



Are central markets the answer to commoditising energy flexibility?



The rapid increase in renewable power production is disrupting the balance of day to day electricity distribution. Experts from CGI tell us more.

In this article, [Mattijs van den Hoed](#), Vice President Consulting Expert, Central Market Systems and [Martijn Frints](#), Director of Consulting, Energy & Utilities, Central Market Systems at CGI, present the case for commoditising flexibility. As a result of local, residential photovoltaic (PV) and large offshore wind farms, power production has become more decentralised, increasingly unpredictable and geographically dependent. Take the example of German transmission system operator (TSO) Tennet, whose network spans the entire length of the country and is heavily dependent on steady winds in the North and Baltic seas. A lull in the wind can send ripples down the whole of Germany. The impact is not limited to TSOs. Balance responsible parties (BRPs) are affected too. These parties trade energy using a prognosis based on long-term standard patterns of usage at the residential level, which are now disturbed by local PV installation. In cases where PV production is netted with consumption on a yearly basis, BRPs may earn very little from the residential household and run a large imbalance risk. On the distribution system operator (DSO) side, local production has the potential to cause local network congestion, as the volume of locally-installed PVs increase.

EVs and grid imbalances

Decarbonisation, the rise in electric vehicles (EVs) and electrical heating will further exacerbate these issues. [The large-scale rollout of EVs](#) could drive up carbon pollution by as much as 30% as peak consumption patterns will require massive on-demand electricity production that cannot be provided by renewable sources at the moment of use. Additionally, it will further strain the electricity grid and increase congestion at the medium and low voltage levels. Effective application of flexibility is required to resolve these issues. Tapping into energy resource flexibility is nothing new; system operators and BRPs already do this at industrial levels. However, it is still based on relatively slow moving and predictable discrepancies in the energy balance. As the volume of renewables increases, the reserve in carbon production will need to increase, leading to cost inefficiency and higher levels of carbon pollution. This can no longer be accommodated by a limited set of large industrial flexibility, especially with the uptake in new technologies such as EVs. Flexibility must be and is being sought by progressively larger volumes of smaller energy consumers and producers. Initially market parties are looking to medium-sized enterprises, such as greenhouses, cooling houses, but longer-term flexibility must be tailored to an even higher level of granularity—at the residential market level. For this to be possible, flexibility must become a commodity.



How to commoditise flexibility

Enabling flexibility in the residential market requires a shift in responsibilities. For instance, the provider of [flexibility](#) in the non-residential market will become actively engaged in decisions and outcomes that involve the residential provider of flexibility. The financial benefit for each residential consumer is likely to be limited. For most consumers, the effort to keep an eye out for the best energy price to plug-in the car or run the dishwasher is far too much in relation to its return. Providing flexibility should be done with as little consumer effort as possible. The decision to provide flexibility can be taken by a market party; usually referred to as the aggregator. The aggregator combines the flexibility of a large volume of small residential resources into one or more large flexibility resources and activates this when needed. To do this efficiently, the aggregator requires standardisation of the various aspects of flexibility including availability and administration, operational activation and financial settlement. In the liberalised market, the aggregator has a commercial role and consumers must be able to switch between aggregators.

In most European countries, a central market enables liberalisation by facilitating day to day processes such as switching, moving in/out, metering and settlement. This could be easily extended to support local production and flexibility facilities that consumers wish to bring to the market. By routing flexibility services through a central market, aggregators are provided with standardised—and in most countries already existing—administrative processes for competitive operations, ensuring an open market and level playing field. Central markets already manage contract and master data such as metering point characteristics and contracts and could easily manage flexibility resources (such as electric vehicles, AC units and heating), including its characteristics (e.g. capacity and grid location) and customer preferences. All of this information can be linked to the already existing metering point entity and the associated processes for switching and metering that primarily require standardisation in the domain model; something that the European Forum for Energy Business Information Exchange is working to deliver.

A market-based solution provides the right conditions for the most efficient utilisation of flexibility, as long as enough flexibility is locally available. In such a market, aggregators compete to provide flexibility services to other market parties like BRPs, [DSOs](#), and potentially even TSOs. Independent of how this market will work exactly and which interactions there will be, a central market solution can facilitate this market place and play a vital role in the operational activation of flexibility that aggregators bring to the market. As an example, a DSO needs to know what will happen in its network to assess security of supply and it needs the ability to act when potential network bottlenecks arise. Assessing if there are bottlenecks can be done by the DSO itself or by a central platform. Tariff solutions are typically intended to prevent congestion rather than to solve congestion situations. An appropriate tariff structure provides an incentive for stakeholders to use the network as efficiently as possible. If these tariffs reflect the cost incurred by the behaviour of the connected customer, it incentivises the use and increases the value of flexibility. Ultimately, the activated flexibility needs to be settled so that flexibility providers are compensated. In any case, information from the physical grid on available capacity and utilisation, as well as information on consumption and production forecasts, and available and activated flexibility need to be combined and exchanged between multiple parties. Central markets are ideally suited to connect market parties and facilitate this exchange of information. However, this is not an easy task. Current central market solutions are typically aimed at transactional administrative processes and bulk settlement processes. They will need to evolve to cater for the near real-time nature of flexibility.

