

Ørsted

Energy flexibility

Making it work
in practice





The rising value of flexibility

As we move towards a more sustainable energy future, having flexibility in the times at which electricity is consumed and generated can help to more accurately match demand with supply patterns.

This flexibility helps to keep the energy system balanced, stable and cost effective. It also creates a new revenue opportunity as flexibility schemes pay businesses to reduce or increase volume when instructed to support system balance.

There are a number of flexibility schemes available for business to participate in, all designed to help meet the needs of our changing energy infrastructure. Although the potential value is clear, participation isn't as high as it could be.

Ørsted hosted a learning workshop with large business customers to learn about their experiences with flexibility to date, educate on the options available, and identify practical ways to encourage greater involvement. Representatives from a range of sectors, as well as relevant industry bodies, participated in the workshop. This report looks at the themes that emerged, identifying specific actions that can be taken to achieve the much-needed increase in business participation in flexibility schemes, which will enable the UK to operate a more sustainable generation infrastructure cost effectively.

Background

Whilst the need for energy flexibility is increasing, the idea itself is not a new concept. Large energy users already provide a range of services to help National Grid balance the system. These range from helping to meet short-term grid stability requirements, to managing longer periods of peak usage or low levels of generation.

Other schemes that allow energy users to reduce demand during peak periods, and therefore avoid high distribution charges have also been operating for a number of years.

The need for flexibility

The electricity network is managed in real-time by National Grid in order to make sure that generation and consumption are balanced, and that frequency and voltage are both managed within acceptable limits. There are two kinds of imbalance. On an individual level, imbalance exists between each generator/ supplier's anticipated generation and anticipated demand, which must match when that generation/consumption occurs. In advance of each half-hour period, industry parties disclose their anticipated volumes for both generation and demand. When actual generation/ demand is different from anticipated generation/demand those parties will face costs – these costs are known as imbalance costs.

Secondly, on a network-wide level imbalance occurs between total anticipated generation and demand, which again must match. This results in balancing costs incurred by National Grid taking action to balance the network. When there is a disparity between that expected supply and demand, National Grid calls upon generators and consumers to switch up or down to counteract the difference.

The associated imbalance costs faced by generators and suppliers can be significant, and are ultimately passed through to consumers. A new regulation, known as P305, was introduced in November 2015 and it made several changes so that the imbalance price would more closely reflect National Grid's most expensive balancing actions.

This has led to stronger price signals in the market, which in turn encourage participants to act earlier to minimise their imbalance and to adjust their generation and consumption so they incur lower imbalance costs.



Flexibility options

A range of options exists, helping businesses with flexible consumption to get involved in balancing the system.

Large businesses are working towards determined sustainability targets and reporting progress towards these is an important part of an energy professional's role. If we could more accurately demonstrate the contribution that flexibility makes towards these sustainability targets, this activity would undoubtedly become more attractive.

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Quick reference guide

	<3 MW	3 - 9 MW	10-49 MW	>50 MW	Response Time	Provider
Cost reduction						
Market Price Optimisation	X	X	X	X	30 mins	Ørsted
Non-energy Cost Management	X	X	X	X		National Grid/DNOs
Reserve schemes						
Renewable Balancing Reserve (RBR)	X	X	X	X	30 mins	Ørsted
Demand Side Balancing Reserve	X	X	X	X	2 hours	National Grid
Capacity Market	X	X	X	X	4 hours	National Grid
Capacity Market Transitional Arrangements	X	X	X	X	4 hours	National Grid
Short Term Operating Reserve (STOR)		X	X	X	4 hours	NG/Electricity Settlements Company
STOR Runway	X	X	X	X	4 hours	National Grid
Fast Reserve			X	X	4 mins	National Grid
Demand Turn Up	X				5 mins	National Grid
Frequency balancing						
Firm Frequency Response (FFR)			X	X	10/30 secs	National Grid
FFR Bridging	X	X	X	X	10/30 secs	National Grid
Frequency Control by Demand Management (FCDM)	X	X	X	X	2 secs	National Grid
Enhanced Frequency Response (EFR)	X	X	X	X	1 sec	National Grid

Table shows minimum direct volumes. It is possible to participate in some schemes at lower volume via an aggregator.

Embracing flexibility

We hosted a flexibility learning workshop with some of our customers to see whether they were already benefitting from making their electricity demand more flexible or were interested in doing so in future.

Whilst all workshop attendees were experienced energy professionals, flexibility expertise within the group was varied. Businesses consuming a large amount of energy were already participating in balancing schemes, while others actively managed their load to reduce commodity costs and network charges.

Some managed this activity directly, whereas others employed aggregator services to do it for them. Regardless of the level of experience, participants expressed an incomplete understanding of the various options available along with an interest in the value.

In addition, some common business needs were identified, which can be summarised as follows:



More clarity over the range of flexibility products and services available



Opportunity to participate year-round, not just during winter peaks



Integrated energy solutions for both electricity supply and flexibility



Risk-free demand side schemes with low or no penalties for non-delivery and guaranteed revenues for reserve



Flexibility schemes that are easier to take part in, contractually and operationally



Guidance on how flexibility could contribute to carbon reduction

Read more about these topics on the following pages.



More clarity over flexibility options

As the importance of demand side flexibility has become more apparent, the level of information and products available to businesses has also increased. Participants expressed that it can be difficult to understand and interpret the range of information. Each organisation is unique when it comes to their challenges, run schedules and equipment and there is a need for more clarity to help them select an option that meets the requirements.



Risk-free demand schemes

Some demand side schemes contain stringent contractual commitments around minimum volumes and penalties for non-delivery, due to the criticality of that volume. This has created a level of apprehension amongst participants, with the risk of penalty outweighing the financial reward. In response, more flexible, light touch options have been developed for existing schemes such as Short-Term Operating Reserve (STOR). There are also alternative schemes available from suppliers that are entirely risk-free, to enable businesses to start engaging in these new services and to get to grips with individual service features before they commit too heavily.

// With so many schemes emerging, as well as a range of different products on the market, it can be difficult to see the 'wood for the trees' and feel confident about choosing the right service, or blend of services.

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Opportunity to participate year-round

Typically, demand side flexibility schemes have helped to manage tight capacity margins during peak winter periods. For current participants, there is an eagerness to achieve financial rewards throughout the year, not just the winter period, providing a welcome boost to energy budgets. In addition, not all organisations are able to guarantee flexibility each winter, but may be able to make commitments at other times of the year. By enabling businesses to take part at different times, the industry will be far better able to harness the flexibility that exists.



Flexibility markets that are easier to take part in contractually and operationally

Becoming 'flex-ready' can feel daunting when it comes to agreeing bespoke contracts for providing flexibility. Depending on the scheme, businesses often have to test their equipment

before entering into a demand side contract to ensure it is capable of reacting at the required times. In some cases, devices must also be fitted to the equipment. Businesses need a robust and quantifiable case for flexibility if they are to prioritise it over other energy-related projects. However, the need to take part in complex tenders or auctions for certain flexibility products can require significant resource – and final financial benefits can be hard to predict. Along with this, there is a perceived operational disruption as well as a disconnect between procurement or finance and operational functions, which can make the process more challenging. Some existing demand side services were designed with the requirements of large generators in mind, meaning that they are not all 'fit for purpose' for a wider range of businesses. For example, some require large minimum bid commitments and necessitate fixed quantities of flexibility to be available for long periods. This has given rise to innovation within schemes to cater for the needs of a larger pool of potential participants.



Integrated energy solutions for both electricity supply and flexibility

Managing energy is becoming an increasingly complex task. Energy management strategies are multi-faceted, and can include a combination of purchasing electricity and gas commodity from the wholesale market, reducing energy consumption and managing demand flexibly to earn revenue or avoid peak pricing. From both a practical and contractual perspective, there is a desire to work with one provider who can integrate these services, to save time and effort.



Clearer contribution to carbon targets

It is relatively straight-forward to articulate the environmental benefit of using renewable electricity or reducing overall consumption in a quantifiable way. Delegates were less clear about how flexibility in consumption can make a contribution to lower carbon emissions. Delegates present at the workshop welcomed further guidance from Government and regulators in quantifying the benefit of flexibility, how it can help to meet carbon and sustainability targets and how participation in flexibility schemes can be reflected in company Greenhouse Gas (GHG) reporting.

Businesses told us they wanted ...

Our approach ...



More clarity over flexibility options

Produced a straightforward customer guide



Risk-free demand side schemes

Renewable Balancing Reserve (RBR) is completely risk-free, with no commitment or penalties



Opportunity to participate year-round

RBR is available 24/7 and year-round



Flexibility schemes that are easier to take part in, contractually and operationally

Energy Vision & Site Optimisation; tech that tells you when to switch up or down



Integrated energy solutions for supply and flexibility

Greater control with a fully integrated, flexible energy solution



Clearer contribution to carbon targets

We've raised this issue with Government and Ofgem and are working to address it

// Businesses need a robust and quantifiable business case for flexibility in order to prioritise it.

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Workshop attendees

Representatives from a range of sectors as well as influential industry bodies, participated in the workshop.

// Whilst I can see the benefit of flexibility, in practical terms I am concerned about interfering with some of our key equipment. That equipment isn't used to being switched off and on again regularly and any problems in getting it up and running again could quickly outweigh the financial benefit of participation.

Ørsted customer



Oil and Gas



Metal Products



Food and Drink



Imaging



Combined Heat and Power



Paper



Sanitary Ware



Brick



Glass and Metal



Printing



International Services



Packaging

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