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WHAT'S HOT FOR 2017

Inside: Top 10 Products (Part 1) plus News, Features and Analysis

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MPs say dealing with red tape is key to UK success in energy storage technology

The UK Government must move quickly to address regulatory barriers so the UK can become a world leader in energy storage technologies, the Energy and Climate Change Committee has recommended.

Citing the example of California, where strong public financial support and clear legislation have been vital in developing the storage industry and laying the foundation for the full integration of storage infrastructure in the grid, the Committee says storage presents a real opportunity for the UK.

In their third report 'The energy revolution and future challenges for UK energy and climate change policy', MPs say there must be a clear definition for storage, that double-charging must come to an end, and a separate asset class for grid-level electricity storage should be established as a matter of urgency.

The Government must also review the outdated Capacity Market rules and regulations in relation to storage, including considering increasing the contract length and addressing restrictions around stacking of revenues for storage projects.

And in order to maximise the potential Ministers should set out a high-level public commitment to making the UK a world-leader in storage and set a storage procurement target for 2020.

The Government should also consider a possible subsidy framework for energy storage to accelerate deployment given the importance of storage to unlocking the full potential of renewable energy.

MPs say that with the right policy framework in place the full potential of demand-side response (DSR) technologies can be unlocked.

They add: "Getting DSR right will empower consumers, reduce bills, ease grid pressure, and lower carbon dioxide emissions. Without explicit market mechanisms and target capacity goals DSR will not be able to deliver best value for consumers."

The Committee notes that while technological leadership can be lucrative, this often occurs on longer timescales than private investment is comfortable with so there is a role for Government in driving energy innovation.

It adds: "The UK has world-leading universities: leveraging these to attract and retain international talent, and support innovation throughout its cycle, is crucial to achieving an energy revolution. The Government should support efforts to get the next generation of students interested in energy research and policy. "

MPs say the energy revolution presents a huge economic opportunity for the UK and with the appropriate strategy, policies and regulatory framework in place, Britain can become a world leader in the green technology sector.

Chargemaster, the UK's leading supplier of electric vehicle (EV) chargers, has welcomed the Government's announcement of a £600 grant supporting the installation of dual charging points at workplaces.

"This is great news for companies that have adopted EVs into their fleets, or wish to provide charging facilities for visitors," commented David Martell, Chief Executive of Chargemaster. "There are now more than 80,000 electric vehicles on British roads – many of those are owned and run by businesses.

"This new £600 grant from Government will allow more companies to install charging points at workplace locations for a fraction of the cost."

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Latest Government auctions are a boost for offshore wind industry

RenewableUK says the Government's recent announcement of the next round of competitive auctions to support offshore wind will be a boost for British industry.

Responding to confirmation of the budget, date and details of the next auction round for Contracts for Difference (CfDs), RenewableUK's Chief Executive Hugh McNeal said: "It's great news that the Government is supporting offshore wind. This will enable our world-leading industry to deliver significant investment to the UK.

The competitive auction process is continuing to drive down the cost of offshore wind energy at an unprecedented speed.

"British supply chain companies are already seizing the massive economic opportunities offered by offshore wind – and there's great potential for further job creation by innovative companies throughout the UK as the industry continues to grow. The Supply Chain Plan Guidance published by Government will help us to make further strides forward on this."

Developers of remote Scottish Island projects, which face higher grid connection costs than those on the mainland, had been awaiting an announcement on a specific Scottish Islands CfD. However, the Government did not set out how this CfD auction would support such projects, announcing instead that a 12-week consultation exercise is being launched today.

McNeal commented: "New projects on remote Scottish islands would provide much-needed power and economic benefits to their local communities. Any delay means those communities won't receive these benefits. We need to ensure that this opportunity is offered to them."

The Government has published strike prices for wave and tidal energy, but has not specified a "minima" – a minimum level of deployment for which money would be specifically allocated.

This latest announcement relates to auctions for developing technologies, and not to developed technologies such as onshore wind on the UK mainland.

Nissan installs first vehicle-to-grid technology

Nissan has announced that its UK-based European R&D facility, Nissan Technical Centre Europe (NTCE), has become the first Nissan site in the company's network of European facilities to install vehicle-to-grid technology (V2G).

Developed by Nissan in partnership with multinational energy provider Enel, eight V2G chargers have been installed at the site and will be available for all NTCE employees to use (*pictured above*).

The V2G chargers work with Nissan's electric vehicles (EVs) to provide an intelligent energy management system capable of both charging the vehicles and allowing the cars to give stored energy from the vehicle's battery back to the grid to help stabilise demand.

The move marks an important step in the company's plans to make its Intelligent Mobility vision a reality in Europe. The integration of V2G technology brings to life this concept, demonstrating how zero-emission vehicles such as the 100 per cent electric Nissan Leaf and e-NV200 and energy management technologies can work in tandem to create a cleaner, more efficient energy network.

Francisco Carranza, Director of Energy Services, Nissan Europe, said: "Nissan has always been at the forefront of EV technology development and we're excited to be using our expertise to help change the way people consume energy.

"Through the integration of Nissan EVs we can help shape a society whose energy use is sustainable, efficient and affordable. It could change the rules of the game and make energy cheaper for everyone."

David Moss, Vice President, Vehicle Design & Development, NTCE, said: "The installation of the V2G chargers at NTCE is a significant moment for us. It gives us the opportunity to showcase to the world how the energy management systems Nissan is developing can work in a real-life business situation.

"Integrating it into our own facilities demonstrates the confidence we have in the technology and our steadfast belief that our electric vehicles can play a pivotal role in developing an ecosystem of technologies that work seamlessly together to create sustainable and efficient solutions for the future."

The news follows the announcement in August that Nissan and Enel secured their first commercial V2G customer in Europe. Enel has installed 10 V2G units at the headquarters of Danish utility company, Frederiksberg Forsyning, making it the first business to commercially integrate and host the V2G units.

Large-scale solar PV schemes face funding crisis, STA warns

A detailed new analysis shows that the standard method for financing large-scale solar PV schemes in the UK is no longer economically viable. An estimated two-thirds of the UK's 12GW solar capacity has been built using this method—known as 'Power Purchase Agreements' —where solar farms or large commercial rooftops contract to sell their power to a third party.

The large-scale solar industry, which matches onshore wind for low-cost clean power, had the great majority of its support removed this year and deployment has plummeted. Figures released by Solar Intelligence show the lowest quarterly deployment of solar power for nearly six years.

However, only modest Government intervention is needed to enable large-scale solar to access the UK market again.

The industry is seeking a new auction round so that the cheapest renewables can compete on a level playing field for Contracts for Difference, enabling the best deal for consumers. Modest but urgent reforms are also needed to Feed-In Tariffs, costing only £6million over this parliament, to boost solar deployment on large commercial roof tops.

The industry is also seeking fair tax treatment for rooftop solar. Taken together the measures could get the solar industry back on track to zero subsidy by 2020.

Report author and STA Policy Manager David Pickup said: "The UK solar industry has been challenged to deliver subsidy free solar but, as our detailed analysis shows, this is not yet possible for mainstream projects. Even terrific financial innovation cannot get around hard economics; large-scale solar still needs just a little support from Government to provide consumers with one of the cheapest sources of clean power.

"The industry cannot invest for cost reductions tomorrow without decent market volumes today: a vicious circle. With only a third of the costs coming from panels, local supply chains and skills are vital for bringing costs down further to benefit consumers. The danger is that we risk losing these skills, financial confidence and supply chains that enable us to deliver the cheapest solar power."

The UK analysis published forms part of the EU-wide Horizon 2020 PV Financing project which examines how the solar PV market could adapt to a low-subsidy world. The UK analysis was undertaken by the STA with the support of expert financial contributors including Bloomberg New Energy Finance, EY and Bird & Bird. It shows that typical PPAs, that have funded an estimated £15bn of UK solar investments, are no longer economically viable, except in some niche applications.

The report details the costly escalating risk perception amongst investors, not only due to the main support schemes for solar power being rapidly withdrawn, but as a result of Brexit.

There has been massive financial innovation in the solar industry which moved over the past five years from pioneers funding small projects to sophisticated funding models involving mainstream banks and dedicated investors. Schemes grew up to 50MW in size and the market brought in around £22bn of investment.

Confidence in the market significantly lowered the cost of financing, helping to reduce the overall cost of solar projects. PPAs became the norm for financing these large-scale schemes, with projects able to sell their power for up to 15 years to a third party, but typically offering three years of forward fixed pricing.

Three key models of PPA developed which helped solar to sell its output not only to electricity traders into the wholesale market, but directly to commercial companies who did not need to be geographically nearby:

* Wholesale PPAs, where the power output was typically purchased by traders
* Sleeved PPAs, where the power was typically purchased by commercial companies, with additional complex facilitating contracts signed with licensed suppliers
* Private wire PPAs, where the output could be sent direct via a dedicated wire from a ground-mounted scheme to a nearby commercial energy user.

STA CEO Paul Barwell said: "Solar beautifully answers the energy trilemma of tackling climate change, security and affordability, but it is being cut out of the market and prevented from competing on a level playing field with other technologies.

"It doesn't help consumers to inhibit the cheapest source of clean power in the UK and the competitive pressure it can provide right across the power sector. We hope new Ministers will act quickly to open the UK market up again to the cheapest applications of solar power."

Mixed outlook for UK's renewable energy market

The UK renewable energy sector has continued to lose its appeal in the eyes of investors, dropping to a new all-time low in EY's table of the world's most attractive renewable energy markets. Uncertainty caused by Brexit, the dismantling of the Government Department for Energy and Climate Change (DECC) and the approval of the Hinkley Point C power station have seen the UK fall for the first time to 14th place (from 13th) in EY's Renewable energy country attractiveness index (Recai).

The approval of the 1.8GW Hornsea wind farm highlighted the offshore wind industry's potential, but was not enough to keep the UK ahead of Morocco which has climbed ahead into 13th place.

Ben Warren, EY's Head of Energy Corporate Finance, said: "Continued uncertainty around the Government's energy policy has created a confusing picture for investors seeking a low-risk return. In addition to radical changes to its structure, the Government has decided to press ahead with investment in forms of energy that either don't seem to have the public's backing, such as shale gas, or have been deemed costly.

"With one more big decision, this time on the future of untested tidal lagoon technologies, expected in the coming months, the Government clearly believes that easy to deploy and cost efficient technologies such as onshore wind and solar are not the answer to the UK's energy security conundrum."

However, the emergence of the battery storage market offers the potential to boost investment, according to the Recai. Warren said: "The last 12 months have seen a significant increase in investment in battery storage technology in the UK. The availability of contracts and continued research and development investments, particularly in the US, will continue to drive down costs and improve returns from investment in battery storage.

"No doubt there are still challenges to be overcome and questions to be answered around affordability and availability. But if the market is ready and willing to innovate, battery storage, coupled with renewables, can help improve reliability and consistency of output to create a far more attractive sector."

The UK's standing was at odds with other European countries which regained ground after falling behind emerging markets in the previous Recai in May 2016. In the index top 10, France moved up one position to 7th as a result of the country's plan to tender for 3GW of new solar capacity over the next three years. Construction of a factory to produce solar panels to pave 1,000km of road work is also currently underway in the country. Warren added: "European countries lack the flexibility of emerging markets to transform their energy industries. Their greatest hurdle is integrating renewables with historically centralised conventional power generation. It began to look like European countries were scaling back their renewables ambitions as a result but, in recent months, we've seen promising new programmes materialise."

Belgium, Sweden, Ireland, Norway and Finland also climbed further up the ranking of 40 countries. In Norway, work on a US$2.3b undersea tunnel to Germany offers a new wind-hydro storage opportunity between the countries. Germany, in addition to the United States, China, India and Chile, remained unmoved in the index top five.

Prior to uncertainty caused by the UK's decision to exit the European Union, Europe experienced the greatest share of renewable energy green bond activity. A total of US$54.9b in renewable energy green bonds were issued in Europe since 2007, followed by North America with US$19.8b and Asia with US$4.5b.

Warren said: "The green bond market is enabling corporates, banks and development finance institutions to tap into enormous demand among investors for clean energy projects. In the last few years, we've seen significant growth in green bonds sold by issuers with plans to direct proceeds to environmental ends." Sixty-five per cent of the proceeds of green bonds issued since the market's inception in 2007 — or US$95.6b — have been channelled to renewable energy. As of July 2016, US$48.2b of green bonds had been sold this year. That's compared to US$41.8b in 2015 and US$36.6b in 2014.

Dulas secures solar fridge deal

Renewable energy specialist Dulas has won a contract to supply 345 of its VC200 Solar Direct Drive fridges, used to safely store vaccines, to agencies working in Yemen, Sierra Leone and Nigeria. The deal reflects the company's latest solar refrigerator technology and large-scale logistical capabilities, and represents a significant expansion of the firm's partnerships with the World Health Organisation (WHO), UNICEF, and the Institute of Human Virology, Nigeria. Dulas' recently designed Solar Direct Drive Vaccine Refrigerators, developed with funding from a joint European Union and Welsh Government research and development project, use the sun's energy to keep vaccines cool. With a revolutionary new thermal energy storage solution, they can be deployed in environments where other cold chain systems will struggle to store vaccines safely, even during extended periods of bad weather.

Selectricity launch

Good Energy is to launch 'Selectricity', the UK's first online platform allowing peer-to-peer matching of renewable energy for businesses with generators. 'Selectricity' gives businesses the power to select where its electricity comes from and allows visibility of usage. Businesses can browse local generators, by tablet or smart phone, and choose to be supplied by generators such as local wind and solar farms. Cornwall's Eden Project, for example, selected Brixton Energy's solar power to match its usage.

Why Tesla's acquisition of SolarCity is boost to entire renewables sector

A marriage of convenience creates the world's first integrated sustainable energy company with products ranging from generation and storage to transportation

Just days after launching its solar roof tile to the US market, a joint venture between Tesla and SolarCity became a marriage when the two firms unveiled the details of a merger deal to create the world's first integrated sustainable energy company, ranging from clean energy generation to storage to transportation.

The acquisition by Tesla of SolarCity will be able to provide the first ever opportunity to generate, store and consume energy entirely sustainably, through a portfolio of integrated products that add aesthetics and function while reducing cost.

By leveraging SolarCity's installation network and Tesla's global retail footprint, the deal-makers believe they can do this in a way that is seamless for their customers.

In late October at a Powerwall 2 and solar roof launch event at Universal Studios in Los Angeles, the two companies shared their vision for how they can create this integrated sustainable energy future.

According to the companies, that vision consists of three components. First, there will be a solar roof that will generate sustainable energy from a rooftop that looks better and is more durable than a normal roof, that can be easily customised to fit the unique needs of each house, and that will lower costs to the consumer.

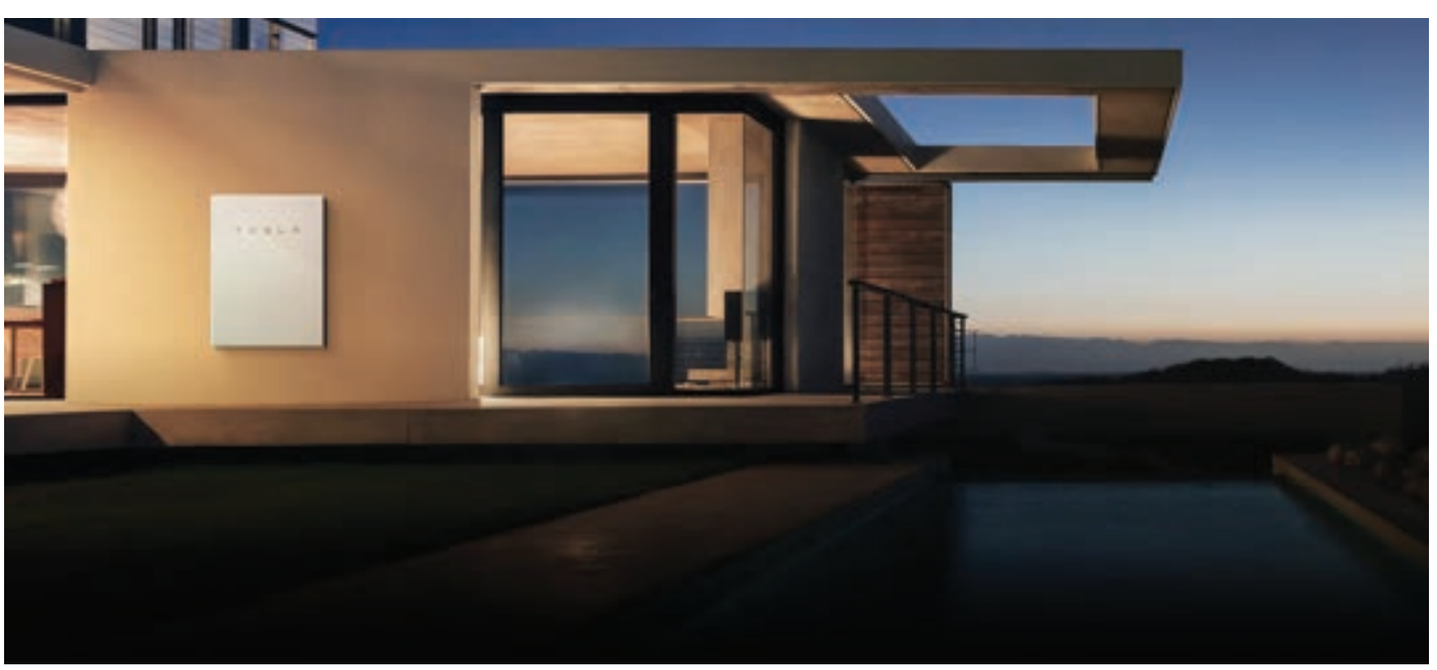
Second, the Powerwall 2 storage system, which starts production this quarter at the Gigafactory, will take the energy that is generated by any source (whether from the solar roof, another solar power system, or even the grid) and use it when it's most beneficial, such as during the night, during a power outage, or when the customer can make money by doing so.

Third, sustainable energy needs to be used for transportation, which is why Tesla firmly believes in the importance of electric vehicles.

In a statement, the companies explained: "With these products, our customers will have an entire sustainable energy ecosystem, comprised of products whose benefits go far beyond simply being sustainable."

Following the proposal announced in August to merge, the two companies are now on the brink of formalising their merger. After the solar roof tile launch, they released further details of the deal, expected to be ratified by both sets of shareholders before the end of the month.

The statement explained: "SolarCity provides nearly one out of every three new residential solar power systems in the US, and now has more than 300,000 installed residential and commercial customers across the country. By combining SolarCity with Tesla, we expect to significantly expand our total addressable market to include a solar market that generates $12bn in the US alone, and that is expected to grow at a compounded annual growth rate of between 15-20 per cent in the next 5 years. Additionally, with the new products that we have shown, we expect that solar's share of the nation's $400bn in annual retail electricity sales will increase more than anyone currently expects. And by pairing storage with solar,



we can capture a market for our batteries that goes way beyond the market for our cars, thus maximising the scale and potential of the Gigafactory, where we are developing the world's leading battery technology.

"Tesla and SolarCity have a tremendous opportunity to create a vertically integrated sustainable energy company offering end-to-end clean energy products. Leveraging the core competencies of each company, consumers can look forward to deploying and consuming energy in an efficient and sustainable way, with SolarCity's existing solar power systems and ultimately with a solar roof, a Powerwall 2 that maximises the benefits of the combined system, and a Model S, Model X or Model 3, all while lowering costs and minimising dependence on fossil fuels and the utility grid."

The news of the merger has been welcomed by industry leaders on this side of the Atlantic.

As Musk points out, it's not that complicated: "This is exactly what the industry needs." Tiles with integrated photovoltaics have been around for years, batteries are nothing new, nor are electric cars. But as everyone knows, Musk does it really well and it looks good," said Sven Lindström, CEO of Midsummer AB.

"Starting with Tesla and the electric cars: Most major car companies have had concept cars with more or less success, but never really launched any viable products out of those concepts. Probably because people working with cars love combustion engines, oil and getting their hands dirty while listening to the amazing sound of a V8 in their garage.

"Now that Tesla is established as the most successful luxury brand we hear news that both VW and Mercedes will transform their portfolio of gas (or diesel...) guzzling cars to fully electric. They do not do it because of their passion for electric engines, but because they have to, to stay alive."

Lindström claims roof material manufacturers without PV solutions now need to re-think their business model.

He added: "Hopefully we will see the same trend in photovoltaics (PV). Until know, PV has been a more or less aesthetic add on. Now it is integrated, looks good and there is not much reason to NOT install PV.

"So, who should be threatened by this launch? Well, as Musk points out our electricity consumption will increase, worldwide! That means there is plenty of space for more PV to be manufactured with any look. However, roof material manufacturers that do not have a PV solution maybe need to re-think their business model. Are they only selling water protection materials or is there a way for them to also contribute to the energy needs of the house?

"With his holistic view, Musk puts together our needs of transport and energy with roofs and batteries. Very few companies are able to do this.

"You would have expected GE, ABB, Dow Chemical or maybe Saint Gobain to come up with an integrated concept, but instead it is this company in Silicon Valley that once again beat the old industrial conglomerates. Maybe there is time for some consolidation between building material manufacturers, PV companies and utilities? Are those industries transforming just as the German car industry?"

Midsummer is a leading global provider of turnkey production lines for cost-effective manufacturing of flexible thin-film CIGS (copper, indium, gallium and selenium) solar cells. Midsummer has developed a rapid process for the production of these solar cells using sputtering of all layers of the solar cell. This allows for scalable and cost-effective manufacturing of thin film solar cells. Midsummer's customers are manufacturers of thin-film solar cells worldwide.

Left: The Tesla Power Wall. Above and right: The company's solar roof products

CURRENT AFFAIRS

Will biogas become a new major player in the UK energy mix?

Bill Wright, Head of Energy Solutions, ECA, answers the question

A substantial proportion of total UK energy consumption is dependent on natural gas for electricity generation, heating and cooking. With concerns about future security of supply and international commitments to reduce carbon emissions, biogas offers a promising additional source of natural gas that is carbon neutral, renewable and which can be produced domestically on a large scale. Biogas is typically produced by the breakdown of organic matter via anaerobic digestion (AD). It is primarily comprised of methane and CO2 which can be refined to 'biomethane' and combusted to produce electricity on site or pumped directly into the national gas distribution and transport network making it a comparatively cheap form of energy generation as it can utilise existing infrastructure.

There are now 316 AD plants operating in the UK, 47 of which pump biomethane directly into the gas grid. A further 454 AD projects are currently under development with predicted further growth in the industry. Support for the fledgling sector has been provided by the UK government through the Renewable Obligation scheme and in turn Feed-in Tariff Contracts for Difference encouraging plants that produce and burn biogas for electricity production. In conjunction with this the Renewable Heat Incentive (RHI) encourages increasing levels of biogas injection into the national gas network as well as small scale combustion schemes.

Support through these schemes is currently still in place though there have been reductions in tariffs. One such change announced this year has now been amended to allow for a transitional period where projects under construction can be completed and will still receive the prior rate of support. Whilst the reduction in support can be seen as a setback, the newly formed department for Business, Energy, and Industrial Strategy's willingness to take on board policy recommendations so as not to damage the sector is a promising sign for future government policy and should enable the industry to play a major role in helping decarbonise the UK economy.

Photovoltaics and fire safety research

There is a risk of fire from any electrical appliances and solar PV is no exception. With nearly 11GW of installed PV in the UK, some fire incidents are inevitable. However, until now, there has been little evidence of the causes of such fires, and whether the number of incidents could be reduced by changes in product design or installation practices. Given our aim is to ensure the highest possible safety standards for solar panels, this project sets out to better understand the root causes of such fires, and also any adverse effects for fire fighters.

Who is involved?

The BRE National Solar Centre (NSC) has been commissioned by BEIS (formerly DECC) to lead a three year study on fires involving solar photovoltaic (PV) systems. The project is also being supported by the Building Regulations and Standards Division of the Department for Communities and Local Government (DCLG) and by the Chief Fire Officers Association (CFOA).

The NSC is partnering with Fire Investigations (UK) LLP, who specialise in forensic investigations of fire incidents. For live or very recent incidents, we send out expert PV-fire teams to investigate on-site.

What is involved?

The study involves on-site forensic investigations of live incidents, laboratory examinations of components, as well as reviews of historical incidents, literature, standards and training.

How will the information be used?

The findings of the project will be used for two purposes: to improve PV standards and training and to make recommendations to facilitate an informed and safe operational response by firefighters.

Steve Pester, Principal Consultant, BRE, discusses how you can help

Confidentiality
In order to promote the reporting of incidents, all personal and commercially sensitive data (e.g. system owners, installers and manufacturer names) will be kept secure. These details will be available to named individuals at BRE only and solely for the purposes specified under the terms of this research contract. For further information on the terms of the contract, please contact BRE at solarfire@bre.co.uk. Only anonymised reports, approved by BEIS, will be published.

How you can help
ES involving PV Systems as soon as possible!
The project team needs information on PV fire incidents – anything from a smoking electrical component to a full-blown building fire. Live incidents are the best for understanding root causes. Information about fires caused by a PV system is the most useful, but we are looking to find out about any fire incidents involving a PV system. We would like to know the address of the building, approximate time of the fire, contact information and any other relevant information. We will then seek further details from the system/building owner, relevant installer and the fire service involved.

How to report a PV fire
If you become aware of an incident:
In office hours, please call: 0333 0033 314.
Otherwise, please send an email to solarfire@bre.co.uk, leaving your name, location of fire and contact details, preferably a phone number.
Let's make solar power even safer!

From the BRE National Solar Centre, on behalf of the Department for Business, Energy & Industrial Strategy (BEIS) Investigating Fire Incidents involving Solar Power

Partner organisation MCS presents its regular column for REI

Microgeneration quality assurance scheme celebrates ten-year anniversary

MCS 1 Million Milestone
The Microgeneration Certification Scheme (MCS) was launched 10 years ago as a quality assurance scheme, aiding the progress in the microgeneration industry and addressing any perceived market place opinions on microgeneration technologies.
The MCS is seen by many as an important certification scheme for making a significant contribution to cutting the UK's dependency on fossil fuels and carbon dioxide emissions.
It covers a range of electricity generating technologies with a capacity of up to 50kW, and heat generating technologies with a capacity of up to 45kW.
MCS are delighted to announce that since the MCS Installation Database went live in April 2010, the number of installations registered has surpassed the 1 million mark! This is great news and is evidence of the significant growth in the number of installations within the renewables market.
The Scheme remains committed to upholding robust standards and providing consumers with the assurance that their installations meet their quality expectations.
We hope you will join us with celebrating this significant milestone!

MCS 008 Issue 3.0 – Biomass Cookers
A new version of MCS 008 (Product Certification Scheme Requirements – Biomass - Issue 3.0) has now been published. The standard has been updated to include requirements for biomass appliances with incidental cooking functionality.
All existing MCS certified Biomass products must comply with Issue 3.0 of MCS 008 by 1st February 2017.

Finn Geotherm – 10 years of turning up the heat on ground and air source

Norfolk-based renewable heating expert Finn Geotherm is celebrating its 10th year in business. The ground and air source heat pump installer, which started as a part-time one-man band with early installations of 6kW units, has grown to a 20-strong team undertaking landmark 350kW projects for pan-European companies. With a decade of operations and almost 600 heat pump systems now under its belt, directors David Alston and Guy Ransom outlined Finn Geotherm's early beginnings and future plans to REI.

The business was set up by technical director David Alston in 2006. A degree-qualified engineer, David was working in the food industry when approached by Finnish heat pump manufacturer Lämpöässä to undertake some UK market analysis. At the time, Lämpöässä had a number of European subsidiaries and wanted to assess the viability of heat pumps in the UK as a new market. Ten years ago, heat pumps were not widely known in the UK, although the technology was well used in Finland – Lämpöässä started trading in the early 1980s. Having completed his research, David, who is half Finnish himself, seized the opportunity

Above: Finn Geotherm directors Guy Ransom (left) and David Alston (right)

and Finn Geotherm was born.

While David retained his food industry role, he began working on heat pumps on his off-shift days. The company operated out of a container unit on David's father's farm, with David spending every spare moment reading and researching heat pumps. Lämpöässä fully trained David in Finland, but the intricacies of UK electricity supply and operating conditions meant that he relied on his invaluable engineering knowledge to complete early installations.

"My background certainly gave me a head start but it was a real challenge to get up to speed on heat pump technology," explains David. "It was essential to increase my knowledge base as we needed to know the industry and technology inside out. Consumer awareness was so low at this point too – it was clear we could use the opportunity to really position ourselves as experts."

Finn Geotherm was initially set up as an importer and distributor for Lämpöässä. However, David quickly realised the UK industry was not yet ready to deal with installing heat pumps. Although the technology was first established over 150 years ago and the first heat pump installed in 1945 (coincidentally, in Norwich, just half an hour down the road from Finn Geotherm), the UK market was still in very early stages. At this point, David decided to take the installation side of the business in-house. David says: "We needed people to install the equipment but the skills just weren't there. To enable us to build a good name for Finn Geotherm, we had to have control over all aspects of every project. By doing the installations ourselves and calling in electricians and other engineers as needed, we were able to complete a series of great projects."

Changes in standards as the market began to develop created another hurdle for Finn Geotherm. "The formalisation of both MCS and RECC gave us not only a challenge but a great opportunity," says David. "It was time consuming and costly but we embraced the regulations. They made such an impact on the industry – improving standards and consumer confidence, but at the same time, reducing competition in the market place." The admin required by RECC and MCS is now just a part of the process for Finn Geotherm as it specialises only in these systems.

Similarly, customer hand-holding, while it remains a key part of Finn Geotherm's focus on excellent customer service, has proved time consuming for the business. The introduction of standards such as MCS has had a positive impact on this and will continue to do so as general confidence grows in the products and installers.

In 2009, David was joined by Guy Ransom – a corporate finance expert who, at the time, was working as a consultant for

Above: A Lämpöässä heat pump

Above: An air source heat pump

Johnson Controls as European Director of Financing. The pair met over a heat pump installation at Guy's home. David asked Guy for advice on finding a new bank and within months, the pair became joint partners. Guy said: "I knew a bit about heat pumps and by talking to David while he installed mine, I found out more about this untapped market and the potential of Finn Geotherm, a fledgling company built on David's solid engineering background. It was a financially challenging time and by securing a new bank with a solid business plan in place, we were able to give Finn Geotherm some breathing space and think strategically about its future."

Working together, Guy and David had to decide whether they would retain their focus purely on heat pumps or diversify into the then burgeoning area of PV systems. They took the brave decision to buck the trend that so many others were following, and to remain experts in their chosen technology. As the years have passed, this decision has been shown to be wise, as many 'Jacks of All Trades' have fallen by the wayside, leaving Finn Geotherm as masters in the field of renewable heating.

The following six years saw the steady growth of Finn Geotherm with new staff and investment in new premises and vehicles. The pair recognised that employing heat pump engineers full-time made the business more robust. David trained them with support from Lämpöässä – a process that takes two years to achieve the required knowledge and skills to carry out installations to Finn Geotherm's exacting standards.

In March 2011, the announcement of the domestic Renewable Heat Incentive (RHI) by DECC presented a great opportunity for companies such as Finn Geotherm, but also created additional challenges. "When the domestic RHI was first announced, it was good news for the industry as it offered a better subsidy than the previous Renewable Heat Premium Payment," says Guy. "However, while customers waited for the final details to be confirmed and for the incentive to launch, they put their projects on hold. It was a frustrating time for us as we felt in limbo until the following Spring when it was introduced."

Since 2009 Finn Geotherm's installations have developed to encompass schools, churches, commercial offices, leisure centres and stately homes as well as every type of home imaginable. The company has also been privileged to receive many industry awards, including being listed as finalists in nine different awards this year. The key to Finn Geotherm's success has remained the superb spirit of teamwork engendered within the company and the attitude accepted by all that every installation, large or small, should be completed to case study standards.

Above: The Finn Geotherm award-winning team

Looking forward

Now a 20-strong team of heat engineers, electrical engineers, salesmen and aftersales support, Finn Geotherm has installed almost 600 ground and air source units. The company has secured more than £10 million in RHI payments for its customers and is positive about the future.

Finn Geotherm believes there are still great untapped opportunities to utilise heat pump technology to not only deliver heat but also cooling. "The heat pump is probably the single greatest innovation in plumbing and heating in the past 60 years," explains David. "This technology is really only just getting started in terms of its adoption. Heat pumps are capable of so much and the range of applications where both heating and cooling can be achieved is vast." An example of such a system at work is Finn Geotherm's recent installation at RAGT (*see overleaf*).

"There has also been a sea change in the use of heat pumps by housing associations," says Guy. "These organisations are now seeing the benefits of high-quality systems and installations. Going forward, there is a real opportunity to embrace this further with the introduction of district heating schemes. Although it is a relatively alien concept in the UK, it is commonplace in countries such as Finland whereby one heat pump provides heating for an entire development. 'Shared' heat is viewed in the same way as electricity and water. This is a more cost effective and easy to maintain system, particularly for landlords renting out a number of properties, and something we would love to help drive in the UK."

The Spectator magazine published an article in 1948 stating "…it seems incredible that a device such as the heat pump has escaped the attention it deserves…" The quote still stands today and it's a challenge that Finn Geotherm relishes for the next 10 years.

Continued on next page.

Installer Spotlight: Finn Geotherm

Continued from previous page

Installations

Finn Geotherm's first heat pump installation was a 40kW Lämpöässä ground source unit in a single-storey barn conversion in Derbyshire. "The system hasn't missed a beat in the past 10 years," says David proudly. "We've installed one new exterior sensor since it was commissioned and that's it."

Installations in the past 10 years have covered everything from barn conversions and village churches to office buildings and even at the zoo.

Banham Zoo

Banham Zoo in Norfolk approached Finn Geotherm with a need to keep its new lorikeet house at a consistent sub-tropical temperature for lorikeets, reptiles and butterflies. Heating costs would be a drain on the zoo's resources and it was difficult to install a fossil fuel system safely within the grounds. In line with its highest environmental credentials, the zoo also needed to maintain a low carbon footprint. A Dimplex LA60 air source heat pump was installed with 1000 litre Lämpöässä thermal store. Heat is distributed via a combination of under floor heating through pathways within the building and reptile houses and Jaga AVS air heaters.

The Dimplex air source system delivers the constant heat required at approximately 60 per cent of the cost of a fossil fuel system. The Jaga AVS units provide consistent temperature warm air, with underfloor heating assisting in overall temperature balance. The zoo is benefitting from no carbon emissions at the site and general lower emissions due to the system's high energy efficiency. This installation won Finn Geotherm the prestigious title of Commercial Installation of the Year in the Energy Efficiency and Renewables Awards in 2009 and went on to secure additional heat pump projects at a dinosaur park run by the owner of Banham Zoo and at his own home.

RAGT Seeds

Finn Geotherm has completed a landmark project for leading European agricultural plant breeder RAGT Seeds in Cambridgeshire. This involved the design and installation of a 350kW ground source heat pump system for its six glasshouses, which are used for developing new crops. The bespoke system completely replaces RAGT's old LPG boiler with three Lämpöässä T120 ground source heat pumps working in tandem to keep the glasshouses at a constant temperature. While specifying ground source for RAGT's heat requirements, Finn Geotherm also identified an opportunity to utilise the new system to deliver air circulation and cooling to ensure a constant temperature all year round for crops to thrive in. This bespoke passive cooling system was designed and installed without impacting on RHI payments, and at the same time, revolutionised the way in which RAGT Seeds maintains the conditions within its glasshouses.

Finn Geotherm's ground source installation has delivered outstanding energy and cost savings for RAGT Seeds, as well as dramatically reducing emissions and enabling a reduced use of chemical fungicides. Shortlisted for top industry awards, the project also provides a blueprint for hundreds of other applications, from similar horticultural schemes to sports halls.

Top: The heating system at RAGT Seeds and below, the company's plant room

How solar energy will overcome the short-term difficulties it faces

The cost of managing solar power's intermittency is a current issue but it will not always be the case, according to a new report which looks into the future

An important new report has shown that the costs of managing intermittency associated with renewable power such as solar will be manageable and will reduce in the long term.

As renewable power capacity increases in the UK's electricity system, the development of a cost-effective battery storage market would turn solar variability into a benefit, according to the report 'Intermittency and the cost of integrating solar in the GB power market'.

Dr Benjamin Irons, a Director at Aurora Energy Research and lead author of the report, said: "Recent spectacular technological progress in renewable power generation puts the promise of cheap, low carbon power within reach.

"The challenge of integrating large volumes of renewables into the network in a way that provides reliable power to consumers and an attractive market for complementary generation technologies is the 'last frontier' in delivering the power system of tomorrow.

"Our analysis shows that such integration is possible and surprisingly affordable: the UK could more than triple the amount of solar power on the system by 2030, with associated costs of integration and backup so low as to be dwarfed by the enormous cost savings anticipated from falling solar prices over the same period. Battery storage aids integration even further, as does a diverse renewable portfolio including wind."

The report, compiled by the independent Aurora Energy Research consultancy, estimates the current and future costs of intermittency for solar; that is, the cost of integrating and backing-up solar's variable output, rather than the cost of generating the solar power in the first place.

The cost of intermittency for the 11GW of solar currently on the system is £1.3/MWh and this figure would increase to around £6.8/MWh by 2030 as solar capacity reaches 40GW, a cost in the order of one-tenth that of the total cost of a MWh of solar electricity today.

With additional wind on the system (up to 45GW by 2030), the report finds that the cost of intermittency for solar would be reduced to £5.1/MWh. This demonstrates the benefit of a diverse renewables portfolio, as solar and wind deliver their output at different times.

The report states that the development of cheaper batteries would also have a lower solar intermittency cost. Batteries allow excess power to be delivered at a more valuable time and reduce the need for backup generation.

It states: "In a scenario with 8GW of batteries on the system by 2030, we find the overall intermittency cost would in fact become negative, falling to around £-3.7/MWh. This effectively means that the intermittency of solar provides a net benefit through enabling the entry of batteries.

In the context of rapidly falling solar and wind generation costs and an increasing need for affordable low-carbon power, we do not see these costs as a major barrier to further renewable penetration."

Welcoming the report, Angus MacNeil MP, Chair of the Common's Energy and Climate Change Committee, said: "This welcome research puts numbers and maths behind the variability of solar power. It gives a concrete understanding of what solar has to offer compared to other technologies. Combined with reducing capital costs solar is going to be as cheap as source of power as you'll find anywhere."

Lord Adair Turner, Chair of the Energy Transitions Commission, said: "Aurora's report for the Solar Trade Association confirms what an increasing number of analyses are now telling us - that we can build electricity systems with high shares of renewables such as solar and wind, using lower cost batteries, other storage technologies and demand management to deal effectively with intermittent supply. We should not be holding back from further renewables investment out of fear that we can't keep the lights on."

Paul Barwell, CEO of the STA, added: "Britain is concerned about its international competitiveness as it exits the EU and moves to ratify the Paris Agreement. The good news is backing solar power, the UK's most popular energy technology, looks set to enhance UK competitiveness - so there need be no trade-offs. The report also shows that solar sits right at the heart of the Smart Power agenda, which overall could save consumers billions every year.

"The tremendous growth in local, clean generation has challenged the old power supply model. Yet Ministers can be reassured that the rapid expansion in solar power over recent years has been absorbed efficiently and affordably."

Bowler Energy changes name to Noble Green Energy

Twelve months have passed since Noble Foods acquired the energy business from the Bowler Eggs Group. Bowler Energy was founded in 2010 by free range egg entrepreneur John Bowler. Piloting both wind turbine and solar PV systems on his own farms to 'go green' and reduce energy costs, John began sharing this knowledge with his customers. The Bowler Energy company was born.

When John retired in 2015, Noble Foods was keen to maintain his legacy for renewable energy within the industry and purchased the business in the November.

Bowler Energy, along with other renewable companies, was heading towards a period of uncertainty due to a drop in the Government funded Feed-in Tariff (FIT) which destabilised the market.

Bowler Energy used this opportunity to diversify into new products and markets.

With a predominantly stronger agricultural focused customer base, strengthening its presence in the commercial and domestic markets is helping put the business back on track.

To complement the PV arm of the business, products offered now include biomass combined heat and power systems, battery storage, LED lighting, ground and air source heat pumps, voltage optimisers and electric vehicle charge point installations.

With the successful introduction of these new products and an increased order book, the timing seemed right to drive the business forward under the new name of Noble Green Energy, this change taking effect from November. Eddie Chadfield, Noble Green Energy Manager, said: "It is an exciting time for us at Noble Green Energy. The business has been through a huge change and now successfully diversified into renewable energy and energy saving products. This provides our customers with several options in which they can save energy, improve efficiency and reduce costs."

Lee Sutton and the MyEnergi team

4eco rises from the ashes to relaunch as MyEnergi

The former owner of 4eco has relaunched in the renewable energy industry after a deal to recover many of the assets of the popular firm.

Former Technical Director and inventor of the immerSUN, Lee Sutton, has created MyEnergi as a new venture boosted by the return of many of the original technical team and near market-ready products. Following the decision of the 4eco directors to place the company into voluntary insolvency in July, Lee set about trying to acquire the company as a going concern and continue his passion for the renewables industry.

Electronics engineer Lee first entered the sector when he founded installation company 4Solar in 2007 and after identifying a niche in the market created and developed the immerSUN system after the company developed into 4eco.

As part of the rescue deal, the newly formed MyEnergi has acquired many of the assets to continue to develop commercial projects as well as products for residential properties; helping home owners consume as much of their PV or wind generation as possible, therefore saving money off their utility bills.

Orders are already coming in from various parts of the industry and the MyEnergi team are focused on matching the demand, working day and night to bring several domestic products currently in the final stages of development to the market. Lee says he is extremely passionate about supplying the best products to the UK and European market with his eyes set to go global.

The company's Business Development manager Jordan Brompton explained: "Lee has been receiving lots of enquiries from installers that want to limit export from wind turbine or solar panels, but without turning down the generation.

"This is exactly the solution MyEnergi have been developing. Instrumental to this project is Lee's relationship with Tim Cooper, inventor of the EMMA and previous owner of Cool Power Products Ltd, the irony being that they used to be competitors.

"They've now teamed up, combining their expertise to deliver a G100 compliant Export Limitation Scheme (ELS) for systems ranging from 3KW to several MW, which will divert surplus energy to useful heat rather than turning down generation."

Energy storage project to support Nottingham housing estate

A new project to install ground-breaking solar energy storage technology in The Meadows area of Nottingham has just been given the green light.

The European-funded project will allow participating homes to store excess solar energy in either batteries or hot water tanks for use in the evenings. Energy storage technology means less reliance on the grid, creating more sustainable communities.

The project will also research the issues and parameters of community energy schemes that sell and share self-generated energy from homes in the project. It will use 'communal batteries' as part of this, located in the area's schools.

Some 37 homes from across the neighbourhood will take part in the project, and 22 of these will receive technology that will allow them to use significantly more of their clean green energy generated from their own solar photovoltaic (PV) panels. Installation begins early 2017.

This innovative project, SENSIBLE, which aims to show positive ways to reduce fuel poverty, is led by The University of Nottingham and MOZES, The Meadow's community energy group.

The Meadows is an ideal community to trial the technology as it has a large proportion of houses across different tenures, housing types and ages and socio-economic groups installed with solar PV panels following the receipt of a Department of Environment and Climate Change grant in 2010 which made it one of 11 UK Low Carbon Communities.

Its residents are therefore relatively used to 'test' initiatives regarding energy and efficiency because of this and the related work MOZES, does within the community. This range of demographics relating to how and when electrical energy is used in The Meadows will go on to help the SENSIBLE researchers to draw more accurate conclusions from the gathered data.

Julian Marsh, architect and member of MOZES, said: "This project is making the most of domestic solar energy generation; this means more energy will stay within the community, reducing the need to draw on energy from the grid, thus reducing household electricity bills."

Lee Empringham, Principal Research Fellow at The University of Nottingham, is leading on the monitoring side. "We will monitor household energy patterns for 18 months to see what benefit there is to storing the excess energy and to see how people react to their 'free' electricity in the evenings," he said.

"We will also be researching the storing of thermal energy (heat) produced by solar PV panels together with dual tariff systems to reduce the total energy costs".

NEP's Home Improvement Manager Darren Barker will be carrying out the technical surveys. "The project will use a selection of batteries, it is important that the battery is suited to the property, the size is the main factor here," he explained. "This is NEP's second energy storage project – the lessons learnt during our Essex-based project will help us ensure that this project runs smoothly and efficiently".

Recently, two key partners joined the team: Queen's award-winning charity Nottingham Energy Partnership and renewable energy experts T4 Sustainability following a successful tender to deliver the project on the ground.

T4 Sustainability will start installing in January 2017. The system will be free to the householder. John Beardmore from T4 commented that "the use of batteries to store energy helps to reduce the load on the grid at times of peak demand, which in the long run reduces costs and bills".

The SENSIBLE consortium brings together partners from six European countries: Germany, Finland, France, Portugal, Spain and the UK. There are three demonstrator sites; Évora in Portugal, Nuremberg in Germany and Nottingham in the UK.

Germany takes a strong lead in global battery storage market

According to new analysis by EuPD Research around 12,700 solar energy storage systems were sold within the first half of 2016 with a significant share of storage solutions by German companies.

The analysis also shows that German companies are not only very present in the domestic market, but also hold a strong position within other European and non-European countries such as the USA and Australia.

Despite the late start of a new subsidy scheme and the changed framework conditions the German market for solar energy storage products showed growth within the first six months in 2016 compared to the previous year.

Decreasing system prices and increasing offerings for storage solutions of domestic as well as foreign companies pushed the sales figures in Germany.

Tesla and Mercedes Benz Energy, in particular, have made a decisive contribution with strong end-customer marketing; but this is not yet reflected in current sales figures. In the first half of 2016 around 60 companies offered storage solutions to German end customers.

All in all more than 12,700 solar energy storage systems were sold within the first half of 2016. For the full year 2016 EuPD Research expects an ongoing growth; reaching 23,000 (worst case scenario) to 25,000 (best case scenario) storage systems in Germany. Compared to last year the sales market in Germany will increase by around 40 per cent in 2016.

According to analysis by EuPD Research, sonnen was the largest solar battery provider in the first half of 2016 with around 3,300 systems sold and a resulting market share of 27 per cent. In second place the German-based company Deutsche Energieversorgung (SENEC) achieved a market share of 19 per cent, followed by E3/DC (10 per cent), LG Chem (9 per cent) and Solarwatt (6 per cent).

However, German companies do not only show a strong presence in their domestic market. The analysis shows that in growing markets like the USA and Australia the German market leader sonnen, for example, has a strong position as well with a market share of 17 and 13 per cent respectively. In summary, sonnen holds a cumulated market share of 23 per cent across Europe, the USA and Australia in the first half of 2016, followed by LG Chem and Deutsche Energieversorgung (SENEC).

The strong position of German companies can be deduced to be down to their dominance in the German market. US companies in contrast cannot hold the position that they have in their domestic market on an international level.

"The international presence of German companies shows that they react to country-specific requirements and provide high-quality products at affordable prices. Coming from the European market, our analysis makes evident that they are already very well established in non-European countries as well," Dr. Martin Ammon, Head of Energy Industry Centre at EuPD Research, summarises.

Japanese firm makes investment in UK renewable energy installer

Renewable energy specialist Prescient Power is aiming for a future of growth following overseas investment from international trading company Inabata & Co., Ltd.

Among many benefits, the six-figure investment will allow Prescient Power's customers to unlock the power of renewable energy by reducing the impact on cashflow with project finance and reduced deposits.

Prescient Power, based in Ashby de la Zouch, Leics, installs, maintains and monitors renewable energy technologies for a variety of sectors across the UK, from country houses and National Trust properties, to property developers, farms and commercial premises.

Formed in 1890, the Japanese Inabata Group provides innovative solutions and services for IT and electronics, chemicals, life industry, plastics, housing & eco materials businesses worldwide with around 60 locations in 18 countries including Singapore, Bangkok, Jakarta, Shanghai, Los Angeles and New York.

Carl Benfield, Managing Director of Prescient Power commented: "This is a major step forward for us in a market that is seeing many renewable providers scaling back or sadly having to cease trading due to financial pressures. Both companies have very similar business ethics and our commitment to the environment so this is a perfect fit. The partnership is of course great news for Prescient Power, as it means we can strategically plan for strong and sustainable growth in an ever-changing market but also for our customers.

Above: Prescient Power MD Carl Benfield

"It is fantastic to be working with such a forward thinking partner in Inabata and to able to build a sustainable business here that will grow to come to be the clean-tech energy company of choice in the UK by 2025."

Silicon used for thermal storage

University researchers in Spain have developed a new energy storage system that relies on heat retained by molten silicon. Described in the journal *Energy,* the new system converts solar or excess renewable energy into heat, which is stored in the molten silicon at up to 1400°C. This energy can then provide electricity on demand via a thermophotovoltaic converter.

According to the researchers, the isolated molten silicon can store more than 1MWh of energy per cubic metre, over 10 times the capacity of current systems which use molten salts. As well as having an impressive capacity to store thermal energy, silicon is also the second most common element on earth after oxygen. This makes it a better commercial prospect for wide scale use.

70% of homeowners unaware of solar PV storage systems

A nationwide survey has found that 70 per cent of UK homeowners are still unaware of the PV storage solutions.

German market researcher EuPD Research recently interviewed 1,000 British homeowners about energy consumption and photovoltaics. Respondents who were interested in PV or even PV owners – who make up over a third of the sample – were asked if they knew that PV storage solutions are being offered. A startling 70 per cent of them answered 'no'.

Awareness of product availability is the most basic step of every buying process. The British market, however, is already deficient at this stage meaning existing market potentials cannot be realised.

The survey results on the solar storage market show exactly this. 70 per cent of the PV-aware respondents do not know that storage solutions exist. This is especially evident in respondents who are currently concerned with PV as they are planning their own solar plant. One in five of these homeowners know about storage solutions. Even among PV owners only 50 per cent are aware of energy storage.

Additionally, results from EuPD Research's 2015 InstallerMonitor showed that only 12 per cent of British installers carry storage solutions in their portfolio. Installers are central intermediaries between manufacturers and end customers, for photovoltaics as well as for storage. Without them, end customers are hard to reach. "For the first time, the lack of commitment by the installers can be shown from the end customer's perspective," EuPD Research analyst Inga Batton sums up the results.

ProductNews

The Chimney Sheep

The Chimney Sheep

The Chimney Sheep is a low-tech novel device made of felted sheep wool that bungs the chimney, preventing heat loss and reducing cold draughts. At this time of year it is one of the most cost-effective means of saving energy and making the home more comfortable. Chimney draught exclusion has largely been ignored by the energy saving industry, yet it provides a quick and easy save. Chimney Sheep Ltd have spent the last three years trying to get the product approved for use as an ECO measure. They are now edging ever closer to achieving that goal.

The Hitachi Nibbler

The PowerBox from Leading Edge Power

PowerBox: All-in-one power

The new PowerBox from Leading Edge Power is an all-in-one power source, fitted neatly into a pallet-sized box, providing power for equipment installed on remote sites with no mains electricity. Equipment ranges from radio repeater stations and security cameras to emergency power for Disaster Relief and remote weather monitoring equipment (LIDAR).

This hybrid wind-solar power system is more powerful than just solar or wind alone. The LE-300 wind turbine will generate 0.5kWh-1.5kWh of power a day and the two x ultra-high efficiency 140W panels made from Sunpower cells can generate over 1.5kWh a day during the summer.

The PowerBox is easily transported to site – it can even travel in the back of a pick-up. Once there, it can be deployed in less than an hour; the two solar panels are unfurled, the wind turbine installed and the mast tilted up - all that remains is to connect the equipment to the box.

Hitachi 18V cordless Nibbler

(*Left*) Designed to make fast, accurate cuts in a variety of metal sheets, the new cordless CN18DSL/JP 18V Nibbler has been launched from Hitachi Power Tools. Slicing through up to 1.8m of steel per minute and cutting up to 20m per charge, the new cordless 18V Nibbler is a force to be reckoned with.

The CN18DSL/JP 18V Nibbler has three cutting positions and a slimline grip, making it comfortable for the user and easy to make tight and precise cuts. Hitachi Power Tools understands that there is little more infuriating than running out of charge mid-job, so a handy battery indicator light is fitted as standard.

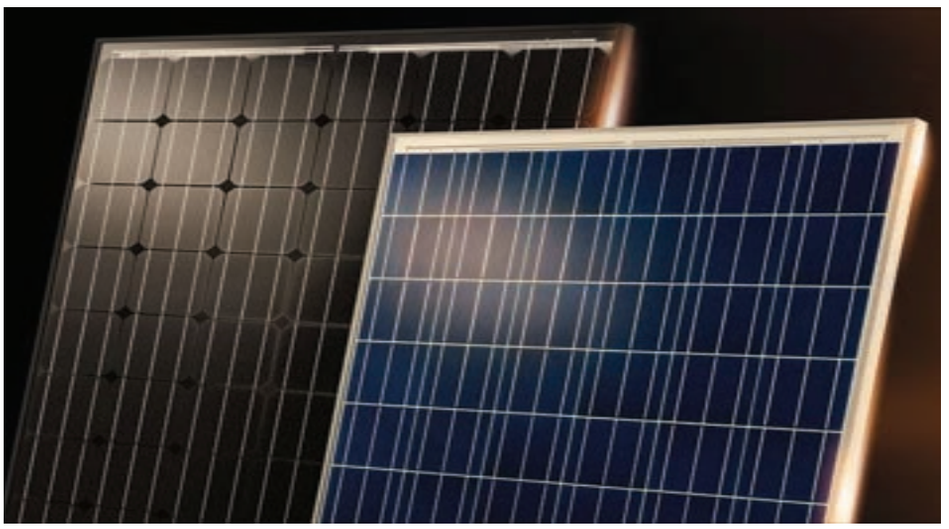
The tool also comes with two 5.0Ah Lithium-Ion (Li-Ion) batteries with a charge time of just 75 minutes – so you need never run out of power on the job. The CN18DSL/JP 18V Nibbler also comes with two wrenches, battery charger and a carry case.

source in a box

No specialist technical knowledge is required as the system is pre-configured and ready to go.

Designed to be durable in some of the world's harshest conditions, the on-board industrial-grade deep cycle batteries and control equipment are housed in a galvanised steel enclosure. As standard, the PowerBox is supplied with four 120Ah AGM batteries which can be configured for 12V, 24V or 48V. Two further batteries can be added to increase the reserve 'in the tank' and keep equipment running.

Despite being in a far-flung location, the performance of the PowerBox is easily monitored via a web portal. The full specification PowerBox is fitted with the innovative Victron Color Control GX and via either a WiFi receiver or 3G/4G dongle, live data is transmitted to Victron's VRM portal where power production, power output and battery status are displayed. There's also the opportunity to change system settings remotely.



SOLARWATT panels

SOLARWATT gains MCS approval for solar panels

SOLARWATT, the leading German pioneer of high-performance dual-glass solar PV energy production and storage systems, has secured influential UK industry approval for its advanced solar panels. All categories of the company's range of glass-glass and glass-foil PV panels were certified under the Microgeneration Certification Scheme to mark their compliance with the scheme requirements. All products in power classes up to 305Wp are now fully certified under the scheme.

The MCS was delivered following detailed testing, inspection and assessment by the British Board of Agrément, an independent organisation that offers an approval service for construction products, systems and installers, providing reassurance to consumers and others.

As the first supplier of a complete glass-glass solar panel portfolio, SOLARWATT has already been recognised for its high standards of quality and innovation, winning praise from Which? and receiving the top rating from the EU's CLEAR Project. The glass-glass range was commended in Benelux for functioning fully and undamaged through recent heavy hail storms.

SMA & LG Chem battery storage inverter

Battery storage inverter

Storage is expected to become the key growth driver of the solar industry. SMA Solar Technology and LG Chem have now partnered to serve this thriving market segment. The companies worked together to develop a highly flexible and cost-efficient solution to store photovoltaic power and help reduce the consumer cost of electricity by more than 80 per cent. The new storage solution is tailored for use in private households and comprises SMA's Sunny Boy Storage 2.5 battery inverter and LG Chem's RESU 10H and 7H storage units. Going forward, the two market leaders are planning to expand the focus of their collaboration on utility-scale storage solutions with the SMA Sunny Central Storage battery inverter.

Commercial

Sustainable heating from the sea in Stromness

The Warehouse Buildings – Orkney Islands Council's multi-purpose facility in Stromness – are the first in the islands to be fitted with a sea-source heat pump, which uses warmth absorbed from Stromness harbour to provide heating for the buildings.

Monitoring over a 12-month period shows this to be a cost-effective choice for the offices, which house the town's library and customer services team, and provide a work base for staff from a variety of Council services. It also means that the Warehouse Buildings produce substantially less greenhouse gas emissions than if a more conventional source of heat was used.

The sea-source heating system from UK based ground source heat pump manufacturer Kensa Heat Pumps has a number of components.

Coils of pipes fixed to twelve stainless steel platforms known as 'pond-mats' are sunk beneath a nearby pier and draw heat from the water.

The pipes feed this to a Kensa Plant Room ground source heat pump, which elevates the temperature of the water supplied to radiators and an underfloor heating system to 55°C – sufficient to keep the Warehouse Buildings comfortably warm.

The cost of the electricity used to run the 40 kilowatt (kW) heat pump was £1,550 over the 12-month period, compared to £2,420 for an oil-based system. Greater savings will result should the price of heating oil increase from its currently low level. The carbon emissions linked to keeping the Warehouse Buildings warm are calculated to be six tonnes of CO_2 per year, compared to more than 15 tonnes if an oil boiler had been fitted.

Top: View from the Warehouse Buildings; left, the pier under which lie the pond mats

LED upgrade to deliver £7K savings for school

An East London primary school has undergone an entire LED lighting upgrade with Energys Group products, in a project that could deliver a return an investment in just four years. Harry Gosling Primary School, in Tower Hamlets, has had a number of improvements to enhance their efficiency. Most recently of all, School Premises Manager James Doherty took steps to replace legacy fluorescent lighting that was aesthetically displeasing and inconsistent in terms of light distribution. In addition to advising on and supplying appropriate LED lighting solutions, Energys was able to support the school through the process of applying for funding from Salix Finance, which delivers 100 per cent interest-free capital to the public sector to improve energy efficiency and reduce carbon emissions.

Energy from waste plant officially opened

German-owned energy from waste specialist MVV Environment has officially announced the opening of its Ridham Dock biomass plant in Kent.

The plant has cost around £126million to build, and has been developed with the capacity to process 170,000 tonnes-per-year of category B and C waste wood. Material to feed the plant will largely be sourced from the Greater London region, the company says.

According to MVV the facility has the capacity to produce up to 23 megawatts of power and will generate close to 200 million kilowatts of electricity to the national grid. The plant is also equipped for heat extraction. Around 30 full-time jobs have been created through the development.

Commenting on the plant's opening, Dr Joachim Manns, Managing Director of MVV Umwelt, said: "This way, we are underlining our commitment to renewable energies and efficiency as key pillars of sustainable, environmentally friendly energy generation."

MVV has also this year opened a 245,000 tonnes-per-year capacity energy from waste plant in Plymouth, built as part of a 25-year contract to handle waste on behalf of Torbay, Plymouth and Devon councils.

Innovative solar project helps Bournemouth University go green

Bournemouth University's new flagship Fusion Building incorporating a 95 kWp solar photovoltaic (PV) array, designed and installed by Photon Energy, was officially opened in September 2016.

The Fusion Building, which saw £22million of investment, aims to provide a state-of-the-art academic space with a minimal carbon footprint. The PV installation is one of a number of measures that has enabled the building to achieve a BREEAM 'Excellent' rating. This is the second installation at Bournemouth University by Photon Energy who also designed the PV system at the University's Student Centre which opened in 2015. Willmott Dixon, a major client of Photon Energy, was the main contractor for both projects.

Photon Energy had an interesting engineering challenge to integrate the solar panels into the innovative architectural design of the building.

The PV system consists of 276 SunPower 345 Wp high-efficiency modules and SMA 3 phase inverters. A total of 206 modules were mounted on a K2 aluminium frame on the octagon shaped standing seam roof.

The arrays of PV were carefully installed in order to provide a magnificent aerial view of the roof.

Additionally, on the top level flat roof of the building, 70 modules were mounted to a bespoke frame system allowing for integration with a plant room screen. The bespoke screen was designed by Willmott Dixon in collaboration with Photon Energy. This innovative design enabled the black SunPower modules to blend seamlessly with the plant screen, which enhanced the aesthetic finish.

Converted church relies on (super) natural energy

What: A historic 17th Century church has been lovingly restored to give the ancient building a new, energy-efficient lease of life.
How: 8.5kW Kensa High Temperature Single Compact heat pump provides 100 per cent heating and domestic hot water
Result: Underfloor heating system delivers free energy from the grounds with RHI payments an added bonus

This renovated 17th century church in rural Wales may give some the chills, but thanks to modern energy-efficiency measures and a ground source heat pump from UK manufacturer Kensa Heat Pumps, its owners are enjoying low-carbon warmth by harvesting free energy from their grounds, which also attracts seven years of quarterly income through the Renewable Heat Incentive (RHI) as a big treat on the side.

With the support of Kensa Partner Installer, Ground Sun, the property has been converted to a modern, energy-efficient residential dwelling. The rural off-gas location of the site made a ground source heat pump the ideal solution.

Naturally, the church required extensive energy-efficiency improvements to ensure the project's suitability for a ground source heat pump. Ground Sun worked closely with the architects and the builders on this project, making recommendations about underfloor heating and insulation to ensure the heat pump would work as efficiently as possible and to satisfy the client's desire for a sustainable, energy-efficient home.

Thanks to the measures installed the heat loss for the building was reduced to c.30W/m^2. Typically buildings of this nature prior to fitting modern energy efficiency measures would expect a heat loss of 100-120W/m^2 (this would mean the project would have been looking at a 24kW heat pump rather than an 8.5kW High Temperature heat pump!).

Following the energy efficiency improvements a Kensa 8.5kW High Temperature Single Compact heat pump was chosen to provide all the heating and hot water for the 274m^2 property.

It was also important to get the heat loss for the building lowered as there was only enough ground to install 3 x 50m long slinky trenches to accommodate the 8.5kW heat pump. The trenches were dug by the builders on the project and filled with a total of 900m of PE32mm slinky pipe.

The MCS accredited renovation qualifies the client for quarterly payments from the Government's RHI; these payments will continue for a seven-year period. The ground source heat pump is installed in a subterranean plantroom to the rear of the church. As it's a very wet part of the country it was decided the heat pump should be fitted on an elevated reinforced steel shelf in case of flooding.

Top: The living area of the beautifully restored 17th century church. Middle left and right: Preparing the underfloor insulation. Bottom left: The project began with the digging of a 50m trench for the heat pump

Off-grid Scottish housing development feels the NIBE heat

What: New-build housing estate taps into the benefits of district heating
How: 24kW NIBE F1345 GSHP unit installed by renewables specialist CoolHeat
Result: Housing association provides reliable, renewable heat to residents and receives RHI payments

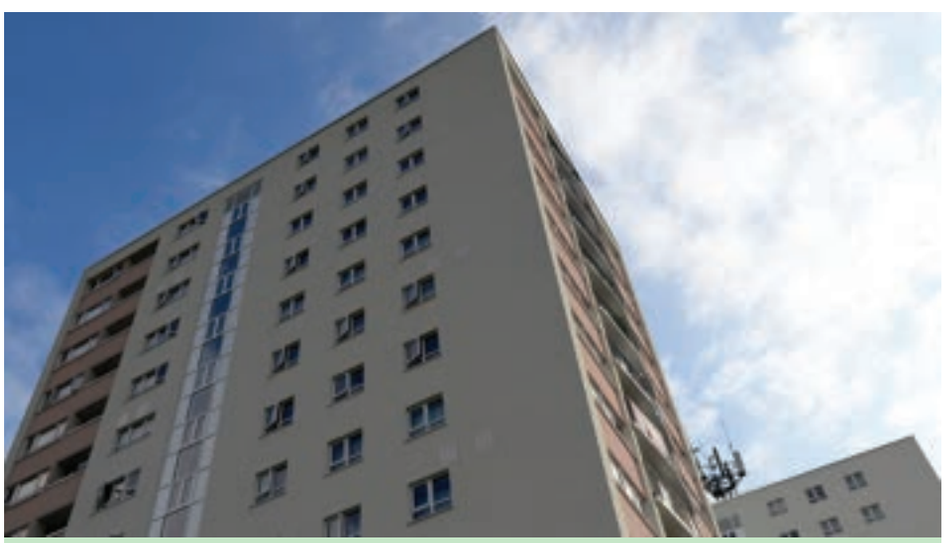
A new-build housing development in Dumfries, Scotland (*top left*) is now benefiting from reliable, renewable district heating – thanks to the installation of a large-scale NIBE ground source heat pump. The system is providing central space heating for each of the site's five new purpose-built supported-housing properties, as well as a dedicated staff base.

The Hallam House development in Beeswing has been supported by joint funding from the Scottish Government's Affordable Housing Supply Programme and Dumfries & Galloway Council, as well as private finance secured by the housing association, Loreburn Housing. The local authority's contribution of £25,000 was awarded specifically for energy-efficiency measures, with £5,000 available for each of the development's five one-bedroom homes.

A consultation by Scottish efficiency advice organisation The Energy Agency identified a ground source heat pump (GSHP) system as the best solution for Hallam House: harnessing geothermal heat from boreholes on the site to meet residents' space heating needs.
Following an initial design by the appointed M&E engineer, local renewables specialist CoolHeat was brought on board to specify a full GSHP system.

This needed to work in partnership with the homes' water-based underfloor heating to ensure consistent space heating, and also offer straightforward operation and controls.

As a NIBE VIP Installer, Stephen Thomson, director at CoolHeat, had extensive experience working with NIBE products, and recommended a 24kW NIBE F1345 GSHP unit to provide space heating for the development.



London tower blocks receive efficiency make-over

As part of a £5.8million regeneration project to enhance heating efficiency and slash bills by 50 per cent, four 1960s tower blocks in North London have replaced their outdated electric underfloor heating systems with next-generation radiators from QRL Radiator Group - all matched with renewable heat sources. Located in Brimsdown, Enfield, the residential tower blocks were refurbished through a joint initiative between the London Borough of Enfield, renewable energy specialist Ice Energy and energy-efficiency consultancy AgilityEco.

The award-winning Exeter Road Retrofit Project saw all four blocks – comprising 181 flats – undergo a series of extensive efficiency upgrades in a bid to tackle fuel poverty, raise heating standards and improve quality of life in the community.

In addition to installing external wall insulation and double glazing, the renovation work included a complete overhaul of each property's old, inefficient electric underfloor heating (UFH) system.

The buildings are not connected to the mains gas grid, so Ice Energy designed a ground source heat pump solution, which uses natural energy stored underground as a renewable heat source.

The team then specified QRL hi-lo Compact panel radiators to work with the GSHPs, as their super-efficient design makes them the ideal partner for renewables (which run at lower temperatures than traditional heat sources).

Christmas surplus food waste could power a large city through AD

No food company deliberately creates unnecessary waste. However, the volume of food waste created over the festive period is typically 30 per cent higher than the rest of the year. Finding a cost-effective, speedy and green way of treating this additional waste can be a headache for food firms at their busiest time of year. Fortunately, there is a solution.

Anaerobic digestion (AD) is an increasingly popular food waste treatment option turning waste into renewable energy in the form of biogas. The last seven years have seen an unprecedented growth in the number of AD plants throughout the UK, rising from less than 50 in 2009 to 381 today (excluding the water sector).

A fifth of these plants (79) process food waste, turning this valuable resource into renewable energy and biofertiliser (digestate). In December, it is estimated that 230,000 tonnes of additional food waste is generated in the UK. If this extra waste was sent to AD, it would create 124 MWe of energy – enough to power 220,000 homes throughout December, or a city the size of Southampton.

While the priority for food businesses should always be food waste prevention and minimisation, the increased complexity and uncertainty around Christmas ordering and production schedules means that an increase in food waste at this time of year is inevitable.

Above: London-based AD plant Willen Biogas will process thousands of tonnes of Christmas food

Global warming potential

Each Christmas, two million turkeys, 11 million potatoes, 17 million sprouts, 12 million carrots and 7.5 million mince pies are wasted, as shopping habits change and consumption rises. The cost of this additional festive food waste to the UK economy is an eye-watering £64million per year.

But not only does this increase in food waste impact on food firms' profit margins, there is also an environmental price to pay – leaving food waste to rot in landfill causes the release of methane into the atmosphere, a gas with 25 times the global warming potential of carbon dioxide. Once food is no longer fit for human consumption, AD is the best treatment option – a fact which is recognised in the waste hierarchy and transposed into UK law through The Waste (England and Wales) Regulations 2011. Sending food waste to an AD (or biogas) plant significantly lowers greenhouse gas emissions compared to landfill and incineration, and is a waste treatment option that is quickly becoming a favourite of food manufacturers, producers and retailers. And it's not solely down to the associated 'green halo' that comes from doing the right thing for the environment; today's modern AD plants are a flexible, cost-effective and hassle-free way to treat waste food.

As waste volumes increase during the festive period, waste hauliers' capacity fills up fast. Food companies can suddenly find themselves faced with a mountain of surplus Christmas food waste that their usual waste carrier is unable to take – or will only treat for a vastly inflated fee. No company wants its waste hanging around for longer than is absolutely necessary, and some sites also have the additional issue of waste permits, which may prohibit them from keeping their waste on site for any length of time. Food firms should plan ahead for an alternative place to send their additional Christmas food waste and seek out their local AD plant.

Last Christmas, food businesses based in London, Essex, Hertfordshire, Bedfordshire and Cambridgeshire sent thousands of tonnes of mince pies, sprouts and turkeys to London-based AD plant Willen Biogas.

"We helped a number of local food companies with their last-minute Christmas waste problems, arranging collection, transport, depackaging and treatment of their food waste at short notice," says Willen Biogas Chairman, Adrian Williams.

"Our cost-competitive waste treatment options can be used for one-off loads or we are happy to discuss longer term contracts depending on our client's requirements."

Located just off junction 25 of the M25, the state-of-the-art, modern 1.5 MW; AD plant processes around 60,000 tonnes of food waste every day – and has capacity to handle any local Christmas surplus. Fitted with sophisticated front-end depackaging equipment, it can handle all types of food waste, including packaged (with the exception of palletised loads) and accepts deliveries with as little as 24 hours' notice.

Sheffield council takes the lead on district heating networks

Sheffield City Council has long led the UK in its commitment to the concept of district heating, and many of its civic buildings are heated by district heating networks powered by waste energy.

The council's commitment goes back to the 1970s, and the pipework in some of its original networks is now in need of renewal.

In one of the first replacement projects of this kind, the original steel pipework at two social housing developments in the city has been replaced with REHAU's RAUVITHERM specialist pre-insulated polymer pipework.

There had been leaks at both sites in recent years as the pipework had deteriorated, so the council took the decision to invest in replacement to eliminate the risk of further leaks, which are costly to repair and inconvenient for residents.

REHAU's RAUVITHERM PE-Xa pipe was used because of the long-term benefits of polymer over steel, including the corrosion resistance of PE-Xa and the ease and speed of installation.

REHAU's UK manufactured RAUVITHERM system is supplied in continuous flexible lengths up to 330m so there are fewer joints required; and those that are fitted use the renowned REHAU EVERLOC leak-free compression sleeve technology, already successfully installed more than 850 million times worldwide.

The Sheffield project involved the replacement of pipework in two separate networks feeding nearly 170 properties in total. On one of the projects, all of the distribution pipework from the plant room into the individual properties has been replaced, using a variety of pipe sizes from the extensive RAUVITHERM range.

New £1.2m study by steam engineering specialists to explore converting waste heat to electrical power

A consortium led by steam engineering specialist Spirax Sarco is to embark on a three year research programme to explore the potential for low temperature waste heat to be converted into electrical power after being awarded funding from the UK's innovation agency.

Spirax Sarco and partners has been granted £1.24 million by Innovate UK, which works with people, companies and partner organisations to find and drive the science and technology innovations that will grow the UK economy.

Entitled 'Low Temperature Waste Heat to Power Generation', the research project will see the development of a pioneering technology which converts low temperature waste heat into electrical power. An estimated 70 per cent of final energy usage in the industrial sector is accounted for by thermal processes such as furnaces, reactors and boilers, with a third of this energy wasted through losses. A significant amount of this heat can be recovered and utilised to improve energy efficiency and reduce emissions, but the majority of this energy is available at low temperatures, making it difficult to use directly within the plant. This project therefore aims to develop a heat-to-power system based on the innovative Controlled Phase Cycle (CPC), which provides up to three times higher heat to electrical power conversion than the widely-used Organic Rankine Cycle (ORC).

Building on successful small-scale trials that have already taken place, the support will allow the consortium of partners to develop a commercial offering that will target the estimated 300TWh of heat available in European Industry and beyond.

The consortium includes five industrial partners: Spirax Sarco Limited, Arctic Circle, Howden Compressors and IPU, Brunel University London, and Cooper Tire of Melksham. Through this Innovate UK-backed programme, these partners are able to collaborate effectively to develop promising new technology which will offer an attractive investment opportunity for companies, allowing them to lower energy bills, create income from otherwise wasted energy, and reduce their carbon footprint. Furthermore, this technology will contribute to reducing overall energy consumption within the industrial sector on a national and global scale.

Leading the project, Professor Jeremy Miller, Group Research and Solutions Manager at Spirax Sarco, said: "The funding we have received from Innovate UK is vital and will allow us to develop a substantial R&D programme to address a real gap in the market. Without this crucial support, the project would only be able to explore theoretical aspects.

Electric vehicle consumer demand sparks to life in Europe

The European market for electric vehicles - both battery and plug-in hybrids - has had several false dawns, but finally has achieved the important milestone of a 1% market share

Electric car sales in Europe doubled in 2015 to at least 144,000 and recent data in 2016 suggests yet further growth in 2016. Year to date sales suggest significantly more than 200,000 plug-in vehicles will be sold in Europe this year taking the total number of EVs on the road to more than 500,000.

Europe is the world's second biggest market, aided by strong sales in Norway and the Netherlands. But there is no single market for electric cars in Europe, with virtually no sales or recharging infrastructure in most EU countries because policy and political support is lacking.

This needs to change if Europe is to become a leader in electro-mobility and in particular compete with China, says a new report *Electric Vehicles in Europe 2016: Approaching adolescence*, published by consultants Transport & Environment.

But why this sudden shift change? According to the report, electro-mobility offers an unequalled solution to make Europe's transport more efficient and less polluting. The electrification of transport is needed to realise the Energy Union's aim to "decarbonise road and rail transport and reduce noise and pollution".

With zero-emission at tailpipe, electric vehicles offer a double benefit of tackling air quality problems and climate change. Whilst there are still ways to improve and optimisation the internal combustion engine this is becoming increasingly cost-intensive for car makers and likely to have reached its practical limit by the mid-2020s.

First generation, food based, biofuels have been shown to have minimal or no greenhouse gas benefits when the full lifecycle is calculated including the effects of indirect land use change. Advanced biofuels and power-to-liquids or gas solutions are technically immature, expensive and unable to meet the large demand for liquid fuels from cars (but may play in a role in decarbonising aviation, shipping or trucks).

Natural gas is a fossil fuel and bio-methane from waste is only available for niche markets. It is therefore electro-mobility that is required to decarbonise passenger cars from around 2025 onwards.

As prices for renewable electricity are falling, a European EV market shifts the energy supply from imported, politically unstable, fossil fuels to domestically sourced, secure, clean and cheaper sources. Half of the European power mix is already decarbonised today and by 2030 this will be the case for about 75 per cent of the generation.

Economic benefits of vehicle electrification are substantial for customers and the economy, the report claims. For example, the owner of an average new car in 2020 will save around €300 to €400 on fuel each year compared to an owner of an average 2010-manufactured car. The transport sector is the biggest driver of oil demand at EU level – two-thirds of final demand for oil comes from transport, and this amount has been increasing. In 2015, a year of historically low oil prices, total spending on crude oil imports in the EU was €187 billion.

Russia accounts for 30 per cent of the region's oil imports, while often geopolitically unstable regions in Africa and Middle East account for an additional 31 per cent.

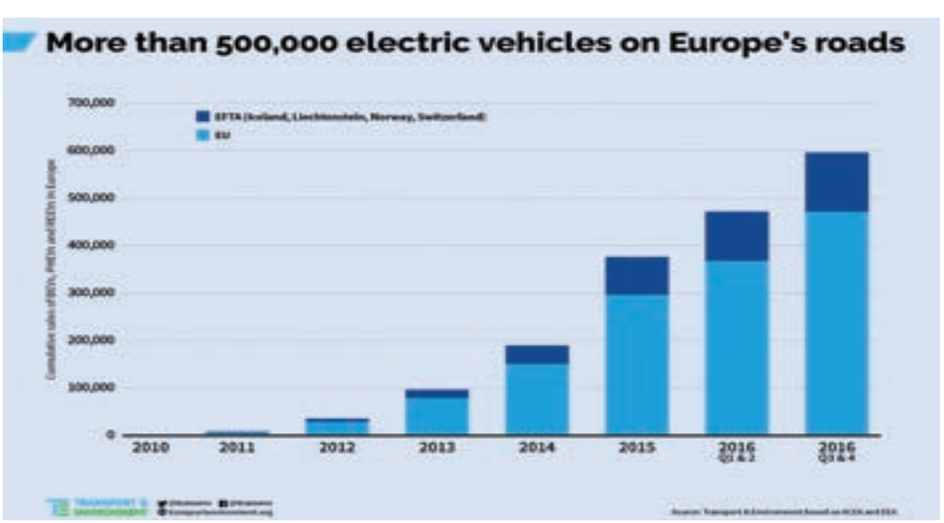
The shift from fossil to hybrid and electric vehicles would allow Europe to save €47 billion by 2030 on imported crude oil or oil products.

The historic brake on demand has, with the notable exception of Nissan-Renault, the world's biggest producer of electric cars, and Mitsubishi the dominant supplier of plug-in hybrid vehicles in Europe, been that most European car makers have until recently been keen to talk down the prospects for electric cars and vans.

However, this is now changing with a raft of recent new announcements including at the 2016 Paris Motor Show. This paradigm shift is underpinned by a rapidly falling price and improving performance of batteries that suggests by the mid-2020s the lease price for battery and conventional vehicles will be similar.

The report predicts that contrary to rhetoric, the shift to EVs need not lead to the destruction of value in the European automotive industry with batteries imported from the Far East or the US. Instead, there are a number of planned new production facilities in Germany, Hungary and Poland; whilst research indicates the transition will create 500,000 to 1 million jobs.

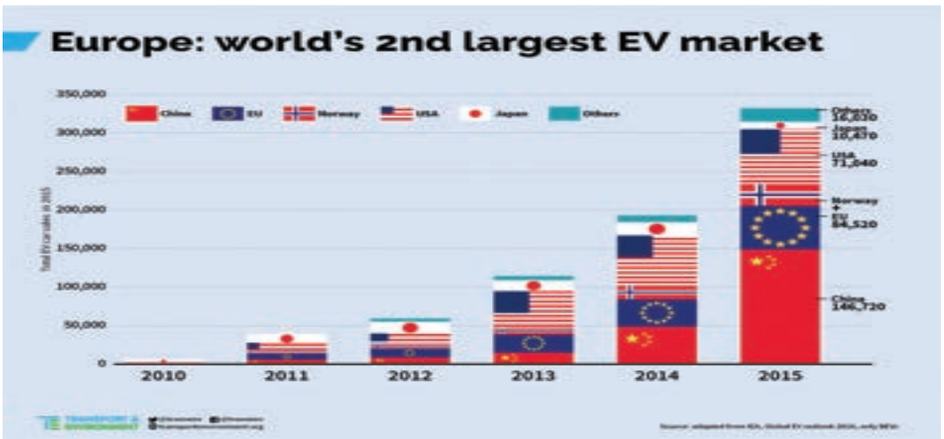
However, there remains a serious lack



of choice in the electric vehicle market particularly for vans. This grossly neglected market is one rich in opportunities, particularly for city deliveries. The report says: "The European Commission must act, and the forthcoming car and van CO2 regulations provides the opportunity to encourage manufacturers to supply new models and build choice for customers through the adoption of a California-style ultra-low carbon vehicle target for all manufacturers."
It goes on to add that electric cars and vans are part of a much wider electromobility revolution. Light electric vehicles offer an alternative vehicle for short trips for individuals, but remain largely ignored by policy makers. Even more important are the growing numbers of electric bikes and scooters that make it easier for longer distance commuting than conventional pedal cycles.

Electromobility including electric trains and trams provides the opportunity for a clean, green mobility future that assigns dirty diesel cars and trains that choke cities and commuters to the dustbin of obsolescence. The outstanding question is not if, but how quickly the disruption occurs and to what extent Europe captures the economic opportunities from this shift. Electric vehicles are in their adolescence, and about to be highly disruptive. Through constructive policy interventions at an EU, national and local level the technology and market can quickly mature and our mobility become quieter, cleaner and its contribution to climate change reduced. Analysing recent market developments, the report claims to demonstrate why sustainable electro-mobility is the most promising medium term option for most European passenger transport and local freight distribution and explains what Europe needs to do to accelerate the shift towards a single market for EVs.

The electric car was invented in the 1830s long before the internal combustion engine came upon the scene. However, the heavy weight and relatively poor performance of batteries meant the internal combustion engine became the dominant car technology in the 20th century. This remained the case until relatively recently, when demand for consumer electronics drove a rapid advance in high-powered battery technology that could also be scaled up for heavy duty uses in vehicles.



A common criticism of electric vehicles is that, although they emit no greenhouse gases at the point of use, they are still responsible for their share of emissions from power stations. This is true, but the criticism on its own overlooks two very important points about EVs: first, that they are inherently much more energy efficient than conventional petrol or diesel cars and that this reduces their average emissions per kilometre; and second, that the average European energy mix has already strongly decarbonised from the days of coal-fired generation, first through the switch to gas, and second through the rapid installation of new renewable power sources. Already CO_2 intensity has fallen by more than a quarter since 1990, and more ambitious plans are expected to follow under national commitments on climate change.

As a result, an electric car in use in Europe today already produces much lower greenhouse gas emissions per kilometre than any conventional car on the road.
The EU's Renewable Energy Directive sets an overall binding target of meeting 20 per cent of all final energy consumption from renewable sources by 2020. Going beyond 2020, EU countries have already agreed on a new renewable energy target of at least 27 per cent of final energy consumption in the EU as a whole by 2030. This target is part of the EU's energy and climate goals for 2030, and underpins the EU's ratification of the Paris Climate Change Agreement. According to the statistics, EV's introduced to the European car stock now can expect their average CO_2 emissions per kilometre to decrease year on year — a characteristic with which no conventional vehicle can compete. Conventional engines, which are already less good than electric motors in total carbon terms, will soon approach the theoretical limits of how much further their efficiency can be improved, and so the relative environmental advantage of EVs will continue to grow over time.

The report notes that one of the primary criticisms of EVs from the oil industry, keen to maintain its virtual monopoly on the supply of energy to transport is that EVs do not reduce emissions but simply move them from the tailpipe to the chimney. Rapidly falling prices for renewable energy capacity installed in Europe, and reduction of carbon intensity of Europe's electricity show that this does not hold true. In addition, EVs on average are more energy efficient than ICEVs and reduce car transport's energy consumption overall. This is why a European EV policy needs to be part of the reformed EU Energy market. A market for EVs provides domestic demand for European renewable electricity, reducing Europe's dependence on oil and increasing energy security. Creating an EV market needs to be a priority for EU investments in a reformed electricity market beginning in late 2016, a more flexible electricity grid allowing better demand-response, smart charging and storage solutions for optimal integration of EVs into the grid.

Furthermore, the 'dieselgate' debacle has firmly closed the door to a global diesel market and the niche 1 in 20 new cars sold globally that is a now diesel will only decline. The report concludes: "Through constructive policy interventions at an EU, national and local level the revolution can be accelerated and our cities become quieter, cleaner and the imminent threat of dangerous climate change abated. This is no longer o question of whether this happens - but how quickly?"

Pioneer geo launches new connected smart energy brand 'Tempo'

Cambrideshire-based geo, the pioneering developer of smarter energy products for consumers has announced two unique initiatives as part of the company's Hybrid Home together under one roof concept. Tempo is a new brand that brings together all of the key connected energy services and products offered by geo to utilities companies.

A menu structure will make it easy for customers to select individual or combined solutions that range from the efficient collection of raw data for delivery on to cloud servers; processing the information so that it can be analysed; and finally assistance with app or portal developments that can display the data in a useable format to consumers.

Part of the Tempo service will also be to deliver data to in-home displays should this be required.

"We want to make it as simple as possible for utilities to be able to pick and mix our services and products to really suit their individual requirements," said Simon Anderson, Chief Strategy Officer at geo. "Tempo is about delivering flexible data solutions and flexible pricing as part of one geo package, and we are excited to be launching this at EUW."

geo will also be unveiling the initial results of two energy projects that it is trialling in Finland and Norway where the vast majority of the population is dependent on electricity for its heating.

The Cosy Nordics initiative provides an automated mechanism to take advantage of spot pricing for electricity ensuring that consumers optimise heating in the home at the best possible price. Results from the trial indicate savings of up to 30 per cent. "We are gathering data on the success of Cosy Nordics currently, but if it continues to show such a decrease in electricity costs, we expect to deploy it as a new service next winter, at which point other countries will also be able to take advantage of it too," continued Simon Anderson.

The geo stand (3D69), is in the Intelligent Buildings Europe zone at EUW and will also feature Topaz - geo's integrated energy management system (iEMS) that works with individual technologies including metering services, energy storage, solar, smart heating and appliance controls to enhance their smartness and benefit the energy-conscious householder.

Concerns raised over UK Government's plans to improve energy efficiency

The Association of Plumbing and Heating Contractors (APHC) has expressed concerns over newly announced Government plans to increase the UK's energy efficiency in line with its Paris commitments agreed in December 2015.

Speaking at the International Energy Agency (IEA) in Paris last month, Baroness Neville-Rolfe, the newly appointed Minister of State for Energy and Intellectual Property, discussed the need for the UK to do more in order to meet carbon reduction targets set during the United Nations conference on climate change in Paris last December.

Emphasising the link between smarter energy use and increased profitability, the Minister discussed the different approaches which have allowed the UK to reduce emissions by 38 per cent since 1990, including smart meters, the increased energy efficiency of new builds and adding insulation to older housing stock.

Suggesting that the failure of the Green Deal scheme was due to the inconvenience of home improvements as well as a lack of finance, Baroness Neville-Rolfe also stressed the need to motivate consumers to install energy efficient solutions and the role heat networks can play in contributing to carbon emissions reduction, with Paris home to the world's largest deep geothermal network.

John Thompson, Chief Executive at APHC commented, "While it was interesting to hear the Energy Minister's thoughts about the UK's ongoing approach to tackling climate change, we would have hoped for more clarity at this stage with regards to exactly how the Paris commitments are going to be met.

"In the wake of Green Deal, the UK urgently needs an alternative means of encouraging the take up of renewable technologies and in light of this latest information we're concerned about the time required to put this in place."

In her maiden speech at the United Nations Prime Minister Theresa May gave her first major commitment that Britain will continue to tackle climate change after leaving the EU, as she promised to ratify the Paris agreement by the end of the year.

Green energy ISA raises over £1m

The UK's first green energy ISA (Individual Savings Account) just launched by Abundance Investment has already attracted over £1 million in investment. It is the UK's first Innovative Finance ISA (IFISA) to allow ordinary people to invest directly in renewable energy, tax-free.

Over £500k has already poured into Abundance's second Swindon solar bond which went live at the start of last month. The debentures can be held in the tax-free ISA wrapper and will fund a new solar farm on a Council-owned former landfill site at Chapel Farm in Blunsdon, Swindon.

The bond will have an average annual rate of return of 6 per cent for a period of 20 years with a minimum investment of just £5. It follows the very successful launch earlier this year of the UK's first council solar bond in partnership with Swindon Borough Council, which sold out early.

The significance of this innovative project has been recognised by the Secretary of State for Communities and Local Government, Sajid Javid, MP. He said: "This is an excellent example of a local council working with the private sector to provide local people with a means of investing in their local community and its infrastructure. I wish it every success."

Bruce Davis, co-founder and Joint Managing Director, Abundance, said: "We want to turn investing in ISAs from something gathering dust in the forgotten corner of a bank or riding the roller coaster of global stock markets into something that makes a difference in the real world. Investors' money will be working harder than it would in the bank, boosting the UK's green economy and sustainable infrastructure, and returns will be tax-free. Our second Swindon solar bond is just the start – we've got other exciting ISA investments which can help ordinary people match their financial aspirations with their environmental values."

The new Innovative Finance ISA (IFISA) has been made possible following a Government announcement that the IFISA can include peer-to-peer investments such as debentures, allowing individuals to invest directly into businesses and projects.

REI looks to the New Year to report on the best of the sustainable heating products that will be on the UK market

"What if I can turn a wall into an electric radiator?"
That was the question Stephen Dempsey of EcoVolt put to Knud Saborowski from Future Carbon, as he was researching new products to help him create new and better heating elements for their range of electric heaters, JouleTherm. Searching endless hours on the web he came across a product that immediately caught his eye and the JouleTherm CeP 24V electric paint heating system was born, changing the way electric heating works.

Voted 'Most Innovative New Product' by event organisers at UK Construction Week 2016 at the NEC Birmingham, the system is a 24V conductive paint heating system that can be installed onto plasterboard walls to create a radiant heating surface of up to 300W/m^2. Here's how it works:

1 After a pre-determined wall or ceiling area is set out on a plasterboard wall, two sets of self-adhesive copper electrodes coated in the JouleTherm CeP coating are applied to the wall after the wall has been treated with a primer.

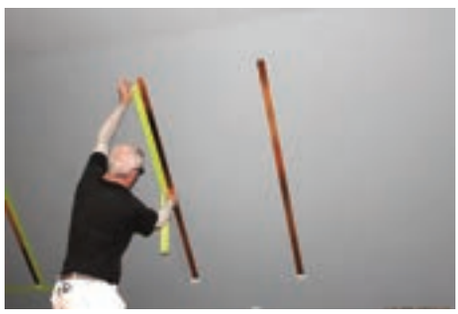
2 Once dry, the entire area is painted with two coats and a resistance reading is checked across both electrodes.

3 When satisfied with the readings according to the training manual the 24V supply can be connected to the electrodes and within minutes the heating area is radiating heat.

4 When satisfied with the performance and heating surface area temperature, the area is ready to be painted over.

5 Controlling the JouleTherm CeP heating panels is done by wireless thermostats with built-in receivers located at the 24V transformer units. Single zone control or multiple zone can be incorporated making it a very cost effective, fully controllable and very efficient system. Delivering over 60 per cent energy savings compared to traditional electric heaters, JouleTherm CeP has lower running costs than gas or oil wet systems as well as heat pump underfloor wet heating systems.

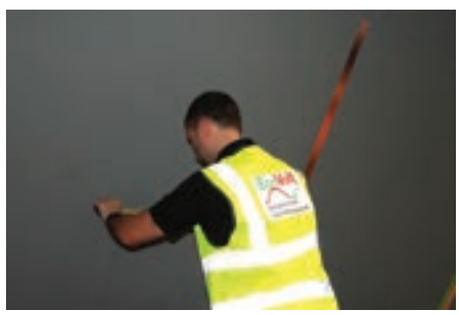
"We can heat a room measuring 16m^2 by using just one zone. One zone (1500x700) only consumes 300 watts.



***1** Preparing for the coating*

***2** Two coats are needed*

***3** Checking the measurements*



***4** Area is ready to be recoated*

***5** Applying the second coat*

***6** Awaiting decorative layer of paint*

Traditionally a room that size would require at least 1500W of electric heat to heat it comfortably. We have just changed the game and everything about electric heating," says Ecovolt Founder Stephen Dempsey, "For me this is up there with the revolution of the electric car. I believe the mind-set and opinions will change when it comes to electric heating."

6 The first commercial installation of JouleTherm CeP was recently completed in Dublin at the Marco Pierre Restaurant.

Twelve heating zones were installed on the ceilings of the 200m^2 restaurant. A total load of 4.8KW was used to heat the premises. Typically 20KW would have been recommended if traditional methods were implemented but less than 25 per cent of that was used and achieved temperatures of 25^{0}C during the unoccupied times.

The controllable thermostats are set to 21^{0}C, leaving the restaurant with a lovely ambient temperature and an effective heating solution.

JouleTherm CeP is now available on the market only to trained installers – organisations can nominate an individual to complete the training and certify installations. It is the world's first paint on wall electric heating system. It can make more than 60 per cent energy savings compared to traditional electric heaters and has lower running costs than gas or oil wet systems.

The Big Magic Thermodynamic Box

The Big Magic Thermodynamic Box combines innovative Solar Assisted Heat Pump technology with an A rated, KIWA approved stainless steel cylinder to create the UK's first ever thermodynamic cylinder.

The Big Magic Thermodynamic Box is an all-in-one solution for hot water heating requirements, with a complete range of Solar Assisted Heat Pumps, with either an 130L or 200L indirect, unvented cylinder, suitable for every installation. This hot water heating and storage system has been MCS tested and utilises Magic Thermodynamic Box's already proven technologies.

Relying on the same thermodynamic principles as the company's existing Solar Assisted Heat Pump range, the Big Magic Thermodynamic Box transfers this energy to water within its casing, to efficiently and cost effectively handle the water heating for use in your home.

Water Heating; How does it work?

The Thermodynamic Collector circulates refrigerant liquid where energy is absorbed from the ambient temperature. This transforms the liquid into a gas, which carries the heat energy to the Solar Assisted Heat Pump. The Solar Assisted Heat Pump then compresses the gas which increases the temperature. The spent gas reverts back to a liquid which flows back in the panel, allowing the process to start again. Simultaneously, the superheated gas heats the water within the cylinder using a proprietary process. This process continues until the water in the cylinder reaches 55°C. Once this is achieved the system goes into standby mode.

ThermaSkirt looking for installers

DiscreteHeat manufactures the 'ThermaSkirt' radiant skirting system that combines the radiators in a skirting board profile to provide a whole house heating solution for new build and renovation projects. Operating 'above ground' means that it is a relatively simple install in existing buildings, often using the existing infrastructure – either pipework or wiring. This in turn can make the installation of renewables such as heat pumps an easier 'sell' as the disruption is much less than would be the case with underfloor, and much more aesthetically pleasing than over-sized radiators. This was a major factor in the Judges of the National Heat Pump Awards to award ThermaSkirt 'Most Innovative New Product' a few years back. As the system is unaffected by, or indeed does not affect the floor construction or finish, it can also be used at the higher flow temperatures provided by biomass and wood and gas/oil boilers.

Managing Director, Martin Wadsworth explains further: "We're pushing hard now into the commercial and domestic sectors and the take up is good. What we really need to put in place now is a more complete network of installers to meet the demand." As a result, DiscreteHeat is appealing directly to the Renewables Installer to help them find the right kind of engineer to fit the product.

Martin goes on; "Any MCS, Gas-Safe, NiCEiC or NAPIT registered installer must have good levels of competence and customer service in order to survive and thrive. These skills attained are what we are looking for in our installers to provide the best possible level of customer satisfaction. We provide full training, exclusive areas, referrals and live business."

Topaz geo battery storage

Cambridge-based geo are one of the UK's pioneers in developing the hybrid home and pushing the advantages of bringing technologies and data services together under one roof. The hybrid home concept combines traditional and contemporary ways to power a home, including demand management and energy storage, to significantly reduce running costs whilst improving living standards. At the heart of the hybrid home is geo's integrated energy management system (iEMS) that works with individual technologies including metering services, energy storage, solar, smart heating and appliance controls to enhance their smartness and benefit the householder.

Topaz, a battery storage system, is the latest in geo's lengthy product list which includes a full range of connected energy services and smarter energy apps all designed to help consumers see, control and automate home energy.

geo was founded in Cambridge in 2006, the award-winning brainchild of CEO Patrick Caiger-Smith and CSO Simon Anderson, both intent on revolutionising the smart home interface in a bid to encourage consumer engagement and a greener way of home living.

Top 10 Products continued on Page 35

The Minus 7 System

The Minus7 system harvests renewable energy 24/7 to provide a complete energy solution for buildings. Solar thermal, PV, heat pump and energy storage technologies are seamlessly integrated into a single hybrid system managed by advanced proprietary control methodologies contained within the Solar Energy Processor (SEP).

The core of the system is a high quality long-life roof composed of patented solar thermal panels with embedded high-performance PV cells designed to harvest energy efficiently day and night at temperatures as low as -7ºC.

The Minus7 System is optimised to absorb the energy needed to provide comfortable heating and hot water from even low ambient temperatures, and therefore needs a large capacity for energy storage.

The System needs two thermal stores: the hot store is warmer, contains water and is the thermal energy source for the building; the cold store is cooler, contains a mixture of ethylene-glycol based anti-freeze and is the thermal energy source for the water-to-water heat-pump.

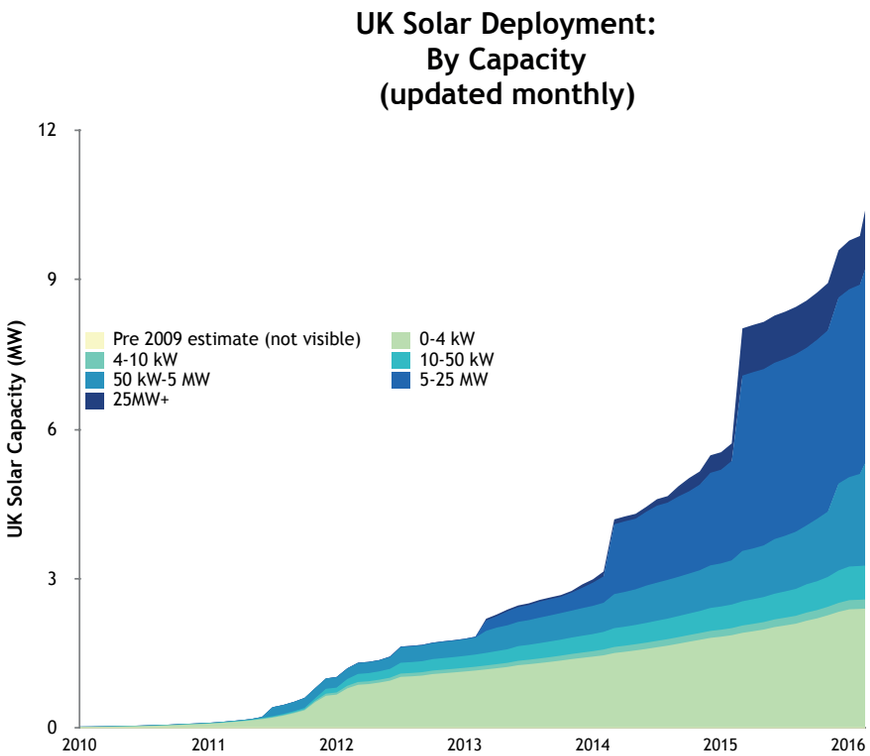
They are both purpose-built tanks with 200mm of insulation on all surfaces. The size and number of stores needed depends on the scope of the project, but they can be sited in various places for least impact; such as in the foundations of the building, in an outhouse or garage, or partially buried in the garden, or under a patio.

Product and Installation quality is of paramount importance to Minus7. The company has a team of trained roofers, plumbers and electricians. All have the required quality certifications to sign off the technology for building regulations and government energy subsidies.

There is no need to service gas boilers with a Minus7 system, there are also minimal operational and minimal maintenance costs. There is no need to service gas boilers, there are also minimal operational and maintenance costs.

Data

Solar deployment



Generation tariffs for solar PV

Tariff band		
<10kW	Higher rate	4.18
	Middle rate	3.76
	Lower rate	0.57
10-50kW	Higher rate	4.39
	Middle rate	3.95
	Lower rate	0.57
50-250kW	Higher rate	2.03
	Middle rate	1.83
	Lower rate	0.57
250-1000kW	1.69	
>1000kW	0.57	
Standalone	0.51	

* Currently subject to consultation

FiT deployment caps that have been reached in tariff period 01 (01 April-30 June 2016)

Accurate as at 00.01 on 15 March 2016

Deployment Band	Cap limit (MW)	Cap reached	Date & time of final installation to qualify	Capacity deployed (MW)
PV <10kW	76.96	No	N/A	2.56
PV 10-50kW	25.72	No	N/A	0.859
PV >50kW	14.5	No	N/A	6.79
PV standalone	5	Yes	08/02/2016 01:15	12.79
Wind <50kW	11.17	No	N/A	-
Wind 50-100kW	0.3	Yes [1]	08/02/2016 00:15	0.542
Wind 100-1500kW	6.8	Yes	08/02/2016 00:18	21.730
Wind 1500kW-5000kW	10	No	N/A	-
Hydro <100kW	1.1	No	N/A	0.135
Hydro 100-5000kW	9.5	No	N/A	-
AD (All)	5	Yes	08/02/2016 00:15	15.67

Generation tariffs for non PV technologies

Technology	Band (kW)	Tariffs (p/kWh)
Hydro	<100kW	7.65
	100-500kW	6.13
	500-2000kW	6.13
	<2000kW	4.43
Wind	<50KW	8.33
	50-100kW	6.08
	100-1500kW	3.92
	>1500kW	0.83

Source: OFGEM

Feed in Tariffs: Communtities and Schools Installations

		Communities				Schools			
		Granted preliminary accreditation		Granted full accreditation		Granted preliminary accreditation		Granted full accreditation	
		Count	Installed capacity (kW)	Count	Installed capacity (kW)	Count	Installed capacity (kW)	Count	Installed capacity (kW)
	Q2 (Apr to June)	1	27	-	-	1	4	-	-	2	31	-	-
2013	Q3 (Jul to Sep)	22	549	-	-	4	89	1	4	26	638	1	4
	Q4 Oct to Dec)	7	163	-	-	1	50	1	10	8	213	1	10
	Q1 Jan to Mar)	10	296	-	-	-	-	1	32	10	296	1	32
2014	Q2 (Apr to June)	53	1,889	6	126	-	-	1	50	53	1,889	7	176
	Q3 (Jul to Sep)	12	377	10	286	7	54	1	10	19	377	11	296
	Q4 Oct to Dec)	9	202	6	197	5	208	2	14	14	409	11	211
	Q1 Jan to Mar)	55	1,655	8	187	2	29	8	223	57	1,684	16	409
2015	Q2 (Apr to June)	10	194	4	104	8	74	4	53	18	268	8	157
	Q3 (Jul to Sep)	44	145,461	4	15	4	59	7	83	48	145,519	11	98
	Q4 Oct to Dec)	135	81,686	8	180	2	20	2	20	137	81,706	10	200
	Q1 (Apr to June)	968	164,104	18	425	13	165	16	200	981	164,269	34	625
2016	Q2 (Jul to Sep)	167	31,497	15	286	1	3	1	10	168	31,500	16	296
	Q3 Oct to Dec)	36	6,609	48	1.674	3	47	2	36	39	6,657	50	1,709

RHI non-domestic rates

Tariff name	Eligible technology	Eligible sizes	Tariff rate Pence /kWh	Tariff duration
Small biomass	Solid biomass, municipal solid waste (inc CHP)	<200 kWth	Tier 1: 3.10 Tier 2: 0.86	20
Medium biomass	Solid biomass, municipal solid waste (inc CHP)	200 kWth and above <100 kWth	Tier 1: 5.24 Tier 2: 2.27	20
Large biomass	Solid biomass, municipal solid waste (inc CHP)	100 kWth and above	2.05	20
Small ground source	Ground source heat pumps, water source heat pumps, deep geothermal	<100 kWth	Tier 1: 8.95 Tier 2: 2.67	20
Deep geothermal			5.14	20
Solar collectors	Solar collectors	<200 kWth	10.28	20
Air source heat pumps	ASHPs	All	2.57	20

(Source: OFGEM

According to the latest figures published by the Department for Business, Energy & Industrial Strategy, as of the end of September 2016, overall UK solar PV capacity stood at 11,152 MW across 891,409 installations. This is an increase of 30% (2,572 MW) compared to September 2015. Provisionally, September 2016 saw 21 MW (4,461 installations) of solar PV capacity being deployed throughout the month, with the main drivers (46% of capacity) being small scale 0 to ≤ 4 kW schemes in Great Britain and Northern Ireland. To date, 49% (5,462 MW) of total installed solar PV capacity comes from large scale installations greater than 5 MW, with 22% (2,441 MW) coming from small scale 0 to 4 kW installations. At the end of June 2016 (end Quarter 2), 53% of capacity (5,669 MW) came from ground-mounted or standalone solar installations.

Domestic RHI deployment

Technology	Accreditations (Apr14-Sep 16)	% of total
ASHP	24,024	47
GSHP	7,489	15
Biomass	11,998	23
Solar Thermal	7,908	15
Total	**51,419**	**100**

Number of MCS registered installers per technology

Technology	Culmative	Registered Sep 16
Solar PV	1,838	13
Biomass	547	0
Air source HP	979	7
Ground source HP	683	2
Solar thermal	755	1
Small wind	54	0
Total	**2,519**	**23**

(Figures supplied by Gemserv)

Number of MCS registered installations per technology

Technology	Culmative	Installed Sept 16
Solar PV	883,581	4,461
Biomass	17,065	51
Air source HP	49,539	466
Ground source HP	13,594	92
Solar thermal	8,683	64
Small wind	5,061	2
Total	**955,615**	**4778**

Domestic RHI tariffs

Technology	RHI rate (from April 1 (p/kWh)
ASHP	7.51
Biomass boilers	4.68
GSHP	19.33
Solar thermal	19.74

Patented wind power technology should be first choice for installers

Jim Smyth, CEO at Airsynergy, explains why making the right choice can positively impact carbon emission levels, power production and energy bills

Renewable energy generation has experienced a shift in the last decade or so. It is now not simply a solution which is viable to design, specify and install; for many it is now seen as economically preferable. The high uptake in renewable energy generation has been felt particularly acutely in the UK. According to the Department for Energy and Climate Change (DECC), low carbon generation has increased from 37 per cent to over 45 per cent from 2014 to 2015. This is due to an increase in nuclear and renewable energy.

Fall in fossil fuels

Many coal plants have succumbed to closures and conversions in recent years. Britain's eight remaining coal-fired power plants are set to face the same fate and close by 2025 unless they take the unlikely step of investing vast sums in new technology to slash their carbon emissions. Whilst coal energy generation has decreased by seven per cent, renewable sources such as wind, solar farms, hydroelectric and biomass accounted for 25 per cent of the UK's electricity generation in 2015.

Wind energy generation has proven a more preferable choice for UK installers, as it has risen in excess of 26 per cent. This is only predicted to increase over the next few years, following the former Chancellor George Osborne's allocation of £730 million towards auctions to back renewable energy projects and their consequent infrastructure in his 2016 Budget.

Wind energy generation is not only helpful to the environment. It has also helped to ease the dependency on coal and gas for energy, which will continue as wind power's dominance continues to grow.

According to a 2014 report commissioned by RenewableUK, coal imports were reduced by an estimated 4.9 million tonnes in 2014, and gas by 1.4 million cubic metres. The higher the number of wind energy installation projects, the stronger the insurance against unstable and often unaffordable gas and electricity prices.

Tayto Park (*above*) is Ireland's first theme park, and contains enough thrills and spills to keep adults and children entertained. Situated 20 miles west of Dublin, it is a theme park which name originates from Ireland's famous Tayto crisps.

Visitor numbers have steadily increased for Tayto Park since its opening in 2011, with yearly visitor numbers topping 800,000. Providing power for Tayto Park is a large-scale operation, and one which required a rethink if cost-effectiveness and sustainability were to be prioritised. Utilising renewable power was an obvious solution, and Airsynergy's Total Energy Solution (TES) was chosen to provide power to Tayto Park via a ground-breaking wind turbine.

When asked why Tayto Park chose Airsynergy over other wind turbine providers, Raymond Coyle, CEO and Founder of Tayto Park commented: "Airsynergy's Total Energy Solution provided a particularly attractive opportunity for us as the wind turbine can produce 20,000 kWh per annum of renewable energy – double the power output of the other competitors we looked at."

Wind generation re-imagined

Two-in-one wind turbines which utilise revolutionary technology have been created to ensure that the potential that wind power can offer is maximised. These newer wind turbines not only contain a standard rotor and blades, but also contain a multi-bladed duct augmenter. This augmenter concentrates and amplifies air from the inside out, increasing the speed of the wind flowing past the two-bladed rotor system. The primary objection that installers have regarding wind turbines has been wind intermittency – are they able to provide regular, reliable energy – something which is crucial, especially in the UK, where the consumption of energy has increased by 1.9 per cent in the last year alone. Turbines which utilise this revolutionary, patented technology can generate energy in locations previously deemed unsuitable. With newly designed, innovative wind turbine technology, ca. 80 per cent of global wind sites can be utilised. The performance of turbines utilising this revolutionary technology is outstanding considering they are often as small as a two storey house in height. They are therefore not visually obtrusive for those living or working nearby.

Due to their ability to magnify wind speeds, these revolutionary wind turbines can increase power production performance by ca. 100 per cent compared to similar kilowatt capacity turbines which do not contain this technology, providing there are no obstructions to wind speed. Importantly for installers, this increase in power output not only makes turbines more affordable when compared to the grid price, but it also makes them the most cost-effective renewable energy solution.

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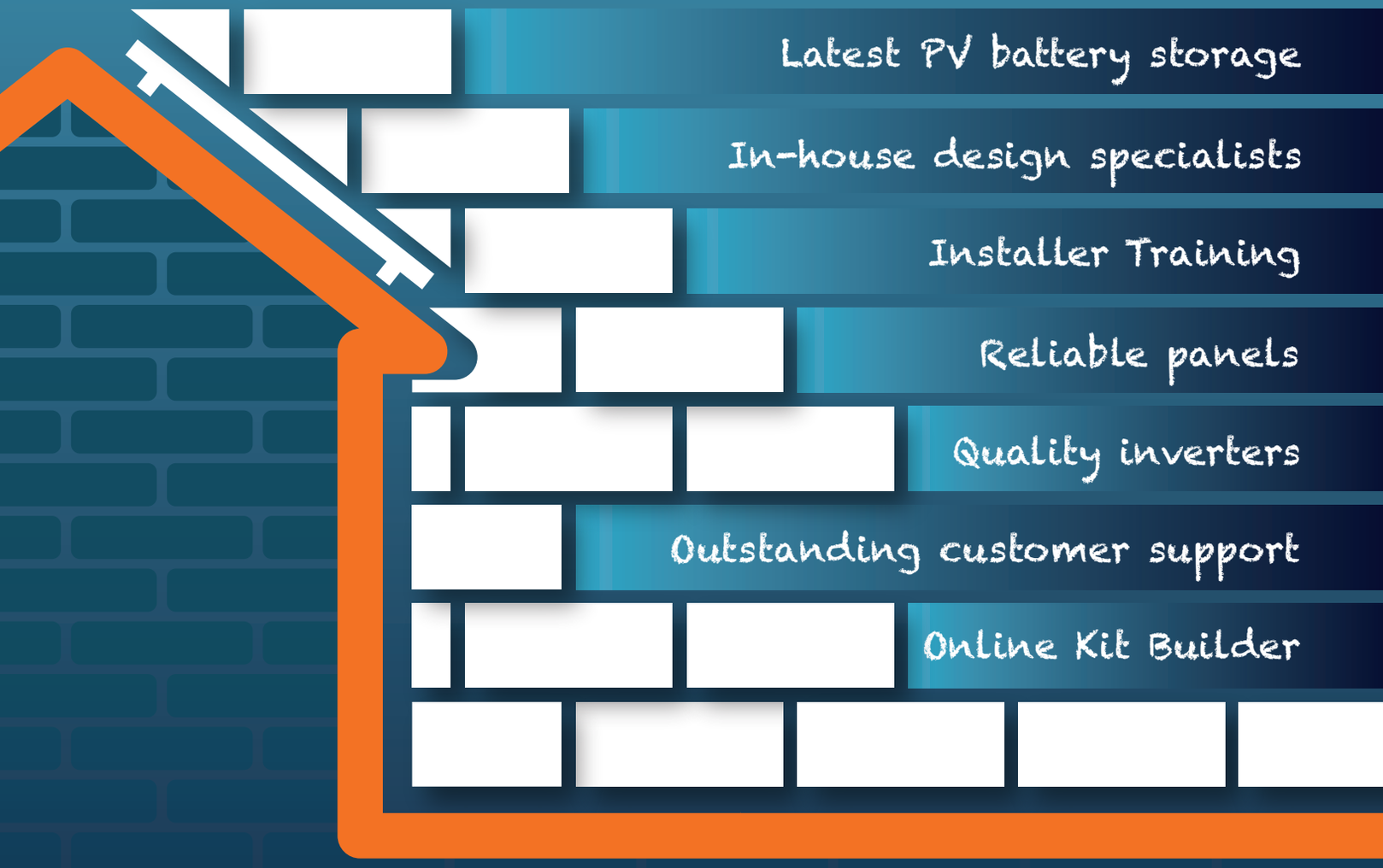

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