

New Power

REPORT

JUNE 2019

CONTRACTS FOR DIFFERENCE

Offshore wind steps up as thermal projects falter



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What can it do for energy?

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Industry should learn lessons

'It is astonishing storage is not on the government's dashboard in the same way as offshore wind'

Mark Wilson, ILI Energy

15 MINUTES

Will GB lose its TERRE derogation?



'Over 200GW of renewable capacity is likely to be required, made up of predominantly wind and solar'

Kyle Martin, LCP

Labour public ownership plan could create hundreds of local energy groups

The Labour Party has put forward a programme for a bigger public role in energy supply that includes both national and regional authorities to set policy and could result in hundreds of local energy agencies.

It promises, in 'Bringing Energy Home', that the change is not a return to "the distant bureaucracies of the 1970s". The policy will start with a National Energy Agency, set up on the institutional base of National Grid, which will have duties over both decarbonisation and social objectives. It will own and operate the transmission system and will take over some of Ofgem's functions. It will also be able to borrow to fund system extensions, including owning and operating storage.

Regional energy agencies, based on distribution network operators' areas, will have similar responsibilities within their areas and will also be able to take action over energy efficiency, regional industrial strategy and new infrastructure such as vehicle charging networks. They will be owned by, and accountable to, local authorities.

The proposals free individual local authorities down to parish council size to become 'municipal energy agencies', licensed by the National Energy Agency, which will have similar functions to the REAs, including local ownership of networks. MEAs will be not-for-profit and will have to demonstrate that they have access to the necessary capital and skills. Finally 'local energy communities' on a secondary substation scale (100-200 homes) will be able to set up voluntary co-operatives to own and operate vertically integrated microgrids. These LECs are specifically place-based – at present the proposals do not, for example, cover members of a club or special interest group who want to form a 'virtual'

community.

Labour expects that the RECs, MEAs and LECs will be able to deliver faster decarbonisation.

The proposals provide a welcome opportunity for energy development to be devolved locally – although they rely heavily on support from the NEA and RECs. Those agencies are expected to provide the skills, training and expertise required by all the new MEAs and LECs, and ongoing staff support where those local organisations are run by volunteers.

Support in financial administration is also likely to be required. Pricing in all the new agencies will be "fully transparent and reflect only the cost of delivering energy – not dividends, executive salaries, or excessive interest payments" and all are expected to be self-funding and manage debt and payments as well as whatever social obligations they are required or decide to take on. Labour is keen to ensure that that ability to form LECs is not restricted to privileged areas, but it is not clear how this will be delivered. All local agencies will continue to be connected to the grid and would "contribute to system costs, as determined by the National Energy Agency". Salaries would have a 'fair wages' clause and executive pay would be capped at a x20 multiple of staff pay.

The transfer of ownership would take place immediately a Labour government takes power, on the basis of a Treasury bond to compensate existing owners. "The process of transforming publicly owned network companies into the nested, participatory, transparent institutions set out above will take longer, and will be achieved over the course of Labour's first term." [NF](#)

Weblinks

[@ Read 'Bringing Energy Home'](#)

SPECIALISTS IN SCARCE SUPPLY

Recent changes in regulation and technical and commercial challenges in the energy market are making it hard for energy scheme developers to cost-effectively recruit, train and maintain the expertise they need to complete projects, says Hugh Taylor, chief executive of consultancy Roadnight Taylor. He said: "Eight developers – both established businesses and new entrants – have approached us in as many weeks. They have all been looking for out-sourced expertise which developers have traditionally resourced in-house."

High profile financial casualties among the energy developer community – including Lark Energy, Camborne Energy Storage and Green Hedge – have highlighted the risks associated with high overheads, including staff costs.

Taylor cited two regulation changes as being key drivers for developers now seeking to outsource specific areas of projects.

The Energy Networks Association (ENA) G99 Engineering Recommendation (EREC) standards came into force on 27 April. More onerous requirements and more specific technical information are now needed before a connection application is deemed valid.

Secondly, before Connection Offer Expenses (the grid application charges colloquially known as A&D fees) were introduced in April 2018, most developers were applying a scattergun approach – putting in multiple, speculative applications to the distribution network operator (DNO) without incurring any fees. Taylor said: "We know one DNO received 250 connection applications from a single developer for a single site in a two-week period before A&D fees were introduced. It now costs up to £10,000 per grid application."

New applications have to be based on thorough network studies and diligent liaison with DNO staff, he said.

Ofgem calls for urgent updates on imbalance costs as UK faces loss of derogation over 15-minute settlement

Electricity market participants in GB may have to change their systems to accommodate an imbalance settlement period of 15 minutes, instead of the 30 minutes currently used. The change is required to fit in with the EU Internal Energy Market's 'TERRE' cross-border balancing arrangements.

The change may benefit some market participants, but comes with high set-up costs, and in 2016 the UK won a derogation from the requirement, arguing that the overall cost to consumers outweighed the benefits. However, the delay to Brexit means that now we will leave the EU with the Clean Energy Package in place, so the UK derogation will not automatically apply. The case has to be made again.

The 2016 decision was backed up with an analysis by Frontier Economics and Ofgem believes that evidence base remains valid. But it has asked for immediate feedback from electricity market participants if their cost estimate has changed.

The UK's Joint European Stakeholder Group, which tracks and responds to changes in EU market arrangements, said that Ofgem is confident that the costs presented in the 2016 CBA were a reliable estimate of the costs at that time. However, to ensure their reliability three years on, Ofgem wants stakeholders to consider whether there has been a significant change to the cost estimates that they submitted to Frontier Economics.

If stakeholders think that there has been a significant increase or decrease in their costs relating to a change from 30 to 15-minute settlement, Ofgem would like to know what costs they estimated for the 2016 CBA and how much more or less their estimated costs are now.

Participants should contact Alastair Owen (Alastair.Owen@ofgem.gov.uk) by 7 June 2019 if their estimated costs have changed significantly.

For parties that do not submit a re-evaluation of their estimated costs, Ofgem will assume that costs are unchanged since 2016. [NF](#)

Weblinks

[© 2016 cost benefit analysis by Frontier Economics](#)

Introducing the EU's DSO entity

The UK is likely to have 'associate' status after Brexit in a new EU 'DSO entity' bringing together the bloc's 2,400 distribution system operators.

The new entity will be set up over the next two years and its first tasks will be to develop network codes, improve cyber security and develop network planning.

Talking about the new organisation at the Eurelectric annual summit in May, Paul de Wit, senior advisor on regulatory affairs at Alliander, told *New Power* the new association would be good for consumers because it would develop common standards and technical rules. That was necessary for developments like one-day switching, or new opportunities like using the same EV charge supplier across Europe, or paying your home supplier for power used elsewhere.

De Wit said the Third Energy Package called for transmission network owner entities to be defined and write codes for cross-border trades. "But it became clear that you cannot write code for just one part of the system, it has to cover all of it," de Wit said.

That arrangement also left DSOs as a simple stakeholder in the alongside owners, users etc. But for DSOs "that was not a comfortable point of view, because we have the same responsibility [as TSOs] to keep the lights on and for system security and so on".

The companies' lobbying was made more difficult by the need to accommodate diversity, where some EU countries have a handful of DSOs and some have hundreds. "It's created enough awareness for the EC to give DSOs a stronger voice in the Clean Energy Package," de Wit said.

Various DSOs are served by four lobby groups already and the new entity will be purely technical. "It's >

DSOs have the same responsibility as TSOs to keep the lights on

a no small feat to come up with a single voice for an organisation with 2400 members of different sizes,” said de Wit.

The Clean Energy Package requires three network codes, for flexibility, cyber security and data interoperability. The codes follow on from work done in the Commission’s smart grid task force. Cyber security “is a complex and a specific task for the entity. It’s still a difficult topic to address”. Alongside is new code and guidelines that will facilitate the entry of new renewable sources and help grow demand-side flexibility and user access to markets. “Digitalisation is also a very important task for the entity and it is very useful to have a European body that can bring expertise from all over Europe and find best practices and learn from each other,” said de Wit.

Starting from scratch on the new entity is “makes it easy and complicated at the same time” and it is not clear that all organisations will join the entity, which is not mandatory.

The organisation will be governed by a board of 27, split evenly between small (less than 100,000 customers) large (more than a million customers) and medium DSOs. Every DSO from the European Union can become a formal member. It is likely that the UK will be in an “associate member” category “because of the fundamental rule that you cannot decide on rules that you

don’t apply. But of course, you need to be aware of the rules to see where the electricity business is going.”

The other issue apparently not entirely clear is which organisations qualify as DSOs. A case currently at the European Court asks, with regard to a Bulgarian network, whether “the voltage is the sole criterion by which the distribution system is distinguished from the transmission system”. [NF](#)

“The fundamental rule is that you cannot decide on rules that you don’t apply

Low carbon ‘could be Europe’s rallying call’

Can the decarbonisation agenda and electrification be a unifying force in Europe?

That was the question posed at Eurelectric’s annual summit in May. Despite major change in the past few years, the power industry still faces complete transformation and new competition from other sectors now being electrified (such as the mobility providers). But some speakers saw the combination of the digitalisation of energy (compared by one speaker to the step from typewriters to computers) and the need for decarbonisation as both an “explosion of value” for those supplying new user needs (€50-70 billion annually) and a new combined purpose for the EU.

Bjarke Møller of Think Tank Europe gave the political perspective: people in the EU are still recovering from at least three major, destabilising crises, he said – from terrorism (and the Twin Towers attack in 2011), from the financial crash (in 2008) and from the migration crisis that is still seeing refugees land in southern Europe. “They are all still with us,” Møller said. The uncertainty made people nostalgic for the past and helped prompt the rise of the far right.

But the EU has been “the front runner in all the climate negotiations”, Møller said. It was important for that agenda that the EU still had momentum in upcoming climate discussions. The bloc should frame the change not as a loss of choice but as an exciting opportunity for consumers. “It’s not enough to have 100 families in Berlin having a low-carbon lifestyle,” Møller said. And although standards and regulation were not immediately exciting parts of the transformation, in fact they are the key to consumer pull and, for example, to being able to travel in and charge up an electric vehicle across the continent.

Eurelectric chief executive Kristian Ruby pointed out that national renewable energy plans across Europe were of varying quality and, cumulatively, did not add up to achieve the EU-wide target. And there were concerns expressed at the meeting that the rate of installation of renewables should not slow. Ruby himself said that in his home country of Denmark, always the leader on wind power, a majority of residents were saying they did not want to see more wind turbines.

“It needs a grand coalition” of governments, suppliers, engineering companies, major cities and others, said Møller. And he pointed out the benefits in the form of 1.6 million renewable energy and energy efficiency jobs already created across the EU. [>](#)

“It’s not enough to have 100 families in Berlin having a low-carbon lifestyle

THE PACE OF CHANGE MUST RISE

As for the pace of change, most speakers were assuming decarbonised electricity production by mid-century.

What is holding up deployment? There is not really a shortage of investment and equipment suppliers at the meeting said they could double build-out rates immediately. The limiting factor is accommodating it on the grid. Francesco La Camera, director-general of the International Renewable Energy Agency (Irena) was surprisingly cautious. “Even the most advanced country can’t put more than 40-50% [renewables] on the grid,” he said.

The answer was seen as interconnectors: speakers pressed for government and the EU to assist in ensuring that all countries in the bloc had interconnectors covering at least 10% of demand. In addition, the role of distribution network operators (DSOs) in helping manage local demand and generation was seen as crucial.

A new DSO entity will be formed under the Clean Energy Package to carry out necessary work on issues like writing codes, ensuring cybersecurity and providing flexibility platforms, bringing together all the bloc’s 2400 DSOs.

Eurelectric’s policy deliverables over the next two years, set out by incoming president Magnus Hall, president and chief executive of Vattenfall, are:

- Facilitate electrification and digitalisation to decarbonise the EU economy
- Enable the power sector to be fully carbon-neutral well before mid-century
- Ensure that climate policies are fair and enable a just transition. [NP](#)

One up, one down on European utilities

Rating agency S&P has set out its view of two mergers of major European utilities.

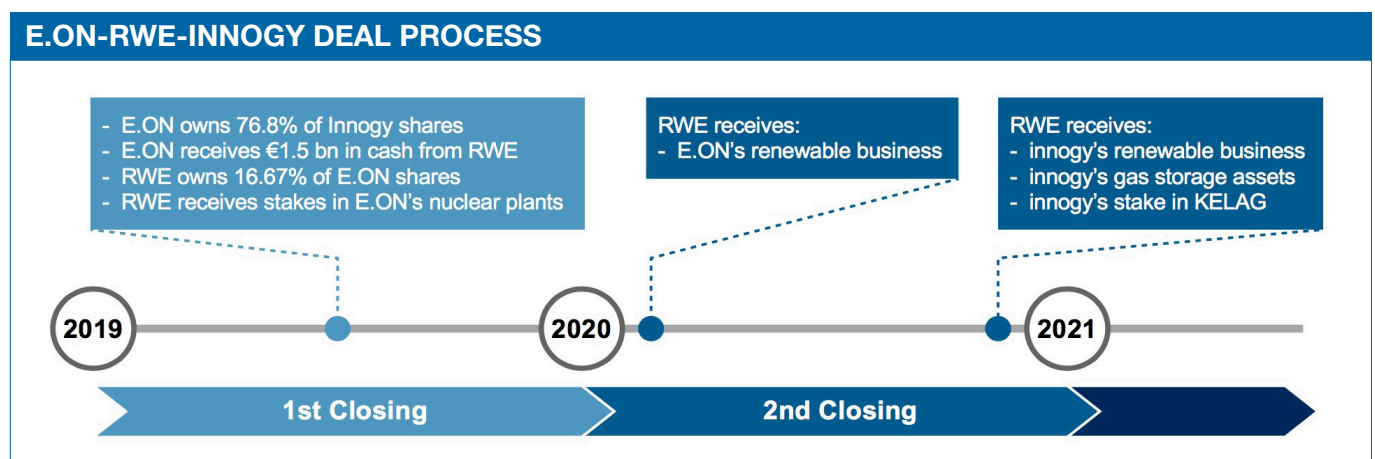
The agency looked at the rating implications of two acquisitions: Fortum acquiring Uniper; and E.On acquiring Innogy.

On Uniper, it said: “The current shareholding situation will evolve in the coming quarters or years, which could have rating implications for both Uniper and Fortum – eventually skewed toward the downside.” Fortum owns 50% of Uniper but increasing that stake is complex, among other reasons because a Russian subsidiary of Uniper has some water rights in that country. Russia’s restrictions on foreign ownership of water rights mean it will not permit an increase in Fortum’s stake.

There is a “misalignment of interests among shareholders”, S&P says, that “creates a degree of uncertainty” about Uniper’s long-term strategy and profile. Long term, a future combination of the two companies “could be negative for Fortum’s business risk profile, due to Uniper’s exposure to carbon-intensive thermal power generation”.

The agency was, however, positive about E.On’s acquisition of Innogy. It said a state aid investigation was unlikely to delay the acquisition and “with assets predominantly in European countries with relatively high ratings and generally ‘strong’ regulatory frameworks, the business risk profile of the combined entity will not only be stronger than its predecessors, but also stronger than other large European peers”.

The complex deal is not due for completion until 2021 (see diagram). [NP](#)



Source: E.On/Standard & Poor’s

Report: do we undervalue interconnectors

DERATING FACTORS

	Current	Based on price
Ireland	33%	55-63%
France	66-71%	74-89%
Belgium	50%	74-89%
Netherlands	43%	96-96%
Norway	87%	87-96%
Germany	n/a	85-96%
Denmark	n/a	87-96%

Source: FTI Consulting

One major cause of constraint in the southeast, and one likely to require new transmission lines to be built in the region, is power flows from the region's growing array of interconnectors. Several are expected to land in the region, and as they import or export according to prices on either side of the Channel they hit grid constraints. It may mean cheaper renewables are constrained off.

The options are to pay constraint charges or invest in more transmission capacity. Either way, the consumer pays. National Grid has accepted that in this case network extensions are required (although other constrained areas may offer 'no-build' opportunities, see following story).

Interconnectors obviously offer a benefit for GB generators in providing a route to the wider European market (although generators are less enthusiastic about allowing European generators access to the GB market). But what do they really add to or security of supply?

Some have argued that the ability of interconnectors to offer reliable supply at times of system stress is more limited than National Grid ESO estimates allow in the system operator's 'derating factors' applied to interconnectors in the Capacity Market. A new report produced by FTI Consulting for National

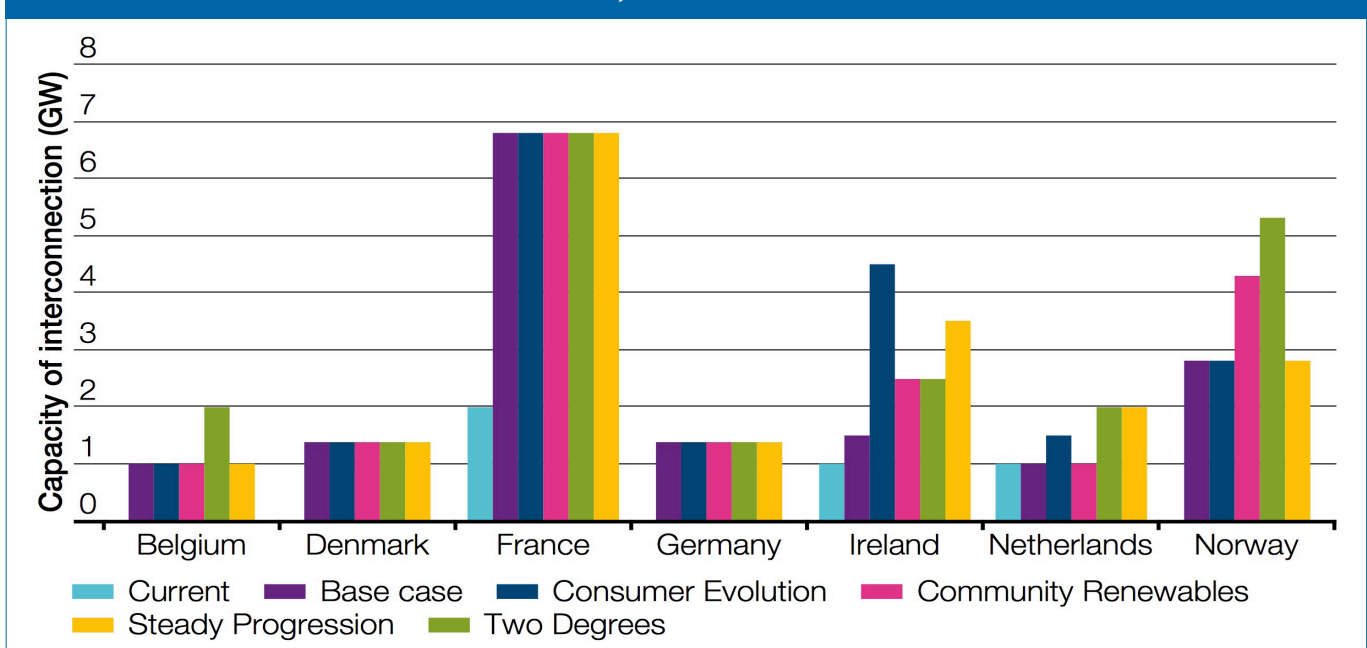
Grid Ventures, an independent part of the company including its interconnector interests, argues the reverse.

The fact that no System Stress Events since the Capacity Market was opened in 2014 means the study had to look at 'near-miss' events. It found that price differentials remained higher than anticipated in Capacity Market derating factors, suggesting they are "unduly conservative". The report said, "it can only be concluded that the current de-rating factors are predicated on a very different energy landscape to that which currently exists." And despite Brexit, "relations would need to deteriorate significantly" for European countries to "choose actively not to support the GB system in its moment of critical need during periods of domestically available capacity and appropriate price signals."

Investigating the derating calculations, it notes that they depend on "a single Base Case that is neither transparent nor the result of any stakeholder engagement". That was also a concern to the CM's Panel of Technical Experts, which recommended "full and transparent disclosure of the construction of NG's Base Case in the ECR, given that it represents NG's view rather than that the whole industry as represented in the FESs and plays a dominant role in the analysis."

The FTI report says that there is an "asymmetric and arbitrarily chosen 'downside' factor", that does

OPTIMAL LEVELS OF INTERCONNECTION, ACCORDING TO NOA



not apply to other CM participants, and that for France, Belgium and the Netherlands the Base Case is far from any of NGESO's Future Scenarios – supposedly a major factor in the analysis. Interconnectors have been disadvantaged, it suggests, and the current five-year CM review should be seen as an opportunity for a fundamental reassessment.

Among options for change, the report suggests updating interconnector de-rating factors at the point of the T-1 'top-up' auction. Alternatively, if the five-year review resulted in a stronger penalty regime, eligible CM participants could select their own de-rating factor.

System operator to begin market engagement on constraint products for Q1 2020 launch

National Grid ESO wants to run tenders early next year for new 'constraint management' products in specific geographical areas. It wants to have a flexible option in place so it can delay or avoid extending or reinforcing the high voltage transmission network.

The SO expects to begin full market engagement on the new products in October but it has released initial detail on its plans.

In a briefing, the SO said that increasingly, "system requirements are driven by conditions, not winter peak demands". New demand and generation assets can connect anywhere there is network capacity, but when it comes to the next half-hourly period, "market dispatch does not take into account network flows and constraints".

The cost of constraints is set to multiply over the coming decade, rising from £10 million to £80 million per month. Constraints are specific to particular regions and have different causes (the SO manages the network in a series of 'zones' and assesses needs by examining how often power export or import between zones is restricted).

The southeast presents one specific problem, for example. There is a highly meshed network where third-party effects can be significant. Particularly important are interconnector flows, which depend on price differential between the GB and Continental systems and may not be predictable. The SO already has plans to expand the network in this region to limit constraints. In other regions constraints may be caused by a surge in new generation, for example. The cause and location is likely to change over time: in the SO's 'two degrees' Future Energy Scenario, the volume of constraints in the north is low but the frequency is high. So in current conditions a constraint product for the northern region may be looking for relief for up to six hours, whereas southern network conditions are constantly changing and products may be shorter.

In the end, it says, constraints are specific, and not only to location. The duration and size of constraints varies a lot depending on system characteristics and issues such as location and even weather. "Some constraints could be days, some could be an hour," it said.

The SO's annual 'Network Options Assessment' helps drive investment into the right locations, and defer it where possible, but the SO says it is now balancing that process against no-build options.

It will be considering:

- Average constraint volumes
- Maximum constraint volumes
- Number of constrained hours
- Number of constrained periods
- Maximum constraint duration
- Average constraint duration

It has two product options in mind. If it uses a single location, where excess energy is absorbed on one side of the constraint, it still has to find a way to raise power supplies to replace it across the boundary. With a dual-location product the market would offer both to absorb and inject power, using assets either side of the boundary (potentially attractive to aggregators as well as multi-site companies).

That would incur a higher capital cost, but there would be less need to balance as above, the ESO says. Both raise complex questions about what happens to the energy, who owns it at what point, how to account for the cost of replacing energy, etc.

The ESO must also consider questions including: how to 'stack' such services with others; the best length of contract; how close it should be to real-time; should payments be for capability and utilisation or something else; what would be the penalties for non-delivery?

The SO is aiming for market engagement in October, and a tender process to begin in 2020. 

What now for Welsh nuclear? MPs report

Losing the Wylfa nuclear project on Anglesey has “the potential to inflict a major blow on the economy of north Wales if it is permanent” Ken Skates AM, Minister for the Economy and Transport in the Welsh government, told MPs at Westminster. In an inquiry by the Welsh Affairs Select Committee MPs heard that Wales is looking towards tidal power as an alternative. The North Wales Economic Ambition Board is considering what it can do to bring those forward and representatives from the Isle of Anglesey County Council, hoped to bring forward such projects more quickly. The committee said: “We were impressed by the various innovative projects, particularly plans for alternative, sustainable energy projects, under way to maintain this importance over the coming decades.”

It called on UK and Welsh governments to develop jointly a new strategy – one that moved away from being solely nuclear, and that focused on a single large project.

The MPs were concerned about the fate of the North Wales Growth Deal bid, submitted in December 2017 by the six local authorities in north Wales. The proposal predicted the creation of 5,000 jobs and investment of £1.3 billion in the north Wales economy and in the 2018 Budget, the UK government

RISKY BUSINESS: NEW POWER'S VIEW

What ended discussions at BEIS over a financial deal for Wylfa? My take is – it's the water chemistry.

I'm using that as a shorthand, but work with me on it.

Nuclear is of course extremely capital-intensive, with a gap of potentially a decade between starting to stump up the billions in investment required and seeing the first MWh exported. That magnifies the risk of costs spiralling due to delays in construction, and make it all the more important that there is a smooth start-up. Once in operation, cash has to be generated in bulk, as soon as possible and consistently over the long term, to pay down huge financing costs. No-one wants unexpected shutdowns.

What makes that possible? Two things it's very hard to get in nuclear: a familiar design, ideally with a few identical plants in operation already that have ironed out issues; and predictability in operation, with all the potential technical and ageing problems well understood. That is what has worked in wind: it has had some real problems, including wholesale replacement of transformers or generators across a project. But once you have pinned down the problem in one you can replicate the solution in the next.

The Wylfa plant, you might think, would be the closest you could get to that predictability in a nuclear context. After all, Japan has had several plants of this design up and running for years.

In practice, however, that's far from true.

First, the design for those plants is old. Their long lead times mean nuclear plants are typically designed 20 years before they see service. Although that doesn't make much difference in a lot of the design, it means the control, instrumentation and IT in a new plant is several generations on from the original. That's a redesign.

Secondly, it's a different site. Up to a third of a nuclear plant design is completely site-specific, including much of the civil and mechanical engineering (cooling will require specific offshore structures, for example). One change often requires another. That's a redesign.

Thirdly I'll come (finally) to that water chemistry. This sounds fairly innocuous: water is 'dosed' with a specific mix of chemicals for various reasons, most to do with slowing down ageing in the pipes. Water chemistry is well understood, but changing it may mean different ageing effects or even different choices on materials. How will those decisions look in five or ten years? The water chemistry, of course, touches thousands of components, and you don't want to be surprised by the need to replace a component buried deep in the guts of the reactor in a few years' time. (Bear in mind that in a BWR like Wylfa Newydd, unlike PWRs like Sizewell B or Hinkley Point C, the turbine is in the same water circuit as the reactor core – more efficient, but raising the issue of nuclear contaminants in the turbine, with knock-on effects on maintenance regimes). That's actually a big design change and it is just one of those required by the Office for Nuclear Regulation in approving the design.

Still with me? We started with a familiar reactor design but, even if those changes were the only ones, we have something very different.

Now imagine the questions asked by the finance team in BEIS when it met the Wylfa team to try to come to a deal for the plant. BEIS doesn't want to take on the risks inherent in the design changes. Nor does the Wylfa team – after all some, like the water chemistry, were required by our ONR.

If they all sat down expecting to have been looking at a project where the design was well-proven and risks well understood, they may soon have been thinking again. There are uncertainties all through the detail.

The risks are bigger than the project headlines suggest. Who takes them on? Apparently that was something the parties could not agree on.

JANET WOOD

agreed to commit £120 million to the Growth Deal, a commitment later matched by the Welsh Assembly. The nuclear sector was key to the proposed deal and the MPs called on the two governments to make sure new proposals, “worthy of further investment”, were brought forward in time for the 2019 Budget.

The MPs agreed that Trawsfynydd, site of a closed nuclear plant, was an ideal site for a first-of-its-kind small modular reactor. “The suspension of work on Wylfa Newydd makes it all the more important that plans for Trawsfynydd are brought forward at the earliest opportunity. We recommend that the UK government work with the Welsh government and potential developers on a proposal for Trawsfynydd to be designated as a site for a new SMR. We ask the UK government to update us on this work in its response to our report,” it said.

WYLFA REVIVAL

Some witnesses were positive about the potential for resuming work at Wylfa Newydd, where the plant was expected to be funded jointly by the UK government, with a one-third equity stake, alongside investment from Hitachi, agencies of the government of Japan, and other strategic partners.

The MPs heard that the funding model, which relied on setting a long-term ‘strike price’ and Contract for Difference, was unlikely to be successful. On previous discussions “the timing of the returns and the ability to have it fully funded was the reason it failed, not the quantum”.

The committee said government should speed up proposals on using a regulated asset base model. “If the assessment concludes that the model would help to restart development on Wylfa Newydd, the UK government should bring forward the necessary legislation without delay, and explore whether it offers a viable model for other large-scale energy projects.” What is more, the committee said government should consider 100% ownership, being part of a consortium of owners or selling the site. “The government,”

should take steps to identify other developers who might be willing to resume the development of, and explore alternative energy projects to, Wylfa Newydd.” **NP**

Weblinks

[@ Read the Welsh Affairs Committee report](#)

Are battery warranties fit for purpose? DNV-GL tests the assumptions

The measures of economic viability for a storage project are less certain than they are for more traditional technologies, such as a natural gas plant or a solar or wind farm, where project risks are familiar, says testing expert and consultancy DNV-GL. But the company predicted in its recent Energy Transition Outlook report that by 2050, in a world with 80% of electricity generated by renewables, energy storage will provide 50TWh annually for renewables integration and grid management.

Battery technologies are changing, the company notes. The cost of a li-ion battery has dropped by a factor of 10 over the past decade, while energy densities have increased by 25%. Use-cases in stationary storage are becoming more varied. But there is a lack of transparent data available from battery manufacturers about their products.

What is more, the data available focuses on characteristics important for automotive uses (and is growing more out of date even for that application). A traditional assessment of a ‘good’ battery is 3,000 cycles, arising from one cycle per day of driving and a 10-year life, with 80% remaining capacity as ‘end of life’ (EOL) condition. But this has little meaning in stationary energy storage, as many use cases involve a series of partial cycles at different battery states.

DNV-GL says storage project structures rest on a battery warranty from the battery manufacturer. If that is proprietary, “the entire project is based on unknown assumptions in the warranty”.

The company looked at ‘throughput’ rather than cycle, and used four different ‘abuse factors’ to test batteries: state of charge (the most degrading state may be at mid levels); state of charge swing; charge rate (lower rates can achieve more cycles but not necessarily more throughput); and temperature (25degC may not be the most effective temperature).

The company found that battery had varying sensitivities to degradation, and there were variations to account for in practice. For example, in battery racks temperatures in some locations will be different

from the area where temperature is being monitored. So battery systems will have battery cells and modules degrading at different rates, while the warranty depends on the average. **NP**

Weblinks

[@ Download the battery performance scorecard](#)

What happened at Utilitywise?

The third party intermediary collapsed earlier this year leaving debts of over £94 million. Janet Wood took a look at where it went wrong for a company who's 'middleman' role is often seen as relatively low risk

Utilitywise was launched in 2006. As a third party intermediary (TPI) it acted as a broker for small and medium-sized companies taking on energy supply contracts. It accrued thousands of contracts, and its income came from commissions, paid by the energy supply companies upfront on the basis of the volume sales during the life of the contract.

In 2012 the company was floated on the Alternative Investment Market (AIM) and was oversubscribed at 60p per share. In 2013 it booked profits of £13 million and in 2014 it was named AIM's 'company of the year' – but by the following year the company was already restating revenues from FY2013/14.

The company's debt was increasing. In 2016 and 2017 it incurred trading losses and cashflow was increasingly threatened (see table). It went into administration in February and was delisted from AIM on 18 March.

Meanwhile, Utilitywise had acquired other companies, with the original TPI known as the 'Enterprise' division.

It paid £15.5 million for Energy Intelligence Centre (EIC), a specialist TPI with 1000 business and public sector customers whose energy contracts were larger and more actively managed than those of Utilitywise's small business clients. It also acquired specialist IT systems engineer T-Mac Technology and ICON (based in Prague). In February they jointly had a book value of £20 million. All continue to trade. Some in the market suggested that Utilitywise's agents – maximising their own commission – had overestimated or been overoptimistic about the expected volumes in the contracts sold, and that meant the company – which was booking revenues from multi-year contracts – was called on to make repayments to suppliers as smaller volumes materialised. Other factors were also at work. In its report, administrator FTI Consulting highlighted changes in the SME and microbusiness market in the past two years. They included early termination options, which allowed other TPIs to get Utilitywise's customers to switch away from their contracts – a benefit for the business users, as they could get cheaper contracts, but one that undermined it (and other TPIs') business model. Also, energy suppliers were capping their commission payments.

The administrator notes that the company had to repay a large commission to one energy supplier. And when Utilitywise began to delay financial reporting it faced market pressure.

Meanwhile, it had to delay its accounts to complete restatements to conform to a new accounting regulation, IFRS15, which covered deferred revenues (relating to many of Utilitywise's long term contracts), and which took effect in 2018.

A turnaround plan would have seen a refocused strategy, based on differentiation and increased product range and a lower cost of customer acquisition, but it required a big investment.

The report said that although the company directors had made contact with a "large pool" of potential purchasers, no offers were received, which the administrator put down to:

- Tight timescale
- Level of funding required to turnaround the business
- Level of implementation risk attached to the turnaround plan
- Level of systemic challenge to the Enterprise business model
- Cost base of the business

HISTORICAL P&L, £k		
	2017	2016
Revenue	67,756	67,734
Cost of sales	-61,167	-51,638
Gross profit	6589	16096
Gross margin	10%	24%
Operating income	441	6233
Administrative expenses	-38,470	-20,947
Operating profit/loss	-31,440	-1382
Operating margin	-46%	2%

Source: FTI Consulting

ESTIMATED CREDITOR RETURNS

	Claim £M	Estimated net distribution, £M		Estimated net distribution, p/£	
		Min	Max	Min	Max
Secured lender	21.1	3.2	3.4	15	16
Preferential creditors	1.2	0.1	0.5	9	37
Unsecured creditors	76.1	0	0	0	0
Shareholders	17.8	0	0	0	0
Total	116.1	3.3	3.9		

Source: FTI Consulting

When the company went into administration in February this year, it owed £93.92 million. The administrator, Andrew Johnson of FTI Consulting, explained: “The statement of affairs includes £35 million of accrued Income, which relates to revenue on long-term contracts that has been recognised in the profit and loss statement of the company, but has not yet been invoiced (and the cash has not yet been received). Future invoicing and cash receipts would be based on targets for future levels of energy consumption by end users”.

Johnson said the collectability of

these amounts is uncertain because future levels of energy consumption are unknown, there is a the risk of early termination of customer contracts; and non-commencement of future contracts as competitors target the company’s customers in order to persuade them to switch to an new energy contract.

It had commission, accrued income and receivables with a book value of £43.5 million. But the accrued revenues for the company relate to contracts far into the future and based on forecast levels of consumption by end-users. In the administrator’s report FTI said it was “uncertain whether these targets will be hit and whether such revenue will become payable”. It considered it could realise just a hundredth of those receivables (£448K).

What now? There is one secured creditor, NatWest Bank, which is owed about £21 million, of which it may see 15-16%. Preferential creditors will receive 9-37% of what they are owed. That leaves over £76 million owed to unsecured creditors, including energy suppliers and an array of supply chain companies down to local businesses, who will not see any repayment. Net, £36 million is owed to other energy suppliers. Among other creditors, ElectraLink is owed £45.6K.

The largest creditor is Total Gas and Power, owed £3 million in advance commissions and a high-volume-incentive liability of nearly £2 million.

The corporate business (consisting of EIC and T-Mac) and the ICON business in Prague have both been sold as going concerns. Johnson said: “These businesses were profitable subsidiaries of Utilitywise plc, held within separate legal entities and continued to trade outside of the administration process while a sales process was conducted and a purchaser found for them. Both sales have now been concluded.”

He added: “We will continue to pursue certain book debts of the company in order to maximise realisations for the benefit of creditors.” ^{NP}

2019 PRASEG ANNUAL CONFERENCE AND DRINKS RECEPTION
GENERATION 2020 : SECURING OUR SUSTAINABLE ENERGY FUTURE

The PRASEG 2019 Annual Conference will focus on what the next decade holds for the UK energy sector as the country embarks on a journey towards net zero emissions and the government prepares to publish a new Energy White Paper.

Register interest in attending the conference here

14:00 – 18:00, WEDNESDAY 10 JULY 2019

ATTLEE SUITE, PORTCULLIS HOUSE



OFGEM

Fast switching

A £1 saving in individual consumer bills – because the domestic market was more competitive – would more than offset all the costs of a faster switching programme, says Ofgem. It based that on CMA estimates that domestic consumers as a whole paid an average of £1.4 billion a year more than they would have done under well-functioning retail markets in 2012 to 2015.

Publishing its full business case for the programme, the regulator admitted that costs had risen by £94 million to £426 million since it published an Outline Business Case.

The range of expected net benefits is now lower than it was in the Outline Business Case, but Ofgem says £185-1,077 million

benefits is “a compelling case for intervention”.

The regulator says it has learned lessons from the smart meter rollout and tried to ‘future proof’ a new central switching service. Bidders were tested on how their systems would be designed to support innovation and address three plausible change scenarios: allowing multiple suppliers per meter point; creating demand points behind a meter point; and circumstances where the customer’s relationship is with an industry party other than a supplier (disintermediation).

TCR review

Ofgem has set back plans to alter some aspects of the charging regime, including that for distribution-connected (‘embedded’) generation.

The regulator now expects to implement three aspects of its ‘targeted charging review’ (TCR) at the latest of the range of potential dates initially proposed, to allow more time for industry consultation. Likely dates now are:

- Reforming embedded benefits April 2021
- Residual charging arrangements, 2021, 2023, or phasing between 2021 and 2023
- Access reform, April 2023

The regulator will publish a working paper in the summer on the potential changes to access rights, distribution network charges and transmission demand network charges. A second paper later in the year will focus on other specific changes to transmission network charges, distribution connection charges and access and charging for small users.

PEOPLE

Are women making inroads on energy company boards? While there are “pockets of success”, progress at board level across the sector as a whole is “disappointingly slow”, says POWERful Women, a professional initiative that seeks to promote the professional growth and leadership development of women across the energy sector. It has published annual statistics on the composition of boards in the top 80 UK energy companies which show that:

- Women occupy 16% of board seats (a marginal increase from 13% in 2018)
- Women occupy 6% of executive board seats (no improvement)
- 42% of companies have no women on their boards at all (a small improvement from 50% in 2018)

POWERful Women chair Ruth Cairnie said: “We still have a very long way to go to truly tap into the pool of female talent available in the energy sector so that it is fit to meet the challenges and opportunities of the energy transformation. The 2019 statistics show that progress is disappointingly slow, and has even gone backwards when we look at progress towards targets.”

Mike Lockett has been appointed Uniper UK country chairman, which he will combine with his current role as chief commercial officer (power) for the Uniper Group.

The Institution of Gas Engineers & Managers has created a new

Executive Board, which it says will help the institution be more agile in its strategic decision making: president Antony Green; vice president Duncan Wong; president elect Ben Clarke; past president Steve Edwards; honorary secretary Gordon Davies; chief executive Neil Atkinson.

TLT is growing its Clean Energy team with the hire of Tom Cowling as a partner in the commercial services group from Ecotricity.

Kris Beyens joins Faraday Grid as chief operating officer and will oversee Faraday’s global engineering, supply chain and operations. Previously he was at eBay. Jan Juhasz joins as VP engineering, UK.

Founder director, Sarah Butler-Sloss will step aside from operations at Ashden to become chair of trustees at the Ashden Trust. The new chief executive is Harriet Lamb, most recently chief executive at International Alert.

SONI, the electricity transmission operator for Northern Ireland, has appointed Jo Aston as its managing director. She was director of wholesale energy regulation at the Province’s Utility Regulator. Last year she led a redesign of the Single Electricity Market.

Magnus Hall, president and chief executive of Vattenfall, has taken over the presidency of Eurelectric

Suppliers

Ofgem will set out its thinking on its revised approach to licensing and regulating suppliers at an industry meeting on 21 June.

After a spate of company failures, Ofgem decided it needed to raise standards around suppliers' financial resilience and customer service, first for new entrants and then for existing companies in the sector. It is also considering how to improve arrangements for managing supplier exit. The regulator plans to publish a working paper this month.

At the workshop, it aims to hear views on the options being considered to increase ongoing scrutiny and oversight of suppliers already operating in the retail energy markets.

RETAIL

Do it by app

Online bank Monzo has added an energy switching service to its app – although the switching options are currently limited to Ovo Energy and Octopus Energy.

Users can enter information about their home to get quotes, then choose a tariff and switch through the app. They can also set a reminder for when their current contract ends, and Monzo will notify them when it is time to consider reviewing their contract.

Get the hardware

Anesco has launched a new venture aimed at the domestic solar and storage market.

The 'Anesco at Home' package combines solar, storage, heat pumps and EV charging technology, with an energy tariff auto-switching service and O&M care plan.

Steve Shine, Anesco executive chairman, said: "We are expanding into the domestic market to meet the growing appetite among consumers for smart energy management and renewable technologies that will support energy self-sufficiency and improve the carbon footprint."

The company said that households in a recent trial with all the technologies installed saw a 40% reduction in their energy bills. RHI payments offset the remaining costs. They also reduced their carbon emissions by around 60%.

Anesco currently handles domestic installations on behalf of customers, such as local authorities and housing associations, as well as through its ECO delivery. Anesco at Home marks the first time the company has directly targeted homeowners.

TAX

Carbon tax

The UK government is consulting, along with the devolved administrations, on a new UK carbon pricing scheme that would be employed in the event the UK could not take part in the EU's Emissions Trading Scheme (EU ETS) after Brexit.

The consultation reiterates that a linked UK ETS is the preferred carbon pricing option, because it allows:

- access to a larger market
- increased abatement opportunities
- more cost-effective emissions reductions for UK businesses

If that is not possible the government has promised that there would be a new arrangement that "would be at least as ambitious as the current EU Emissions Trading System (EU ETS) and will provide a

smooth transition for relevant sectors". Fall-back options include the UK introducing its own domestic trading system, which would not be linked to the EU ETS or the introduction of a tax on carbon. It also considers the implications if the UK participates in Phase IV of the EU ETS (as the UK is still in the UK, regulations for this phase have to be transposed into UK law during 2019).

A UK ETS would follow the EU model in auctioning allowances, but with some free allocations which the government said would help stop 'carbon leakage' when industries move to countries with no emission limits. Free allocation would not apply to the power sector.

The auction would have a reserve price that would take into account recent prices for carbon emissions, which have ranged from £4.70 to £13.70.

VAT fears

Sustainable energy organisations have called on HMRC to halt planned changes to the VAT regime that would raise the cost of installing more efficient and lower-carbon energy measures.

VAT applied to energy efficiency measures such as insulation and low carbon heating technologies like heat pumps, biomass boilers and micro combined heat and power, is at a reduced rate of 5%.

Under the new rules proposed to be implemented this October, the reduced rate of VAT will no longer apply to wind or water turbines. For other measures such as insulation and low carbon heating, the reduced rate would only remain available to those who meet a 'social policy test' (60 years or over and in receipt of benefits or a 'relevant housing association').

In a letter to minister Mel Stride MP, the organisations

>

argue that the change “would inflict significant damage on thousands of UK businesses, and would severely undermine the government’s ability to meet its legally binding decarbonisation commitments”.

The Sustainable Energy Association also argued that the measure would have unintended consequences. For insulation and low carbon heating, whether VAT is raised to 20% from 5% depends on what proportion of the total cost of the job is capital and what is labour. The SEA says “this may disproportionately disadvantage people in areas where labour costs are lower, which tend to be less prosperous areas, and it could also lead to installers increasing charges for labour to ensure that the labour cost is a bigger proportion of the overall cost”.

NEW PROJECTS

Peel plan

Peel Ports is consulting on plans for development at Hunterston, North Ayrshire. The 300 acre site was previously used to import coal to burn in Scottish power stations.

A new 20-year ‘master plan’ could see the port house an LNG terminal and CCGT. Other options alongside include a manufacturing plants, concrete batching, marine construction and decommissioning, aquaculture and plastics recycling and storage.

The port, 35 miles from Glasgow, handled a peak volume of 10.3 million tonnes of coal in 2005. Since the closure of Longannet power station there has been no market for coal imports.

In recent times, the port yard has been used as an onshore wind turbine test centre. The two turbines are now in the process of being removed.

Choices change

Independent generators invested £58 million in 80 new renewable energy projects last year, adding 329MW to bring the total capacity of the sector above 14GW, according to Smartest Energy’s annual Energy Entrepreneurs Report. But investment has switched away from renewables towards gas peaking plants and storage, in response to cuts in government support.

Of the £106.9 million total investment in gas peakers that delivered last year, SmartestEnergy calculated that £36.6 million was invested by existing energy entrepreneurs. Investment was concentrated on northern England, where land costs are lower and locations easier to find.

The amount of storage capacity in the planning system more than doubled to 4.9GW during 2018, with 36% of the total in Scotland.

Among the new renewable energy projects, Scotland accounted for 276MW, thanks to five major onshore wind farms being connected to the grid. Some 10MW came from new solar PV farms at 49 sites.

TRADING

Epex promises change

Power exchange Epex Spot has headed off an investigation by regulator Ofgem by agreeing to help set up another power exchange for companies trading power across interconnectors between the GB and Irish/Northern Irish markets.

Ofgem warned in November that it would open an investigation over whether Epex Spot had abused a dominant position.

Epex Spot (and parent

company EEX) had committed to joining a testing programme that would allow more than one power exchange to be available. Before go-live of the single energy market (i-SEM) it said that it was not willing to participate in the testing required to enable that plan to be delivered. Implementation groups accepted that position, because they did not want to delay the go-live and there was a “clear intention and commitment to deliver arrangements” to support participation of another market operator in the auctions “as early as practicable”.

Despite a delay in the iSEM go-live to October 2018, “GB trading parties have been able to access these auctions only via EPEX’s trading platform. Despite the delay to the launch date, and the time that has now elapsed since go-live, the necessary arrangements required for other GB NEMOs to participate in these auctions have still not been put in place,” said Ofgem.

Epex has agreed to take the necessary steps to enable Nord Pool – its main competitor in GB – to participate in the auctions. A timeline anticipates go-live of the new platform by 23 July.

FLEXIBILITY

UKPN offers contracts

After its second flexibility tender UK Power Networks has offered contracts to six companies across eight different locations. They will install or recruit new flexible capacity with a total value of more than £450,000 and a total capacity of 18.2MW. The technologies involved are a mix of energy storage, demand side response, renewable energy and other generators.

Barry Hatton, director of asset management at UK Power Networks, said: “Flexibility offers >

a wealth of opportunities for the energy resources connected to our network like wind and solar plants, but also demand side response to help us create an open, transparent and accountable new market for their services.

“All of the bids we accepted in this tender round met our robust economic criteria to ensure they will benefit our customers by offering lower costs in comparison to the traditional approach of building new assets. The UK is a world leader in smart grid technology and flexibility has a key role to play as we move towards a decarbonised, decentralised and digitised network that will offer significant benefits to our customers.”

By 2023, UK Power Networks estimates its market for flexibility could be over 200MW.

Be assured

The Association for Decentralised Energy (ADE) has launched a compliance scheme to help industry and business develop a ‘smart’ energy strategy. The Flex Assure scheme (and its Code of Conduct), will help businesses to compare the different services offered by ‘aggregators’ – organisations that give businesses access to power flexibility markets.

The voluntary membership scheme is open to all demand-side response (DSR) aggregators and licensed energy suppliers offering DSR services. It sets common standards across the industry, making it easier for industrial and commercial customers to access the revenue these new energy services can provide.

Seven DSR aggregators have so far applied to join Flex Assure: Centrica Business Solutions, Enel X, ENGIE, Flexitricity, GridBeyond, Kiwi

Power and nPower Business Solutions.

The launch of the scheme follows nearly two years of development and consultation. It will be overseen by an independent committee, which will also adjudicate customer complaints and provide public notifications if any company is in breach.

SUPPLY CHAIN

New at Siemens

Siemens is to spin off its gas and power interests in a new company to be given “complete independence and entrepreneurial freedom”. The new company will comprise Siemens’ current oil and gas, conventional power generation, power transmission and related services businesses. It will also take over Siemens’ 59% stake in renewable energy company SGRE.

The new company will be separately listed on the Stock Exchange by September 2020. Siemens will be a “strong anchor shareholder” in the new company, with a minority stake but one that remains “above the level of a blocking minority holding” and will also support the new company via Siemens Financial Services, its sales network and by licensing the Siemens brand.

WAVE AND TIDAL

New support call

A cross-party group of 91 MPs have signed a letter to energy minister Claire Perry asking for more support for wave and tidal power.

The letter, written by Conservative MP Richard Graham, chair of the , encourages the government

to include new policies to support innovative wave and tidal stream technologies in its upcoming Energy White Paper. It says auctions for Contracts for Difference will not bring forward marine renewables, as the sector is at an earlier stage of development than competing technologies such as offshore wind.

The letter suggests reforming the CfD system so that marine technologies compete among themselves for government-backed power contracts. This would drive competition and reduce costs, while incubating them until they are cost-competitive with other mainstream forms of low carbon power. The MPs also highlight an industry proposal to offer tax rebates to corporations that sign Innovation Power Purchase Agreements, which would pay above the market rate.

CODES

Fewer codes option

Elexon has put forward proposals to reduce the number of codes in the energy sector.

Elexon proposes three codes would be:

- A Retail Smart Energy Code covering all aspects of the energy retail markets, including codes which govern smart metering
- A Wholesale and Settlement Code combining the BSC with the management and operation functions of the existing Uniform Network Code (which governs the gas sector)
- A Network Use of System Code bringing together the current five network codes governing connection and use of the networks



GAS

Record fine

Gas network company Cadent's failings over keeping records of the buildings where it delivers gas were so poor as to threaten its fundamental duties under Section 9 of the 1986 Gas Act, Ofgem said.

But the regulator decided on customer redress totalling £44 million, instead of pursuing enforcement action that could lead to a fine.

Cadent spent £3.6 million

identifying the missing connections. They included 774 high rise blocks, containing 4,671 gas risers in total. Ofgem also notes that without the records – which the company missed opportunities to gather and check – Cadent could not report on the condition of those risers, as required by the regulator.

Nor could it properly plan maintenance and repair activities.

Cadent also acknowledged failings in customer service. It reported to Ofgem earlier

this year that it failed to pay compensation over a six-year period to a possible 12,000 residents left without gas for over 24 hours as required.

The package of redress measures includes setting up a £20 million fund to support consumers in vulnerable circumstances.

Cadent will also make two payments to Ofgem's consumer redress fund administered by the Energy Savings Trust: £2.3 million for delays in paying compensation and £3 million for its data failings.

NEWS IN BRIEF

RES has sold its first UK subsidy-free wind farm project. The 25MW Craiggore wind farm in Northern Ireland was purchased by ERG UK Holding for £37 million. The wind farm is expected to start operating in early 2021. RES said Craiggore is the first in a consented UK onshore wind portfolio of over 200MW that the company plans to bring to financial close on a subsidy-free basis within the next year.

ERG has lost its planning appeal over Dumfries and Galloway Council's refusal of its 23MW Longburn windfarm in Scotland. The Scottish planning reporter who conducted the hearing accepted that the project would have had economic benefits but concluded these did not outweigh the adverse impact on the landscape. Mountaineering Scotland had claimed that if the scheme had gone ahead it would have created a "ring of steel" around a prominent hill-top.

Four onshore and one offshore wind farm have recently passed all the Contracts for Difference (CfD) 'operational conditions precedent' and begun to receive CfD payments, the Low Carbon Contracts Company (LCCC) has announced. They are Mynydd Y Gwair (first payment on 20 March), Kype Muir (28 March), Bad a Cheo (31 March), Achlachan (8 April), and offshore Beatrice phase 2 (28 April). The five generators combined will have capacity of 494.6MW.

Aggreko is adding mobile and modular energy storage to its 10GW fleet of distributed energy assets. The Y.Cube is a fully integrated, ready-to-install lithium-ion battery system, using technology from Yunicos, which Aggreko acquired in 2017. The 1MW unit is housed in a standard 20-ft container. It is available in a 30-minute 'power' unit and a 60-minute 'energy' unit

SIMEC Atlantis Energy has entered into a technology partnership and preferred supplier agreement with GE's Power Conversion

business. They will work together and share resources on utility scale tidal energy generation and associated energy storage solutions.

Ofgem has received 13 smart meter roll out plans from suppliers, a number of which have been rejected so far, according to minutes from the Gas and Electricity Markets Authority board. Suppliers have been provided with feedback and invited to resubmit.

Welsh ministers have issued a statement about Biomass UK No.2's proposed 10MW wood-fired energy-from-waste gasification facility at Barry, south Wales, which highlights a potential breach of the EU regulations on environmental impact assessment (EIA). The ministers said the position would be helped if an environmental statement was drawn up which would give everyone a chance to comment.

A County Wicklow stud farmer has begun an Irish High Court challenge against An Bord Pleanála's decision to allow a 59ha solar power facility with a capacity of up to 30MW on lands adjoining his property.

Wäertsilä and Lappeenranta-Lahti University of Technology LUT, a Finnish public university, have signed a research agreement on strategic power system modelling with the aim of understanding and developing paths towards 100% renewable energy systems. The scope of the agreement covers collaboration on detailed energy system modelling of the transition taking place with the global energy sector.

Swedish marine energy developer Minesto has engaged with leading financial advisor Pareto Securities to "intensify relationships" with institutional investors to accelerate and capitalise the commercial rollout of Minesto's 'Deep Green' renewable energy technology.

MEETINGS

[@ Going Offshore – Challenges of the future power grid](#)

CIGRE
Aalborg, Denmark
4-7 June

[@ Financing challenges for a transforming energy industry](#)

Energy Institute
London
5 June

[@ Floating Tidal Energy](#)

ICE
London
5 June

[@ Energy Summit 2019](#)

Spectator/National Grid
London
5 June

[@ UK Small Hydro Projects](#)

ICE
Poole
11 June

[@ Nuclear New-Build](#)

NIA
London
11-12 June

[@ Hydrogen – taking control of your future](#)

IGEM
Kegworth
12 June

[@ Disruption and continuity in the UK energy system](#)

Imperial College
London
13 June

[@ Energy Exports Conference](#)

Energy Industries Council (EIC)
Aberdeen
18-19 June

[@ Introduction to the Energy Market seminar](#)

Elexon and National Grid
London
19 June

[@ Global Offshore Wind 2019](#)

RenewableUK
London
25-26 June

[@ FT Energy Transitions Summit](#)

FT
London
27 June

CONSULTATIONS CLOSING

DCMS consultation

[@ Consultation on regulatory proposals on consumer IoT security](#)

Closes 5 June

Treasury Consultation

[@ Infrastructure finance review](#)

Closes 5 June

Environment Agency consultation

[@ Revising standard rules sets for medium combustion plant and specified generators](#)

Closes 10 June

Scottish government consultation

[@ The future of low carbon heat for off gas buildings: a call for evidence](#)

Closes 17 June

Scottish Government consultation

[@ Energy Efficient Scotland](#)

Closes 17 June

OTHER DATES

[@ Fully Charged UK](#)

7-9 June
Silverstone

[@ British Renewable Energy Awards](#)

R-E-A
London
11 June

AI finds a role

Ravi Mahendra is an analyst at Pöyry Management Consulting. He summarises the progress of artificial intelligence in the energy sector

Some elements of artificial intelligence (AI) are hyped out of proportion, some elements are ahead of their time and some incite fear. However, there remains some truth beneath the hype. Artificial intelligence and related processes stands to benefit the energy sector but come with limitations and practical concerns.

Machine learning is a type of artificial intelligence used to tackle prediction-type and classification-type problems. An example of the former might be 'can I predict when this equipment will fail?' If so, I can arrange maintenance before the failure happens, to stop the plant grinding to a halt and save on unnecessary maintenance. An example of the latter might be, 'is this customer different from another, based on the data I have from them?' If so, I can further study the differences and maybe deploy new marketing to retain them.

The key requirement for these predictions has been clean and useful datasets. For this reason, the method that has been showing the most potential is 'deep learning', which can extract complex patterns and sequences in a dataset. In challenging areas such as speech recognition and image recognition, deep learning models have had more

success than traditional rules-based approaches or detailed expert systems.

The most promising area now is reinforcement learning, in which software agents are trained towards a certain goal through rewards – mimicking how humans learn. Combined with deep learning, this is the key algorithm being used to develop autonomous vehicles.

Computational power is now easy to acquire (possibly on a short-term basis) and common algorithms are reasonably well known. The major investment has been in acquiring and assembling data, removing errors and assessing different algorithms to see which one delivers the best performance.

EXAMPLES IN ENERGY

Machine learning, coupled with data and computing power, can augment or automate decision-making by creating an expert system, used in enabling automation, but also in aiding complex decisions.

In energy, there are already interesting examples of artificial intelligence. Fault prediction and dynamic maintenance is one of the most obvious, enabling operators to predict equipment failures. It does this by using sensor data from a variety of units and it can significantly reduce their costs for downtime and maintenance.

At the domestic level a start-up, Verv, is offering a device which identifies individual home appliances and tries to predict faults and send an alert when devices are accidentally left on.

It also optimises investment. BP's venture arm invested in a start-up called Beyond Limits, which digs into seismic images and geological models to increase the chances of success when drilling wells.

Google has used its DeepMind subsidiary to use reinforcement learning to reduce energy use in its data centres and claims a reduction of 15%. The model learnt by looking at years of operational data and then sent changes to individual units. DeepMind has recently announced talks with National Grid about better forecasting of GB system demand to reduce GB energy usage by 10%.

More broadly all retailers are using machine learning to understand patterns of customer behaviour, attract and retain customers and predict bill non-payment. Customer call centres are being fronted >

BEHIND THE TERMINOLOGY

AI is a broad term and its scope varies, but the basic idea is adaptive intelligence displayed independently by a machine, in which the behaviour is not necessarily pre-determined, but adapts according to data inputs. Formally, deep or reinforcement learnings are promising types of machine learning (which itself is a subset of artificial intelligence). Within those fields the building blocks include robotics, speech recognition, computer vision etc. But the key is the use of statistics to give computers the ability to learn from data. Fast advances in machine learning have prompted a sudden interest in artificial intelligence.

Early improvements were in underlying algorithms and data architectures. Now progress is focused on data and computation. Data development is driven by smartphone uptake and improvements in sensors, and better communications and storage. It has made many more datasets available that can be scrutinised in depth. There has been a dramatic increase in processing power, so that algorithms can tackle many parameters simultaneously and compute in parallel rather than in sequence.

by algorithms which chat to customers and deal with queries verbally.

AI is also gaining traction among consumers and retailers are offering systems as part of an integrated package. Devices such as Amazon's Alexa enable the customer to seamlessly interact with their thermostat and control systems. This helps develop a personalised usage profile, which helps the energy provider to forecast demand.

TRADING

In energy trading Origami Energy uses machine learning to predict asset availability and market prices in near real-time, enabling them to be bid into Frequency Response markets. Pöyry is exploring a deep learning algorithm to support trading and dispatch decisions for generation assets in the prompt trading markets, focusing on the question of 'when should I commit a trade' (to maximise the option value of flexible capacity).

There has been some discussion around using algorithms to assist on large trading desks. In fact, very few trading desks are directly using algorithms at the moment. But they are using them indirectly, as some of their information providers are using machine learning techniques.

It is likely that this will shift in-house over time. Initially it will be to reduce costs, because fewer people are required to make decisions. It will then be adopted fully when people see the advantages of a scalable solution that can make fast decisions. The rate of uptake is unclear.

Another potential use is to manage small and medium-sized power assets owned by funds and other companies that are relatively small and new to the market. They often use some automatic trades and also the trading is often done at one remove by specialist companies.

What does that mean in the way they react to market signals? In principle, more players leads to more competition and creates better prices for consumers. Being able to absorb large amounts of information and act quickly can help these players achieve higher profits. There could be some cost savings at this level, but the savings will be felt more on a larger scale.

For both groups (and the market as a whole), how can the market guard against 'herd' behaviour where similar algorithms make the same decision for too many assets, or small market changes are amplified, leading to market volatility? There is experience of this in the financial sector, and market volatility in the financial sector does overlap with the power market in some areas. But we predict that the need for physical delivery, combined with regulation and a fear of causing political upset, will contain the volatility in the power market.

Financial sector volatility, on the other hand,

with different factors behind it, has been tackled by strong regulation coming from the Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC) in the USA. These methods may not be perfect, but they aim to contain volatility in the financial market. Then again, for some businesses models the volatility can be useful (such as batteries, etc) so any similar measures in the power sector would need careful review.

CAVEATS AND CONCLUSION

Despite all the upsides, AI comes with many caveats. What happens if there is a low volume of data available for the model to learn from? Can it contextualise between two similar tasks and transfer learning from one to the other? Can AI systems be protected against false (perhaps maliciously-introduced) data? As some of these models are essentially black boxes, can the model users understand why the model took a particular action? Will the AI systems learn to collude or break through regulatory ringfences? Can the model take the right decision when it faces a new unforeseen environment? And, as decisions are increasingly driven by AI outcomes, will the underlying system converge, or will the outcomes be unstable?

Techniques will be developed that can combine outcomes based on historic data with outcomes that anticipate changes in the fundamentals (eg a new interconnector, or market rule changes).

Questions will persist. Coupling reinforcement learning with intelligent model design – with safety constraints and external controls – should allay many of these concerns. As the standards of AI decision support improve, the interface with humans must adapt. Initially, humans must learn to trust the systems, even though the results cannot fully be explained. Techniques will be found to blend human anticipation of the future with historical data to augment today's algorithms, in what might be termed 'augmented artificial intelligence' (in which the AI is augmented by human knowledge, not the other way around).

As the algorithms become more robust and are given more autonomy to act without human intervention, we must ensure that appropriate controls are in place.

In non-critical business applications, machine learning is already uncovering value in almost every application where past predictive data exists.

Human behaviour and existing prediction methods are far from perfect, and AI should not be compared with an impossible benchmark.

For now, artificial intelligence and machine learning can be combined with better analytics, sensors and robotics to automate the small issues entirely – and let us focus on the unstructured problems of tomorrow. **NP**

Wind steps up

Offshore wind is expected to be the big winner in this year's Contracts for Difference allocation round, with 6GW up for grabs. Janet Wood looks at how the CfD process has worked for wind. But has it failed for other renewables?

The next stage in the third allocation process for Contracts for Difference (CfDs) opens as this issue of *New Power Report* arrives with subscribers. Companies have already been working to qualify, for example by submitting supply chain plans (required for projects over 300MW). But between 29 May and 18 June the application window opens.

The results may not be known until late September as developers can appeal decisions until August. There is £65 million (2012 prices) up for grabs to bring forward up to 6GW of capacity for delivery in 2023-2025. Allocation will be by auction (assuming there is overcapacity on offer), and the auction window opens for sealed bids between 9 October and 15 October. The outcome, according to the EMR Delivery Body, will be known on 4-5 November.

The government has offered strike prices for eight technology options (see table) but all eyes are on the offshore wind potential and the table shows why: offshore wind is competing at a price at or around the wholesale market price, while in comparison other technologies still require hefty support to get them over the line.

Once again, wave and tidal has the highest strike price on offer, but that has not proved enough to bring forward projects in previous auctions. It highlights a longstanding concern over the CfD process. It is extremely successful at bringing forward near-competitive technologies and driving the price down. But that risks crowding out less developed technologies.

The wave and tidal industry has managed to install 10.3MW of operational tidal stream capacity, and 1.4MW of operational wave capacity but that is a small step towards what it sees as an industry with multibillion-pound potential. The industry thinks a new approach is needed. In May, a parliamentary group won support from 91 MPs from across the political spectrum when it wrote to

energy minister Clare Perry MP to propose a ring-fenced model. In this, different marine technologies would compete among themselves for government-backed power contracts.

The group also proposed an 'Innovation Power Purchase Agreement' (IPPA) in which government would give tax rebates to corporations which agree to pay above the market rate for electricity generated by wave and tidal projects. The proposals are aimed at the government's impending energy White Paper.

DELAYS IN BURN TECHS

As regards waste and biomass (burn) technologies, experience from the past two CFD allocation rounds has been mixed.

The Low Carbon Contracts Company register shows that none of the advanced conversion technology (ACT) projects offered contracts in previous auctions have yet gone into operation. Three have been delayed and although two of those are due

ADMINISTRATIVE STRIKE PRICES, (£/MWH, 2012 PRICES)		
	2023/24 Strike prices	2024/25 Strike prices
ACT	113	111
AD	122	121
Dedicated biomass with CHP	121	121
Geothermal	129	127
Offshore wind	56	53
Remote island wind (> 5MW)	82	82
Tidal stream	225	217
Wave	281	268

Source: BEIS



PROGRESS ON 'BURN' CFD PROJECTS

	Original start date	Revised start date	Strike price (current)
Advanced conversion technologies			
BHEG Walsall	Dec 18	Aug-19	£128.67
Energy Works Hull	Jan 18	Aug-19	£134.86
Enviroworks Hirwuan	Mar 18		£134.86
Blackbridge	Apr 21		£84.08
Drakelow	Apr 21		£84.08
IPIF Fort Industrial	Mar 22		£84.08
Northacre Renewable Energy Centre	Apr 21		£84.08
Station Yard	Apr 21		£82.58
Dedicated biomass with CHP			
Teesside	Jul 18	Mar 20	£141.84
Grangemouth	Jul 21		£82.58
Rebellion	Apr 21		£84.08
Biomass conversion			
Drax	Jul 15	Dec 16	£113.65
Lynemouth	Dec 15	Jun 18	£119.29
Energy from waste with CHP			
K3 CHP	Dec 18	Nov 19	£89.99
Wren Power and Pulp	May 18		£89.99

Source: LCCC

to go into operation shortly, the register notes that those dates are being re-examined. That must raise questions over delivery of the next phase of these projects, which are not due for commissioning for two years or more but are accessing much lower strike prices. BEIS has nevertheless tightened up requirements for ACT projects in the current round, requiring a schematic to show that the gasification/liquefaction process is separate from combustion, and to declare that this is consistent with BEIS guidance.

The waste to energy plants have also been delayed and their startup dates are again being reviewed.

In sharp contrast, offshore wind CfD projects have been commissioning on time. In-service dates for Beatrice and Burbo Extension were within a month or two of those planned. At Dudgeon and Walney there have been delays at the six month level for the first phase, but they are right on schedule for the second phase. That is testament to the learning that is being absorbed for this technology.

The other successful plants have been biomass conversions at Drax and Lynemouth, and a raft of

onshore wind projects. The most recent to receive their first payments are Mynydd Y Gwair (first payment on 20 March), Kype Muir (28 March), Bad a Cheo (31 March) and Achlachan (8 April).

BIG WIND

Offshore wind is one of the sector's biggest success stories and it has become strategically embedded in policymaking. It is not surprising that it is attractive: the industry estimates that it will employ 27,000 people by 2030 and the UK-based supply chain already exports products and services to 22 countries.

In its proposals on a 'net zero' carbon emissions target for the UK, the Climate Change Committee suggested the level of offshore wind would increase tenfold by 2050. More immediately, in March the offshore wind industry and government agreed a 'sector deal' – the first in the renewables industry. That would see offshore wind capacity almost quadruple from 7.9GW now to at least 30GW by 2030, using an established development framework around stakeholders on the Offshore Wind Industry Council (OWIC).

Benj Sykes, Ørsted UK country manager for offshore and chair of the OWIC, said at the launch of the CCC report: "In any scenario, offshore wind will be the backbone of the future electricity system. The ground-breaking Offshore Wind Sector Deal means at least one-third of the UK's electricity will come from offshore wind by 2030. This is a clear signal to industry and government to aim high when it comes to our renewable energy supply. That's good news for consumers as offshore wind is one of the lowest cost power sources we have, and good news for jobs in the UK."

The sector deal aims to increase UK offshore wind exports fivefold in value to £2.6 billion a year by 2030.

Another indication of the huge step up in offshore wind commitment is the size of project. In May, Phase 2 of the Beatrice wind farm reached the Contracts for Difference (CfD) 'Operational Conditions Precedent' milestone and received its first CfD payment. The project was one of eight awarded an 'investment contract' in April 2014 ahead of the first CfD allocation round and it has a capacity of 334MW, with a strike price set at £140 (now indexed to £158.73/MWh).

In the upcoming allocation round, in contrast, the offshore wind farm size limits are set much higher – 1500MW – for projects expected to be much bigger. Much of the increase in capacity will be delivered by a step up in turbine size, from 3MW to potentially the 10MW levels by the time this year's projects are delivered. The remainder comes from operating and installation experience that allows larger wind farms to be built farther from shore.

NEXT STEPS

The current portfolio of offshore wind farms and their progress are summarised in *New Power's* Offshore Wind Index, see table on following pages. The index incorporates progress on planning, funding and export (see box for the index methodology).

The CfD allocation round is hugely important for the offshore wind industry. But so too is the pipeline that will deliver those ambitious targets in 2030 and 2050. That relies on new leases being granted by the seabed owners (The Crown Estate and Crown Estate Scotland). The owners have a track record of support and facilitation of offshore wind but the leasing rounds present developers with another 'gateway' through which projects have to pass before they become reality.

Both in England/ Wales and Scotland the seabed owners have engaged with developers to refine the process and both have decided that changes to the process justify a delay in the next licensing round.

In England and Wales, The Crown Estate has delayed its planned offer of new leases for Round 4 projects until the autumn. The sea bed owner sought feedback from developers in a series of engagement events in November last year. It is now exploring changes in the commercial assessment phase at ITT (invitation to tender) that it says will introduce greater transparency for bidders and help inform their decisions on project location and option fee bid price.

Among expected changes:

- A new tender requirement to ensure that projects are awarded across a minimum of three seabed regions, so the project pipeline has geographic diversity
- The option to bid for up to five variations of site boundaries, anchored at each of five locations, totalling a maximum of 25 possible site options.

- An increase to lease terms from 50 to 60 years
- Ongoing stakeholder engagement is continuing in parallel on plan-level Habitats Regulations Assessments, which will affect the seabed regions coming forward for Round 4.

Jonny Boston, business development manager at The Crown Estate, said: "While the additional work we are committing to at this stage requires us to revise our timescales for the launch of Round 4, we are confident that developers and stakeholders will value the time we are investing now to address their feedback, ensuring our final designs offer a robust and attractive proposition, supporting the continued growth of the UK's world leading offshore wind sector."

A further update is expected shortly, once the revised tender design has been developed and stress-tested.

In Scotland the timetable is slightly more settled, with the new leasing round wind likely to fully launch in October, Crown Estate Scotland has announced. A 'pre-launch' in July will provide further details.

The proposed timings are:

- Pre-launch to provide further information – July 2019
- Launch – October 2019
- Deadline for applications – between February and April 2020
- Offer of option agreements following publication of the Final Sectoral Plan adopted by Scottish ministers – between May and July 2020

John Robertson, senior development manager for Crown Estate Scotland, said: "We want to provide clarity around our leasing proposals. We'll continue to liaise closely with the industry and others in the coming months, and we'll confirm the exact launch date in due course."

That should give the industry more confidence over the pipeline. [NP](#)

HOW THE OFFSHORE WIND INDEX (PP22-23) IS SCORED

- 1: If the project has applied to National Infrastructure Planning (NIP) it is awarded 20 points
- 2: If it receives NIP approval it receives 10 points OR: If Scottish government consent granted, it receives 30 points
- 3: If no onshore reinforcements are needed it receives 20 points
- 4: If onshore reinforcement has applied for planning permission it receives 10 points
- 5: If permission is granted for onshore reinforcement it receives 10 points
- 6: If section 37 consent is awarded it receives 5 points
- 7: If the project has a Contract for Difference (CfD) it is awarded 20 points
- 8: If the CfD 1-year milestones have been met it is awarded 5 points
- 9: Seabed lease acquired (10 points)
- 10: If the project has TEC it is awarded 5 points
- 11: If the EPC contract is signed it is awarded 10 points
- 12: If the project is in a vertically integrated company or has an offtake deal it is awarded 10 points
- 13: If construction has begun it is awarded 5 points
- 14: If commissioning has started it is awarded 5 points
- 15: If in commercial operation it receives 5 points

CONTRACTS FOR DIFFERENCE

NEW POWER OFFSHORE WIND PROJECT INDEX					
Project name	Location	Owner	MW	Online	Score
Walney Extension	Irish Sea	Ørsted/PKA/PFA	659	On hold	130
Fully operational since last wind index					
Beatrice	Outer Moray Firth	Beatrice Offshore Windfarm Ltd (SSE/Copenhagen Infrastructure Partners/Red Rock Power)	750	2018	125
Generated first power in July 2018. Has a 15-year PPA with Danske Commodities for 294MW. Commissioning has been undertaken for most of the installed turbines at Beatrice, a few turbines remain uninstalled.					
East Anglia One	North Sea	Scottish Power/Vattenfall	1,200	2020	120
Hornsea 1	East Coast	Ørsted	1,200	On hold	120
Hornsea 2	East Coast	Ørsted	1,800	On hold	120
CFD awarded September 2017					
Near Na Gaoithe	Firth of Forth	EDF Energy Renewables	450	On hold	115
Won a CfD in round one with a strike price of £114.39/MWh. Defeated a legal challenge from the RSPB since the last wind index					
Triton Knoll	North Sea	Innogy SE/J-Power/Kansai		On hold	115
Awarded 860MW in second CfD auction.					
European Offshore Wind Deployment Centre (EOWDC)	Aberdeenshire	Aberdeen Offshore Wind Farm Ltd (Vattenfall/AREG)	100	2018	105
Has become operational since last wind index					
Blyth Offshore Demonstrator	Northumberland	EDF Energy Renewables	41.5	2018	100
Has become operational since last wind index					
Dounreay Tri	Caithness	Hexicon AB	12	On hold	100
The project remains on hold but the developers expect to restart the project and commissioning is planned for the first quarter of 2020. Construction began in 2017					
Moray East	Moray Firth	Moray Offshore Renewable Power Ltd (EDPR/Engie/China Three Gorges/Kansai/Mitsubishi)	1,116	On hold	100
Three wind farms with a maximum combined capacity of 1,116MW have been consented for development in the eastern area. In 2017, the project won a 950MW CfD at £57.50 per MWh					
Rampion	Sussex offshore	E.On climate and renewables	400	On hold	100
Has become operational since last wind index					
Kincardine	Aberdeenshire	Kincardine Offshore Windfarm Project (Grupo Cobra)	50	On hold	85
The developer installed a single 2MW turbine in 2018 so as to meet the RO deadline (October 2018), securing a rate of 3.5 ROCs (Renewable Obligation Certificates). It intends to install five more turbines to increase capacity to 50MW by 2020.					
Dogger Bank Creyke Beck A&B	Dogger Bank	SSE and Equinor	2,400	2020	80
SSE and Equinor have said they will compete for a Contract for Difference (CfD) in this spring's auction for their Dogger Bank wind farms					

CONTRACTS FOR DIFFERENCE

Project name	Location	Owner	MW	Online	Score
Dogger Bank Teeside A	Dogger Bank	SSE and Equinor	1,200	2020	80
SSE and Equinor have said they will compete for a Contract for Difference (CfD) in this spring's auction for their Dogger Bank wind farms					
Dogger Bank Teeside B – Sofia	Dogger Bank	Innogy	1,200	2020	80
Innogy said: "Construction timelines will depend on a successful outcome in the next Contracts for Difference (CfD) auction and a positive financial investment decision."					
East Anglia Three	North Sea	Scottish Power/Vattenfall	1200	2025	80
Seagreen Alpha-Bravo	Firth of Forth	Seagreen Wind Energy Ltd (SSE)	1500	On hold	80
Marine Scotland approved increasing the maximum capacity to 1500MW in August 2018. The developers have said they will compete for a CfD in the spring auction					
Inch Cape	Angus coast	Inch Cape Offshore Ltd (Red Rock Power)	1,000	On hold	65
Forthwind/Methill	Fife	Forthwind (Cierco)	60	On hold	60
The development missed the October 2018 ROCs deadline for floating wind, due to consent delays. It is currently on hold					
Hornsea 3	East Coast	Ørsted	2,400	On hold	50
The Planning Inspectorate has until 2 July 2019 to publish its recommendation					
Thanet Extension	Firth of Forth	Vattenfall	340	On hold	45
The Planning Inspectorate accepted the application for examination in July 2018					
Norfolk Vanguard	East Anglia	Vattenfall	1800	On hold	40
Applied to Planning Inspectorate in June 2018					
East Anglia One North	North Sea	Scottish Power Renewables	800	TBC	25
Scottish Power Renewables has brought forward the application date for East Anglia One North and deferred the application date for East Anglia Two, with both projects to be submitted Q4 2019					
East Anglia Two	North Sea	Scottish Power Renewables	900	TBC	25
Scottish Power Renewables has brought forward the application date for East Anglia One North and deferred the application date for East Anglia Two, with both projects to be submitted Q4 2019					
Seagreen Charlie-Delta-Echo	Firth of Forth	Seagreen Wind Energy Ltd (SSE)	1400	On hold	25
Norfolk Boreas	East Anglia	Vattenfall	1800	On hold	20
Vattenfall has said the Norfolk Boreas timeline is approximately a year behind its Norfolk Vanguard project, so a consent application to the inspectorate could be expected this summer					
Moray West	Moray Firth	Moray Offshore Renewable Power Ltd (EDPR/Engie/China Three Gorges/Kansai/Mitsubishi)	TBC	On hold	15
Under initial consultation					
Hornsea 4	East Coast	Ørsted	1,000	On hold	10
Project is at the beginning of the pre-application phase					
Outer Solway	Solway Firth	Ørsted	280	On hold	10
Seagreen Foxtrot-Golf	Firth of Forth	Seagreen Wind Energy Ltd (SSE)	790	On hold	10

The New Power Leader



JANET WOOD EDITOR, NEW POWER

Cadent's data disaster should be a lesson for all

In this issue we look at the possibilities of artificial intelligence in power trading. We frequently discuss the possibility of a 'smart, flexible' system that would see innovative companies take advantage of immense new sources of data on user behaviour and appliances. We look forward to the data-driven options that will empower consumers and offer them a world of new opportunities. Most important, we discuss how rich data sources can do this and at the same time make sure the energy system – and along with it industry and society as a whole – is being decarbonised.

It beggars belief that as we talk about how to take forward this exciting new industry, a gas company can have so little control over or understanding of its data that it can entirely lose the equivalent of a fairly large town.

We heard in May that Ofgem was imposing a record-breaking redress deal because gas distribution network Cadent had lost track of thousands of supply risers, in hundreds of blocks of flats. Even more shocking, that loss appears not to have become apparent within the company, despite the regular surveys, required maintenance, meter points and other data sources that ought to have regularly flagged up that there was a yawning gap in the middle of the company's records.

It is decades since I wrote my first article about continuous online monitoring equipment and years since cheap sensors came on the market that allowed such measures to be installed inexpensively. It's hard to install monitoring on largely passive pipework that is inside a building. But even the surveys of a century ago ought to have shown that there was a lack in Cadent's record keeping.

It seems impossible that there were not continual flags in Cadent's systems when attempts to update records with new information found that there was no record to update. It seems impossible that engineers responding to gas escapes did not realise they were working with a lack of information about the buildings where

they were working. It seems impossible that no manager or planner found themselves often irritated by missing records.

There is no excuse for Cadent. There is equally no excuse for the gas networks' previous owner, National Grid. The data problem is clearly not new and it is National Grid that ought to take some responsibility and learn the lessons from what could have been a disaster and clearly often resulted in consumers being left without heating and hot water for months.

The utility industry often finds itself working with historical data, and information that is fragmented, hard to access, and takes time, dedication – and money – to clean and bring into a useful state. It is time for the industry to learn from Cadent's mistakes and carry out a thorough data housekeeping. Network and consumer data is no longer the private fiefdom of incumbent utility companies, with gaps ignored or dismissed. There will soon be no place to hide, because new organisations are making use of consumer data. Nor should there be. It seems there is more than one way that new entrants are needed to keep energy companies up to the mark. **NP**

There is equally no excuse for the gas networks' previous owner, National Grid.

We must start preparing for new zero's extreme power scenarios

LCP's Kyle Martin takes a look at some of the implications of the Climate Change Committee report for the power sector

The Committee on Climate Change (CCC) has published its report on moving to a net zero economy and the UK's role in halting global warming. In summary, the CCC concludes that "net-zero is necessary, feasible and cost-effective" by 2050.

This has received mixed views from commentators, as is to be expected from any report that proposes such significant changes across the economy. While the proposals have been welcomed overall, there are several organisations that are either calling for the report to go much further or for a much slower rate of change.

While fully supporting the ambition of the CCC's report I recognise that the recommendations need to be realistic if they are to be credible. There are some significant lifestyle changes we will need to make if we are going to meet this target.

If the CCC had demanded everyone to become vegan overnight It would alienate a significant proportion of the public, while allowing more criticism of the other sectors that also need to rapidly decarbonise. Instead, the CCC has set out a number of sensible changes to our behaviour including a 20% reduction in the amount of beef, lamb and dairy produce consumed, reducing aviation use, switching to low carbon heating and using low carbon transport. Although some of these changes are desirable (I'd happily switch my car for a Tesla tomorrow) others will be more challenging.

Changes to the power sector will ultimately be driven by government policy and regulation, with the

industry largely building the infrastructure needed to decarbonise this sector.

Electricity production will continue to play a pivotal role in decarbonising the economy. As the cost of low carbon technologies continue to fall, this will allow heat and transport to decarbonise through electrification. With this increase in electrification, which the CCC suggests could result in electricity demand increasing to 645TWh by 2050, significant questions are raised about which technologies will have to be installed, and the speed of deployment.

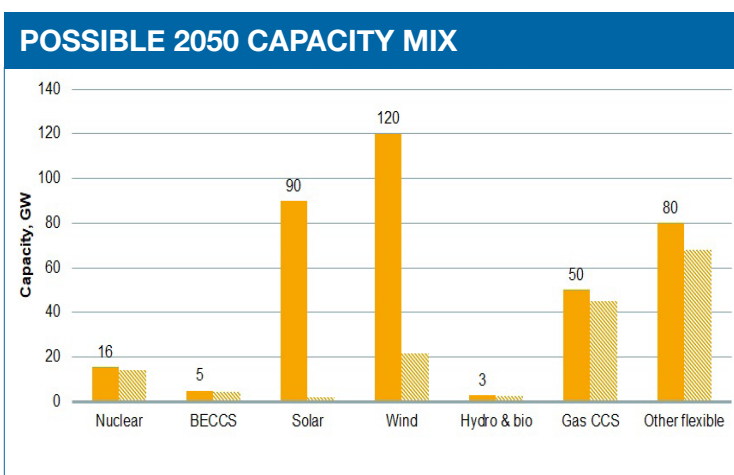
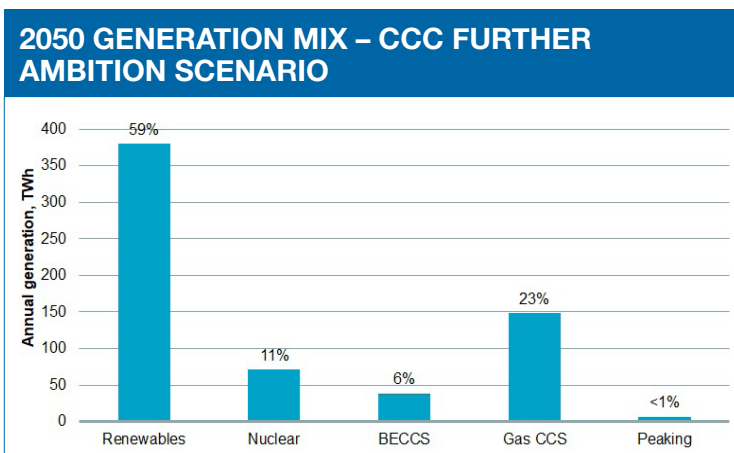
The CCC also stresses the need for carbon capture and storage (CCS) if we are to meet net zero by 2050.

This technology has the potential to provide back-up generation during security of supply events, but just as importantly it will be crucial to produce hydrogen for use in 'hard to decarbonise' sectors, including shipping and aviation.

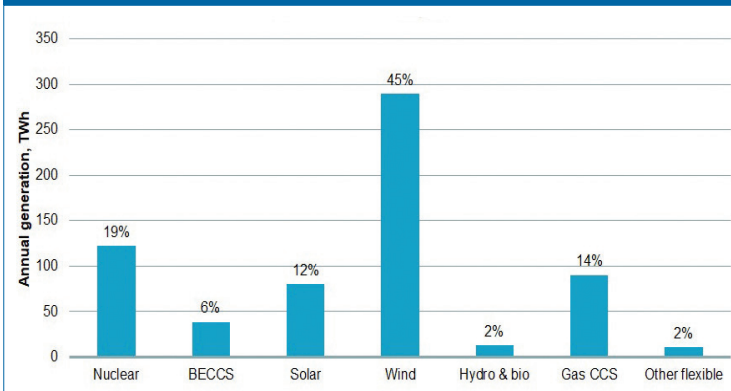
With peak demand of up to 150GW, the size of the system will grow. Security of supply will be more important as our increased reliance on electricity means we need to guarantee the supply of electricity.

Looking at the CCC's 'Further Ambition' scenario, which reduces emissions to close to zero, we can see that the generation mix is dominated by renewables (59%), with firm power provided from low-carbon generation including nuclear (11%), bioenergy with CCS (Beccs, 6%) and mid-merit gas with CCS (23%). Open-

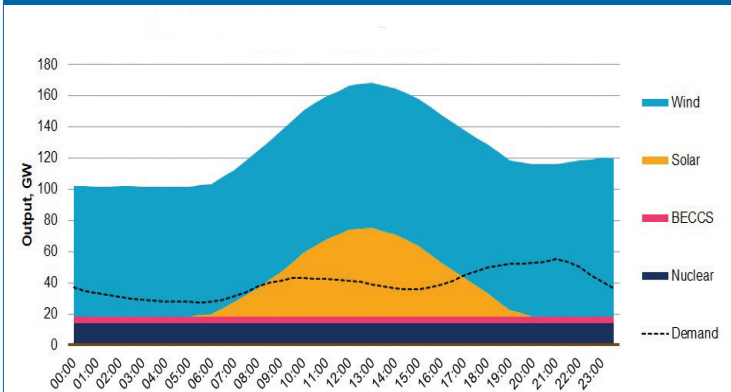
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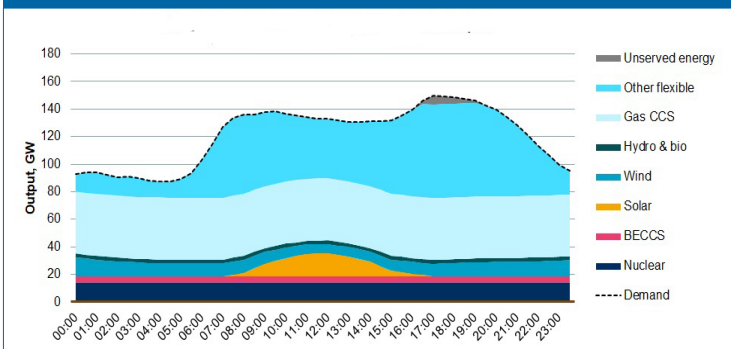
POSSIBLE 2050 GENERATION MIX



2050 DAY WITH LOW DEMAND & HIGH RENEWABLE OUTPUT



2050 DAY WITH HIGH DEMAND & LOW RENEWABLE OUTPUT



demand (close to the 150GW peak) used to show a day of extreme high demand. These extreme days, with very high levels of renewable curtailment and utilisation of vast quantities of backup generation, illustrate the benefits of long-term storage.

There is no doubt the level of change that needs to be delivered is challenging, but it also necessary. The UK must decarbonise its economy and putting the right tools in place now will allow us to reach these ambitions in the most efficient way.



Kyle Martin
Head of Market Insight
Lane Clark & Peacock

cycle gas peaking plant would provide back-up generation during periods of high demand and low renewable output, but their output is limited to <1% of the total annual generation.

How feasible is this scenario? To understand this, LCP has created a more detailed capacity and generation mix that is consistent with these assumptions, while making one change to the CCC assumptions.

MODELLING THE IMPACT

Our analysis shows that, accounting for the intermittency of renewable generation, the CCC report implies a gas CCS capacity requirement of 70GW.

This would require almost 3GW of new capacity to be deployed per year, assuming deployment started as early as 2025. We instead limit gas CCS build to 50GW, with 6GW of baseload nuclear capacity providing the remainder of the 23% of total generation required.

To provide 59% of generation from renewables we estimate that over 200GW of renewable capacity is likely to be required, made up of predominantly wind and solar. The 80GW of 'other flexible' would predominantly be the backup gas plant envisaged in the CCC scenario, but it would also include other technologies such as interconnection and battery storage.

How does a market like this operate? For one thing there is a significant amount of renewable curtailment implied by this modelling. To illustrate this, we can look at one extreme day where low demand is combined with high renewable output. We can see the high levels of curtailment required, with over 120GW of renewable generation to be contained. The sample day used is 7 August 2016, with the values increased to match the CCC's 2050 scenario.

We can also see the need for high levels of backup capacity. Pulling out an extreme day of high demand and low renewable output, we can see that there is a small amount of unserved energy, even with 80GW of flexible backup capacity and 50GW of gas CCS. The sample day used is 19 January 2016, with the CCC's peak

The New Power Interview



MARK WILSON, ILI ENERGY

Janet Wood spoke to an entrepreneur who is translating a relationship with farmers in Scotland into ambitious plans to help meet the GB energy market's desperate need for storage. It has taken him back to an old technology firmly back in fashion: pumped hydro storage

After decades when it was seen as too expensive to develop, pumped storage has come back into fashion. Such a plant uses excess power to pump water into a high reservoir, so when power is scarce it can be generated by releasing the water into a lower reservoir. It is flexible and fast-response (a few seconds) but capital-intensive, and when a Welsh project (Glyn Rhonwy) won planning permission last year using abandoned slate mines as the reservoirs, it was the first new such consent for three decades.

That project was for 50MW (possibly to be increased to 100MW) and it is no longer the only new plant in prospect. But it is an interesting choice for a non-specialist.

That – initially, at least – described ILI Energy chief executive Mark Wilson,

who hopes to gain consent for over 20 times that amount in the next three years.

Unlike many in the energy industry, Wilson did not start in the sector. He had been working on eco-home development (hence the parent

company's name, Intelligent Land Investments). The projects were not necessarily even equipped with small power generation like PV rooftops or ground source heat pumps. How did he get from there to kick-starting 2.5GW of pumped storage projects?

Wilson says he is an entrepreneur, looking for the next opportunity. His direct involvement in energy goes back to 2008, he says, because after the financial crash: "I knew if I stayed in that sector [homes development] I would go out of business. I looked around and renewables seemed the obvious answer."

He looked at the team he had built up to originate housing projects and then made similar investigations to other new entrants in the energy industry: "We looked at renewables and the different technologies, and we were in Scotland, so wind made the most sense to us at the time.

"Initially we looked at big wind (30MW-plus) but we didn't have a lot of funding. I sold 40% of the vehicle we pulled together to develop the onshore wind and that was enough to get us started." There were 23 investors – mainly family and friends.

"We quickly realised that the costs to get a big project through a full Environmental Impact Assessment runs up to several hundred thousand per project. We were fortunate that at the end of 2009 one of our advisors suggested we look at the >

“We were in Scotland, so wind made the most sense to us at the time

Feed-in Tariff. It was obviously a completely different scale, but when we did our research if we could do it in volume it could be quite lucrative.”

He decided on offering a single 500kW turbine to farmers, “and my background is in farming and I found it very easy to deal with the farming community. We created software that put all the necessary constraints overlapping each other. It told us where to go.”

Over five years the company signed up over 600 landowners that had the right sites and enthusiasm for the project. It whittled them down to 160 planning applications at the best sites over the period and it achieved 96 consents.

“That worked really well for us,” he says, but “the government quickly pulled the Feed-in Tariff without giving us much of a warning. That had an impact on the whole industry.” Of ILL’s sites, about 30 projects didn’t get built “because they lost all their value”.

Wilson sold the permitted sites on in their entirety. He says, “In hindsight it would have been nice to [continue to] own some of the assets, but the reality is we were very underfunded. Every time we sold an asset we got paid, got our creditors paid, and went on to the next one.”

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AN INDUSTRY MATURES

Wilson says he is an entrepreneur, not an engineer, and he was already thinking about his next step when the FIT changes put a halt to the wind pipeline. In that industry, he recalls. “We saw it go from being born to maturing.”

At the start, he says, people were very careful about what technology to go with. It was interesting watching that and to see when we were selling to developers instead of entrepreneurs.” There was a later period when the majority of investors were big funds from London and finally banks followed them in.

“The majority of [renewable sources] will come back again and I do see onshore wind going forward unsubsidised.” There are projects he will pick up later but now “all our resources and energy are in energy storage”.

Wilson sees more storage as an “absolute necessity” – and a gap in the market.

“The government quickly pulled the feed-in tariff without giving us much of a warning”

“I do see onshore wind going forward unsubsidised”

PUMPED STORAGE IN OPERATION

- Cruachan in Argyll, Scotland, now belongs to the Drax Group and has a capacity of 400MW. It took six years to build and opened in 1965.
- Ffestiniog in Gwynedd, Wales, has a capacity of 360MW and is operated by First Hydro. It was commissioned in 1963.
- Dinorwig in Gwynedd, Wales, has a capacity of 1700MW. It took 10 years to build at a cost of £425 million and started up in 1984. It now belongs to First Hydro.
- Foyers on Loch Ness is owned by SE and has a capacity of 300MW. It was opened in 1975.

He says the turbine series had made his team, extremely good at packaging projects. It had developed an extensive check process that Wilson compares to a jigsaw puzzle where all the pieces have to be passed to the developer, including planning, grid connections, leases etc.

Now, about 80% of the team’s attention is on its three major pumped storage projects and the remainder is batteries, of which the company has two already with planning permission.

“I looked at all the technologies,” he said, including searching the UK for salt mines to house compressed air storage. “I watched onshore wind and I saw how slow it was to pick up,” he says, because it took a long time for banks to become comfortable with the technology. The lesson was to use a very familiar technology and that was pumped storage. Put that together with the 600 landowners already on his books to find a site, and “it ticked all the boxes”, he says.

ILL needed a specialist at that point, so it brought in Aecom as a consultant. “They have looked at well over 100 locations in Scotland and we believe we have chosen the best,” he says. The result is three projects, on Loch Ness, Loch Awe and Loch Tay, all around the 600-800MW range.

This time, to run at pace, ILL used Abundance to crowdfund the project, raising “a few million”.

THREE PROJECTS IN THREE YEARS

The Loch Ness project, dubbed ‘Red John’ and requiring capital investment of £500-600 million, is with the Scottish government consents team now and Wilson hopes for planning approval later this year.

Originally that project would have pumped water between Loch Ness and a small neighbouring loch, but that was not permitted, as it would cause mixing of local ecologies. Instead, the project has to construct an upper reservoir. That adds up to £100-150 million rather than £100 million for the upper water source if the loch was used, but the >

new reservoir has had the thumbs up from the Scottish Environmental Protection Agency (SEPA).

It has a substation within 20km, with capacity, (both among ILI's requirements list) and the cable will be buried so overhead wire consent is not required.

“We are running as fast as we possibly can

Since January 2018, Wilson says he has been contacted by 15 major corporations interested in developing the project once it has all its consents.

“At the moment we are 90% there with Red John.”

The follow-on projects are Loch Tay and Loch Awe, both 600-800MW. Wilson expects to get Loch Tay into planning in Q2 2020 with consent a year later, and Loch Awe not more than three months behind.

I am surprised by the pace – my experience of hydro power projects is that planning can take much longer, and Wilson says since inception, “it’s still six or seven years, but we are running as fast as we possibly can”.

He says the Scottish government is extremely open and positive about this technology. That is where he thinks like an entrepreneur and not an engineer – he wants to get ahead of the competition. That certainly exists – the pumped storage pipeline is now at over 4GW (see panel) and although none have been realised several have planning permission.

Wilson says at one point onshore wind “was an absolute gold rush, everyone was trying to get ahead of you and we think that will happen again with this [pumped storage]. It is already happening with batteries.”

That’s not a bad thing, given GB’s growing need for storage on different time scales. That brings us to the financing needed to get these capital-intensive plants from permitting to construction.

“It is astonishing it is not on the government’s dashboard in the same way as offshore wind

What is needed is “government tweaks” he says. It is “astonishing it is not on the government’s dashboard” in the same way that

offshore wind is. Government must recognise pumped storage’s useful ability to provide ancillary services (like black start), but his first target is the Capacity Market, where he thinks pumped storage should have terms of 20-plus years. Then it needs long term

PUMPED STORAGE IN PLANNING

At the former Glenmuckloch open cast coal mine in Dumfries and Galloway a 400MW plant won planning consent in 2016.

SSE won planning approval for a 700MW plant named Coire Glas, and located at Laggan Locks near Loch Lochy. It wants to more than double the consented capacity, bringing it to 1500MW.

It has further plans for a 300MW plant at Balmacaan, near Invermoriston

Plans have been announced to double the capacity of the existing plant at Cruachan and to convert the existing Sloy hydropower plant, rated at 150MW, to a pumped storage plant..

Eishken Ltd is said to be planning a pumped storage plant with capacity of up to 150MW close to its planned Muaitheabhal wind farm on the Isle of Lewis. .

contracts – a decade – for those ancillary services.

“That will allow investors to commit,” Wilson says. There is potentially 4.1GW of pumped storage in the pipeline and “that’s a decent chunk. We are really hoping it is recognised.”

WHO PAYS?

I suggest there is little appetite for longer contracts in the Capacity Market, and National Grid ESO is tending towards shorter terms for its ancillary services products. Is he against the run of play?

“I think what we are doing is realistic,” he says, but a government guarantee for the debt would be another alternative, “It’s about getting cheap money or lowering the risk.” The inability to find low-risk finance is the reason why there is not more projects in the early stages, he says. ILI is able to take the risk because it has fewer investors to satisfy.

I ask his thoughts on other options to alleviate the financing issue.

Is there a half-way house, like interconnectors and their ‘cap and floor’ regime? It was one of the first things ILI looked at, he says. “It would get these built, undoubtedly,” but he thinks his fellow pumped storage developers agree with him that getting political agreement for a cap and floor mechanism is not achievable. And Wilson thinks it is wrong for pumped storage, which is there to take advantage of volatile prices.

“If you have cap and floor in there it kills the whole purpose of the asset,” he says. Even with a limited-term cap and floor followed by a market regime, the Capacity Market is a better option.

“With all the existing onshore and offshore wind it just makes sense,” to use the capacity Market and ancillary services, he says. Combining pumped >

storage with wind would make that firm capacity and allow those projects to offer firm capacity into the market, he says.

Is there appetite among corporates – perhaps in conjunction with a wind farm corporate power purchase agreement (PPA)?

“Unless you put some kind of security ... there are very few people that will take that leap

He goes back to either the Capacity Market or a government guarantee, but the PPA is “certainly an opportunity”, he says.

The question is whether the PPA would have to

be set at so high a price it is not attractive to a corporate buyer. But it doesn't seem outlandish, and there are proposals around for a 'innovation PPA' that would offer tax benefits similar to those available for Enterprise Investment Schemes. I ask whether the project is too big for corporate PPAs and he says it is right-sized for data centres and

the needs of Amazon, Google or other big buyers.

As for ILI, it appears that now he is in the energy market Wilson will be here for the long term. He is not planning to jump away from the pumped storage plants when development consent completes the package. “We would retain a small interest and continue through the build because we can provide help. For the second and third projects we want to retain more.”

Now he will be looking for specialists to help bring the projects to the finance market. That still seems a big step: “The IRR for these projects can be extremely positive just looking at existing mechanisms, but unless you put some kind of security in there or guarantees from the government, there are very few people that will take that leap.”

There are still a few years to go and some hurdles to clear before these plants are in operation. Frustratingly, we are talking at a time when Scottish wind is constrained, because of cable issues with the new Western Bootstrap that links Scotland with the England and Wales grid. It seems more large storage can't be built too quickly. **NP**

Another pumped storage entrepreneur takes the ‘new technology’ option

Pumped storage is back in style. The same week I spoke with ILI's Mark Wilson (see interview) I heard energy industry veteran Mike McWilliams talk about a dramatically different pumped storage design, at a lecture given at the Institution of Mechanical Engineers.

McWilliams' proposal is for a pumped storage installation with capacity of 1,000MW and storage of 6GWh. It can be standardised because it relies less on geography and topology than regular hydro. Almost all the plant is underground.

In this proposal, McWilliams explained, the first stage is to bore a 1,400m vertical shaft – in fact, it is new developments in vertical boring that make the new design practicable. At the foot of the shaft a tunnel boring machine would be used to excavate a tunnel 7m in diameter and 46km long. But it is not used to take water anywhere: instead the tunnel, bored in a spiral out from the foot of the shaft, is the pumped storage plant's lower reservoir. Also at the bottom of the shaft are four turbine generators, while at the surface is just one (upper) reservoir, covered and lined. It is a closed system, requiring just 2 million cubic metres of water, and the surface site takes up 10ha.

As a generator, the plant is efficient (and the res-

ervoir relatively small) because it has high ‘head’ – the 1,400m shaft. What is more, with so-called ‘ternary’ generating units at the foot of the shaft the project can pump and generate simultaneously; it sounds odd, but it is a more efficient way of generating at less than full power than operating a turbine generator at part-load (and it means it can add stability to the network, and other ancillary services, at any time).

Overall, McWilliams believes the unit can be built for US\$1,745 per kW and US\$290 per kWh – although that excludes interest during construction. Because it has relatively little redesign for different sites and a fairly small surface footprint it could be constructed in around five years.

Is it an option for the UK? This is where the project becomes more difficult and why McWilliams expects it to be built overseas. He does not see the Capacity Market, or short-term ancillary service contracts, as enablers for such a project. Instead, he wants the System Operator to specify, procure and eventually own such a project, in a structure he refers to as ‘finance, engineer, lease and transfer’ (FELT).

It suggests that for such a plant, financial structuring is a bigger barrier than engineering design. **NP**

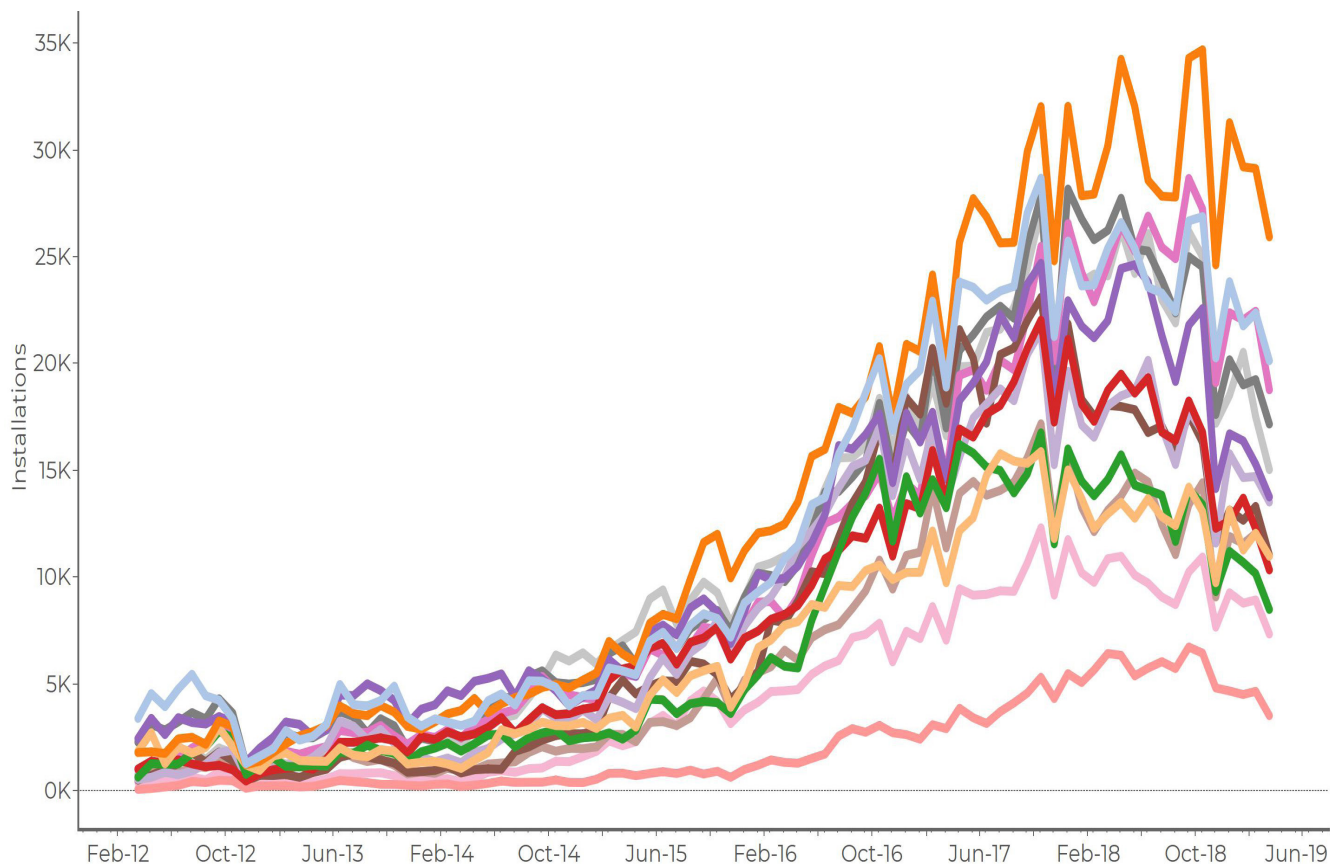


ElectraLink

As the smart meter rollout continues, *New Power* will be tracking progress with the kind assistance of ElectraLink.

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MONTHLY SMART METER ROLLOUT BY GRID SUPPLY POINT



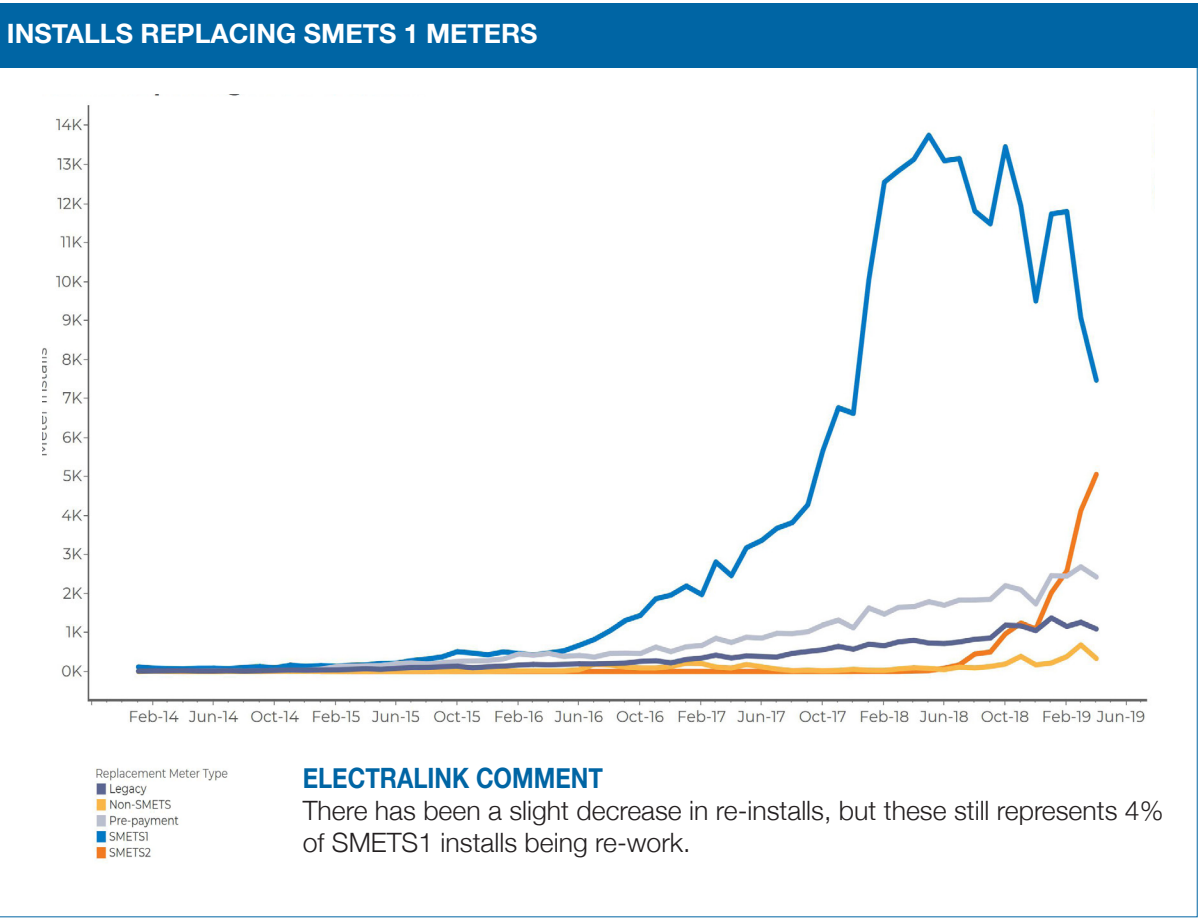
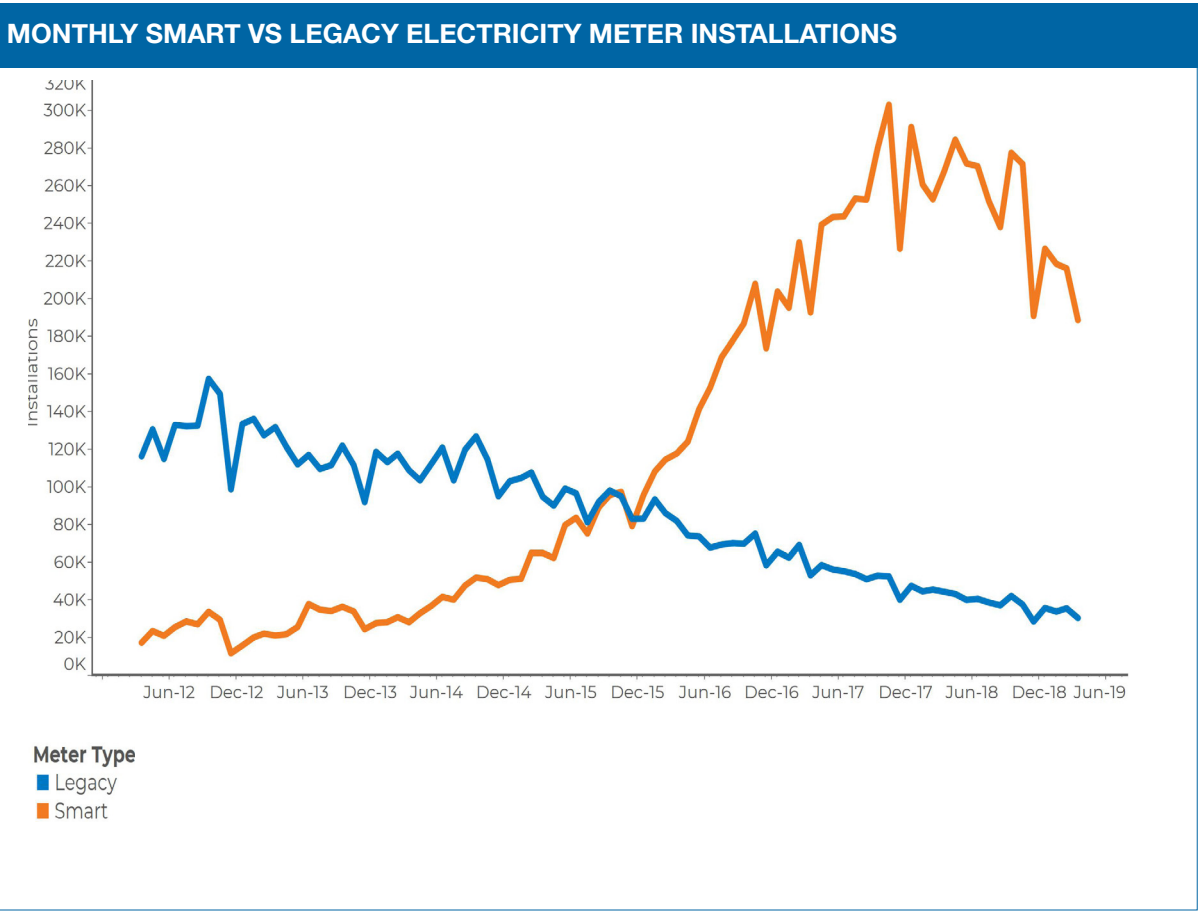
Gsp Group

- East Midlands
- Eastern England
- London
- Merseyside and North Wales
- North Eastern England
- North Scotland
- North Western England
- South Eastern England
- South Scotland
- South Western England
- Southern England
- Southern Wales
- West Midlands
- Yorkshire

ELECTRALINK COMMENT

April saw a new record month for meter installations, exceeding 300,000 for only the second time. This was without the weather disruptions and with longer daylight hours that can help improve productivity. The improved productivity was not across the board, with two areas decreasing install numbers in April. Despite the increase in installs, there is still a long way to go – at current rates the rollout would not complete until late 2023 at the earliest.

The chart shows progress split by geographical area, but note the rollout is led by suppliers.





All of the price statistics in this section are derived from the Energy Imbalance Prices produced by Elexon. These are available from the Elexon Portal: www.elexonportal.co.uk. Elexon makes sure that payment for imbalances in wholesale electricity supply and demand is settled accurately and efficiently. For more information on the BSC or Elexon's services, visit www.elexon.co.uk.

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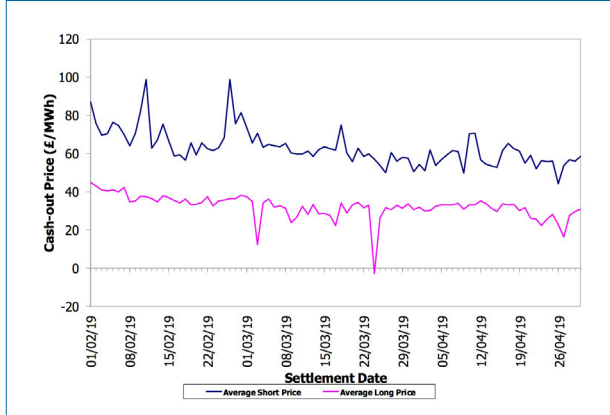
SYSTEM PRICES (LONG SYSTEM), £/MWH

	Min	Max	Median	Mean	St Dev
April 2019	-61.00	50.35	31.10	29.92	7.39
March 2019	-70.24	55.50	32.75	29.08	14.81
February 2019	0.00	60.82	38.50	37.09	7.17
January 2019	-50.00	65.68	47.30	44.48	9.87

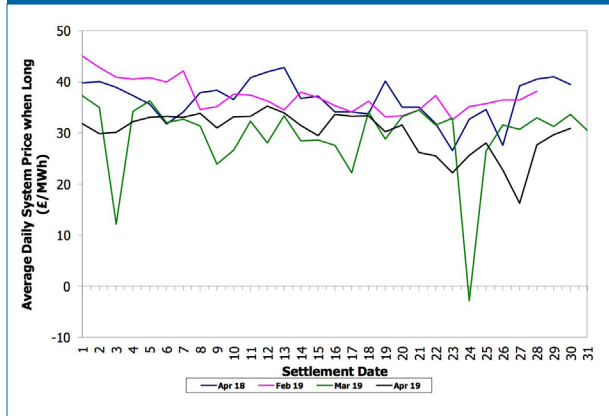
SYSTEM PRICES (SHORT SYSTEM), £/MWH

	Min	Max	Median	Mean	St Dev
April 2019	0.00	100.00	55.00	57.87	11.52
March 2019	36.80	152.30	59.94	62.28	11.62
February 2019	32.60	145.00	68.45	70.21	16.37
January 2019	29.80	195.00	80.00	84.77	21.75

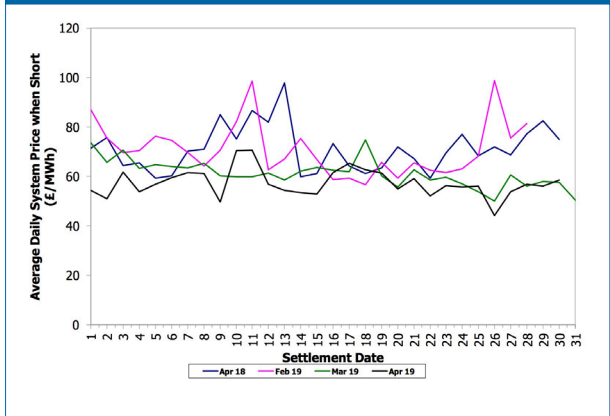
DAILY AVERAGE SYSTEM PRICES, £/MWH

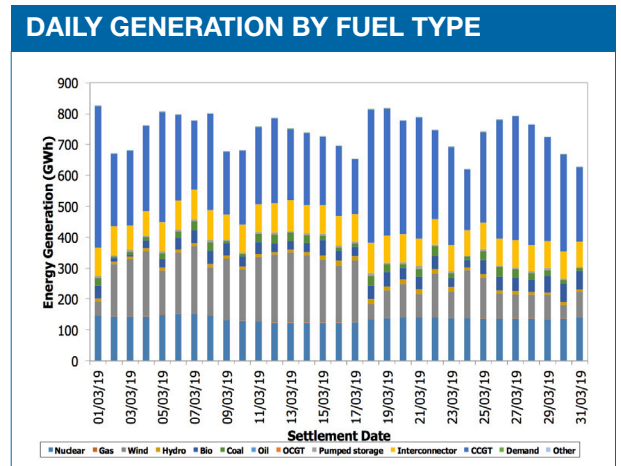
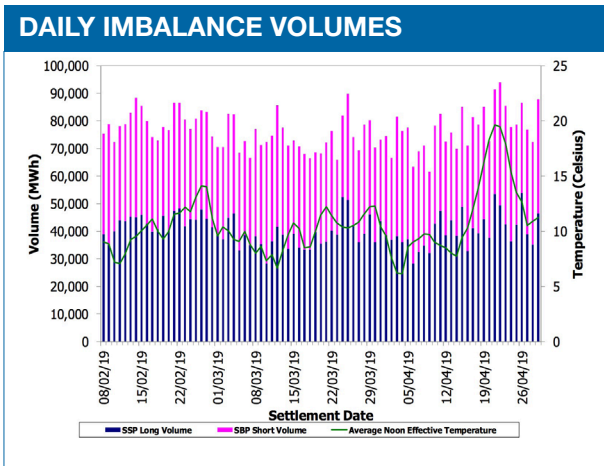
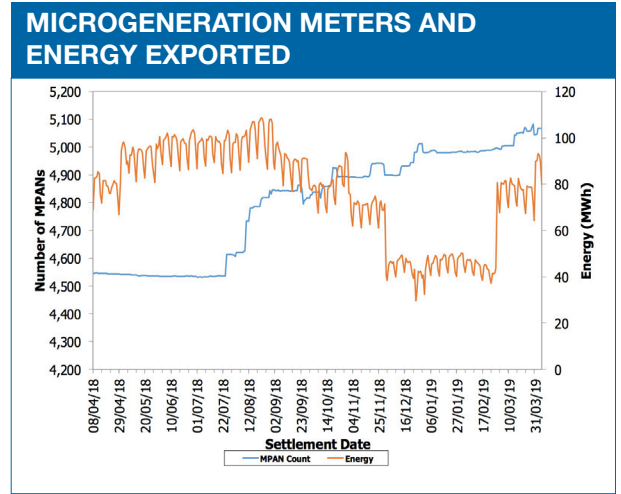
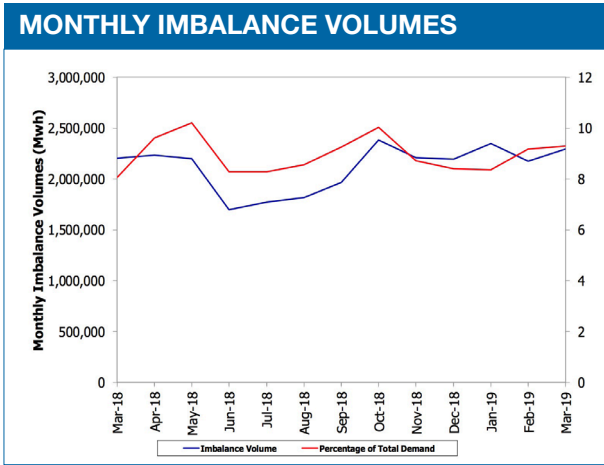
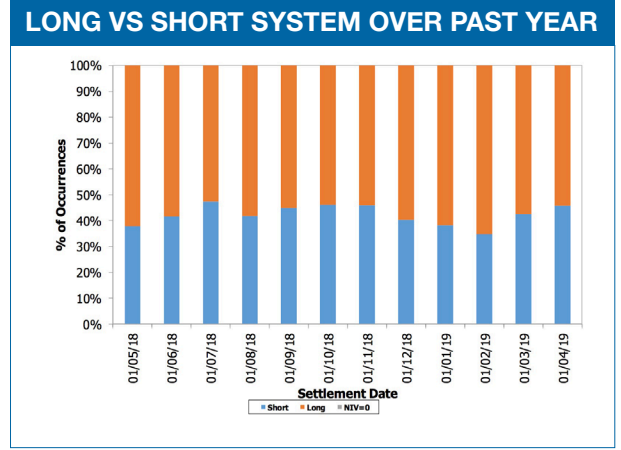
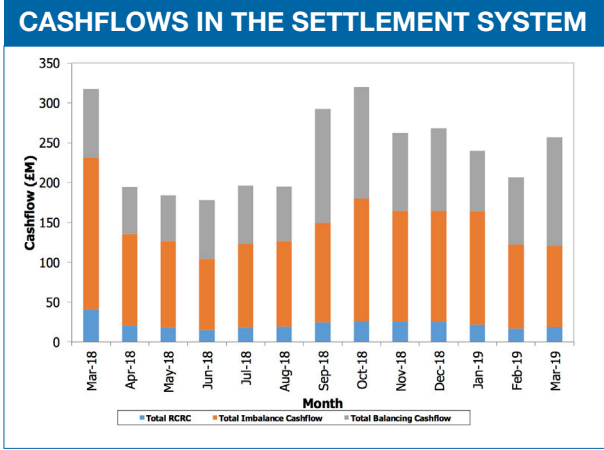


AVERAGE LONG SYSTEM PRICE PER SETTLEMENT DAY, £/MWH



AVERAGE SHORT SYSTEM PRICE PER SETTLEMENT DAY, £/MWH





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USING NEW POWER'S ONLINE DATABASE

New Power's database includes all types of power projects: gas (combined cycle gas turbine (CCGT), open cycle gas turbine (OCGT) and small engines), coal, onshore wind, offshore wind, hydro, photovoltaics (PV), energy from waste, biomass, wave and tidal, etc; also interconnectors and storage.

Sort entries by: project name; developer; project type; location (mostly by county); country (England, Scotland, Wales, Northern Ireland); original planned start-up date; planned capacity; status (see below); actual start-up; current capacity; transmission capacity and from when; ownership.

You can use other categories to refine your search.

To access the database, use the 'subscriber area' tab. You will be asked for your login and password.

We welcome updates, please email the editor.

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