

the energyst

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OUR EUROPEAN EXPANSION

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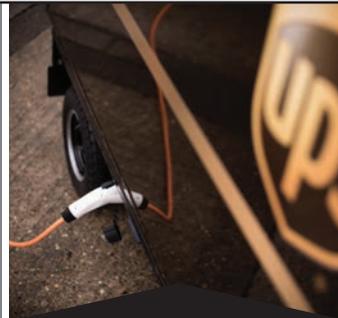


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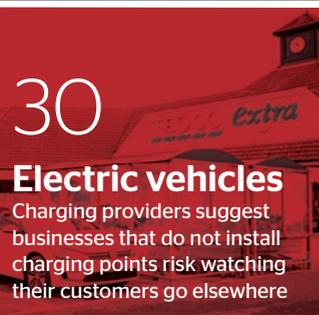


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Interaction can make all the difference

The Energyst Event is fast approaching and promises to bring a mix of industry thought leaders, end-user case studies and, importantly, debate. It aims to bring you the latest developments in technology, strategy and policy. Just as *The Energyst*, incidentally 20 years old this month, aims to cut through the noise with news and analysis of current energy management topics, so too does The Energyst Event.

However, the point of live events is interaction – and this can be the difference in understanding crucial subtleties or tailoring advice and products to suit your actual circumstances.

“The point of live events is interaction – and this can be the difference in understanding crucial subtleties or tailoring advice and products to suit your actual circumstances

As you will be acutely aware, the energy sector is undergoing profound change.

Renewable energy has, aside from becoming cost effective, opened up the need for flexibility; and means we need to rethink how and when we use power.

Battery storage has also been given a boost from the intermittency of many renewable technologies and electric vehicles could potentially factor into that equation, posing both challenges and opportunities.

In the push to reduce carbon emissions, policy and regulations relating to energy are being revised - and

often then revised again to remove adverse impacts. The volume of consultation, rule changes and resulting uncertainty makes the energy manager's job both more critical and more difficult.

And as climate protests increase in volume and scale, the pressure on companies to demonstrate that they are taking positive action will rightly increase.

The Energyst Event, alongside *The Energyst*, reflects these challenges and offers solutions. Speakers and exhibitors reflect the spectrum of industry, both from the supply side and importantly your peers in energy management will detail their successes and struggles and share best practice. Get involved to steer the debate and make the event bespoke to your needs.

The CPD-certified sessions are free to attend, giving you a cost-effective way to continue your professional development. The conference programme is ably supported by a second stream run by ICON (Industrial & Commercial Operations Network).

There are also Masterclasses on energy benchmarking and performance indicators by expert Vilnes Vesma (details at vesma.com/training).

So for everything energy, be sure to attend The Energyst Event, 1-2 May at the National Motorcycle Museum, Birmingham. Register at theenergystevent.com

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National Grid confirms 2018-19 Triads

National Grid Electricity System Operator has confirmed this winter's periods of peak demand, known as Triads.

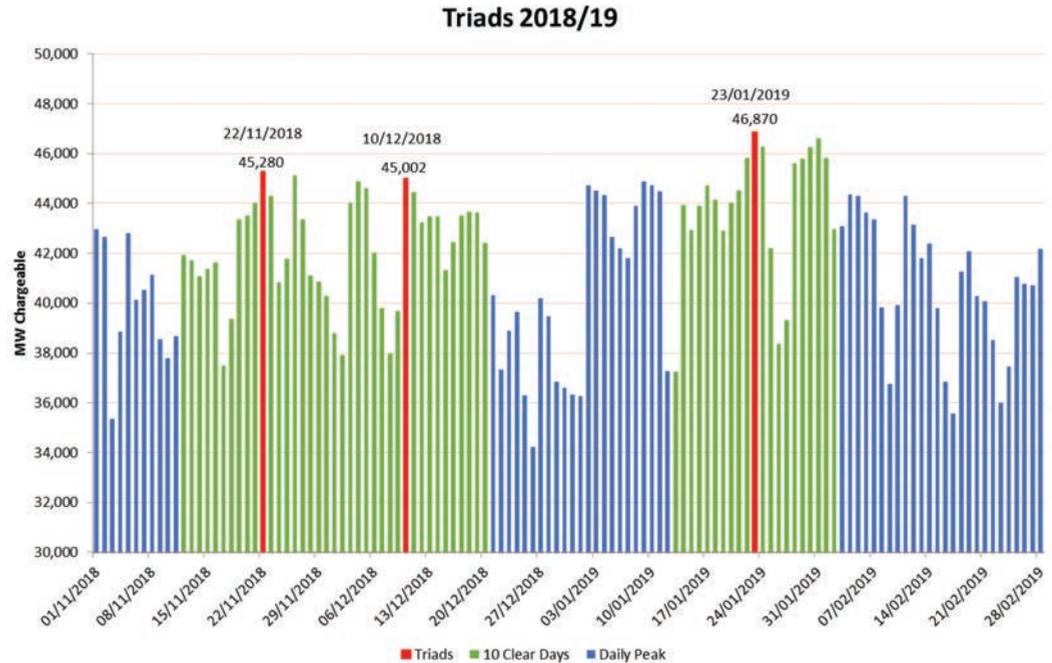
Transmission charges for large businesses are based on these periods, the three half hours of highest demand that are at least 10 days apart, between November and February.

But the cunning trick is that National Grid only reveals them retrospectively – and failing to hit a Triad can be very expensive.

As a result, many firms curb consumption or switch to onsite generation over winter evenings to try and reduce their bills.

Fear of missing a Triad results in an estimated 2GW of demand reduction when a peak period is deemed likely.

That reduction is encouraged by an army of consultants, who send Triad warnings to their clients, aiming for the coveted prize of guessing the three peaks in



Transmission charges are based on the three half hours of highest demand at least 10 days apart

the lowest number of calls.

The winter 2018/19 Triads were as follows:

- Thursday 22 November 2018 from 17:00-17:30 with peak demand at 45.3MW
- Monday 10 December 2018

from 17:00-17:30 with peak demand at 45MW

- Wednesday 23 January 2019 from 17:30-18:00 with peak demand at 46.9MW

The three peaks continue a

downward trend – the lowest for about quarter of a century.

The Triad mechanism looks set to be scrapped as part of Ofgem's charging review, but will likely remain in place for a few years yet.

Government details next steps for summer Capacity Market auction

The government has detailed its plans for a T-1 Capacity Market auction for delivery over the coming winter.

It aims to hold an auction by August at the latest, and has outlined how agreements will be awarded and honoured – subject to state aid approval.

The Capacity Market is suspended following a ruling by the European Court of Justice that found in favour of Tempus Energy, which took the government to court, arguing

that the European Commission had not followed due procedure and that the market design discriminated against demand-side response.

That ruling came just as power providers had pre-qualified for a year ahead, or T-1 auction that was due to be held in January 2019 for delivery next winter. To ensure sufficient headroom on the

power system, government said it would run the auction at a later date and consulted with market participants on its approach.

In its consultation response, Beis said it plans to issue 'conditional capacity agreements' to winning bidders, as state aid approval is unlikely to be granted at the time of the auction.

The department said it anticipates approval will be received ahead of the start of the delivery year, ie by November. However, it will make provisions to make back-payments to successful bidders if approval

is not received by that point.

Those with conditional agreements must deliver their obligations and penalties will apply to those that do not, or fail to hit delivery milestones.

Beis said it intends to allow secondary trading of conditional agreements after the auction. It will waive credit cover requirements, though will introduce termination fees if non-proven DSR over 2MW does not provide a test certificate.

However, because lead times will be shorter, Beis plans to make changes to rules around tests for DSR providers.



System operator says it can go 100% renewables by 2025

National Grid ESO believes it will be able to operate the power system with 100% renewable power – for periods at least – by 2025. But it says it will need to “fundamentally change” the way it operates.

“Operating a zero-carbon electricity system in 2025, whenever there is sufficient renewable generation, is a major stepping stone to full decarbonisation of the entire electricity system; enabling new technologies and removing barriers to ever increasing levels of renewables,” said ESO director Fintan Slye.

In order to achieve that goal, the system operator has to roll out new ways of managing system characteristics like inertia and voltage across the system. That means in some cases developing new markets, for system products that have not yet been designed, and it requires far more data to be



We need to fundamentally change how we plan, analyse and operate the electricity system and innovate
Fintan Slye,
National Grid ESO



handled to model the system.

The ESO said: “We need to fundamentally change how we plan, analyse and operate the electricity system and innovate in the development and deployment of new technologies, products and services.”

The development timeline includes plans to:

- Be able to use wind and solar to provide reserve and response services by 2020
- Increase deployment of storage and its use in frequency markets
 - Define new ancillary services that deliver the inertia currently provide by rotating fossil plant, so that new markets for these services can be developed and put in place by 2022
- Investigate existing and new technologies that can provide voltage support

- Improve forecasting of wind and solar, along with embedded generation
- Develop the ability to monitor and measure inertia and new network analysis tools that allow it to be modelled and different operating scenarios assessed in real time

The ESO said that although this would be a step-change in grid operation “we know, through approaches that we have had to date, that there are customers with the right technologies that can provide these services. Therefore, once we have identified and described the technical requirements of the network it should be possible to create the right products and market place.”

A version of this story first published in our sister publication, New Power

‘We’ll use a lot more gas before we use less’

“Natural gas is absolutely crucial and we are going to use more of it before we use less,” according to Centrica CEO Iain Conn.

Speaking at Aurora’s Spring Forum, Conn suggested using hydrogen for heating is “unlikely to be practical”. He said British Gas, instead of installing boilers in homes, will ultimately install heat pumps, “and be in business long after natural gas [use] disappears”. However, he added, “it will be quite a long time before we get to that point”.

Aurora’s John Feddersen launched the conference by citing a need to build out 400-600GW of renewable energy globally per annum for the next 30 years to meet increasing demand, including electrification of transport, and climate goals. That broadly equates to a Hornsea One offshore wind farm coming on stream every day from now until 2050.

Asked if that could be achieved, Conn said distributed generation in combination with centralised renewables projects may be able to deliver. But he suggested that the headline generation figure could first be significantly reduced by better energy efficiency and use of flexibility.

Shell ‘will be world’s biggest power company’

Shell believes it can be the world’s biggest power company by the early 2030s – driven largely by renewables and gas. It thinks electrification will grow rapidly and eyes double-digit returns from smart trading and management of flexibility.

In an interview with Bloomberg TV, Maarten Wetselaar, Integrated Gas & New Energies director, said the company is interested not in legacy power sector business or economics, but “what we see in next 20 years – intermittent demand and supply”.

He implied that Shell

sees greatest margin from domestic retail – selling not just power but solar, storage and smart home and electric vehicle management, nodding to recent deals for Sonnen and others as enablers.

However, generation is also important, as Shell does not believe consumers will want to buy clean energy from those that do not generate it.

While Shell has stepped up its investment in clean technologies in recent years, it will move rapidly to scale once its strategy is proven, said Wetselaar.

Eon's Johannes Teyssen: 'The grid, not generation, will crack decarbonisation'

Eon chief executive Johannes Teyssen says the energy sector must change the narrative on climate change, minimise costs of decarbonisation and start working on today's challenges instead of trying to design perfect long-term solutions.

Much of the heavy lifting, he suggested, can be done by better use of existing power grid infrastructure.

Speaking at Aurora's Spring Forum, Teyssen warned that negative public perception of climate stabilisation measures could spark civil unrest if people are not engaged and costs run unchecked.

"People want subsidies for this, for that. But the state is [the wallet of] the private person. We need to respect that."

The conference earlier highlighted Aurora projections that in the UK alone 60TWh of seasonal storage and/or



Why focus on 'unknown unknowns' if there are so many areas we can tackle first? Johannes Teyssen, Eon

flexibility may be required under a net zero scenario.

Teyssen acknowledged the scale of the challenge but urged sharper resolve on making immediate progress than perfecting long-term solutions.

"Why focus on 'unknown

unknowns' if there are so many areas we can tackle first?" asked Teyssen, suggesting that power grid utilisation is the best place to start.

"Most of the solution is in the grid," he said, "not generation."

Electrifying transport, Teyssen thinks, could deliver wins for the power system and for consumers: cars can remove excess power from the system when required and enable a greater number of units of electricity to be used within existing infrastructure, driving down unit costs.

Teyssen believes the need for 60TWh seasonal storage is "about two decades out".

"We can look at that and use it as a scapegoat, or focus on the problems of the coming decade and start today."

Audrey Zibelman, chief

executive officer at the Australian Energy Market Operator (AEMO), seconded that view. She said unexploited assets could be better utilised to managed "deep bellied ducks" (the curve between peak demand and available renewable resource – so called because it looks like a duck).

"There are solutions; you can make demand a primary resource to follow generation as opposed to generation following demand," she said. "So maximise what we have ... Then look at what we need going forward."

Irene Rummelhoff, executive vice president, Marketing, Midstream & Processing at Norway's Equinor (formerly Statoil), disagreed.

"It does take time to solve long term issues – and it is the responsibility of companies like ourselves to spend some time solving them," she said.



Innogy finance chief: winding down Npower an option

All options are on the table for Npower, including winding down the business. During an analyst call, Innogy chief finance officer Bernhard Günther said Innogy expected a negative Ebit contribution from UK retail of about €250m in 2019 and perhaps €150m in 2020.

"Based on the current market situation, we don't give any guidance on when this business on a standalone basis will turn positive," he said, adding that "irrational pricing behaviour" from other energy retailers hampers forecasting.

"We observed towards the end of 2018 that some are offering [tariffs] at negative gross margins and gaining customers by doing so. We always said we would not try to buy customers at a loss." As such, the company expects more customer losses, which will create further drag.

Asked why Npower has performed consistently badly compared with the rest of the Big Six in recent years, Günther was frank: "Because on our way to restructuring,

we have lost so many customers. In retail, B2C at least, a significant part is cost-driven," he said. "The larger the customer base, the [greater the contribution to] covering fixed costs.

"Our fixed cost base is relatively similar to [the other Big Six competitors]. But we [now] have around 4 million customers. Eon has 7 million, Centrica has about 10 million. We just lack the critical mass to be on an equal level of profitability as they are. It is a typical fixed cost dilemma that we are in."

Günther declined to quantify the number of roles that would be required at a combined Eon-Npower retail entity, should that eventuate. Should Innogy decide to close Npower, the "all-in" cost would be "significant" triple-digit millions of pounds, said Günther.

Günther: 'We do not exclude any option'

"We do not exclude any option. Of course the strategic option ... selling the customer book and winding down the operation of the business is one of the various options and the wind down scenario would include some significant costs," said Günther.

Whether those costs are considered "prohibitive ... is in the eye of the beholder", Günther suggested. He said the cost of closure would be taken into account in when weighing up other options for Npower, but added that making assumptions about how much a prospective buyer might be prepared to pay for Npower's customers was a "very volatile 'unknown unknown'".

Asked to make a comparison with the sale of 770,000 customers to Utility Warehouse for £216m in 2013, at around £300 per customer, Günther suggested those days were long gone.

"We would be happy to consider any offer based on those multiples," he said.



Honda to electrify models and move into energy management

Honda has announced plans to ensure its entire range of European models are electrified by 2025, though that includes hybrids.

It also plans to launch an energy management company. The carmaker has struck agreements with charging companies and smart grid platforms in a bid to unlock smart charging and vehicle-to-grid opportunities, where cars can essentially be aggregated into virtual power plants.

Announced at the Geneva Motor Show, the move is another significant indication of the convergence of energy and transport. It serves as another warning to traditional utilities that the game is rapidly changing: Honda is not the only carmaker getting into the energy business.

In January, Volkswagen



Honda is moving into the energy business

announced the launch of its own energy company, Elli. The world's largest carmaker, which has committed to invest €30bn on EVs over the next five years, said energy supply was "strategically relevant" to its business.

Nissan is also considering launching an energy company and is bullish on the prospects of vehicle to grid

services. It is likely that other carmakers will follow suit.

Honda will work with Moixa on smart charging and vehicle to grid services. The company's Gridshare platform aggregates lots of small loads, such as home energy storage systems and EV batteries. Moixa claims its technology uses artificial intelligence to learn consumption patterns and optimise batteries. The company, which counts Tepco as an investor, last year signed a strategic partnership with Itochu Corporation to take its Gridshare platform to Japan.

Honda has also struck a partnership with Ubitricity, a charging firm that has developed technology enabling chargers to be installed more easily on streets – such as on walls or lamp posts.

"This is a significant move for Honda, our intention is

to deliver industry-leading innovation by launching energy services...to create additional value for power system operators and EV customers alike," said Tom Gardner, senior vice-president, Honda Motor Europe.

Moixa founder and chief executive Simon Daniel said: "We are delighted to support Honda's ambitious plans for total electrification of new car sales in Europe. Our technology will be able to manage millions of EV batteries, maximising savings for customers and using spare capacity to support a low-carbon electricity grid."

Chief technology officer Chris Wright added: "Moixa's GridShare software ensures cars are charged in the most cost-effective way to save money, it can use their batteries to power a home when energy costs are high, and it can aggregate spare capacity in a virtual power plant to provide a range of services that help balance supply and demand."



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£100m tab for failed energy suppliers

Energy suppliers may face another big Renewables Obligation bill after a spate of market exits.

Cornwall Insight forecasts a potential shortfall in the RO Buyout Fund of up to £43.8m for 2018-19.

Under the Renewables Obligation, energy suppliers are obliged to buy a certain amount of power from renewable sources. If they do not, they pay into a buyout fund.

The cost of the Renewables Obligation is added to the customer bill and the suppliers then pay into the

fund at the end of the year. The problem is, many of the 14 small suppliers that have gone bust since the

£43.8m

Potential shortfall forecast in this year's RO Buyout Fund

start of last year spent the Renewables Obligation money.

The resulting shortfall is mutualised – or smeared – across all other suppliers.

It was £58.6m light for the 2017-18 period, leading Ofgem last November to announce it was tightening rules for new market entrants.

Within days, several more firms that owed millions in Renewables Obligation payments had ceased trading.

Solvent suppliers picked up that tab. Should Cornwall's estimates prove correct, it will mean customers end up paying around £100m in total through their energy bills, effectively subsidising the unsustainable prices with which the failed suppliers gained customers.

That will add further pressure to smaller suppliers already struggling with cashflow issues, rising prices and tougher terms imposed by traders in the wake of market failures.

Meanwhile, renewable generators that qualify for Renewables Obligation payments will have to wait many months longer to get paid the full amount they are due, said Cornwall Insight team lead Tim Dixon.

Dixon urged policymakers to think about collecting payments more regularly to avoid repeat episodes.

Northumbrian Water signs offshore wind PPA with Ørsted

Northumbrian Water has signed what is believed to be the UK's first corporate power purchase agreement (PPA) for offshore wind.

It will take about 100GWh per year from Ørsted's 573MW Race Bank wind farm, located off the Norfolk coast. The deal is for 10 years.

PPAs are starting to become a more common way for large companies to buy power: they agree to pay a fixed rate over number of years, giving themselves price certainty and mitigating market risk.

In a post-subsidy environment, PPAs will become an increasingly important mechanism for developers to finance renewable energy projects, though offshore wind may need support for some time yet.

"This PPA is not only a first of its kind in the UK; more importantly it aligns perfectly with our sustainability goals and our ambitions of creating a truly cohesive energy management strategy," said Graham Southall, Northumbrian Water's group



commercial director.

"The long-term stability this brings is fantastic for us, and great news for our customers and stakeholders, because it reduces operational costs without compromising our work."

Alana Kühne, head of corporate PPAs at Ørsted, said the deal "is an important step towards building long-term green partnerships with corporate power customers".

Northumbrian Water signed a four-year energy supply contract with Ørsted last year.

Ørsted owns or has a stake in nine UK offshore wind farms

(Barrow, Burbo Bank, Burbo Bank Extension, Gunfleet Sands, Lincs, London Array, Walney, West of Duddon Sands and Westermost Rough).

It also has another four projects under construction (Hornsea One, Hornsea Two, Race Bank and Walney Extension), which would take its offshore interests to 4.9GW, plus two in development (Hornsea Three and Isle of Man), which, if built, would result in an 8GW UK portfolio.

The company, part-owned by the Danish state, plans to build 15GW of offshore wind capacity by 2025.

Nicola Lovett promoted to Engie CEO

Nicola Lovett has been appointed CEO of Engie's UK & Ireland business as of 1 May. Current CEO Wilfrid Petrie will join the group's executive committee in Paris and lead development of its French B2B business.

Lovett joined the firm in 2013. She was most recently divisional CEO for Business Energy and Services. She said she was "delighted" to take on the top job. "We have a clearly defined strategy in integrated client solutions and flexible and renewable energy, delivering outcomes for both business and local authority customers that enable them to balance their performance with responsibility," said Lovett. "I look forward to helping our customers in the transition towards a more decentralised, increasingly digitised, zero carbon economy."

Wilfrid Petrie said Lovett is a "strong leader" with the requisite "experience and qualities" to steer the organisation. He said his own tenure had been "a great pleasure."

Good Energy pushes harder into b2b market

Good Energy believes its growth will increasingly come from the business market, with energy services the future of its business model.

Posting unaudited full year 2018 results, the company said overall business customer numbers grew by 4.6% to 122,210, though most of these – 115,773 – are Feed-in-Tariff customers.

However, SME business energy supply customer numbers increased by 39.8% to 6,347. Domestic customers fell by 3.4%.

Good Energy plans to begin its smart meter rollout this year, using Smets2 meters and eschewing in-home displays for apps on customer's phones.

The company said it would also invest battery storage

and electric vehicles in 2019, following its framework agreements with Belectric and Powerstar and recent investment in Zap-Map.

The company hopes to deliver fully funded, behind-the-meter storage solutions to business customers. Meanwhile, it hopes to create a peer-to-peer or 'energy sharing' model for domestic customers, which combines aspects such as rooftop PV, smart energy management and electric vehicles.

"Your home can become a miniature power station, with the right equipment in place," said CEO Juliet Davenport.

On revenues of £116.9m, Good Energy posted a profit of £865,000 compared with a £2.7m loss in 2017.

Monarch Partnership acquires Utilitywise's EIC

The Monarch Partnership has acquired Energy Intelligence Centre (EIC) and T-Mac Technologies for an undisclosed sum.

The deal follows the collapse of third party intermediary Utilitywise, with the sale brokered by administrators FTI Consulting. EIC was Utilitywise's corporate arm, handling larger businesses, while energy software and smart buildings firm T-Mac was acquired by the group in 2015.

In a statement, the company said all 130 staff from EIC and T-Mac will join The Monarch Partnership, creating a firm with 250 employees and combined revenues of £20m.

Peter Dosanjh, chairman and CEO at The Monarch

Partnership, said the aim is to build "a premier utility consultancy focused on helping our customers to become fully sustainable energy users".

He added that the company is now working to integrate the businesses, though they will retain separate brand identities and offices.

• Latest Companies House filings show Utilitywise racked up £94m in debt. It collapsed owing Total Gas & Power £5m, of which £3m was advanced commissions. The list of corporate creditors suggests Engie and SSE are also substantially out of pocket, with several other energy suppliers featuring in a long list of those owed money.

Don't get complacent about falling commodity costs

By Amy Bolton, Supplier Relationship Team Manager at Inenco

As 2018 marked the tenth successive year of rising business energy costs, energy managers are understandably focused on mitigating the effects on their energy bills. In today's volatile market, creating the optimum

procurement strategy is a vital element in achieving this.

Last year, many businesses saw energy bills increase as wholesale energy prices rose significantly, driven by European gas demand, rising carbon prices and bullish oil markets. Since February, however, we've seen wholesale costs fall due to a mild winter and a healthy supply of gas – but that doesn't mean businesses can get complacent.

While commodity prices have fallen so far in 2019, non-commodity costs continue to rise. The end of the Carbon Reduction Commitment (CRC) scheme at the beginning of April has increased the Climate Change Levy (CCL) by 45% for electricity and 67% for gas, for example, which will have a significant impact on businesses that aren't exempt from the CCL. And while the Capacity Market (CM) has been suspended, payments will be backdated when the market is restored. Businesses need to be prepared for this, as the levy is expected to be around £100MWh this year – a huge increase from winter 2017/18, when it was around £40/MWh.

Savvy energy managers will be focusing on their



Savvy energy managers will be focusing on their energy management strategy to mitigate spiralling non-commodity costs

energy management strategy to mitigate spiralling non-commodity costs, which now make up around 60% of business energy bills. But taking the optimum approach to energy procurement is also key, as if we see wholesale costs rise again then businesses will once again face pressure on both sides of their bill.

Creating an energy buying strategy isn't easy – businesses need to take into account their appetite for risk, in-house capability and resources, as well as their budget. If your contract is up for renewal, Inenco's procurement experts can help you to find a solution that's right for your business – to find out more, visit www.inenco.com/experts.



GREEN ENERGY CONSULTING: EUROPEAN EXPANSION

An introduction to Green Energy Consulting

Green Energy Consulting is a well-established, leading consultancy specialising in renewable energy and sustainability. The company was established in 2012 by our two directors in one of Gateshead's redeveloped railway arches. Since then we have grown to 100 members of experienced staff and manage over 3.1 TWh for the thousands of clients in our portfolio.

Due to our vision and drive, we are confident that our services make a real difference to the environment and our clients. We assist our clients with all issues from energy management to consumption reduction strategies. We pay attention to the ever-changing utilities market and introduce measures that will help tackle the challenges the industry is facing.

We pride ourselves on the holistic service we offer to our clients - going above and beyond simple procurement to offer a turnkey solution to energy management.

Our work throughout the UK

Our consultancy service allows our clients to adopt the most sustainable approach to consuming energy, as such, improving their green credentials enabling them to deliver against brand values, without the added cost. We work with a vast range of clients, across various industries including, for example; Kurt Geiger, Spud u Like, Sixt and L'Occitane.

We understand the dynamics of operating within the energy market - we are completely independent and always look to add value to our clients from SME to Corporate level. GEC conducts a fully managed tender process for all clients - ensuring the best contract terms. Our bespoke system encourages buy-in from all suppliers, which in turn results in an extremely competitive tendering process through which our clients can save time, energy and money.

We have relationships with across the supplier market, from the Big Six, through to independent, regional and renewable suppliers - which helps us to get the best deal for each client. Due to the buying power of our portfolio, we can offer 100% renewable electricity and carbon neutral gas to our clients.

Our energy experts carry our regular market analyses to identify changes in the industry that may affect our clients. We have worked with over 100 companies to facilitate their compliance with the ESOS scheme and identify behavioral changes and technological solutions to help reduce their energy consumption and enhance sustainability performance.

European Expansion

Through continuous examination of the market, we endeavor to come up with new ways for organisations, in any area, to benefit from services that have beneficial influences on the



“WE PRIDE OURSELVES ON THE HOLISTIC SERVICE WE OFFER TO OUR CLIENTS – GOING ABOVE AND BEYOND SIMPLE PROCUREMENT TO OFFER A TURNKEY SOLUTION TO ENERGY MANAGEMENT”



number of energy suppliers – reducing the complexity of billing in the portfolio – while taking advantage of economies of scale. A single point of contact for sustainability ensures that we can provide reporting on consumption on a European level and provides the opportunity for clients to implement group wide sustainability practices.

Our future plans

Given our success in the United Kingdom, and our early work with some of our multinational clients in Europe, we see this as being a key part of the organisation moving forwards. We are looking to bolster the European function within the coming months to provide coverage across the entirety of the region – taking advantage of existing supplier relationships and building our new relationships to provide a wide panel for future procurement activities. Although we have conducted work with some of our multinational clients in Europe already, we continue to add to our existing client portfolio by taking on new opportunities across France, Spain, and Germany. We have expanded our in-house energy management platform Energetics to deal with region specific data, and will be offering clients a solution that provides group wide usage coverage.

We continue to rise from strength to strength as we always look to develop new consumption reduction strategies, that are simple, unique and at a minimal cost to the environment. Our forward and innovative thinking is just a small part of what makes us stand out in the energy sector.

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environment - this is why we have taken the opportunity to expand into the European Union.

To provide clients with the same level of service in Europe that we do in the United Kingdom, we chose to build a team of experienced European Energy Consultants. We are initially launching in France, Spain, Germany, The Netherlands and Italy during the initial months of the projects, with plans to provide full European coverage in the coming months. Our existing service to clients is based upon having highly skilled Energy Consultants and Account Managers provide an efficient and effective solution that fits with a clients' expectations and needs – allowing them to save more than just money. By having access to customer consumption information, our Sustainability Consultants can conduct desktop audits of energy consumption against equipment on

site to identify opportunities of energy savings. The new European function will follow the same methodology, and will offer clients the ability to access a level of service often taken for granted in the United Kingdom. The staff have years of experience throughout Europe providing large multinational clients with an extremely high level of service, intelligent purchasing, and costed opportunities for reducing energy consumption.

Integrated procurement across UK & Europe

An advantage of having an integrated procurement strategy throughout the United Kingdom and Europe is that it allows for a more efficient procurement, account management, and sustainability service. Our wide market coverage in Europe combined with our full market coverage in the United Kingdom ensures that we can provide the opportunity to streamline the

Imbalance prices turned negative for 13 consecutive settlement periods on Sunday 24 March, as low electricity demand and high levels of wind output led the system operator to reduce generation output from a variety of wind, combined cycle gas turbines (CCGT) and biomass power stations.

The imbalance price dropped below zero in period 21 (starting at 10am) and remained negative for 13 periods until period 33 (up to 4.30pm), with the price falling as low as -£70.24/MWh in periods 28 and 29 (see Figure 1).

What happened?

The fact that many wind farms are located in Scotland exacerbated the requirement to turn down output in certain locations, as there is not enough capacity to transport all the electricity to southern England, where electricity demand is highest – known as ‘constraints’ in grid terminology.

As shown in Figure 2, the majority of the capacity turned down by National Grid was from wind farms, but with some biomass and CCGT plant also reducing output. Wind farms and biomass in particular will be in receipt of subsidy payments, and therefore require a payment to decrease output.

With many of these actions taken to manage constraint issues in Scotland, rather than because there was simply too much generation, much of the output that was turned down needed to be offset by increasing the output of other plants. This can also be seen in Figure 2, with National Grid turning up CCGT plant at the same time as wind farms were being asked to turn down.

Figure 2



When the wind blows: Negative pricing

Cornwall Insight team lead Tim Dixon explains negative pricing, an increasing phenomenon as renewables penetration increases, and what it means for renewable generation economics

Figure 1 shows the volume of electricity that National Grid accepted in the BM to turn up (known as accepted offers), and the volume of electricity National Grid turned down (known as accepted bids), by technology. The accepted bid volumes were significantly greater than the accepted offer volumes, indicating there was too much generation on the system and ultimately resulting in negatively priced actions being accepted to balance the system.

In addition, the way the imbalance price is calculated

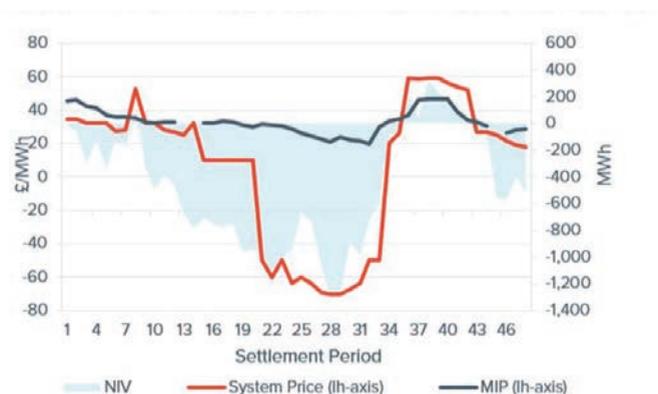


Figure 1: Net Imbalance Volume (NIV), System Price and Market Index Price (MIP), 24 March



Tim Dixon



changed in November 2018. Under the new arrangements, the Single Imbalance Price (SIP) for each settlement period is effectively calculated using the costliest 1MWh of actions that National Grid takes to balance the system. This is the Price Average Reference (PAR) volume, which changed from 50MWh (PAR 50) to 1MWh (PAR 1) last November.

Under the new methodology, it is more likely that imbalance prices will outturn negative, with the potential that only one negatively priced action on the BM will result in a SIP below zero.

Who got paid what?

The average accepted bid price (the price to turn down generation) from wind farms was -£75.9/MWh, with Walney offshore farm – which is accredited to the Renewables Obligation (RO) – receiving the lowest price of -£188.9/MWh. Biomass power stations, most notably Drax, which also receives RO payments, had an average accepted bid price of -£61.2/MWh.

For the majority of negatively priced periods, it was either Drax's biomass units or onshore wind farms setting the imbalance price, with CCGT and hydro plant occasionally setting the price.

Conversely, the average accepted offer price (the price to increase output) from CCGT plant was £62.3/MWh, the highest of which came from Pembroke at £621.0/MWh. During the day, accepted offers were rarely used to set the imbalance price as the volume of bid actions outweighed the volume of offer actions.

The wider impacts of negative prices

While negative pricing in the BM is not a new phenomenon, it is a trend that is on an increasing trajectory, as more intermittent renewables are added to the system and changes to the imbalance price calculation

has made it easier for the SIP to outturn below zero.

However, negative pricing events have not yet had a significant impact on the wholesale power market. While there have been some occurrences on the within-day wholesale market, day-ahead auction prices have never fallen below zero, with the lowest being £1.57/MWh for a single one-hour block, which occurred in 2017. But events on 24 March do highlight the increasing impact of price cannibalisation – the depressive effect that high levels of intermittent renewables output have on the wholesale power price – which can significantly reduce revenues for renewable generators.

Our analysis expects a rising number of negative wholesale price occurrences in the future, as intermittent renewables capacity rises. This is shown in Figure 3, which shows that by 2034 14% of half-hourly settlement periods could outturn negative at negative prices.

The cannibalisation effect will have a significant impact on the business case for new build renewables, as projections that this phenomenon will increase have lowered projected revenues for merchant plant and hindered the ability for off-takers to offer investible floor prices in long-term Power Purchase Agreements.

The impacts are not limited to subsidy-free renewables reliant on the wholesale price, but also to RO stations that are also exposed to wholesale prices. Furthermore, while Contracts for Difference (CfD) generators are largely protected against price cannibalisation, any generators from Allocation Round 2 and onwards will not receive their subsidy payments if day-ahead auction prices turn negative for six consecutive hours or more.

Negative pricing, both in the BM and on the wholesale market, is a trend to watch out for as more intermittent renewables capacity comes online. **te**

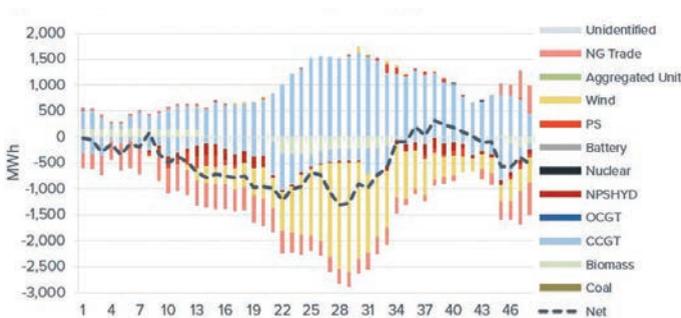


Figure 2: Accepted bid-offer volumes in the BM by technology, 24 March

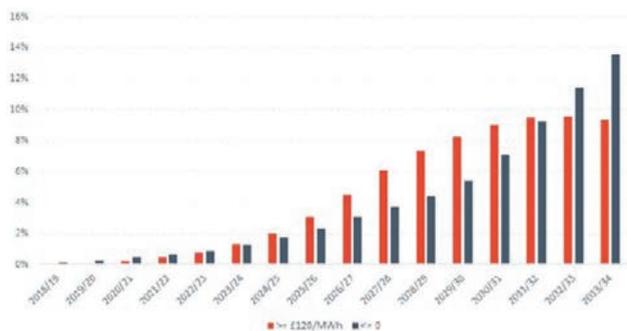


Figure 3: Annual frequency of <=£0/MWh & >=£150/MWh wholesale price periods through to 2034

Warrington Borough Council has signed a huge solar plus battery storage deal, enabling it to generate all of its electricity and make millions of pounds a year in profit.

Both the council and Gridserve, the company behind the project, believe it creates a blueprint for other local authorities to follow.

Warrington will pay £62.3m for two solar farms totalling 60.4MW plus 27MW battery storage.

The battery will be co-located with a 34.7MWp solar farm at York. Construction work will commence ‘imminently’, according to Gridserve.

A second 25.7MWp solar farm at Hull is due to follow, with plans to add a battery at a later date.

Blueprint

The council will take ownership of the projects once completed. By supplying or ‘sleeving in’ its own power, Warrington will lock in prices and cut its bills by about £2m a year. It expects to make £150m in surplus from the solar farms over 30 years, which will be fed back into frontline services. Gridserve, founded by former CEO and co-founder of Belectric Toddington Harper, will continue to operate the assets.

The leader of Warrington Borough Council, Cllr Russ Bowden, says local authorities have a pivotal role to play in decarbonising the economy. He urged other councils to emulate the “working model” its projects have created, deemed by the Association for Public Service Excellence (APSE) as ‘prudent, commercially viable and of high investment grade’.

Gridserve’s Harper says it was “very likely” more councils will follow suit. He believes the subsidy-free model is “genuinely



Making unsubsidised solar stack up

A massive solar and storage deal promises to lock in renewable power for Warrington Borough Council, cut bills by £2m per annum and generate £150m for frontline services over 30 years.

Brendan Coyne reports

sustainable and delivers multiple wins for everybody”.

No subsidy, no limits

Since selling Belectric, Harper has been working to make unsubsidised solar viable. He thinks the Warrington deal represents a watershed moment.

“Previously, everything was driven by a subsidy, a pot, a target. All of a sudden we don’t have any of that, we are limited merely by the extent of our ambition.”



Local authorities have a pivotal role to play in decarbonising the economy and are urged to emulate the ‘working model’

That means “no more scabbling in mid-winter mud, racing to finish projects” to hit a subsidy-driven deadline. Crucially, he says, it requires “much greater intelligence” around how the power is used.

“In the subsidy environment, projects were designed around those subsidies. There was not a great amount of attention about the energy itself once it went into the grid.”

That led to imbalances and inefficiencies, which



Toddington Harper believes the subsidy-free model is 'genuinely sustainable and delivers multiple wins for everybody'

and tracking technology.

Bifacial panels generate energy on both sides – from ambient light on the back, from daylight on the front. Trackers rotate the PV panels from east to west, smoothing out generation curves throughout the day.

That is important in a world where income is market-driven, says Harper.

“Subsidy-type solar farms, designed for index-linked returns rather than grid impact, will typically have panels facing south and typically achieve highest output around noon,” says Harper.

“Without subsidy, in a system driven by supply and demand, exporting power to the grid when everybody else is exporting means prices will fall – and that’s not particularly helpful to the system.

“So the trackers and the bifacials enable us to generate a little more power and generate it more evenly throughout the day. There is still a curve but it is much flatter, and it generates additional [financial] benefit as well as benefit to the grid.”

Adding a battery enables Warrington to spread

the load further, and potentially export more at peak times, or whenever the system needs it most.

Grid services

The import-export connection means Warrington can also draw power from the grid – for example, when there is too much wind, or too little demand on the transmission system (demand-turn up), a growing challenge for National Grid.

“Batteries can provide any grid services – frequency, reactive power, Black Start, a whole combination of things,” says Harper.

“But even without securing contracts from National Grid, or ultimately distribution system operators (DSOs), you can just time shift when it makes sense. That is why we are called Gridserve. We aim to help the grid – and that is what we mean by ‘sustainable’ energy above ‘renewable’ energy.”

Harper says Gridserve has been conservative in its modelling for York and Hull and could ultimately end up making money for the council in many more ways.

“We have actually put a lot of potential revenue lines at zero. That way, when we over deliver, everybody is happy. But anything is possible. We can do much more with these projects than we are forecasting.” te

require further actions and payment to correct.

“That’s not particularly clever,” says Harper. “If we are going to have an infrastructure based primarily on renewable energy, you have to make projects part of the solution.”

Smarter systems

Without subsidies, solutions must also be more efficient to wring out maximum value. At Warrington, Gridserve thinks it will deliver 20% more power by combining bifacial panels

Solar+storage+EV forecourts

Gridserve has also unveiled plans to build 100 electric vehicle (EV) charging forecourts, with 80 sites in various stages of planning. The aim is to build 20 forecourts within the next two years and more than 100 within five – each with retail, services and restaurants – and EV showrooms or ‘experience hubs’, says Gridserve’s Toddington Harper.

Where possible, the firm will deploy megawatts of solar and storage at each site – as it is doing in York and Hull with Warrington Council.

Harper says the forecourts will have optimised queuing systems to avoid charge rage: “You don’t want to get that wrong.”

There will be up to 12 super chargers “capable of 500kW per charger” as well as up to 12 spaces for fleet and commercial vehicles per site. With a “well-organised queuing system”, the company’s modelling suggests drivers will typically be waiting “for a few minutes, which is acceptable”, Harper says.

Local authorities seizing power

Members of the UK100 network of local authorities have pledged to convert to using 100% green energy by 2050. Janet Wood spoke to the network's director, Polly Billington, about taking a local approach to energy

UK100 came out of the Paris agreement in 2014, explains director Polly Billington. A large number of companies made a commitment to 100% clean energy at the time but she says: "I have been around enough campaigning to understand that if you are not careful a political commitment like that can get put in a bottom drawer and nothing happens."

She sourced funding for a network of UK local authorities, who would replicate the Paris Agreement's C40 network of 'megacities' committed to addressing climate change.

From the original 66 UK100

members, the network has grown to 94, about a fifth of UK local authorities.

"The more connections you make between people who are elected to make these decisions, the more you can increase not only their ambition but also their ability to deliver," says Billington. Local leaders are better placed to do some of these difficult things because "they are committed to their communities, they have good relationships with local business and they are very connected".

Climate change is a huge motivator for some people, she explains, but for others it comes alongside other practicalities, like deep retrofitting social housing, or understanding and engaging with the energy sector.

"Those things are the bread and butter of local authorities and although these are not particularly sexy, they are also things that deliver co-benefits that local leaders can talk about. You are more likely to win on your deep



Polly Billington



London is leading the way with its Ultra Low Emission Zone but 'there is a long way to go', says Billington

retrofit if you are talking about saving people money and creating warm and healthy homes, than you are if you talk about saving the planet."

Enable or regulate?

How can local authorities best engage with the energy industry? Billington says UK100 sees a high level of ambition among its members but "there is a long way to go for local leaders in understanding the rapidly changing energy landscape and how they can formally engage with it". Regulatory structures at the moment don't favour the rapid decarbonisation of energy and heat and transport required, she says.

The important thing about local leaders is that "they have levers across all their vectors"

with Ofgem and the DNOs is so challenging for local authorities. There are significant barriers to [authorities] doing what is really necessary."

Her ideal approach would be comprehensive: generating power, facilitating storage, creating the environment for smart EV infrastructure, having high levels of energy efficient homes and generating electricity to be able to cross-subsidise retrofits. Supply can lead that and "some of the most interesting things that Nottingham is doing might be related to Robin Hood Energy but include community energy, retrofits on the Energisprong model and other funding that has supported solar panels and storage on social housing. So they are

on the cost, or finding cheaper capital", she says

What can be done?

There are pathfinder projects: Swindon initially set up a solar farm and now it is doing solar with storage. "They are able to do it because they set up a wholly-owned arms-length company, so they can effectively de-risk it for the private sector and sell it on," says Billington. Plymouth has a similar approach, whereas for some local authorities owning it would be an intrinsic part of what they do. UK100 is "pretty agnostic on that. We aren't going to dictate an ownership model."

Next steps

What's the next step for UK100? Billington says

“ You are more likely to win on your deep retrofit if you are talking about saving people money and creating warm and healthy homes, than you are if you talk about saving the planet ”

in delivering local services, she says, so, even if they don't have control over transport, they still have control over planning – where and how you put car charging points in. On heat they have levers in the social housing and the private rented sector, and "you have planning regulatory powers to say you can't build houses unless they meet high energy standards".

Local authorities have become energy suppliers and many "are still attracted to following the lead of Bristol Energy and Robin Hood Energy in saying we can shift towards a cleaner energy offer through creating an energy company ... it means they can provide for the residents in a better way than the big players in the market," Billington says.

The attraction of the supplier space is, she says, "partly because engaging

trying a whole lot of ways of transforming a city," she says.

Generally, electricity generation locally is difficult and that puts local authorities off, she says. First, "they are not instinctively entrepreneurial", and second, they are in a Catch 22: authorities borrow money at a low interest rate from the Public Works Loan Board (PWLB), but that body will not lend to "interesting" projects supported by the sustainability team – those with higher risk.

"The finance team pushes the project back towards PWLB to save borrowing costs 'and you get a 'business as usual' development," says Billington.

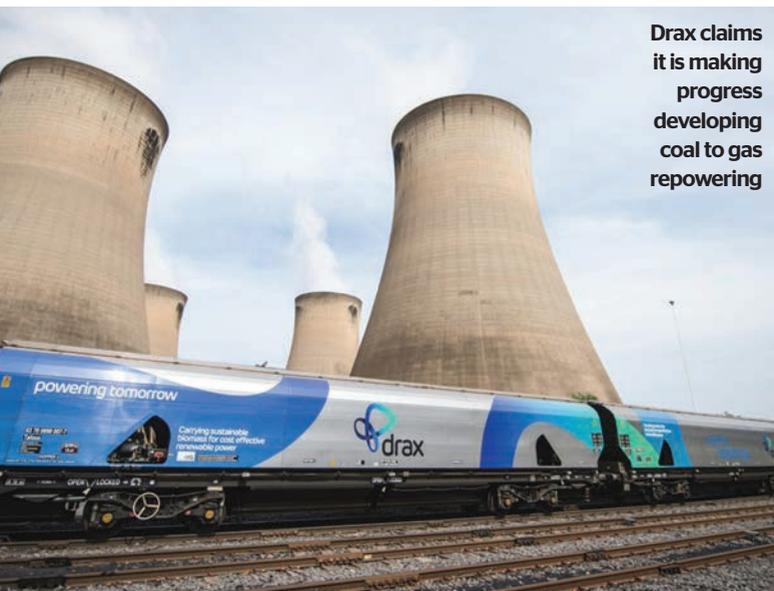
To break out of that cycle, UK100 members "have to find other forms of development capital and reassure their finance team that this is worth taking a slight hit

a key issue is connecting local authorities with businesses that can help solve their problems, and with financiers. The plan is to launch a sustainable finance All Party Parliamentary Group in order to link local leaders to policymakers and parliamentarians. But she thinks her 'crack team' and connecting it to the rising energy hubs "will send a very strong signal that government wants this to happen and that will reassure local leaders. We need to transform local [development] plans into 'net zero' plans by 2050. That's the way we should be living"

This is an abridged version of an interview with Polly Billington that first appeared in our sister subscription title, New Power. For in-depth energy industry news and analysis, see www.newpower.info

Drax CEO: ‘Increasing volatility will boost value of flexibility’

Energy firm says income from flexibility is set to significantly increase in 2019, but calls for market and regulatory change. Brendan Coyne reports



Drax claims it is making progress developing coal to gas repowering

The value of flexible power assets will increase, according to Drax CEO Will Gardiner.

“Given the structural shift in UK generation towards intermittent renewables we expect greater power price volatility, a growing need for system support services and increasing value from flexibility,” he said.

However, the company thinks

market and regulatory change is required so that generators get paid more for providing power when it is needed.

Drax made £79m from flexibility in 2018. That figure is set to increase significantly in 2019 with the acquisition of Scottish Power’s gas and hydro assets.

That assumes the Capacity Market will recommence, with Drax expecting £68m of capacity payment revenues in 2019.

Capacity market

“Our view that the Capacity Market will be re-established on the same or similar terms is consistent with the position expressed by the UK government. We expect the issue to be resolved during 2019 and we reflect this in our expectations for the year,” said Gardiner.

Nevertheless, Drax hedged against a longer hiatus or permanent suspension in the

deal it struck with Scottish Power owner Iberdrola: if less than 100% of Capacity Market contracted revenue materialises, and the portfolio’s gross profit is lower than expected, Drax will receive a payment from Iberdrola of up to £26m. However, if the portfolio performs better than expected, Iberdrola can earn up to £26m in upside from Drax, even if 100% of the Capacity Market payments are not received.

More gas

If the Capacity Market is reinstated and prices increase, Drax may look at building a new 1.8GW combined cycle gas turbine (CCGT) plant at Damhead Creek, an option acquired as part of the Scottish Power acquisition.

More immediately it is “making progress” in developing options for four 300MW open cycle gas turbines (OCGTs) and up to 3.6GW of coal to gas repowering at Drax Power Station. Those projects would require Capacity Market support, said Gardiner.

While the company sees increasing value in flexibility, it also states that “many ancillary services require policy, regulatory and market change to ensure generators are suitably compensated for these services”.

Adjusted revenue for 2018 of £4,237m, up £552m on 2017. Adjusted gross profit for 2018 of £601m (2017: £545m).

The company posted a total profit before tax of £14m. **te**



“
We expect greater power price volatility, a growing need for system support services and increasing value from flexibility
Will Gardiner, Drax

Bad debt hits returns at Opus and Haven

Increasing levels of bad debt hit returns for Drax-owned business energy suppliers Opus Energy and Haven Power.

The companies increased market share by 1%, but margins were below target and the market remains challenging, said Drax CEO Will Gardiner. Drax will continue investing in digital technology to lower cost to serve and improve retail margins, he added. Bad debt charges increased by 72% to £31m.

For the year ended 31 December, B2B energy sales increased from £1,999m in 2017 to £2,242m in 2018. B2B energy supply adjusted gross profit improved from £117m in 2017 to £143m.

Noting business risks for the year ahead, the company said it “remains vigilant to the risk” that Ofgem’s retail price cap “could be extended to some SMEs”.



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Eon to build 75MW CHP at DS Smith's Kemsley paper mill

Eon has signed a deal to build a combined heat and power plant at DS Smith's Kemsley paper mill in Kent.

The energy company said the 75MW development is its largest customer solutions project in a decade.

The plant, due to start generating in 2021, will

provide steam required for DS Smith's processes as well as power. Colin Smith, CEO for DS Smith Paper and Recycling divisions, said the firm "expects to see a 36,000 tonnes per year carbon reduction" as a result.

DS Smith has set a target to reduce its carbon

emissions 30% by 2030.

Anthony Ainsworth, CEO of Eon Connecting Energies, said generating steam and power onsite gives energy intensive industries greater efficiency.

"We want to show that sustainability and profitability can do hand in hand," he added.

Flogas to convert National Grid's Avonmouth gas storage site to LPG

Flogas has been granted planning permission to convert National Grid's former LNG site at Avonmouth to store LPG.

The aim is to create a facility capable of holding 34,564 tonnes of LPG, the largest of its kind in the UK.

Flogas said it will bolster gas security for both commercial and residential customers.

Flogas Britain managing director Lee Gannon said the site will be "a game changer, massively increasing the UK's total LPG storage capability".

Jon Butterworth, president and COO of Global



Transmission for National Grid Ventures, said the site had served its purpose for 40 years, but as the gas network had expanded deeper into the South West and Wales,

was no longer necessary for National Grid's business.

In 2014, National Grid said it would close Avonmouth in 2016 after deciding the facility was no longer required.

ABB and Rolls-Royce to build I&C microgrids

ABB and Rolls-Royce have formed a partnership to build microgrids for industrial and commercial companies.

The aim is to allow businesses to combine power from CHP, diesel and gas-powered gensets, renewables and batteries to meet their industrial loads. They can function on or off-grid and can separate themselves from the main grid in the event of a potential grid fault or emergency.

Andreas Schell, chief executive of Rolls-Royce Power Systems, said: "Combining our integrated MTU diesel and gas genset system technology and our control solutions, with ABB's modular microgrid solution, control capability and remote service, will offer customers the combined strengths of the two world leaders in technology."

Massimo Danieli, head of ABB's grid automation business line, noted that the company's Ability e-mesh gives power generation asset owners a vertically integrated, unified view of their distributed energy resources and renewable power generation. Site and fleet optimisation, weather and load forecast and machine learning algorithms offer insights for decision-making, he claimed.

• First published in *New Power* magazine



Low carbon gas obligation call

A think tank has urged government and Ofgem to implement a low carbon gas obligation. Bright Blue's report, supported by the Energy Networks Association, takes in a range of views – from gas networks and other hydrogen proponents, to those that believe that gas networks cannot exist in a decarbonised system.

It outlines the options for decarbonising heat, the associated challenges and costs, and makes the case for new policies, incentives and rule changes to reduce emissions from existing gas infrastructure while minimising cost and disruption.

Implementing a low carbon gas obligation, which obliges suppliers to buy an increasing proportion of gas from lower carbon sources, would enable a market-based approach to reducing emissions and send a clear signal to energy suppliers



and investors, the report argues.

Emphasising the importance of improving energy efficiency to reduce the significant consumer costs of deep decarbonisation, the report also recommends:

- Ofgem increases the amount of money networks are allowed to spend on innovation within the next price control
- Rules governing the amount of gas such as hydrogen that can be injected into

- the network are relaxed
- Energy Performance Certificate methodologies are improved
- 'Home Affordability Assessments' (HAAs) be introduced for new-build homes
- The minimum Energy-related Products (ErP) requirement for domestic gas boilers should be raised from the existing level of 92% to 95% energy efficient
- Introducing carbon life cycle assessment as part of public procurement procedures to drive the market for energy efficiency and renewable heat technologies
- Establishing a new regulatory unit within Ofgem to oversee regulation of district heat networks and develop price controls

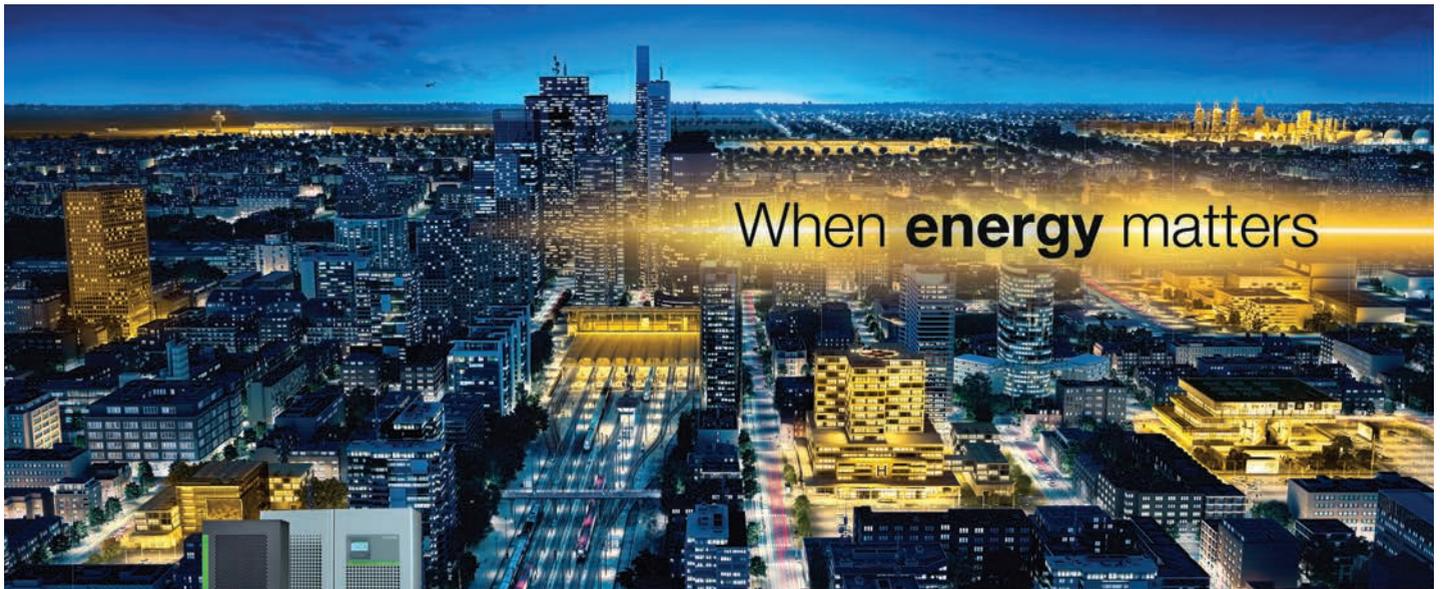
See the report at brightblue.org.uk

BioSNG plant to fuel transport fleet

Progressive Energy has sought consent for a £150m biomass to BioSNG plant. The Protos plant is expected to start production in 2022 within the Energy Innovation District (EID) which brings together Cheshire & Warrington LEP, Cheshire West and Chester Council and the University of Chester energy users, network owners, innovators and partners working alongside.

The plant will generate gas from unrecyclable wood and refuse derived fuel for the transport sector. It is expected that another eight facilities could be built across the UK during the 2020s.

First published in our sister title, New Power.



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Delivering on decarbonisation

UPS outlines what it has learned from deploying electric vans in central London – and why smart charging could be key to electrifying transport. Brendan Coyne reports

UPS first trialled electric vehicles in New York in 1930. The technology has moved on somewhat, yet in 2019, decarbonising a delivery fleet at scale remains a complex challenge with many moving parts.

In Europe, UPS revisited electric vans in 2008, with six of 12 ordered from manufacturer MODEC destined for London. But MODEC soon stopped producing them due to lack of demand. That led UPS to convert some of its diesel vehicles, sending them to Germany to be refitted.

Currently, UPS has more than 300 EVs deployed in Europe and the US, with 65 stationed at its Camden base. With a range of 50-60 miles a day, UPS is using the knowledge it is gaining at Camden to inform the next phases of its strategy.

Infrastructure challenge

One of the first lessons learned was that the associated electrical infrastructure is a key challenge, says Claire Thompson-Sage, sustainable development coordinator at UPS.

Ensuring the site had sufficient power capacity necessitated a substantial grid upgrade – and one that came with caveats.

“Where the substation was outside of our leased area, the landlord did not want responsibility for maintaining supply if we ever moved out,” explains Thompson-Sage. “So we had to agree that we would pay to strip it all back should that eventuate. In terms of financing, it was a tricky situation.”

Smart charging

Hence when seeking to further electrify the central

London fleet (UPS ultimately hopes to go all electric with 170 central London vans), it sought a different approach.

Working with UK Power Networks and Cross River Partnership, via a project part-funded by OLEV, the consortium has developed a smart grid system. It uses battery storage, network monitoring and smart controls to accommodate vehicle charging at the site – which would otherwise have required an expensive grid upgrade (see box).

While the system currently uses new batteries, UPS ultimately hopes to use batteries from its current electric fleet as they approach end of life.

UPS is also exploring the option of exporting power generated from solar PV into battery storage systems at its London Gateway Facility – and while the Camden base does not have PV, UPS is “exploring that option”, says Thompson-Sage.

At Camden, where smart charging has been in place since April 2017, it has been “hugely beneficial”, says Thompson-Sage. The system

interrogates battery state and charges each accordingly, giving only as much as each battery requires. Because it is designed for full electrification of the fleet, and the site is not yet at capacity, it can charge later at night, says Thompson-Sage, when electricity is cheaper.

“So we are paying less for electricity via the smart system and it has also helped with maintenance,” she explains. “If a vehicle is not charging at the rate it should be, that is a warning sign that something might not be right, such as faulty cables.”

Practical challenge: Maintenance

Any change of system throws up challenges. But Thompson-Sage says practical aspects should not be overlooked.

“Probably the biggest unexpected item was damage to cables,” she says. “Vehicle maintenance is cheaper – but with so many vehicles charging in one depot, it was easy for loose cables to get damaged.”

Thompson-Sage says UPS is now looking into wireless charging infrastructure.

“**We are paying less for electricity via the smart system and it has also helped with maintenance**”

Claire Thompson-Sage, UPS

“Wireless wasn’t available in 2008 [when UPS first trialed electric vans at Camden]. Although it is more expensive upfront and there are some losses, there is less kit to maintain – so wireless charging could be a more cost-effective option overall.”

Maintenance may also become a challenge as more companies switch to EVs.

“One thing that gets overlooked is the availability of mechanics and engineers: if there is an influx of electric vehicles to maintain, do we have the trained mechanics to service them? If there is a shortage, labour costs will increase,” says Thompson-Sage. “That is a very important issue, but one that gets missed.”

Practical challenge: Planning ahead

If the company is to deliver on its ambitious decarbonisation goals, it will need to expand electric or alternative-fuelled vehicles outside of London.

Planning a major logistics operation on limited range must account for many variables, says Thompson-Sage.

“Currently, a lot of the electric vans are limited to around 50

Sustainability goals

UPS has committed to make one in four new vehicles purchased by 2020 being an alternative fuel or advanced technology vehicle.

The company has also pledged to obtain 25% of the electricity it consumes from renewable energy sources by 2025 and replace 40%

of all ground fuel with sources other than conventional petrol and diesel.



miles a day. We need to identify routes that could be undertaken

by an EV, then factor in the current power availability at each of those buildings and how many vehicles could be charged without the need for a grid upgrade,” she explains.

Looking first at cities that are implementing clean air zones helps focus that activity, says Thompson-Sage, but throws further elements into the equation.

“You have to consider the size of the clean air zone and how it is implemented,” she says, with certain cities planning blanket implementation, and

others zonal approaches.

Zonal clean air zones means hybrids can use diesel range extenders to recharge batteries. But some cities plan to make the whole area a clean air zone. “That means there is no opportunity to recharge [via the diesel range extender]. So in Leeds, for example, we will have to opt for Euro 6 diesels as opposed to hybrids.”

Could ultra rapid chargers not solve that problem?

“Not practically. Drivers are doing up to 120 stops a day. A 20-30 minute charging stop is not really an option,” says Thompson-Sage. “Plus generally, the quicker the charge, the more expensive it is. So we have to charge in our own centres.”

Another potentially overlooked issue is licences and drivers. As vehicles with longer ranges and bigger batteries are developed, they increase in weight. If vans exceed 3.5 tonnes, younger drivers require category C driving licences. Thompson-Sage says that is something to bear in mind.

Finance

The cost of electric vans is “cost-comparable” to internal combustion vehicles over a nine-year service life, says Thompson-Sage. But she says the first year is “very capex intensive; the upfront cost is significant”.

As a global corporation committed to decarbonising its fleet, UPS has the resources to manage those costs, says Thompson-Sage, but smaller companies may struggle to swallow them – especially if grid upgrades are also required.

Scale and share

Bringing down those costs is therefore key to decarbonising transport – and the broader economy. In that sense, working through the challenges and sharing learning is something UPS hopes will bring its own rewards.

“UPS has always had a very strong sustainable ethos and wants to be a leader in industry,” says Thompson-Sage. “Hence working with partners not just to provide solutions for UPS, but for the whole marketplace.”

Rather than altruism, she says that approach is good business sense.

“Scale brings the cost down for everybody, which is why we aim to develop solutions with partners and bring technology to market,” says Thompson-Sage.

“Our goals are not just reducing carbon emissions and increasing sustainability but improving air quality and helping to reduce congestions – because it is central to what we do.” **te**

Smart charging: Overcoming grid constraints

UPS wanted to increase the number of EVs at its Camden base but was limited by grid infrastructure, so it collaborated with distribution network operator UK Power Networks and consultancy Cross River Partnership on the Smart Electric Urban Logistics Project (SEUL), which commenced in April 2017 with government funding from OLEV.

The project designed and implemented a smart charging and energy storage system that takes into account variations in daily demand on the network.

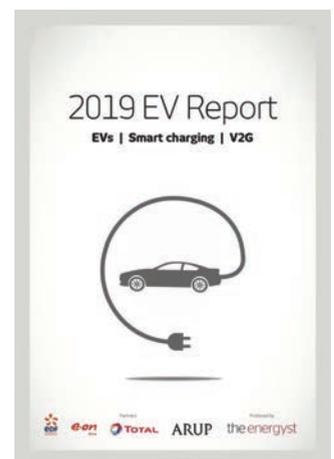
Taking that approach meant UKPN could immediately add another 20 vehicles to the depot, which previously had charging capacity for a maximum of 52 vehicles. The system means it can now manage up 170 electric vehicles via its existing grid connection agreement, future proofing the site.

Taking a smart approach brings down capex. Without it, UPS would have had to increase its grid connection from 1,250kVA to 2,200kVA.

It can also reduce opex, because smart charging can take advantage of cheaper periods.

The system has the potential to provide other benefits, such as grid balancing services from the battery stack, should UPS wish to do so.

For details, see: tinyurl.com/y39eaaw3



This article was first published in *The Energyst's 2019 EV report*, available as a free download at: theenergyst.com/EV

Mitie plans to switch 20% of its cars and small vans to EVs by 2020. That's around 717 vehicles, says fleet and procurement director Simon King.

"It's very important to focus on the fleet, because it makes up 93% of Mitie's carbon footprint," says King.

"That initial tranche of EVs will save over 4,000 tonnes of CO₂ per annum – about the same as planting 200,000 trees."

Switching 700 vehicles is ambitious. King sweated on his presentation to CEO Phil Bentley, but says he needn't have worried.

"Selling sustainability ideas into a business can be something of a challenge. I spent the weekend preparing a great presentation, but Phil said: 'You don't need to persuade me, it's a great idea.'"

Roadblocks

King believes issues of cost and range "have largely been addressed", at least for small vans and cars, and that Mitie can make the switch cost neutral with upfront cost mitigated by fuel savings.

The roadblocks that remain, says King, are charging points and driver behaviour.

"Zap-Map shows about 19,000 plug-in sockets in the



Mighty ambition: 700 EVs by 2020

Mitie has ambitious plans to convert its fleet to EVs. But getting hold of the vehicles is no mean feat. Brendan Coyne reports

Testing the water

SES Water has decarbonised its power consumption, now it is targeting transport emissions

SES Water is trialling 10 Nissan e-NV200 vans, installing chargers at its head office and at a treatment works. The aim is to prove that EVs can be cost competitive with diesels and plot a route to broader deployment.

The company will lease the vehicles, while Drax Group, parent company of SES's renewable energy supplier Haven Power, will provide a package that includes the cost of electricity for charging, telematics and usage data. Drax

also helped with choosing the right charging infrastructure for the two sites and will provide maintenance and support services going forward.

SES energy and carbon manager Henrietta Stock hopes the five-year trial will inform a broader rollout plan, by which time there should be a wider range of vehicles to meet more of SES Water's use cases. At that point, the company, which harnesses both onsite generation and load to sell flexibility services to the grid,

may also look at integrating EVs with its energy assets.

"We're not looking at vehicle to grid (V2G) just yet, but it is something we have our eye on. The data from the trial will lay the foundation to do V2G in the future."

For now, she says the company is concentrating on the basics, part of which is process.

"We switched to 100% renewable electricity supply last June, which reduced our carbon emissions significantly.

UK, so we need to have the right charging points in place.”

These will be installed at employees’ homes as well as Mitie offices and the company is also approaching customers with a view to installing them at suitable sites.

“We will be deploying 800 chargers by the end of 2020,” says King.

“That’s about the same amount as have been installed in the UK in the last three months.”

Driver behaviour

King says battery-powered cars require a shift in driver behaviour – topping up batteries regularly instead of filling up when the fuel light flickers.

The company is developing learning programmes for drivers to support safety and charging behaviour, but King thinks Mitie drivers have appetite for disruption. To gauge staff receptiveness, the firm emailed a survey to 1,200 drivers for whom an EV may be suitable.

“Within three days we had over 500 responses, which shows a real willingness from employees,” says King.

Vehicles

Vehicle supply is a challenge. “My biggest ask of car and van manufacturers is: meet with us, commit to supply

and provide visibility on what they can deliver through to the end of 2020,” says King. “We need partnerships and commitments.”

With hindsight, he says Mitie would have engaged manufacturers even earlier to secure guarantees.

“We are used to buying 1,500 vehicles a year and having a fairly robust supply chain,” says King.

“Buying smaller numbers with different suppliers presents a different challenge. But vehicles ultimately spread to the wider market through fleets via the secondary market – so engaging will help us all do the right thing by the planet.”

With current visibility, Mitie is attempting to match the rollout of chargers with incoming vehicles.

“There is an element of chicken and egg, but we are trying to address both parts. With our experience of managing professional services, we think we are ideally suited to manage that piece of work,” says King.

Applying the insight from the project will also provide a commercial advantage as Mitie starts to manage EV rollouts for customers.

Billing and benefits

Working out how to recompense employees is not

straightforward, says King.

“Electricity is not classed as fuel in the same way that diesel and petrol is, so there are some unique challenges in terms of recompense – and we know some other large fleets are struggling in exactly the same way.”

Mitie will use technology to track how much electricity each EV uses to ensure employees with home chargers are fairly reimbursed. “But it is one of the biggest challenges,” admits King.

“I believe we have a workable solution, but I would like to see a situation where companies can pay directly for electricity being used at employees homes to charge EVs.”

He says “utopia” would be a corporate renewable power contract that could extend to employee’s home charging use, with all billing direct to Mitie.

While “the regulation is not quite there” to support such an approach, Mitie is “interested in speaking with people that can support that aim,” says King.

Simon King says there is ‘an element of chicken and egg’ but Mitie is attempting to match the rollout of chargers with incoming vehicles



Chargers and capacity

Mitie aims to deploy 7.2kW chargers at homes and workplaces – which will be smart where possible, says King. At sites where a large number of chargers will be installed, they will be “linked together to do load balancing”, avoiding the cost of additional capacity, says King.

Mitie is also open to collaboration with other large fleets to access semi-public and rapid chargers, which will become increasingly useful as Mitie looks beyond small vans and cars.

However, that may take some time to eventuate.

“We have lots of transit sized vehicles, but [electric versions] are just not available,” says King. The low volumes that are available don’t cut it.

“Paying a high price for a 45-mile range in winter is not commercially viable,” he says. “If you know a manufacturer with a solution, give them my mobile number.” **te**

“

The data from the trial will lay the foundation to do V2G in the future
Henrietta Stock, SES Water



The major remaining aspect is emissions from vehicle fuel – so that comes under my energy and carbon remit. But we manage our vehicle fleet separately, so we need to ensure collaboration between departments,” says Stock.

“I think that is a challenge businesses face – the vehicle fleet is not seen as an energy asset, despite the fact that we report on CO₂ emissions.”

There are other housekeeping aspects to manage, such as working out

the billing and benefits for employees that charge their cars at work. “I don’t think companies are on top of that yet,” says Stock. “Even without company charging points there can be challenges in charging for mileage in an EV.”

Then there’s the general aspect of helping staff become more comfortable with EVs.

“Quite a lot of people are unsure about electric vehicles – will there be charging spaces when we need them, range anxiety – minor concerns

can easily become issues in a work environment so they need to be managed.”

Stock says Drax has provided support in managing those challenges, but thinks other stakeholders could be more proactive.

“There could be more of a push from vehicle manufacturers and leasing companies,” she says. “Demonstrating that EVs are cost competitive is really important and needs their input.” **te**

DNOs prepare for impact

Western Power Distribution's new electric vehicle strategy details what its network can handle, costs of connections and upgrades – and some interesting plans to pay customers that charge their cars flexibly. Brendan Coyne reports

Western Power Distribution (WPD) has published an electric vehicle strategy that outlines how it plans to handle increased uptake by households, businesses and local authorities.

The strategy details WPD's estimations of EV uptake. It thinks 217,000 chargers will be connected to its network by 2023 – up from about 7,000 a year ago.

The distribution network operator (DNO) indicates it has spare capacity to handle those kind of numbers in urban areas, with existing infrastructure – ground-mounted transformers – able to provide a charge for customers every five days, provided charging is 'optimised', or managed. However, in rural areas, which use overhead networks, "options are somewhat less".

The company plans to produce a heat map of transformer capacity, showing where capacity is available and where constraints are likely.

It said aggregators could use that map to determine where they can offer flexibility solutions, or signal directly to EV owners that they will need to pay more if they want to charge at certain times via time of use tariffs.

Either way, WPD said it would not allow domestic users to blow fuses and inconvenience other customers – and will use tools to manage demand within known limits ahead of overloads.

Costs

The plan outlines the cost, lead times and related works required to connect different

Estimating connection cost and timescale

Charge Point type and power output	Likely installation location	Approximate connection lead-time	Network considerations	Approximate connection cost
Slow up to 3kW	Domestic	Immediate	None	None
Fast 3.7kW	Domestic or street side	Immediate in most cases	Usually none	Usually none
Fast 7kW	Domestic or street side	4 to 8 weeks	Likely upgrade to service cable and local mains	£1,000 to £3,000
Fast 22kW	Street side or public charging location	8 to 12 weeks	Streetworks and permissions	£3,500 to £12,000
Rapid 43kW	Public charging location	8 to 12 weeks	Streetworks and permissions	£3,500 to £12,000
Super 130kW or multiple rapid chargers	Public charging location	16 weeks	Streetworks, permissions and cost of land for transformer	£70,000 to £120,000

Source: Western Power Distribution Electric Vehicle Strategy

types of chargers, ranging from nothing and immediately for slow (3kW) domestic chargers, to £120,000 and 16 weeks for a 130kW super charger or multiple rapid chargers (see table).

It states that businesses with depot-based fleets seeking to install significant numbers of chargers – and that are likely to mostly charge at night when demand is low – will be offered alternative connections in order to mitigate costs and minimise required reinforcement.

For other workplaces and EV charging destinations, such as supermarkets and retail parks, WPD said it will make use of existing supply where it is capable of supporting the additional load,

or charge for reinforcement works where required.

For on-street parking, WPD said it may be able to deliver options through new street lighting.

Flexibility: for households

As well as flagging discussions with an airport over vehicle-to-grid potential, WPD trailed plans to create an 'active' domestic flexibility product for EV owners, "where we are able to pay directly for energy deferred under demand response demonstrated through metering".

However, it said this would likely go through suppliers or other entities who will aggregate customers and then need to show to WPD that an action has been taken to qualify for payment.

It will also create a 'passive' product, where WPD pays an annual fee to EV owners that sign up for a time of use tariff, and then uses price signals to encourage customers to shift charging away from constraint periods

Flexibility: for businesses

WPD said there is potential for depots and long stay car parks to participate in flexibility programmes – less so for rapid charging destinations.

While the DNO already procures flexibility from businesses in certain postcodes, it will also launch projects to show how flexibility could be used within EV charging to free up capacity.

It will start with simple 'alternative connections' approaches – where the business agrees to charge overnight and use capacity that is not required during that period. It will then move to 'active network management' or ANM solutions, where customers react to constraint signals. WPD said it has already implemented an ANM system at a car showroom in Lincolnshire.

Whole system flexibility

WPD said it is in discussions with an airport about deploying a vehicle-to-grid system that would deliver frequency response to National Grid. Its plan also hints at further incentives for people that use local generation, storage and EV charging in ways that help the grid.

It states: "As vehicle-to-grid solutions and smart charging develop we have the opportunity to make use of these flexible solutions on our network. In fact, a customer who makes use of local generation, storage and EV charging could actually reduce their impact on the network and help us avoid conventional reinforcement." **te**

217K

Number of chargers WPD thinks will be connected to its network by 2023



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EV infrastructure: Charging ahead

The EV tipping point is coming, say charging point companies, fossil majors and disruptors building charging networks. How are they planning to meet the challenge, asks Brendan Coyne



“Within five years, EV charging will be like wifi; a hygiene factor that you have to offer or customers will be unhappy,” says Erik Fairbairn, CEO and founder of EV charging infrastructure provider Pod Point.

Supermarkets and other retail and destination sites are mobilising. Tesco has struck a deal with Pod Point and Volkswagen to install 2,400 EV charging bays across 600 stores over the next three years, the biggest UK rollout of its type to date. Some will be free-to-use 7kW units, others 50kW rapid chargers, which shoppers will pay to use.

As Tesco’s competitors start to respond, Fairbairn says it will move the market. “I would be unsurprised if in six month’s time we see a deal of another order of magnitude. Corporates with customer car parks

understand EVs are something they have to deal with now – not in a few years,” says Fairbairn. “It is a megatrend.”

Legal & General shares that view. It has acquired a 13% stake in Pod Point – giving the firm both significant expansion capital and boosting its development pipeline: Legal & General plans to install

“
Corporates with customer car parks understand EVs are something they have to deal with now – not in a few years
Erik Fairbairn, Pod Point



charging points across its estate and new homes portfolio.

Driving profit

Tom Callow, director of communications and strategy at BP Chargemaster, agrees and says destination charging drives both footfall and spend.

“Our data shows drivers are going into those sites and spending money,” he says, providing a breakdown via email:

- The majority of drivers who charged at these locations did so more than once a month, creating regular footfall
- The majority of drivers who charged at the locations – up to 84% for one type of location – spent money there
- For one type of location, more than one in four drivers were not members of the relevant loyalty scheme, suggesting they may not otherwise have visited the site

- Presence of charging points made a visit to these sites more likely for 95% of drivers.

Forecourt models

BP, which bought Chargemaster in 2018, has some 1,200 UK forecourts (300 owned and operated and more than 900 owned and operated by dealers) and is commencing a rollout of 150kW superfast chargers.

“Forecourts are designed for a quick turnaround so the 150kW units fit that profile nicely,” says Callow. “Rapid and ultra rapid chargers will take up an increasing proportion of our network.”

Yet even with that amount of power – where cars can take such speeds – a full charge still takes around 20 minutes. That could present challenges to forecourt operators and motorists alike. But Callow thinks it

may be an opportunity.

“Most people don’t fill up a fuel tank from full to empty, they tend to top up with 20-30 litres. With electric cars, we will see a similar top-up culture,” he says.

“An efficient EV does around four miles per kilowatt hour. If you can offer 100 miles of range in 10 minutes, it is not that much longer than current fuel courts,” suggests Callow.

“OK, topping up the tank takes two minutes but by the time you have queued and paid, it is not a million miles away.”

Moreover, drivers do not need to attend electric cars while they are charging – so they can buy a coffee or other goods and services on offer. Callow says this is where BP’s experience with retailers such as M&S will help “make all of that fit together”.

BP Chargemaster will begin its 150kW forecourts rollout “as soon as possible this year”, says Callow. But he stresses that ‘rollout’ is the operative word.

“This is not a trial, but a network rollout. Others are talking about dipping toes in the water; BP is definitely going for a swim.”

Power struggles

Securing megawatts of capacity for forecourts will be neither easy nor cheap. “The power piece will be a challenge,” admits Callow. He says obtaining distribution network connections and capacity can occasionally become “like a game of



This is not a trial, but a network rollout. Others are talking about dipping toes in the water; BP is definitely going for a swim
Tom Callow, BP Chargemaster



It is not just about securing the 1-2MW they will need for 10-15 fast chargers, but future proofing
Matthew Boulton, Pivot Power

battleships” with distribution network operators (DNOs).

Everyone deploying significant numbers of chargers therefore needs to find “creative ways” of managing capacity challenges, he adds, with BP Chargemaster no exception.

What about connecting directly to the transmission network?

“That is outside my business unit,” says Callow. But he does not rule it out: “It’s safe to say all businesses in this area are looking at all options on the table rather than a single avenue.”

Transmission pivot

Pivot Power is connecting 49.9MW batteries directly to the transmission system with a view to delivering grid services – and later, EV charging.

The firm hopes to work with chargepoint operators – and thinks they may ultimately come to Pivot. Chief operating officer Matthew Boulton says its transmission-connected approach “is unblocking a problem they will face”.

“It is not just about securing the 1-2MW they will need for 10-15 fast chargers, but future proofing. In five to 10 years the utilisation rates will reach a level of demand that no DNO can provide for today, because they cannot promise reserve capacity.”

Boulton says the “dream” scenario would be to turn some of the 45 sites Pivot is planning into “EV flagship sites” with showrooms and rentals, alongside other retail.

He also believes Pivot’s city edge sites could prove interesting to fleets and transport providers. Boulton thinks bus companies “could be massive” for Pivot.

Capacity constraints may lead some transport companies to set up around the grid, rather than trying to bring the grid to

their existing depots. Boulton says the company is in “very early” discussions with one bus company about that.

“Its depot is split across two leased sites without long-term commitments,” says Boulton. “But I think we will find other scenarios where the depot is close to the city centre and not within reach of our city edge substation. Town real estate has considerable development value, does it make commercial sense to move further out?”

In some cases, Boulton thinks that may be the only way Pivot can provide power for depots. “We’re not proposing to take a 33kV cable through a city centre,” he says. **te**



This article is from our 2019 EVs report, which contains expert views from energy companies, EV charging firms, consultants, and businesses that are electrifying their fleets or rolling out charging infrastructure. Download the free report at theenergyst.com/EV

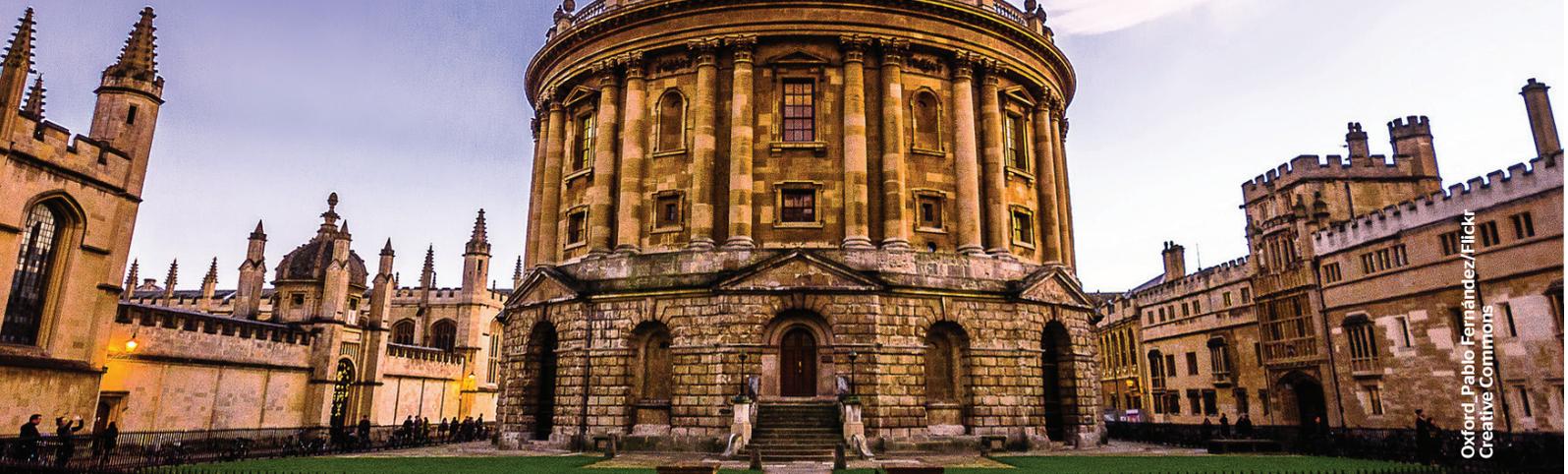
Electric buses-as-a-service

With cities establishing low emission zones, bus companies are under pressure to switch their fleets to alternative fuels. Their challenge is cost and complexity, says Daniel Saunders (right), investment director at Octopus Investments. The company thinks it can solve that by offering electric buses-as-a-service.

“For bus operators firstly the buses are very expensive and secondly they have to invest in their depots, which probably means they must also invest in the local grid,” he says. While depot investments can sit on balance sheets, grid upgrades do not, making an investment harder to justify to shareholders. Saunders thinks that makes a pay-per-mile approach attractive. “They stay in control and choose the buses they want to run. We package that together with the infrastructure and they pay off the investment as they use the vehicles.”

Saunders agrees with Pivot’s Matthew Boulton that some operators may choose to move closer to grid infrastructure than pay for upgrades. “That is not always straightforward, but if that is what they want to do, we will support it. We are coming at this with no restrictions.”





Oxford, Pablo Fernández/Flickr Creative Commons

Oxford City Council has received government funding to build what it terms a ‘Superhub’ – a massive lithium ion-flow storage hybrid that underpins a network of EV chargers via a 10km private wire around the city.

The project will also install 300 heat pumps, which, along with the battery and EVs, will be smartly controlled to enable flexibility trading.

The hub will consist of a 48MW lithium-ion battery plus integrated 2MW/5MWh flow storage connected directly to the transmission system at Cowley substation, south Oxford. Pivot Power is raising investment for the project with government body UKRI putting up £10m.

RedT is the flow battery provider. Habitat Energy will trade the flexibility, largely on the wholesale markets. Kensa Contracting will provide the ground source heat pumps.

As well as powering a public ‘ultra-rapid and fast’ charging network of around 100 charging points, the plan is to run the private wire to council depots on either side of the city, enabling electrification of Oxford’s fleet, ultimately even the bin lorries. Pivot Power chief commercial officer Matthew Boulton is hopeful other logistics firms will connect to the network.

“We already have three offtake points from the council. We would love to pick up

Oxford goes large on hybrid storage, EVs and heat pumps

Oxford City Council plans to build a massive hybrid battery and EV charging network as well as a heat pump loop. Brendan Coyne reports

both the city bus depots and two or three big fleet points along the way,” said Boulton.

The heat pumps do not require a connection to the private wire but will be linked to a shared ground loop system. They will be controlled by the same software that Habitat is developing to trade power from the battery.



The Oxford system would be the ‘largest vanadium/lithium hybrid system installed globally’

Habitat director Ben Irons said the grant funding enables the company to ramp up R+D activity and further enhance their forecasting and algorithmic trading capability.

He said Habitat will start virtual trading of the battery “as soon as possible” to demonstrate the revenue potential for the £41m project and execute the optimisation strategy.”

He added that the company is also keen to apply its platform to EV charging and heat pump optimisation so that vehicles are charged – and houses kept warm – at least cost as part of a tradeable cross-vector system.

The aim is to use RedT’s units, which do not degrade, to provide “some heavy lifting” and assess how they perform in a hybrid system, said Pivot’s Boulton.

Once the final investment decision is made, RedT will have “six months from notice to proceed to delivery”, said Boulton, with the company aiming to pack 72 of its vanadium redox flow storage units into 18 containers.

While RedT has built a 1MWh lithium-flow hybrid in Melbourne, Australia, CEO Scott McGregor said the Oxford system would be the “largest vanadium/lithium hybrid system to have been installed globally”.

The consortium hopes to gain planning consent by summer and deliver the storage, private wire and EV chargers by 2020, with the heat pumps installed by 2021, when the Renewable Heat Incentive closes.

Councillor Tom Hayes said the project would “move the council closer” to its goal of becoming a zero carbon city. He said businesses were investing in the city because of its investment in projects “exactly like the Superhub”.

“[It] will enable the city council to install more electric vehicle charging points of the kind that charge vehicles quickest,” he said.

“It gives black cab drivers additional support to shift from 100% diesel today to 100% electric in the next few years. It enables the council to move our own vehicles to electric on a faster timescale and, crucially, to install heat energy across homes to tackle fuel poverty.” te

Jaguar makes smart move

Jaguar Land Rover has installed 166 smart electric vehicle chargers at its Gaydon engineering centre.

The company is using 7kW smart charging stations from Shell-owned New Motion. It plans to install more chargers at its other UK sites.

"We hope that by providing a network of electric charging points to staff and visitors at our Gaydon engineering centre we can help encourage the uptake of alternative fuels among our employees," said head of e-mobility, Mick Cameron.

"It's part of our commitment to act more sustainably."

Jaguar plans to make hybrid or electric versions of all of its internal combustion engine models from 2020.



InnovateUK-funded project seeks six trial sites

Car parks sought for vehicle-to-grid trial

An InnovateUK-funded project to demonstrate how electric vehicles could play a role in stabilising the UK power system seeks six trial sites.

The project will combine solar, storage and smart technology. It wants to prove that large numbers of vehicles can be charged in different

types of destinations – such as public and retail car parks, hospitals and train stations – without breaking the grid or requiring major upgrades.

It also hopes to show that commercial returns from vehicle-to-grid (V2G) services are viable. This involves using the cars'

batteries to provide various services – either to local or national grid operators, or in wholesale and balancing markets when prices spike.

The consortium comprises Turbo Power Systems, Flexisolar, Smart Power Systems and Flexitricity. Interested parties can email info@flexitricity.com



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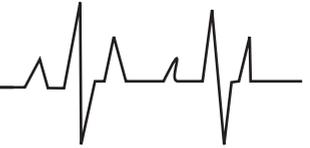
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A year in response: National Grid outlines DSR past and future

System operator uses more Stor and frequency response but flags challenges ahead. Brendan Coyne reports

National Grid's annual Power Responsive report shows the electricity system operator used an increasing amount of demand-side response in 2018.

However, greater competition in services such as short-term operating reserve (Stor) and firm frequency response (FFR) continued to drive down prices.

Meanwhile, demand turn up (DTU) attracted fewer providers and looks set to be revised or replaced by another negative reserve service.

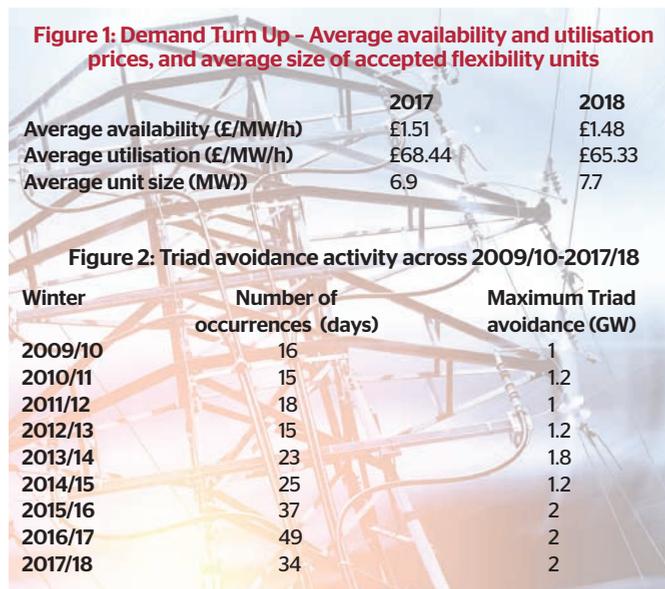
The report details changes to ancillary services and the broader energy market and their effect on flexibility providers. Some of these are positive, such as the Electricity System Operator's (ESO) steps to open up the Balancing Mechanism and its introduction of long-term contracts for FFR.

Others, such as Ofgem's overhaul of charging arrangements, the suspension of the Capacity Market and the impact of the Medium Combustion Plant Directive (MCPD), are causing market uncertainty.

As a result, flexibility providers have warned National Grid of a near-term risk that more demand-side response (DSR) providers could exit the market than enter (see p38). For much of 2018, however, they piled into certain services in the hope of securing contracts.

More Stor

Stor is a mature service, with more than 3,300MW of unique capacity tendered from DSR providers alone last year.



Competition within Stor has driven down prices paid and in 2018 National Grid used 49% more Stor than in 2017. It said the impact of competition on accepted prices made using Stor more economic than using other tools. However, National Grid noted the MCPD and Specified Generator controls – which prevent diesel generators from taking on new balancing services contracts without fitting expensive abatement – could have an impact on Stor from this year onwards.

FFR rush

Aggregators have piled into firm frequency response, pushing out traditional providers: in 2017, 392MW of dynamic capacity was accepted from demand-side response providers; this increased to 2720MW in 2018.

Year on year, average static FFR prices fell 30% to £32.46/hour. The average accepted price for dynamic FFR contracts

fell by 64% to £110.18/hour.

The ESO said aggregators or virtual power plant operators may be finding efficiencies in their business models that enable them to undercut traditional providers, or that the larger power players are focusing on less pressurised returns in the intraday mandatory frequency response market.

Demand-turn up

National Grid launched demand-turn up to counter falling demand on the transmission system in summer. It is a simple service: providers must reduce exports to the grid, or increase consumption and are required to have basic metering requirements, a phone and Microsoft Outlook.

However, uptake was lower in 2018 than in 2017, with about half the volume of bids entered, and it was far less utilised. National Grid said

it may be that the prices on offer were not sufficiently attractive and that an annual auction made price discovery difficult. It said DTU is 'not viewed as an enduring solution' for negative reserve and will be reviewed along with other services this year.

Triads

Transmission charges for large businesses are based on 'Triad' periods, the three half hours of highest demand that are at least 10 days apart, between November and February.

They are set retrospectively, so those aiming to reduce bills curtail demand or switch to on-site generation when they think a Triad period is likely, usually on a winter evening between 5pm and 6pm.

National Grid does not have much Triad data, and can only see how people react to cold weather. But as more people participate, it said Triads are getting harder to predict, so businesses are taking evasive action more regularly.

Next steps

National Grid said it would continue to work on product revisions and introduce new market opportunities in 2019, such as wider access to the Balancing Mechanism and Project Terre.

The ESO will also examine exclusivity clauses, where changes could allow DSR providers to sell flexibility into other markets if they can still deliver contractual obligations – a move that would be welcomed by those with aggregated portfolios of assets. **te**

A flexible move for Britain's greenest energy company

Ecotricity enters the flexibility market

Last year, Ecotricity partnered with experienced German smart grid, or virtual power plant (VPP), operator Next Kraftwerke, to launch our own flexibility platform.

The new platform is designed to provide flexibility not only for Ecotricity and our power portfolio but also for business partners and supply clients. It is a proven model that has been a material revenue earner for thousands of businesses in Germany over the last eight years: the platform wirelessly connects thousands of businesses, energy generators, and energy storage systems, remotely monitoring the energy grid and making small adjustments to these assets.

Why the move into flexibility platforms?

As a green supplier entirely dependent upon renewable power, developing a smart grid is a particularly important piece of work for us, as we seek to embed more flexibility into our power portfolio. For Ecotricity, it is about strengthening our commitment to generating renewable energy that works for our customers – and the grid.

Our entry into the flexibility market is a first among the independent supply sector, which has typically been characterised by aggregators, now either being swallowed by bigger players, or taking out supply licenses in an effort to access other income streams, such as the traded and balancing markets. For these aggregators, theirs has largely been a non-risk presence in the ancillary services market, sharing income with their clients on a best-effort basis.

However, at Ecotricity, we need to develop this proposition for ourselves, not least to enable some of our storage plans, so it is useful to be able to offer such additional income stream possibilities to partnering businesses, who can see we're

invested and fully committed.

With this in mind, we have initially connected up our 6.9MW wind farm at Alveston in South Gloucestershire. This asset is being deployed for traded and balancing markets, as well as frequency response.

Critical to its successful participation in the VPP is the ability to accurately forecast generation output as well as very short-term prices – and then to control the asset activity 24 x7 in conjunction with those forecasts and our proprietary 'bot' which interfaces with our flexibility platform, and is critical in controlling renewable and demand-side response (DSR) assets.

Demand-side response and energy storage

The VPP controls not only generation assets, such as our wind farms, but also DSR customers and the storage assets we have in development. It will also be a key element of our domestic offering, harmonising smart EV charging, domestic PV and domestic storage, as well as providing DSR income to our business supply sites. We believe that an offering for business clients incorporating DSR activity with their supply will be leaner and cleaner for clients, both in terms of billing and metering, and also because any DSR created imbalances won't trigger any tolerance/'take or pay' clause penalties.

A big problem faced by owners, or prospective developers of renewable assets and DSR providers, is that it is very difficult to model the business case to see whether involvement in a third party VPP, such as ours, is really worth it. Revenue streams are complex and constantly changing, either in their design or value.

For this reason, it is a crucial part of the process to model the revenue stack for our clients, sharing the assumptions and being



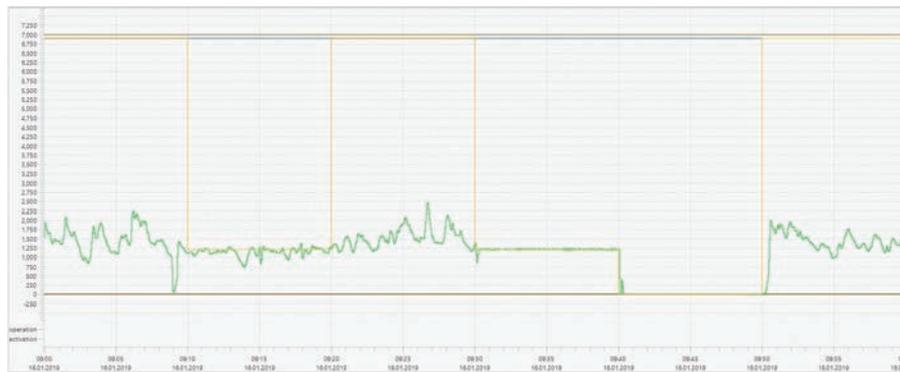
very transparent as to how that revenue stack is created – and what we think it is worth. We do this after we've made a site visit and examined the essential and optional loads with the plant manager.

This is important, because we know that in the past aggregators have over-promised and under-delivered in many cases. In some extreme cases, aggregators have sought to penalise their clients for wanting to run their plant at times that differ from the aggregator's wishes. Our scheduling ensures a client's 'must run' load is never impacted.

A healthier grid – better for everyone

Our experience as a supplier in managing our power position will be a major plus, because VPP performance will be a function of how well we optimise the revenue stack, which is very much a function of good forecasting for short-term system needs, a necessary part of what we do as a supplier. In addition, we're able to spot the most valuable opportunities in the market and optimise the flexible assets of our customers to capture them.

We're excited to be working with such an innovative partner as Next Kraftwerke, which has over 6,800 sites and 6GW of power under its control. Our proposition means lower costs or enhanced revenues for our partners and clients, as well as enabling the further deployment of battery storage and renewable generation into the market – a vital part of the UK's journey towards a cleaner, smarter grid.



Our set-point control of a wind farm in action. From 9:30 to 9:50 you can see the precision with which the wind turbine follows the signal we generated

Mark.Meyrick@ecotricity.co.uk





Brain power: flexibility's future?

State-owned Statkraft is building a big stake in the UK flexibility market. It aims to bring businesses into its AI-driven virtual power plant and simultaneously sell them energy. Brendan Coyne reports



The platform's origins lie in remotely controlling wind farms

Statkraft has quietly amassed a gigawatt of flexibility in the UK. It plans to double this by the summer while building a pipeline of new distributed assets via its B2B supply business, Bryt Energy.

Duncan Dale, UK vice-president sales and new products, is confident Statkraft will shake up the flexibility market. He just wishes they could think of a better name. "Virtual power plant (VPP) doesn't do the technology justice," Dale suggests. "We describe it as a 'flex aggregation brain'"

The platform's origins lie in remotely controlling wind farms to avoid negative pricing, a growing requirement as renewables penetration increases. Statkraft's team in Germany then developed software to automatically balance generation, rolling in weather forecasts and other market data and using robots to trade within-day.

Meanwhile, the UK team built code to optimise battery charging and discharge. Then they brought gas peakers

into the mix, while the Germany operation added pumped storage. Pulling it together into "one algorithmic package" was a natural evolution, says Dale.

"It is like a brain that has evolved, making zillions of calculations a year to place flexibility where it delivers most value," he says. "It is like a system operator and a market built into one."

DNA

Dale believes the platform has "high growth potential" and thinks combining behind and front of meter assets with energy supply sets Statkraft apart in a crowded market.

"Why us? Because trading energy is what we do, especially

renewable energy. We have a gigawatt of different types of flexible assets connected in 50 different locations, so our platform works," says Dale.

Crucially, the Norwegian state-owned company has an A-credit rating, "so you know you are going to get paid," he adds.

Other large energy companies are attempting to combine PPAs, flex trading and energy supply. Shell, for example, has launched and acquired energy retail businesses and will acquire VPP operator Limejump (see p39), a company Statkraft's Ventures arm had invested in.

Dale is not overly concerned by competition, large or small. Competitors may find it is "difficult to make supply, settlement and trading systems work together," he suggests.

"We are the largest offtaker of renewable energy and the largest long-term offtaker in the UK market. Hydro flexibility is also our core competency. Working with renewable and intermittent generation is our DNA and the VPP taps into that."

Regardless of market and regulatory changes, says Dale, "we will invest and improve what we do, so that if a customer signs a long-term agreement they can sure that we are good for that now – and good for that in future."

He points out that Statkraft, in various guises, has been around since 1895. "There are other IT companies [offering VPPs] with some very smart people on board. But they may not exist in two years' time."

Alternative technologies

Statkraft recently struck a deal with flow storage company RedT. The immediate aim is to deploy up to 10MW of solar PV and 6MWh of flow storage at industrial and commercial sites, scaling up to 100MW over the next three years. It seeks contract lengths of 25 years and claims the funded solution will cut energy bills by 20%.

Dale says Statkraft will provide "a range of alternative battery technologies" to customers, though details remain under wraps.

Merging of markets

The VPP 'brain' works on both sides of the meter, stacking up ancillary services as well as trading in energy markets, says Dale.

"It needs to do both [aspects] because the ancillary market is moving shorter and shorter. National Grid is looking to procure up to day-ahead and we are seeing the merging of markets and services. It ultimately becomes the same thing."

Growth

Dale believes the VPP will quickly reach 2GW of flex by bringing existing customers' wind and solar farms into the platform. But he says Bryt will also bring in megawatts by funding solar and storage installations for industrial and commercial firms.

He says business customers are receptive to the idea that a "flex aggregation brain" is working for them.

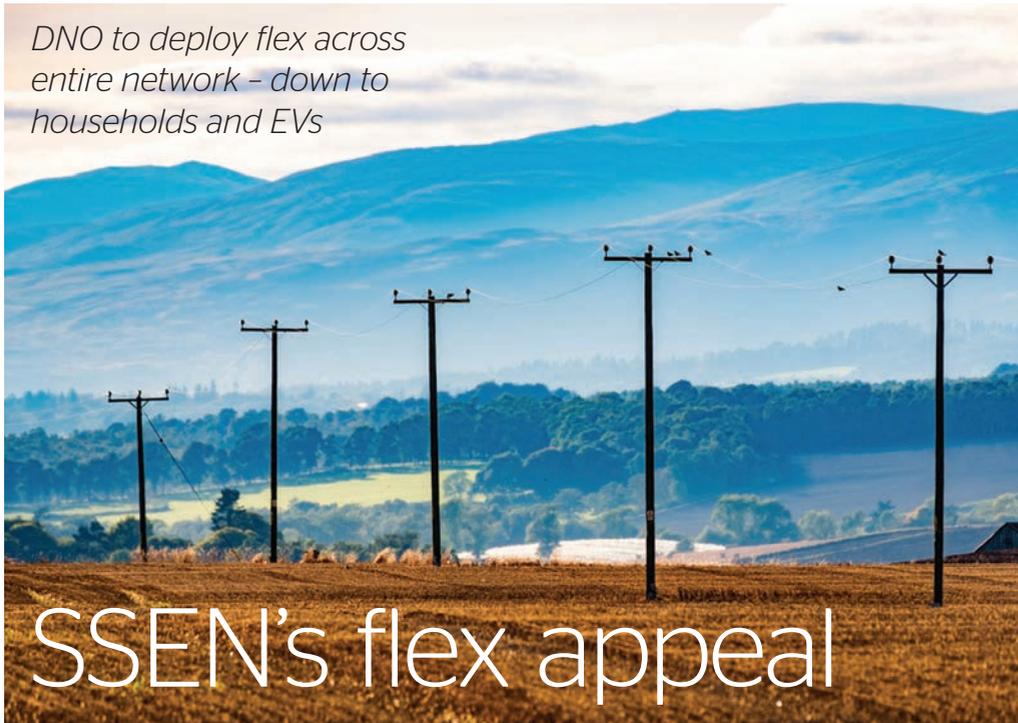
"They like that because [Bryt] helps with demand-side management, price, load, demand-side response and we can fund rooftop solar as well," says Dale.

"The customer makes an immediate saving. We pay, it is off their balance sheet, and we deal with the landlord lease problems that many have.

"So it is a renewable offering that future-proofs customers from all the changes taking place in the distributed energy revolution," he suggests. "Many are finding that quite compelling." **te**



DNO to deploy flex across entire network - down to households and EVs



may introduce one ahead of tenders. It has floated paying around £300/MWh for flexibility, and will initially procure four services (see box). The split between availability and utilisation payments will vary by service.

SSEN plans to launch three more CMZ service types by the end of the year.

“SSEN is committed to being a neutral facilitator of local and national markets that are created by the transition to a flexible network,” said Stewart Reid, head of Future Networks at SSEN.

“To do this successfully visibility, transparency and accessibility will be key. Too often asset owners that may be considering providing flexibility services find that the process is neither clear nor simple.

“With Piclo we are hoping to address that challenge, to provide the communities in which we operate a level-playing field that supports local solutions and builds a network of flexibility providers.”

Piclo CEO James Johnstone said he is “delighted” to reach a commercial agreement with SSEN – and outlined global expansion plans.

“This deal will hopefully be the first of many, not only in the UK but with other grids across the globe which suffer from the same limitations,” he said.

“The potential reach for our software is enormous.” **te**

Scottish & Southern Energy Networks has agreed to procure flexibility and demand-side response services across its entire network, rather than just constrained areas, which SSEN calls CMZs.

The DNO said it has not set a megawatt cap on how much flexibility it will procure, nor a budget cap.

“We are committed to securing flexibility market services wherever possible in lieu of load-based reinforcement so we do not want to cap our aspirations,” a spokesperson told *The Energyst*.

SSEN urged anyone in its distribution areas interested

Flex types

- CMZ Prevent - the traditional CMZ product that supports the management of peak demand
- CMZ Prepare - to support the network during planned maintenance work
- CMZ Respond - to support the network during fault conditions as a result of maintenance work
- CMZ Restore - to support the network during faults that occur as a result of equipment failure

in providing flexibility to register on the Piclo platform, a flexibility marketplace used by distribution operators to find service providers.

The deal is Piclo’s first commercial contract, following trials with all of the UK DNOs.

For SSEN’s requirements, providers can be individuals, communities or aggregators.

All assets – from small scale renewables, batteries and electric cars, as well as load response and demand reduction/energy efficiency – can play a role, said the company.

SSEN says there is no minimum kW threshold to register an interest, but it

Norway’s Equinor invests in Reactive Technologies

Reactive Technologies has secured another tranche of funding, with Norwegian state-owned Equinor investing.

The demand-side response and smart grid company said the funding round was eight digits. It also counts Octopus and RES as strategic backers,

while Ingenious Infrastructure invested last October.

Reactive Technologies operates in a number of areas. It is developing services for grid operators to measure and manage inertia, has a demand-side response or ‘optimisation’ platform for corporate energy users, and touts a

‘hybrid’ or enhanced PPA structure for renewable generators.

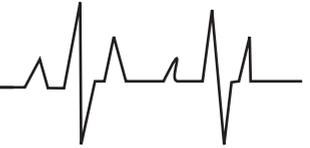
Reactive CEO Marc Borrett said the company will spend the money on more staff and to “significantly scale



Funding round was ‘eight digits’

up our power purchase optimisation and grid measurement and analytics services to reach renewable generators and system operators globally”.

Equinor is the new name for Statoil.



Aggregators and flexible power providers at the electricity system operator's latest Power Responsive meeting presented a gloomy outlook: uncertainty created by the suspension of the Capacity Market (CM) and the targeted charging review (TCR) is compounded by Brexit.

According to the meeting summary: "It's hard to make a [DSR] business case for the UK right now."

Participants reiterated calls to better align changes to residual or backwards-looking charges (Triad has been a mainstay of DSR business cases) with changes to forward-looking charges and the flexibility markets National Grid and others are trying to create. As a minimum, they believe Ofgem should not make any decisions on the TCR until it is clear that the CM will be reappraised.

Local flex markets

Flexibility providers also urged distribution network operators to show greater willingness (i.e. money) to support the market, pointing out that placing price caps on flex services has in some instances resulted in DNOs procuring nothing.



DSR providers urge National Grid to go faster, Ofgem to go slower

There is a near-term risk that more demand-side response providers could exit the market than enter, with firms urging National Grid to increase the pace of product redesigns in the face of revenue streams drying up. Meanwhile, Ofgem must consider charging arrangements in the context of the time required for competitive markets to develop. Brendan Coyne reports

They called for better collaboration and coordination between the ESO and DNOs/DSOs to enable DSR providers to understand the "entire pot" available to those that can provide flexibility services. "In other words, a holistic view of where the opportunities may lie nationally, regionally and locally," according to the summary.

Move faster

Market participants pointed out that it takes approximately four years until an auction can deliver from first concept and urged market makers to move faster where possible.

Cathy McClay, head of future markets at National Grid ESO, said it would "shortly" issue a full update on balancing and ancillary services, covering what they will be and how they will be procured.

She said the Epex auction will go live in March with standardised versions of existing FFR products.

While Frequency Control by Demand Management (FCDM) will end, a new faster static FFR product launched in March.

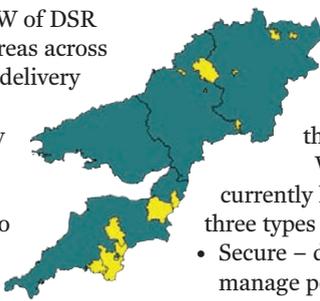
However, new dynamic FFR products need to be stress tested – which could take "upwards of a year". **te**

WPD's 93MW DSR tender now open

Western Power Distribution (WPD) has opened its demand-side response tender window.

The company aims to procure 93.4MW of DSR services in 12 areas across its network for delivery in 2019/20.

The company has also signposted the flex it is likely to require out to 2024.



The tender closes late April and WPD urged interested providers to register as soon as possible.

It has developed a postcode checker for potential providers to check if their assets are in the right areas. WPD is

currently looking for three types of services:

- Secure – designed to manage peak demand on the

network and pre-emptively reduce network loading

- Dynamic – developed to support the network in the event of specific fault conditions, usually during summer maintenance
- Restore – designed to help with network restoration following rare fault conditions.

Secure will pay firms an 'arming fee' between £75/MWh and £118/MWh, depending on location. It will also pay a utilisation

fee of £150MWh.

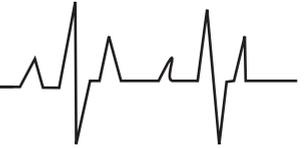
Dynamic pays a small availability fee but a utilisation fee of £300/MWh.

Restore pays £600/MWh.

Firms can provide either Secure or Dynamic in most areas, and make themselves available for Restore services.

The company says it will release further procurement zones in July.

Interested parties can register via: <https://rjfxp.westernpower.co.uk/ECE>



Shell buys DSR aggregator Limejump

Fossil fuel giant makes move into virtual power market

Shell is to buy virtual power plant firm Limejump. The move follows Shell's recent acquisition of home battery storage firm Sonnen.

Shell, which sells energy directly to large industrial and commercial companies in the UK, also acquired household energy retailer First Utility a year ago.

The fossil fuel company could now arguably be called a virtually, if not vertically, integrated utility.

Terms of the deal were not disclosed. Upon completion Limejump will become a wholly owned subsidiary of Shell, but CEO Erik Nygard told *The Energyst* that the firm would retain autonomy.

"Everything stays the same in that sense. We will remain an independent subsidiary of Shell. The current management team stays in place and we can focus on ensuring the energy future we want to build comes

together faster," he said.

"It becomes a supercharged version of what we have always tried to do, with greater support and resources," Nygard

added. "We would otherwise have been looking at quite a different set of scale opportunities."

Shell's buy follows a round of consolidation in the UK demand-side

response market. Kiwi Power's founders sold out to Engie in late 2018, Centrica bought Restore for £62m the year before, with Enernoc bought and renamed by Enel in a deal that valued the firm at £236m.

Nygard suggested the global investments in renewables and smart grid companies Shell has made in recent years sets the acquisition apart.

"Suddenly it starts to look highly global; a big differential versus a lot of acquisitions we see in this space. Shell is letting [the acquired companies] operate in their own way without



Hydro into VPP

Limejump is adding hydro to its virtual power plant (VPP) and will trade its power into wholesale and balancing markets.

The firm has signed a deal with DHG Hydro for the 1.2MW Langwell hydro plant near Ullapool, Scotland. DHG has a lot more hydro assets, noted Limejump.

Access to wholesale markets via the Power Purchase Agreement (PPA) is worth around £300,000 for the plant, said Limejump, with additional value to be had from the Balancing Mechanism and ancillary services procured by National Grid.



forced integration, but it sets up a very interesting strategy in the long term. Shell New Energies' vision is fully aligned with ours."

Brian Davis, vice-president Energy Solutions at Shell New Energies, said: "We are impressed by the Limejump team and their track record of building a digital energy platform that connects and optimises a diverse range of assets.

"Together, we can offer more choices to our customers

in the UK as we accelerate the building of a customer-focused energy system in support of Shell's strategy to offer more and cleaner energy solutions to customers." **te**



Erik Nygard: 'We can move faster now'



EDF and Upside to trade flex from Anesco's Clayhill solar-storage farm

EDF Energy and technology partner Upside Energy will trade the power from Anesco's 16MW Clayhill solar-storage farm.

Terms of the deal include EDF providing a floor price for the storage aspect, and the site's output will be bid into wholesale markets as well as contracted to grid operators.

EDF said it will now bring more of Anesco's assets into its PowerShift demand-side response platform.

Anesco has completed 100MW of battery projects to date and aims to have 380MW on line by the end of next year.

Don't miss The Energyst Event

Be sure to register for your free ticket to The Energyst's flagship conference and exhibition, being held on 1-2 May at the Motorcycle Museum, Birmingham

The Energyst Event returns on 1-2 May 2019 – and this year delegates can expect an even bigger, and better, event.

Here's what we have got lined up...

Hear from the experts

As the way we use energy evolves and new technologies emerge, it can be difficult for businesses to know whether they are taking the optimum approach to managing their energy. That is why this year we will be focusing on energy convergence: how energy is converging across efficiency, sustainability, procurement and flexibility.

The conferences in our Energy Convergence theatre will tackle the big questions businesses have about creating a future-proof energy strategy, from deciding on the best procurement approach in a volatile market to how to make the most of new technologies like onsite generation and energy storage.

With speakers from key players within the industry, we are certain that everyone will take away some useful insights they can use to inform the way they manage their energy.



Have your say

We also have an official 'fringe' event, icon's Unconference (see box), which we have created with the goal of igniting passion back into utilities education. The Unconference will comprise a series of TED-style talks from industry insiders, alongside workshops and debates designed to address energy managers' and



We will tackle the big questions businesses have about creating a future-proof energy strategy

Earn CPD points by attending

All of our conference sessions are CPD certified, which means attendees can accrue CPD points and demonstrate that they are continuing their professional development by attending The Energyst Event.

buyers' primary concerns.

In these sessions, we are giving energy professionals an open platform to share their views, challenges and opinions – within the context of utilities management, no topic is off-limits.

With some controversial debates around whether businesses really need energy brokers and whether

sustainability is a distraction from progress, it is bound to be lively. And with so many delegates from different backgrounds in attendance, it will be interesting to gain some different perspectives on the common challenges facing business energy users.

Learn something new

There will also be opportunities to get involved in our workshops, which are focused on boosting skills and promoting best practice in the areas that are typically challenging for energy professionals.

We know that compliance is a complex area for many, for example, so energy analysis expert Vilnas Vesma will be running two three-hour masterclasses on the critical aspects of energy reporting. We will also be looking at how to improve softer skills in our Confidence Building workshop, which will focus on engaging senior colleagues in energy management.

A number of not-to-be-missed reports will also be launching at the event, and delegates will also have the opportunity to speak to the experts behind the research.

Energy consultant Inenco will launch a new report,

Register for your free ticket at theenergystevent.com

Does energy reporting really deliver carbon savings? (see p42), which focuses on business attitudes to energy reporting, while Engie will consider our low carbon future in 'How realistic are ambitions of zero-carbon?'

We will also be launching our own report into businesses' attitudes to electric vehicles – *Powershift: The impact of EVs on your energy strategy* – and we are welcoming delegates to discuss our findings with us at The Energyst Event.

Seminar highlights

Energy outlook: The impact of incoming change

How the shifting policy and regulatory landscape will affect your energy strategy across consumption, generation and flexibility. Paul Sheffield, Haven Power; Rob Williams, BT; Caroline Bragg, the ADE; and Kyle Martin, of LCP outline what's coming down the track and how businesses can prepare for the future.

Energy efficiency rebooted

Tesco group head of energy Brian Cairns will detail what's working for the retailer and how to deliver efficiency through better use of data. EnergyPro's Steve Fawkes will look at how to take energy efficiency even further by creating a tradeable resource that can be procured

The 'Unconference' hosted by Icon

The industrial and commercial operators network (Icon) is running a fringe event, or 'Unconference' alongside The Energyst's programme. The idea is to spark debate and interaction in a less formal format. Sessions include:

- This house believes that we don't need an energy broker
- The significance of Significant Code Reviews
- Demystifying DSR
- How to read an energy bill
- Calculating RoI on energy efficiency

"Within the context of utilities management, no topic is off-limits. We are here to ignite passion back into utilities education," says Icon director Georgina Penfold.

"With market insecurity, socio-political factors and rapid technological development strongly impacting businesses, this theatre addresses energy managers' and buyers' primary concerns through keynote TED-style talks, targeted workshops, plenty of debates and top-level discussion."

Energy reporting masterclasses

Energy benchmarking and performance indicators have come to the fore this year thanks to requirements in SECR, ESOS and ISO50001, which between them cover a large proportion of significant energy users. At The Energyst Event, energy analysis expert Vilnis Vesma will hold two three-hour masterclasses covering these critical aspects of energy reporting (priced at £75). Details can be found via links at www.vesma.com/training.

by energy companies and system operators.

2019: The year of the PPA

Power purchase agreements appear to be coming of age; are buyers and sellers on the same page; and what are the emerging opportunities to lock in clean power? James Brabben of Cornwall Insight and Chris Bowden of Squeaky Clean Energy will share their insight, while Anthony Browne of Northumbrian Water will explain how the water company is making PPAs a key part of its broader energy strategy.

The impact of EVs on your energy strategy

Electric vehicles will significantly impact energy strategies. This session covers the roadmap from early

adoption and installation of EV charging infrastructure through smart charging and vehicle-to-grid services. Andy Kershaw of Marston's will outline the pub chain's charging rollout, Peter White of Western Power Distribution will provide a DNO's perspective, Filippo Gaddo of Arup will outline some of the key challenges ahead and Chris Rimmer of Cenex will deliver insight and data from its vehicle-to-grid trials. Free copies of the Energyst's new 2019 EV Report will also be available.

Onsite generation, flexibility and storage

Sessions around onsite generation storage and flexibility will be held on both days, with speakers from EDF Energy, Ylem, Piclo, Scottish & Southern Energy Networks and ABB detailing the latest developments, challenges and opportunities for businesses seeking to make investments in generation and storage deliver best bang for buck.

With the event fast approaching, now is the time to ensure that you have secured your place. Whether you are looking to network with your peers or pick up some tips on how to refine your energy strategy, you won't want to miss this event – so secure your free ticket today.

For full details and to register visit:
theenergystevent.com

Register for your free ticket at theenergystevent.com

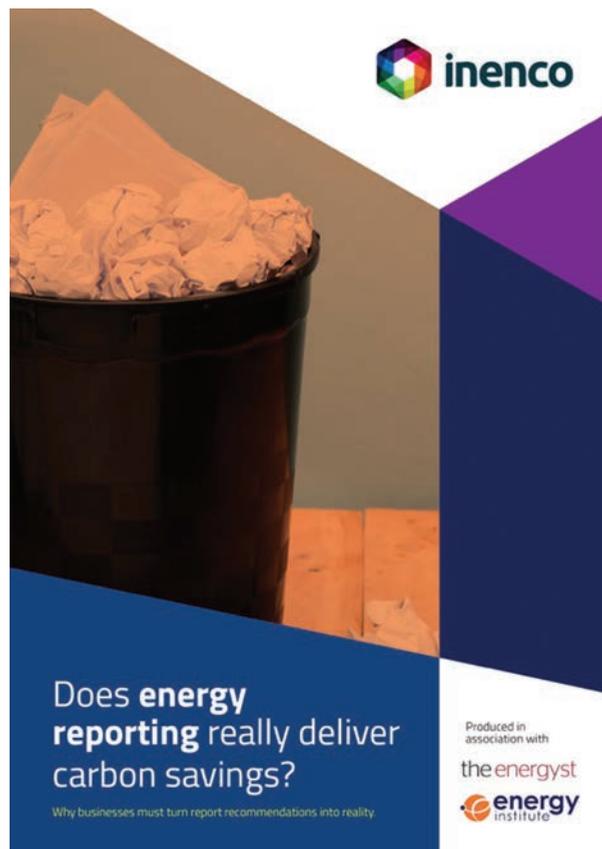
Energy and carbon reporting: Compliance is not enough

Businesses can unlock genuine benefit by going beyond the compliance aspect of compliance schemes. Tim McManan-Smith highlights key findings of a new report that will be discussed at The Energyst Event, 1-2 May, Birmingham

Energy reporting is back in the spotlight in 2019, with the new Streamlined Energy and Carbon Reporting (SECR) framework launched in April and Phase 2 of the Energy Savings Opportunity Scheme (Esos) concluding in December. However, new insight reveals that not all businesses are turning data and insight into energy saving actions.

Energy consultancy Inenco, alongside *The Energyst* and Energy Institute, has conducted a survey looking at business attitudes to energy and carbon reporting. *Does energy reporting really deliver carbon savings?* found that more than eight in 10 respondents view CSR as increasingly important or have already embedded it within their business. Yet at the same time six in 10 found Esos Phase 1 a waste of time and about half are unprepared for phase 2 or fully understand the requirements of the SECR, a framework which is now live.

Compliance schemes do seem to have had a positive effect regarding awareness,



with 82% of respondents saying energy reporting has either raised the profile of energy efficiency or that the organisation already prioritised

it. So it seems the message for better managing how we use energy is understood.

However, despite this appreciation of the need to



The benefits of the reporting are only realised when organisations utilise the data and turn it into insight and actions

be more energy efficient, there is inertia regarding its implementation. Esos Phase 1 was viewed by 61% of respondents as not being worth it. Correspondingly, the same number of respondents has not acted on their Phase 1 recommendations. Which may explain to some extent why it was not worth it.

The audits needed for Esos take time and money and the return is only realised when the energy saving opportunities identified are acted upon.

Tick box exercise or opportunity?

Despite the new framework being 'streamlined', business

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energy professionals have borne a growing reporting burden in the past five years. This has presented challenges from resource constraints to accessing the data required to submit into various schemes.

Bogged down in paperwork, and disheartened by a lack of meaningful outcome, it can be easy to lose sight of the bigger picture. Done correctly and actioned, data and energy saving opportunities identified by energy reporting provide businesses with a wealth of insight to not only reduce carbon emissions but also cut costs and deliver a significant boost to both CSR credentials and, crucially, the bottom line.

“Businesses are mistaken if they pigeonhole legal reporting obligations such as Esos and SECR as a compliance issue. They’re about opportunity,” comments Energy Institute external affairs director Nick Turton.

Those engaged in Esos Phase 2 should therefore redouble efforts to emphasise the opportunity aspect, according to Inenco’s Esos Solutions Programme Leader Rui Zu. Robust, accurate data should help encourage meaningful action, he suggests.

“Energy reporting is the foundation for compliance, by offering businesses a true picture of their energy consumption, costs and carbon emissions. However, the benefits of the reporting are only realised when organisations utilise the data and turn it into insight and actions,” says Zu.

“The results of this

survey show that nearly two thirds of businesses have not capitalised on the opportunities made available to them through Esos Phase 1, undoubtedly impacting their cost base and competitiveness.

It is also concerning that 54% of businesses have not yet commenced their Phase 2 assessments.

“Businesses should really utilise their energy compliance work to rethink how they can cut energy costs and improve their competitiveness,” says Zu.

To help businesses drive action from their audits, the report provides insight and advice based on 320 Esos Phase 1 audits conducted by Inenco. For those looking to gain a deeper understanding of energy saving opportunities and the changing framework for energy and carbon reporting, we think this is essential reading. [te](#)

Download Does energy reporting really deliver carbon savings? at: inenco.com/esos-report

To understand why businesses might be inhibited from acting on their report recommendations, Inenco, *The Energyst* and Energy Institute surveyed energy professionals in businesses affected by Esos and SECR during February/March 2019.

The report’s findings will be discussed in a dedicated session, ‘From tick box to toolbox’ at *The Energyst* Event on 2 May. Speakers will outline optimal approaches to energy reporting compliance.

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Small changes add up to big savings

Eon and Savills ran a month-long experiment to see how behavioural ‘nudges’ could complement a building management system. The Energyst finds out how they fared

Eon and the Cardiff office of global real estate adviser Savills have come together to run an innovative behavioural science experiment, to test how businesses can encourage their employees to do their bit and reduce their energy use. These small and unobtrusive changes had little or no impact on day-to-day business activities but saw energy use fall by an impressive 26%.

The four-week experiment in the city centre office revolved around Savills employees, comparing the behaviour of two sides of the office: one with a series of behavioural science-inspired ‘nudges’ to prompt responsible energy behaviours; the other running as a control group without any interventions, to monitor energy use over the same period.

Nudges are small interventions designed to prompt people into a different pattern of behaviour, such as switching a light off that they may have left on. These make use of behaviour change techniques to guide employees into more sustainable choices – for example habit formation and creating social norms where individuals change their behaviour to fit in with the group.

Given that Savills office already has its own building management system in place with energy efficiency measures such as pre-set timers for lighting that could

26%

Reduction in Savills energy consumption using behavioural science-inspired ‘nudges’ to prompt responsible energy behaviours

not be controlled by staff, the experiment offered an opportunity to explore other ways that a business can save energy and the important contribution individual employees can play.

Anna Kuzniar, associate director at Savills Energy, says: “The results at the end of the four weeks show we can all do more to save energy. We’ll use the results to support our own sustainability targets, and to inform our advice to clients. With energy prices at an all-time high we know that reducing consumption can make a real difference to a company’s bottom line, as well as to its carbon footprint.”

Phil Gilbert, director of customer solutions at Eon, adds: “Large-scale technologies and smart systems often get all the attention when it comes to

businesses making the most of their energy needs but, from an efficiency perspective, it’s often the case that the first step is making sure you’ve eliminated waste and you are operating efficiently. That’s why we’re really excited to have come together with a forward-thinking organisation like Savills on this experiment and show there are improvements that can still be made, even in a modern and well-managed office.

“These fantastic results prove that behavioural science is a powerful tool, with small changes able to make a big impact on office running costs. I look forward to helping more of our customers use these learnings to save energy and money.”

For businesses looking to replicate the effects of the experiment, there are a few simple changes that you can make to help see reductions in your energy cost:

- Install prompts across the office, to remind employees to use less energy – for example, above light switches and printers, to remind users to switch them off when not in use. These can range from fun engaging stickers, through to small and simple pieces

“Behavioural science is a powerful tool, with small changes able to make a big impact on office running costs



Challenge colleagues to set clear goals and commit to them, suggests Eon

of text, depending on what works best for your office environment.

- Appoint energy ambassadors to keep colleagues motivated and on track. One task includes checking everyone has switched off their computer monitors at night, leaving red and green stickers to indicate who has and hasn’t remembered. This encourages people to compare themselves to other colleagues and uses social norms theory, which shows that sustainable behaviour can be encouraged in environments (for example, work offices) where individuals don’t typically have these habits.
- Give regular feedback on how staff are doing and giving them a comparison – for example, to other



parts of the business or similar businesses. This maintains momentum as well as encouraging a bit of healthy competition.

- Encourage goal-setting by challenging colleagues with clear goals to commit to. This takes advantage of the fact that we seek to be consistent with our public and personal promises that we make.
- Change your default settings, for example on office thermostats. We all know that heating in the office can be a contentious issue, however our human nature is to go with the flow and stick to pre-set options. Change the temperature to be within a seasonally appropriate range and provide a prompt above the thermostat to remind people to keep within this. [te](#)

The science behind the experiment

At the core of this experiment, Eon and Savills were looking to test how a range of behavioural science theories can be used to change employees' habits and help reduce energy use - from switching off computer monitors and printers at night, to turning off lights and leaving the office thermostats alone.

The set-up of Savills' Cardiff office proved ideal for the experiment. Each side of the office has its own energy meter, which made it easy to directly compare the impact that small and low-cost nudges can have on the company's energy use at work, as well as the financial savings to the business, compared with a control group with no nudges installed.

The nudges used varied from simple stickers above light switches prompting people to turn them off, text above heating controls guiding employees to keep it within an advised range, to goal-setting 'contacts' and assigned energy ambassadors to keep people accountable. The nudges installed were all subtle and low cost to produce, costing less than £50. The experiment was designed and delivered by a team of behavioural science experts from H+K Strategies.

The results

As a result of these nudges, the experiment saw significant reductions in the energy use, with the amount used for sockets and lighting falling by 4%. Meanwhile, with the experiment taking place in the colder autumn months, energy use for heating in both halves of the office saw a rise. However, while the control nearly doubled its usage, the experiment group only rose by a quarter.¹

This resulted in a total saving of 26% in energy use for the half of the office undertaking the experiment. When applied to the entire office, over the course of a year, this represents an energy saving big enough to run an office of 81 laptops for eight hours a day for a year.²

These figures are significant when compared with other similar experiments to reduce energy use, which typically achieve 3-5% decreases. For example, a programme undertaken in the US using letters comparing consumers' energy use with other households saw just a 2% reduction in energy.³ Moreover, when considering the fact that the Savills office used for the experiment already had a building management system, this experiment demonstrates the powerful role behavioural science has to play in energy saving.

1. Energy use for heating in the control group increased by 90%. The experiment group rose 26%

2. When applied to the whole office, annual energy reduction found in the experiment group would be equivalent to a 12,120kWh saving. Based on dividing this figure by a 0.225 kWh average energy use to boil a kettle (source) and a 225kWh average energy use to run a laptop for eight hours a day for a year (source). Year is based on a working year of 250 days

3. Source: *Journal of Public Economics*

Unlocking energy efficiency starts with people power

Turning energy into something that is of interest to the people who work in or visit the buildings is where success often lies, writes Carbon Credentials founder Ciaran Duggan

On the surface, unlocking energy efficiency or bridging the energy performance gap between what a building was designed to cost versus what it actually costs in utilities seems like an easy win-win. Who wants to spend more on electricity and gas than is absolutely needed?

In 2009, in the wake of the financial crash, organisations worldwide scrambled to reduce spend. As energy prices rose, many focused on the costs of electricity and gas. So, when I started Carbon Credentials nearly 10 years ago, it seemed this strong desire to cut costs together with energy efficiency projects – with many offering clear sub three or sub five year paybacks – was a ‘no brainer’. And I predicted that within five years the UK would be as energy efficient as possible.

57%
said their employer is not involving them enough in cutting carbon emissions

66%
would support a bonus incentive scheme that aligned to carbon reductions

But fast forward 10 years and only 3-5% of buildings are as energy efficient as they can practically be, based on the analytics of our ADAPt data warehouse, run on over 43,000 buildings globally.

Many organisations continue to struggle to unlock energy efficiency and few involve their employees – many of whom are keen to help.

Last year we ran a research study, the ‘Carbon Commitment report’, based on the views of 2,000 employees, managers and, more specifically, heads of sustainability, energy and facilities managers. Some 57% of employees said their employer is not involving them enough in cutting their carbon emissions; 71% have taken their own action to cut their carbon footprint at work in the past six months and 66% would support a bonus incentive scheme that

aligned to carbon reductions.

In the same research, competing business priorities was reported as the biggest challenge in delivering a sustainability programme.

Lack of take-up

So, what is going on? Why are so few companies embracing ways to drive sustainable change? Why, when ever more large and mid-sized companies want to portray themselves as good corporate citizens and regulation and reporting frameworks continue to spring up such as the SECR, TCFD and ESOS?

There are two reasons for this – both related to people.

Firstly, building energy and control systems are complex. Often there are lots of different individuals and companies involved in the provision of the things needed for people

related to overheating and overcooling of spaces.

Secondly, the staff who ultimately experience (or suffer) the conditions within the buildings are rarely engaged and involved with the process of making offices, hotels, leisure centres, universities and retail spaces more comfortable and efficient.

Overcoming conundrum

Data and visual analytics are the glue to bringing together the multiple technical people who impact energy efficiency and staff/guest comfort. Creating and communicating 'one version of the truth' and showing what the building is actually doing versus what people think it is doing is step one towards a more efficient building.

When this works well,



By engaging employees from top down, energy savings can be quickly and cost effectively unlocked
**Ciaran Duggan,
Carbon Credentials**

interest to the people who work in or visit the buildings is where success often lies.

This is working for many clients – for example, at Village Hotel Club we relate the energy and sustainability programmes back to the key business priorities of filling bedrooms, enabling pleasant public spaces for gathering and dining, and providing excellent leisure and corporate meeting facilities. As a result, our measurement and verification process showed that in December last year, we have saved Village more than £1m in energy cost savings since 2017. For this to be an ongoing success, the programmes we initiated are now embedded and owned by the staff at its 30 hotels across the UK.

A true win-win

By engaging employees from top down, energy savings can be quickly and cost effectively unlocked. And it is a true win-win; staff feel better and more engaged, the board can point to a great news story of how they have implemented a successful energy and cost reduction programme, and as a society we nudge towards a global lower carbon economy.

Where to start, strategically or tactically? Strategically, create a target, ideally a science based one. Our study found that only 10% of organisations had a carbon reduction target. If you are not measuring it, you are unlikely to be managing it.

Tactically, gather data, analyse it and start on a quick win 'halo' project to start winning hearts and minds in the boiler room and boardroom and everyone in between. 2019 is predicted to be the 'Year of the Smart Building', and with Smart Building Solutions now very cost effective and easy to install, this approach will be attractive for many building managers. It is certainly where many of our clients are putting their time and energy this year. **te**



The programmes Carbon Credentials initiated at Village Hotel Club are now owned by staff

to work effectively and productively in buildings: fresh air, heating, cooling, lighting and ancillary services such as lifts, escalators and canteens.

This wide and disparate group of people rarely collaborate, and traditionally only see their piece of the puzzle, rather than the holistic view of the building. Technical staff, managing agents, facilities managers and energy managers are often overworked, underpaid and spend most of the time firefighting to respond to urgent calls – with the number one and two complaints by volume being

significant positive results and impact are achieved. For example, we have worked with the Jockey Club for a number of years, gathering data, analysing it, creating interesting infographic aids and then engaging with the staff across its many racecourses. The result is engaged and enthusiastic staff – and more than £1.5m in cost savings since the programme began in 2014.

The challenge is also how to make energy interesting to the wider workforce. For most, energy is boring. It is inaccessible, kWh or tCO₂ are just not engaging for the

vast majority. The energy cost savings, while significant in percentage terms, are often not big enough to excite the majority of employees and board members. Sixty per cent of the heads and managers of sustainability, environment and energy interviewed said a lack of leadership support was a top barrier to implementing sustainable change programmes.

Building utilities are often just 1% of a company's costs, while staff and payroll costs are often closer to 90% of an organisation's expenses. Turning energy into something that is of

Smart lighting via smartphone

A lighting control solution that enables the maintenance team to control it via a smartphone app is saving energy at The Dyson School of Design Engineering



The Dyson School of Design Engineering at Imperial College, London (ICL), was established with a £12m donation from the James Dyson Foundation.

BEG Lighting Controls was selected by ICL to provide a user-friendly system that can be maintained by its own maintenance department and meet the lighting control standards required by the research university.

The lighting controls manufacturer worked with mechanical and electrical consultant Buro Happold.

ICL's main criteria were energy and cost savings and maximising natural daylight. BEG Lighting Controls and Buro Happold worked on the layout of the lighting as well as the level of light and type of control across teaching rooms, laboratories, offices, corridors, stairwells, toilets and store rooms.

"The design brief from ICL meant we had to carefully specify lighting controls products for each area, which differed greatly from room to room, so this was by no means a 'one size fits all' solution," explains Tom Greenrod, specification director at BEG Lighting Controls.

"It was imperative that the lighting was mostly switched on in the offices and teaching rooms during working hours

and that it could be controlled to reduce lighting levels when the natural daylight was brighter. For the laboratories, we used DALI photocells instead of occupancy sensors."

Greenrod continues: "Areas such as the corridors, stairwell, toilets and store rooms do not need to be fully lit and lighting only needs to be switched on once our occupancy sensors detect there is a person in the room. It is in these areas, naturally, that the most energy consumption could be saved so it was vitally important we selected the right products for these areas."

He says using a range of BEG DALI Broadcast Occupancy Sensors enabled a suitable sensor to be installed in all sections of the building.

The luminaires selected on the project are DALI dimmable and daylight harvesting

is achieved mainly for the light fittings adjacent to the windows. For these areas, the BEG DAA4G Occupancy Sensor was deployed as it can be programmed so that the window luminaires are dimmed by 25% to the main room.

If the sensor's photocell detects any change in the level of natural daylight, all luminaires will adjust accordingly. This sensor is specifically used in the teaching rooms, where up to four lighting zones can be set – and it can be programmed using a smart phone and BEG Lighting Controls app, as can all of the DALI sensors used on the project.

The only mains fitting on the project was a feature chandelier in the main stairwell. "This needed to be controlled by occupancy sensors together with the DALI luminaires," says Greenrod.

"We solved this by using their sensor with a DALI and switching output. This sensor was also used in the toilet areas where the lighting and the extraction fans required occupancy control. The DALI would control the luminaires and monitor any natural daylight whereas the fan was controlled independently and worked on occupancy detection only.

"A feature of the DALI master detector is the orientation setting where the lights can be set to 20% once an area is unoccupied. This function is used in the circulation areas so that some illumination is provided at all times – a useful comfort and safety feature."

In laboratories, occupancy sensors were not required as ICL wanted to avoid the possibility of lights turning off, which could be considered unsafe depending on the type of experimental work being carried out. In these rooms, the BEG DALI photocell is used to control the window row of luminaires to enable energy saving.

Greenrod says he appreciated the onsite meetings and technical support prior to first fixing, which helped ensure the wiring philosophy was understood for each type of sensor deployed on the project.

"These meetings ensured that a smooth trouble-free installation was achieved," says Greenrod. **te**



ICL's main criteria were energy and cost savings and maximising natural daylight

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Eon will provide connected lighting and occupancy mapping as the building's initial stage of 'smartness'.

Eon makes smart move

Energy firm strikes connected lighting deal with enModus

Eon has struck a deal with smart buildings solutions company enModus.

The energy company's Connected Energies division will now deliver smart lighting services using the Chepstow-based firm's technology.

EnModus says it can make any building smart. The company uses power line communications instead of wifi and has claimed some massive savings for companies such as Virgin Media and retailer Claire's in recent months.

EnModus CEO and co-founder Andy Heaton says the deal with Eon was "momentous" for the company and would enable enModus

to expand into Europe.

"They [Eon] have a vision of transforming yesterday's power lines into tomorrow's smart energy networks and enModus has Wattwave – our patented power line communications technology – to deliver that connectivity."

Garance Emmerich-Bundel, head of product management and engineering at Eon Connecting Energies, says: "The agreement with enModus gives us the opportunity to offer our customers new solutions that drive energy efficiency and reduced carbon emissions."

Eon has already installed the technology at its research centre in Aachen, Germany, where it will

“

Eon has a vision of transforming yesterday's power lines into tomorrow's smart energy networks ... We can deliver that connectivity

provide connected lighting and occupancy mapping as the building's initial stage of 'smartness'.

Other smart technologies will be added to improve energy efficiency and occupant wellbeing.

The deal with enModus, whose technology is primarily aimed at B2B customers, follows Eon's UK launch of its smart home solution.

The energy company aims to deploy connected lighting, power and heating that is controlled by a 'virtual home assistant' capable of learning inhabitants' habits, for example anticipating when they will return home and adjusting heating accordingly. **te**

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Data analysis unlocks energy savings

A smart building starts with a single view of data, enabling greater asset efficiency, more effective maintenance and underpinning investment decisions, says James Spires, managing director of Smart Buildings at Engie

Creating smart buildings that control and regulate their energy and operational systems to provide comfortable, efficient, high-performance environments is the ultimate objective for most energy and facilities managers. Smart building solutions allow you to optimise the performance of building systems, eliminate wasted energy, increase productivity and improve occupant comfort and wellbeing.

Understand consumption

The first step towards creating an energy-efficient smart building is to connect all of the data produced by your building's systems, technology and sensors. This can include data on utility consumption, air temperature, humidity, space utilisation, weather conditions, production output, air quality and much more.

By collating this data and analysing it on a single platform, you will get a

clearer picture of when and where energy is consumed in your building. But more than that, you will gain a clear understanding of the relationships between different activities and assets in your building, so you can see how data in one area is influenced by activities in another.

Harmonise assets

These insights offer myriad potential benefits for your business. Firstly, they allow you to see whether assets are working in harmony or in conflict. For example, are heating and cooling systems fighting against each other to achieve different temperatures in certain areas of your building? This can waste a huge amount of energy, and simply unifying HVAC temperature settings in each area will lead to immediate energy savings.

Take control

Using the data from your smart building systems enables you

to easily identify anomalies or unexpected usage and take appropriate action. By enabling you to take targeted actions, such as improving controls, utilising Internet of Things (IOT) devices, modifying equipment set-points and schedules, smart building data helps you to significantly improve efficiency and reduce consumption.

If you combine this with the use of automated digital control solutions, you can further optimise the performance of systems and improve building operations and efficiency. For example, by linking lighting to daylight sensors, lights can be dimmed automatically when there is sufficient natural light. Similarly, movement sensors can be used to ensure lights are not left on in unoccupied areas.

Maintenance efficiencies

By monitoring data from key assets such as air-handling units, pumps, chillers and other mechanical and

electrical equipment, you can also ensure maintenance and servicing interventions are timed appropriately and efficiently. For example, rather than simply changing air filters every month, you can do so when the data indicates that new filters are needed.

Similarly, if any fault is identified, engineers can be directed straight to the problem with an indication of the type of fault, so that interventions can be more effectively targeted. These insights into the condition and efficiency of your assets help to prevent wasted time and effort for your engineering and maintenance teams.

Informing investment

If you want to invest in more energy-efficient plant, equipment or systems, accurate, integrated data from your smart building system provides the required evidence. Once investments or operational changes are made, the same data can be used to immediately demonstrate the impact on energy consumption.

Real-time data also helps fine tune and adapt any changes to achieve optimum efficiencies. Over the longer term, the data can also be used to measure and report return on investment.

Connect your data

Connected data is the critical enabler for effective smart building systems – and targeted energy-efficiency programmes. By connecting data via a single intelligent analytics platform, you can ensure that operational changes and capital investments designed to improve energy efficiency are based on a clear understanding of how your building really works. That will enable you to manage your building more efficiently and effectively to achieve cost, energy and resource savings, and to extend the life of your assets. **te**

Siemens claims 'digital-as-a-service' will de-risk productivity investment and cut costs at Boortmalt Group

Siemens Digital Industries has signed a contract with Boortmalt Group, one of the world's largest malt manufacturers. The 'digital-as-a-service' programme is designed to reduce costs by up to 30% across its business.

Starting at Boortmalts' Malton facility in North Yorkshire, before potentially being rolled out across other Boortmalt sites, the plan will see Siemens conduct an audit of the Malton plant.

This will include the analysis of its utility consumption, raw material usage, machine performance and production processes which are key cost areas in the large-scale manufacture of malt.

The North Yorkshire site



Smart approach to cost cutting

produces >50k MT of malt every year and exports its speciality malt products across the world.

Boortmalt has ambitions to reduce its water consumption by 50% between 2010 and 2025 as well as reduce carbon emissions by 60% between 2010 and 2030. Both targets will be reached by deploying state of the art tech

and boosting productivity.

Siemens is also working towards a range of targets and said the deal is underpinned by a tailored commercial model that de-risks financial performance metrics.

Boortmalt chief operating officer Peter Nallen says: "From a commercial, environmental

and competitiveness perspective Boortmalt is totally committed to delivering value to customers. We think we can make a great product and improve our productivity at the same time, so it's a win-win."

He adds that Siemens "de-risked financing capital investment model means we can achieve Boortmalt's sustainability strategy with confidence".

Brian Holliday, managing director, Siemens Digital Industries, says: "We employ a range of investigative and digital tools to work with our customers and have found that manufacturers like Boortmalt can achieve productivity improvement and reduced cost while lowering their carbon footprint when we co-create solutions."

Siemens Digital Industries is working on similar productivity programmes in the UK with companies including Pilkington Glass, Kingspan and Encirc. **te**

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Leisure centres are a major source of energy use, with energy costs accounting for as much as 30% of total operational costs, second only to the cost of labour. So how to go about making leisure centre businesses more energy efficient without minimising comfort levels and visitor satisfaction?

The government has identified heat as a natural target for improvement. Certainly, heating and hot water provision accounts for a large proportion of energy bills in leisure centres, particularly in complexes with swimming pools. With large volumes of water that must be continuously heated, swimming pools typically use five times as much energy per square metre as offices, according to CIBSE.

Electricity usage is also high, especially in centres that use it extensively for air conditioning, ventilation, lighting, fans and pumps.

Due to its ability to generate lower-cost electricity and heat simultaneously onsite, this is where combined heat and power (CHP) can deliver benefits. But to generate maximum returns, the CHP needs to run for long periods of time during the day.

How to achieve this? Firstly, check that the demand is there; secondly, avoid oversizing; and thirdly, consider long-term maintenance options from the outset.

Providing a good example of CHP best practice is the installation at Penrith Leisure Centre in Eden, owned by Eden District Council (EDC) and operated by GLL.

Constant demands

In addition to a state-of-the-art gym, studios and a sports hall, Penrith Leisure Centre has a 25-metre swimming pool and 13-metre studio pool. Because it is open almost every day of the year, it is



Pooling the savings with CHP

Leisure operators use a lot of energy heating swimming pools and showers as well as powering air conditioning, pumps and fans. Their profile really suits combined heat and power, says Remeha technical manager Mike Hefford

perfectly suited for CHP.

The centre had previously been heated by a turbine CHP, boilers and water heaters, but the unit was oversized and failed to achieve the anticipated performance levels, savings and life expectancy.

When replacing the existing plant, EDC's requirements were to implement a new high-efficiency renewable or low-carbon solution that would improve the centre's energy performance, reduce emissions and increase operational efficiency.

35%

Primary energy savings at Penrith Leisure Centre

Mechanical and electrical engineer Thomas Armstrong recommended replacing the old plant with a Remeha 20/44kW ultra-low R-Gen condensing CHP unit operating in conjunction with three Remeha Gas 310 Eco Pro high efficiency condensing boilers to meet the project requirements.

Maximum benefits

Accurately sizing the CHP unit is critical to maximise the energy and carbon saving benefits – as a result, the CHP has been running non-stop.

“The CHP produces 44kW of heat per hour and it's using it all, even says the summer months,” says Thomas Armstrong's Stephen Clarkson.

“It's heating the constant temperature circuit, feeding

A Remeha R-Gen 20/44kW CHP unit, working in conjunction with three Remeha Gas 310 Eco Pro condensing boilers, is generating lower carbon heat and power at Penrith Leisure Centre

radiators, fan convectors, air handling units, providing hot water for shower facilities and, of course, heating the two swimming pools.”

Effective maintenance is also key. “A CHP unit is a specialist piece of plant,” Clarkson adds. “For us, it was important to install a unit that was not only sized correctly for maximum run time, but that there was a service programme offered that would keep the CHP operating at its optimum.

“Servicing the CHP allows the engineer to monitor the multiple moving parts and electrical components, identify any wear and tear and react quickly to any issues,” he continues. “That way, the CHP continues to produce electricity and heat to the building.”

As an estimated 85% of reported CHP faults can be corrected and reset remotely, remote monitoring is an important component of the service programme.

“If the unit has stopped working, is in alarm, or the performance drops for any reason, this is picked up within hours and action is taken to rectify the problem without prolonged downtime,” says Clarkson.

Long-term benefits

Initial data from the council indicates impressive total primary energy savings in the region of 35%. The findings compare energy use in the second half of 2017 with the same period in 2018, after the installation of the new CHP unit. Factor in the spark spread – the difference between gas and electricity costs – and this will translate to substantial cost savings for the council and GLL **te**

LEEF old heat problems behind you



Leveraging London's energy efficiency funds and an energy performance contract, Epsom and St Helier University Hospital NHS Trust is set to save £1m a year and slash carbon emissions

As part of the mayor of London's RE:FIT programme, energy services firm Breathe is working in partnership with Epsom and St Helier University Hospitals NHS Trust on a programme of retrofitting works that will significantly reduce energy costs and CO₂ emissions.

Following a fabric improvement programme completed in February this year, Breathe is also delivering critical infrastructure upgrade schemes at both hospitals.

The majority of the project finance comes via from the London Energy Efficiency Fund (LEEF) and the new mayor of London's Energy Efficiency fund (MEEF), both managed by Amber Infrastructure.

On the St Helier site, the steam central boiler plant will be replaced by new energy

efficient boilers and a low NO_x Combined Heat and Power (CHP) plant will reduce ongoing operating costs.

Steam systems throughout the hospital will also be replaced by easier to maintain low temperature hot water piping. Lighting, control systems and heating, ventilation and air conditioning systems will also be replaced or upgraded, creating a safer, well equipped environment which promotes the wellbeing of staff and patients.

On the Epsom site, the hospital is undergoing a significant transformation with the relocation of core energy services to accommodate a land sale. The project will see a new high efficiency central boiler plant, a new combined heat and power plant plus a new standby generator installed in a novel design intended to minimise spatial requirements for this new equipment and maximise the space available across the site. The lighting systems throughout the hospital will also be upgraded, providing a higher quality environment for patients and staff.

As part of the RE:FIT programme Breathe will provide a long-term performance guarantee to ensure the investment made by the trust is underpinned by energy savings.

Trevor Fitzgerald, director of Estates, Facilities and Capital Projects at Epsom & St Helier University NHS Trust, says: "The programme of works will bring significant energy saving investments to the Trust's estate, allowing it to greatly reduce its CO₂ emissions and energy consumption."

Shirley Rodrigues, deputy mayor for Environment and Energy, says: "St Helier University Hospital is leading by example. This is expected



Breathe will provide a long-term performance guarantee to ensure the investment made by the trust is underpinned by energy savings

to save £1m a year from energy bills and reduce carbon emissions by 27%. The mayor and I want to see other NHS trusts in the capital take advantage of RE:FIT and MEEF and help London on the path to becoming a zero carbon city by 2050." **te**



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CHP and EPC save leisure centre

An energy performance contract (EPC) across leisure centres operated for Glasgow City Council will reduce bills by six figures per year.

Veolia's agreement with Glasgow Life, a charity that delivers leisure and learning activities for the council, guarantees savings of more than £106,000 per year and a reduction of 1.7GWh of energy drawn from the grid.

Installing a 125kWe combined heat and power

(CHP) plant under the contract, alongside variable speed drives, energy management system upgrades and new lighting, will also help cut carbon emissions by 200 tonnes per annum.

The project, delivered via the Scottish Non-Domestic Energy Efficiency framework, will also improve resilience at the Scotstoun, Gorbals and Bellahouston leisure centres.

Richard Kirkman, Veolia's chief technology and innovation officer, said EPCs have a "key role" in enabling the public sector to become more sustainable while improving services for local communities.



Emergency cold storage unit

Cold storage warehouses will be able to immediately recover from breakdowns thanks to Aggreko's new temporary air cooled low temperature AC units.

Delivering 100kW of design cooling capacity at -22°C air outlet temperature, the machine is a plug and play solution which is housed in a 20ft container.

Available as an air- or water-cooled machine, it can cool down existing cold stores to freezing temperatures as low as -40°C. Interference with any cold store warehouse is minimised because the Aggreko unit is installed outside, increasing safety and

avoiding installation fees.

The units also allow for temporary cooling during planned shutdowns, allowing the operation of the cold store to continue while a fixed cooling installation is being maintained or upgraded.

Other features of the unit include Aggreko's wireless temperature sensors and built-in management system, which controls the temperature of the air.

Aggreko's access to temporary power generators also means warehouses can be supplied with enough energy if no electricity is available from the grid.

Insure against permit challenges

CLS Risk Solutions has launched an insurance product that it says protects against interruption to renewable energy project construction due to third party (judicial review) challenges to the permit.

The company claims Permit Challenge Insurance creates better investment opportunities for lenders and removes

uncertainty from renewable development projects.

It ensures the solvency of the developer during third party challenges and, in the event of an unfavourable final court order, it covers the capital investment into the project and financing repayment obligations.

"It's an area of insurance that is little known and even less understood in the wider broker market – it has been a sleeping giant in many respects," said business development director, Will Brooks. "The growth potential is huge."

Smart meters: SSE appoints SMS to do SMEs

SSE has signed Smart Metering Systems (SMS) as preferred national supplier to roll out 200,000 smart meters to its small and medium-sized business customers (SMEs).

The meters will be the fully smart variant, or Smets2 units. Glasgow-based SMS claims it manages some 2.8 million metering and data assets across the domestic and non-domestic sectors.

"We are delighted to have built on our longstanding relationship with SSE to sign this new agreement in our well established commercial sector. We look forward to helping SSE bring the benefits of smart metering technology to its small business customer base," said CEO Alan Foy.



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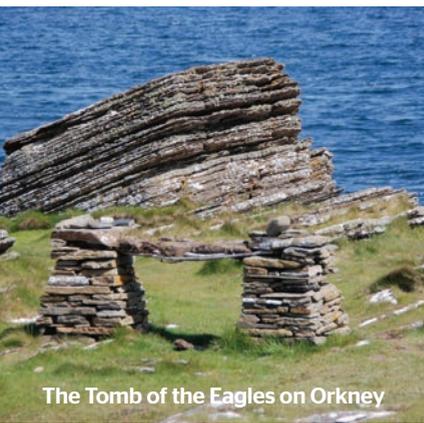
Caroline Bragg

The Association for Decentralised Energy's senior policy manager breaks cover to discuss prehistoric time travel, communications with alien life forms and avoiding Piers Morgan

Who would you least like to share a lift with? Piers Morgan. For obvious reasons.

You're god for the day, what's the first thing you do? Walk up to Dawkins and say 'hi.'

If you could travel back to any historical period when would it be and why? Prehistoric Orkney. A couple of years ago, I got to go there for a few days. For a small island, they have an incredible equivalent of Stonehenge, the Ring of Brodgar, the Tomb of the



The Tomb of the Eagles on Orkney

Kristel Jeuring on Flickr (Creative Commons)

Eagles where eagles were buried alongside the dead and Maeshowe, a beautiful passage grave that was probably built around 2800 BC.

We have got the monuments they left behind but we do not know that much about what they believed and how they lived. I would like to know

what their culture was like.

Who or what are you enjoying listening to?

Janis Joplin. Happy but pretty dark at the same time and I love the sound of singing through chain-smoked Marlboros.

What unsolved mystery would you like the answers to?

I recently read about the Woah! signal. In the 1970s, a telescope was looking for radio signals from aliens. Unexpectedly, they found exactly the type of signal that would be produced if another planet was trying to send a signal to space. They saw it once and never saw it again. Some people now think it was comets. I would like to know for sure, in case it really was an alien communication.

What would you take to a desert island and why?

Desalination kit, rum and a pirate hat.

What's your favourite film (or book) and why?

First couple of books of *The Hitchhiker's Guide to the Galaxy*. The later books are less good – apart from the bit where Arthur Dent becomes a sandwich-maker because he needs to contribute somehow and doesn't know how toasters or digital watches work. I can relate.



20th Century Fox

I 'Spy': Energy policy is just a cover

If you could perpetuate a myth about yourself, what would it be? I'm actually a spy. Energy policy is just a cover.

What would your super power be and why? Jumping downwards. Seriously – flying. I love the idea of being able to swoop.

What would you do with a million pounds? Buy a canal boat... a big canal boat.

What's your greatest extravagance? Good beer, and lots of it.

If you were blessed with any talent, what would your dream job be and why? Whisky tasting. For obvious reasons.

What is the best piece of advice you've ever been given? It'll all be alright.

What irritates you the most in life? People who are selfish.



What should businesses be doing to help themselves energy-wise?

From where the system is going, I think businesses need to look at how they can manage their energy more actively. That has the potential to help businesses be more in control of their energy bills and earn more revenue through their flexibility.

What's the best thing - work wise - that you did recently?

I went to the National Grid Control Room. They didn't let me touch anything! **te**



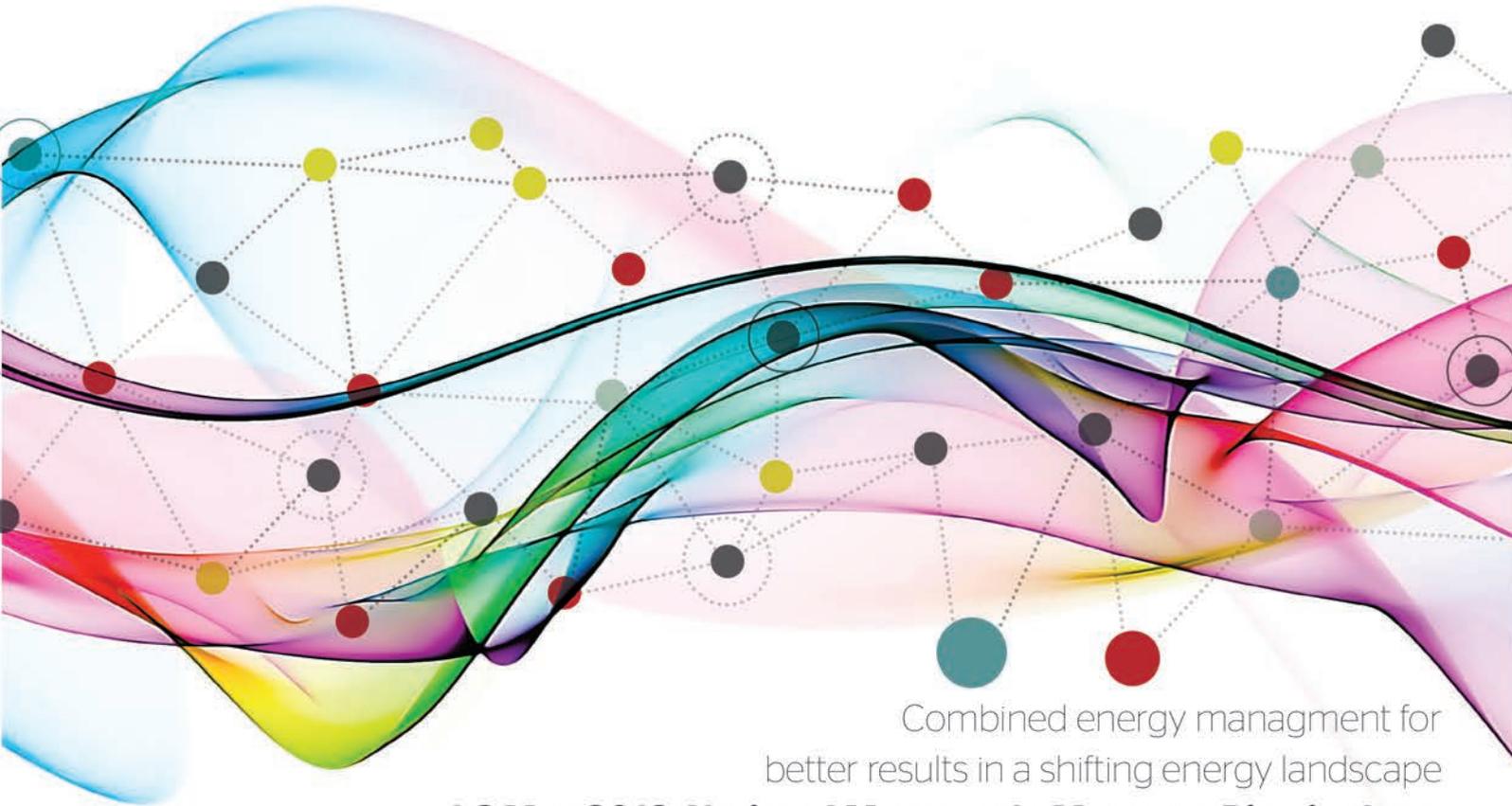
Piers Morgan

“ I went to the National Grid Control Room. They didn't let me touch anything! ”

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