



Local Energy Matters



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Energy storage projects: universities take the lead

A number of UK universities have announced innovative low-carbon and energy projects in the last month, seeking to build on existing research, working with the private sector and partners in higher education. These projects cross the energy sector, looking at smart technologies, transport and supply to homes and businesses alike.

The East Anglian region remains at the forefront of these initiatives with the University of Cambridge. It confirmed that it will lead on an £11.9mn project funded by the Faraday Challenge, to look at ways to extend battery life for electric vehicles (EVs). Working alongside nine universities and ten industry partners – including Newcastle University, Imperial College London and the University of Warwick – the project will examine how issues such as environmental factors affect the way in which energy is stored, used and re-charged in batteries.


The overall objective is to better understand how a range of factors can affect the component parts and compounds that make up a battery, and in turn how this can impact how efficiently and how long batteries work. This is one of four projects into batteries that has been funded by Faraday, the others being led by different institutions across the country, which will receive a total of approximately £42mn in funding.

Further afield, the University of Manchester has been announced as the lead institution on the European Commission-funded Energy Poverty Observatory, working with partners in higher education, the public sector and business to examine energy poverty and ways in which it can be combatted through new policies and technology.

Looking at new ways of providing low carbon heat, Cardiff University will be one of the main partners in a £9.4mn geothermal district heating project financially supported by the UK and Welsh governments. Led by Bridgend County Borough Council and located on the site of the former Caerau Colliery, the plan is to use water heated geothermally in the mine to provide heat to an initial 150 homes as well as other local buildings.

Keele University has announced that it has appointed Siemens to convert its campus into the largest single integrated electricity, gas and heat Smart Energy Network Demonstrator (SEND). The university said the project will be the first facility in Europe for “at-scale living laboratory” testing and demonstration of new smart energy technologies and services.

**The Faraday
Institution
was set up in
October by the
Department
for Business,
Energy and
Industrial
Strategy (BEIS),
which has
£246mn to
boost battery
R&D in the
UK.**



This is in addition to the university's ongoing work on the Cadent Gas and Northern Gas Networks HyDeploy project. This is examining the use of hydrogen in the nation's gas network as a means by which to reduce carbon dioxide emissions and is due to move to its latest testing phase in the coming weeks.

Meanwhile, the Offshore Renewable Energy (ORE) Catapult has announced that it is looking to partner with UK-based universities in an Electrical Infrastructures Research Hub. The Catapult, which has already provided support to projects in East Anglia, said the partnership would aim to accelerate research and development activities in relation to offshore renewable technologies through a combination of academic and industry skills and resources.

Energy storage projects: commercial funding gathers pace

In the commercial battery world, battery provider Connected Energy received a \$3mn investment from Macquarie Group and French utility company Engie. This will fund its development of ex-EV batteries as stationary electricity storage. Connected Energy is partnered with Renault and more recently Jaguar Land Rover to deploy old vehicle batteries, extending their working lives.

New company Fluence, a start-up co-owned by multi-national battery players Siemens and AES Energy Storage, opened for business. The company will look at projects up to 100MW, and will be deploying the largest battery in the world in California: a 100MW project which will be able to supply energy for four hours before re-charging.

The company will also offer financing deals, simplifying the route to deploy batteries. Small-scale projects in particular may be able to obtain batteries for no up-front cost, allowing them to reduce their impact on the grid and save money.

SmartestEnergy, a GB energy supplier working in the non-domestic arena, has struck a deal to provide commercial services for a 25MW battery in Tynemouth. The company will supply energy to, and take energy from, the battery. It will also help the project access the Enhanced Frequency Response market, which sees National Grid pay providers for their help in ensuring that the system remains stable and lights stay on.

East of England tariffs

Tariffs from seven 'household archetypes' reflect households with similar energy consumption levels, and are a useful tool to provide pricing information relevant to different types of customer.

Figure 1 (below) shows the best tariff deals, and Figure 2, overleaf, shows the range of annual cost of tariffs for the Eastern supply region, updated to 30 January.

The average saving between the least and most expensive deals across all archetypes is £400.

The best deals in the region are standard variable tariffs (SVTs). Big Six supplier SVTs are usually more expensive than fixed deals; however, some smaller suppliers are consistently offering lower priced SVTs. This includes the likes of Outfox the Market and Utility Point. Utility Point also offers the best fixed deal for the majority of customers in the Eastern region.

The most expensive deals in the Eastern region are, for all archetypes, SVTs and prepayment deals. The least expensive prepayment deals are always significantly more expensive than the least expensive SVTs and fixed deals, by between £100-£200 per annum across all customer archetypes.

Figure 1: Best buys in Eastern region (January 2017)

Archetype	SVTs	Fixed tariffs	Prepayment tariffs
1	Utility Point FlexiOnlineTracker - £768	Utility Point Just Up 18 - £825	Bristol Energy SVT Paper Billing - £946
2	Outfox the Market Whack! January Tariff - £1,067	Breeze Fixed 1 Year - £1,153	Bristol Energy SVT Paper Billing - £1,284
3	Outfox the Market Whack! January Tariff - £449	Utility Point Just Up 18 - £496	IRESA Flex5 Prepayment - £611
4	Utility Point FlexiOnlineTracker - £623	Utility Point Just Up 18 - £668	Bristol Energy SVT Paper Billing - £786
7	Utility Point FlexiOnlineTracker - £696	Utility Point Just Up 18 - £721	Nabuh Energy Holly Tariff - £844
8	Toto Energy TOTO Smart Meter Saver - 873	Breeze Fixed 1 Year - £906	Nabuh Energy Holly Tariff - £1,046
9	Toto Energy TOTO Smart Meter Saver - £925	Breeze Fixed 1 Year - £963	Nabuh Energy Holly Tariff - £1,108

Fixed tariff

A tariff which offers guaranteed standing charges and unit rates, usually until a defined end date.

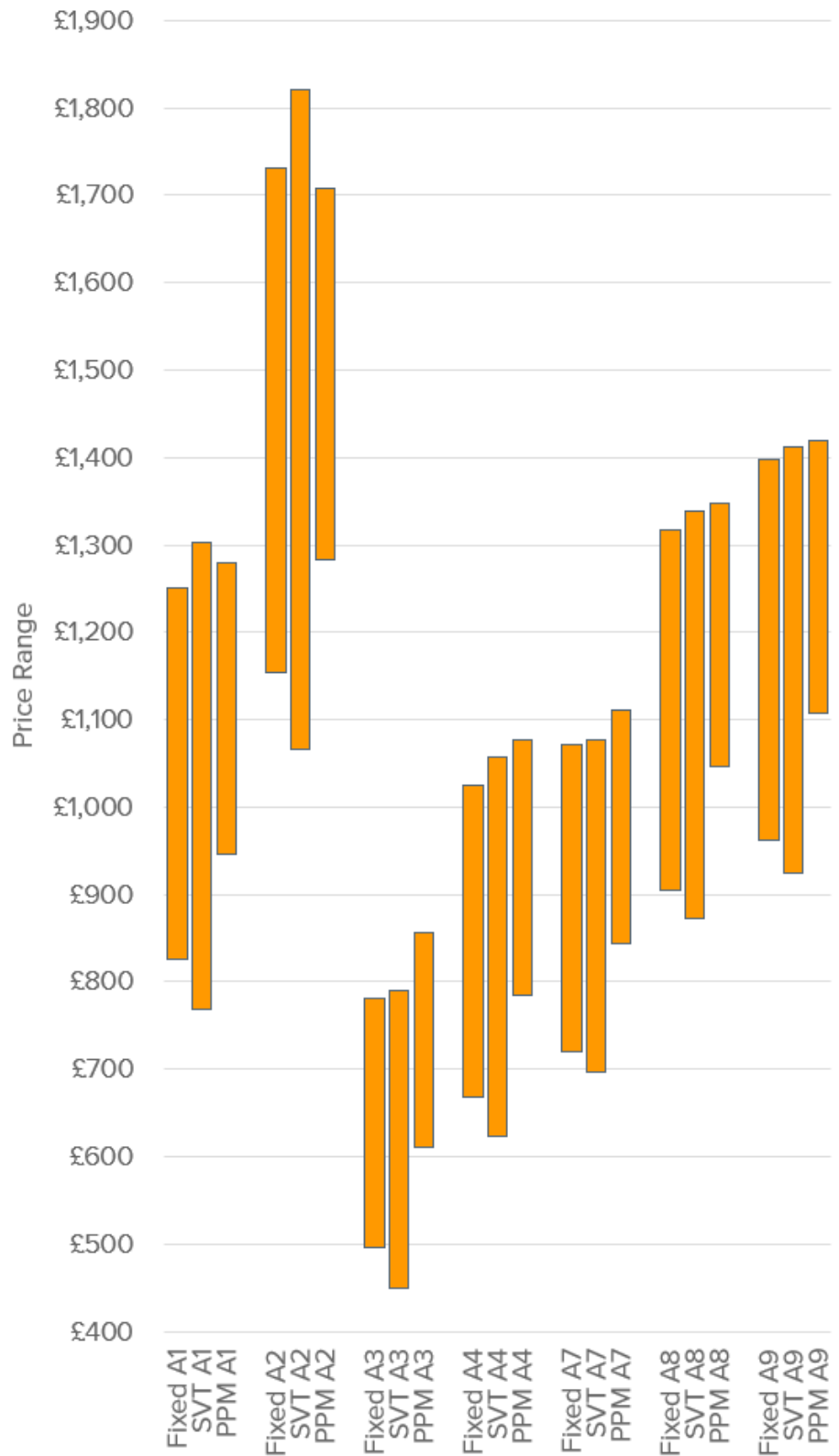
Standard variable tariff:

A supply contract with an indefinite length, which has variable prices that can go up and down with the market.

Prepayment tariff:

A tariff for customers with prepayment meters, which enables payment for energy in advance through 'topping-up' using prepay tokens, cards or a key.

Figure 2: Annual tariff cost spread in the Eastern region at Ofgem medium typical consumption value (January 2017) by archetype



Non-mains gas households:

- Archetype 1: Low-income electrically-heated
- Archetype 2: All other electrically-heated
- Archetype 3: Low-income non-metered fuel-heated
- Archetype 4: All other non-metered fuel-heated

Mains gas heated households:

- Archetype 7: Low-income single adults (lone parents or elderly) in social rented houses
- Archetype 8: Younger working families in medium-sized rented houses
- Archetype 9: "Average" mains gas-heated households

East Anglia energy savings revealed

In January, Business Energy Efficiency (BEE) Anglia, announced that over 500 Norfolk and Suffolk businesses identified £3mn worth of savings. The BEE Anglia project, which is funded by the European Regional Development Fund, is an energy advisory and grant funding venture, and is being delivered across the region by Suffolk County Council, Norfolk County Council, Groundwork and NWES.

The project, to date, has reviewed 513 organisations and has uncovered three key findings:

- Cost savings of £3,250,000 (£6,335 per business)
- Carbon savings of 27,000t (52t per business) and;
- Savings equal to the equivalent of taking 17,700 new cars off the road a year.

On top of identifying savings, BEE Anglia has supported energy efficiency projects through over £184,000 in grant funding. These projects, which are now worth a total of £660,000, include radiant heating, wood burners, lighting and vehicle tracking.

The successes of BEE Anglia add to a raft of projects and initiatives that have been laid out in East Anglia and surrounding regions over the last month.

Cambridge University is to install a new 1,500 panel, 373kW solar array on its campus, to provide renewably sourced power for a housing development and academic buildings on its campus.


Elsewhere, in Cambridgeshire, consulting and infrastructure support services provider Amey claimed community support for its proposals to build a £200mn energy-from-waste plant at Waterbeach. If approved, the project could create around 300 jobs and provide electricity for over 60,000 homes.

Meanwhile, in Bishop's Stortford, Hertfordshire, an 18-foot high battery storage power station could be built on a green belt site, pending planning permission. The 10MWh plant would release surplus electricity onto National Grid's transmission system at peak times, reducing the likelihood of local power cuts.

Finally, North Lincolnshire Council announced plans to improve energy efficiency and cut carbon emissions, while saving local tax-payers £4mn in the process. The measures reflect mindfulness of rising energy costs, which could rise as much as £5.2mn by 2022 if mitigating action is not taken.

BEE Anglia three core offers:

- **Free energy reviews: impartial and independent reviews that identify best cost and carbon saving opportunities**
- **Grant funding: European funding to support businesses in implementing innovative energy efficiency measures**
- **Carbon charter accreditations: local accreditation to help businesses stand out**



Examples of energy efficiency measures include biomass heating systems in Scunthorpe and Crowle, and district-wide LED street lighting. The council intends to undertake more projects over the next five years, and hopes to cut carbon emissions by 25% in the process.

Lenders question market for energy efficiency

The UK government's consultation on creating a market for energy efficiency measures as a means by which to promote take-up in homes and businesses closed in January. Among the points raised were the extent to which mortgage providers have a role to play in improving the energy efficiency of the properties on which they offer loans.

In its response to the consultation, finance and banking industry trade association UK Finance said that lenders "support in principle" affordable measures to reduce domestic energy costs, although it questioned some of the assumptions that the government made in this area. These include that lenders have a role to play in promoting energy efficiency to both new and existing customers, and that lenders should be required to improve the efficiency of properties on which they lend.

However, the group said it was "not wholly persuaded" that there is industry acceptance of these assumptions, or that they are true in all cases. It added that issues such as property value, mortgage affordability and the potential for default are influenced by so many factors that it may be hard to isolate energy efficiency as a "factor of material influence." It was also critical of the way in which the Green Deal scheme had been managed, stating that "complexity and bureaucracy" reduced interest from homeowners.

Staying in the property sector, Brunel University London has announced the launch of a new research project aimed at demonstrating how buildings can be renovated to use "near zero energy". The €8.4mn (£7.4mn) project, funded by the European Commission's Horizon 2020 scheme, will see 17 partners from industry and academia work together to develop a "Retrofit Kit" that could reduce energy consumption of renovated buildings by 60-95%.

The kit will consist of a range of "advanced, cost efficient and energy saving technologies" that can be fitted 30% faster than typical renovations. As part of the project, construction on four demonstration "near Zero Energy Buildings" will begin in 2019 to provide practical, real-world examples of the retrofit

potential. One of these sites will be located on the university campus and the others located in Denmark, Switzerland and Spain.

In the public sector, the NHS Sustainability Campaign has called on the government to support NHS Trusts demonstrating efficiency and freeing up capital for front-line services with appropriate support and funding. The campaign published its report, NHS Sustainability Impact Report 2018, which offered examples such as the Manchester University NHS Foundation Trust.

The Trust has cut its carbon footprint by 5.58% since 2013-14, despite a 3% increase in patient contacts year-on-year. Its energy-related carbon emissions have fallen by 8.5% in its usage when normalised against patient contact figures. The North East Ambulance Service, meanwhile, is three years through a seven-year Carbon Management Programme which is expected to save it £1.2mn/ year in electricity, gas and diesel. It targets a 30% reduction in CO₂ by 2020.

Nissan launches home solar and storage, and vehicle-to-grid project

On 18 January, Japanese car maker Nissan announced its new venture, an all-in-one home energy solution. Dubbed the xStorage solution, the offering combines solar panels with a lithium-ion battery to generate and store energy. xStorage also comes with an intelligent home energy management system, which will help owners to control their energy use.

Starting from £3,881, Nissan said that the system will save up to 66% on energy bills. The batteries are 'second life' units, recycled from Nissan electric vehicles. Domestic use is less demanding than EV use, so batteries too degraded for EVs can be repackaged to support solar panels in the home.

Nissan will aggregate the batteries to offer services to National Grid, earning money by doing so. The system also allows houses to continue using electricity during a power cut. It is planning to use 7.5kWh battery units, larger than similar units from elsewhere in the sector.

A vehicle-to-grid (V2G) trial called e4Future was also announced in January by Nissan, awarded £9.8mn in funding from the Office for Low Emission Vehicles and the Department for Business, Energy and Industry Strategy. In partnership with Nuvve, National Grid, and distribution networks UK Power Network and Northern Powergrid, Nissan hopes to install 1,000 trial V2G chargers.



These will offer both smart charging to EVs, and use the vehicles' batteries to support the electricity grid during peak times. National Grid and the distribution networks would pay for these services, as it allows them to run the network without expensive upgrades.

Nissan is a world-leader in electric car manufacture, with its LEAF having sold over 300,000 units: more than any other EV. Around 50,000 a year are built in its Sunderland factory.

Ministers urge councils to take advantage of EV funding

In January 2018, BEIS Ministers Jesse Norman and Claire Perry called for more local authorities to engage with the government's 'on street residential charge point scheme'.

Launched in 2016, the government's 'on street residential charge point scheme' grants up to 75% funding to local authorities to cover the procurement and installation costs of EV charge points. It recently emerged that only 5 Local authorities in the UK are currently engaged with the scheme and over £4.5 million of funding still available, resulting in an intervention from BEIS. Government ministers Jesse Norman and Clare Perry wrote to local council leaders to remind them of the scheme's availability and the benefits it can bring to their districts.

The scheme aims to address the issue that millions of UK households do not have access to off-street residential parking, where they could charge EVs. BEIS estimates that the number of EV drivers in the UK grew by 30% in 2017, increasing demand for charge points. Transport Minister Jesse Norman commented "We are in the initial stages of an electric revolution in the UK transport sector, and connectivity is at its heart. Millions of homes in the UK do not have off-street parking, so this funding is important to help local councils ensure that all their residents can take advantage of this revolution."

Transport links for energy coasts

Transport links between the North East and North West coasts are to be reinforced in a bid to create 850,000 new jobs and £100bn of economic value by 2050. Transport for

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the North (TfN) published its draft Strategic Transport Plan on 16 January.

TfN said that the transport corridor will improve connections between Cumbria, Lancashire, North Yorkshire, the North East and Tees Valley.

These areas all contain significant non-carbon energy manufacturing and research facilities, in addition to Cumbria's nuclear facilities at Sellafield and the proposed nuclear station at Moorside. TfN noted that while north-south links were already good or receiving investment for upgrades, east-west links still had many gaps in capacity.

The new transport links will connect offshore wind farm sites in the Irish Sea – Burbo Bank, Walney and West of Duddon, for example – with turbine and blade manufactories on the east coast such as the Siemens blade and turbine factories in Hull. The proposals are predicted to add £20.8bn in gross value, 408,000 population and 217,000 jobs.

January 2018 e-POWER Auction

The latest e-POWER began on 23 January 2018, with 65 generators participating, representing over 280MW of capacity.

e-POWER is an online platform where low carbon generators can sell power contracts in a live bidding auction. Power contracts sold are usually 6 or 12 months long and are include a range of technologies: wind, hydropower, waste to energy (WtE), biomass, anaerobic digestion (AD), solar photovoltaics (PV), landfill gas utilisation (LFG), combined heat and power (CHP), and mixed technologies.

Commencing on 23 January 2018, the latest e-POWER auction lasted for three days and sold 280MW of capacity. Bidding activity was high relative to previous auctions, with an average of 16 bids per site, and up to 50 bids on some sites. Of the 65 generators represented, 22 were wind, 14 were PV, eight were Hydro, six were AD, six were LFG, five were WtE, 1 was biomass, 1 was CHP and 2 mixed tech.

Prices delivered ranged from £4.42/MWh to £15.27MWh, with controllable technologies – which can generate on demand – and stations including renewable obligation certificates in their offer gaining the highest prices. Pixie Energy is currently working with e-POWER on a FiT Aggregation campaign, to help generators receiving the standard FiT export tariff to sell their power through the e-POWER auction and reap the full market price.

Visit www.pixie-energy.com for our daily feed of low-carbon news.



The next e-POWER auction is scheduled to take place on 27 February 2018.

Government reveals database of low-carbon projects

The government has unveiled an online database of 4,300 low-carbon energy projects to “highlight the support on offer for low-carbon carbon technology”. Projects contained in the database have all benefitted from either Innovate UK, the Energy Entrepreneurs Fund or Engineering and Physical Sciences Research Council (EPSRC) funding in the last five years.

The initiative is designed to complement the Clean Growth Strategy, published in October 2017, which set out proposals for decarbonisation, including £2.5bn worth of investment to support low-carbon generation to 2021.

Furthermore, it is hoped the initiative will engender interest from domestic and foreign investors, who would potentially seek partnerships and export opportunities. Claire Perry, Minister of State for Energy and Clean Growth, has already announced a new UK-South Korea partnership. The two countries will contribute £3mn funding each to support pilot projects for innovative smart technologies.

Record number switch energy supplier in 2017

Figures published by trade association Energy UK show a record number of consumers switched energy supplier in 2017. 5,543,472 households changed provider, 15% more than in 2016 and over 70% more than in 2015.

Nearly three in ten switches (28%) were away from the Big Six energy supplier – British Gas, EDF, E.ON, Npower, Scottish Power and SSE – to independent suppliers. Independents are often less expensive than the incumbent suppliers, and have built a combined 20% market share.

Switching peaks were seen in March and especially in September and October, ahead of the winter period when most households spend more on energy.

The average switching rate in the East of England region was 16% between September 2016 and August 2017.

Feed-in-Tariff update

The Feed-in Tariff (FiT) has entered the first quarter of 2018 (Q118). Data published by Ofgem set out new tariff rates and installation numbers up to the end of the previous quarter (Q417), as well as policy updates to the scheme.

As of 31 December 2017, there is 5,898MW accredited to the scheme, spread across 813,714 installations. Relative to previous quarters, the accreditation of new capacity to the scheme has begun to slow. This slowdown can be attributed to the deployment caps introduced by BEIS in January 2016, which limit the amount of new capacity that can be accredited to the scheme in each quarter. New capacity accredited under post-2015 tariff rates frequently falls significantly short of the caps. Significantly reduced tariff rates have discouraged uptake of some technologies.

The cost of the scheme is covered by energy suppliers, who spread the cost among their customers. The cost to suppliers in Q417 was £4.57/MWh. FiT costs are affected by load factors, which are the percentage of time a generation site operates at full capacity. In Q417, load factors were notably lower, relative to the same quarter of the previous year, which decreased the costs of the scheme.

The Clean Growth Strategy (published by the government in October 2017) implied that the FiT scheme will close to new generators in April 2019. This was later confirmed in the Autumn budget. After this date, accredited generators will continue to receive payment, but no new generators will be accredited to the scheme. The government has yet to confirm if there will be a grace period after this date for under-construction generators to complete work.

First opening for accreditations in April 2010, the FiT is an incentive scheme to increase the uptake of small-scale, low-carbon renewable energy generation. The FiT provides a generation tariff for all energy generated, and an export tariff for every kWh of power which is exported. The scheme is open to most renewable, low carbon generation technologies with capacity below 5MW.

Figure 3: Cumulative capacity by technology since April 2010, Ofgem Renewables and CHP Register

