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"We will see in a year or two whether it makes sense for Nissan to be an energy suppler" – p36


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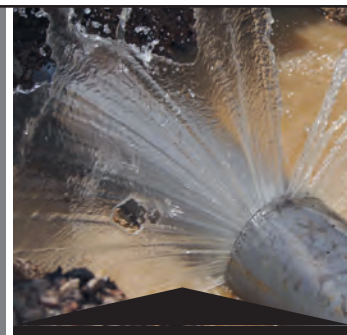

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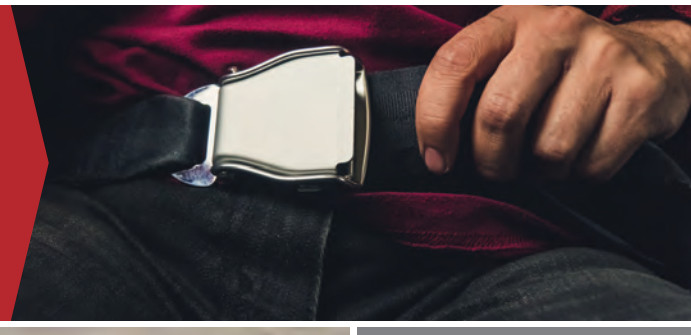

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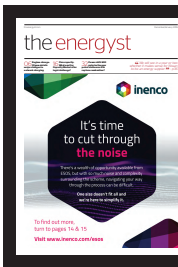

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Strong and stable

The government has decided to scrap Feed in Tariffs next March, not just the subsidy but the export payment as well. There were 345 responses and more than 91% were opposed to the closure of the export tariff.

As costs for renewable generation continue to fall, it is only fair to expect it to be deployed without a subsidy. However, why should the export tariff go too? If you generate power and that power is put onto the grid, you are supplying – and no other supplier generates without payment.

Chris Hewett, chief executive of the Solar Trade Association, comments that "nobody is saving any money here because the export tariff is not a subsidy.

> ***if you generate power and that power is put onto the grid, you are supplying – and no other supplier generates without payment***

Beis took this decision even before it sets out how it will overcome a really fundamental market failure that risks seeing new solar homes put power on the grid for free from next April".

The government freely acknowledges what it's doing: "The arguments put forward [by respondents] included that it would be unfair for small-scale generators to provide free electricity to the grid when not self-consuming." It says that a "flat rate export tariff does not align with the wider government objectives to move towards market-based solutions"; but then theft doesn't fit as a market-based solution either.

The government says that it is thinking about other routes to market for small-scale low-carbon generation. But why scrap something with no credible alterative? One of the challenges with transitioning to a low carbon energy system is decentralisation and getting the masses to engage needs a fair, stable and credible framework.

More organisations are deploying energy strategies such as self-generation, selling flexibility through DSR, the use of storage, electric vehicles, PPAs and peer-to-peer trading. Not only are they moving in this direction they are being encouraged to do so by the government, Ofgem and National Grid (though there are some very mixed messages here too).

What confidence will anyone have if the system repeatedly falters at the legislative/regulatory level? Take the SECR for instance, it has omitted liquid and solid fuels from what you are required to report, so if you burn oil, you're okay?

Time and again we are left with an energy policy that spreads confusion when all consumers keep on asking for is certainty.

As disciplines within energy converge and benefits of a more integrated approach become palpable, consumers need the regulatory support of a stable policy landscape to operate effectively. They are perhaps further from stability than ever.

the energyst

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Registered in England & Wales – 8667229
Registered at Stationers Hall – ISSN 0964 8321
Printed by Warners (Midlands) plc

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Ofgem outlines 'line rental' for all and further embedded benefit cuts ...

Ofgem is consulting on imposing fixed charges on all users of the electricity system instead of basing 'residual', or backward looking charges on usage.

Residual charges cover the sunk cost of the networks, about £4bn per annum. Ofgem wants to stop businesses avoiding them. It thinks moving to a fixed cost model, much like line rental in telephony, means everyone will pay a fair share for being able to use the power system.

Under its 'targeted charging review' or TCR, the regulator is consulting on whether to implement the change in 2021 or phase it in between 2021 and 2023.

Ofgem has long signalled the end of the current Triad regime, whereby larger businesses can reduce network costs by reducing the amount of power they draw from the grid at peak times over winter. It has also cut payments that small generators can make from exporting during Triad periods. The regulator's latest consultation highlights further planned cuts to so-called 'embedded benefits' for small generators.

Ofgem plans to axe usage-based residual charges

For example, it plans to remove the BSUoS embedded benefit and replace it with a charge. Ofgem intends to implement that change by 2021 at the latest.

The regulator said any proposals would take into account whatever happens to the Capacity Market, currently suspended following a legal challenge (see opposite).

While Ofgem is trying to make network charging fair for all, the rule changes will have major implications for companies with onsite generation or who avoid peak costs. The Association for Decentralised Energy fears the proposals will undermine both UK competitiveness and the case for demand-side response.

Director Tim Rotheray warned of "businesses walking away from providing flexibility full-stop".

See further details on the charging changes on p24

... and signals intent on wider network charging regime change

As *The Energyst* went to press Ofgem outlined the other side of its charging reforms, which will have major implications for how businesses pay to use and access the power grid.

As well as overhauling residual charges, the regulator is conducting a broader review around how people pay forward-looking charges, via a significant code review (SCR).

Under the SCR, Ofgem plans to redesign transmission and distribution system access rights – that is, how people pay to connect and export generation or how they pay for certain amounts of capacity.

It also aims to overhaul transmission and distribution charging, including how network reinforcement costs are allocated. At present, the last project to connect to a distribution network that triggers the need for upgrades can be left to pick up the tab. Ofgem thinks those that contributed to using up capacity prior to breaching that threshold should pay a share. It is also looking at how to implement different types of connection arrangements, for example allowing people to pay less if they agree not to export at certain times, though electricity transmission and distribution networks will lead on most of that work.

Under the targeted charging review (detailed above), Ofgem outlined plans to move from consumption-based distribution charges for sunk costs to a 'line rental' fee. For forward-looking charges under the SCR, it aims to define how to split charges between capacity and time of use charges and include locational elements. This means people will be charged different amounts based on their usage behaviour and where they are located.

The regulator is also examining how to stop people 'sitting' on spare network capacity and may regulate to make people give up capacity they are not using.

> ***Ofgem thinks people that contribute to using up network capacity should pay for it, instead of costs falling on the last party to trigger upgrades***

Capacity Market suspension stuns industry, providers left in limbo

The suspension of the Capacity Market in November left industry stunned and those with agreements to provide power over winter wondering whether they will be paid.

The suspension follows a legal challenge launched in 2014 by Tempus Energy, a demand-side response company. The firm argued that the European Commission had not properly scrutinised the policy with regard to State Aid compatibility. The General Court of the European Union agreed, leaving the UK government with no alternative to suspend the policy and freeze payments to generators and those able to cut demand when instructed.

The government is trying to get the policy quickly reinstated. Secretary of state Greg Clark believes it is simply a "procedural issue". However, it could take many months for the Commission to conclude its investigation. While the Department for Business Energy and Industrial Strategy (Beis) is confident its winter insurance policy will withstand scrutiny, there is no guarantee that the Capacity Market will be waved through without changes.

The government hopes to reinstate the Capacity Market

Anticompetitive?

Tempus argued that the Capacity Market was anticompetitive because it allows those building new assets – from large power stations to smaller gas engines or batteries – to bid for 15-year agreements. These government-backed instruments were supposed to give investors confidence to build new generation; a measure of comfort and assured revenue in a rapidly changing power market. However, demand-side response can only bid for one-year agreements.

Tempus CEO Sarah Bell told *The Energyst* in 2014 that the billions of pounds worth of subsidies paid to companies under the policy "will not be paid". At the time, former Department for Energy and Climate Change (Decc) minister, Matt Hancock, insisted Decc was "very confident" of winning the case.

Instead, the UK is left with no winter insurance policy and significant damage to investor confidence.

See more on the Capacity Market on p16

Bloomberg: Bring on new sources of flex or pay and emit more

Without new sources of flexibility, power bills and emissions will be higher than necessary in the medium and long term, according to a new report by Bloomberg New Energy Finance (BNEF).

It models a number of scenarios and combinations of generation and flexible technologies, including battery storage, demand-side response and smart charged electric vehicles.

Across all scenarios, renewables deliver about 75% of the generation mix by 2030 and 80% by 2040.

However, without new sources of flexibility starting to come on stream relatively quickly, policy and market makers risk locking in higher emissions and costs, according to the report, which was co-sponsored by Eaton and Statkraft.

"A lack of 'new' flexibility would have a real cost; the low-flex scenario is the least desirable across all metrics," the report states.

That outcome would lead to greater reliance on gas peakers, which it says will cause higher system costs and emissions, the latter 36% higher in 2040 than BNEF's base case.

Meanwhile, high penetration of electric vehicles that can be flexibly charged will enable the power system to absorb slightly more renewable generation and reduce the need for fossil back-up power by 7%, the report suggests.

However, the report states that the ability to shift demand could perhaps deliver the biggest long run impacts.

"The ability to shift or curtail greater portions of demand allows the energy system to operate with 10% less fossil capacity, 42% less battery capacity and 5% lower system costs in 2040, reflecting the importance of flexible demand in a high-renewable energy system," says BNEF, though it adds "these impacts are not felt until after 2030".

> ***A lack of 'new' flexibility would have a real cost; the low-flex scenario is the least desirable across all metrics***

Norwich to launch white label energy company via Engie

Norwich City Council plans to launch an energy company this spring. The council approved a recommendation to work with Engie at a cabinet meeting in November.

The intention is to supply 100% clean energy and help the city's 7,000 households that are currently in fuel poverty.

By taking a white label approach, the council avoids any trading risk management, billing and back office legwork, and can concentrate on elements such as marketing and promotion.

An alternative is to acquire a supply licence. That gives local authorities full autonomy, but the cabinet report outlines the significant upfront cost involved with a licensed approach. The report notes states Bristol Energy, which has a licence, is not due to make a return on its £27m investment until 2021 and that Nottingham's Robin Hood Energy, while in the black, must use its small surplus to start repaying a £20m council loan.

Norwich City Council aims to reduce fuel poverty via 100% renewable gas and power

The decision to partner with Engie hinged on its strong balance sheet and ability to provide "100% renewable power and gas at no premium", according to the report. Norwich anticipates signing a five-year agreement with the French utility.

The council aims for the project to be cost neutral. It will fund staff and marketing of the yet-to-be-named energy brand from existing budgets, which it will supplement with customer acquisition fees.

It hopes to attract at least 1,500 customers a year and will offer a tariff that enables richer customers the chance to pay £30 more a year to directly help reduce bills for poorer customers.

Business power prices to rise 50% over four years

Inenco says businesses may be paying 50% more in 2020 for power than they were in 2016.

The third party intermediary has published a new cost forecast that illustrates how rising non-commodity costs and wholesale markets are driving up prices.

In the past two years, non-commodity costs, which make up about half of business bills, have increased 25%, says the firm. Meanwhile wholesale prices have risen sharply this year, with volatility also returning to the market.

The firm warns the impact of Brexit on Sterling could compound price rises while a rise in the Climate Change Levy in April also adds cost.

Changes to the Energy Intensive Industries threshold, which will reduce exposure to policy costs for more big businesses, could mean those levies are smeared across the rest of the market – adding another incremental increase to business bills.

Inenco's cost forecast also looks further out to try and gauge how prices may rise in the longer term. It suggests bills may double by 2032.

While that presents an ongoing procurement challenge for those on tight budgets, the firm said the flip side is that rising costs could help build business cases for energy efficiency and demand-side management initiatives.

Utilitywise rebrands corporate division as EIC

Third party intermediary Utilitywise has split out its corporate division, rebranding it as Energy Intelligence Centre – or EIC.

The choice of name is interesting. Utilitywise bought industrial and commercial third party intermediary Energy Information Centre, also known as EIC, for £15.5m in 2013.

The move comes as the company attempts to repair its balance sheet following a change to the way it recognises revenue and the value of contracts after overestimating client consumption, which artificially pushed up their value. As a result, the company delayed publishing full year results for 2017 and ultimately a posted a heavy loss.

The company believes it can deliver growth by expanding into overseas markets and bundling services such as insurance as well as energy to clients.

Posting half-year results in April, the company said its corporate division was making progress, with some 1,200 buildings connected to its 'internet of things' platform, based on technology acquired via its t-mac acquisition in 2015 and a deal struck with Dell the

However, it warned performance would be softer in the second half of 2018, particularly for the enterprise – or smaller business division – which will remain under the Utilitywise brand.

Shares in Utilitywise have dropped sharply in recent months,, trading at around 7p as *The Energyst* went to press, down from a 52-week high of around 54p.

Rising energy consumption puts EU 2020 targets at risk

Rising energy demand across EU member states could mean 2020 energy and emissions targets are missed, according to latest data.

Preliminary 2017 data published by the European Environment Agency shows that while the bloc remains on track to meet targets, demand has been rising since 2015. That has slowed progress, it said, with only 20 individual countries still set to hit renewable energy targets versus 25 in 2016.

To ensure targets are hit, demand must be curbed, otherwise the share of renewables in the overall mix is reduced. Yet energy efficiency targets are more challenged, with almost half of the bloc (13 countries)

set to miss targets on their current trajectory. The EEA said rising transport consumption was primarily to blame and member states would have to step up efforts to reverse the trend.

These efforts will need to intensify – and new measures introduced – to hit more challenging 2030 targets, added the EEA.

Centrica seeks judicial review over price cap

Centrica has launched legal proceedings against energy regulator Ofgem over the way it has calculated the incoming price cap on standard variable tariffs.

The company said it is not challenging the price cap itself and does not expect its implementation to be delayed.

But it is challenging Ofgem's "decision not to investigate and correct its failure to enable the recovery of the wholesale energy costs".

The company refused to rule out a judicial review when questioned by MPs last year.

In a statement, the company said: "We do not believe that a price cap will benefit customers but we want to ensure that there is a transparent and rigorous regulatory process to deliver a price cap that allows suppliers, as a minimum, to continue to operate to meet the requirements of all customers".

See details at centrica.com

Mitie offloads social housing business

Mitie is to sell its social housing business, Mitie Property Management (MPM), to Mears Group in a deal worth up to £35m. The FM firm, now mid-way through a three-year structural overhaul, will put the money towards rebuilding its balance sheet and pension fund hole.

‘Geo-exchange’ heat pump firm signs deal after slashing CO_2 at Sainsbury’s

Four-year stores trial cut CO_2 emissions and energy consumption

A company working to decarbonise heating and cooling has signed a licensing deal to push its technology to UK corporates.

The agreement with developer Black Mountain follows a four-year trial at about 25 Sainsbury’s stores that it claims cut CO_2 emissions by 28,000 tonnes and energy consumption by 160GWh.

Erda Energy’s technology uses heat pumps and boreholes to take waste heat from cooling systems and store it in the earth for later use via a closed loop system. That reduces the energy need for both requirements.

The company calls it a ‘geo-exchange’ and has signed a deal with Black Mountain Developments, a Swansea-based company of which Mark Shorrock is a director and majority shareholder. Shorrock was also a director of Tidal Lagoon Power, the company trying to secure funds to build tidal lagoons in Wales.

Erda Energy says its technology can be retrofitted or incorporated at build stage, can balance energy across multiple buildings or add capability to heat networks.

Commenting on the technology licensing deal, Erda Energy managing director Kevin Stickney said the firm “looks forward to witnessing the substantial reductions Black Mountain’s team can make for energy and carbon conscious businesses”.

Black Mountain says it will specialise in deploying decentralised electricity, heat and cooling solutions to UK businesses, claiming its team has “collectively consented £1.9bn of utility scale renewable assets across Europe”.

Black Mountain managing director Roger Woods said the licensing deal “allows us to bring two core offerings together, and provide a whole site solution for transforming energy and carbon performance”.

SSE-Npower domestic retail business merger scrapped, other buyers sought

The proposed merger of SSE and Npower’s retail businesses has been scrapped.

SSE said its board and that of Innogy’s had been unable to agree revised commercial terms.

Many in the market had suggested the deal was dead after SSE flagged problems in November.

SSE said it will now look at other options – and potentially other buyers – for its domestic retail business.

“The transaction has been impacted by multiple factors including the performance of the respective businesses, clarity on the final level of the default tariff cap, changing energy market conditions and the associated implications of these for both the joint business plan and the market in which the business would be operating,” SSE stated.

“These implications meant the new company would have faced very challenging market conditions, particularly during the period when it would have incurred the bulk of the integration costs.”

SSE chief executive, Alistair Phillips-Davies, added: “This was a complex transaction with many moving parts.

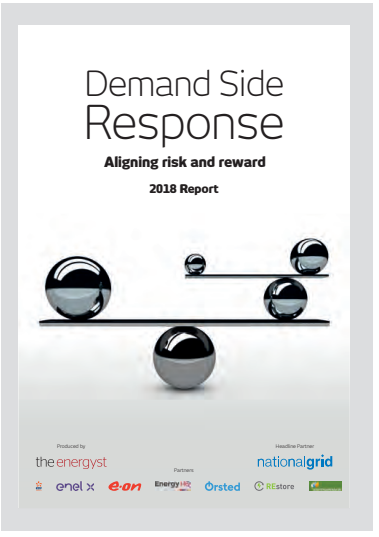
> ***SSE is now exploring all options to demerge the domestic retail business from the broader group***

We closely monitored the impact of all developments and continually reviewed whether this remained the right deal to do for our customers, our employees and our shareholders. Ultimately, we have now concluded that it is not. This was not an easy decision to make, but we believe it is the right one.”

He added that the long-term future of the domestic retail arm was “outside of the SSE group” and that the company will “is now exploring all options” to demerge the retail arm from its broader business.

Most read stories of 2018 from theenergyst.com

1. Amazon would be a good buyer for SSE+Npower
2. Energy storage will wipe out battery storage
3. Tempus Energy wins Capacity Market court case
4. Electric vehicle boom no sweat, says National Grid
5. The money and the power: What next for Capacity Market?
6. Capacity Marker clears at £8.40, lowest yet
7. BES Utilities goes after Trading Standards following raid
8. Feed-in Tariff set to close April 2019
9. Medium Combusion Plant Directive takes back-up generators out of DSR
10. Utilitywise shares suspended as results delayed further



The most downloaded report of 2018 was the DSR report

Readers' comments

"My advice to Marstons would be to lower the unit charge on the slow charger (perhaps to 20p/unit, which is still significantly more than the usual retail price of electricity) to act as an incentive to use them rather than the fast chargers, for which people may be willing to pay a significant premium." **Ian Byrne, Ibeccs**, *on pubs and supermarkets the new petrol stations?*

"If the NAO says the extent of gaming biomass is unknown when consultants and energy providers say it is commonplace, then the NAO should get out into the field and find out, as biomass is mopping up subsidies that could be better used for other technologies." **David Dundas, Lion Industries** *on government to end subsidies for urban biomass*

"You write that some see 'a small increment on gas bills' to pay for new gas storage as a 'better outcome'. Nonetheless I am willing to bet that it won't stop the very same people moaning about any subsequent price increases." **Andrew Warren, BEEF**, *on Beis Select Committee to examine gas security*

Energyst Media buys New Power magazine

Energyst Media, publisher of *The Energyst* magazine, has acquired *New Power* for an undisclosed sum.

New Power is a subscription-based magazine and information portal that delivers expert insight across all aspects of the power market. It also has a comprehensive database of every UK power project operating, in construction or in planning. This searchable resource provides subscribers with data in minutes, enabling informed market analysis and planning that may otherwise take days and significant budget to resource.

The magazine was owned and edited by Janet Wood, a former editor of *Utility Week* and who has decades of experience writing about energy, including books on nuclear power.

Wood will continue to edit and develop *New Power* as part of Energyst Media's growing portfolio of energy publications and events.

Janet Wood

Tim McManan-Smith, editor of *The Energyst* and co-founder of Energyst Media, said: "With her wealth of energy industry knowledge and expertise, we are delighted to welcome Janet to Energyst Media.

"We believe that *New Power* fits perfectly with our existing titles and reports, expanding our market intelligence and reach, while enabling us to further develop new propositions."

Risk mismanagement: A recipe for disaster?

Energy Potential's Gary Huish believes more small suppliers will go bust because they do not have robust risk management strategies in place. Brendan Coyne reports

More small and medium-sized energy suppliers will go bust because they fail to grasp the basics of risk management. For some, the problem is more fundamental, according to Gary Huish, director at Energy Potential, a consultancy that specialises in energy risk management.

He suggests they step back and define what they do.

"Many are not particularly clear if they are a service driven company whose product happens to be energy, or a risk taking enterprise – and that is a recipe for disaster," says Huish.

Selling energy, he suggests, "is not like flogging baked beans".

"Extracting value from wholesale energy markets is challenging, even for experienced traders," says Huish, who spent years in trading and risk management, most recently as head of commodity risk for Morgan Stanley.

"In a banking business model, the core 'franchise' skills are all about accurately pricing the risks, adding a fair margin to the customer and quickly trading away the risks," says Huish. "This 'locks in' margin, leaving the institution with as near a riskless revenue stream as possible."

That is exactly the model that new supply companies should replicate, he advises. The problem is, many are not.

"Smaller players are implicitly speculating on wholesale prices, selling fixed-price tariffs and hoping that, when they deliver their energy, spot pricing levels will allow them to make a profit," says Huish.

When prices are falling, that strategy seems smart. "But markets always revert," he adds. When they do, suppliers can quickly find themselves with "serious 'out of the money' liabilities that they are never going to recover from their tariffs". This is why Huish thinks there is a market for his firm's services. In simple terms, it "helps companies develop a clear business model based around risk control, while providing pricing models and processes that accurately value risk" alongside "hedging strategies to de-risk their exposures", he explains.

> ***Smaller players are implicitly speculating on wholesale prices, selling fixed-price tariffs and hoping that when they deliver their energy, spot pricing levels will allow them to make a profit***

Armed with the right tools, Huish says suppliers can focus on customer acquisition, service and billing. If they want to actively manage some risk, "our models make it very clear how much risk is consistent with the business model".

Without those tools, new entrants lacking sufficient energy trading expertise, "are setting themselves up for a very bumpy ride, with a significant risk of failure", he warns.

Shift or bust

Managing an energy company "is quite tricky", says Huish, "even if you strip out all

the changes" currently redefining the market.

The risks are myriad: "Fuel price volatility, seasonal patterns, weather risks, not to mention the massive influx of green power that has disrupted conventional pricing mechanisms," he explains.

"You have to condense that into a competitive tariff for the year ahead. That is difficult."

Huish believes ignorance of those fundamentals contributed to the failure of small suppliers seen in recent months. He thinks more will go under, with rising wholesale prices piling on the pressure.

Even well-resourced challenger and municipal energy suppliers have had to implement double-digit price rises in recent months.

"From April to October [prices] have almost doubled. If you are not properly hedging risk, energy purchasing costs can be much higher than sales revenues. Cash reserves can be consumed very quickly," says Huish.

"Typical retail margins are just a few per cent of total supply costs, so there is little scope to get pricing and hedging wrong. The UK pricing environment has been extremely challenging even for the most experienced energy traders."

Reality bites, worse to come

Two weeks after Gary Huish outlined his concerns, Extra Energy went bust. The firm had about 21,000 business customers and 100,000 household accounts. It was followed by Spark Energy, which closed its household retail business (but kept its commercial supply business open). It had 290,000 accounts. One Select, which had 36,000 domestic customers folded soon after.

As Extra Energy failed, Ofgem proposed new rules for new suppliers. They will have to demonstrate they have the money and the resource to operate for at least a year before being granted a licence.

It came as the regulator announced a £59m hole in the Renewables Obligation buyout fund that it manages. Suppliers are obliged to pay into the fund if they do not source a certain percentage of their power from renewable sources.

The money is collected retrospectively. The problem is, many suppliers – facing mounting debt and rising wholesale costs, having acquired customers on loss leading tariffs – do not have the money. That is why some have gone bust, and more will likely follow.

Chris Bowden, a former commodities trader at Rothschild and Merrill Lynch, who founded Utilyx before selling to Mitie, suggested the domestic retail market "is a massive house of cards". He warned that independent suppliers were several hundred million pounds in debt, which, should they also go bust, would be smeared across other suppliers.

While the business energy supply market requires participants to have stronger balance sheets, and has not suffered from the "race to the bottom" on price, Bowden fears a knock-on effect from the "mess" that now represents the domestic market.

"It's unfortunate that the customers and liquid suppliers like ourselves have to pay for this. And it is going to get worse. Significantly."

Do, or do not

Suppliers have to decide if they are a risk management business, or a marketing business, suggests Huish.

"If it is the latter, the focus should be customer acquisition and service, with risks passed through to a third party. You will have to pay that third party to take on those risks, leaving a reduced – but secured – residual profit. Hoping the risks will manage themselves is fool's gold. You might get lucky – you can never discount luck – but over the long run your business model will almost certainly fail," he says

"Either you actively manage against a clear strategy, or pay someone else to do it. There is no middle ground."

Going pop: small suppliers must get to grips with proper risk management

Key considerations for local authority energy suppliers

Local authorities (LAs) continue to consider launching energy companies. Energy Potential works with LAs involved in energy. As such, Huish is limited in what he can disclose, but he says while councils have deeper pockets, the same risks apply. So what are the key steps to consider?

Stage one is "have a clear strategy", says Huish.

> *Hoping the risks will manage themselves is fool's gold. You might get lucky – you can never discount luck – but over the long run your business model will almost certainly fail*

"Never underestimate the power of good planning. A transparent, agreed trading strategy will provide a solid foundation for risk management decisions."

Stage two is "have timely, risk reflective pricing".

"Many supply companies produce a tariff and may hold it open for weeks or even months. Timing risk between tariff creation and customer acquisition is very real, and can lead to customers being effectively loss-leaders. Gaining customers is important," Huish says, but so is avoiding losses.

Stage three is to "measure your risks accurately and hedge quickly and efficiently" leaving "residual risks that – even if things go badly – do not materially compromise the business".

Huish thinks local authorities "are absolutely trying to do the right thing". But, if they are going the whole hog with supply licences, they must be crystal clear about the challenges posed by energy markets.

"An undefined trading approach is a recipe for disaster." te

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ESOS Phase 2: Cutting through the white noise

There's a wealth of opportunity available from ESOS, but with so much noise and complexity surrounding the scheme, navigating your way through the process can be difficult. **We're here to simplify it.**

ESOS holds real value

50%

50% of businesses surveyed in Phase 1 made a financial saving

It's estimated that if all eligible UK businesses implemented their recommendations, they could **save a total of £1.6bn**

One size doesn't fit all

Our insider insight has revealed that **businesses want different things from ESOS**, from help with basic compliance to a fully managed solution

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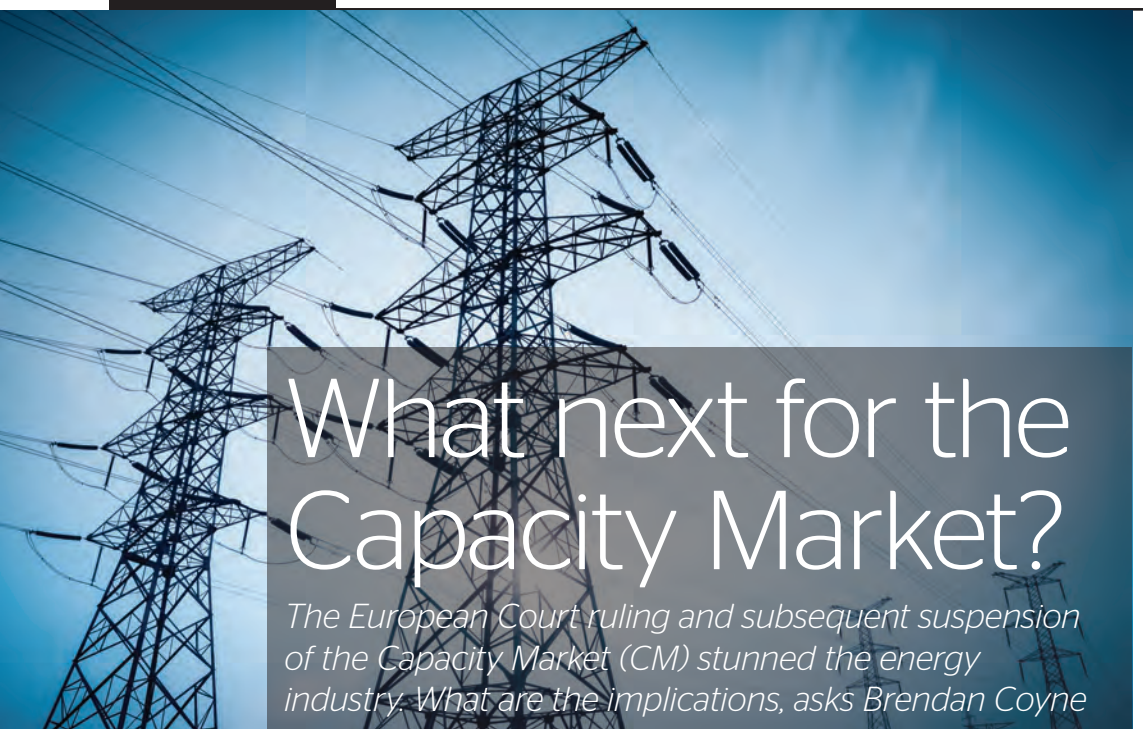

What next for the Capacity Market?

The European Court ruling and subsequent suspension of the Capacity Market (CM) stunned the energy industry. What are the implications, asks Brendan Coyne

In the short term, ie this winter, "system impact is likely to be minimal", said Ben Irons, a former executive director at Aurora Energy Research and director of strategy at Centrica Energy, now director at Habitat Energy.

"Profit impact for recipients of CM revenue will be painful, but the more important question at system level is whether it changes behaviour," he added.

"Even for plant that depends on the CM payment for its survival such as low merit thermal, I would not expect the removal to cause it to temporarily cease generating, mothball or close immediately."

Irons said that is because most costs are unrecoverable in the short term, that it takes time to close a power station and that winter is the most lucrative time to generate.

> *Loss of CM revenue would be a hit, but ceasing to generate would only cause a bigger profit loss*
> **Ben Irons, Habitat Energy**

"Loss of CM revenue would be a hit, but ceasing to generate would only cause a bigger profit loss," he suggested.

Irons reasoned that generators may also wish to carry on meeting their obligations in case the CM is reinstated – or some other incentive introduced.

He also suggested any loss of CM revenue is unlikely to directly affect wholesale prices in the short term.

"If there was an opportunity for disadvantaged plants to bid differently to earn more in the merchant markets to recover lost CM value, they would already have been doing it," he said.

If their bidding behaviour does not change, "nor do power prices. This winter's prices and shape are likely to look much the same as they would have with CM still in place."

Winters to come

However, that may change if the Capacity Market was taken out of the picture longer term. If so, and older thermal plant decides to shut down in spring and new build projects are shelved, there would be less spare capacity, leading to increases in price and volatility, said Irons.

> *We've long recognised that the value of flexibility moves around the market*
> **Alistair Martin, Flexitricity**

A more volatile wholesale market could provide upside for flexible assets, including batteries. However peaking plant, which have higher rating factors in the CM, would likely gain less overall, Irons suggested.

"In general though, this is bad news for an industry desperate for a stable policy regime," said Irons. "It increases market risk and cost of capital, and that's ultimately bad for the consumer."

Flexitricity founder and chief strategy officer Alistair Martin agrees it is unlikely large plant will close immediately. "We're right on the edge of winter. I think coal will stick around to see what it can get out of it."

Martin also agrees with Irons that there is potential upside for flexible technologies that can access merchant markets.

"While we didn't see [the court judgment] coming, we've long recognised that the value of flexibility moves around the market. It spent a long time in reserve services, moved into the Capacity Market and much will head into the Balancing Mechanism," said Martin.

However, Martin said the "smart move" for government would be to "find a way through this" and reinstate the Capacity Market, albeit in an altered state.

Procedural issue?

Secretary of state Greg Clark noted that the ruling is based on a "procedural matter; the Commission's process for granting State Aid approval", and not the policy itself. That indicates government hopes to go through due process, get the policy re-stamped and carry on.

But Martin is not so sure.

"It's naïve to say this is just a procedural thing," he said. "There is an issue of substance [over contract lengths/ disparate treatment of technologies] and I would question whether it is wise to go back for State Aid approval not having addressed that issue – especially since the evidence base has shifted in the last four years.

"I think it would be quicker if the government was to do it right, which is to address the central issue that has dogged the CM since inception."

Martin thinks DSR providers "would absolutely" be able to deliver on 15-year contracts. "Alternatively, they could just say one-year contracts for everyone," he said.

"That approach is what we understand international experience to show. Investors, above all, say they want certainty. A good track record can provide that better than

a mechanism undermined by its own mistakes."

Will DSR still respond?

Martin noted that the billion pounds due to be paid to capacity providers for delivering this winter is "quite a lot of money" in an industry with slim margins. He said aggregators seek clarity on what they are expected to do in the event of a system stress event.

The current advice is to keep delivering, with government and delivery bodies working out how payments will be collected and allocated should the CM be reinstated.

What next?

While government hopes to restart the Capacity Market as soon as it can, the freeze might be a good opportunity to consider the end game, said Erik Nygard, chief executive at aggregator Limejump.

"In the short-term, removal of a guaranteed revenue stream will force people to think more creatively about how to derive some level of certainty without the Capacity Market being there," said Nygard.

"The problem is, you don't know how it will develop. But long-term, I think this is potentially very good. I do believe businesses and innovators will find a way to make this work."

If the ruling expedites change, and "large coal power plants come off the system faster, that might lead to a market opportunity", said Nygard.

"Ultimately that could be a lot better approach than relying on the Capacity Mechanism – which is a once a year process and not very market-driven."

"If the Capacity Market helps drive investment and security for a period of time and is designed the right way, it could definitely have value," said Nygard. "But, in my view, mid-to long-term, it needs to move to a market-based system."

> *I do believe businesses and innovators will find a way to make this work*
> **Erik Nygard, Limejump**

Is the Capacity Market actually needed?

For the foreseeable future, most of those interviewed agreed an amended Capacity Market, or something similar, is required.

Consultants Aurora suggested wholesale prices would double to around £120/MWh next winter without the CM in place.

"Aurora believes that the Capacity Market is pivotal in maintaining the reliability standard in the GB and as such, it is unlikely that the mechanism would be cancelled altogether without replacement," it stated.

> *If de-rating [as proposed] is applied, that will have a greater impact on DSR revenues*
> **Seb Blake, Open Energi**

Good result?

Seb Blake, head of policy and markets at Open Energi, said Tempus and its action "did a good job" in escalating awareness that the CM "is not a level playing field" in terms of contract lengths.

But the short-term implications – the hit to market confidence and uncertainty over revenue and agreements awarded to date – will negatively impact the DSR market.

However, Blake suggested the biggest issue facing DSR in the Capacity Market is not contract lengths, but de-rating factors being considered under the five-year review. De-rating DSR in the same manner as batteries were de-rated could significantly reduce the amount of money providers can earn from the CM.

"If de-rating [as proposed] is applied, that will have a greater impact on DSR revenues," said Blake.

So, after inching its way through the European justice system for four years before bringing the Capacity Market to a complete stop, demand-side response providers might finally be able to bid for longer contracts because of the legal challenge, said Blake.

"But then, if de-rating factors are applied, we could actually end up being in a worse place." te

How was the CM suspended?

Demand-side response company Tempus Energy launched a legal challenge against the government in 2014. It argued the design of the capacity market was anticompetitive, because new build generation could bid for 15-year contracts, while demand-side response could only bid for one-year contracts. It argued the European Commission had not done its due diligence when approving the policy.

The General Court of The European Union agreed, leading to suspension of the market – and payments, until the Commission completes a formal investigation. If it finds nothing wrong, the market should be reinstated, potentially with some adjustments. The government hopes that will happen quickly, but it may take many months. There is also the risk that the policy fails to receive state aid clearance, which would necessitate a rethink, if the UK is still bound to EU rules at that point.

Top up auction and payment collection

As *The Energyst* went to press, government launched a consultation around next steps for the Capacity Market while the EC's investigation takes place.

If the investigation, which Beis said the Commission hopes to start early next year, puts the CM in the clear, it would mean that auction results to date still stand and payments are legal, according to the department. Beis is confident it will clear state aid requirements.

In meantime, it has asked National Grid to keep running the Capacity Market scheme "short of making payments". If those with contracts deliver their obligations, they will be eligible for deferred payments if and when the market is reinstated, Beis said.

In the meantime, Beis and industry parties are making plans to re-start Capacity Market payment collection by suppliers so that bill payers are not hit with a big clawback next winter, by when Beis hopes the policy will be back in play. Taking that approach is also intended to give capacity providers that they will eventually get paid and that the money is ringfenced. That means the CM charge will likely re-appear on bills early next year.

The consulation also confirms plans for a summer top-up auction for delivery next winter.

Capacity market suspension: What's the upshot?

The Energyst asked experts at Aurora, Baringa Partners and Cornwall Insight for their take on how the Capacity Market's suspension will affect participants

Tom Edwards, senior consultant, Cornwall Insight: Beis is extremely confident in getting the existing CM through the state aid process following its conversations with the commission, as it understands the judgment is entirely procedural

This outcome would mean all existing agreements would be honoured and payments for 2018-19 could be made

However, there are still risks the scheme could be found non-compliant and there are some parts of the EU guidance on capacity mechanism design which would suggest this:

Beis hasn't explained how DSR being unable to access multiyear agreements, if it could evidence required spending, is technology neutral

The EU notes reliability options such as the I-SEM CRM (the Integrated Single Electricity Market's Capacity Remuneration Mechanism) reduce the distortion of energy markets compared to stress event schemes

It is unclear what would happen if the investigation required changes to make the scheme compatible. It would presumably mean existing agreements would be illegal State Aid and no payments could be made to existing providers and new auctions would be needed.

> *There are still risks the scheme could be found non-compliant*
> **Tom Edwards**

Richard Howard, research director, Aurora Energy Research: There are a number of scenarios for how this plays out. At one extreme it is possible that the EC grants State Aid with no further changes required, and the original contracts are reinstated in full some time next year. At the other extreme, if the EC's assessment deems the scheme to be unfair then it is possible that existing CM contracts could be annulled and auctions would need to be rerun. There are other possible scenarios in between these two scenarios – for example, an outcome where changes are made going forward, but existing contracts are reinstated.

> *Short-term cashflow challenges posed for some players*
> **Richard Howard**

This poses a short-term challenge for some players in terms of cashflow, since they would have been relying on these payments for winter 2018/19.

It also poses challenges for projects which we about to start construction for winter 2019/20 – since some of these project had not yet been financed, and will struggle to move forward given current uncertainties.

For existing CM contract holders, there are some uncertainties about whether they still need to meet CM obligations, and whether CM payments for 2018/19 could be backdated at some point in the future.

If the CM is not reinstated quickly then this could lead to some capacity coming off the system and/or new capacity not building, which would lead to tighter margins and higher prices – partially offsetting the loss of CM revenues for remaining plants.

Looking further ahead – government is also supposed to be doing the five-year review of Electricity Market Reform (EMR), reporting by summer. We would expect it to be looking at the penalty regime, CM agreement term, de-rating factors for DSR and interconnectors, and participation of renewables – among other things. Although I imagine the CM team will be pretty busy on the suspension issue so it remains to be seen what happens in this space. te

If the CM is reinstated, will players still play?

Even if the Capacity Market is reinstated, there could be fewer parties bidding for contracts, suggests Tom Harper, senior manager at Baringa Partners.

Some may decide to take back their credit cover and avoid taking further risk, especially those with slimmer balance sheets that have yet to "put steel in the ground". While that scenario may apply more to those developing gas engines – or peakers – Harper thinks 'traditional' demand-side response business models are also affected.

Tom Harper

"DSR has been hit massively over the last few weeks," he said at the start of December. "Aggregators and suppliers have worked hard on the sales side of things, explaining that aspect of the energy market to customers and underlining the bankability of CM agreements. Now that income is not materialising while the most material revenue stream in the contract, Triad, is potentially all over from 2021. That could make life very hard for traditional providers of DSR services."

Harper thinks that DSR providers with a diversified offering, and those acquired by suppliers to be integrated into wider flexibility propositions are better positioned to deal with these market disruptions.

For standalone aggregators focused on network charge avoidance and CM payments, the impact of market disruption could prove challenging, he suggests.

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Are you prepared for 2019?

The Energyst asked consultants and suppliers for views on key challenges and opportunities facing businesses in the year ahead

In the immediate term, hitting all three Triad periods is a key challenge for businesses, as failure to do so will mean substantially bigger power bills, according to Ben Spry, head of Npower's risk management service.

As the year progresses, Spry says it is essential that energy managers are alert to incoming change.

Whether or not the Capacity Market (CM) is reinstated has a direct bearing on business cases for investment in onsite generation or demand-side response. The CM charge, if it is still collected by suppliers while the market is suspended, also affects the ability to accurately forecast budgets. Then there are Ofgem's charging reviews. "Energy managers must be alert to all of that," says Spry, who adds that "2019 is also the start of step changes in non-commodity costs", particularly the CfD levy, and potentially for CCL cost increases.

The year "marks the start of a transition period for charges which affects customers' ability to forecast or set business cases beyond three years", says Spry. As such, the onus is on

We are definitely in a period of transition and ambiguity
Ben Spry, Npower

Energy as a service and Amazon energy?

Energy companies are keen to sell services rather than kilowatt hours. Will 2019 be the year 'energy-as-a-service' (Eaas) comes of age?

Maybe, says Dan Smith, deputy vice-president, I&C Supply at Smartest Energy.

"Energy as a service feels like it has been in its infancy long enough. The challenge is whether suppliers can change their business models and skillsets," says Smith, "because the contracts you are selling are very different."

Dan Smith

"It is refreshing to see a different breed of people within energy companies, but it is crucial that the left and right hand – the engineering and the market data sides – are brought closer together. That will be key [to the success or failure of energy as a service]. Hopefully it will happen in 2019."

What about the big tech platforms disrupting energy supply? People have long talked about the Faangs (Facebook, Apple, Amazon, Netflix and Google)

Businesses should prepare for turbulance but remain alert for upside

suppliers and consultants to guide businesses through a "massive" amount of change: "We are definitely in a period of transition and ambiguity, but there is a lot of intelligence that can help guide energy plans in short and long term – so it is a must to keep eyes open in order to be able to react to that."

Capacity Market bonus?

David Oliver, senior energy consultant at Inenco, thinks there may be some upside from the suspension of the Capacity Market if the full amount expected to hit bills is not collected by suppliers.

Should businesses find themselves under budget as a result, "it might be wise to spend the surplus on energy efficiency measures", says Oliver, particularly if the extra funds help get projects over the line.

Esos and SECR

Oliver advises businesses "to actually read their Esos reports" and consider acting on the auditor's recommendations ahead of the next round of compliance in 2019.

Meanwhile, new Streamlined Energy and Carbon Reporting (SECR) regulations also take effect in 2019, under which about 11,000 companies will find their consumption and emissions ultimately published in the public domain.

The first reports under SECR will not be published until 2020 and there are no financial penalties. But those companies that are taking meaningful steps to improve sustainability will be visible to the public – as will those that are not. The year ahead is therefore an opportunity to take demonstrable action, advises Oliver.

It might be wise to spend any surplus on energy efficiency measures
David Oliver, Inenco

Georgina Penfold, director at the Industrial and Commercial Operators Network (Icon), agrees SECR should encourage investment in energy efficiency.

"It puts energy and emissions firmly into the consciousness of the finance director," she says. "Along with financial support from the government, it should help join the circle and hopefully result in funds being committed to energy management in every sector."

Volatility, risk, reward

While cutting consumption should always cut bills, there is potential for upside for those that buy and sell power at the right time, according to Michael Coulten, senior business analyst at Vuepoint Solutions.

"Gathering storm clouds over the global economy suggest commodity price weakness could continue, driven more by softening demand than increasing supply," says Coulten. "However recent moves by OPEC could delay declines in oil prices if output cuts can be delivered – a big if given domestic budget constraints. Negative supply shocks from Venezuela and Iran could also help buoy prices."

Michael Coulten

Overall, he says the macro picture is highly uncertain, "so it's a very good time to ensure your »

Time to cut the chord?

Bobby Collinson (right), managing director of Noveus Energy, thinks the state of UK policy and regulation could lead to businesses cutting the chord connecting them to the public grid altogether.

"Is investment in energy generation in the UK dead? The Capacity Market suspension could be the last nail in the coffin. I would be incredibly reluctant to invest in energy assets in the UK with the current ever-changing regulatory framework," he says.

"Then what? Does that start to facilitate what I believe is Nirvana in energy, self-generation using private wire to a consumer. Having done these, I believe this is the utopia of self-sufficiency; a true smart, decentralised network."

blowing everyone else away.

Smith, however, thinks 2019 may be too soon.

"It is not a profitable place to be right now. It is difficult for suppliers to make investment decisions, so energy might not be as attractive as other areas for a big player," he says.

"I think they are on a watching brief, but you might see more strategic partnerships. We are seeing lots of smaller tech players link up with utilities and large car manufacturers, for example."

Peter Davies

Appetite for disruption

Peter Davies, CEO of smart energy platform Verv, thinks 2019 will see new energy service models emerge, with democratisation of energy underpinned by blockchain.

"Long-existing business models continue to be disrupted in all industries and we are starting to see this trickle into the energy space, with major players beginning to realise that new services and choices need to be offered to consumers, and at lower prices," he suggests.

"Consumers have long been billed by kWh of electricity and confused by their energy bills. I believe we will see significant steps towards changing how consumers engage with their energy in 2019."

Brexit remains the great unknown

risk management policy is up to date with limits and buy triggers agreed and in place to ensure efficient execution".

Flexibility

With volatility returning to energy markets, Jo Butlin, director at Energy Bridge, agrees on the need to carefully manage risk. But she advises large consumers to make sure they are joining the dots. That means, "developing an integrated energy strategy focusing on reducing consumption, directly sourcing generation and potentially accessing the emerging flexibility market – in addition to a supply contract that enables the development of all of the above at no additional cost", says Butlin.

"The drivers behind rising non-commodity costs are the incentivisation of new renewables, development of the infrastructure to support them and funding the consequent increase of costs of balancing. The funds raised from consumers bills are used to pay generators and those accessing flexible markets – the smart game now is to not only contribute but also to receive, but that requires a more complex strategy," she adds.

The opportunities are there to cut energy costs and carbon
Jo Butlin, Energy Bridge

De-silo energy

As a result, Butlin says responsibility for energy should no longer be shouldered solely by the energy manager.

"The opportunities are there to cut energy costs and carbon, but developing an appropriate strategy – and particularly how the different elements interrelate, and work together – requires procurement, finance and sustainability teams to work together to develop a single strategy," she says.

Brexit: deal or no deal

Brexit is the great unknown in any outlook – and uncertainty tends to be the enemy of investment.

That has had a general impact on the sector, says Richard Howard, research director at Aurora Energy Research, but he highlights specific Brexit implications for carbon markets and interconnectors.

Richard Howard

"There is some uncertainty regarding the UK's ongoing participation in the EU ETS. In a 'no deal' scenario it looks like that we would exit the ETS and instead have a Carbon Emissions Tax at a fixed level of £16/tonne. In a 'deal' scenario there are a few possibilities – ranging from continued membership of the ETS, to a linked UK ETS scheme, to a simple Carbon Emissions Tax," Howard suggests. He believes a 'no deal' Brexit could have impacts on the prospects for interconnector projects.

"Coming out of the [EU] Internal Energy Market could make power trading across interconnectors somewhat less flexible, leading to lower congestion rents. On top of this, outside the EU the UK could decide to make changes to the existing regimes – which favour interconnectors. For example interconnectors are currently exempt from grid charges as a result of EU rules – this could change after Brexit." te

Fill your boots with solar PV

Alex Moor (right), lead analyst at flow storage company Red T, believes the biggest challenge for businesses in 2019 is "updating energy procurement and on-site generation strategies in line with recent changes brought about by Ofgem's Targeted Charging Review, for example".

He thinks businesses must develop "new, longer-term business models going into 2019, including managing wholesale energy price volatility and its inevitable effect on fixed price contracts".

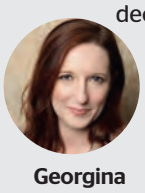
Moor believes falling solar costs represent the biggest opportunity for end users to lock in some certainty on costs in an uncertain environment.

"Energy managers should now be pushing to install as much solar as they can on their sites," says Moor, suggesting long-duration storage assets can help businesses get better returns from PV.

The I&C consumer view

Industrial & Commercial Operations Network director Georgina Penfold says members are keen to see details on the Industrial Energy Transformation Fund announced in the Budget, plus the consultation on funding for efficiency in non-industrial businesses.

The results from the government's call for evidence on 'Building a Market for Energy Efficiency' are due out in the first half of 2019. Penfold says while Icon is "nervous about the potential cost implications – not to mention workload – if commercial premises are pushed to conduct regular operational efficiency ratings, the outcome will present some exciting opportunities for both consumers and solutions providers to collaborate to deliver decarbonisation".



Georgina Penfold

That could translate to firm action on decarbonising heat, suggest Penfold. "Government support for heat networks and for properties off the gas-grid is promising and several of our subscribers are actively reviewing the application process to secure funds under the Industrial Heat Recovery Support Programme – which is starting to galvanise the capture and use of waste heat," she says.

"'Waste' heat shouldn't even be a concept; we're delighted to see this being tackled."

Overall, Penfold thinks 2019 will be "the year energy management, generation and balancing truly converge" and that energy efficiency will "finally move into the limelight on a political level as well as a practical one".

2019 DATA CENTER TRENDS

The Network Edge is on the tip of our tongue as we discuss 2019 data center trends, writes Rob Johnson, chief executive officer.

For several years now, Vertiv has undertaken an interesting experiment as we head toward the new year.

We have gathered many of our leading experts on the data center space and solicited their thoughts on the trends they expect to influence activity and conversation across the industry. Their instructions are limited and their responses, not surprisingly, wide-ranging. We assign no timetable to their forecasts, which leads to predictions that may strike some as science fiction and others that may seem rather, well ... predictable. We value every suggestion, and the project has become more than an exercise. It is a useful idea-generator.

The Network Edge is becoming the core of the industry

As I reflect on this year's forecast, it seems to me our experts are focused more on near-term trends. There was a heavy emphasis on innovation at the edge of the network, and why not? The edge was a $1.47 billion market in 2017, but it is projected to grow to $6.72 billion by 2022. The network edge, ironically enough, is the center of the data center universe, and that isn't changing anytime soon. Predictions of more intelligent systems and technologies designed to simplify edge computing seem certain to come true. Vertiv itself is seeing to that.

The data center workforce will also shape the landscape

Our experts also anticipate a shift in the way we think about our data center workforce, with technology helping to preserve institutional knowledge as we transition to a new generation of IT leaders. And we expect those leaders to come from non-traditional backgrounds, with data center companies taking a more active role in training. This reflects the challenge many traditional IT educational programs have found in keeping pace with innovation and change in this industry.

We also expect innovation in the power and cooling spaces and increased attempts to normalize data center builds. We'll talk more about all of these in future blog posts.

How will the Internet of Things and 5G Networks shape the IT infrastructure?

Some broad industry and consumer trends – things like the Internet of Things and the rollout of 5G networks – influenced our thinking and are drivers for these trends in the data center infrastructure. That's also true of some of the interesting ideas that didn't make our final list.

For example, there was some discussion about increased use of localized clouds, especially at the network edge, and there is momentum for these models in parts of the world. We talked quite a bit about ongoing innovation around batteries, and everyone agrees lithium-ion will continue to establish a foothold in the data center – with other technologies not far behind. Fuel cells, DC power and microgrids all were part of a healthy, inspiring discussion.

We even had someone ask if the time had come to rethink the form factor of the standard 19-inch rack, and it's a great question. Rack size has been unchanged for decades. What might we accomplish if we abandoned the traditional parameters limiting server size and dictating power and cooling decisions? These are the types of questions I'm proud to see our people asking, even if industry inertia is overwhelming. We should always be willing to ask, "What if?"

For more information on these trends or any data centre solutions from Vertiv, visit **VertivCo.com**

Rob Johnson
Rob Johnson joined Vertiv on Dec. 1, 2016, as chief executive officer. Rob is the former CEO of American Power Conversion (APC) and, most recently, was an operating partner at venture capital firm Kleiner Perkins Caufield & Byers (KPCB)

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How will Ofgem's charging review affect business bills?

Andy Pace, director at Energy Potential, breaks down the implications of the changes to transmission and distribution charges that Ofgem is planning

Ofgem has published a consultation on its Targeted Charging Review minded to decision and draft impact assessment. This 'minded to' decision looks primarily at how the residual element of network charges are recovered both at transmission and distribution.

Residual charges can be considered as the balancing element of network charges that allow network companies to recover the correct amount of revenue. The principle adopted by Ofgem in its minded to decision is that the residual charge element should not be avoidable by consumers as there is no subsequent cost saving for network companies.

Fixed charges

Ofgem's preferred approach is to recover the residual element of network charges as a fixed charge from demand customers only (with recovering residual charges on a capacity basis as a second option). This means that any consumer of electricity will have to pay a fixed contribution each year to the residual network charge. This can only be avoided by disconnecting from the network.

The concept of fixed charges is not new. Most demand customers pay a fixed charge as part of their electricity bill. However, the minded to decision means that the fixed charge will now include the additional element of the residual charge at both transmission and distribution.

Triad

The impact of this change varies by customer type and the contribution customers are making to the residual charge element under the current arrangements. At present, transmission network charges are recovered via the triad charge (levied on a customer's consumption during the three highest half hours of national peak demand across the winter, separated by 10 days). Customers who manage their demand during the triad will not pay much towards the residual charge. At distribution, the residual is spread across the unit rates, so can be avoided by consumers reducing their consumption (eg by installing behind the meter generation).

The proposed new arrangements will see the total

Energy managers' views...

The Energyst asked senior energy managers for their opinions on key challenges and opportunities for the year ahead

Adam Pawelas, group director environment and utilities, Carlsberg: "From an economic perspective, energy prices after being flat for some time are on the rise. It is difficult to predict exactly how that will play out because many thermal fuels are linked to oil – where prices are now coming down. So there may be a correction. But as electricity prices rise, so viability and [RoI] visibility of energy efficiency projects is better.

"In the longer term, the difficulty is still to make longer financial projections when it comes to carbon. Carbon taxation or carbon pricing, which may affect not only electricity [pricing] but also thermal energy, is not yet clear."

James Tiernan, group energy and environment manager, Unite Students: "For us the biggest opportunity is using innovative solutions that not only deliver attractive energy savings, but also a wider range of tangible and measurable business benefits.

"For example, the new Prefect IRUS smart heating control system we're deploying helps us meet customer expectations on comfort in an energy efficient manner, but helps us manage other business needs: The system has potential to automate the monitoring and recording of hot water tank temperatures for water hygiene purposes, and provides invaluable building information around space occupancy, temperature, humidity, light levels and noise levels that we can use to improve management and behaviour in our properties.

"The biggest challenge probably comes from uncertainty: whether it is Brexit, what future energy prices are going to do, or the direction of government energy policy, the risk is that the level of uncertainty and volatility makes it difficult to put together robust business cases or make long term investment decisions."

Gareth Chaplin, senior energy performance manager, Unite Group: "We have both a challenge and opportunity in developing a more sophisticated M&V process to make sure we capture all of the benefits of some of our control strategies (rather than just using a blended kWh rate) that we can communicate simply to the business.

"For example, with the Prefect IRUS system, we've implemented a DUoS and TUoS avoidance strategy and we'll see the benefit of much better control in December/

residual for transmission plus the total residual for each DNO area split by customer segments based on the net consumption of each segment. The transmission residual charge will be the same across all DNO areas and the distribution residual charge will be specific to a DNO area. Once the total pot has been split, it is simply divided by the number of customers within each segment to determine a fixed charge that each customer in that segment will pay.

The customer segments are based on the Line Loss Factor Classes (LLFCs) used by DNOs for allocating distribution losses and applying use of system tariffs. The only exception is Extra High Voltage (EHV) customers who all have an individual LLFC and these customers will be grouped together as one customer segment.

Will I pay more...

Ofgem has published an impact assessment to show how these changes will impact different customer segments. As a general rule, those customers who currently avoid, to some extent, the residual charge will pay more under the new arrangements (eg customers with behind-the-meter generation or those who reduce demand at time of triad). As the total amount of money to be recovered is fixed, those customers who do not currently avoid the residual charge will see a reduction in the amount they pay.

Any consumer of electricity will have to pay a fixed contribution each year to the residual network charge. This can only be avoided by disconnecting from the network
Andy Pace

The impact varies by the customer segment within which a customer falls combined with which DNO area they are situated and whether they currently manage their demand.

An average EHV customer connected in the Electricity North West area who currently does not import during the triad period will see their transmission residual charge increase from £0 to £65K and their distribution charge increase from £44K to £77K to give a total increase in the residual charge from £44K to £142K.

...or pay less

Conversely, an average EHV customer connected in the Electricity North West area who currently imports during the triad period will see their transmission residual charge decrease from £298K to £65K and their distribution charge increase from £44K to £77K to give a decrease in the total residual charge from £342K to £142K (note: the residual element of the EHV charge at distribution does not change as it is currently recovered within the capacity charge).

A high voltage light industrial customer in Electricity North West area would experience a total decrease in their residual bill from £58K to £29K. The published impact analysis does not differentiate between those customers with or without onsite generation.

At the smaller end of the industrial market, a small non-domestic site in Electricity North West's area would experience an increase in their total residual bill from £129 to £176 where onsite generation exists but a decrease from £369 to £176 where there is no onsite generation.

This summary provides an indication of the impact on business customers in one DNO area. te

Andy Pace can be contacted directly at andy.pace@energy-potential.com

January (when we have periods of low occupancy and energy costs are higher) by reducing energy consumption to an absolute minimum. The challenge is how do we come up with a way for accounting for this and simply communicating it to the rest of the business? However, there is opportunity to be had in pursuing and reducing the most expensive kWhs. All kWhs aren't equal!"

Vikas Ahuja, energy projects manager, Imperial College Healthcare NHS Trust: "As an NHS trust, security of supply is – understandably – profoundly important to us. However, uncertainty around Brexit, continuously varying landscape [because of ever-increasing share of distributed generation] and changes in regulation [the most recent being Capacity Mechanism and Triad charging] and very quickly it becomes really overwhelming.

"On the other hand, I believe there are still opportunities out there and we need to explore them in detail such as battery storage, electric vehicle charge points, carports and Power Purchase Agreements. If we carefully choose our options, I think it is very much possible that we not only improve our resilience but also cut costs in the process."

Dan Fernbank, energy and sustainability manager, University of Reading: "A key challenge for us is to look at more innovative funding solutions for sustainability projects with more constraints on internal budgets. A key opportunity is to try and capitalise further on the clear interest and enthusiasm that currently seems prevalent locally and nationally for environmental action.

A good example would be in trying to engage building occupants with tackling out of hours energy usage (which usually equates to energy wastage!), making the most of our new online energy platform – https://bit.ly/2rHSCxA

Andy Pennick, United Utilities' energy production planning manager: "Making a solid business case for flexibility continues to be a challenge in the short term as regulatory change takes hold and we wait for market access to open up for commercial and industrial [C&I] customers. With the likely disappearance of triad avoidance, the Capacity Market suspended and firm frequency response [FFR] prices dropping significantly, we will continue to monitor closely and wait and see how these changes in the market play out. We will, however, continue with our plans to invest in behind-the-meter renewable generation at our largest treatment facilities."

Henrietta Stock, energy and carbon manager, SES Water: "The biggest challenge for me is going to be getting support for ongoing investment in all scales of renewables and battery storage, given the end of FiT and the Targeted Charging Review. Opportunities include the work that we'll need to complete for ESOS compliance and starting the process of electrification of the vehicle fleet." te

Think longer, stay stronger

Strength and volatility have returned to commodity markets and non-commodity energy bill elements continue to rise. How can businesses navigate an increasingly complex environment? The Energyst asked market experts

The tail end of 2018 saw several smaller energy suppliers going bust and the Capacity Market suspended. It underlined "how quickly things can change in the energy market", according to Ben Spry, head of risk management at Npower's Energy HQ.

"The market is changing at pace. We have seen strength and volatility return to the wholesale market and that brings risk management and timely market intelligence back into focus," says Spry.

A strong year for all kinds of fuel as well as carbon prices have seen wholesale prices "rocket compared to 18 months ago", he adds, bringing price management "firmly back into focus".

Cheaper wholesale prices had masked increases in non-commodity costs. "I'm not saying people had become complacent, but [softer prices] had perhaps reduced the focus on following the markets intently to keeping a watching brief," Spry suggests. "But markets are cyclical and we have seen a real reverse."

The market is changing at pace
Ben Spry, Npower

Volatility

But Spry says the volatile and unpredictable nature of the current market is an opportunity as well as a challenge.

"Short term, the challenge is to navigate through winter. Longer term it is to understand price drivers, the impact of structural changes in setting the price of power," says Spry, with increasing volumes of wind and solar likely to significantly increase price variability.

"Wind generation is forecast to be around 35GW by 2030. That could cause negative prices when it is windy, but then quickly drop off, leading to very high prices, potentially hundreds of pounds per megawatt hour," Spry suggests. "We are already starting to see the impact [of higher volumes of intermittent generation] this winter. But that should really benefit those that have the ability to react quickly to market price signals."

Many businesses have been used to cutting their power bills by reducing consumption during peak network charging periods, both transmission (Triad periods) and distribution (DUoS red bands). Spry thinks there is now greater opportunity for those that can react at any time, rather than planned evening peak reductions.

Customers that bought two to three years ahead last year when prices were very low are in a good place right now
David Oliver, Inenco

Risk management

For businesses with less agility, Spry says it is important to minimise exposure to high costs and increasing volatility.

"If you do not have the ability to avoid price spikes or policy charges you need robust risk management; a hedging strategy and exposure to risk that suits your business," Spry advises. "And it's always worth reexamining energy efficiency measures to use fewer kilowatt hours in the long run."

While there is still value to be had – energy prices for summer 2019 were trading in the mid fifties per megawatt hour as *The Energyst* went to press – Spry thinks there are "enough supporting anecdotes" around rising commodity and non-commodity costs for businesses to justify looking at energy efficiency more seriously.

"The evidence suggests energy costs are set to dramatically increase to 2030, so now is the time to do something about it. Energy should now be quite high on the agenda because of the risks businesses may face," he suggests.

Long view

David Oliver, senior energy consultant at Inenco, agrees that a robust hedging strategy is now vital for larger energy consumers. That strategy must be both long-term and flexible, he suggests. Taking that approach means Inenco's customers that bought "two to three years ahead last year when prices were very low are in a good place right now", says Oliver. "They are paying about half the current market price for gas, 30p per therm (ppt) versus 60p".

While it is too late for firms that did not take that approach, "there are still opportunities to buy in the forward markets," says Oliver, "and a long-term strategy enables you to do that".

Non-commodity rises

Commodity markets are hard

Wind generation is forecast to be about 35GW by 2030

to forecast due to external variables. Non-commodity costs, however, are easier to predict, and make up the bulk of the power bill.

Oliver says non-commodity costs will rise in 2019, but will not be as marked as the "massive" year-on-year increases that were driven partially by the Renewables Obligation (RO), which is closed to new schemes. The RO, which makes up about 20% of the power bill, will still increase with inflation and businesses will have to pay more if government decides to exempt a larger number of energy intensive firms from the scheme.

Meanwhile, Oliver thinks increases in contracts for difference (CfD) costs will be softer than anticipated partly due to higher wholesale costs (CfDs pay a top up to generators if wholesale prices are low) and because 'strike prices' taken by offshore wind farms in recent auctions have fallen.

For CfD costs longer term, he says Hinkley C would "add three or four pounds per megawatt hour to bills overnight".

Consumers have grown used to non-commodity rises but we have seen commodity cost increases for contracts this winter
Dan Smith, Smartest Energy

CCL increases

Another significant non-commodity charge for larger businesses is the Climate Change Levy (CCL). For electricity it will increase by more than £2.50/MWh in 2019. However, it will fall for the following two years as Treasury moves to transfer the cost to gas. The tax rate on both fuels should align in the mid 2020s, at which point it will be around £6.50/MWh, said Oliver. "So if you are a big gas user and not in a Climate Change Agreement, that is quite a big impact,", he warns. "It will be more than 10% of the cost of gas."

Company-wide approach

People need to understand that when they use energy will make a big difference in the price they pay, says Dan Smith, deputy vice-president, I&C Supply at Smartest Energy. He says that shift means energy procurement must engage all parts of a business – from engineering to finance and commercial.

"Consumers have grown used to non-commodity rises but we have seen commodity cost increases for contracts this winter," says Smith. "I think [the combined effect] will shock some buyers, some have come to market late and are paying about 25% more as a result."

Businesses therefore need "not just a procurement strategy but an energy strategy, a long-term coherent vision", says Smith.

"The market is becoming increasingly complex and you can no longer do procurement and FM in isolation, it has to be across the whole company."

Costs are Scaled to 100GWh | 55-60% Load Factor | Customer in London

CHARGE	Cost p.a.	%	Forecast
Energy (incl. Losses)	£6,147,512	48.7%	↑
Supplier Costs (incl. Margin & Risk)	£156,958	1.2%	→
Transmission Charges (TNUoS)	£874,539	6.9%	↑
Distribution Charges (DUoS)	£1,082,514	8.6%	↑
Balancing Use of System Charges (BSUoS)	£282,524	2.2%	↑
Renewables Obligation	£2,209,896	17.5%	↑
Feed-in-Tariff Charge	£580,000	4.6%	↑
Climate Change Levy	£583,000	4.6%	↑
Contracts for Difference (CfD)	£359,956	2.9%	↑
Capacity Market (CM)	£300,638	2.4%	↑
Other Charges (BSC, AAHEDC, Metering)	£33,260	0.3%	↑
TOTAL ESTIMATED COST	£12,610,796	100.0%	↑

Figure 1: Breakdown of an electricity bill. Source Noveus Energy

Corporates will replace utilities as the primary offtakers of renewable power
Chris Bowden, Squeaky Energy

Otherwise, he says, a missed opportunity, ie saving cost, becomes a threat, ie paying more while others reap the benefit of taking action, which pushes up overall business costs and reduces competitiveness.

Get off the grid?

Major changes to the energy market and the way charges are applied compound uncertainty exacerbated by Brexit. As a result, consumer interest in getting off the grid altogether is increasing, says Smith.

While Smith believes the 'prosumer' approach is "definitely the future", there are less extreme means of risk mitigation available now, such as power purchase agreements (PPAs), where power users contract to buy power directly from generators.

Smith thinks PPAs are a useful means of providing cost certainty and says "the gap is closing" between the rates generators want and the prices consumers are willing to pay.

Meanwhile, some generators will accept shorter terms, which may open up the PPA market.

The year of the PPA?

Chris Bowden, managing director at Squeaky Energy, believes 2019 will be the "breakthrough year" for corporate PPAs.

Squeaky's peer-to-peer platform connects buyers with sellers, enabling firms to buy clean power directly from generators.

"I think we are going to see a structural shift in how the market operates. Corporates will replace utilities as the primary offtakers of their power," he says.

Bowden thinks costs have reached "an inflection point", and points to solar deals in the UK and Europe that are "sub-fossil fuel prices" by way of example.

"Wind is very close [to that point] while in the secondary market [where older renewables schemes are coming off subsidies] you can do shorter term deals – and there is a lot of interest there," he says.

Bowden says those market shifts mean PPAs are now viable for mid-sized firms.

"If you are spending a few million a year on electricity, what is wrong with doing a quarter of spend via a PPA and locking it in for five to 15 years? I think a lot more people are coming around to that view." te

Opening up energy data: an introduction to Open Source

The energy industry creates a huge amount of data, spewing from meters, transformed by billing systems and fed into management systems. Yet energy specialists often reach for Microsoft Excel whenever they need to do some analysis. Karthik Suresh presents some alternative options to crunch the energy numbers

The Excel approach has worked for several years and you can do a lot with a line chart and a 'Mark I' eyeball but there are more options for energy managers who want to go further.

A natural step is to think you need some kind of fancy system. Perhaps a Software As A Service (SAAS) platform that does everything. Maybe one that uses machine learning and artificial intelligence to make your job irrelevant.

But such grand solutions rarely seem to address the specific problem you have right now. Instead of kicking off a large, complex IT project, can you do something that is simple and useful right now? That's where Open Source comes in.

The Open Source movement has resulted in creating much of the software that runs global networks behind the scenes. While our personal computers are still dominated by Microsoft, there is a world of software out there available for free that can help you create simple and useful systems if you are willing to spend the time to learn how to use it.

For many people that journey starts by exploring programming in the R statistical language or the Python programming language. You can install both on Windows and, with very little effort, do some quite complex analysis.

For example, Figure 1 shows historic market prices going back to 2005 and uses the daily variation to make a forecast of what could happen to prices and projects a central case – the black line. The program for this chart is about 15 lines of Python. Creating something equivalent in Excel would be a non-trivial task.

The sharp-eyed ones among you will notice that the analysis was run in October and predicted a downturn in prices – something that has actually happened recently.

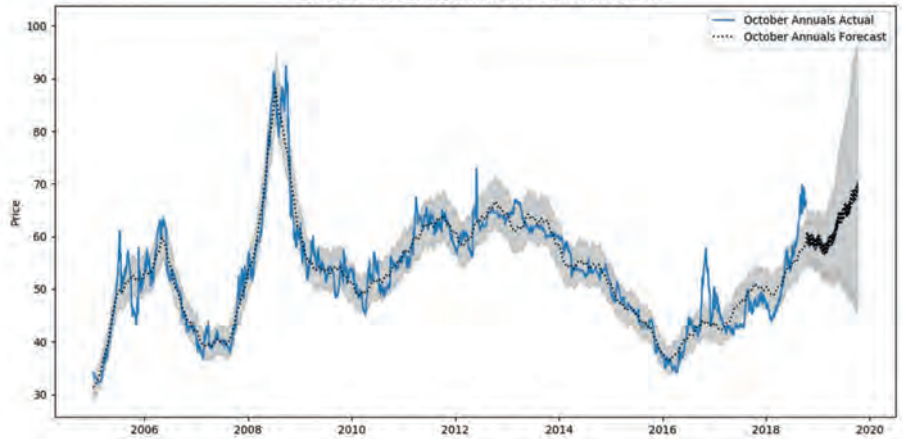


Figure 1: Forecasting energy prices using Open Source

MPAN	Days	Zeroes	Zeroes(%)	Total	Min	Average	Max
XXXXXXXX	30	0	0.00	106473.10	7.60	73.94	97.20
XXXXXXXX	30	0	0.00	39471.90	0.10	27.41	48.60
XXXXXXXX	30	0	0.00	55568.90	3.00	38.59	41.20
XXXXXXXX	30	0	0.00	31634.35	0.06	21.97	27.03
XXXXXXXX	30	0	0.00	28420.00	7.10	19.74	35.40
XXXXXXXX	30	0	0.00	293607.00	4.80	203.89	251.20
XXXXXXXX	30	0	0.00	11920.79	1.85	8.28	19.56
XXXXXXXX	30	0	0.00	3958.49	0.30	2.75	10.10
XXXXXXXX	30	0	0.00	34187.23	0.08	23.74	29.34
XXXXXXXX	30	22	1.53	11272.90	0.10	7.83	14.20
XXXXXXXX	30	0	0.00	7900.10	2.10	5.49	70.40
XXXXXXXX	30	0	0.00	9390.30	0.13	6.52	10.06
XXXXXXXX	30	0	0.00	5602.20	2.40	3.89	5.50
XXXXXXXX	30	0	0.00	33850.70	0.50	23.51	35.90
XXXXXXXX	30	0	0.00	14511.80	1.30	10.08	48.90
XXXXXXXX	30	0	0.00	34417.90	2.80	23.90	36.60
XXXXXXXX	30	0	0.00	985466.40	164.50	684.35	916.70
XXXXXXXX	30	0	0.00	577.32	0.01	0.40	18.24
XXXXXXXX	30	0	0.00	13246.70	5.90	9.20	13.10

Figure 2: Using Open Source to manage half-hourly data outputs

Another task many of us do on a daily basis is slice and dice tabular data like half-hourly metering data. For example, let's say you want some basic statistics about your data set and check that there are no zeroes for a portfolio of a few hundred sites before you use the data for ESOS (see Figure 2). A program can do this for hundreds or thousands of sites in less time than it will take for a spreadsheet to open.

Writing programs such as these requires getting familiar with a different interface and way of working than the traditional application approach where you press buttons and make things happen. The

command line – that old DOS-like box – that many think is dead is actually where much real work gets done.

If you have never done any programming the learning gap can seem huge but, in reality, the amount of information and support for Open Source technologies has never been greater.

There is no other field where so much is out in the open. The Open Source movement and the Free Software Foundation have long believed that software should be open – that it should give users freedoms – to study, modify and share source code. Most commercial software, on the other hand, is designed to take away freedom. It is designed to be sticky – the more you depend on it the less control you have and the more power the supplier has over you.

That is not a bad thing when you trust each other. But perhaps one of the reasons why Microsoft Excel is so widely used is because everyone can use it, program it and see how spreadsheets are built. Although it is a commercial software product, the openness built from calculations in cells reduces your risk of losing control over the data and calculations that matter to you.

A related benefit of learning to program is that once you write a program to do something automation becomes much easier. You can schedule that program to run daily or weekly to do the analysis that would otherwise involve you opening and editing a spreadsheet manually.

So, where should you start? If you have a computer the first step for most people is to install a copy of a GNU/Linux operating system, often available with one of the Linux magazines at the local supermarket. You might have recently heard that IBM bought Red Hat Linux – and I installed one of their distributions for the first time in 1998. IBM's decision shows how pivotal it thinks Open Source will be for it in the future.

These days many go for Ubuntu as a starting point or, if you are braver, start with one of the distributions optimised for statistical and scientific work. You can even install Ubuntu under Windows or run it entirely from a disc or USB drive without installing it on your computer at all.

The main thing, if you would like to learn more, is to get started. If you are aware that Open Source options exist you can start building your own software or find that one of the numerous packages out there can be adapted to what you need. For example, there are packages that offer energy monitoring, facility management and CRM capabilities, just to name a few.

There really are very few limits to what you can do once you start to use Open Source systems. For those of us who wrestle with data on a daily basis, they make it simple to do simple tasks, and make complex tasks possible.

Some useful links to find out more are python.org, r-project.org and ubuntu.com te

42nd World Energy Engineering Congress (WEEC) – Association of Energy Engineers Call for 2019 Regional Award Nominations

Deadline 22 February

Regional Awards (open to international energy managers/professionals) will be presented on 25 September 25 in Washington, DC, at the 42nd World Energy Engineering Congress (WEEC). If you know individuals, organisations, agencies, corporations or institutions in your region that are doing outstanding work in energy, make sure they are nominated for this year's awards. To learn more about the Regional Awards Program and to see award categories, visit **aeecenter.org/regionalawards.**

Karthik Suresh is a committee member at the UK Association of Energy Engineers (UKAEE) and is a director at Ameresco (all opinions in this article are those of the author and do not express the views of Ameresco). UKAEE covers a range of expertise in the energy management and energy efficiency sectors. It delivers a range of technical focused seminars and offers excellent networking opportunities for energy and sustainability professionals. It offers Continued Professional Development opportunities for AEE certifications such as Certified Energy Manager, Certified Measurement and Verification Professional and Certified Energy Auditor.

Sir Terry Leahy's advice: keep it simple

At the launch of Myenergi's smart EV charger, the former Tesco chief talked about simplicity both in winning over the board and straightforward solutions to cut consumption. Brendan Coyne reports

Former Tesco chief executive Sir Terry Leahy has offered energy managers pitching projects to their board some advice: keep it simple.

Speaking at the launch of a new range of smart EV chargers from Myenergi, in which he is an investor, Sir Terry noted that the most effective ways of cutting carbon are often the most straightforward – literally.

"Supermarkets are the second largest consumer of energy in the country. But you can massively reduce the amount of energy they consume just by keeping pipes straight," he said. "It is amazing how much energy is expended just pushing fluids around bends."

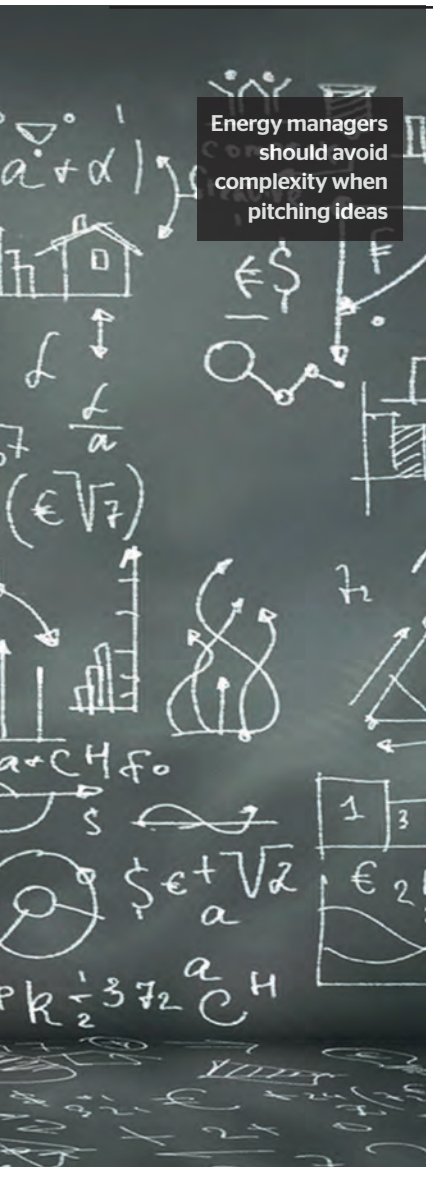
Much of what brings about sustainability "is just good business practice", said Sir Terry. "A lot of it is just conservation of resources and I have never seen an example of good conservation that damages the bottom line."

In fact, the opposite is true, "it adds directly to the bottom line".

While Tesco has made massive improvements in efficiency and investments in technology, Sir Terry said new technology does not always deliver to expectations and "can be quite unreliable".

That was one of the reasons he decided to invest in Myenergi. Its chargers and technology maximise use of solar and only draw from the grid when required, or when told to, automatically picking the cheapest times.

"I was very drawn to the product. It uses something that may otherwise be wasted and instead uses home energy to heat water or charge the



Energy managers should avoid complexity when pitching ideas

car. That is a very practical solution to potentially wasted home generation."

Equally important, he said, "is the fact that it works".

Picking winners with those characteristics is something energy managers pitching to boards should use as a guiding principle, Sir Terry told *The Energyst*.

"It always has to be about payback. Conservation drops straight through to the bottom line, because whatever that is, it means you are not wasting anything.

"But it is also about communicating simply and effectively that it can be done, and that you are the person who can do it. Because as soon you bring in complexity and uncertainty, it is too easy for people to put it to one side and move on to something else."

Petrol stations under threat?

Sir Terry is also involved in traditional transport fuels, chairing the executive committee of the board at the Motor Fuel Group, the UK's largest independent forecourt operator with about 1,000 petrol stations.

The group "wants to put in a network of chargers, but it is incredibly hard", he said. "Even the big players are struggling" in terms of understanding which technologies to deploy.

"Traditional chargers are too slow, superfast chargers are very expensive ... there's not really a clear industry standard and I think that is why people are finding it difficult," he said. "There is still a lack of certainty around what is the right technology to choose."

Despite the complexity, and the fact that supermarkets and pub chains are mobilising on charging infrastructure, Sir Terry believes traditional petrol stations will remain major players as transport pivots to electricity.

"You can see [competition arriving from other sources], but it is a very expensive business, so it is more likely to be the specialists [that dominate]," he said.

Forecourts "will become retail destinations – and they already are," said Sir Terry. Moreover, "there is a huge fleet of petrol and diesel vehicles and they will be around for a long time".

"But [petrol stations] do need to become a network for charging."

Amount VW is investing in EVs over the next five years

Chicken and EV

While investment is pouring into electric vehicles and infrastructure, the UK EV market today remains tiny, with about 200,000 plug-in cars and vans on the road. What would encourage more people to buy EVs?

"The price has got to come down," Sir Terry said. "The technology also has to progress. There is a lot of range anxiety and a lack of trust between the [manufacturers'] quoted range and actual range, and that is a challenge for the market."

To drive down price requires volume manufacturing. Traditional manufacturers are stepping up – with VW announcing it will invest €30bn in EVs over the next five years.

But existing electric vehicles are not coming to the UK in sufficient numbers, suggested Fiona Howarth, chief executive at Octopus Electric Vehicles.

"Availability is the biggest challenge, you have to wait months from order to delivery," she said.

Speaking alongside Sir Terry at the Myenergi event (Octopus Energy's EV tariff rewards owner for smart charging), Howarth believes manufacturers are sending cars to geographies with the best policies, citing Norway, China and California.

She hopes UK policymakers can better align rhetoric with incentives to expedite decarbonisation of transport and improve air quality.

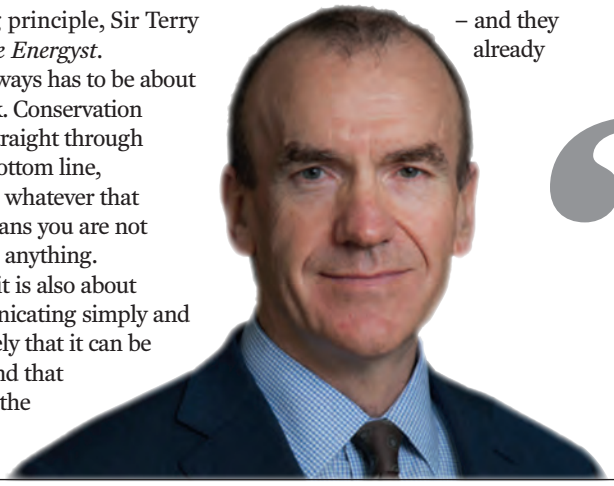
Vehicle to grid?

Despite volume constraints, Howarth said UK businesses are starting to integrate energy, transport and sustainability strategies – and believes smart charging and vehicle to grid technology will help the UK decarbonise at lowest cost (the company is involved in UK Power Network's EV fleet trial, which also includes Uber and Centrica).

Sir Terry agrees, though he said the incentives for people to cede control of charging have to be right.

"It is important that there is competition in the grid so that people can be rewarded for providing that [flexibility], which will be needed as power generation becomes greener," he said.

"There must be sufficient incentives for people [to help balance power grids with their cars]. That is important – to make sure it is worth people's while." te



> *You can massively reduce the amount of energy they [supermarkets] consume just by keeping pipes straight. It is amazing how much energy is expended just pushing fluids around bends*
> **Sir Terry Leahy**

Marston's and Tesco hope to attract more customers and boost sales by installing EV charging bays across their properties. Brendan Coyne reports

Pubs the new petrol stations?

Pubco Marston's and supermarket giant Tesco have announced big plans for electric vehicle charging infrastructure.

Tesco will install 2,400 EV charging bays across 600 stores over the next three years in a deal with charging firm Pod Point. Some will be free-to-use 7kW units, others 50kW rapid chargers, which shoppers will pay to use.

Pod Point describes the deal as a "new model" with Volkswagen involved as a sponsor.

Public charging houses

Meanwhile, Marston's is installing 400 rapid charges at pubs across the country in a deal with charging firm Engenie. The chain thinks the move will increase footfall at its pubs – and potentially extend opening hours.

Marston's energy manager Andy Kershaw will not be drawn on how he managed to get the deal signed off by the board, nor financial terms of the 15-year leasing and revenue share arrangement. But he says the company hopes to capitalise on an EV "ownership boom" in the next few years.

The 50kW rapid chargers, owned and operated by Engenie, mean people can charge their cars in 30-60 minutes. "That fits well with the dwell times of a meal in a pub," says Kershaw. "It's almost a perfect match."

The pubco also has lodges at some sites and may install slower chargers for overnight guests in a bid to keep rapid chargers free for passing trade.

However, Engenie business development director Patrick Sherriff says that when slow and fast chargers are sited next to each other "people always go for the fast charger". Marston's would therefore need to work on marketing and incentives to make that approach work.

Kershaw says Marston's sees "a lot to gain from being an early adopter".

He adds that the company was keen to work with Engenie because of its open model – it can charge all types of vehicle, does not require any specialist kit or subscriptions, and means vehicles can be charged with 100% renewable electricity with a tap of a card.

Full service

Customers will be charged 30p/kWh plus VAT and Marston's will take a cut. But Kershaw said the business is not banking on "hundreds of thousands of pounds" coming in from charging revenue any time soon.

"For us, it is not about profit, it is about service. In some locations it will give us the ability to extend the trading day slightly. A traditional pub might not open until late morning. But it may now become a breakfast site, or a place to meet for coffee and cake while you charge your car," says Kershaw. "The days of being a traditional boozer are long gone."

The deal with Engenie intends to deliver 400 chargers across 200 sites, but Kershaw says Marston's, with about 1,500 pubs, may ultimately build its own network.

Engenie's Sherriff thinks pubs and other destination locations could ultimately become the new filling stations.

"There are around 8,500 [petrol stations] in the UK. They will only be able to do a tiny percentage of EV charging because of grid constraints," says Sherriff. "Marston's will be able to attract people from that market."

Grid constraints

However, grid constraints are not limited to petrol stations. "Grid [capacity] is an issue," says Kershaw. Adding 50kW-plus of chargers "is like building a pub next to a pub [in terms of consumption] and that capacity is just not available in a number of parts of the country."

Given the cost of capacity, "developers want to keep headroom to a minimum," says Kershaw. That leaves very little for the pubco to work with when it acquires the building and wants to install chargers.

"The cost of getting grid capacity to site is probably the most significant part of the [EV charging infrastructure] equation," he says.

Sherriff suggests smart charging and batteries, should prices fall, may in future help address constraint issues. But despite current challenges, both he and Kershaw think faster chargers at destination sites likely have more mileage than other models.

"Many of Marston's sites are in built up areas," says Sheriff. "Half of people who own a car do not have off-street parking. Where are they going to charge? Not from a 1kW lamppost."

Kershaw agrees. "As we are seeing in Scandinavia, people will change their habits and plan their journeys." Instead of driving to the petrol station, "they will go to a pub, a restaurant, a shopping centre to charge their cars". te

> *"There are around 8,500 [petrol stations] in the UK. They will only be able to do a tiny percentage of EV charging because of grid constraints*

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West Yorks plans free-to-use rapid charging network

Free-to-use EV charging stations to be deployed across county in a deal struck with Engie

Councils in West Yorkshire have struck a deal with Engie for dozens of electric vehicle rapid charging stations which will be free to use until late 2021.

The energy supplier will own and operate the network and supply 100% renewable power for up to 88 chargers.

The charging stations should provide an almost full charge in 20-30 minutes.

To help pay for the infrastructure, West Yorkshire Combined Authority has some £2m in funding from the Office for Low Emission Vehicles.

The councils of Bradford, Calderdale, Kirklees, Leeds and Wakefield are providing an additional £1.2m of match funding.

Each charging station will have two bays – one for taxis and private hire vehicles, the other for anyone to use.

The councils hope that providing fast free charging will encourage people to switch to EVs.

Cllr Kim Groves, chair of the West Yorkshire Combined Authority Transport Committee, hopes free fuel will persuade taxi drivers to convert to hybrid and pure electric vehicles.

If 500 do so by 2020, that "would reduce nitrogen dioxide emissions from taxis by as much as 18%, in line with our target of developing Clean Energy and Environmental Resilience for Leeds City Region", she said.

Engie said public charge points it installed in Rotterdam last year were used 480,000 times, which it claimed equates to 30 million driving kilometres and a reduction of 4.5 million kg of CO_2 in one year. The firm hopes to make inroads with similar models in the UK. te

Chargepoint raises £189m for infrastructure rollout

Investors willing to pump big money into EV charging stations

Pension funds, governments and fossil fuel companies have invested almost £190m in electric vehicle charging infrastructure company Chargepoint.

The company plans to expand its charging network in Europe and the US – and increase its focus on fleets and commercial vehicles as well as cars.

In the UK, the company recently entered into a partnership with French energy company Total Gas & Power to bundle energy sales and EV infrastructure to industrial and commercial companies.

Investors in the latest funding round include American Electric Power, Canada Pension Plan Investment Board, Chevron Technology Ventures, Clearvision, Daimler Trucks & Buses, Government of Singapore Investment Corporation (GIC), and Quantum Energy Partners.

Given the risk-averse nature of governments and pension funds, Chargepoint president and CEO Pasquale Romano said the willingness of these investors to put big money into EVs suggests the market is at "a tipping point in the generational shift to transportation electrification".

The company has some 57,000 charging stations around the world. It aims to have 2.5 million ports within seven years. te

BESPOKE POWER SOLUTION FOR WATER TREATMENT WORKS

Power Control Ltd has recently completed an extensive power protection installation for Hampton Loade Water Treatment Works in South Staffordshire.

The project was scoped into Power Control by one of its long standing clients, Sentridge - a drives and controls business with an impressive background of projects within the water treatment industry.

Working in close conjunction with one of its principle UPS manufacturing partners, Borri Italy, Power Control was able to supply, install and commission 18 custom built 100KW IP54 UPS units. Positioned as standalone units, the UPS systems are now providing essential emergency backup power across the entire water treatment site.

With extensive knowledge of the complex requirements demanded from the multifaceted utilities sector, Power Control was expertly placed to provide a future proof power protection strategy and essential technical guidance towards the development of the UPS systemsw. One of the key prerequisites was for the solution to be IP54 rated (protected from water and dust particles), with a sizeably reduced footprint.

Rather than issuing a standard IT grade UPS within an IP54 rated box, Borri was able to design and manufacture an IP54 UPS. The customised solution also needed to be reconfigured to be smaller than the standard Borri 100kW units as space was extremely restricted. The modified units are all front access for easy access and maintenance. The air inlet and outlet fans are also on the front meaning the UPS systems can be pushed right up against the wall, which also contributes to space saving. The battery boxes were also customised to provide IP54 with a built in DC isolator and housed in a matching 800W x 800D x 2000H front access box. In addition, the bypass switches have also been placed in IP54 enclosures.

Power Control's divisional sales director, Matt de Frece commented on the project:

"The water treatment works – Hampton Loade, had incredibly strict specifications from the offset. Power Control won the work based on its ability to deliver a custom built Borri UPS solutions and its commitment to delivering the installation within a tight timeframe and within stringent budgets.

"Having worked in partnership with Borri Italy for almost a decade on developing bespoke power protection solutions, Power Control was confident that it would be able to provide a customised UPS systems that could be IP54 rated and significantly reduced in size.

"Borri Italy has an impressive research and development team and we have worked in close collaboration with them on a number of high profile custom installs. Power Control has direct access to the factory and witness testing facility at Borri Italy and can therefore easily deliver a service that is wholly indicative of our manufacturing partner. It is our close working relationship that enables us to provide our clients with tailored solutions, designed to meet their exacting requirements."

Power Control's product portfolio includes single phase, three phase standalone and modular UPS solutions, the technologies Power Control supplies are of the highest calibre. The business provides complete peace of mind, bringing together the very best components to achieve industry leading performance and superior efficiency.

CONTACT

For further information about about Power Control's UPS solutions visit https://powercontrol.co.uk, call 01246 901528, or email info@powercontrol.co.uk

PowerControl

Nissan: 2019 'breakthrough year' for EVs as power plants

Carmaker backs vehicle to grid services to gain traction, and may ultimately enter the energy supply market to enable smarter services. Brendan Coyne reports

Nissan sees 2019 as "a breakthrough year" for grid services via electric vehicles. The carmaker could potentially become an energy supplier soon after that.

"It is something that could happen. In the UK there are companies offering electricity that are not typical utilities, so it is possible," Eduardo Mascarell, head of energy aggregation and vehicle to grid at Nissan Europe, tells *The Energyst*.

"So far, we are just concentrating on EVs and battery solutions. We will see in one or two years if it makes sense to get into that [energy supply] business as well, but why not?"

Cars as power plants

Nissan has almost 400,000 EVs on the road worldwide, hypothetically equating to "about four gigawatts already connected to the grid", if all were connected via 10kW bi-directional chargers, says Mascarell.

The company has sold 28,000 EVs in the UK to date. In 2019 it hopes broader EV sector growth will continue at the current rate of "50-60% a year, and even higher in some countries", says Mascarell.

He hopes 2019 will also mark the turning point for vehicle-to-grid (V2G) services. The company will launch its own designed and specified chargers that enable V2G services in the second quarter.

"I think 2019 has to be the breakthrough [for V2G], because we are moving from charging infrastructure that was costly to manage to something that is smaller, bi-directional and competitive in terms of cost," he says. Moreover, other infrastructure providers are coming to market, with competition reducing costs and improving service, adds Mascarell.

Nissan's trials in Denmark indicate EVs could earn about €1,300 a year if used to help balance the grid. "In countries like the UK, that are more dynamic and flexible, that could be even higher," he says.

However, "you cannot transfer all of that revenue direct to the EV owner", says Mascarell, as other parties would take a cut. "But it would not be very challenging to offer the customer something like free transportation – all the electricity you use for driving the car could be covered by these kind of operations."

Mascarell says it is incumbent on carmakers and service providers to market propositions in those terms. "Not to talk about kilowatts or kilowatt hours, or frequency services, because that is complex. But how to make things really easy for people to understand that the car is no longer a car, but a platform that gives you transport services and energy services."

Service propositions are also not just about money, says Mascarell. "People are not always looking to save pennies or pounds, but to have a sensation of control: I am managing my own environment, my data, appliances and energy. These things are coming together and the EV will be a part of that."

Grid constraint or solution?

Smart charging and vehicle to grid is necessary to decarbonise power and transport without having to build unnecessary infrastructure, says Mascarell.

"If we only use EVs as big, dumb washing machines with wheels, that will of course create grid constraints. But we can turn them into something that actually helps the grid," he suggests.

"In the future you will see that we are not just talking about 'an end user', but entire districts and neighbourhoods collectively helping to balance the grid, becoming new market agents that create a sustainable solution for the whole system."

Businesses or households first?

Both business and household markets are "really attractive" in terms of vehicle to grid potential, says Mascarell, though he thinks the former may initially scale faster.

"B2b is easier because you can accesses multiple EVs in one shot. Fleet managers have parking lots, the space to install chargers and enough power [capacity] to include charging and discharging solutions," he says. "It is also possible for them to build an ecosystem, based on solar PV, batteries and EVs that can help them reduce peak consumption and do other things."

While EV sales are rising, range anxiety remains a concern – and could prove a roadblock for companies with vehicle to grid ambitions. Mascarell thinks those fears will subside as the charging infrastructure rollout gathers pace and carmakers can demonstrate that using cars to balance the grid will not drain batteries.

"Our trials in Denmark, the UK and other places in Europe prove the technology is not a challenge. The challenge is the customer proposition – and we need some time for people to learn that the technology is useful and driving patterns are OK for EVs and vehicle to grid," he says.

"People still have the same concerns, but those with range anxiety are those who have never driven an EV." te

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Making sense of your energy

The future of EVs and the impact on the UK grid

Kinect Energy Group's Adam Piggot outlines some of the challenges and solutions posed by the rise of electric vehicles

The UK's current infrastructure is designed to deal with the power we consume today. We do not have an infrastructure that is designed to charge millions of electric vehicles, and this is the challenge our electrical infrastructure will face with the increase in adoption of electric vehicles and the increasing deployment of other new technologies that will be necessary to meet climate change targets

If you want an electric car today, you have got a choice of something fairly small or something very large and expensive. If you drive something midsized, you will be hard-pressed to find an all-electric equivalent, currently. However, in the next few years, we will see electric vehicles pushed into the mainstream, with a number of new models being released in 2019.

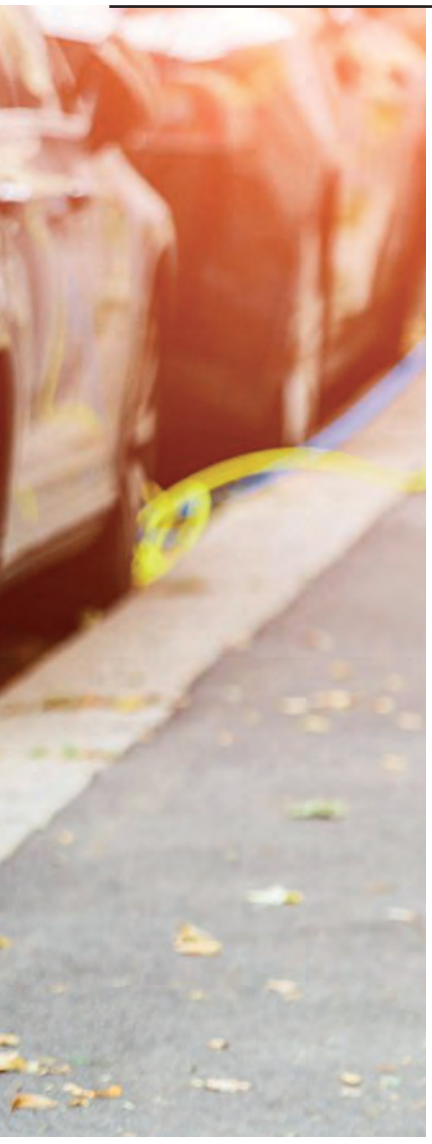
Any business with an employee or customer car park will need to be conscious of the increasing need for EV charging infrastructure. Furthermore, many businesses will probably be unaware that installing significant numbers of EV charging points is likely to have implications for their existing electricity supply, which may well need upgrading in order to cope with the increased demand.

Currently, incentives are available to assist with the cost of installing charging points, in certain circumstances and there are subsidies for all-electric and hybrid cars. However, as the number of cars start to increase, such incentives will doubtless diminish and possibly disappear altogether – in much the same way as we have seen with the Feed-in Tariff, that has successfully increased renewable energy penetration and consequently, driven equipment costs down.

The collective capacity of EV batteries and their ability to store electricity will be colossal

Evolution of smart charging

Given the increasing demands EVs will place on local distribution, national transmission and generation infrastructure, and the likelihood that it will not keep pace with EV adoption, we will likely see the evolution of smart charging. Instead of charging as soon as it is plugged in, the EV or charger will examine a number of parameters related to local and nation demand including price signals, time



of day, the customers charging preferences and battery charge state, and decide upon the most optimal time to charge.,

Smart charging will likely be underpinned by cost to charge. Those customers willing to be most flexible around when it happens will likely pay a lower price for electricity, while those who want to recharge immediately will be penalised with a higher electricity cost, in much the same way most larger commercial customers are now through consuming significantly at peak times through seasonal time of day contracts.

However, in the future the peak (and therefore costly) periods are likely to be much more dynamic than we see today.

A natural extension of smart charging will doubtless be the possibility of supplying power from an EV's battery back to the grid. Already under development, Vehicle to Grid (V2G) will allow export from an EV to the grid in much the same way as behind the meter PV will export, albeit in a much more demand-driven fashion.

Once EVs become more mainstream, the collective capacity of EV batteries and their ability to store electricity will be colossal – significant numbers of EV owners allowing even a small percentage of their EVs battery capacity to be flexed to provide grid services in this way, will allow for balancing of both local and national loads.

As with smart charging, V2G will largely be driven by financial incentive – allowing access to a small percentage of the EV's battery will likely result in either payments for doing so or preferential rates for charging.

Given the quantity of data analysis and the number decisions that will need to be taken in real time, the process of EV charging and V2G is likely to be fully automated. The system will require extensive telemetry throughout the electrical distribution system as well as real-time info regarding electricity price, weather data, predicted generation availability and EV owner preferences.

In all likelihood, the EV owner will set some basic parameters regarding when they want to be able to use the vehicle and the range they want and the system will operate to ensure the EV charges sufficiently at the lowest cost, charging and discharging as required. Alternatively, an override would allow maximum charging at a higher price for the fastest recharge, for faster availability.

Who pays for the electricity?

Where the vehicle is charged will also throw up some interesting questions that will need to be resolved. For example, if charging in a supermarket car park, who pays for the electricity? Who captures the value of any export via V2G? Will the costs and benefits site with the owner of the charger or will the electricity account follow the vehicle around?

Currently, there is a lot of enthusiasm for behind-the-meter battery storage (although this is still not translating into many installations) to provide balancing services. However, when V2G becomes mainstream, will the requirement for standalone storage disappear?

A business case needs to be built, weighing the battery installation cost against the return from the provision of balancing services. With EVs, the battery purchase has been made anyway as part of the EV (or leased as part of it) – consequently, gaining financial reward for allowing a small proportion of that battery to be flexed is surely a no-brainer.

While the battery capacity of a single EV is likely to be smaller than a behind-the-meter battery and only a small proportion would be accessible for discharge, the number of electric vehicle batteries available in time quickly eclipse the total available capacity of standalone batteries. If EV adoption accelerates at the pace many believe, and V2G follows suit, the market for behind-the-meter battery storage could quickly die before it has the chance to become mainstream.

The adoption of EVs will increase significantly in the next five years and they will be commonplace in 10 years. The rate of adoption will largely be driven by economics – as battery prices reduce and the technology improves, the cost of EVs will fall. Combined with improved range, the EV proposition becomes more attractive. Once EVs reach price parity with petrol and diesel vehicles, except in very select circumstances, virtually all new cars sold will be EVs.

While wide-scale adoption of EVs will bring challenges to the electrical infrastructure. In many regards the flexibility afforded by the batteries will in itself go some way to solving those challenges. Furthermore, as electricity generation tends increasingly to intermittent renewables and away from conventional, dispatchable, fossil-fuelled generation, the collective battery capacity of EVs will be key in maintaining a stable grid. te

The Energyst and Kinect will record a podcast on EVs' impact on energy strategies in January. See theenergyst.com for details.

> *If EV adoption accelerates at the pace many believe, and V2G follows suit, the market for behind-the-meter battery storage could quickly die before it has the chance to become mainstream*
> **Adam Piggot, Kinect Energy Group**

Resolving conflict: can suppliers and aggregators work together?

Aggregators are becoming suppliers and suppliers are becoming aggregators, but can the two parties collaborate to help customers maximise the value of their flexibility and where does best value lie? The Energyst asked Flexitricity and Npower for their thoughts

Alastair Martin, founder and CSO at Flexitricity

Can parties with competing agendas (aggregators and suppliers, for example) maximise value for customers while minimising whole system impacts/costs?

For the right customer, supply and aggregation can work well together.

A conflict could arise where suppliers also trade their own books. Whether they are trading against their own generation fleet or their own speculative positions, there's a natural potential for conflict with the customer's own ability to offer flexible services.

But perhaps the biggest conflict is with tradition, embodied in business processes that were designed when customers didn't know very much about the energy they were buying. We've been repeatedly taken aback when suppliers' apparent enthusiasm for flexibility has foundered on the rocks of their own middle-office strictures.

To minimise whole system impacts and costs, the only thing that works is an open market with maximum information available to those who are in a position to act on it. That's not only power stations or trading houses – it is customers as well.

What are the challenges thrown up by customers taking an action (how does it affect suppliers' positions and what is the upshot)?

In market-speak, if a customer delivers a reserve service by turning down load or turning up generation on request from National Grid or a distribution network operator, it 'goes long'. In the old world, when prices were fixed regardless of consumption, this long position immediately landed on the supplier, who would end up sitting on an excess of electricity, giving them an imbalance for which they would be paid – generally quite well.

In today's hodge-podge of imprecisely worded volume tolerance arrangements, it is not always clear where the extra ends up. It is equally hard to figure out who is losing out and who is making extra gains. Be that as it may, it has been decided, through Project TERRE and a code change known snappily as P354, that volumes will be corrected for certain reserve services. If a customer delivers a STOR call, the energy of that will be calculated (with the aggregator's help) and taken off the supplier's account.

It is between the supplier and the customer to sort out the effect of this through the supply agreement. That's if they want to – they can just leave it to ordinary fixed-price or volume tolerance risk management.

Suppliers need customers' consent before they access customer-specific information about STOR calls and the like. This is to prevent suppliers from restricting or controlling customers' access to the flexibility markets.

Before granting such access, I would encourage customers to ask three penetrating questions of their suppliers:

a) Do you have your own power stations or traded book which is playing against me in wholesale energy markets, and if so, how are you protecting my interests?

b) Can you please write down exactly how my volume tolerance and imbalance are calculated? No arm-waving, please; I want the maths.

c) Since I know my business better than you do, and since I can easily get independent advice on the energy markets, how about just giving me straight pass-through contract so that I can manage my own risks and sell my own flexibility direct?

Are there potential ways in which different parties could work more closely to address those challenges?

This is about listening to the customer. Rather than forcing energy managers to interpret trader gobbledegook for their finance directors and operations managers, it might go better if energy suppliers designed their back- and middle-office functions to suit the ways in which customers run their businesses.

It's also about speaking clearly. Witness the ongoing debate about network charges – how many customers knew what the demand residual was until they heard that it was going to be revised? This one is as much for Ofgem and the network companies as it is for suppliers and aggregators.

Customers have been paying the residual for years, and soon they will pay it differently – with profound effects on their businesses. Time-of-use operations – avoiding red periods and triads, for example – may soon give way to more active load-

shifting. In all things flexibility, even in flexibility itself.

Wholesale markets or balancing mechanism: Is there a 'best bet' to optimise flexibility revenue?

The answer is 'both'. There's a broader question – what's the best bet between energy markets, capacity, ancillary services like STOR, and new activities like TERRE? The answer to that one is 'all of the above'.

As markets change, value moves around. The right approach for a DSR customer is access to all of the opportunities which are relevant. Where there's scope for reasonably regular flexible operation, or where the flexibility is two-sided, the balancing mechanism is a key component. Intraday and day-ahead trading are great where operational schedules can be adjusted in timescales of a few hours, and these activities can work very well with the balancing mechanism. More rigid loads may be better in more regimented ancillary services like committed STOR or firm frequency response.

The businesses with the broadest range of DSR participation are best protected from market and regulatory changes, and have the best potential to profit from the flexibility inherent in their own assets.

Wayne Mitchell, director of Energy HQ at Npower Business Solutions

Can parties with competing agendas (aggregators and suppliers, for example) maximise value for customers while minimising whole system impacts/costs?

Yes, definitely. I would challenge the notion that aggregators and suppliers can't collaborate. Suppliers that have aggregation capabilities (such as ourselves) will actively participate in the DSR market. However, where our customers are already in partnership with other aggregators, we can work together to generate additional value for their flexibility.

After all, it is in the best interest of the customer if aggregators and suppliers work together – it means they can access more markets, generate more value per kW and de-risk their business case.

In the current policy landscape, with the 'Targeted Charging Review' impacting DSR fundamentals such as winter peak cost avoidance, the only certainty is change. We are already seeing customers reducing their flexibility – or considering it – based on changes in the market.

It is vital for consumers to become more flexible, to support the UK energy system. So, the industry should be working to ensure customers get maximum value for their contribution.

What are the challenges thrown up by customers taking an action (how does it affect suppliers' positions and what is the upshot)?

It comes down to knowledge and sharing knowledge. The real question is, 'what is the impact of a customer taking an action a supplier doesn't know about or isn't aware of?'

A supplier can't help a customer generate value from flexibility if they don't know it is happening. There is a benefit to the supplier hedging customer flexibility in the short-term wholesale markets and only the supplier (because they hold the customer position) can do this. This is needed for the customer to get the best result from their deployment, so we need to encourage an industry openness. There is also a risk the supplier could penalise the customer for breaching volume tolerances on contracts, and our experts at Energy HQ, Npower Business Solutions, try hard to work with our customers to ensure this does not happen.

As an example, we traded over 100MWh of volume for customers at prices exceeding £150/MWh in short-term markets in one December day. That essentially meant these customers received extra value for completing an action they were delivering anyway. This only worked because we were aware these customers would be delivering DSR – our experts are able to generate this extra value for any customer in our portfolio. Our challenge is gaining visibility of customer action.

Are there potential ways in which different parties could work more closely to address those challenges?

Honestly, as a supplier, we are conscious aggregators don't want to tell us who within our portfolio they are working with as it could lead to competition. We just want to know what's going on across our portfolios or have a dialogue with those delivering the services, then we can ensure customers aren't being penalised and reduce their business case risk, while maximising revenues.

The current gap is communication – and once we start talking more as an industry we can deliver more value for customers and reduce our risk as a supplier, that's why the door is open from our side.

Wholesale markets or balancing mechanism: Is there a 'best bet' to optimise flexibility revenue?

DSR business cases are built on revenue stacking. We recommend that where any revenue streams are not mutually exclusive, they are stacked and incorporated into the overall asset strategy, this is true for any services including short-term wholesale market access and the balancing mechanism (BM).

If pushed to pick one, I would say that the short-term wholesale markets provide the more tangible opportunity for the majority of DSR providers. These markets were worth more than £6bn last year and with 15 years' market experience through our Optimisation Desk, we believe we are well placed to give our customers a share of this.

In comparison, the BM totalled £350m last year, which is tangible, but nearly 20 times lower than the N2EX and APX markets combined. The other critical point is that these markets can generate additional value for activity a customer is already completing. For example, by being made aware of a customer's intention to respond to triad calls, we can generate around £3K/MW of additional benefit this winter.

Other benefits include:

- Trades are completed prior to an event so there is absolute certainty of the value your response will deliver
- We can manage and monitor delivery through billing data so there's no need to have on-site controls or site visits
- Trades down to 0.1MW mean customers don't need to be aggregated and value is transparent
- Market access can work with both high and low market (including rare negative wholesale price events)
- You actually have two opportunities to trade volume in either the day ahead or within-day markets, which gives customers the best chance of getting the deal done. te

London eyes 1GW of flex

A plan to unlock a gigawatt of peak flexible power resource in the capital by 2050 is under way as part of the mayor's plan to move the city to zero carbon. Brendan Coyne reports

The GLA-backed Flex London project forms part of the mayor's plan to make the capital a zero carbon city.

The authority, plus project partners, is bringing together public and private sector organisations that have the potential to provide flexible power with solutions providers that can help them unlock it.

A number of projects are in line to be taken forward via an initial 'sprint challenge'.

The project is aligned with UK Power Networks' plans to procure flexibility to help balance its network, so businesses that come forward may find themselves with a contracted source of revenue sooner rather than later.

Matchmaking

Through mapping and research work undertaken by the Carbon Trust and aggregator Open Energi, the Flex London project found that even companies with a high potential for flexibility were not making the most of it.

Barriers include complexity; that rewards are perceived as not sufficiently attractive for the effort required; and that aggregators are too focused on their own technology and needs, rather than those of the customer.

Flex London brought together some of those end-user organisations with solutions providers to help solve that disconnect – and start a matchmaking process

As well as matchmaking energy users with flex solutions providers, the aim is to bring together end-users with similar needs that may benefit from shared resources, such as EV charging infrastructure or battery storage.

That approach could lead to new business models – shared-storage-as-a-service between two hospitals, for example – that deliver flexibility that otherwise might not stack up for individual organisations.

Those involved so far include Islington and Merton councils, South Western Railway, Premier Inn, Liberty Global, Go Ahead London and Centrica, among others.

> ***Flexibility has been shown in numerous models to deliver the lowest cost decarbonisation resource***

Join in

Energy Unlocked is helping to coordinate the project. Founder and chief executive officer Molly Webb urged other businesses in the capital to come forward.

"There's absolutely still time to get involved. We are very open to others coming in and it has relevance to any site in London that uses energy," she said.

The plan is to work through projects and determine those that are viable in July, which would align with UKPN's flex procurement programme.

By unlocking flexibility at lowest cost, the aim is to reduce bills for Londoners while helping to deliver decarbonisation and air quality goals, said Webb.

"We want to ensure London gets the value [currently locked away in unused flexibility]," said Webb.

"It is about improving the efficiency of the system. Flexibility has been shown in numerous models to deliver the lowest cost decarbonisation resource – which means directly the lowest cost to consumers." te

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Gateshead Energy Company is the first to sign up for with Flexitricity for energy supply

Flexitricity signs Gateshead as first energy supply customer

DSR company now has supply licence to deliver blended service

Demand-side response company Flexitricity has launched its supply business with Gateshead Council's energy company as its first customer

Flexitricity, known primarily as a DSR aggregator, acquired a supply licence in order to access wholesale markets and the Balancing Mechanism (BM), National Grid's main tool for balancing UK power supply and demand.

While the company does not plan to become a major business energy supplier, it intends to use the licence to help businesses make more money from flexing consumption up and down, or using on-site generation to help balance the grid across contracted ancillary services, the real-time balancing market and within-day and day ahead power markets.

Flexitricity's head of supply, Rachel Maitland, said: "Flexitricity+ is a disruptive proposition" that would enable it to "maximise the revenue customers can earn from the [flexibility] marketplace".

The firm hopes to announce more customers in the coming weeks, and is targeting community energy schemes, firms with CHP and other forms of onsite generation, cold stores, gas peakers and battery storage.

Flexitricity signed a DSR contract with Gateshead Energy Company last year to help the firm make money from its flexibility.

Gateshead's energy centre combines CHP and hot water storage with batteries and a private wire.

While it earned revenue from the Capacity Market and reserve power services, the company's energy services manager, Jim Gillon, said it also wanted to enter the balancing market, which can pay high prices to those that can quickly react when the system is out of balance.

Gillon said Flexitricity's BM solution "was the best value option" for the company, which will use the revenue generated to feed back into frontline services. te

Engie becomes largest shareholder in Kiwi Power

French-owed utilty buys major stake as founders exit firm

Engie has acquired a major stake in Kiwi Power, buying out founders Yoav Zingher and Ziko Abram.

The French-owned utility acquired a share in 2015 via its New Ventures corporate venture capital company. A New Ventures spokesperson confirmed that it has increased its stake "to just under 50%", making it Kiwi's largest single shareholder.

The two founders have exited the company as a result, having built Kiwi from the ground up since 2009.

Yuval Tamir, former chief operating officer, will become interim CEO. The board is likely appoint a permanent CEO in the coming months.

The deal may ultimately lead to Engie acquiring full ownership of the company, with the remaining shares held by private equity.

In a statement, Kiwi said the deal "marks the start of the next phase of growth for Kiwi Power, backed by its other major shareholders who have supported the company since its inception".

Engie intends to leverage Kiwi's flexibility platform across its sizeable global footprint. Kiwi currently provides DSR platform services for other energy companies.

The deal follows several recent acquisitions of aggregators by utilities. Centrica bought Restore last November for £62m. That followed Enel's acquisition of Enernoc in a deal that valued the company at £236m.

Engie's move means that there are very few aggregators left in market that are not yet owned by or tied to a large utility.

Kiwi Power made a loss after tax of £364,000 for the year to 31 December 2017 on turnover of £6.4m. It is a subsidiary of General Electricity Holdings, which made a loss after tax of £2.4m. te

WPD joins Piclo

All six DNOs have now signed up to flexibility platform

Western Power Distribution has joined the Piclo flexibility platform. All six distribution network operators (DNOs) have now signed up as trialists.

The platform brings together buyers and sellers of flexibility. Crucially it provides visibility around location of available flexibility. The next step is to become an online marketplace, running local flexibility auctions.

With all DNOs on board, it can create a common platform to access all distribution procured flex in the UK.

Company CEO James Johnston has called for other third parties to make use of the platform and upload their data to grow the market and give buyers, the DNO/DSOs "a bit of comfort that if they are going to be looking for flex, that it is actually out there and they are not wasting their time".

Western Power Distribution was one of the early movers in demonstrating how flexible assets, such as distribution connected generation, storage and load forms of demand-side response can be used to help manage network constraints.

It began a flexibility trial in the Midlands, which went live in April 2018 and recently extended a call ahead of tenders for the Midlands and South West in a bid to drum up more potential flex providers.

The company said while 121MW of flexible resource answered the expression of interest for the first trial, and 261MW responded to its summer procurement exercise, the challenge is converting interest into contracts, with strict locational requirements not always understood by potential providers.

"Allowing our flexibility needs to be displayed on Piclo Flex should drive more participation and build upon the visibility already available on our website's network flexibility map," said WPD network strategy team manager Ben Godfrey.

Given the challenges posed to traditional flexibility revenues posed by the suspension of the Capacity Market, network charging regime change, the continued removal of embedded benefits and falling prices in traditional ancillary services, DNOs are likely to become a significant route to market for demand-side response providers. te

Next steps for hundreds of millions worth of services

National Grid outlines its plans to tackle grid balancing in an age of renewables and declining thermal plant

National Grid has published further detail on new ways of balancing and managing the power system via services worth hundreds of millions of pounds a year.

Its first system operability report explains the challenges posed by declining inertia as large thermal plant closes or runs less frequently while renewable and distributed generation increases. It also provides an update on potential solutions.

Reactive power

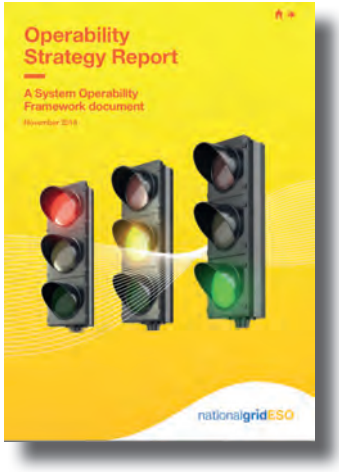
National Grid uses reactive power services to manage voltage stability on the network. As this is variable by location, it requires providers in specific areas to either absorb reactive power, which decreases voltage, or generate reactive power, which increases voltage.

The electricity system operator (ESO) called for providers of reactive power earlier in 2018 for two zonal services in South Wales and Mersey. The report states it will publish a decision on whether to run tenders for services in those zones from 2019-21 by the year end.

It is also looking at how networks could provide solutions in conjunction with commercial service providers and plans to roll out new reactive services procurement more broadly by 2021.

Black start

National Grid ESO has outlined plans to open up black start beyond large power stations. Ofgem confirmed its black start innovation trial has been approved and the ESO will use the project to inform its strategy on how to reboot the grid in the event of failure. Securing those services cost about £58m in 2017/18.



National Grid's *Operability Strategy Report* outlines the challenges facing the system operator as well as updating on potential solutions

Even when coal closes in the early to mid 2020s, black start will largely remain the preserve of gas, hydro and interconnectors, said the ESO, but it showed how new technologies could start to play a role at that point.

It said black start services could be split between two providers. One would need to be able to self-start and energise their partner, the second could provide the other black start grid requirements but would not need the ability to self-start. National Grid said it has one such arrangement now in place.

The ESO will issue an expression of interest (EoI) around black start in early 2019 and use the feedback to inform a competitive tender trial in the South West and Midlands for a service delivering in 2022.

Thermal constraints

Fewer big power stations and more distributed generation also affects ability to manage thermal constraints – ie limits to stop pieces of network kit being overloaded. National Grid spent between £200m and £350m annually in the past five years on thermal constraint management services.

As well as opening up the balancing mechanism to more providers that could help with constraints, and working with DNOs on new types of connections agreements, the ESO is working with distribution network operators more broadly on a whole system approach. It thinks network operators may be able to provide new solutions alongside the commercial market.

The operability report states National Grid ESO will issue an RFI for commercial solutions to specified constraints by early 2019. It hopes to incorporate network and non-network solutions across transmission and distribution by 2020. te

National Grid and Epex Spot to collaborate on weekly FFR auction

European power exchange Epex Spot is to work with National Grid on its weekly firm frequency response auction. It will help develop and operate the auction platform that is set to launch in June. The electricity system operator is working on a number of trials to bring procurement of some balancing services closer to real time.

It aims to bring in non-dispatchable sources of generation such as wind and solar into frequency response – and a weekly auction with service delivery starting on the same day could allow less predictable sources of power to participate.

The two-year trial, which National Grid indicated will procure a "small volume" of frequency response, will take place every Friday. Results will be published the same afternoon and the first delivery window will be 11pm that night.

All DNOs commit to considering DSR and energy efficiency over reinforcement

The Energy Networks Association has published a commitment from all distribution network operators (DNOs) to consider demand-side response or flexibility solutions over network reinforcement in all major projects.

Energy efficiency solutions are also in scope.

All DNOs are starting to pay for flexibility. The ENA said they will have collectively procured 320MW by the end of this year.

The association has also published a guide to connecting to the network on a flexible basis. It outlines the different types of connections generators can request from their DNO, and the restrictions and requirements of each option.

See details at: energynetworks.org

Electricity distribution map

Gridbeyond strikes DSR deal with ENW's commercial arm

Gridbeyond and Electricity North West's commercial arm will jointly market and implement demand-side response (DSR) services to some 900 large industrial and commercial companies.

ENW Commercial and Maintenance is the non-regulated part of the distribution network operator's business. It provides high and medium voltage services to the biggest companies in the North West, for example, maintaining on-site substations and installing and managing high voltage rings or private wires.

Distribution network operators (DNOs) are starting to procure flexibility services to manage constraints on their networks. As such, the partnership could bring more demand-side response into play both at distribution level and into national ancillary services, as well as wholesale and balancing markets.

"The more businesses we can work with to deliver enhanced energy services, the closer we are to an innovative and participative electricity system that provides value to the industrial, commercial and public sector while and improving security of electricity supply nationally," said Gridbeyond UK managing director, Wayne Muncaster.

Mark Williamson, energy solutions director at Electricity North West, said the DNO had not historically helped its large customers access flexibility markets and products, but will now.

The move comes as Ofgem confirmed plans to scrap Triad (evening winter peak charging methodology, which large companies have traditionally used to cut electricity bills by switching to onsite generation or reducing demand) early next decade.

The upshot of charging reforms is that more large companies will have to find other ways of cutting their power bills, such as by contracting with DNOs to help balance local grids, or with suppliers to arbitrage wholesale market peaks and troughs.

While posing a challenge for firms that have become accustomed the current arrangements, regulatory change will hammer home the need to take a year round approach to demand management and flexibility, suppliers and aggregators suggest.

Northern Powergrid launches demand-side response tender

Northern Powergrid has launched a call for businesses that can provide at least 100kW of flexible power to help balance its network in specific locations in return for payment.

If assets are part of an aggregated portfolio, the minimum amount of flexible power is 200kW.

The distribution network operator plans to use the flexibility across nine areas from next winter, with services starting as early as October and running through to March.

Location specific

Up to 12.5MW is required within postcodes in Sheffield, Bridlington, Newcastle, Goole, Scunthorpe, Hull, Dewsbury, York and Huddersfield.

In some postcodes, services are required to manage evening peaks, in others the requirement is throughout the day.

The DNO urged businesses that could provide flexibility services in the required postcodes to register assets via the Piclo Flex platform, which is being used by all network operators to find and procure flexibility services.

Northern Powergrid asked those interested in tendering services to first complete a questionnaire on its plans to transition to a distribution system operator (DSO). The questionnaire can be found at: *northernpowergrid.com/DSO*

To express an interest in providing services, Northern Powergrid asks that completed questionnaires are returned to *flexibility@northernpowergrid.com* by 25 February.

A giant leap for battery storage in 2019?

This year could be a breakthrough year for UK battery storage, believes Ben Irons, executive director at Habitat Energy, particularly if volatility drives big price spikes over winter. But he thinks new business and commercial models are required. Brendan Coyne reports

A former executive director at Aurora Energy Research, Ben Irons says financiers have got to grips with merchant risk and are on the brink of signing off some chunky deals.

With renewable subsidies harder to come by, he evokes an image of wildebeest at the Serengeti's Mara river.

"A lot of institutions don't want to be the first to sink £100m into storage, but they would be very happy to be the second," says Irons. "As soon as we see the first move, I think we will see a surge over 6-12 months."

If prices top £1000/MWh on the Balancing Mechanism (BM) over winter, he says, "it starts to get interesting".

> ***Running for revenue is sub-optimal and 'could degrade the battery completely in four years'***

Commercial break

Revenue uncertainty is the key challenge for most mulling storage investment. Firm frequency response (FFR) was "hot", says Irons, until prices collapsed due to far too much capacity attempting to pile into a market limited to around 500MW.

"That was unsettling, but my view has always been that merchant trading is the best opportunity for batteries. The depth of the wholesale market and the BM and the sheer volume of renewable assets being built out ... means there is a level of intermittent generation swinging tens of gigawatts every day," says Irons. "That is where batteries are of most use."

Finding suitable business models is the challenge. Habitat believes there is room for an intermediary to optimise both asset and revenue. Irons thinks the company can help deliver "unlevered returns of 10-12%" by treating portfolios "as if they were our own assets".

That is, not taking a cut of revenue but managing the degradation of the battery to minimise operating costs and extend the life of the cells.

One shot

Irons suggests that optimising and trading merchant storage is harder than other flexible assets, and hence best performed by specialist third parties

"If you have a thermal asset, it's quite simple. You have

> *If you have one hour of power, when are you going to sell it? When the price gets to £80/MWh and you can make a profit? No – you want to sell it when the price peaks. That requires more accurate short-term price forecasting and the same applies to battery charging*

marginal cost; whenever the price is higher you generate, whenever it is not, you turn it off. It's a little more complex than that with the BM and ancillary services but, in a nutshell, that's it," he explains.

"Financiers can understand that model. They might hire a consultant to advise on long term price outlook, but it's relatively straightforward."

Storage is more complex. "If you only have one hour of power, when are you going to sell it? When the price gets to £80/MWh and you can make a profit? No – you want to sell it when the price peaks, and that means a higher degree of reliance on accurate short-term price forecasting," says Irons, "and the same applies on the charging side".

The need to sell in and out of multiple markets – day ahead, within-day and the BM – at any time compounds the challenge. "You can be buying and selling independently in those three markets. You may be selling tomorrow's power today, not actually having bought it yet. That compounds the forecasting complexity."

"In addition, the fact you could be marking multiple trades per day for a single storage asset, and potentially refreshing your forecasts and re-optimising your position every few minutes means an algorithmic/machine learning approach is essential".

Running more cautiously means 'you may give away 10% of revenue, but you extend the battery life by 50% or more'

Degradation

Understanding the battery's physical properties is also crucial to preserve asset life, says Irons. "If you don't know how a battery performs and degrades there is a gap no matter the trading expertise – every trade has to cover its marginal degradation cost." That cost is not constant but varies with temperature, state of charge, age and numerous other factors. Without a full grasp of these elements "it is hard to work out which trades create or destroy value", says Irons.

Commercial misalignment

The physical characteristics of batteries also mean traditional commercial models may no longer suitable, Irons suggests.

"If you are using a third party aggregator, there is an incentive alignment challenge. Most aggregators will take a percentage of revenue and are therefore incentivised to over-cycle the battery and shorten its life." Running for revenue he says, is sub-optimal and "could degrade the battery completely in four years". Running more cautiously and for bigger spreads means "you may give away 10 per cent of revenue, but you extend the battery life by 50 per cent or more".

New model

The question is how to reward a third party for more prudent asset management that preserves the battery while generating best whole-life buck.

"It is more complex," admits Irons, but that is how Habitat sees its business model working.

"It is not just short term transactional, more about long-term incentive alignment. But then, what is the baseline and what is the improvement?"

Agreements must therefore be bespoke, says Irons. It is one of the reasons Habitat is positioning to manage larger portfolios of front of the meter batteries.

The company "prefers not to be called an aggregator" and does not plan to build a virtual power plant. Instead it is developing "a service more like an in-house trading and optimisation scheme for portfolios of 50MW plus". Or as Irons puts it, "the dream team they would want to hire for themselves".

A bold claim, but Irons touts Habitat's credentials: the 11-strong team includes founder Andrew Luers, a distributed energy and SaaS expert; co-founder Phil Robinson, most recently responsible for revenue optimisation of Calon Energy's 2GW of gas plant; David Howey, an associate professor in engineering science at the University of Oxford specialising in energy storage; plus energy traders and data scientists.

Treat it as one of your own

Habitat plans to announce its first client early in 2019 and Irons is confident its model will gain traction.

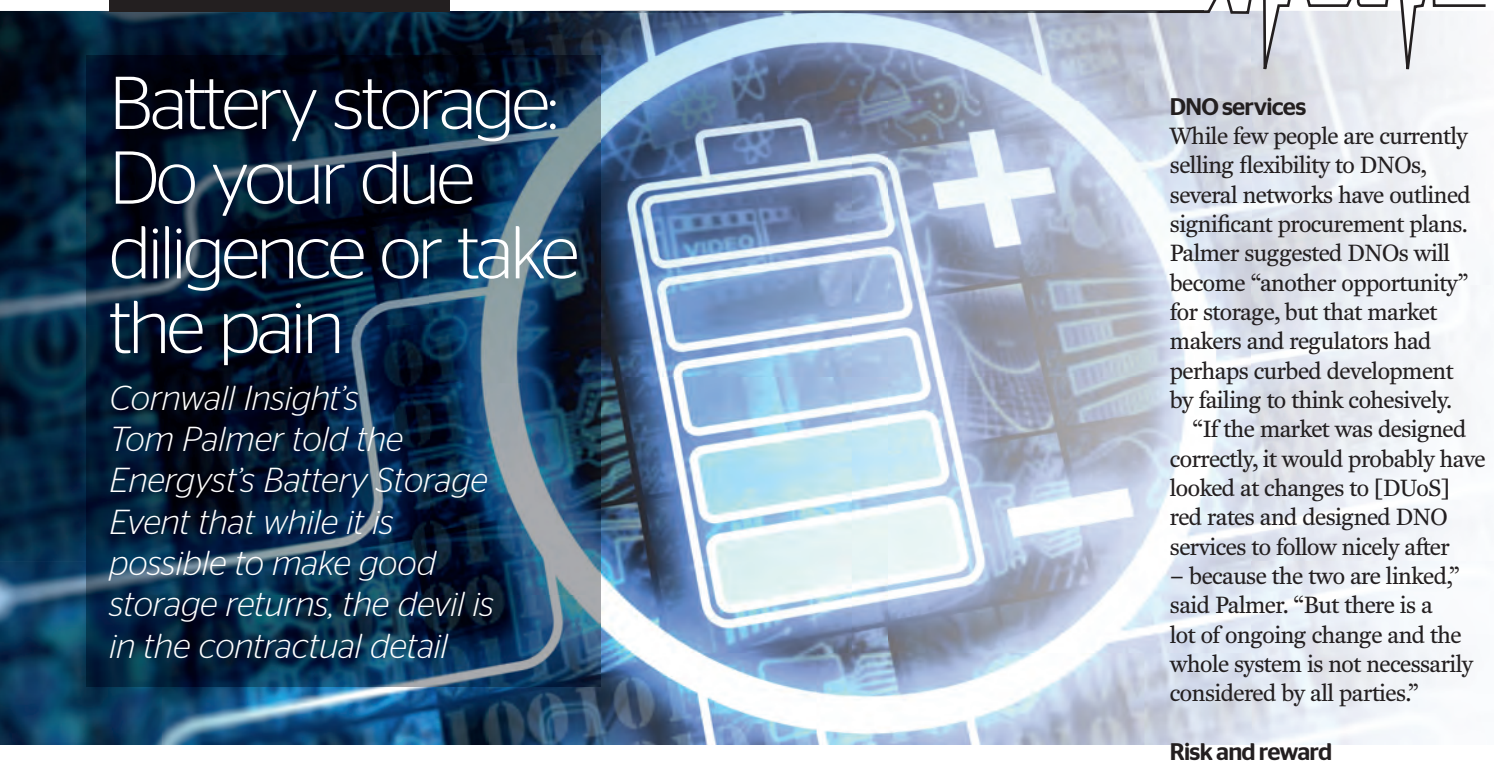
"Our view is that it's really complicated to do trading and optimisation. There is no sense in relatively small portfolios building that capability themselves."

He suggests it may cost £1m-£2m to build a desk and establish a route to market.

"That is a big drain on return and not something most developers want to spend their time doing. So our view is that a third party relationship makes the most sense. The key principle is to act as if we, the third party and the battery owner, are the same company and optimise on that basis." te

Battery storage: Do your due diligence or take the pain

Cornwall Insight's Tom Palmer told the Energyst's Battery Storage Event that while it is possible to make good storage returns, the devil is in the contractual detail



Behind the meter battery storage can cut costs and provide income if done correctly. Done badly, however, and businesses risk being stuck with an expensive box of chemicals that costs them money.

There is a lot of heat in the market – and buyers would be foolhardy to take marketing claims by aggregators and suppliers at face value, believes Tom Palmer, principal consultant at Cornwall Insight.

"When people offer £100K per flexible megawatt, you must do your due diligence," he told *The Energyst's* Battery Storage conference.

"You have to understand the risks and caveats attached to that sales headline. I look at firm frequency response (FFR) projects, some are losing money."

Declining FFR prices are well publicised. More batteries bidding for contracts exerts downward pressure as asset owners and operators take what they can get.

Irrational behaviour

But some behaviour is less than rational, Palmer suggested, pointing to the static FFR market by way of example.

"Everyone sees the lowest price – £1.50/MW/hr – and thinks 'we better bid that to secure a contract'." However, Palmer suggested a distribution network operator with a large battery left over from an innovation trial was behind such low bids.

"Actually, [the DNO] only has about 30MW" and the static requirement is often much larger "so you don't need to match that [bid]," said Palmer.

Costs

Dynamic FFR prices, while down significantly, can still hit double figures. But even when good prices are secured, costs may wipe out gains, Palmer warned.

"Someone we work with earned £20K of FFR revenue in a month, but they actually only made £2K. When all the costs are included, consumption levies, network costs etc, it can be difficult [to turn a profit]."

While some levies will "disappear" over the next few years, those considering storage must get to grips with all cost aspects to develop an informed business case, said Palmer.

Tom Palmer: Every revenue stream is a tradeoff. You need to understand those tradeoffs and ensure you consider costs as well as revenues

Contractual arrangements

Given that almost every aspect of the market is under review, "you must be prepared to move [with the market] and be a bit more flexible", said Palmer.

That requires appropriate contract structures with suppliers and aggregators – who may have competing agendas and who may not be the counterparty for the life of the battery.

As well as transparency on revenue shares for different services, contracts need sufficient leeway to allow batteries to perform new services as they materialise, said Palmer.

If the battery storage contract locks assets into specific services, such as the Balancing Mechanism or wholesale market arbitrage, for example, "I would be very worried", he said. "You should ensure [the ability to provide] distribution network operator (DNO) services are also in that contract."

DNO services

While few people are currently selling flexibility to DNOs, several networks have outlined significant procurement plans. Palmer suggested DNOs will become "another opportunity" for storage, but that market makers and regulators had perhaps curbed development by failing to think cohesively.

"If the market was designed correctly, it would probably have looked at changes to [DUoS] red rates and designed DNO services to follow nicely after – because the two are linked," said Palmer. "But there is a lot of ongoing change and the whole system is not necessarily considered by all parties."

Risk and reward

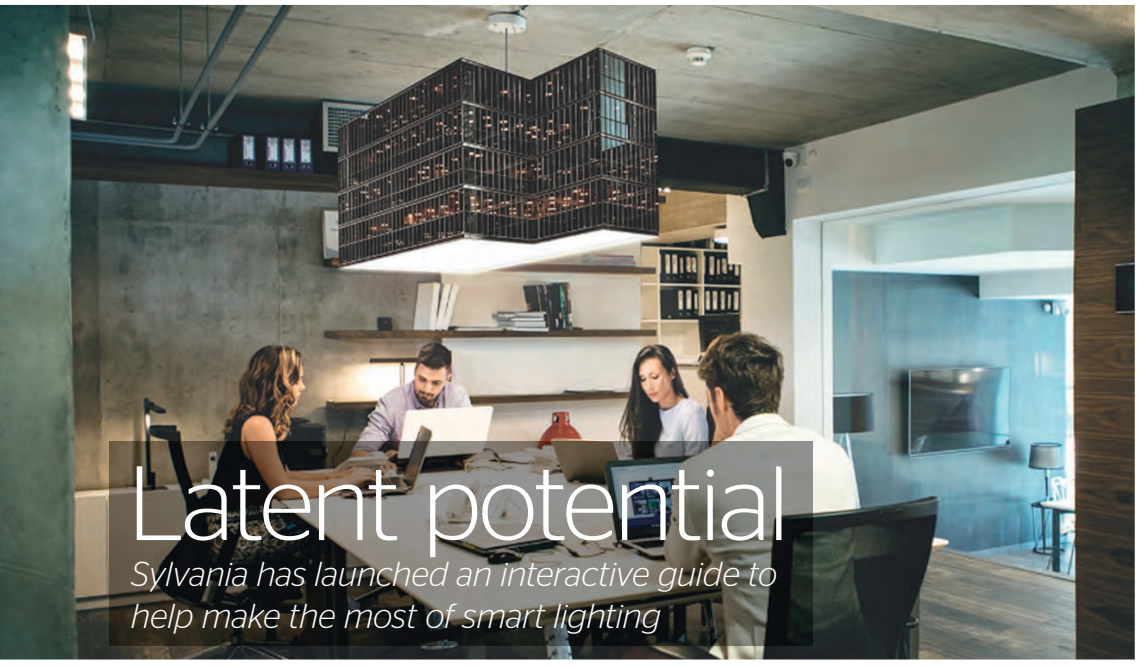
That compounds the challenge faced by those building storage business cases – revenue and regulatory uncertainty were the key challenges cited by *The Energyst's* survey of 50 public and private sector organisations considering storage.

Yet despite market-wide flux, Palmer said battery storage remains a viable proposition for those that fully understand the risks.

"There are opportunities for storage, but you have to be aware of all the variables and market fundamentals. Every revenue stream is a tradeoff. You need to understand those tradeoffs and ensure you consider costs as well as revenues.

"Due diligence needs to be proportional to the project, but there are different risks and you need to fully understand your risk strategy." te

Tom Palmer was one of a number of contributors to The Energyst's 2018 Battery Storage report and conference. Sponsored by National Grid ESO, Eon, Flexitricity, Gridbeyond and Npower. The report, which examines the current storage market and opportunities, is available at theenergyst.com/storage



Latent potential

Sylvania has launched an interactive guide to help make the most of smart lighting

Sylvania's new interactive guide – *Introducing Your New Operational Manager* – suggests lighting has an untapped potential to improve employee wellbeing, productivity and ultimately profitability.

Sylvania's specification luminaires business unit director Richard Turner, explains: "It is well documented that the EU's building stock is ageing and inefficient, with about 35% of buildings now over 50 years old and only 25% of them considered to be energy efficient. Couple that with the increasingly stringent regulatory climate and rising cost of illness – estimated to cost European businesses £77bn a year – and it's clear to see there is great potential for a healthier and more productive environment.

"Making the switch from halogen to LED lighting alone, can have a significant positive effect. However, those who choose to make the switch to smart lighting will reap the greatest benefits. For example, using occupancy sensors to dim or switch off lighting when a room is unoccupied can reduce electricity use by 30%. But it's not just occupancy usage, intelligent lighting solutions are also giving business owners and employees the power to actively manage and adapt their lighting depending on occupancy usage, machine functionality, room temperature and natural daylight levels. In that way, the office becomes the chief operating officer, providing valuable insights and data that can be used to adapt and control all areas of operations and improve productivity and profitability." te

Using occupancy sensors to dim or switch off lighting when a room is unoccupied can reduce electricity use by 30%

The guide is available at: https://bit.ly/2DqXIqQ

Human centric and efficient

Derbyshire firm Scenariio has installed human-centric smartlighting at fitness apparel and accessories brand Gymshark's HQ in Solihull. Human centric means it simulates the daylight curve of the sun and monitors usage across the building to optimise energy and cost efficiency.

Gymshark needed a system suitable for shift working and for viewing products in different light, so required tuneable white light and colour temperatures adjusted for users, based on job roles.

Data from the system's sensors is also helping Gymshark decide whether the building is being used to best effect to help plan future growth and staff moves. The project connects more than 500 light fixtures with 450 smartsensors, deployed entirely over structured cabling.

Scenariio used WTEC's smartengine technology, its sensors measure temperature, brightness, power usage and presence of staff, making the data available in real time. It also provides information for other building systems including security through motion detection, air conditioning and occupancy.

Scenariio is part of the University of Derby and European Regional Development Fund-backed Low Carbon Business Network.

Raising the bar at Tower Bridge

Hoval heats historic London landmark in challenging boiler upgrade project

The success of a boiler upgrade project at Tower Bridge relied heavily on close collaboration within the project team and manufacturer Hoval's end-to-end service delivery.

As well as being one of London's most familiar historic landmarks, Tower Bridge is a popular venue for corporate and other events, with a number of unique spaces for hire. The ageing boilers, however, were struggling to meet space heating and domestic hot water requirements, so a decision was taken to upgrade them.

The work coincided with the conversion of a 9m-high exhibition space, with the addition of a mezzanine to create two new spaces.

The design was carried out by consulting engineer Brinson Staniland Partnership and the new boilers, along with associated upgrade works, were installed by contractor T Brown Group.

Hoval engineers worked closely with both parties in meeting a number of key challenges, ranging from providing design support to constructing the boilers in-situ because of access issues.

One of the early challenges faced by the design team was that, while regulations require condensing boilers for such an upgrade, the Grade I listing of the structure meant that Tower Bridge did not want plumes emitting from the flues on the side of the bridge base columns, 10m above the water level.

Following lengthy discussions with the City of London authorities, special dispensation was given to use a bespoke, non-condensing boiler installation.

As a result, Hoval SR-plus 225 high efficiency, low NOx boilers were specified for the project. However, again because of regulations such as the ErP Directive, the fully modulating Riello burners selected for the project had to be supplied separately from the boilers. Two Hoval SR-plus 225kW boilers were installed in each of the two boiler houses, which again presented challenges.

Access issues meant the boilers had to be constructed in-situ

"Not least of these challenges was access to the boiler houses through narrow walkways and corridors, steep stairwells, ship's ladders and tight turnings," recalled John Pearson of T Brown.

"To overcome this, Hoval supplied the boilers in 'complete knock-down' form, which were then assembled on site, fully welded and hydraulically tested by Hoval's engineers, and then casings, burners and controls were fitted."

The original boilers were mounted on a platform suspended at 15m above the floor and this was extended by T Brown to accommodate the new boilers.

It was also important to avoid disruption to the venue, as well as to traffic in the area, with most deliveries being made during the night. Managing this situation required interaction with the Tower of London project team, the City of London, the Port of London Authority, Transport for London and two local authorities.

"Despite all the challenges, the project went very smoothly and the clients are delighted with the end result," Pearson concluded. te

Download your copy now at
theenergyst.com/dsr

£50bn to plug leaks

Ofwat's 2019 price review will see suppliers propose a multibillion-pound investment to fix the networks. Eddie Spencer, head of water services at Schneider Electric, outlines the impact this will have on water utility costs and the opportunities available to businesses to think smarter about their water utility

With as much as 25% of water output being lost to leakage before it even reaches the end user, together with increasing stress placed on ageing infrastructure due to the effects of social and climate change, the water companies are committed to investing huge sums of money to upgrade their assets.

Despite being encouraged by the regulator to deliver services more efficiently and with less impact on the environment, the cost of replacing the industry's main and sewer networks is huge, and although investments are repaid over the life cycle of the assets, the price of such highly capital and resource intensive programmes is ultimately financed by the customer.

With prominent NGOs calling for companies to demonstrate corporate water stewardship and promote responsible use of water resources, companies are now facing growing financial and social pressures to introduce sustainable water operations across their business.

Procurement with purpose can reap savings

Hailed as the catalyst for businesses to place a greater level of focus on their water utility, 2017 deregulation affords companies the opportunity to shop around beyond their local supplier for cheaper pricing and more tailored services.

However, constrained within the limits of what are relatively modest gross retail margins and savings of 3-5%, central market data shows that less than 7% of businesses had switched supplier by 1 November 2018.

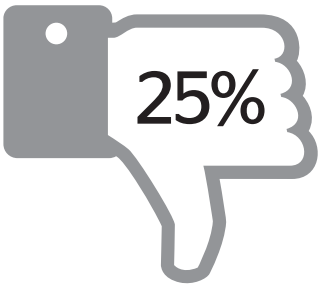
Nevertheless, despite a slow start and a lack of awareness in some sectors there are benefits to be had around supplier consolidation, enhanced billing services and account management, and if nothing else, businesses should at the very least take time to understand the options available to them.

Generous pricing discounts may not be available just yet; however, deregulation should prove to be the stimulus for placing water firmly on the boardroom agenda.

Reduce your water footprint

While not holding the carbon intensity of electricity and with costs often considered comparatively cheap, as long-term water supplies become threatened by social and climate change, water should not be overlooked as an opportunity to achieve environmental efficiencies and cost savings.

Many businesses suffer from leakage (a risk heightened by the cold winter weather), and with industry regulations stipulating that the condition of the network after the meter is the responsibility of the customer, businesses are well advised to understand their supply arrangements and take a proactive approach to water management. Water fixtures and fittings require ongoing maintenance as well as the buy-in of an educated workforce – as left unresolved wastage caused by faults or negligent behaviour can very quickly have a detrimental impact on both the environment and costs.



Water output that may be leaking away before reaching the end user

Best practice guidance

- Check your bills to establish your main cost drivers and the financial context of wastage
- Validate your consumption against industry or organisational benchmarks and identify the poorest performing sites
- Monitor consumption using a robust metering service:
  - *Negotiate enhanced meter reading services with the supplier*
  - *Take meter readings to supplement supplier reads*
  - *Sub meter the major water using areas to create a site water balance*
  - *Determine water usage profile by installing AMR at key premises*
- Have a strategy in place to quickly respond to and address wastage
- Engage with employees to instil a zero waste attitude through encouragement, ownership and accountability
- Copy paste best practice across your estate to create a culture of continuous improvement
- Procure with purpose to enjoy cheaper pricing, consolidate suppliers, gain access to improved billing and reporting systems or simply keep abreast of the market changes and technologies

In-depth survey work can be both resource intensive and costly; however, the advancement of technology is allowing organisations to monitor their usage remotely with automatic meter reading (AMR). Much like the energy industry, this allows companies to understand their demand profile and identify exceptions in real time.

One such company for whom we installed AMR across their estate was alerted to leakage calculated at 150 litres per minute, costing almost £1,200 per day. This information allowed the rail company in question to focus site activities and quickly locate and repair the leak at source, in the process preventing costs from spiralling out of control. However, it was only through a proactive approach to monitoring that allowed it to avoid what could have been a financial disaster; reliant upon irregular supplier meter readings to track consumption, the losses would have continued.

The financial and environmental opportunities for businesses to benefit from committing to a water management strategy are great, and with prices ready to rise, regulations likely to become progressively complex and consumer expectations for sustainable practices set to increase, now is the time to take action. te

TPI enters water marketing touting savings for firms that switch

Open Energy Market launches platform to help firms switch water suppliers – and claims businesses can save up to 24% just by switching

Supplier switching levels have been depressed since deregulation of the water industry in 2017 because savings are perceived to be scant. Approximately 90% of businesses have not switched supplier, according to figures from regulator Ofwat.

However, Graham Mann, head of water services at Open Water Market, the new sister platform to Open Energy Market, claims "savings of between 6 and 24% are achievable" simply by switching – that is, before the application of a water management strategy.

Mann said water audits could deliver savings "on average of 20 to 30%" and said companies should be aware that they can claim significant refunds due to historical overcharging by suppliers.

He said a lack of market awareness and perceived complexity is also behind low switching rates – which is why the company thinks there is a market for a streamlined, more transparent procurement platform.

The company claims it automates a lot of the data legwork, strips out the smoke and mirrors and that its platform is "wholly transferable" to the water sector.

Earlier in 2018, the company secured £3m funding from Calculus Capital to scale its operation and is also expanding into the US.

> ***Firms don't even need a strategy to save 6-24% on water bill***
> **Graham Mann, Open Water Market**

Building controls vital to compliance

The Building Controls Industry Association (BCIA) is encouraging industry to consider the importance of implementing effective building controls from the outset of building projects in order to meet current legislation.

The 10 80 10 rule represents the total lifetime costs of a building, whereby only 10% of costs are invested at the design stage while a staggering 80% is spent on the running and maintaining of a building.

The BCIA is calling for a change in approach from those in the supply chain at the initial stages of building projects. By investing in an efficient controls system at the start of construction, this will dramatically lower operational costs in commercial buildings over the long term while also helping to meet a wide range of legislation.

An example of this is the Minimum Energy Efficiency Standard (MEES), which came into force in 2018. It is now unlawful for a landlord to let or renew a lease on a property if the Energy Performance Certificate (EPC) rating is F or G.

By installing additional zone control for instance, or demand control of lighting and heating using occupancy sensors, your EPC rating can receive a welcome boost and substantially lower unnecessary energy usage.

Sensors to help buildings talk

Pressac Communications has released a new range of mini, wireless, low energy sensors for monitoring temperature, humidity, dry contact and door or window opening and closings.

The small, unobtrusive sensors can measure temperature and humidity, as well as dry contact output, door and window status to get an instant view of the conditions in each room or zone within a building, transmitting data wirelessly using the EnOcean Protocol. The data captured can feed into an existing building management system or using Pressac's smart gateways, sensor data can be made securely available in formats such as MQTT and JSON.

Jamie Burbidge, product manager – Digital Solutions at Pressac, said: "The non-invasive, easy to install mini-series sensor range has been designed to complement Pressac's existing offering both aesthetically and functionally. The new discreet and compact sensors are all available with optional security in every EnOcean supported territory. Our streamlined, lean production processes enable us to offer per unit cost savings. These sensors form part of a suite that we will continue to develop to match our customers' requirements. We are continually extending our turnkey capabilities into other smart building solutions to make building and energy management more economical and functional."

All sensors offer a fast, peel-and-stick installation option with optimal positioning and no wiring constraints, so are ideal for retrofitting into existing buildings with minimal disruption.

Solar PV installation project

Campbell & Kennedy has recently completed the first phase of solar PV installations for Brooke Weston Trust and Ormiston Academies Trust as part of a larger energy saving project.

The solar project is part of an overall energy pilot scheme, the MAT Loans Pilot Scheme, which has seen both trusts collaborate to secure a loan to fund the installation of energy saving technologies across their sites. This is the first time two academy trusts have worked together on a joint energy saving project and it is something that could be rolled out to other academy trusts across the country. The loan from the Education and Skills Funding Agency will help the trusts to reduce their buildings' CO_2 emissions and bring about long-term cost savings.

The works were awarded to Campbell & Kennedy following a competitive tender via the YPO Low Carbon Electrical Micro-generation framework. To date more than 500kWp and 1,800 panels have been installed across eight schools, reducing carbon emissions by over seven thousand tonnes during the lifetime of the systems.

The trusts, which between them manage more than 40 academies, have already installed LED lighting across several schools, estimated to generate savings in excess of £1m over the course of their lifespan.

Cemex goes 100% renewable

Building materials supplier Cemex will now be provided with 100% renewable electricity to all supplied sites. Engie has been providing electricity to about 150 Cemex UK sites for more than 10 years, also supplying gas to 33 of these sites. The current contract is to be extended for a further 12 months.

All of the electricity supplied to the sites will be from 100% renewable energy sources including wind energy. As these sources produce zero carbon emissions, this makes a significant contribution to reducing Cemex UK's carbon footprint. Engie's renewable electricity supply is underpinned by Renewable Energy Guarantees of Origin (REGOs).

Martin Hills, head of energy and carbon at Cemex in the UK, commented: "Cement manufacture is inherently energy intensive and we work hard to minimise energy consumption within the process constraints. The switch to electricity from renewable sources is playing a key role in our carbon reduction strategy."

Cemex is also taking advantage of Engie's demand side services, such as load management to avoid peak tariffs and rapid frequency response, which generates extra revenue for Cemex UK. Engie also manages all contractual requirements with National Grid on Cemex UK's behalf.

Cemex's Rugby plant is among sites to be supplied with 100% renewable electricity

Investment firm targets efficiency

SDCL Energy Efficiency Income Trust (SEEIT) claims to be the first investment company listed on the main market of the London Stock Exchange to focus exclusively on energy efficiency infrastructure. It successfully raised £100m following the placing and offer for subscription of ordinary shares in the the company.

Assets in its seed portfolio include combined cooling/heating and power plants at a Citi data centre and St Bartholomew's Hospital in London, as well as LED lighting projects for hundreds of Santander properties and more than 100 NCP car parks in the UK

Jonathan Maxwell, CEO and Ffounder of Sustainable Development Capital, commented: "We are delighted to be listing SEEIT as the first investment company on the main market of the London Stock Exchange to focus exclusively on energy efficiency infrastructure. It is a testament to the proposition that we have been able to attract high quality investor support in challenging markets. We look forward to delivering a stable and growing income stream from our seed portfolio and from attractive acquisition opportunities."

Distributed generation mapping tool

To overcome the challenge of needing to replace its legacy Distributed Generation (DG) Mapping Tool, UK Power Networks has successfully built a replacement using the cloud-based Cartosys location-based services toolkit from Scisys UK.

"Cartosys' flexibility and open architecture enabled us to quickly and easily build a replacement DG Mapping Tool, allowing our customers to determine from our green, amber and red colour-coded areas and substations, where it would be most easy and cost effective for them to connect to our electricity network," said Steve Halsey, distributed energy resources development manager for UK Power Networks.

Cartosys gives UK Power Networks the ability to display complex data around the exact location of its assets, including its substations and overhead power lines, in a simple geographical presentation that is easily accessible via a web-browser and easily understood by non-technical and non-specialist users.

"We are preparing for the future by transforming our network to be smarter and flexible enabling our customers to make the most of new technologies like electric vehicles, storage and smart meters. Our DG Mapping Tool, powered by Cartosys, will undoubtedly be a key component in helping us achieve this," said Halsey.

UK Power Networks had just 10 weeks to replace its previous DG Mapping Tool as it was no longer going to be supported by the supplier.

Janet Wood

The editor of specialist energy magazine New Power, which has been acquired by Energyst Media, on annoying people, the mystery of the Princes in the Tower, and making good use of empty wine bottles (after she's drunk them, of course)

Who would you least like to share a lift with?
Johnny Fartpants.

You're god for the day, what's the first thing you do?
Make myself god for every day.

If you could travel back to any historical period when would it be and why?
Since reading *Wonderful Life* I've had a wish to see the bizarre and monstrous animals that died out at the end of the Cambrian. I don't want to stay for long, though.

Who or what are you enjoying listening to?
At the moment I am catching up with friends' and relatives' bands. That's a mix of West country anarcho punk, Kentish jazz, East Midlands folk and an orchestra in Southwark. Lots to digest!

What unsolved mystery would you like the answers to? Who killed the princes in the tower?

What would you take to a desert island and why?
Plenty of bottles of wine. I'm sure I will need it, I may be able to make tools from the empties and I can set up a bar to attract other islanders with all the skills I lack.

What's your favourite film and why?
His Girl Friday: wisecracks, newspapermen and uncovering corruption in city hall – what's not to like?

If you could perpetuate a myth about yourself, what would it be?
None – I'd rather be known for finding out the truth.

> *People walking along while they stare at their phones... it's risky as well as annoying*

What would your superpower be and why?
To be able to fly. Three degrees of freedom

What would you do with a million pounds?
Clean water and toilet provision are top of my charities list, and I'll have to travel as well.

What's your greatest extravagance?
A mortgage in London.

If you were blessed with any talent, what would your dream job be and why?
Is there a better job? The energy industry has never been so interesting.

Unsolved mystery: The Princes in the Tower

What is the best piece of advice you've ever been given?
From my mother: clear up as you go.

What irritates you the most in life?
People walking along while they stare at their phones... it's risky as well as annoying.

What's the best thing – work wise – that you did recently?
Joining forces with *The Energyst*, obviously! It's such an exciting time in the industry and we'll have such powerful insight together. I am really looking forward to it. te

> *The energy industry has never been so interesting*

the energyst event

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