Recommendations for Electricity Market Design Improvement

smartEn Position Paper

with the support of AFRY

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EXECUTIVE SUMMARY

The EU is currently facing an energy resilience and energy affordability crisis. Short-term solutions put forward by both EU institutions and Member States in the last months aimed at addressing these urgent challenges, but some emergency measures have undermined the cost-effective transition towards climate neutrality.

The revision of the Electricity Market Design (EMD) should address in a structural way the current energy resilience and energy affordability crises with a long-term horizon, while supporting – instead of undermining - the clean energy transition with end-users of all types in the lead (from households to energy intensive industries, acting individually or collectively).

As recognised by ACER and the European Commission, the current EMD can already deliver significant benefits to both consumers/prosumers and the energy system: **Member States should accelerate the implementation of EMD rules and regulations to activate demand-side flexibility**[1]. smartEn urges the European Commission not to question existing rules targeting demand-side flexibility[2].

In the ongoing reflections to improve the EMD, smartEn also calls to introduce **national targets to activate demand-side flexibility**. This can be achieved by transforming the emergency measure to reduce electricity consumption during peak hours into a permanent, structural obligation of the new market design, and ensure it is:

- implemented in a consistent way with the existing EU rules through a market-based activation of flexibility from demand-side sectors[3],
- complemented with other alternatives to activate flexible demand, e.g. to reduce peak load or integrate variable renewable electricity cost-effectively.

In addition, existing EU rules should be complemented with new provisions to address 3 major upcoming disruptions caused by an increase in renewable electrification of the energy system:

- Location: significant amounts of new load and electricity generation in places where they were not previously present, notably at the edge of the system;
- Energy balancing: increased need for flexibility and stability, over different time-frames (from instantaneous, to intra-day, to seasonal), as variable generation displaces fossil fuel generation;
- Commercial and investment disruptions: new investment requirements due to price and volume volatility for renewables and other flexibility resources, including at demand-side.

[1] This is a joint call from 14 European business organisations urging the European Commission to open infringement procedures towards Member States that have not implemented yet those provisions unleashing the demand-side flexibility potential. A letter was issued in October 2022: https://smarten.eu/wp-content/uploads/2022/10/Joint-letter-to-implement-the-Electricity-Market-Design-now.pdf smartEn published in March 2022 a monitoring report on the EMD implementation: https://smarten.eu/wp-content/uploads/2022/03/The_implementation_of_the_Electricity_Market_Design_2022_DIGITAL.pdf

[2] Around 20 articles in both the 2019 EU Electricity Regulation and Directive are crucial for demand-side flexibility and they set rules on 1) the market-based procurement of all Decentralised Energy Resources by System Operators 2) the non-discriminatory participation of all DERs to all markets and mechanisms 3) frameworks for innovative services, including aggregation services and local communities 4) access to price signals for end-users.

[3] The market-based implementation of this 5% national obligation enshrined in a Council Regulation agreed in September 2022 is crucial. smartEn developed a Guideline outlining 4 cost-effective implementation methods to support Member States in this effort for winter 2022/2023 and beyond: https://smarten.eu/wp-content/uploads/2022/11/Final-Electricity-peak-demand-reduction-target-adopted.pdf

This Position Paper, developed by smartEn with the support of Afry, aims to inspire this debate and is framed around 5 sets of recommendations which should be evaluated in a thorough Impact Assessment by the European Commission before the official legislative proposal:

1. Strengthen consumer empowerment

The new EMD should strengthen the solidity and variety of the innovative business models that enable an enhanced activation of distributed flexibility while rewarding active consumers. For this to happen, it is crucial to clarify in EU secondary legislation the flexibility functionalities of Decentralised Energy Resources (DERs) by defining "Demand-side flexibility". It should also specify that there should be the possibility for active consumers to participate through either type of scheme (implicit and explicit), and automation should ease their interaction with the system to facilitate the activation of their flexibility. For this to happen, smart meters and sub-metering systems shall have equal treatment and the supplier or aggregator shall be responsible for defining the active consumer's baseline based on data from the boundary smart meter or any other certified sub-meter. Harmonised products to reflect the contribution of DERs for system services should be accelerated through Flexibility Registers based on EU principles and allowing a single registration point across Member States.

2. Maximise District Self-Balancing

The deployment of new decentralised forms of load (e.g., electrification of transport and heating) and generation (e.g., solar PV in buildings, renewables in communities) is increasing the overall capacity needs and putting pressure on power grids. The activation of the flexibility potential of DERs at local level through different district self-balancing schemes can help solve local congestion challenges and avoid costly grid reinforcements. The deployment of DERs, for multiple services, should be inherently linked to network capacity needs, and a local market design should be shaped to complement existing provisions targeting local flexibility markets by DSOs. The revised EMD should foster a system of interoperable systems to get optimal value from flexible resources for both system and consumers' benefits.

3. Unlock the value of demand-side resources in wholesale energy and ancillary services markets

The current market design must be adapted to further meet the flexibility needs of a decarbonised electricity system and to reflect the special role that DERs can play in providing flexibility. smartEn calls for the continuation of the existing marginal price formation as it provides the necessary signals for investment in flexibility assets. This should be accompanied by scarcity pricing to enhance the value of flexibility in wholesale markets and revise time granularity of electricity markets through shorter settlement intervals and later gate closure.

4. Support investments with capacity remuneration arrangements

Capacity remuneration mechanisms in the past have been targeted to support peak demand, rather than matching the rapid variations of (renewable) generation and consumption that is expected in a decarbonised system. smartEn proposes future capacity remuneration mechanisms that fully recognise the value that DERs bring to capacity adequacy and system flexibility. DSF should therefore be allowed to play an active role in such mechanisms, including in critical peak pricing schemes.

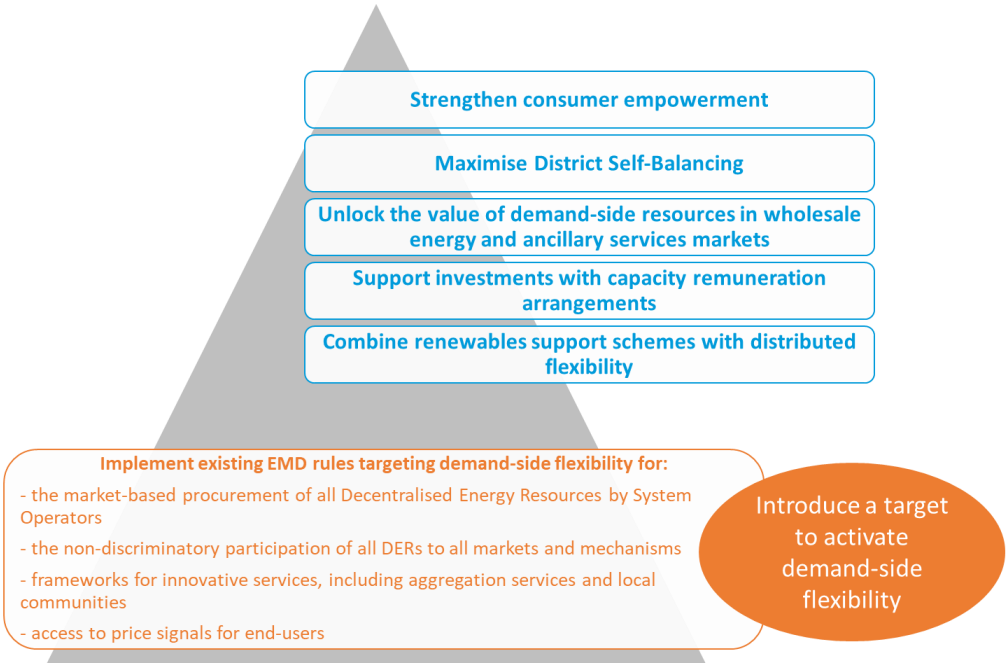
5. Combine renewables support schemes with distributed flexibility

Support mechanisms for renewables can have an impact on demand-side flexibility at wholesale level: if renewables are heavily over-deployed this could lead to artificially driving negative energy prices, making demand-side flexibility non-profitable, putting grid-stability at risk due to low flexibility at the demand-side. To avoid that, all renewable support schemes for utility-scale investments, including PPAs and CfDs, shall become responsible for procuring flexibility themselves from the demand-side,

notably being systematically backed by a 24/7 Guarantees of Origin mechanism to require real-time matching between flexible consumption and renewable electricity generation.

The revision of the Electricity Market Design should complement existing provisions in the 2019 Electricity Directive and Regulation

7 Recommendations for a consumer-centric EMD revision



INTRODUCTION

Challenges faced by electricity systems due to the clean energy transition

Our transition to a decarbonised world has two key aspects: the replacement of fossil fuel generation with zero carbon (mainly renewable) capacity, and the mass electrification of domestic and commercial energy uses. These two aspects of the transformation are bringing three significant disruptions that the future market design must deal with:

- Location: significant amounts of new load and electricity generation in places where they were not previously present, notably at the edge of the system;
- Energy balancing: increased need for flexibility and stability, over different time-frames (from instantaneous, to intra-day, to seasonal), as variable generation displaces fossil fuel generation;
- Commercial and investment disruptions: new investment requirements due to price and volume volatility for renewables and other flexibility resources, including at demand-side.

The political nature of these issues is undermining support for the competitive market principles which are the basis for the Internal Market for Electricity, and which are the life-blood of innovative service providers that can help ensure a cost-effective energy transition.

The Electricity Market Design (EMD) has already been adapted to accommodate decarbonisation objectives and reward the use of flexibility, but the role of demand-side flexibility in all aspects of the power system remains under-exploited, ridden with legacy barriers limiting their participation.

For example, explicit services for flexibility are still designed around traditional large generators, which are considered by system operators to be predictable and directly controllable. Most network operators today benefit from financial incentives that encourage them to invest in assets rather than buy flexibility services from connected parties, due to a CAPEX remuneration. The use of implicit flexibility is hampered by the lack of dynamic tariffs offered by suppliers and network companies, and the slow roll-out of smart meters in some jurisdictions. Although the Clean Energy Package addressed several of these regulatory barriers, it has not yet been implemented in most EU countries, or has only been partially implemented.

As recognised by ACER and the European Commission, the current EMD can already deliver significant benefits to both consumers/prosumers and the energy system. Existing rules targeting demand-side flexibility in both the Electricity Directive and Regulation should not be questioned and:

- **Member States should accelerate the implementation of EMD rules and regulations to activate demand-side flexibility,**
- **the European Commission should introduce a national target to activate demand-side flexibility as a permanent, structural obligation of the new market design**.

These are top priorities before any reflection on the modification of the existing market design, which is anyway necessary because the current EU principles on market design are not fully ready for the long-term future and must be adapted to face sustained extreme events like those happening in 2022[4].

In summary: the future market design must stimulate and reward flexible, active consumers and prosumers for the benefit of the wider system, building on and improving the provisions which are

[4] Markets are functioning and are simply reflecting the price in light of the EU strong dependency on gas.

already in place in European legislation. This is the challenge which we seek to address in this position paper developed by smartEn with the support of independent consultants from Afry.

Opportunities

Distributed Energy Resources (DER) are already key, low-cost providers of flexibility - as at the electricity system transforms, they will become essential for an efficient, low-cost system.

DERs encompasses a wide set of solutions, including demand management, energy storage, and distributed renewable generation. These resources are generally found behind the meter and are connected to the distribution network.

DERs can provide Demand-side Flexibility, giving the opportunity for any active customer to react to external signals and adjust their energy generation and consumption in a dynamic, time-dependent way, individually as well as through aggregation.

As quantified in 2022 by smartEn with the support of independent consultants from DNV, DER flexibility can provide significant benefits for both consumers and the overall system.

Among others, the following results[5] were derived in a scenario that unleashes the full activation of flexibility from buildings, electric vehicles, and industry in 2030:

- €11.1 - €29.1 bn can be saved annually in distribution grid investments
- 15.5 TWh (61%) would be the avoided renewable curtailment
- €2.7 bn would be saved annually in avoided peak generation capacity
- 37.5 million tonnes can be saved annually in GHG emissions
- €71 bn would be saved annually by consumers directly due to reductions in electricity costs and new flexibility revenues

DERs and their flexible use do not only benefit their immediate owners, but the society at large, amounting to €300 billion collectively, including households, energy communities, and businesses in 2030.

DERs empower consumers and have the potential to mitigate most of the challenges of transitioning to a decarbonised energy system: location, flexibility and resiliency needs. Without harnessing DER flexibility, the EU's energy transition will be significantly slower and more costly. Meeting the transformed system needs presents opportunities for new technologies and service providers. There are new business models for DERs, providing services to local neighbourhoods, transmission and distribution system operators as well as the wider energy and capacity markets. New products and services are being created, with economic value in both explicit and implicit demand-side flexibility.

However, the realisation of these opportunities – and the conversion of economic value to financial reward – depends on the evolution of the electricity market design(s) in each of the European countries to accommodate DERs.

[5] For a detailed quantification of EU benefits in 2030 following the activation of DSF, smartEn issued in September 2022 a report carried out with the independent consultants from DNV: https://smarten.eu/wp-content/uploads/2022/09/SmartEN-DSF-benefits-2030-Report_DIGITAL.pdf

Objectives of market design and scope of our recommendations to valorise flexibility from DERs

The goal of a functioning consumer-centric market design is to stimulate:

- effective investments, notably to enable longer term certainty to underpin investment and planning decisions
- efficient use of all climate-friendly resources following market-based incentives and,
- appropriate allocation of revenue, cost and risk aiming to an overall systemic efficiency and increase of benefits to consumers.

This entails fostering both the deployment of more flexible assets among end-users (GW) and the activation of their flexibility (GWh). Delays in both directions could lead to a significant number of stranded assets and a substantial waste of resources.

There are many forms of system integration for diverse types of DERs which must be accommodated in the market design. Flexibility resources can be used for a range of needs: (collective) self-consumption, congestion management, ancillary services, wholesale arbitrage and security of supply. Many of these needs are complementary and the market arrangements must enable flexibility providers to stack revenues from the various value streams, enabled by effective coordination of needs and resources among DSOs, TSOs and wholesale market participants over all timeframes.

To improve the existing market design, we shaped our recommendations around 5 priorities:

1. Strengthen consumer empowerment
2. Maximise District Self-Balancing
3. Unlock the value of demand-side resources in wholesale energy and ancillary services markets
4. Support investments with capacity remuneration arrangements
5. Combine renewables support schemes with distributed flexibility

Each of them is described and specific recommendations for EMD improvement are highlighted.

1. Strengthen consumer empowerment

As already foreseen by current EU rules, flexibility should be provided by a much greater variety of providers and technologies, with new products and services, reflecting a greater variety of asset sizes, timeframes, ownership and operation.

DERs play a crucial role in supporting increasing system flexibility needs and the new EMD should strengthen specifically the solidity and variety of the innovative business models that enable an enhanced activation of their distributed flexibility while rewarding consumers.

For this to happen in a sustainable and rewarding pattern for consumers, their participation to different flexibility schemes must remain a matter of choice, meaning that:

- no consumer must be obliged to participate, but shall have the choice of how to engage and indeed whether to engage.
- there should be opportunities for customers to change their minds; i.e. offer ad-hoc flexibility at times, and also to find ways of reassigning long term commitments when the consumers' needs change or to achieve efficient use of resources in real time dispatch.

In this perspective, diversity of tools, offers and market players is crucial:

- **Diversity of certified metering and control devices**

DER participation in markets requires a combination of forecasting, baselining, real time monitoring, operational control and after-the-event metering systems, although not all of these functions are needed for all flexibility services.

Smart meters alone are not sufficient for future DER participation: resources behind a meter may be used in different ways for different purposes. There should be possibilities for participation by different resources, potentially with multiple suppliers or aggregators behind a single meter, to permit this diversity to reach the market.

For these reasons it is crucial to foster the use of sub-metering systems that can be deployed by market parties, along with the utility-deployed metering systems. Provided the existence of sub-metering systems, there might be different service providers for different DERs even at a single customer premises[6].

An equal treatment between smart meters and sub-metering systems would accelerate the activation of demand-side flexibility in Member States without a smart meter and multiply the spectrum of flexibility services that could be offered by a DER, individually or through aggregation.

New interoperability requirements would ensure switching of service provider minimises the need for physical DER replacements and vice-versa, thus avoiding consumer lock-in

- **Diversity of service providers**

The market participation of DERs shall be conceptually based on the co-existence of different players fulfilling various roles, in particular:

  - Retailers, who have direct incentives to monetise flexibility in the energy market due to their balance responsibility and exposure to market imbalance prices; and
  - Aggregators, including energy communities, who can complement the role of the retailers, to monetise services that some of the retailers do not offer.

Aggregators and/or retailers are important in managing small scale resources effectively at whatever spatial level is required.

- **Diversity of flexibility schemes**

Demand-side flexibility shall be remunerated through both an implicit[7] and an explicit[8] pricing scheme. At the moment, very few consumers can receive and react to both signals, but the increased system

[6] For example some would specialise on EV charging or on the management of solar+battery combinations. Others might concentrate on heating services or even domestic appliances which use hot water. Some aggregators might focus on DSO services and others might choose to bypass the DSO (e.g. energy market, TSO services).

[7] Implicit demand-side response consists of consumers retaining control over their assets (or using embedded DER automation based on their preferences), responding to price signals which they face for their consumption. The decision whether to respond to the price signals rests with the consumer depending on his/her risk preferences, and the incentive consists of consumers avoiding paying for something which they judge to be too expensive. Such an arrangement requires accurate metering and (ideally) cost-reflective charging, but on the other hand does not require any baselines. For implicit response to be efficient, tariffs faced by consumers should be cost-reflective, including reflecting the use and congestion of the network and other key information, such as the carbon intensity of the grid should be made available by grid operators.

[8] Explicit demand-side response consists of consumers handing over control of their flexibility by offering a dispatchable service which they can then sell. The customer makes an offer to alter their consumption, and is paid an availability and/or an activation price (if the resource is needed). The difference from the implicit case is that consumers don't directly take the decision on the activation of the resource, but offer control to a third party, perhaps via an aggregator. Consequently, the economic incentive changes: consumers pay for the right of using

flexibility needs would require consumers to receive multiple signals. The future market design should avoid a cannibalisation of implicit and explicit signals, but ensure an automated reaction by flexible consumers to combine their capabilities and preferences with system needs.

Recommendations

To ensure the empowerment of consumers and effective use of DERs across all types of market arrangement, smartEn recommends to:

- Clarify the flexibility functionalities of DERs by defining "Demand-side flexibility" as "the capability of any active customer to react to external signals and adjust their energy generation and consumption in a dynamic, time-dependent way, individually as well as through aggregation". To clarify which DERs can be considered flexible assets, we suggest complementing this definition with "Demand-side flexibility can be provided by smart decentralised energy resources, including demand management, energy storage, and distributed renewable generation to support a more reliable, sustainable and efficient energy system";

- Specify that there should be the possibility for consumers to participate through either type of scheme (implicit and explicit), and automation should ease their interaction with the system to facilitate the activation of their flexibility. A silo-approach opposing implicit and explicit flexibility should be avoided. In addition, recent developments towards the re-introduction of regulated tariffs should be restrained and suppliers should be required to offer at least one option for a dynamic price contract, providing incentives for implicit participation to consumers willing to react (automatically) to price signals as a whole or with specific assets;

- Ensure equal treatment between sub-metering systems and smart meters. Sub-meters should be described as "A metering function which is certified and can be embedded in behind the meter DERs, and which produces data which can be used by consumers and market parties in their processes, as well as by system operators in their regulated system operations processes". Metering arrangements must permit sub-metering for individual applications to permit different types of participation for different types of assets;

- In light with the above, allow the supplier or aggregator to be responsible for defining the consumer's baseline based on data from the boundary smart meter or any other certified sub-meter that the supplier or aggregator can provide. An ex-post verification of delivery shall be performed by comparing actual consumption to the baseline to attest activation. The baseline methodology proposed by market parties should be approved by the NRA and measurements can be independently audited;

- Accelerate the development of harmonised products for system services through Flexibility Registers at national level based on a set of rules harmonised at EU level, adaptable to accommodate future types of flexibility which have not yet been defined. The register should be open-ended and, to facilitate mobility and registration, a single registration point should be set up at each Member State and once registered it should automatically be registered for other Member States in line with the reciprocity principle.

the resource, and then sell back the flexibility for another entity to control the actual use of the resource (be it either energy consumption, or network capacity, or generation capacity). Such an arrangement requires that DERs are treated on an equal basis with other dispatchable assets, for which there might be advance commitment, and which requires the possibility of re-trading of any commitments.

2. Maximise District Self-Balancing

Although there has been extensive harmonisation of wholesale market arrangements and ancillary services as part of the development of the EMD, arrangements at local level, behind the sub-station (BTSS), are much more diverse.

Collective self-consumption, Citizens Energy Communities or cooperatives, Renewable Energy Communities and Local Flexibility Markets by DSOs are developed in a very heterogenous way across Europe, and confusion about their identity features and benefits is limiting their uptake. Most of them are still in their infancy or restricted to pilot projects, although their relevance to improve the (local) system efficiency in the long-term is crucial.

The increase in electrification of end-use sectors risks leading to massive local congestions and over-investments in distribution grid capacity if the use of deployed DERs is not optimised through multiple initiatives to foster district self-balancing.

If DERs are to play a significant role in the future, innovative and additional market arrangements must be designed around new models of local use of available distributed resources: district self-balancing would entail a future-proof diversity of local initiatives valorising the flexibility value of DERs, without limiting their use to the local dimension.

What has happened in The Netherlands should be taken as an inspiration: over 600 local energy communities have now emerged as a result of locally-enabled, smart congestions via bottom-up local for locals markets using distributed resources, notably behind the sub-station (BTSS), for a market-based flexibility sharing of local supply and demand. These initiatives are not limited to local needs, but are allowed to contribute to DSOs' flexibility markets for congestion management and eventually broader systemic needs, including TSO balancing and ancillary services and wholesale markets.

The EMD should foster a system of interoperable systems to maximise the use of flexible resources for both system and consumers' benefits. Instead of maintaining segmented market models, an integrated mechanism will unlock additional value streams to the consumers and prosumers.

Recommendations

smartEn recommends not to introduce location signals via nodal pricing or smaller price zones for energy markets, The introduction of locational marginal pricing (LMP) in nodal markets would determine potentially different wholesale prices at particular points in the grid wherever there is network congestion. Any potential move towards smaller price areas would be politically sensitive, particularly in countries where there is a strong political expectation of a common price for all the country (e.g., Germany, France, Finland), and would lead to deadlocks.

Locational signals should be looked for elsewhere, notably through the enhanced development of district self-balancing initiatives behind the sub-station (BTSS).

To allow this development, it is crucial that the revised EMD:

- Allows the commercial development of district self-balancing initiatives, for both the establishment and management of these initiatives by third parties, in parallel to the non-commercial Citizens Energy Communities or cooperatives. All these local initiatives are valuable because they can protect consumers from extreme price volatility while increasing security of supply and systemic resilience;

- Introduces the concepts and definitions for both "district self-balancing" and "energy sharing" that allow a local DER optimisation behind the sub-station (BTSS) through multiple initiatives, not limited to Renewables Energy Communities and Citizens Energy Communities. These local

initiatives should have the option to become self-balancing units to provide important flexibility to the local DSO, along with a maximisation of the district members' flexibility potential and allowing for an efficient and cost-effective integration of DERs;

- Enable value stacking by ensuring that both district self-balancing and flexibility markets monetization is permitted. DERs can offer a multitude of flexibility services: from consumers/prosumers engaged in (collective) self-consumption to local flexibility markets to solve DSO congestions, from balancing and ancillary services to TSOs to wholesale markets. Some of these services can be complementary (e.g. demand reduction can help solve both transmission and distribution congestion), while others may be competing. However, it is crucial to enable the use of DERs for all services and not limit to a single functionality (e.g. collective self-consumption), but enable a multitude of offers (e.g. DSOs' procurement through local flexibility markets should not be detrimental to the development of Citizens and Renewable Energy Communities);

- In light with the above, the EMD shall avoid DSOs gaining privileged rights to exercise control over connected assets or associated data, but instead requires them to permit assets to be used for different services to support efficient dispatch and revenue stacking. This would strengthen the principle of DSOs as neutral market facilitators and ensure DER participation is based upon choice for customers, not obligation;

- Requires full data transparency on network congestions to avoid over-building networks or under-allocating network capacity;

- Ensures DSOs offer a connection to all customers while allowing DSOs to choose between two models for local network access (or a hybrid of them)[9]:
    - 'Capacity buy-back' (or firm access): DSOs over-assign firm network capacity in the long term and then have to buy it back to manage flows on a dynamic basis close to real time. In this model the DSO is the primary buyer of local flexibility. DERs may need to be aggregated in dynamic ways which respect the locations of potential network constraints;
    - 'Capacity cap' (or non- firm) access[10]: DSOs restrict the allocation of firm capacity and limit some users' capacity rights, but enable connected parties to re-trade their firm capacity rights or flexibility obligations. The model must enable consumers to exercise choice over time (including opting in for firm access at a later date).

3. Unlock the value of demand-side resources in wholesale energy and ancillary services markets

The market design must be adapted to meet the new flexibility needs of a decarbonised electricity system and to reflect the special role that DERs can play.

It must permit revenue stacking while supporting both long-term and shorter-term decision making.

[9] These access model(s) are needed both for long term and short-term flexibility, to cover both planning and investment and also short-term operational timeframes. For flexibility to substitute grid reinforcements it must be (collectively) reliable when needed; but the nature of flexible assets is that their efficient dispatch can only be determined close to real time.
The nature of local constraints is that they are dynamic, in terms of their location and also in circumstances of network reconfigurations. Any market model for how access rights are allocated, traded and priced must reflect this dynamic situation. Capacity rights do not need to be managed at the level of individual connections, but could be handled collectively below the point where the constraint occurs.
[10] This model is currently developed in Amsterdam for grid connection of EVs: the local DSO assigns minimal firm capacity for EV charging and the CPO trades the non-firm needs.

This means enabling proper remuneration for investments in flexibility assets, to whomever in the value chain is making the investments, including consumers that invest directly or service providers that invest on behalf of the consumers.

Today's EMD poorly recognises the investment needs for flexibility at the demand-side and a few tendencies are forth highlighting:

- Forward energy markets tend to trade baseload products which do not recognise flexibility;
- As trading moves closer to real time, the products have greater granularity (towards 15-minute traded products and perhaps smaller), but the ability to capture value for flexibility is limited to the shorter-term markets, including intraday and balancing;
- Markets with high renewable penetration are moving to shorter settlement intervals (e.g., 5 minutes in Australia) and gate closure is being moved closer to real time, to enable renewable participants to adapt to changing forecasts within the market rather than relying on TSO balancing;
- Ancillary service markets tend to be short term with the TSOs as single buyers of the services, and long-term arrangements for ancillary services typically take the form of Grid Code obligations rather than market-based payments.

However, existing wholesale markets function well overall: freedom of trading including between day-ahead, continuous (or repeated) intraday and balancing markets as well as price formation which reflects the marginal value of energy in each settlement interval are critical to enabling flexible resources to capture their economic value.

Recommendations

In order to harness the full value for flexibility in wholesale energy markets and ancillary services markets, we recommend to:

- Defend the existing marginal energy price formation. The current political debates on the price formation are a threat to the value that flexible assets can earn; and any watering down of marginal prices would be detrimental to investment in flexibility, which is a natural hedge against price volatility.

- Support scarcity pricing – for example applied to balancing prices based on the system generation margin – to reflect the market value of scarcity and enhance the value of flexibility in wholesale markets[11]. There are examples of scarcity price arrangements in ERCOT, as well as the GB imbalance pricing and Irish electricity markets.

- Enhance the time granularity of electricity markets through shorter settlement intervals and later gate closure to enable service providers to retain operational control over their assets as late as possible until delivery time. For this to happen, metering devices should be designed in such a way that does not restrict an eventual move to shorter settlement intervals (e.g., by allowing the settlement interval to be a firmware upgrade rather than requiring hardware replacement).

[11] The logic of scarcity pricing is that balance responsible parties should face energy prices which reflect system scarcity. An important part of this is that if scarcity actually leads to mandatory demand reductions, the retailers' energy balance positions are adjusted to include an estimate of the energy which would have been consumed were it not for the demand reduction. Without this adjustment, the imbalance exposure is artificially lessened at times when the system is most short. This imbalance adjustment is in place in GB and Ireland.

4. Support investments with capacity remuneration arrangements

Market design for DERs must enable a combination of long-term availability contracting to meet investment and planning needs, and short-term trading of obligations to enable efficient dispatch.

Capacity remuneration mechanisms in the past have been targeted to support peak demand, rather than matching the rapid variations of (renewable) generation and consumption that is expected in a decarbonised system. If capacity remuneration arrangements are used in the future they should recognise the value of low carbon, distributed flexibility in supporting system flexibility needs.

Procuring long-term commitments in the form of critical peak pricing auctions in case of severe grid emergency situations should be performed in the moment of capacity planning (as opposed to the moment of operational dispatch) when DSO/TSOs define the crucial days and/or hours and auction for flexibility during those periods.

Such emergency capacity remuneration mechanism, that would reveal the value of distributed flexibility in critical peak pricing, should be additional (not in place of) capacity remuneration mechanisms, and would have the advantage that the volume procured is visible and can fully be taken into consideration by System Operators in their calculations.

Recommendations

The participation of DSF in capacity remuneration mechanisms implies:

- Capacity mechanisms should be reshaped to reflect the value that DERs bring to system flexibility, instead of being only capacity adequacy mechanisms, and reward providers of zero carbon flexibility, including from the demand-side, by reducing the emissions requirements limit;
- To complement existing EMD provisions on equal treatment of resources, ensure that the de-rating factors and (separately) the procurement process fully values DER and do not tilt the procurement towards conventional types of resource (e.g. by requiring patterns of delivery or availability which are not achievable by DERs and which are not justified by system needs). In other words, the derating factors have to fully reflect the value of the different types of resources, and not discriminate against demand-side providers.
- In the forecasting of resource adequacy assessments, full transparency should be given to the way that demand is evaluated, including the role of implicit demand-side flexibility;
- To enable implicit participation in capacity mechanisms, remuneration for flexibility service providers should consider capacities activated during the specific time periods and allow flexibility providers to prove the reduction in consumption from their clients;
- Introduce critical peak pricing schemes and ensure participating assets receive the same remuneration as if they were participating in other capacity markets;
- Facilitate the development of forward hedging products for flexible demand – such as reliability options, to protect consumers from excessive price spikes.

5. Combine renewables support schemes with distributed flexibility

To increase the resilience of the energy system the solution is often only limited to investments in supply. Long-term investments in renewable generation are certainly required to balance divestments

in fossil fuels, but mechanisms put in place to support renewables can have a significant impact on the available demand-side flexibility at wholesale level.

Most renewable support schemes – whether CfDs, green certificate or feed-in tariffs – focus on payments per-MWh of production and if renewables are heavily over-deployed this could lead to artificially driving negative energy prices at wholesale level, making demand-side flexibility non-profitable, putting grid-stability at risk due to low flexibility at the demand-side.

To avoid that, renewable support needs to be designed with accompanying measures to develop distributed flexibility to deal with the increased volatility and congestion caused. Otherwise a significant amount of costly grid infrastructure would have to be deployed to deal with the congestion and renewable generation might need to be curtailed.

Mechanisms such as 24/7 certificates (i.e. Guarantees of Origin, GOs) where renewables are asked to commit to matching profiles of consumption can help the achievement of decarbonisation goals while not undermining flexible demand.

Recommendations

Ensuring long-term investments for (utility-scale) renewables and maintaining signals for demand-side flexibility can go hand in hand.

The revised EMD should ensure that all renewable support schemes, including PPAs and CfDs, become responsible for procuring flexibility themselves from the demand-side. This shall be achieved through the proper valorisation of the time-wise matching of supply and demand of green energy: renewable support schemes shall be systematically backed by a 24/7 Guarantees of Origin mechanism to require real-time matching between flexible consumption and renewable electricity generation.

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About smartEn - Smart Energy Europe

smartEn is the European business association integrating the consumer-driven solutions of the clean energy transition. We create opportunities for every company, building and car to support an increasingly renewable energy system. Our membership consists of the following companies:

The positions expressed in this document represent the views of smartEn as an association, but not necessarily the opinion of each specific smartEn member.
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