Explicit and Implicit Demand-Side Flexibility

Complementary Approaches for an Efficient Energy System

Position Paper
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Explicit and Implicit Demand-Side Flexibility: Complementary Approaches for an Efficient Energy System

It is now widely acknowledged that an active demand-side participation in the energy market is essential for effective competition, system efficiency and consumer empowerment. Two types of Demand-Side Flexibility can be distinguished in this respect:

- **Explicit Demand-Side Flexibility** is committed, dispatchable flexibility that can be traded (similar to generation flexibility) on the different energy markets (wholesale, balancing, system support and reserves markets). This is usually facilitated and managed by an aggregator that can be an independent service provider or a supplier. This form of Demand-Side Flexibility is often referred to as “incentive driven” Demand-Side Flexibility.

- **Implicit Demand-Side Flexibility** is the consumer’s reaction to price signals. Where consumers have the possibility to choose hourly or shorter-term market pricing, reflecting variability on the market and the network, they can adapt their behaviour (through automation or personal choices) to save on energy expenses. This type of Demand-Side Flexibility is often referred to as “price-based” Demand-Side Flexibility.

Both types of Demand-Side Flexibility are complementary and should coexist to allow for consumer choices and enable efficient energy system. It is important to note that enabling both types are necessary to accommodate different consumer preferences and to exploit the full spectrum of consumer- and system benefits from Demand-Side Flexibility.

**Different consumer preferences and needs**

Consumers have different preferences and abilities. Some consumer groups are able to directly manage their own demand based on variable market price signals. This is true for large businesses, but increasingly also for smaller market participants equipped with smart monitoring and/or automation solutions. These consumers would typically opt to participate in implicit Demand-Side Flexibility.

Other consumers prefer to rely on a stable retail price without direct market-related variability. These electricity consumers may still have significant flexible resources that can be activated and typically marketed via an aggregator, usually without directly affecting the consumer’s behaviour. These consumers would opt for participation in an explicit Demand-Side Flexibility scheme.

Finally, some consumers – especially the larger businesses and industrial sites – would engage in both implicit and explicit Demand-Side Flexibility for different applications and time-scales.

It would be a severe limitation of consumer choice if only one type of Demand-Side Flexibility was allowed in a certain market, in which case a large number of consumers could be expected not to provide any flexibility to the system at all.
Different service provisions

The need for different types of consumer engagement is not only driven by consumer preferences and capabilities, but it also by technical reasons: certain flexibility functions can only be provided by either explicit or implicit Demand Response.

For example, explicit Demand-Side Flexibility is very well suited to provide dispatchable and reliable capacity, balancing and ancillary services to Transmission and Distribution System Operators, a function that cannot be provided so easily by implicit Demand-Side Flexibility. Explicit Demand-Side Flexibility is a resource, which can be measured in terms of capacity available, and hence can be incorporated in system adequacy assessments, in a comparable way to generation.

On the other hand, implicit Demand-Side Flexibility does not require a firm commitment by the consumer to adjust consumption at specific times, but leaves it to the consumer’s discretion, how and when to react to the price signals given. Nevertheless, automation processes can imply a decrease of demand above a certain price. With an increasingly wide consumer participation and automation of energy using appliances and processes, the predictability and reliability of implicit Demand-Side Flexibility can therefore be expected to grow.

Enabling both explicit and implicit Demand-Side Flexibility

In order to ensure that both explicit and implicit Demand-Side Flexibility can develop in a market, important provisions have to be implemented.

Explicit Demand-Side Flexibility

For explicit Demand-Side Flexibility to realise its efficient potential, it should be enabled to compete on an equal footing with generation. Therefore, it is important that all market segments – wholesale, capacity, balancing and ancillary services and where they exist capacity markets – are open, and product definitions do not discriminate against Demand Response, distributed generation or storage.

Furthermore, market rules shall be designed in such a way that all market parties, including new market entrants, can fairly compete. In particular, third party aggregators must be able to access all markets without prior agreement of the respective consumer’s energy retailer/BRP. This is essential as retailers typically compete with aggregators in the market, offering flexibility from different sources. The actors can therefore not be expected to find bi-lateral agreements and collaborate. On the contrary, the requirement for bilateral agreements would maintain full control with existing energy retailers.

A clear regulatory framework to ensure market access for third party aggregators independently of other market player’s control should allow fair competition. It should define the roles and responsibilities and put in place standardised processes for information flows on a need to know basis, as well as volume and financial settlements between the different market parties, with a view to avoiding any significant distortive impacts on the retailers/BRPs.
Implicit Demand-Side Flexibility

Enabling consumers to engage in implicit Demand-Side Flexibility depends on the access to market-related retail pricing. Electricity retailers, including default providers, should offer price plans that allow consumers to choose hourly, or where applicable shorter time-interval pricing, that reflect the actual market conditions and create incentives for consumers to align their demand with system conditions.

As a pre-condition for market-reflective pricing schemes, it is necessary to measure when the consumption of individual consumers takes place during a day. This requires that the consumer is equipped with a smart meter with registration of the consumption at an hourly, or where applicable half- or quarter-hourly, basis.

Additionally, the balance responsibility of the energy retailer should be set up in a way that is aligned with the actual load profile of the consumer. This requires an adaptation of the settlement processes, which should be enabled also by the involved DSOs and TSOs.