RAP™ Energy solutions for a changing world

Demand Response, Aggregation, and the Network Code for Electricity Balancing

Philip Baker, Michael Hogan, and Sarah Keay-Bright
May 2015

A responsive demand side is critical to the success of the integrated European electricity market (IEM) and, more particularly, to the cost-effective transition to a decarbonised electricity market. The intermittent nature of renewable technologies such as wind and PV makes ensuring a continuous energy balance more challenging and responsive demand can play a significant role in meeting this challenge, reducing the need for more expensive flexibility services from alternatives such as conventional generation and grid-scale electricity storage.

While larger industrial and commercial loads already provide flexibility services in some Member States, the contribution across Europe is patchy, and the scope remains limited primarily to isolated peak-shaving services. If this is to be rectified and demand participation in the wholesale and balancing markets increased, barriers in a number of Member States will need to be addressed. Furthermore, if the full potential of the demand side is to be realised, the flexibility of smaller industrial and commercial loads, and specifically the residential sector, will need to be "aggregated" by entities capable of acting on consumers' demand to deliver energy services at a scale that is useful to system operators and/or Balance Responsible Parties (BRPs). In theory, incumbent suppliers would develop the innovative combinations of commodities and services needed to access the untapped flexibility embedded in consumer demand for energy services and in practice some may do so, but experience tells us that most will respond only when pressed by new competitive entry, if at all. For competition to allow these services to develop, there is a need to "unbundle" flexibility from supply and clarify the relationship between energy services entities or aggregators and incumbent energy suppliers or retailers.

Happily, a unique opportunity exists to overcome some of these barriers and generally to promote competitive innovation in delivering consumer energy services and monetising the value of demand-side flexibility. A suite of Network Codes is currently being developed to codify the operation of the IEM and one of those Codes, the Network Code on Electricity Balancing (NCEB), is particularly relevant to the promotion of innovation in tapping the value of demand flexibility. However, while calling for the inclusion of the demand side and aggregation in balancing activities, the wording of the Code could be strengthened to ensure that specific barriers to their participation are removed across Europe.

This note outlines some of the issues that need to be addressed if the potential value of demand-side flexibility is to be realised and how the NCEB could support that development. As the focus of the Code is on energy balancing post market closure, issues related to the promotion of demand response and aggregation in other market timescales are not considered. However, the measures necessary to promote the use of demand response and aggregation for balancing purposes will also assist their participation in the electricity wholesale and capacity markets, as well as be a means of addressing network constraints.

Definition of Terms Used

Aggregator: An entity that "aggregates" the flexibility of individual customers to form flexibility products useful at a utility scale. Aggregation can be performed by incumbent suppliers or by independent specialist entities, the latter being referred to in this note as an "independent aggregator."

Balancing Responsible Party (BRP): An entity participating in the wholesale electricity markets, responsible for balancing its contractual position at market closure with actual outturn in any particular settlement period.

Balancing Service Provider (BSP): An entity that provides balancing services to a system operator.

Distribution System Operator: An entity responsible for operating a distribution system.

Demand-Side Response (DSR): The modification of a customer's demand, either upwards or downwards, in response to price signals embedded in the customer's supply contract (price-based demand response) or incentives offered by a transmission system operator either directly or via an "aggregator" (incentive-based demand response).

Imbalance Position: The difference between a BRP's contractual position at market closure and actual outturn for any particular settlement period.

Imbalance Adjustment (IA): An adjustment made to the imbalance position of a BRP to reflect the impact of the actions of an independent aggregator on the BRP's customers, made to ensure that the BRP's imbalance position is not aggravated by those actions.

Supplier: Entity that supplies energy to individual customers. For the purposes of this paper a supplier is assumed to operate as a BRP, although the supplier could delegate balancing responsibilities to a separate BRP.

Transmission System Operator (TSO): The entity responsible for operating the transmission system, including balancing energy supply and demand at the system level.

Other Acronyms

DSMO: Demand-Side Management Operator

NCEB: Network Code on Electricity Balancing

TOU: Time of use

The Need for Demand Flexibility and Aggregation

The value of flexible demand, referred to in this note as demand-side response (DSR), in enabling the successful implementation of the IEM and the transition to a decarbonised electricity system involving the deployment of variable-output or intermittent renewable sources and the partial electrification of the heat and transport sectors is well understood. Through the ability to respond to price or other signals, either by reducing or increasing demand, DSR often represents a cost-effective alternative to generation in terms of resource adequacy and energy balancing services, reducing both investment and operational costs. DSR can also be used to manage network power flows, providing a cost-effective alternative to distribution and transmission system investment or at least delaying the need for that investment[1]. DSR is also the key to allowing consumers to express the true value at any given time of the wide range of energy services they desire, leading to the more efficient and economic solutions for security of supply and resource adequacy ultimately promised by the IEM.

In many jurisdictions, large industrial or commercial loads already provide DSR either to assist Balancing Responsible Parties (BRPs) to avoid imbalance exposure, or to provide balancing or ancillary services to system operators in balancing supply and demand at a system level.[2] Furthermore, with the introduction of smart metering and time of use (ToU) or dynamic tariffs, smaller commercial and domestic customers will increasingly have the ability to minimise energy costs by shaping their demand in response to price signals. While demand shaping will contribute to the efficient operation of the market and reduce the need for investment in conventional generation capacity, these smaller customers will not be able to participate in the wholesale or balancing markets directly, and will require the services of “aggregators” to parcel up demand response from individual customers and provide services that are usable at a utility scale.

Aggregators can also maximise the value of DSR by selling flexibility services to the customers that value it most, whether that be a BRP to balance its contractual position, a transmission system operator (TSO) to balance energy at the system level or manage transmission system flows, or a distribution system operator (DSO) to manage flows on a distribution system. Aggregation is therefore a vital link in realising the full flexibility potential of demand and in maximising its value to the system while delivering at lowest cost the energy services desired by end-use consumers. Aggregation can be performed either by an incumbent supplier managing its customers’ demand, or by an independent entity managing the demand of customers supplied by others. In managing its own customers’ demand, an incumbent supplier could either provide a balancing service to meet its own balancing responsibilities as a BRP, or provide balancing services to the TSO. In this latter case, the supplier would be acting as a balancing services provider (BSP). An independent entity, henceforth referred to as an “independent aggregator”, shaping the demand of customers supplied by others in order to provide a balancing service, would also be operating functionally as a BSP.

[1] The ECF 2050 Roadmap suggests that, assuming 10 percent of demand is flexible, generation back-up costs can be reduced by 30 percent and grid investment reduced by 10 percent.

[2] In Great Britain, DSR is also used to reduce the exposure of incumbent suppliers to peak transmission charges.

The Network Code on Electrical Balancing

The Network Code on Electrical Balancing (NCEB) is one of a suite of ten Network Codes being developed to underpin the development of an IEM across Europe. Because demand participation in the markets is a cornerstone of the IEM's potential value to European citizens, it is particularly important that the NCEB as well as the other relevant Codes go as far as practicable in enabling the full participation of demand-side alternatives in providing the services needed by system operators. The NCEB is currently with ACER for assessment and a final draft will be submitted to the European Commission at some point in the near future, accompanied by a revised ACER opinion and recommendation. There is, therefore, currently a window of opportunity to raise concerns with both ACER and the Commission, and indicate how the Code may be improved. A summary of the Network Code development process is given in the attached Annex.

The primary focus of the NCEB is the creation of coordinated balancing areas across Member State boundaries and the eventual creation of combined balancing and reserve merit orders, complementing the arrangements currently being developed for the day-ahead and intraday wholesale markets. However, the NCEB also has the high-level objective of facilitating the participation of DSR and aggregation in the balancing markets. The development of the NCEB therefore represents a unique opportunity to embed DSR in Europe's balancing and wholesale markets, maximising its contribution to delivering the benefits of the IEM to European citizens and to decarbonisation through the cost-effective integration of renewable resources.

Despite this general commitment to DSR, the NCEB is a high-level document and the task of defining the balancing arrangements (referred to as "balancing terms and conditions") that will apply to individual coordinated balancing areas is delegated to the responsible TSO or group of TSOs. Consequently, and notwithstanding the generally helpful wording of the NCEB in terms of DSR and aggregation, the TSO community is provided with a considerable degree of discretion in terms of detailed arrangements and implementation. The potential therefore exists for balancing terms and conditions to vary across balancing areas and for local customs and practices to be preserved. This could be a problem in those areas where the potential value of DSR and aggregation is not currently being exploited and where barriers to implementation exist.

What the Draft Code Currently Says About DSR & Aggregation

The NCEB draft currently in the public domain is a complicated document consisting of 72 Articles, mostly devoted to the creation of coordinated balancing areas and the integration of balancing and reserve procurement. However, the text also addresses issues relating to the participation of DSR and aggregation in balancing activities. Summarising, the Code requires that;

- The participation of DSR, including aggregation facilities, should be facilitated and that the Code should foster competition and be non-discriminatory.
- TSOs should purchase services from BSPs (an independent aggregator providing balancing services to a TSO would operate as a BSP), who should be qualified to provide balancing products according to certain high-level service requirements.
- TSOs develop terms and conditions for their areas of responsibility that will apply to BSPs and BRPs. *Inter alia*, the terms and conditions should:

- Allow the aggregation of DSR;
- Allow demand facilities and independent aggregators to become BSPs;
- Require that each BSP balancing bid is assigned to one or more BRPs in order to allow the imbalance position of that BRP to be adjusted via an imbalance adjustment (IA);
- Set out the modalities to identify those BRPs to whom an IA will apply (i.e., those BRPs whose customers' demand has been included in a balancing product supplied by an independent aggregator);
- **If required by national legislation**, set out arrangements to allow BSPs to act independently of BRPs and include arrangements for financial settlement; and
- Require TSOs to calculate an IA for each activated BSP balancing energy bid.

Issues Raised by Aggregation

Before considering how the NCEB could be improved to further encourage the participation of DSR in balancing timescales, either directly or via aggregation, it is useful to consider the issues that participation might raise. As mentioned previously, it should be recognised that both incumbent suppliers and independent aggregators can aggregate the embedded flexibility of demand, including the ability to store energy in its end-use form, and offer balancing services to TSOs or other potential customers. Suppliers and independent aggregators effectively compete in this area and it is therefore necessary to ensure that independent aggregators are not required to negotiate directly with suppliers in order to be able to manage a customer's demand or that incumbent suppliers are allowed to "veto" or frustrate such arrangements, either directly or indirectly. The functions of supplying energy on one hand, and providing flexibility or balancing services on the other by exercising discretion over where, how, and how much of a given end-use energy to consume, should be clearly "unbundled." Customers should be free to choose how they manage their consumption of energy services and with whom, if anyone, they arrange to do so on their behalf.

In selling flexibility as a dispatchable service, a customer offers to modify his demand usage, either directly or through an independent aggregator, in order to provide services that are useful to a TSO (or possibly a BRP) as illustrated in Figure 1. When reducing demand in order to provide a balancing service, a customer is effectively selling on the right to use energy purchased in advance by his energy supplier. This raises two issues; firstly, how to recompense the supplier for energy bought up front in anticipation of the customer's consumption but not used (or billed); secondly, the possibility of a supplier as BRP being placed in imbalance by the customer's actions or the actions of the customer's independent aggregator. It should be noted at this point that a customer or an independent aggregator offering energy in the form of demand response in either the balancing or wholesale markets is quite different to a customer adjusting his demand, or an aggregator doing so on his behalf in response to price signals emanating from his supply tariff or simply for reasons of energy efficiency. In the latter case, the supplier should be expected simply to adapt to the customer's revised demand profile, and no compensation for any loss of energy revenue for failing to do so would be justified.

When a customer increases demand in order to provide a flexibility service, the issue of compensating the supplier for energy purchased and sold on does not arise as the energy is sourced from the balancing market and not purchased in advance. In this case, the issue is how to compensate the customer, or his independent aggregator, for the additional energy sourced from the balancing market but billed via the supplier's tariff as if it had been purchased in advance. The issue of the customer's supplier as a BRP potentially being placed in imbalance is still relevant as the unanticipated increase in demand may cause the supplier's energy purchases to exceed its contracted position.

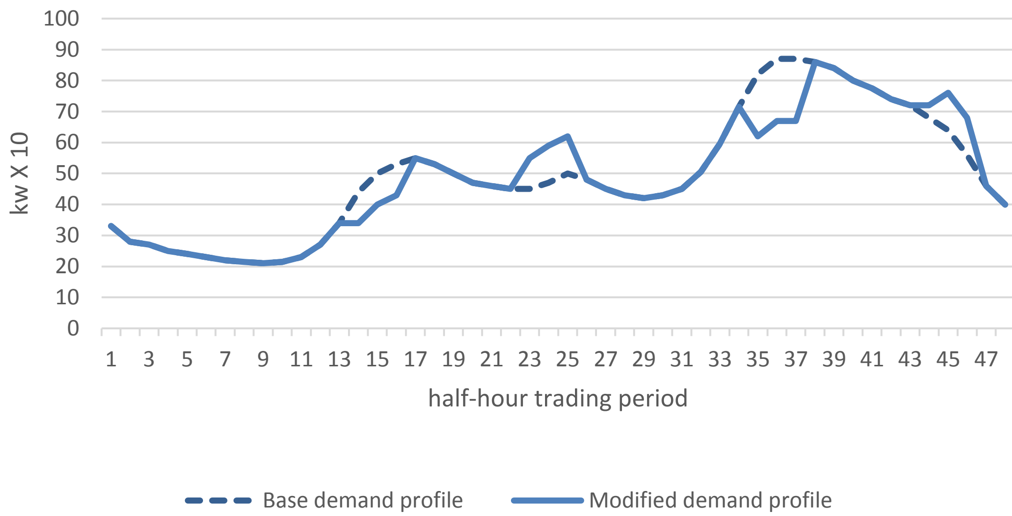

Figure 1. A Domestic Customer's Demand Profile Modified in Order to Provide a Balancing Service[3]

Reimbursing a Supplier/BRP for Up-Front Energy Costs

When curtailing energy consumption in order to provide balancing services, both the customer and, if applicable, the customer's independent aggregator are profiting from selling on the right to use energy purchased in advance by the supplier. As illustrated in Figure 2, this energy will be generated and used, but not by the intended customer, preventing the supplier from recovering the associated costs and potentially placing the supplier's position in imbalance. Where the balancing service offered by the customer or independent aggregator is purchased by a TSO, the energy will be sold on by the TSO to some BRP who happens to be in imbalance. The TSO will have paid the independent aggregator acting as a BSP for the balancing service, and it therefore seems appropriate for the BSP to recompense the supplier who originally bought the energy and the shape.

[3] Note that the provision of balancing services yields a different profile than the typical "peak shaving valley filling" profile associated with price-based DSR. The need balancing or flexibility services can arise at any time, not just when energy demand is particularly high or low. The need for balancing services will increase with the deployment of increasing amounts of intermittent generation.

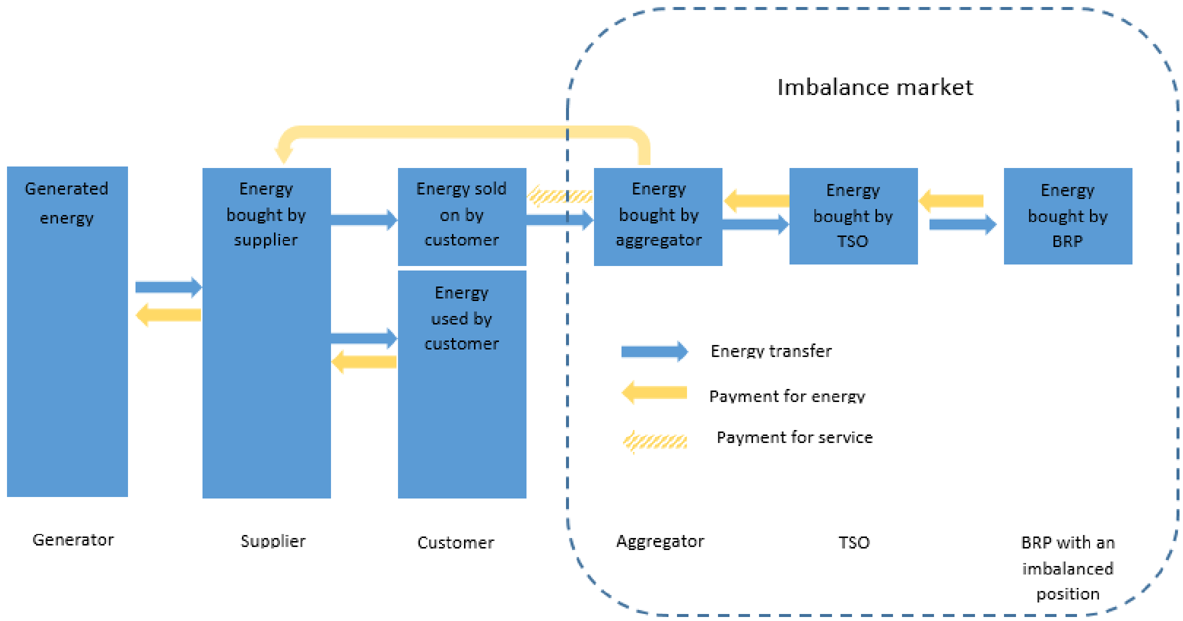

Figure 2. Energy Flows and Payments When an Aggregator Decreases a Customer's Demand as Part of a Flexibility Service

It may, however, be difficult for the supplier and customer/independent aggregator to agree on a price for energy bought up front. As a supplier will purchase energy in many timescales and is likely to have many contracts in place to service its portfolio of customers, it will generally not be possible to associate a particular contract with a particular customer. Given this uncertainty and the fact that suppliers could be incentivised to exaggerate or overstate the price originally paid while the independent aggregator could be incentivised to pay as little as possible, and given that incumbent suppliers in many cases enjoy an advantaged position in their relationship simply by virtue of their incumbent status, a centrally administered and regulated solution would clearly have advantages. The administered solution could involve the use of a price index such as the average day-ahead energy price or a basket of price indices designed to replicate a "typical" supplier contracting strategy.[4] The solution would be designed to be fair to both parties, recovering genuine costs incurred by the supplier but not lost profit. The critical features of this centrally administered solution would be that a supplier would no longer be able to refuse permission for an independent aggregator to sell on the rights to unused but paid for energy, and that

[4] Different suppliers will adopt different strategies in purchasing energy to meet their customers' needs although, in general, most energy will be purchased well in advance with the remainder purchased short-term. Nevertheless, it should be possible to construct a notional purchasing strategy that reflects a "typical" approach, and to use this as the basis of a common methodology for calculating compensation between supplier and customer/independent aggregator. More information on supplier purchasing strategies and the derivation of a notional purchasing strategy for the determination of suppliers' wholesale energy costs is given in a report by Ofgem, *Energy Supply Probe – Initial Findings Report*. Available at: https://www.ofgem.gov.uk/publications-and-updates/energy-supply-probe-initial-findings-report

the possibility of unequal or “lopsided” negotiations between a supplier and customer/independent aggregator becoming a barrier to DSR participation in the balancing market would be removed.

An example of this approach is to be found in France, with the adoption of the “Block Exchange Notification of Demand Response” mechanism or NEBEF, which implements French Law 2013-312 known as the “loi Brottes.” To use the NEBEF service, an aggregator or Demand-Side Management Operator (DSMO) must contract with the TSO and Reteau de Transport d’Electricite (RTE), and with a BRP. The NEBEF rules allow DSMOs to trade their demand flexibility in the wholesale electricity markets and require the DSMO to compensate the supplier concerned according to a set annual tariff. Currently, only profiled and remotely monitored customers can use the NEBEF service.[5]

Placing a Supplier/BRP in Imbalance

In some jurisdictions such as Great Britain, the provision of certain balancing services by a customer or independent aggregator is not taken account when calculating the supplier/BRP’s imbalance, with the consequence that the supplier may be placed in imbalance by the demand customer or independent aggregator’s actions.[6] In the situation depicted in Figure 2, i.e., where a customer has reduced energy consumption and sold on the unused energy to the TSO either directly or via an independent aggregator, the supplier would contractually “spill” the unused energy into the balancing market. In doing so he would receive a payment which would partially or even totally recover the cost of energy bought but not used by the customer. However, this will no longer be possible once the NCEB is adopted, as the Code requires that all activated balancing services must be reflected in an associated BRP’s imbalance position via an IA.

This adjustment of a supplier’s imbalance position should also address the situation when a customer’s demand is increased to provide a balancing service. In this case, which is illustrated in Figure 3, the increment in the customer’s demand will not have been anticipated by his supplier and not purchased in advance. The energy will therefore be purchased from the balancing market, although, following adoption of the NCEB, the supplier’s imbalance position will be adjusted via an IA and the supplier will not be placed in technical imbalance by the customer’s actions.

[5] See NEBEF rules at RTE Customer Portal. Available at: https://clients.rte-france.com/lang/an/clients_distributeurs/services_clients/effacements.jsp
[6] This is also the case in the US, where demand flexibility and aggregation is well established.

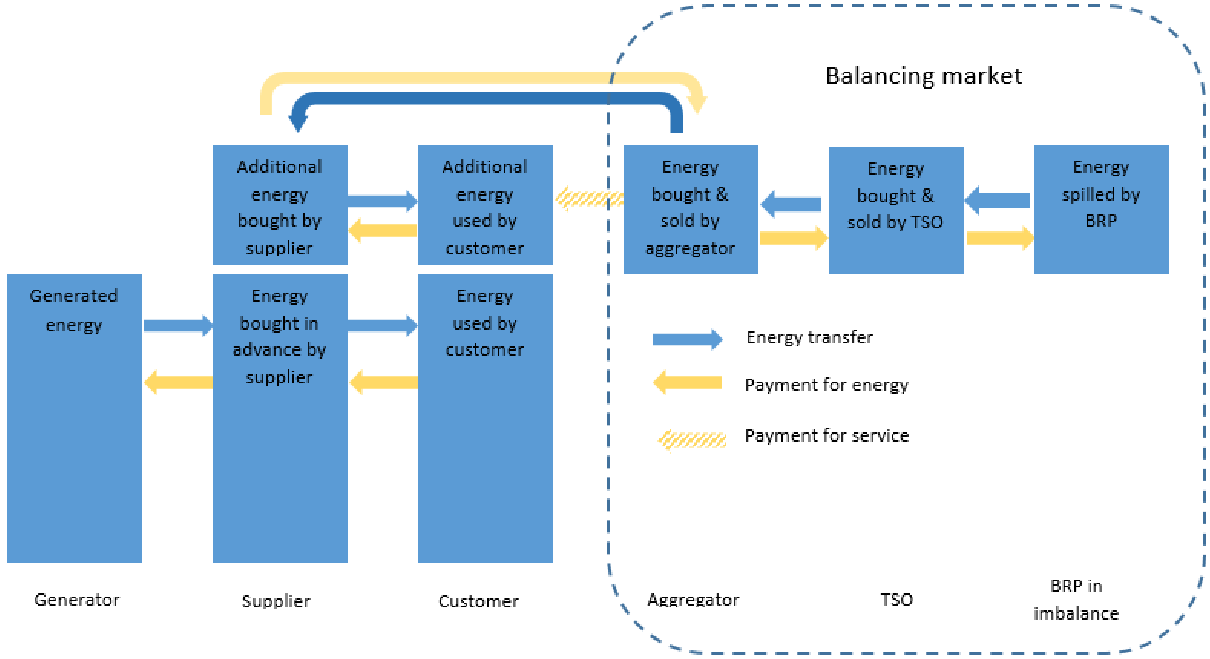

Figure 3. Energy Flows and Payments When an Aggregator Increases a Customer's Demand as Part of a Flexibility Service

Compensation for Energy Bought from the Balancing Market

When a customer increases his demand in order to provide a balancing action, the supplier bills the customer for the additional energy. However, rather than having been purchased in advance by the supplier, the energy is sourced from the balancing market (presumably at a low price in response to an oversupplied or "long" market), and the supplier should therefore compensate the customer or his independent aggregator. Although the price paid for energy from the balancing market would be known, the supplier and independent aggregator may have quite different perceptions as to what that compensation should be as the sourcing costs underlying the supplier's energy tariff may not be so easily identified. An administered contractual solution, designed to be fair to both parties, would again seem to have the advantage in that protracted negotiations could be avoided.

Identifying BRPs Impacted by Customer/Aggregator Actions

The arrangements for identifying which BRPs are impacted by the activation of particular balancing services are to be developed by the TSO(s) responsible for the balancing area in question, following adoption of the NCEB. It will be crucial that these arrangements simply require identification of the supplier/BRP and do not involve any negotiation between the supplier/BRP and the customer/independent aggregator acting as a BSP. If, for example, the BSP was required to first obtain the agreement of the supplier/BRP to operate on its customer's demand and have its imbalance position adjusted accordingly, the supplier/BRP would be placed in a dominant position and would be able to prevent aggregation from taking place.

How Could the NCEB Be Improved?

The fact that the high-level objectives set out in the NCEB include a requirement that DSR and aggregation participation in balancing markets should be facilitated is clearly helpful. Similarly, the requirement that the Code should foster competition, non-discrimination, and transparency in balancing markets, which implies that DSR and aggregation should have the same access to balancing markets that traditional generation capacity currently enjoys, is also encouraging.[7] However, it is disappointing that the current version of the Code does not go further and include as high-level objectives the need to ensure that aggregators acting as BSPs should be able to operate independently of BRPs without the need for negotiation over the management of a BRP's customer end uses, and ensure that customers have the right to choose to whom they sell their flexibility.

Hopefully, this omission will be addressed in the final draft Code to be submitted to the Commission. The issues of independence and customer choice could then be dealt with in more detail when setting out the roles and responsibilities of BSPs and BRPs. As indicated previously, the roles of supplier as BRP and independent aggregator as BSP are effectively in competition for the management of a customer's use of energy services and there is a need to clarify the relationship between them. The Code does refer to the relationship between BSPs and BRPs in other respects but does not refer to the issue of independence, other than in a qualified sense when setting out what should be included in the balancing terms and conditions as discussed below.

The Code does require that the detailed balancing terms and conditions to be developed by TSOs for their areas of responsibility should allow the aggregation of DSR and allow aggregators to become BSPs. This is clearly helpful, as is the requirement that the imbalance position of BRPs should be adjusted to reflect the impact of any activated BSP balancing services. As mentioned above, this latter requirement effectively removes from play the issue of BSP actions causing BRPs to be in imbalance, although, unfortunately, it also removes one possible route for allowing suppliers to at least partially recover the costs of purchased but unused energy that is sold on as a balancing service. In effect, the application of an IA and removal of a supplier's ability to spill energy into the balancing market introduces the need for aggregators to establish a relationship with impacted suppliers and provide compensation.

Turning again to the need for BSPs to be able to operate independently of BRPs and the need to define the financial settlement arrangements between the two, the Code requires that the balancing terms and conditions need only address this issue: "if required by national legislation." This is entirely inadequate and would allow BRPs to frustrate the activities of aggregators in those jurisdictions where no legal requirement for independence exists. It could also intensify the already significant differences in the treatment of demand flexibility and aggregation across Europe, undermining the principles of competition and non-discrimination that are embodied in the Code's high-level objectives and undermining the development of a critical success factor for the IEM. As suggested above, the independence of BSPs from BRPs should be a high-level objective of the NCEB that applies equally across

[7] The specification of flexibility and balancing services currently reflect the particular characteristics of conventional generation. For DSR to have "equal access" to these markets, some service specifications need to be redefined so that all providers can compete. An example of this would be replacement reserve, where in some jurisdictions the service specification involves unnecessarily long durations and effectively rules out the participation of DSR and should be replaced or complemented by short-term auctions in which DSR can participate.

all jurisdictions. These high-level objectives should include the principles to be adopted by TSOs in developing the "balancing terms and conditions" to be implemented in balancing areas. In addition to ensuring the independence of BSPs from BRPs, these principles should cover the financial settlement whereby independent aggregators acting as BSPs compensate suppliers for energy bought but sold on by the customer, and where aggregators are compensated when customers consume additional energy as a balancing service and are billing according to the supplier's tariff. These principles should ensure an equitable outcome for both parties, that the arrangements are as symmetrical as possible, and that while suppliers should be allowed to recover their costs they should not be compensated for "lost profit."

Conclusions

Empowering demand to respond to market conditions is essential to delivering the benefits promised to European citizens from the IEM and is a critical source of the flexibility available to facilitate the transition to a low-carbon energy sector at the least cost to consumers. The development of the NCEB represents a unique opportunity to overcome existing barriers to demand-side participation in wholesale and balancing markets and to allow these benefits to be realised.

While the current version of the NCEB contains some helpful language in promoting the participation of DSR and aggregation in balancing markets, it is a high-level document and the task of developing the detailed "balancing terms and conditions" that will codify the operation of Europe's balancing markets is delegated to the TSO. There is a danger, therefore, that some of the high-level objectives set out in the Code may not be consistently applied across Europe. While the Code recognises the value of DSR and aggregation, the high-level nature of the Code and the language used may allow the barriers that exist in many Member States to persist. If the full potential of demand flexibility, driven by the development of aggregation services, is to be realised in balancing timescales across Europe, the NCEB needs to mandate a consistent approach to change across all Member States. Statements that permit essential change to take place "where required by national legislation" are wholly inadequate and contrary to successful implementation of the Third Energy Package and the IEM in that they will allow an inconsistent approach to persist. The development of the NCEB represents a unique opportunity to address the barriers to demand flexibility and aggregation that exist in many Member States. To leave the Code as currently drafted would be an opportunity missed.

Annex: The Network Code Development Process

There are presently ten European Network Codes at various stages of the development process, covering grid connection, markets, and system operation. Additional Codes are expected to be commissioned in the future, covering access, connection procedures, and tariffication. The process for developing Network Codes is set out in Electricity Regulation 714/2009 and involves the European Commission, ACER, ENTSO-E, and ultimately the Council and European Parliament.

The key stages in the process are described below and illustrated in Figure A1.

Development of Framework Guidelines (FWGL)

A six-month process, initiated when ACER is invited by the European Commission to prepare a set of high-level principles that a particular Network Code should embrace.

Development of the Network Code itself

Following approval of the FWGL, ENTSO-E is invited to prepare a particular Network Code. The Code must embody the high-level principles set out in FWGL developed by ACER. This is a 12-month process and includes a two-month public consultation period.

Review of the Network Code

ACER reviews the Network Code for compliance with the FWGL. ACER may ask ENTSO-E to make some revisions and iteration may be required between the two. At the end of this process, ACER will issue an (non-binding) opinion and (possibly qualified) recommendation and submit the Code to the European Commission. The ACER initial review will take three months, however the process for ENTSO-E to make revisions is not time constrained.

Commitology

The Commitology, or "committee procedure," is the formal process by which European Law is agreed. It involves Member States, the Council of the European Union, and the European Parliament.

The Commitology process has three phases:

- **Preparation stage.** On receipt from ACER/ENTSO-E, the Network Code is prepared for commitology. This includes informal discussions between Member States, legal drafting, consultations with other departments in the European Commission, and translations into the official languages of the European Union.

- **Cross-Border Committee (or Committee on the implementation of legislation on conditions of access to the network for border exchanges in electricity).** This is the key decision-making phase of Commitology. During this phase the Member States agree and ultimately vote upon the text of each European Network Code. Voting takes place on a "qualified majority" basis. Once agreed by the Cross-Border Committee, the text of the European Network Code is essentially finalised.

- **Council of the European Union and European Parliament Approval.** The Council of the European Union and European Parliament both need to approve the Network Code. Based on previous experience, this is a ratification process and it is not expected that a Network Code would be modified at this stage.

Once approved by the European Parliament, the Code passes into European Code and must be adopted by Member States.

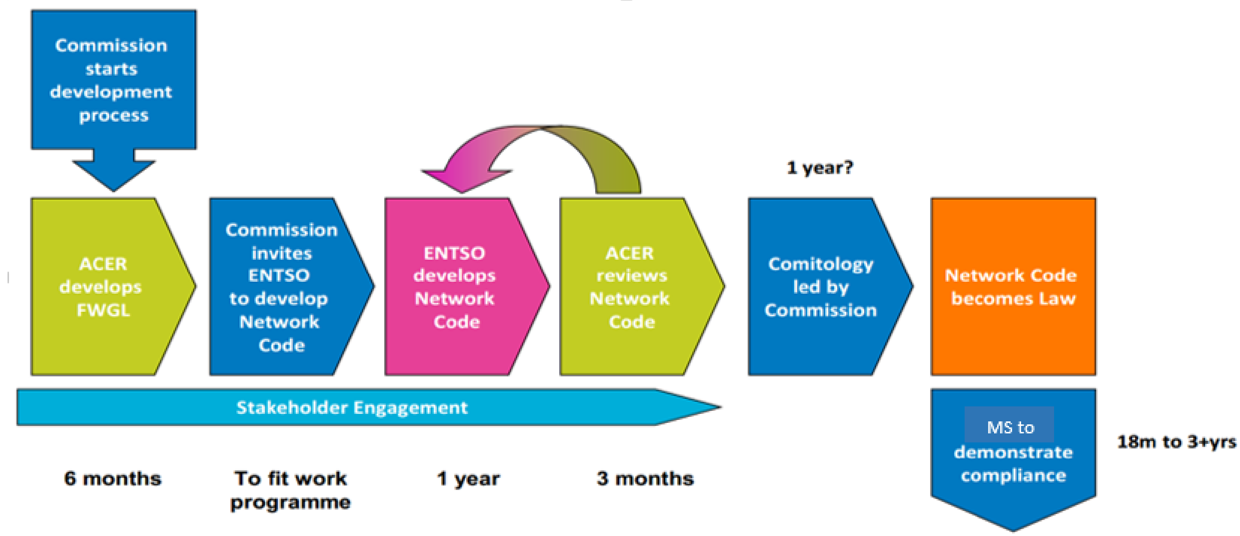

Figure A1. Network Code Development Process