Package and European Balancing Guidelines has been disappointingly slow and inconsistent across member states. Nevertheless, transmission system operators are moving towards standardisation of ancillary services, which should expand access to storage and demand-side flexibility. Aggregated access to markets is unlocking the value of ancillary services to the demand side.

At the residential level, the emergence of dynamic tariffs and demand charges is accelerating the growth of Home Energy Management (HEM) solutions to optimise the self-consumption of rooftop solar in individual buildings.

However, network charging does not incentivise individual consumers to behave in a manner that reduces costs for all consumers. Market-based solutions at the distribution level have only been implemented on a small scale through trials and pilots.

[The 2022 Flexibility Market Monitor](#) by [LCP Delta](#) and [smartEn](#) has highlighted the North-South divide in approaches taken across Europe. In southern Europe, energy communities are more prevalent, providing more opportunities to share excess solar generation. In northern Europe, meeting the peak winter heating demand is the greater challenge, and markets for flexibility procurement offer the distribution system operator more control.

Regardless of approach, progress has been slow and value low, hindering the development of scalable business models to harness the growing capacity and capability of local flexibility.

How do customers get involved?

We know that many customers can adjust their consumption patterns to be more flexible. [Enel X Global Retail](#) has found over 8 GW of such flexibility around the world. However, convincing customers to participate is challenging, as they are typically risk-averse and need to be certain that it will be worthwhile.

While dynamic tariffs and demand charges can help, we believe that more customer engagement can be fostered through explicit participation in markets where they are rewarded for their flexibility.

Enel X Global Retail and other aggregators work with customers to maximise the value of their flexibility. Currently, this often involves providing services to transmission system operators combined with wholesale markets and resource adequacy mechanisms. In our

vision of the future, an increasing proportion of the value should come from addressing local issues as distribution networks become more constrained.

What are the new proposals?

The proposed amendments to the Electricity Market Design aim to address some of the challenges to demand-side flexibility, but the distribution gap risks being overlooked.

Both transmission and distribution system operators will have an obligation to assess their need for power system flexibility and to consider the potential of demand-side response and storage to fulfil this need, and member states will define an objective to be reflected in national energy and climate plans.

Networks need to consider both capital and operating expenditure to provide appropriate incentives to use flexibility services and facilitate demand response, but this falls short of the requirements in the most advanced markets for local flexibility. And the proposed peak-shaving product for demand-side response is still focused solely on the needs of transmission system operators.

The right to separate contracts for flexible assets like heat pumps and EVs, combined with market trading closer to delivery, will increase the opportunity for demand response to participate fully in all markets. But poorly implemented renewable energy sharing within a bidding zone may worsen the problem of local congestion where there is a conflict

with the need for local balancing.

To benefit from local optimisation, it's crucial that local- and system-level flexibility products are designed to coexist. If either of them requires exclusive control of participating assets, it will make both more expensive.

How do we prevent the next crisis?

While the proposed reforms to the Electricity Market Design are a step in the right direction, further steps are needed to realise the full benefits of local flexibility.

We will need flexibility solutions to integrate variable renewables and low-carbon demand assets in a way that meets consumer demand and helps solve congestion issues. This could include more ambitious actions on energy sharing, energy communities and local optimisation schemes. This would also allow distributed assets to

play their part in replacing gas as the dominant source of flexibility.

Balancing at the local level will reduce the need for investment in networks and generation, and can reduce the amount of expensive rebalancing by system operators. This will reduce carbon emissions from the energy sector, ensure more efficient use of assets, and reduce costs for consumers.

Prioritising flexibility won't remove the need for grid investment. To meet the challenge of climate change we will need both, and we will need to balance these approaches and focus them where they will have the most impact.

The upcoming smartEn Smart Energy Summit on 19th April 2023 will offer a platform for debates on financing, innovation, and monetisation of local flexibility.



For information on
EURACTIV Event Reports...

Contact us

Frédéric SIMON

Senior Editor, Energy & Environment
frederic.simon@euractiv.com
tel. +32 (0) 2 788 36 78

Marco VENOSTA

EU Affairs Manager
marco.venosta@euractiv.com
tel. +32 (0) 2 226 58 19