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National Grid Electricity Transmission response to Ofgem's consultation on "Creating the right environment for demand side response".

National Grid owns and operates the high voltage electricity transmission system in England and Wales and, as National Electricity Transmission System Operator (NETSO), we operate the Scottish high voltage transmission system. National Grid also owns and operates the gas transmission system throughout Great Britain and through our low pressure gas distribution business we distribute gas in the heart of England to approximately eleven million businesses, schools and homes. In addition National Grid owns and operates substantial electricity and gas assets in the US, operating in the states of New England and New York.

In the UK, our primary duties under the Electricity and Gas Acts are to develop and maintain efficient networks and also facilitate competition in the generation and supply of electricity and the supply of gas. Our activities include the residual balancing in close to real time of the electricity and gas markets.

Executive Summary

National Grid Electricity Transmission (NGET) welcomes the opportunity to comment on Ofgem's consultation, "Creating the right environment for demand side response". This response is on behalf of National Grid Electricity Transmission plc in its capacity both as the National Electricity Transmission System Operator (NETSO) for GB and the Transmission Owner (TO) for England and Wales. We are supportive of this work and welcome the approach taken to identify how current market arrangements might constrain the system wide development of Demand Side Response (DSR) and prevent customers benefitting from the cost savings DSR has the potential to deliver. Furthermore we believe successful development of DSR needs to consider the use of such resources by all industry parties - distribution and transmission networks, suppliers and NETSO - and the interaction between the parties.

The consultation generally captures the main challenges and sets out coherently the steps that are currently being taken to address them. We are supportive of work taking place although suggest it would be beneficial to consider prioritising it to address the issues in the order the solutions are likely to be required.

Any new regulatory requirements that are developed for DSR should be focused on incentivising a wide range of innovative approaches; setting out a broad, coordinated framework across the whole industry of what needs to be achieved, leaving participants to innovate on how to achieve those objectives. Different commercial approaches may be necessary for different types of customers though. Development needs to ensure DSR can be one of many solutions and to avoid designing frameworks where DSR becomes the only solution.

One of the commercial interactions that will need to be considered is how settlement arrangements can reflect DSR actions. The use of such demands by parties other than the supplier need to be accounted for within the settlement arrangements, otherwise conflicting incentives could be created where such use affects supplier imbalance volumes. Due to the small volumes of DSR utilised at the moment this is not a significant issue but could become so as the amount of DSR increases in future.

A key challenge to consumer participation in DSR will be developing trust in the energy industry and a greater understanding of the make up of energy bills. Both are likely to need to be overcome before further engagement on DSR will be effective. Ofgem's Retail Market Review has reset the baseline for consumers by simplifying tariff structures, which is the right step forward in building the trust.

We currently utilise demand side response as part of our role of residual balancer of the electricity transmission system – fine tuning the balance between the demand and generation of electricity in real time. We continuously develop our range of balancing services to procure a capability to change demand or generation at short notice as economically as possible.

The demand side currently participates in our three main balancing services. These are primarily transactable DSR as defined in the consultation document (although one of our services is non-transactable DSR). We categorise balancing services participants into balancing mechanism and non-balancing mechanism, with non-balancing mechanism provision being made up of:

- A. True demand through load reduction
- B. Back up generation offsetting demand, so that the grid no longer sees the consumption as a demand
- C. Back up generation supplied to the grid for balancing services purposes
- D. Embedded generation (non-back up) supplied to the grid for balancing services purposes

The first two types of provision fit within the definition of DSR in this consultation while the second two do not. The distinction between the non-balancing mechanism balancing service providers which reduce demand from the grid and those which supply electricity to the grid is made in the summary of the DSR currently utilised within balancing services:

1. **Short Term Operating Reserve (STOR)**

Non Balancing Mechanism providers currently represent approximately 1400MW out of 3000MW of STOR. Around 120MW of the 1400MW is provided by load management or back up generation offsetting demand with the rest provided by back up generation / embedded generation directly supplying the grid.

2. **Fast Reserve**

Historically approximately 50-300MW of real demand side response has been provided by a service based upon teleswitched electrical night storage heating. By its nature this is an overnight, winter only service.

3. **Frequency Response**

DSR participates in both static¹ & dynamic² frequency response through two commercial services: Frequency Control by Demand Management (FCDM): Approximately 80-100MW of static frequency response is provided depending on the availability of the demand.

¹ Static frequency response is where a service provider responds to a set trigger point, and is in effect an all or nothing provision. Typically this is a service procured from interruptible demands which once the frequency drops to particular point the demand will be disconnected from the network

² Dynamic frequency response is a near continual service, which requires the provider to give a linear and proportional response to the deviation in system frequency.

National Grid is a trading name for:

National Grid Electricity Transmission plc

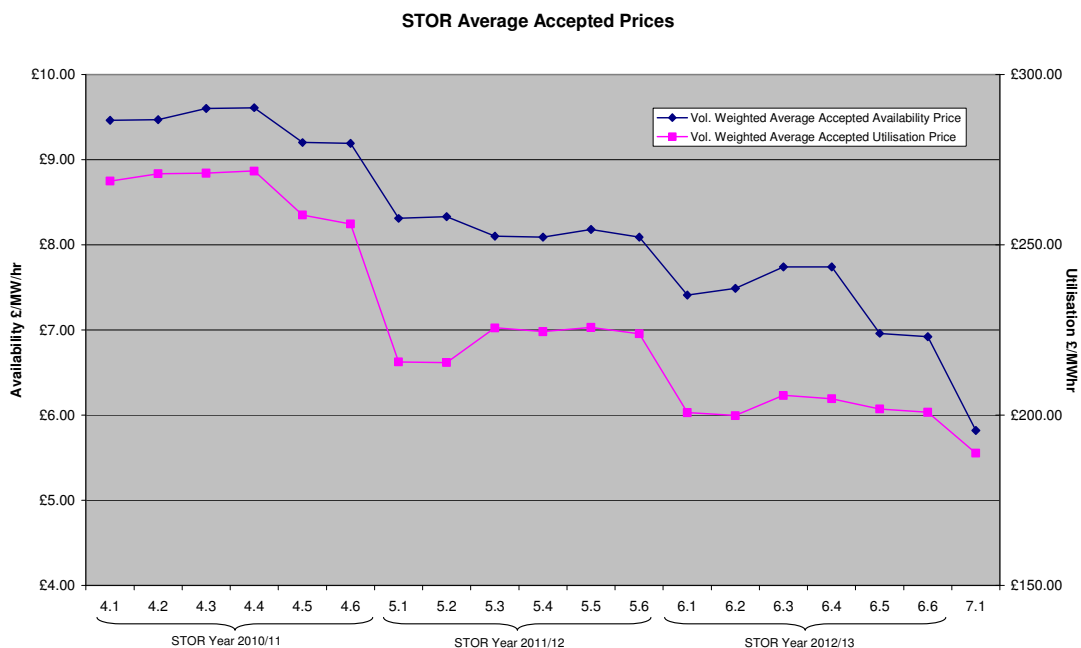
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Firm Frequency Response: A 3-4MW dynamic frequency response service is currently provided from true demand. In addition there is currently 42MW of static frequency response from embedded generation.

We are also currently investigating the use of DSR as an alternative to asset based reinforcement within the transmission network, and to enhance the transmission system resilience post-fault. We will progress its use for this purpose if it meets our needs and the appropriate security standards. One challenge already identified is securing a sufficient amount of demand side response for such purpose in the required area. We will be learning from the experience of relevant Low Carbon Networks Fund (LCNF) projects on the use of DSR for network purposes where relevant.

Although as the residual balancer for the GB wholesale electricity market we are proactive in our use, development and facilitation of DSR, our use is finite and relatively small in volume compared to the rest of the wholesale energy market. Furthermore, while we agree with the barriers highlighted in the paper, which could limit the development of the DSR market, there is already a general trend towards greater service provision. Taking STOR for example, which is well subscribed. Even with a reduction in the price over the past 18 months as shown below, DSR is still wanting to participate and competing in tenders for the service. We are working with DSR providers to develop greater participation in balancing services beyond STOR and will continue to do so.



If you would like additional information on our response to this consultation please contact Alice Etheridge (alice.etheridge@nationalgrid.com) as we would welcome the opportunity to discuss our response further and the next steps for this process.

Yours faithfully

by e-mail

Craig Dyke
Strategy Development Manager

Precondition 1: Industry parties need to be confident that there is value for them in demand-side response to justify the investment

Question 1: Are there any additional key challenges associated with revealing the value of demand-side response across the system? If so, please identify and explain these challenges.

We generally agree with the key challenges to revealing the value of DSR across the system that are set out in the document and that the work highlighted should help address them.

As mentioned in the consultation, there is work underway as part of the Ofgem Electricity Balancing Significant Code Review (EBSCR) to investigate how to accurately value DSR and reflect it in price signals. This includes attributing a cost to non-costed actions such as by calculating the Value of Lost Load for electricity, and pricing non-BM STOR reserve actions. Whilst the details of how these could be implemented are being worked through, we are supportive of their intention.

An additional challenge is that there isn't currently a market for DSR – it is primarily based on contractual agreements needed to meet specific requirements. Our experience of DSR in balancing services suggests the market and providers of the service can take a long time to develop (see question 5 for more detail). The inclusion of DSR in the Capacity Market is a real opportunity to develop such a market as has been shown by its inclusion in capacity markets in the USA. We have been working with DECC to develop preparatory auctions for DSR in the Capacity Market, to enable DSR to provide capacity in advance of the main mechanism being in place. This should help the DSR market develop by helping clarify the requirements for DSR provision, identify barriers and enable the environment for new commercial offerings to develop.

Question 2: Can current regulatory and commercial arrangements provide the means to secure demand-side response being delivered? If not, what will regulatory and commercial arrangements need to deliver in future?

We agree with the regulatory areas highlighted in the consultation document which could be improved to further facilitate DSR. Developments under consideration within the EBSCR to facilitate sharper price signals have the potential to be beneficial to incentivising DSR through more appropriate cost reflectivity.

More broadly, any regulatory requirements that are developed for DSR should be focused on incentivising a wide range of innovative approaches to reduce system and therefore consumer costs; setting out a broad, coordinated framework of what needs to be achieved across the whole industry and leaving participants to innovate on how to achieve those objectives. The regulatory framework needs to remove barriers and enable, rather than take a prescriptive approach, to ensure DSR can be one of many solutions. We should be mindful that frameworks aren't designed so DSR becomes the only solution.

Part of the reason that we believe a regulatory framework should underpin innovation is due to the potential substantial differences in the uses of DSR by different parties. In many cases we believe that different commercial arrangements are likely to be needed to manage these differences from both the procurer and provider of the DSR perspective. As mentioned previously we have contractual agreements in place for DSR that is largely required for energy balancing purposes. Currently these services, a mixture of reserve capacity and firm energy volumes, are procured on a committed basis, i.e. the provider commits to be available to meet the contract and National Grid commits to pay the provider. However, a DNO may wish to procure DSR to meet a network need, be it pre-network fault, peak energy flow reduction or for contingency post fault purposes.

We also note that there may be many potential challenges around monitoring and validating the service provision from DSR. This tends to be easier with industrial and commercial customers than with domestic customers. We currently work with others to share our experience of monitoring and verification and contractual arrangements for balancing services through LCNF projects and more

widely through the Smart Grid Forum and the ENA Electricity Demand Side Response Shared Services Group. We would be happy to continue to do so across the range of industry participants. LCNF projects looking at DSR should also provide some helpful learning in this area.

Smart Meters should be an important enabling tool for DSR in the domestic sector. Alongside the development of smarter consumers it will be important to ensure the relevant access is provided to the data for relevant industry participants. It is also important to consider whether the Smart Meters will enable DSR in all areas. For example, most balancing services require minute by minute metering to participate and in some case second by second monitoring (dynamic frequency response services) is necessary although this does not mean it does not have a value to other market participants. It should be noted that distributed generation in homes has the potential to make measuring domestic load shifting more challenging.

Question 3: Is current work on improving clarity around interactions between industry parties sufficient? If not, what further work is needed to provide this clarity?

Providing clarity around the interactions between industry parties is very important. As the consultation document recognises, more than one party may be interested in accessing and utilising DSR resources within their business activities (energy providers, system and/or network operators) and the value associated with the utilisation of a particular DSR asset may be shared across multiple parties (networks and System Operator, Suppliers etc). This 'sharing' of a DSR asset (generation unit and/or demand turn down) will require each party (DSR provider and DSR service users) to understand how, when and why that resource will be utilised by each party. This will enable any conflicts, challenges and synergies associated with the sharing of a DSR resource to be identified and subsequently the appropriate contractual arrangements to be developed.

Any DSR market design will require a demand gate closure, similar in timing to that used in the Balancing Mechanism, to ensure we can balance the national system in the last hour and a half against a fixed baseline. This would not preclude for example a DNO using demand response for a post-fault action (because it would typically be small in volume). Uncertainty around what has or could take place in terms of load shifting could lead to us potentially taking a precautionary approach to procuring balancing services, which is unlikely to result in efficient operation of the system and has the potential to result in higher costs for consumers. Awareness of other actions is also relevant to for transmission assets where we need to be aware of whether DSR actions taken by other participants may increase the load at specific grid supply points beyond their capacity.

Further consideration of these issues that builds on the work being done through the Smart Grids Forum and more widely will be needed. We are working with DNOs to understand the opportunities and challenges associated with sharing DSR in order to identify and establish a network view on what a data sharing framework would look like and the associated implications. The work is also considering the extent to which it will be possible for different industry bodies to share or concurrently use services, in order to ensure the value of DSR can be realised as far as possible by a wide range of industry participants and therefore benefit the customer. The work will be shared with suppliers and more widely at a relevant opportunity and is likely to lead to further work in this area, with greater involvement of suppliers. This work should lead into and direct the development of new commercial arrangements.

One of the commercial interactions that will need to be considered is how settlement arrangements can reflect DSR actions. The use of such demands by parties other than the supplier need to be accounted for within the settlement arrangements, otherwise conflicting incentives could be created where such use affects supplier imbalance volumes. Due to the small volumes of DSR utilised at the moment this is not a significant issue but could become so as the amount of DSR increases in future.

In addition, there are challenges around the transparency of DSR utilisation at the moment, particularly for Triad avoidance purposes. It would be beneficial for planning on a national and local

level, and also to help understand the DSR potential going forward, to have a clearer picture of the current DSR activities taking place.

Precondition 2: The value of demand-side response services needs to be effectively signalled to customers

Question 4: Are there any additional key challenges associated with effectively signalling the value of demand-side response to consumers? If so, please identify and explain these challenges.

The key challenges to effectively signalling the value of demand side response to consumers seem to be captured although it would be worth considering that the approach is likely to be different for different types of customers. For example, domestic consumers are likely to need a different approach to industrial and commercial customers and this is being demonstrated by the trials being carried out by DNOs under the LCNF. The approach taken for all customers will need to present information simply and clearly to help with understanding.

One of the challenges to signalling the value of DSR, particularly for network and system operation purposes, is that any market signals will be diluted by the time they reach customers' bills, with transmission charges making up 4% of costs, distribution charges 16% and balancing charges a proportion of the 5% of 'other' costs. Whilst DSR may result in the best outcome for customers overall, the impact on individual bills may not be sufficiently different to signal a change in behaviour. This brings into question whether a significantly different commercial model is necessary at the domestic level.

There are also challenges around the strength of signal for energy balancing purposes in the nearer term. The level required to encourage a response from customers is unlikely to be seen for a few years; until the price of carbon and level of wind on the system are higher. The EBSCR referred to in the consultation document should help these signals to be clear once the changes are implemented. We support this move to increase the cost reflectivity of cash out and in particular movements towards more marginal pricing and incorporating non-BM STOR volumes into imbalance prices

An additional challenge will be competing technologies and methods of balancing to DSR, such as storage, interconnection and flexible generation. Early adopters of DSR are likely to receive the more beneficial tariffs as there is the greatest value in the action. Depending on the relative timing of their development, once interconnection, storage and some DSR has been established it is possible that the price differential between off peak and on peak electricity usage will diminish and thus late adopters will receive less benefit and therefore lower reward. In our role as system operator we have requirements and incentives placed on us to manage the system in an economic and efficient way. In order to meet these criteria we will contract for services that most effectively fulfil them.

Question 5: Do you agree that signals to customers need to improve in order for customers to realise the full value of demand-side response? Does improving these signals require incremental adaptation of current arrangements, or a new set of arrangements?

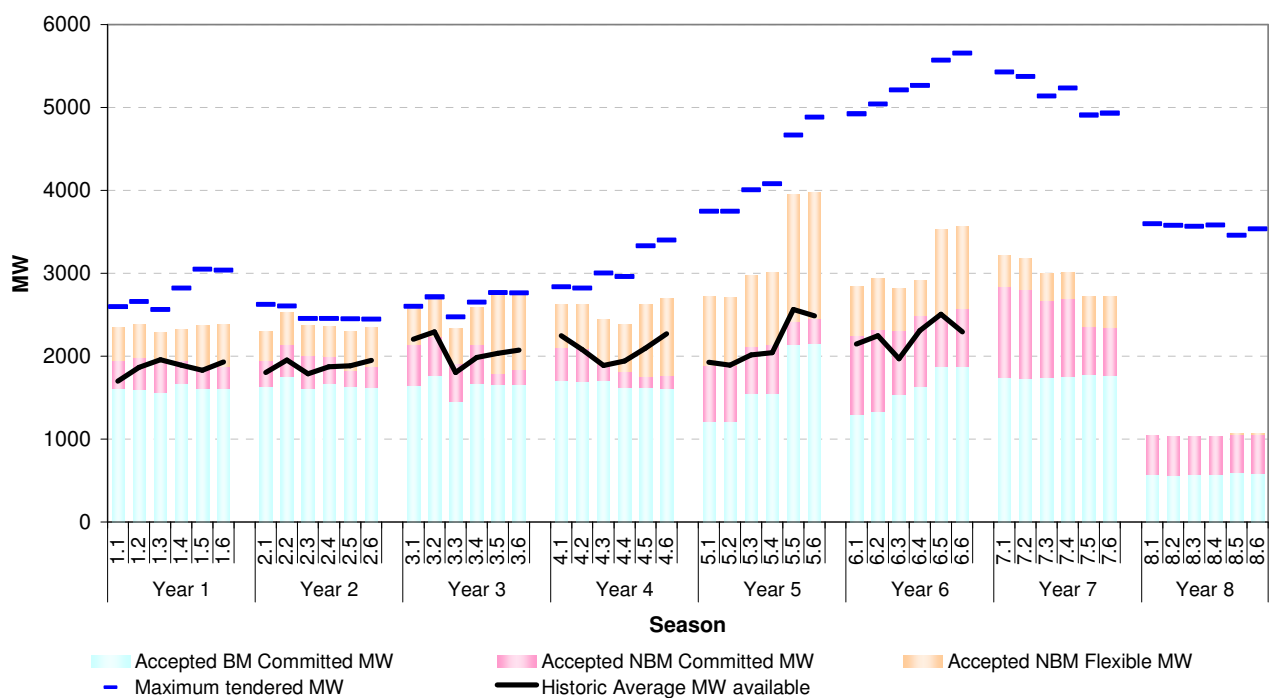
Given the developments in technology which allows customers the opportunity to consider DSR opportunities, it is logical to consider whether the pricing signals that currently exist are appropriate. The majority of current charging and billing arrangements completely remove the signals related to the different cost of electricity over time, which will not be effective in signalling the full value of DSR.

Incremental adaptation of the current arrangements for non-domestic customers may be sufficient. Our experience with DSR in balancing services suggests that DSR markets and new providers such as aggregators take some time to develop and mature, but that it is made readily available if the right signals are in place. Offerings into STOR tender rounds have developed well over the last few years with the current market being highly competitive. The time needed for market development and

promotion is likely to be a consideration for its use in other areas, for example as an alternative to reinforcing the transmission network.

The figure below gives a breakdown of the accepted flexible and committed MW per season since the start of the STOR service. The blue line represents the sum of the maximum tendered MW from unique units from any tender round for each season. For seasons with tender rounds still to come, this figure will increase if units that thus far have not tendered for that season, tender in. The black line on the chart represents the outturn average availability for each season (where available). Please note this chart contains data from previous tender rounds up to and including TR19.

Breakdown of Accepted Flexible and Committed MW per season



Another possible example of this developing market could be an increase in demand management seen this winter for the avoidance of Triad periods. One explanation of which could be a side effect of the more developed aggregator market. We estimate that over the 2012/13 winter, Triad avoidance levels were double those of the previous year; typically in the region of 1,000 MW, and up to 1,300 MW on the coldest days compared to 500 MW and 700 MW in previous years. There could be seen to be a correlation of increased participation of DSR in the STOR market and resulting apparent increase in Triad avoidance as a result of a developing wider DSR market. However we do recognise that the apparent increase in Triad avoidance could be coincidental and as a result of many other factors.

What it does highlight is the need to push towards more transparency around the current markets where DSR is utilised as more markets and opportunities are developed. Consumers must have visibility so they can see what it means for them, which markets may be appropriate and where they can get value. Likewise it will give users of DSR greater scope to understand how and when DSR is deployed elsewhere, identifying potential synergies and creating scope for sharing of DSR resource where there are no conflicts.

A step change in arrangements likely to be needed for domestic customers if the value of domestic DSR is to be realised; to transform from a system of smoothed prices to those which more effectively signal the cost at different times of the day. The installation of smart meters and their associated systems will provide technology to facilitate that change but effective commercial arrangements around those tools will need to be developed, including the provision of appropriate tariffs. We welcome the exclusion of time of use tariffs from the current tariff simplification work.

Question 6: To what extent can current or new arrangements better accommodate cross-party impacts resulting from the use of demand-side response?

As mentioned in question 3, knowing what DSR is taking place or has the potential to be carried out and when will be important to efficient functioning of the system. New arrangements may be necessary to ensure the appropriate information flows, which are being considered further in the previously mentioned work currently taking place. It will be important for suppliers to be involved in these discussions to a greater extent as they develop to ensure the customer-facing aspect is fully considered and incorporated in any approach developed.

Precondition 3: Customers need to be aware of the opportunities to provide demand-side response, able to readily access information on options and able to act

Question 7: Are there any additional key challenges associated with customer awareness and access to opportunities around demand-side response? If so please identify and explain these challenges.

The document seems broadly to capture the key challenges associated with customer awareness and access to opportunities. It will also be important to ensure that domestic consumers in particular understand the requirements they are committing to, what they are going to get in return for a change in behaviour and the implications of not carrying out the action they have committed to; whether that is the potential for impacts on the network or increased costs.

While it will be important to raise awareness of DSR opportunities and how to access them, it will not be effective unless consumers trust the energy industry and understand their current energy bills to a greater extent. Both challenges will need to be overcome before further engagement on DSR will be effective. Ofgem's Retail Market Review has reset the baseline for consumers by simplifying tariff structures, which is the right step forward in rebuilding the trust.

The existing relationship between suppliers and customers may mean that suppliers provide a simple route for customers to understand and access DSR. Information on DSR will need to be easily accessible, understandable and as simple as possible for the customer to assess and compare the value of providing DSR.

As has been seen with STOR, in the absence of supplier participation third party organisations develop to fill the gap. Supplier participation in balancing services is currently limited and has been overtaken by third parties. The aggregator market has really taken off over the last few years and there are no indications that this will not develop further and potentially into the domestic market if the necessary value can be achieved. The introduction of an additional provider to engage with is likely to add complexity for customers though, which may be particularly unwelcome for domestic consumers and deter participation.

Question 8: Is any additional work needed to explore the role of third parties in helping customers to access and assess demand-side response offerings?

One additional area to potentially consider is that in order to help customers access and assess DSR offerings, third parties will need access to smart meter demand data from consumers, which they will not be able to access without their permission. This will limit third parties' ability to assess the DSR potential in total and per household in advance and the additional step and data request may result in added complexity or concern for consumers.