

DEMAND SIDE RESPONSE

Users have much to gain from flexible energy generation

Demand side response and on-site generation add two new tools to businesses trying to optimise the energy affairs. Here, Flexitricity's Dr Alastair Martin lays out the options.

For over a decade, the public sector has quietly been working with industry and commerce to help keep Britain's lights on. From horticulture to hospitals, energy users of all types are keeping the national grid in balance, right round the clock.

By providing demand side response (DSR), this eclectic array of flexible energy assets has, since 2008, received financial incentives for reducing or shifting its electricity use at times of stress. This helps transmission and distribution network operators manage supply and demand on the electricity system in a cheaper, greener and more decentralised way.

With DSR, customers can generate extra electricity when it's needed, or simply reduce their own demand. The public sector can often do both.

Combined heat and power (CHP) systems and back-up generators can each be used to cover local needs when national demand is high, but they're used in quite different ways. CHP units are economic, low carbon and flexible, but they have a 'day job' and may already be generating when power is required. Conversely, they can reduce generation when wind and solar generators are producing more than the grid needs, and keep heat customers supplied using thermal stores.

Back-up generators are best for the tightest moments, such as when a power station fails, or national demand rises very quickly. In this role, they benefit from on-load testing, which is crucial to reliability.

Some DSR works under specific contracts like National Grid's Short Term Operating Reserve (STOR) scheme, or its frequency response programmes. At other times, DSR responds to network peaks, such as cutting consumption during the 'triad' periods, during which

transmission network charges land on customers. Avoiding triad charges with DSR allows well organised companies to create large cost savings.

The road to flexibility

When Flexitricity went live operationally as Britain's first DSR aggregator ten years ago, the electricity generation market was dominated by nuclear, gas and coal. In our first winter, we regularly switched off industrial refrigerators and turned up CHP generation in response to failures at large nuclear stations (the nukes were having a particularly bad spell of unreliability at the time).

Now the market is driven by renewables. Wind and solar have replaced so much of the generation which would traditionally come from fossil fuelled power stations that they now dominate the grid. Renewable generation varies a lot, but it carries less risk of very sudden drops. So a new pattern of balancing has become important to us – adjusting consumption and generation more slowly to match the ups and downs of wind power, or covering the 'revealed demand' that pops up quickly when the sun goes down.

Four or five years ago, the headlines were all about 'Blackout Britain'. Would there be enough power to meet the peak? In the end, there was no blackout – and the public sector had a lot to do with that. Energy efficiency, especially in lighting, made a dramatic negative difference to peak demand, which is now 20% lower than it was when Flexitricity began.

Big power stations still fail occasionally, as do the cross-channel interconnectors to France and the Netherlands. So there is still a big place for the fast, firm, occasional reserve power that standby generators are good at. But equally, district energy schemes

with heat stores can provide the sort of flexibility that matches very well with the new, greener grid.

Ten years ago we spotted the gap in the market for small generators and business electricity users to use their flexibility to reduce costs and lift the bottom line. Since then, we've generated £12mn in direct revenue for industrial, commercial and public-sector energy users, by bringing them into DSR and using their flexibility to keep the national electricity system in constant balance.

Electricity trading

The energy market has changed a lot in the ten years we've been operating. We believe the next thing is for energy users, including public service organisations and community energy schemes, to transform the way electricity is traded.

Earlier this year we secured electricity and gas supply licences from Ofgem, giving us the green light to enter the wholesale energy markets on behalf of our customers. The core of our proposition is to allow customers to make their own choices about buying and selling energy, from months ahead to day-ahead, and then to profit from the flexibility they have in the on-the-day markets.

The most important of those markets is the Balancing Mechanism (BM) – a tool which National Grid uses to balance electricity supply and demand close to real time. As the only DSR company taking public-sector energy users into the BM, we can give our customers a slice of a £350mn marketplace that, until now, was closed to them.

Our new energy trading service, 'Flexitricity+', has turned us from aggregator to energy supplier – allowing us to bring industrial and commercial energy users – from all sectors – closer to the market by opening the door to energy trading via the BM for the very first time.

Unlike the Big Six suppliers, we don't own any power stations. This means there's no conflict of

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Taking a closer look: Gateshead Energy Centre

The Gateshead District Energy Scheme supplies heat and power to domestic, public and commercial customers, from 4 MW of gas-fired CHP engines via a new 3 km heat and 'private-wire' heat and power network.

Built to serve Gateshead town centre's current and future energy needs for decades to come, the scheme sets the blueprint for next-generation district energy, integrating heat and power generation and distribution with energy storage, whilst providing national grid services.

The scheme originated in 2010 from the Council's ambition to reduce energy costs and carbon emissions for Gateshead Town Centre. However, it has grown into a major infrastructure scheme that will underpin the future redevelopment of the town centre, stimulating inward investment and job creation, as well as becoming a significant trading opportunity to support the

Council's financial position.

Since becoming part of Flexitricity's demand response network in 2017, the project has received in excess of £60,000 per year by using its flexibility to smooth out peaks and troughs in national electricity demand.

Jim Gillon, Energy Services Manager, acting for Gateshead Energy Company, said: 'As a publicly owned, local heat and power generator, we need to continually look for ways improve our income base in order to support a low-cost energy offer to local customers. Flexitricity has already helped GEC do that since 2017.'

Gateshead Council leader, Martin Gannon, added: 'Once we realised that we could bring more revenue into the project by providing capacity to the National Grid – without changing our day-to-day operations – the decision was made for us.'



Gateshead Energy Centre

Photo: Flexitricity

interest when we take our customers into these markets. Flexitricity has always been a customer-centric business: we've never had any other way to earn revenue. Our systems are all built around uniting disparate energy stakeholders into larger groups, working together to balance the grid.

Energy prices in the BM can reach £2,500/MWh, compared to around £50–£70/MWh in wholesale markets. By taking the flexibility of industrial, commercial and public-sector energy users right into the BM, we are now giving our customers a slice of this premium market, while cutting the cost for National Grid and all energy users. In doing so, we're democratising energy and making the electricity system more able to absorb variable renewable generation.

Opportunities are there

BM access for energy users is brand new. Energy users should think about their next energy contract round – it might look quite different to their current deal.

Our services are different to the norm, and we're finding that they appeal most to organisations which are already active in energy management. This brings in community energy schemes, CHP generators, cold stores, 'dispatchable' renewables (like biogas or hydro) and merchant plant such as batteries or peakers.

In October, Gateshead Energy Centre – an innovative district energy scheme run by the Gateshead Council – became the first of our customers to use Flexitricity+. As a participant in the BM, Gateshead Energy Company is now generating revenue through its CHP plant – an excellent source

of flexible reserve energy.

Gateshead is one shining example of how DSR can help transform the public sector's role in creating a fairer energy system that is more decentralised than ever. DSR doesn't disrupt the participating organisation's primary operations – the energy producing assets already exist, and our job is to monetise the flexibility within the constraints of core business at the site. Engaging with DSR makes the public sector greener, and helps it save money while creating a fairer energy system for everyone. ●

Dr Alastair Martin is the founder and Chief Strategy Officer with demand response aggregator Flexitricity.