



UK demand side response

The importance of flexibility and what's next on the journey to a net zero grid

drax



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Flexibility – and specifically ‘demand side response’ – is key to supporting the National Grid in balancing power supply and demand in a cost-effective way. It’s also a crucial element in enabling a net zero future.

The National Grid Electricity System Operator (NGESO) has announced that it’ll continue – and expand – its Demand Flexibility Service (DFS). This recent news is further evidence that flexibility’s importance is growing. This paper looks at DFS and other types of flexibility, the impact flexibility can have, and what we can expect from it in the future.

Expert snapshot



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The commercial environment for manual demand response has suffered since Ofgem replaced much of the Transmission Network Use of System charge with a fixed charge. DFS has acted as a stopgap to support this kind of response, which is likely to be lost without appropriate incentives.

Earning values from flexibility is dependent on volatility in the energy market. DFS provided a safe haven for flexibility by enabling organisations to understand revenues ahead of delivery.

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Daniel Starman - Sales Energy Market Lead, Drax

Read more about our take on the future of DFS on page 10, where Jake Miller, our Product Development Manager - Asset Optimisation, shares his views.



What is flexibility?

Flexibility in the context of the power system includes modifying electricity production or consumption in response to a signal or variability. NGESO may provide this signal, or it might be evident when tracking market prices.



Why's flexibility so important?

Demand for electricity is increasing as a result of new developments like electric transport and heat pumps. Renewable sources of energy like wind and solar are growing, while fossil-fuel-based generators – at least in the UK – are disappearing.

The result is that weather conditions are driving the availability of an increasing proportion of our energy supply.

But what happens when the sun doesn't shine and the wind doesn't blow – and supply from these sources falls short of demand? And what happens when it's sunny and/or windy – but the demand doesn't meet the level of supply available? What can replace the carbon-intensive gas generators on the energy system in helping the Grid balance supply and demand?

Flexibility represents a crucial component in both the Grid's ability to keep the lights on – and in its continued transition away from fossil fuels.

Consumers can deliver flexibility to support system requirements by tendering to support balancing services or through dispatch in the Balancing Mechanism or Capacity Market.

Flexibility involves altering output or consumption in response to a price signal or a signal from National Grid. In the future, more consumers are likely to become more flexible and therefore able to generate 'demand side response'.



What's demand side response?

Demand side response (DSR) involves reducing or increasing demand for electricity using a controllable electrical process. This causes a temporary increase or reduction in energy consumption. For example, it might be possible to vary the levels at which a cooling and freezing system cools, between minimum and maximum levels.

National Grid signals a shortage or surplus of electricity - and flexibility across systems, equipment and organisations helps keep the network in balance, whatever the weather. This results in energy prices varying less and it contributes to the UK's transition to clean energy. Organisations that make their flexibility available to the Grid receive compensation.



There are different types of DSR. Which one consumers can offer depends on the operational equipment they have installed and the way in which it communicates.



Automated

It's possible to set certain electric assets to respond to energy prices or other external signals, like a direct dispatch signal from NGESO. Owners of EV chargers with smart functionality, for example, can set them to start charging in the late evening, when demand or prices are lower.



Manual dispatch

Manual DSR involves individuals or companies turning the DSR on themselves. This can be in response to a text or email signal from NGESO. It can also include people choosing to use electricity at different times, for example turning off an immersion heater in the evening to save money. NGESO services with manual dispatch need to have more notice than their automated equivalent. So, manual dispatch isn't suitable for some fast-acting services.

There are different DSR markets that can offer revenue to participating consumers. You can [read more about DSR and these markets](#) in our website's Insights section.

Why do we need flexibility and DSR?



The planet

To hit net zero targets and limit climate change, we need to transition to a system which relies on the supply of intermittent renewable sources of electricity. Flexibility enables this by providing support at times when the weather's not supportive of renewables generation. In the past, we relied on additional generation from gas or coal-fired power stations. Now that these options are disappearing, flexibility's crucial to support cleaner grids and enable a net zero future.



The Grid

To avoid blackouts, the Grid needs to maintain the balance between electricity demand and supply. This is increasingly difficult in a renewables-based generation system, as supply's largely reliant on the weather. So, flexibility, and DSR, is vital for absorbing the peaks and troughs in supply – by managing the levels of demand. Additionally, as times of Grid stress are times of high prices, these services also help prevent price volatility, limiting potential price peaks.



Organisations

Flexibility, increasingly, is becoming an additional revenue stream for organisations with high levels of electricity consumption. Mechanisms such as the DFS offer companies financial incentives for turning down demand – either automatically (based on automation and within pre-agreed levels) – or manually (in response to short-notice requests). Organisations that respond flexibly can also minimise their costs, through avoiding peak wholesale power and Third Party Charge (TPC) periods.



Demand side response – where are we now?

The Demand Flexibility Service (DFS, see opposite) has shown the widespread appeal - among both businesses and households - of opportunities to participate in demand side response.

This is going to be critical in the future – so DFS is only the start. There's a long way to go before flexibility alone can support a fully renewable grid and take the place of fossil fuels in managing times of system stress. But in its net zero scenarios, NGESO predicts DSR potential of 6-12GW from residential, commercial and industrial sectors by 2040.

Demand Flexibility Service

In November 2022, NGESO launched DFS, a new flexibility scheme for the winter period. DFS rewarded businesses and households for flexing their electricity consumption during specified periods, or 'events'. Doing so helps the National Grid to manage demand when it otherwise might exceed available supply. Historically, the Grid helped satisfy peaks in demand by asking fossil-fuel generators to turn their assets on.

During the winter of 2022/23, over 1.6 million participating consumers earned revenue for helping NGESO balance the grid at times of peak electricity demand. DFS returned for winter 2023/24, growing its reach and delivering an even higher flexibility total (see graphic).

The service provides easy accessibility to businesses and householders for engaging with flexibility. It's also encouraged early consumer engagement by offering guaranteed rewards for participation. In this sense, DFS is an important scheme in the UK's net zero journey. It's shown an alternative for the Grid in the absence of being able to call upon fossil-fuel generation in the future. However, on its own, the service is unlikely to contribute a large amount of flexibility against NGESO's stated DSR targets.

	2022/23	2023/24	Change
 Events	22	16	-27%
 DFS-approved providers	31	48	+55%
 Meter participation	1.6m	2.6m	+63%
 Total flexibility delivery	3.3GWh	3.7GWh	+12%



What's next for DFS?

NGESO recently shared its plans – its 'initial design service proposal' – for DFS, to apply from winter 2024/25. The main thing – which can only be good news for businesses, the Grid and the journey to net zero – is that the DFS will continue.

There were some more intricate details to the announcement that will affect - or maintain - the service's structure and its standing, though.

These include:

The shift to an 'in-merit margin service'

1 DFS was previously an 'enhanced action service', but the change means that it won't always be the go-to flexibility tool for reducing demand. NGESO will make the decision based on the relative prices of implementing services at that given time.

DFS retaining a 'pay as bid' structure

2 This means that NGESO won't pay out for flexibility at a flat rate. Each participant instead bids for flexibility – and following delivery of flexibility, NGESO will pay at the rate they've agreed to.

Flexibility procurement changing to 'within day only'

3 Previously, NGESO released some dispatch signals – or requests for flexibility – on a 'day ahead' basis. This change will make it trickier for certain – particularly smaller or less flexible – organisations to plan for manual turndown of consumption.

The removal of DFS exclusivity

4 Previously, if you opted in for DFS, you weren't able to use those same assets for other flexibility services. Now, however, it'll be possible to 'stack' DFS revenues with the Capacity Market and DNO flexibility services, adding value for a lot of participants.

DFS extending to become a year-round service

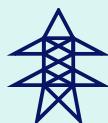
5 Previously, DFS had only run through winter periods.



The future of flexibility

NGESO's 'Future Energy Scenarios' analysis features a 'Holistic Transition' path, which it projects would result in the UK hitting net zero in 2050. In this pathway, industrial and commercial (I&C) DSR could have increased by a factor of five times, and total system flexibility could have risen to 72GW, by this date. Vehicle-to-Grid (V2G) functionality and smart charging represent the 'Holistic Transition' pathway's largest 2050 consumer flexibility technologies.

The change in the DFS's format from winter-only to a year-round service is likely to see NGESO communicating requests for demand turn-up in the future. When supply is plentiful but demand's low, it'll make sense to incentivise large consumers to move their consumption to take advantage of surplus electricity.



Expert view

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At Drax, we're pleased to hear that DFS is going to continue and excited about some of the plans NGESO has in store for it.

There are some aspects that we have concerns about, though, and that we hope NGESO might address in the future.

Firstly, whilst we understand the decision to switch DFS to an in-merit service, we worry that this could see revenue significantly drop, making the service less attractive to organisations. The in-merit service and a lack of test events mean there's no guaranteed volume of dispatch. In-merit competition means it's likely prices will need to fall for NGESO to dispatch DFS-capable assets rather than other technologies. Both metrics will impact annual revenues from the service.

Secondly, we feel that, among domestic and I&C customers, the new rules that the NGESO has laid out will make participation for many impossible.

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Jake Miller - Product Development Manager - Asset Optimisation, Drax

Of course, it isn't always realistic to give a day or more of advanced warning – or to reward all participants handsomely for flexing. But there's a sense that DFS is heading towards automated responses at the expense of small and medium-sized consumers, whose flexibility potential lies in manual dispatch.

Thirdly, we sense that having no guarantee of DFS revenue will make certain decisions necessary to provide flexibility – such as those relating to investment- or workforce-planning – more difficult. This could disadvantage or even preclude certain smaller or mid-sized organisations from taking part.

All in all though, we're glad DFS seems here to stay and we're still hopeful that it'll provide hundreds of megawatts of dispatchable power for the Grid. We're also keen to help shape the service as it switches to a year-round flexibility framework.

Flexibility at Drax

Although DFS is going to evolve from a winter-only service, at Drax we already offer year-round flexibility opportunities through our **ElectriFlex** product. This service – which encompasses the existing DFS – helps organisations like yours benefit from manual DSR, whatever the time of year.

It offers a simple and commitment-free way to explore the opportunities of demand flexibility, enabling you to retain control of whether you opt in or out of each request. These requests are clear – and there aren't any penalties if you opt in but end up being unable to deliver the flexibility.

We also support automated flexibility through our asset optimisation expertise.

By analysing your existing consumption patterns, we identify flexibility opportunities. We then help you optimise how you use power at different times of day, always bearing in mind the constraints you set.

Using this flexibility, we apply our expertise in data analysis, DSR and energy market trading to deliver fixed monthly savings on your energy bill.



You can [find out more about our asset optimisation and ElectriFlex solutions](#) on our website.



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