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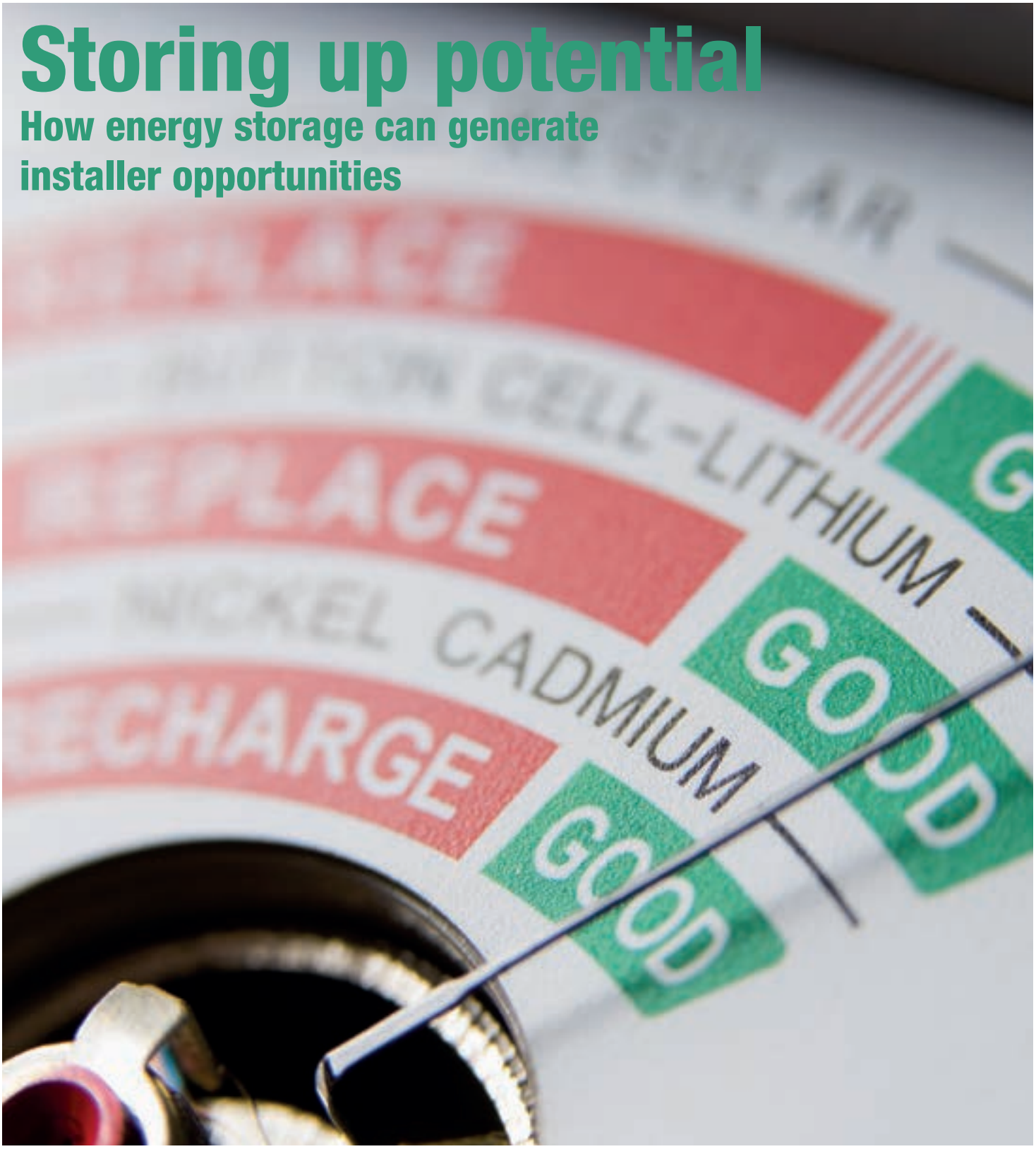
Storing up potential

How energy storage can generate installer opportunities



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Positive moods

It was great to meet so many of the readers, contributors and partners of Renewable Energy Installer last month at Ecobuild.

Setting off to London, the REI team was unsure of the mood the industry following a string of subsidy cuts and tariff reductions.

However, the general reaction we received was remarkably upbeat and optimistic. And walking around the stands, it was clear why there is much to be positive about.

The potential of energy storage is enormous and will without doubt shape the future of the industry by creating opportunities for hundreds of installers. The advantages are clear and households will continue to install renewable energy as it makes even more financial sense.

It was virtually impossible to have a conversation without mention of energy storage and battery technology. The installers appear anxious to learn very quickly about this new market and want to know when the supply can start to match the product demand.

Another sector that was generating huge interest at this year's show was around community and district energy.

Both community energy and smart energy are covered within their own dedicated sections, and this magazine is also highlighting innovation across multiple sectors with a new section focused on the latest product news and developments.

Please continue to send through case studies and your company news to share with the rest of the industry and together continue to bounce back from the disappointment of recent policy changes.

Editorial panel members

Andy Buchan, CEEC, Future Renewable Energy

Dave Sowden, SEA

Garry Broadbent, Lifestyle Heating

John Kellett, Mitsubishi Electric

Paul Joyner, SBS

Liz McFarlane, Zenex Solar

Tim Pollard, Plumb Center

Phyllis Boardman, Green Deal Consortia

Robert Burke, HETAS

Gideon Richards, MCS

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In brief

Green energy link-up
Ecologicliving, a Carlisle-based renewable energy solutions company, has launched a new partnership with British Gas. The link-up, one of only two in the county, means that Ecologicliving can now offer unique biomass and combined heat and power (CHP) products and services in the local area.

New appointment
The Sustainable Energy Association has announced that Edwin Bannock, Chair of the Board, Ice Energy Technologies Ltd, has been elected as its new Vice President and chair of its Executive Committee, to serve for the next two years.

Investment high
The solar photovoltaic (PV) manufacturing sector is forecast to increase capital expenditure on new factories and technologies in 2016 by more than 60 percent, compared to 2012, when manufacturing fell to a six-year low. Manufacturing-related investments are forecast to reach a five-year high of $5.3 billion in 2016, according to the new PV Manufacturing & Technology Quarterly report from the market research division of Solar Media Ltd.

Finance for biomass heating switch
Biomass heating specialists Windhager UK has introduced a new asset finance package for commercial clients to fund biomass boiler system installations.

Under the new scheme, Windhager UK is working with finance partner Macquarie, to help consumers invest in a biomass heating solution without denting the cashflow figures.

Windhager UK's Managing Director Oliver Duckworth commented: "Numerous projects are already underway using this scheme, including hotel and care groups."

Treasury ditches plans for VAT rise on residential solar

The Solar Trade Association has greeted reports of a change of direction on VAT on solar as "very encouraging".

HMRC proposed last December to hike VAT on domestic solar PV and solar thermal installations from five to 20 percent, following a European Court of Justice ruling that UK rules on VAT on energy weren't in line with EU law.

An amendment to the budget resolution, empowering the Treasury to give solar and other energy materials lower VAT rates, has gained cross-party support and is due to be agreed in the House of Commons – and the Government has said it would not oppose the move.

Leonie Greene, Head of External Affairs at the STA, said: "The signals coming from Government appear to be very encouraging. Increasing VAT on solar to 20 percent while retaining five percent for grid electricity, gas and oil defies all logic, which is why the STA has consistently taken a strong line on this issue. The Chancellor can and should stand up to Brussels on this – lower VAT on domestic solar is within the guidelines set out in EU law.

"We hope the Treasury will issue an official statement confirming the Government's intention as soon as possible, as HMRC is still in theory considering responses to the consultation on this. We also want to see the reduced solar rate of VAT in black and white in the Finance Bill later this year."

The STA had estimated that the VAT increase would add £900 to the cost of a typical residential solar PV installation.

Solar farms provide boost for biodiversity

National energy efficiency solutions company Anesco has joined forces with the RSPB, Europe's largest nature conservation charity, on a pioneering new project that aims to enhance the biodiversity of solar farms.

The agreement, the first in the UK, will see the creation of natural habitats for some of the country's most at-risk species. It comes after research revealed 60 percent of UK species have declined over the last 50 years.

Anesco works with clients from major corporations to individuals, and has managed the design and construction of some of the UK's largest and most complex ground mount schemes, installing over 500MW of solar PV.

RSPB experts will visit a number of Anesco's existing solar farm sites to advise on ways they can be enhanced to the benefit of 'priority species' – wildlife groups under the most serious threat. These recommendations will then help shape Anesco's biodiversity management plans for all new solar farm sites.

Darren Moorcroft, RSPB Head of Species and Habitats Conservation, said: "It is an excellent opportunity to develop habitats for nature in need of our help, showcasing how a renewable energy business and wildlife conservation can be delivered in unison."

Partnership to power up cheaper battery technology for solar storage

Researchers at WMG, University of Warwick, have formed a new partnership with battery technology innovators Faradion, and smart energy storage specialists Moixa Technology to develop sodium-ion cells as a lower cost alternative to lithium-ion batteries for solar energy storage. The collaboration is part-funded by Innovate UK, the UK's innovation agency.

A significant proportion of the cost of current solar energy storage systems comes from the commonly used lithium-ion battery. By using highly abundant sodium salts rather than lithium, Sodium-ion cells are anticipated to be 30 percent cheaper to produce. This makes solar storage more accessible, opening up the possibility of domestic renewable energy storage to a greater number of households and businesses worldwide.

The partnership will also have to prove sodium-ion technology can meet the life cycle needs of solar energy storage. A conventional lead-acid battery would be replaced up to five times in the lifetime of a PV solar system. WMG's role in the research will see it employ its large-scale prototype manufacturing and electrode coating capabilities.

PV installers Down Under report greater satisfaction

Australian installers report a higher overall satisfaction with PV module brands they carry in their portfolios than their colleagues in Germany, Italy, the UK and the Netherlands, a new report has found.

These findings are particularly noteworthy as Australian installers are also apparently the most discerning. They assign higher importance values to a variety of brand selection criteria in comparison to the European installers. Among these, the most important are quality, reliable delivery information and guarantee conditions. This highlights the ability of renowned PV module manufacturers to satisfy even the most demanding customers.

These results arise from the new Australian PV Installer Monitor – this year's special edition of the European PV Installer Monitor, which has been conducted by EuPD Research for the eighth year in succession. Apart from topics such as market penetration, the study features issues such as procurement and brand management, satisfaction and recommendation as well as energy storage.

Free solar for tenants

One of the UK's award winning renewable energy companies has been awarded – and is successfully delivering – a contract to provide almost 2,000 homes with solar PV on behalf of Suffolk-based Havebury Housing Partnership.

Saving Energy, based in Essex, has been fitting up to 120 homes per week with solar PV in the areas of Bury St Edmunds and Haverhill. The Housing Association has encouraged its tenants to take up the opportunity to have solar PV installed – absolutely free of charge – which will help them to save up to 50 percent on their electricity bills.

Government rapped by MPs for hit to investor confidence

The House of Commons Energy and Climate Change Select Committee has heavily criticised the Government in a report into 'Investor confidence in the UK energy sector'.

The inquiry focused on the low-carbon energy budget, the Levy Control Framework (LCF). It describes how confusion over the LCF is hampering investment decisions and risk assessments across the energy sector.

The Solar Trade Association (STA) and a number of solar businesses including Lightsource, Next Energy Solar Fund and Octopus Investments gave evidence as part of the inquiry's oral evidence sessions.

Paul Barwell, CEO of the STA, said: "This influential Committee has added its voice to the growing chorus of criticism of the secrecy surrounding the LCF budget. The best way to ensure the market's confidence and trust is to be open with what is being spent, how much is left and how you are managing and forecasting future spend. Government has still to properly account for the apparent sudden increase in expenditure used to justify the rapid withdrawal of support for the solar industry."

The report also criticises the succession of policy changes and scheme closures in renewable energy since the General Election.

Generate electricity and heat from your biomass boiler

Generating electricity from a biomass heating boiler has recently become a reality for customers in the UK, thanks to the innovative Cogetherm range of biomass CHP systems manufactured by Wood Energy Solutions (WES).

Cogetherm ranges in output from microCHP 1.5kWe to 200kWe with electrical efficiencies ranging from 10-40 percent depending on system design and heat load.

The CHP system is a heat led application. The boiler via an evaporator (plate heat exchanger) heats a proprietary organic fluid turning it to gas. This superheated gas drives a patented scroll expander which drives the generator creating electricity. The gas then passes through a condenser (plate heat exchanger) and delivers hot water to the buildings central heating system.

For larger commercial users Cogetherm is available in the CogeCabin. WES's prepackaged cogeneration plant room with wood pellet boiler and CHP system comes fully installed ready to be delivered to site as a 'Plug and Play' solution.

WES's Cogetherm/E-COMPACT Biomass Boiler combination attracts both biomass RHI (CHP) tariff at 4.17p/kwh and ROCs (1.4 ROC, which is equivalent to circa 6.4p/kWh) for 20 years.

An added attraction is the RHI tariff is not subject to Tier 1 and Tier 2 levels like conventional RHI tariffs for biomass boilers. The 4.17p/kwh is a flat rate irrespective of the amount of hours the boiler runs. For this reason, users with high heat load benefit most.

In brief

Fridge grant
Dulas, leading designer and manufacturer of renewable energy systems, has been awarded £57,400 of funding from the Welsh government's SMARTCymru program, to support the development of its Solar Direct Drive Refrigerators. Dulas pioneered solar vaccine refrigerators in 1982, and has been a market leader in the technology ever since.

EV future
The electric vehicle revolution could turn out to be more dramatic than governments and oil companies have yet realized. New research by Bloomberg New Energy Finance suggests that further, big reductions in battery prices lie ahead, and that during the 2020s EVs will become a more economic option than gasoline or diesel cars in most countries.

Battery drive
Germany's Government has announced further support for PV battery installations with €30m set aside to assist investments in battery storage connected to a photovoltaic installation and to the grid for the period up to the end of 2018. Intended to improve the system compatibility of installed battery technology, the promotion is valid for systems with less than 30kWp power installed after December 2012.

Solar car park good practice
New guidance from the BRE National Solar Centre shows how car park owners can maximize their economic and environmental performance with PV technologies.

The guide gives details on selecting the best sites, tapping into revenue streams and developing a strong business case for solar investment. A number of design concepts and considerations are set out, and the guide is accompanied by a financial model, downloadable from the BRE website.

World first bio plant for handling household waste to be built in UK

A world first bio plant for handling unsorted household waste will be built in Cheshire by DONG Energy.

It will be the first bio plant in the world to handle unsorted household waste, without prior treatment, using enzymes. The ground-breaking new technology, called REnescience, has been developed by DONG Energy and tested at a demonstration plant in Copenhagen since 2009.

Now the world's first commercial full-scale plant will be built in Northwich, meaning a much larger proportion of UK household waste can be recycled and converted into biogas energy.

DONG Energy will finance, build and operate the plant, which will be operational in 2017.

Around 150 people will be involved during the peak phase of construction, with an average of 75 at any given time. The plant will also require around 24 full-time local employees to operate it.

BayWa r.e. announce partnership with leading installer

BayWa r.e. has announced a strategic partnership with the Exeter-based solar PV company SunGift Trade Ltd. The two companies are co-operating to extend the offering to the customers of SunGift Trade, the distribution arm of the pioneering and award winning renewable energy installer SunGift Solar Ltd.

SunGift and BayWa r.e. have entered into partnership to strengthen their position on the UK solar PV market. BayWa r.e. as a natural choice will support the trade customer base by supplying high quality products from leading manufacturers whilst SunGift Solar focus on the installation and consultancy activities of the business.

Located in Exeter, Devon, Sungift Trade are based within the 'Solar Powerhouse' that the South West of England represents, enjoying the highest irradiation and concentration of PV installations. This is also an area that holds great potential for BayWa r.e. as they look to supply a customer base who are keen to develop new offerings to domestic and commercial end users of PV.

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Energy storage could cut household bills by £50 a year

A new report outlines significant cost benefits for the UK electricity system, should the potential for energy storage be realised. The predicted system-wide saving of up to £2.4bn a year by 2030 would translate to up to £50 each year off the average consumer energy bill

The report, launched at the Scottish Renewables Annual Conference at the beginning of March, was collaboratively funded by three major utilities, E.ON, SSE and Scottish Power, as well as the Department of Energy and Climate Change (DECC) and the Scottish Government.

The analysis, carried out over 12 months by the Carbon Trust and Imperial College London, is the most comprehensive review to date of the benefits of storage at a UK-system level. By reviewing the societal case for storage at system wide, the report highlights the significant savings that could be made for consumers by deploying storage.

It then explores two specific example applications of distributed storage to highlight a series of core barriers to deployment that have created a market failure, and makes recommendations on how to overcome these barriers to create a level playing field for storage going forward.

"Outdated market framework"

Andrew Lever, Director of Innovation at the Carbon Trust, said: "Energy storage has long been seen as a panacea for a low carbon energy sector in the UK, offering a suite of services to balance the system, make electricity networks more efficient and help the UK to meet its carbon targets at the lowest cost.

"But storage turns conventional knowledge on its head as it doesn't fit neatly into existing regulatory frameworks, which have been designed around an energy system where power is supplied to consumers from large centralised power stations. We have now reached a stage where the technologies are looking promising, but will face challenges in deployment due to an outdated market framework. An urgent rethink is needed so we can address and overcome the broken value chain of energy storage, which is essential if Britain is to provide low carbon energy at the lowest cost to the consumer."

Which pathway forward?

The report assesses the wider benefits of flexibility solutions for a future UK electricity system, examining the impact storage might have to bill payers across three future energy scenarios out to 2030. These include the National Grid's 'No Progression' and 'Gone Green' scenarios, as well as a third scenario developed specifically for this report showing a least-cost pathway for the UK to meet its 2030 carbon emissions reduction target.

Under the National Grid's 'Gone Green' scenario the addition of energy storage can unlock system cost savings of up to £2.4bn a year by 2030. And if just 50 percent of this saving was passed on to domestic customers it could reduce the average household electricity bill by up to £50 a year.

On a least-cost pathway, deploying storage could deliver cost savings of up to £7bn in 2030. According to these figures, £2bn of this comes from the deployment of storage, with a further £5bn primarily from

improved use of existing generation assets and optimised and reduced investment in new low carbon generation assets.

Creating commercial viability

The range of potential benefits provided by energy storage includes absorbing "wrong time" energy, then releasing it to meet demand, to help support capacity constraints and to balance the influx of intermittent and/or inflexible low carbon technologies onto the grid, plus avoiding expense associated with reinforcing assets and adding new capacity.

If the UK addresses current regulations to create a fair and transparent market, these reduced costs and increased resilience translate into cheaper household energy bills. However, the report finds that despite the technology readiness the split of its benefits across network stakeholders makes it difficult for a single one to develop a business case. An incompatible market structure has reduced the commercial viability of storage for investors by increasing risk and reducing revenue potential.

Scottish Energy Minister Fergus Ewing said: "If Scotland and the UK are to meet our shared ambitions to decarbonise energy and tackle climate change, we must have energy storage. This welcome report demonstrates that investing in storage now will reduce the cost of a future UK electricity system, cutting bills for consumers.

"Scotland is already deploying storage technologies, with existing and proposed pumped hydro sites, as well as battery projects and the storage of renewably generated hydrogen for use in heat, power and transport. The regulatory arrangements must change to recognise the economic and the energy security benefits of storage and I urge the UK Government to accelerate its work in this area.

Paul Cooley, Director of Renewable Development at SSE, commented: "SSE supports the findings of the Carbon Trust's report, which spells out how energy storage can significantly reduce bills for consumers whilst decarbonising our energy system and retaining security of supply. It also shows that with the correct market structures, price signals and policy certainty, projects such as SSE's proposed pumped storage scheme at Coire Glas could make a valuable contribution to society."

The analysis shows that many of the necessary regulatory reforms are likely to be cost neutral and will require no additional funding from the Government. Until the current market conditions are addressed to reflect more accurately the value that storage can provide to the network, the UK risks a future under-deployment of flexibility solutions, preventing the capture of the systems benefits identified in the report.

The report calls for a clear and comprehensive strategic approach to energy storage and other forms of flexibility. Recommendations include: the creation of a multi-stakeholder taskforce to develop proposals for adaptation of market frameworks; the establishment of an inter-governmental working group to consider proposals from the taskforce to ensure changes are coordinated across the multiple and independently regulated markets relevant for storage; and joint industry projects to demonstrate specific cost or performance characteristics of storage solutions.

Partner organisation
MCS presents its regular column for REI

MCS Certification: Experienced Workers Route

The competence of a company is paramount to providing consumer protection. However, demonstrating this competence at times can be complex.

Previously companies wishing to become certified contractors for the Microgeneration Certification Scheme (MCS) would have been asked to provide evidence of competence through a route of preferred qualifications. Whilst this is relatively easy to implement, this avenue could penalise many installation companies whose workforce is able to install technologies perfectly well without having attended the specific qualification, or indeed impart an additional cost on those companies to undertake the exercise.

Following feedback, the MCS has been developing an exciting new programme to enable companies to demonstrate the competence of their workforce through an alternative route.

MCS has defined the actual criteria utilised by the Scheme and the methods of how this can be demonstrated. To this end the Experienced Workers Route (EWR)* has been designed and the new 'Pilot' stage is being deployed.

To find out more about this route, please look at the information at **www.experiencedworkersroute.com**. If you would like to express an interest in becoming a provider for the 'Pilot' or in undertaking the programme please see the following links:

If you would like to express interest in becoming a provider of the EWR pilot, **www.experiencedworkersroute.com/interested-becoming-ewr-provider**

If you would like to express interest in undertaking the EWR pilot, **www.experiencedworkersroute.com/interested-in-the-experienced-worker-route**

*The EWR route will mirror the traditional training and assessment routes but may well be a preferred option for some companies

What the UK can learn about renewable heat generation from Europe

Gordon Moran, writing for the European Energy Centre, details the steps the UK can take to improve domestic heat generation from renewable energy sources

Heat generation for domestic, industrial and commercial use accounts for a substantial proportion of energy consumption in most northern countries, and is a major source of carbon emissions. The UK has implemented a number of measures over the years to increase the proportion of heat generated from renewable sources, to meet international commitments to reduce both emissions and costs. Though there has been sustained interest from both private companies wishing to expand within the sector and from the Government, the UK still obtains a relatively small amount of its heat from renewable sources in comparison to other European countries.

Over 10 percent of Germany's heat comes from renewable sources, compared to the UK's one percent. Some countries can generate almost all their heat from renewable sources due to local geography; Iceland, for example is able to harness vast amounts of geothermal power. However, some countries have been able to generate substantial amounts of heat without these advantages. Germany's success is due to a combination of strong government leadership and by strategically prioritising technologies that utilise existing infrastructure.

The UK would benefit from stronger Government incentives to increase energy efficiency, lower energy demand and encourage the widespread installation of microgeneration heat renewables such as solar thermal water heating systems, biomass pellet boilers, and ground and air source heat pumps. Perhaps the largest change could be the use of biogas to replace natural gas for domestic heat production. The UK gets 80 percent of its heating from natural gas, so the best way to make substantial inroads would be to push the large-scale development of biogas in the national gas grid. This would also capitalise on existing supply chains and workforce skills.

To learn more about Renewable Energy and Energy Efficiency through training courses visit www.EUenergycentre.org

Lighting up the green path

Insights from **Richard Baker**, Sales Manager, Energy Efficiency Financing

When it comes to deploying energy efficiency measures, businesses are inclined to first explore energy-efficient lighting due to its relative ease of implementation and ability to generate significant savings in a comparatively short time. A 2013 Carbon Trust survey revealed that 77 percent of businesses polled had invested in energy-efficient lighting in the previous year. The use of efficient lamp technologies, namely light emitting diodes (LEDs), compact fluorescent lamps (CFLs) and energy-saving halogen lighting, has the potential to reduce operational costs by up to 80 percent. Intelligent lighting controls can be used to further reduce energy consumption, usually 30-50 percet in a typical office environment. In terms of LED lighting, no other energy-efficient upgrade offers the same level of reduction in tandem with maintaining or enhancing operational performance.

Energy-efficient lighting upgrades also represent the highest return on investment (ROI) of any single-technology project. According to the Energy Savings Cost Council, these upgrades generate an average ROI of 45 percent, with a potential payback period of just over two years. In fact, in industries where operating hours are the highest, such as commercial or retail buildings, payback periods are often close to one year. Even in office environments where annual hours of operation are more intermittent, payback periods can be achieved in less than five years.

To help businesses seize the economic and environmental benefits of upgrading to energy-efficient lighting, suppliers can now make technology investment even more convenient and affordable for their customers by becoming a recognised supplier of the Energy Efficiency Financing scheme (EEF). A joint initiative between the Carbon Trust and Siemens Financial Services Limited (SFS), the scheme aims to provide finance for organisations acquiring energy-efficient equipment, with affordable monthly payments designed to match – and be offset by – the average monthly savings on energy bills. In some cases, the value of the savings can actually be greater, allowing the customer to be cash positive from day one.

Recognised suppliers of the scheme can integrate the financing offer into their overall sales propositions. Prior to finance being approved, an energy saving assessment will be undertaken by experienced specialists at the Carbon Trust to ensure that the expected carbon reduction, and hence financial savings over time, should match or exceed the monthly finance payments.

Kym Jones, Director of Energy Saving Solutions and Products, an energy-efficient lighting provider, comments: "Eighty percent of our business, where transactions range between £20k and £200k, is now facilitated by the EEF scheme."

Turn parking spaces into energy generators and chargers

Solar car port technology could deliver electricity and many other benefits, argues **Steve Pester**

Ever looked at a car park and thought what a lot of space is being used for lines of metal boxes? I call them that because most cars spend most of their lives being precisely that – space-hungry metal boxes, only becoming sleek chariots again when it is time to whisk their owners to work, the supermarket or back home again.

Okay, so some of you may have slightly more interesting lives than that (I hope so!), but the point is: what if some of that car parking space could be used for something else at the same time as storing our prized four-wheeled vehicles? This could add huge value to all those car parks at airports, supermarkets, DIY stores, companies, hospitals, etc.

Solar car ports have yet to become widespread in the UK, even though the concept is tried and tested in Europe and the US. The technology can have multiple benefits:

- Generating electricity (obviously!)
- Providing solar charging for electric vehicles (EVs)
- Keeping people dry on the walkways in bad weather
- Keeping cars shaded in hot weather
- Providing car park lighting (if grid-connected)

and when combined with battery storage:

- Providing car park lighting without grid connection
- Providing grid services, e.g. aggregated with other power sources to support the local grid at times of peak demand.

Why aren't solar car ports everywhere? They should be; and the NSC is making the case with its new guide, 'Solar car parks, a guide for owners and developers'. The guide covers all you need to know, from the business case, funding and site selection, through to design, planning and grid connection. There are also some great case studies at the end showing what some forward-looking clients are already doing. Get a copy free from the NSC website: www.bre.co.uk/nsc.

Energy Ministers reveal plans for shock shake-up of RHI scheme

Significant changes to the Renewable Heat Incentive (RHI) proposed last month by the Department for Energy and Climate Change (DECC) pose the threat of a hefty reduction in the deployment of biomass boilers over the next five years

If the proposals are brought into effect, the Renewable Energy Association (REA) argues this would collapse an industry that the Government has invested in for over five years and side-track progress on meeting our renewable heat targets.

The consultation proposes reductions to tariffs that support growth in the biomass heat industry, which has delivered the majority of the UK's legally binding renewable heat target to date. It also holds consequences for the anaerobic digestion industry, which has also recently been negatively impacted by reductions in the Feed-in Tariffs and extremely tight deployment caps.

The most significant changes that the Department of Energy and Climate Change has proposed are:

- The reduction of biomass tariffs by up to 61 percent
- The reduction or removal of support for energy crops used in Anaerobic Digestion and ending of support for digestate drying
- The removal of solar thermal from the RHI.

DECC expects that changes to non-domestic biomass support will reduce annual installations from 7,132 systems in 2014, and 3,023 in 2015, to only 65 systems by 2021. This represents a reduction in the installation of biomass boilers of 99.1 percent and 97.9 percent compared to 2014 and 2015 respectively.

The proposals foresee the installation of 1,000 domestic biomass boilers per year by 2021, compared to 4,721 in 2015 – a fall of 78.8 percent.

Frank Aaskov, Policy Analyst at the Wood Heat Association (a subsidiary of the REA), said: "The Government has now proposed to further reduce biomass boiler tariffs by up to 61 percent, but many tariffs have already been cut by 58 percent since July 2014. This new proposal would make most biomass heating projects unviable, and represents a dramatic 98 percent reduction in deployment.

"If these proposals are enacted, it would represent the loss of five years' worth of Government effort and investment that have helped built a mature and stable industry. Biomass represents the majority of the decarbonisation of the UK heat sector, and 89 percent of the renewable heat in Europe.

"Biomass heating has been vastly popular among small and medium care homes, schools, the agricultural sector, and offices. It has been hugely successful at replacing more expensive fossil heating with a renewable and sustainable alternative."

Dr Kiara Zennaro, Head of Biogas at the Renewable Energy Association, said: "We welcome constructive discussions with DECC to see how the value for money of the RHI can be improved. We are pleased with the proposed growth rates and reset proposals of the biomethane tariffs, but are concerned with the proposed reforms of energy crop support and digestate drying."

Dr Nina Skorupska CBE, Chief Executive of the REA, said: "The REA has a long-term vision for an affordable, secure and low carbon future energy system. Consultations such as this, however, make it apparent that the Government's own energy policy is short-sighted.

"This consultation proses yet another series of sudden and severe changes to the UK's energy sector. The Energy and Climate Change Committee very recently said that such changes have 'marred the UK's reputation for stable and predictable policy development', and we couldn't agree more.

"We are also disappointed to see solar thermal being singled out and removed from

the RHI. We need the entire spectrum of renewable heating to fully decarbonise."

If the consultation proposals go through, the internationally proven technology will be cut out of the Renewable Heat Incentive entirely next year.

Solar thermal is one of the most established and accessible renewable energy technologies with over 350GW of global capacity, considerably more than that for solar PV. Its applications have expanded into space heating, community heating, district heating, hotels, hospitals and industrial processes. Solar thermal has also been demonstrated to work effectively alongside other renewables technologies.

Paul Barwell, CEO of the Solar Trade Association, commented: "This proposal simply doesn't make sense. The Government acknowledges the many benefits of solar thermal, yet proposes singling it out for the removal of financial support. With UK renewable heat deployment falling desperately behind target, Government should be full square behind this technology as part of a strategic plan to permanently bring down heating costs for British families.

"Discriminating against this globally important technology in the UK would send a terrible message to householders, and it would have very serious ramifications for the British solar thermal sector. Manufacturers of solar thermal equipment, including cylinder manufacturers as well as installers, risk a full scale winding-up of their sector. We are urging Government to think again, particularly since sales enquiries are on the rise."

Solar thermal technology is particularly popular with social housing associations in the UK to help in tackling fuel poverty.

Gordon Watts, Sustainability Manager at South Yorkshire Housing Association, said: "The use of solar thermal panels to provide hot water in some of our existing housing schemes helps to keep our customers' gas bills down, and this technology and other renewables continue to be important options we consider as part of our stock development and improvement plans. Continuation of the Renewable Heat Incentive and the Feed-in Tariff is important for solar thermal and other renewables until these markets more fully mature."

The new proposal is doubly surprising because of the Government's stated intention in the consultation to ensure less-able-to-pay households can benefit better from the Renewable Heat Incentive scheme. Unlike other renewable heat technologies, solar thermal has negligible running costs, it can be added to existing heating systems, and its performance does not depend on investing in a highly insulated house, making it especially well suited to homes in fuel poverty. It also works effectively in built-up urban areas and on smaller roofs, broadening the opportunities for British homes to invest in renewables.

The proposals also put at risk precious domestic manufacturing in renewables as the UK already has a number of excellent solar thermal manufacturers such as Viridian in Cambridgeshire, AES in Moray in Scotland, Thermatwin in Manchester and Solar UK in East Sussex.

The UK solar industry is particularly aggrieved by the proposals, as the UK solar thermal market, which is dominated by domestic systems, slumped during a policy hiatus lasting from 2010 to 2014. It was not until the first half of 2014 that the Renewable Heat Incentive was introduced for domestic solar thermal, by which time the market had halved in the UK, leaving the industry in a weakened position to promote sales. Analysis by the STA shows that there has been an 88 percent increase in monthly solar thermal sales enquiries amongst its membership compared to this time last year.

The justifications for removing solar thermal in the consultation proposal are weak, including survey results that show that most of the homeowners who have already installed solar thermal say they would have done it without any subsidy. However, the relatively small size of the current market means that these survey interviews are not representative of a mass market – many homeowners who are currently choosing to go solar are not primarily motivated by financial return.

Solar thermal is well established in colder and less affluent Eastern European countries because of its ability to provide effective renewable heating. For example, per capita, Poland has four times and Slovenia seven times the capacity of solar thermal of the UK. Germany, meanwhile, has 20 times the solar thermal per head of population.

Previous analysis by the Solar Trade Association has shown that while solar thermal is already relatively affordable, costs can be reduced significantly given a strong domestic market.

The Solar Trade Association is calling on the Government to allow solar thermal to contribute not just to hot water but also space heating (such as central heating systems) and still qualify for the Renewable Heat Incentive, so that the technology can be combined with biomass boilers and heat pumps. Now is the time to ramp up support, not remove it. Red tape has hindered the roll out of solar thermal and the STA is asking Government to remove this.

Round-up of all the latest green gadgets and innovation to hit the market

ProductNews

Renusol

Versatile PV mounting solution

Renusol has unveiled a new mounting solution for small freestanding photovoltaic systems. The Micro Ground System (MGS) substructure is suitable for light commercial, agricultural and residential areas.

These modular pre-assembled mounting kits, which can be customised to fit the size of the PV installation, are particularly attractive to distributors, as they significantly simplify logistics processes and do not necessitate any layout and design planning. The system is fixed to concrete foundations, meaning that it can be easily rebuilt in the event of its owners relocating and thus eliminating a common concern.

Brackets are integrated into the rails, enabling the installer to easily hook and secure the module's upper edge into place without the need for any clamps. The lower edge of the module is then fixed using two adjustable clamps. In contrast, conventional mounting solutions demand four clamps to fasten each module, which increases installation time and requires the involvement of two installers, one to position the module and the other to attach it.

Grant

Grant UK launches new heat pump

Heating specialist Grant UK has launched its third generation heat pump – the Aerona³, an innovative new inverter driven air-to-water unit that has an impressive ErP rating of A++.

The Grant Aerona³ produces a consistent heat output while being compact in size, increasing installation choices for engineers. Comprising three outputs – 6kW, 10kW and 16kW – the unit combines clever design features such as weather compensation controls and a base tray heating element to stop ice formation in cold weather conditions.

Incredibly efficient, the Grant Aerona³ heat pump units will particularly suit homes where owners wish to incorporate renewable technologies but space is at a premium. As with all Grant products, Aerona³ heat pumps are geared towards easy installation and maintenance for both installers and homeowners.

Panasonic

Panasonic unveils new solar modules

Panasonic Eco Solutions has announced that the HIT N330 and N325, the company's newest high-efficiency, heterojunction photovoltaic modules, are now available to UK solar installers.

The N330 and N325 feature an expanded 96-cell design, returning approximately 27 percent more peak-power compared to mainstream 260-watt multi-crystalline modules.

Both models supply higher energy density per square metre by achieving 19.7 percent module-level efficiency and a nominal output of 330/325 watts, which significantly decreases balance of systems costs for UK installers on residential and commercial installations.

In January, Panasonic upgraded its HIT product guarantee from 10 to 15 years, backed up by a record low claim rate of below 0.005 percent for more than 3.7 million photovoltaic module HIT series sold in Europe since 2003.

Enphase

Next-generation gateway

Enphase Energy has launched its next-generation Envoy-S gateway, which serves as the control of the Enphase Home Energy Solution, an integrated, scalable platform for solar generation, control, energy management and storage. Featuring enhanced hardware and software, the new gateway enables more cost-effective and reliable solar installations. Designed to work with all Enphase microinverters, Envoy-S offers consumption monitoring, increased metering accuracy, flexible networking options including integrated WiFi and optional cellular connectivity.

geo

Latest version of geo Cosy smart thermostat

Smart energy pioneer geo has launched the Cosy 3, the latest version of its independent home heating system to help customers control their energy use.

The Cosy 3 has the ability to work with a twin zone heating system, with a paired Cosy display acting as the thermostat for the second zone. Additionally, the installation of an extension pack allows users to switch their hot water on and off from their Cosy display or mobile app.

Minus7

Unique heating system

Clean-tech company Minus7 claims to be the first to deliver round-the-clock heat, hot water and energy storage. The patented system can cut the annual heating bill of an average three-bedroom home to around £200.

Able to harvest energy at much lower temperatures than other similar technologies (down to -7°c), Minus7 technology is made up of a solar energy collecting roof (slate grey 'tile-style' aluminium planks filled with water) with fully integrated solar PV, a solar energy processor (SEP) and thermal storage tanks that heat the building. The energy from the solar roof is processed by the SEP and moved to the thermal water stores, which act as a 'battery' for the building. Typically, one Minus7 unit can deliver heat and hot water for up to four dwellings.

Pumping power for district heating scheme

An important district heating scheme in Sheffield, which generates heat and energy from waste wood, has come to fruition with the help of an integrated packaged pump solution from Armstrong Fluid Technology

The pump solution incorporates six large Armstrong 4300 Series variable speed pumps with built-in inverters, integrated with Armstrong's IPS 4000 pump controller, which optimises operation of all six pumps to minimise energy consumption.

Bespoke requirements

When planning the pump house for the district heating scheme, R K District Heating Limited had a number of priorities. The pumping requirements for the scheme are complex and involve handling water at high maximum temperatures (up to around 115°c). The plant needs to offer outstanding levels of energy efficiency across a wide range of operating conditions, as the district heating scheme is being expanded incrementally over time. In addition, the demanding timescales for the project meant that the equipment had to be installed within shorter than average lead times.

The company chosen to supply the integrated pump solution was Armstrong Fluid Technology – an expert in packaged pump solutions and integrated plantrooms with extensive experience of biomass-based systems. At the heart of the installed system are six Armstrong 4300 DE variable speed pumps integrated with Armstrong's IPS4000 Pump Controller.

Planning for the future

The variable speed pumps incorporate on-board inverters which enable them to respond instantaneously and automatically to changing requirements, adjusting their motor speeds and drawing only the power required to meet the load. As they are Armstrong DE (Design Envelope) models, they also provide energy efficient operation across a wider operational range than other pumps, providing flexibility to adapt in the future without the need for replacement or system over-sizing.

Optimum efficiency

The pumps are controlled by the Armstrong IPS4000, which calculates how best to meet demand and automatically manages pump operation accordingly.

The IPS4000's advanced control technology ensures that pumps are operated at their most efficient points at all times, and are phased in and out in the best possible configurations to deliver the required capacity. By treating the system holistically, and balancing supply across all six pumps, the IPS4000 is able to achieve levels of efficiency that exceed those made possible by less sophisticated capacity-based control methodologies.

As the biomass-based district heating scheme has a particularly wide range of operating scenarios, the advanced control made possible by the IPS4000 ensures that energy efficiency is optimised whatever variations may occur.

In the future, as additional plant rooms across the Sheffield area are integrated with the district heating scheme, the IPS4000 will ensure that the pumps adapt to accommodate the changing requirements whilst still maintaining optimum energy efficiency. The additional flexibility and sophisticated control provided by the Armstrong pumps and IPS4000 controller means that the energy wastage associated with over-sizing of systems is avoided.

Leapfrog provides £4m for flagship community solar farm

Leapfrog Finance is funding construction of a 4.1MW solar project co-developed by Plymouth Energy Community and Communities for Renewables CIC

Plymouth Energy Community (PEC), an award-winning community benefit society, was formed to help Plymouth residents change how they buy, use and generate energy. The dynamic community-led organisation provides a range of grassroots services addressing fuel poverty and carbon emissions.

PEC Renewables was set up in 2014 to fund and build community-owned renewable installations in Plymouth. It has since completed solar arrays on 30 schools and community buildings across the city. Profit from the Ernesettle solar array, located on the river Tamar, will provide funds for PEC, and a local community interest company, the Four Greens Community Trust, will also benefit from a long-term ground rent. A community share offer, due to launch in May, will provide the opportunity for local ownership.

Leapfrog Finance was launched in 2015 with a fund of £15m from Big Society Capital. Its mission is to fund the construction or acquisition of community energy projects that deliver positive social impact for local communities. Leapfrog was supported on the Ernesettle deal by Louisa Cilenti at Lux Nova Partners and Mark Stewart and Jamie Davidson at RSM International.

PEC's primary mission is to provide the people of Plymouth with the power to transform how they buy, use and generate power in the city. In essence, it's all about people power, focusing around three core energy goals, namely: reducing energy bills; improving energy efficiency; and generating a green energy supply in the city. Alleviating fuel poverty is an integral part of achieving these aims.

The Four Greens Community Trust (FGCT) is a new trust, serving the areas of Ernesettle, Honicknowle, West Park, Manadon and Whitleigh in the north of the city, where there is a high concentration of low wages and deprivation.

Communities for Renewables (CfR) CIC provided risk investment, commercial advice and project management support and worked with the PEC team to deliver the project through feasibility, development, procurement and financing.

Pfalzsolar played a major role in the technical and economic success of the project. In 2015 alone, Pfalzsolar, the 100 percent subsidiary of a German community and local authority owned energy supplier, constructed photovoltaic projects with an overall capacity of 35.5MW, half of which was within the UK. Pfalzsolar has planned, built and operated photovoltaic plants since 2003, and is a committed partner for investors, commercial and private customers, and especially for communities.

Richard O'Rourke, Managing Director of Leapfrog Finance, said: "This project exemplifies wonderfully what can be achieved through community-owned renewable energy assets, and is a model for what Leapfrog Finance wants to deliver through its fund. Forecast to deliver over £1m of community benefit over the life of the project, delivering social impact across a wide spectrum of issues in the community, it's a model we'd like to see replicated across the country."

Candice Motran, Investment Director at Big Society Capital, an independent financial institution with a social mission, set up to help grow social investment in the UK, said: "Across the UK we are seeing a growing number of communities coming together to develop energy projects. These are not only tackling issues such as fuel poverty, but also creating sustainable income streams for those communities at a time when grants are dwindling. Leapfrog Finance are experts in this area and have done a fantastic job in supporting this project to fruition. We hope that Plymouth Energy Community will inspire other organisations to think creatively in the future."

Alistair Macpherson, Chief Executive at Plymouth Energy Community, said: "We are hugely proud to be watching our solar farm come to life. This was the project that many said would not be built; and to see it realised is a great credit to those that have had the vision to support us. Plymouth City Council, CfR, Pfalzsolar, and Leapfrog Finance, should all take a bow in this regard. Local residents have been at the heart of this project from the outset and Leapfrog's construction finance keeps alive our chances of it remaining a long-term community asset."

Tom Cosgrove, Development Manager at Communities for Renewables CIC, said: "We have gone from feasibility to commissioning in 12 months, and have overcome some big challenges along the way, including Government policy changes that threatened the viability of keeping the project in community ownership. It has been a mammoth effort from all involved and the team has worked really well together. The Ernesettle solar project is a great legacy for Plymouth and a flagship community energy project for the South West."

Thomas Kercher, CEO of Pfalzsolar, said: "It's inspiring to see how communities in Great Britain are pushing forward the energy turnaround. Even though Pfalzsolar was confronted with bad weather conditions at the Ernesettle site, they pulled out all the stops to get everything in place on time."

Prime Minister lends support to community energy plans

David Cameron has recognised a community solar farm proposed in his constituency, which has already attracted almost £350,000 in investment from local people

Southill Community Energy (SCE), a community benefit society, launched a share offer on 17 February to fund construction of a 4.5MW community solar farm on the Cornbury Park estate, just outside Charlbury, Oxfordshire.

In a statement, David Cameron said: "I am very proud of my Government's green record – and especially the fact that 98 percent of the UK's solar panels have been installed since I became Prime Minister. The Southill Solar project is a great example of people's enthusiasm for this technology. As costs come down even further, I look forward to solar competing against other technologies and continuing to be an important part of the UK energy mix."

The community group needs to raise a minimum of £2m to build the solar farm, which was granted planning consent in July 2015. It

has been pre-accredited for the Feed-in Tariff and will be one of the last community solar schemes to be guaranteed the subsidy since Government support was slashed at the start of the year, but is on a tight deadline: construction must be completed by 31st August 2016.

Tim Crisp, Director, Southill Community Energy, said: "We're delighted the Prime Minister recognises how popular community solar farms are with the public, both here in Oxfordshire and in the rest of the country. This sends a strong signal to potential investors that community solar is worth supporting and has a long-term future in the UK – and will serve as a reminder to the Prime Minister of what communities can achieve right here on his doorstep!"

The share offer aims to generate an average annual return for SCE members of 5% over the 25-year lifetime of the solar farm. The minimum investment is £250 and the maximum is £100,000. As well as offering investors a return well above current bank interest rates, SCE will also provide around £750,000 over the solar farm's lifetime to the local community to support schemes tackling fuel poverty, improving energy efficiency and reducing carbon emissions.

Two minutes with . . .

Who are you?
Kate Wright, green scheme specialist at Yorkshire Heat Pumps

What do you do?
I specialise in the detail of the Renewable Heat Incentive scheme, which rewards homeowners for switching to a sustainable system such as ground source or air source heat pumps or biomass boilers.

What would you advise prospective customers looking to invest in green energy?
We would advise anyone thinking about going green to do their homework and ask for advice as it is complicated and a constantly changing picture. Any decisions made could have a long-term financial impact.

It's been announced that there will be a first wave of scheme changes in April 2016 and a further, more significant wave in April 2017. With long lead times on some installations that are part of a self-build project or renovation, it pays to look that far ahead.

Who will be affected by the changes?
Self-builders are among those who will benefit from changes coming into effect at Easter.

Previously, self-builders had to wait 183 days (six months) before they could apply to benefit from the Renewable Heat Incentive scheme, which rewards switching. From 24 March 2016 they can apply as soon as they move in.

What other insight can you provide?
We have also learned that there will be no tariff changes for domestic RHI technologies between now and July this year – and we should know what those changes will be at the end of April. As the trend over recent months has been to reduce the amount of payback on offer for biomass boilers, this is further incentive for anyone interested in that technology to act sooner rather than later.

Scheme applicants will no longer need a Green Deal Assessment to be eligible for RHI either after March 24, but minimum levels of insulation will still be required, as will an Energy Performance Certificate (EPC) as this calculates the deemed heat requirement for the property, which is used to calculate those all-important RHI payments.

What opportunities are emerging for the future?
Looking further ahead, current predictions are that domestic RHI tariffs may actually go up in April next year for ground source and air source heat pumps. This is just one of a number of possible scheme changes Government is consulting on at the moment. Some expected rule changes will make it easier for those less able to pay, by introducing what's called 'assignment of rights to payments' to allow third-party funding to be developed. Under such arrangements a homeowner would assign their RHI payments to a third party who funds the installation. While they would not benefit from any surplus over and above the cost of installation they would have a cost-effective heating system for the long term.

What are the negatives?
On the downside, from April 2017 Solar Thermal will no longer be an eligible technology for RHI payments. Our advice would be for anyone interested in this technology to install solar thermal in the short term to secure seven years of payments for free hot water, and perhaps await the new higher tariffs before installing a ground or air source heat pump.

While there is still the capital investment to take into account, for those considering what heating system to install on a renovation or self-build, adopting renewable technologies still makes total sense as under the RHI scheme you are being paid for something you would be doing anyway – heating your home and hot water.

A cap on heat demand is also likely, meaning there will be a limit on how much RHI those with bigger houses and higher heat demands can receive.

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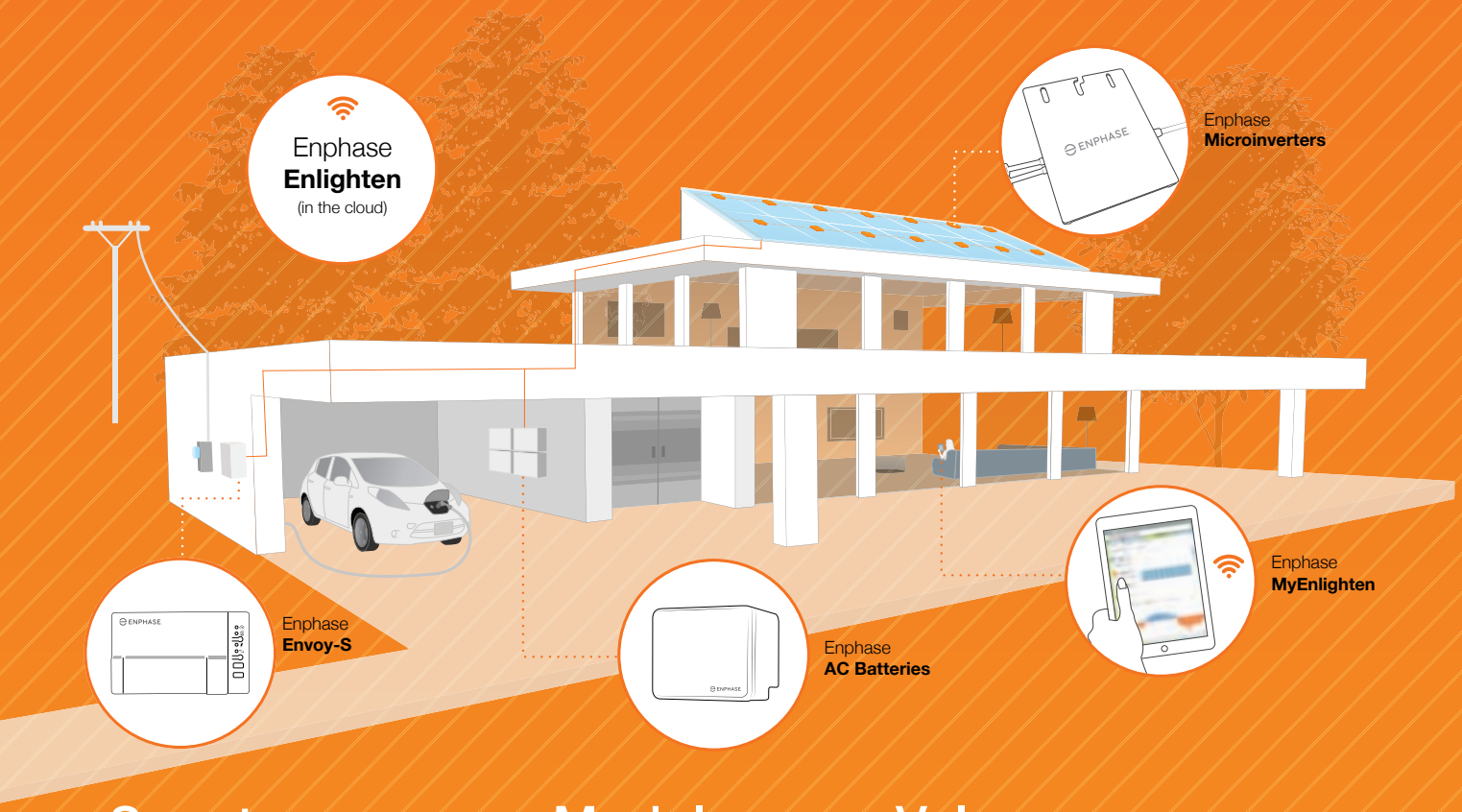

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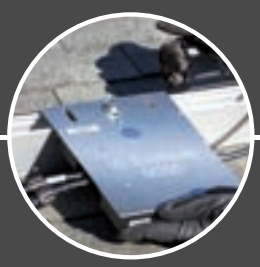

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ENPHASE

Pioneering on-farm CHP burning system

Biomass expert C&H Biomass has recently completed a landmark project that has enabled a Nottinghamshire farm to be completely self-sustained, fuelling its entire energy needs from the litter created by its own chickens

Germany Farms is a family-run poultry business based across two large sites in rural Nottinghamshire. Previously heated by LPG, the farm has embraced the recent change in legislation that allows the burning of poultry litter.

C&H Biomass has designed and installed a CHP system at the Germany Farms' Muskham Wood site that generates both heat and power for the business. The technology installed includes an impressive 2MW Uniconfort biomass boiler capable of producing high temperature hot water at 150°c.

However, unlike most biomass installations at poultry sites the heat is not sent straight to the sheds but instead via an ORC (organic rankine cycle) engine to generate electricity. This electricity is then cleverly used to power the sheds with the excess power sold back to the grid and the waste heat generated from the ORC used to heat the 16 poultry sheds.

Capable of operating on either wood chip or chicken litter, the CHP system includes a purpose-built fuel store with a capacity of 1,321m^3, big enough to last a full chicken cycle (37 days). Two adjacent top-loaders run across the store to evenly circulate the chicken litter and allow the fuel to feed into the boiler. Alongside the plant room a giant 240,000l buffer tank acts as a thermal store, providing heat in case of breakdown and creating a stable heat load for optimum boiler operation.

As well as eliminating fuel bills, the system installed at Germany Farms will generate a healthy income – it not only qualifies for support from the Renewables Obligation (ROCs) for electrical output but also secures the CHP Renewable Heat Incentive (RHI) tariff for heat generated.

Another key consideration was the ongoing maintenance and monitoring of this complex system. To this end C&H installed a state-of-the-art control system that fully integrates with the CHP, boiler, thermal store and district heating, optimising heat supply and maximising RHI income. The site is fully operated and maintained by C&H and the company also has the ability to adjust the system remotely if required.

This pioneering project took almost 12 months to complete. Ed Caldecott, Director at C&H Biomass, explains: "This was a challenging project as we looked to integrate various technologies and comply with new legislation but we are delighted with the finished result. We have been involved with this project since its inception, working closely with our client to provide a bespoke renewable solution."

Germany Farms plans to expand its supply of renewable heat with a future similar installation at its Model Farm site, which hosts a further 12 poultry sheds.

Sawmill at cutting edge of solar energy

One of Cornwall's oldest sawmills, Duchy Timber, has invested in the installation of a solar power system at its base in Lostwithiel

Established in 1958, the timber, garden furniture, gates and fencing manufacturer has installed a 250kWh roof-mounted solar system, which will reduce on-site electricity usage by 30 percent.

Duchy Timber is part of the Premier Forest Group, one of the UK's leading independent importers and distributors of timber and panel products. Premier installed solar technology at its head office in Newport early last year, and is currently commissioning a dedicated biomass plant that, together with the solar panels, will enable it to run its office, warehouse and all machinery on renewable energy.

The Group plans further PV solar installations across its UK and Irish sites and is looking at ways to lead the sector through CHP technology, water management and lowering on-site energy demands.

Olly Bennett, General Manager at Duchy Timber, said: "We are proud to be playing our part in helping our planet by further reducing our carbon footprint. This latest investment, in solar energy, is part of our green philosophy as a company and we hope to influence others in our industry to follow suit."

Shoe chain invests in renewables

Wynsors World of Shoes, based in Bacup, Lancashire, is working on reducing its carbon footprint by introducing a number of solar power initiatives to its logistics department

The company's main warehouse, owned by K2, is based in Padiham, Lancashire, and has recently had a 250kW solar PV system installed, which will help to save over 104 tonnes of carbon each year. By generating 75 percent of the warehouse's power requirements, the system will not only make it environmentally friendly but also have a big impact in terms of cost saving.

In addition, Wynsors has systems set up for two further warehouses:

- The system at Parkside is set to save over 78 tonnes of carbon a year and meet 85 percent of the power requirements
- The system at Barnsley was commissioned in January and will save over 11 tonnes of carbon each year and generate 20 percent of the overall power.

There are also plans to add 30kW solar panels to a further six retail sites, which will help to save over 21 tonnes of carbon per annum in total.

Wynsors is also looking to invest in green initiatives such as LED lighting and biomass heaters for its warehouses.

Mark Chalmers, Director at Wynsors World of Shoes, spoke of the benefits of the initiative: "Courtesy Shoes selected Low Carbon Energy, through Carbon Trust's accredited suppliers list, due to their professional no nonsense approach – no hard-sell sales people, just good, honest, trustworthy advice. We also like to work with local companies where possible, supporting growth and jobs in communities we operate in."

Ged Ennis, from Low Carbon Energy, helped to install the system at the K2 warehouse and stated: "It was great to work with yet another fantastic

local company and to transform their energy supply. We're pleased we could help K2 and Wynsors move forward with a solution that's not only good for the company, but good for the environment too. We look forward to them reaping the rewards!"

AD solution for organic fruit grower

Leading underfloor heating specialist Giacomini has been selected to assist Hertfordshire tomato growers, Guy and Wright, in the production of Eco Tom tomatoes using anaerobic digestion

The Eco Toms are grown with the help of an anaerobic digestion process that uses waste vegetable matter which, when it decomposes, produces methane gas. The methane is then used to fire micro turbines that generate electricity to heat the tomato growing glasshouses. All the waste CO2 from the process is fed back into the glasshouses and absorbed by the plants, which in turn helps the fruit ripen more quickly so more tomatoes are produced.

Giacomini's underfloor heating is used in the concrete anaerobic digester tanks to heat the organic material, causing anaerobic fermentation. This is where microorganisms break down the organic matter of the waste vegetables, producing biogas, a mixture of biomethane CH4 (65-70 percent) and CO2 (30-35 percent) and small amounts of other gases. The biogas is collected in gas storage tanks and utilised in growing the tomatoes.

The system provides a recirculation of nutrients intro agriculture and contributes to wider environmental protection and preservation, as it is a carbon-neutral process, unlike using fossil fuels, and further supports Giacomini's stance on efficiency: "Traditionally our underfloor heating is installed in domestic or commercial settings. However, this is now the third time we've worked on a biofuel project of this nature. We're becoming quite the expert tomato growers now! Our heating system is the catalyst that makes it all work, whilst working in harmony with other technology to complete the process. It really is green energy in every sense of the word."

HEAT PUMP

What: Ground source heat pump provides green heat for barn conversion

How: 11kW Lämpöässä heat pump installed by Finn Geotherm

Result: Lower running costs for self-build renovation and RHI cash

Ground source heat pump for self-build barn conversion

Self builders Tony and Sally Valentine are reaping the rewards of choosing a ground source heat pump from Finn Geotherm when planning how to build heat into their barn conversion.

Having been in the building trade since he left school, Tony headed up a small team of builders and worked with his wife Sally to project manage a set of specialist trades. Their aim was to transform a derelict barn into a stunning new home in the picturesque Norfolk countryside.

The best way to build in heat was key. There was no access to gas and having ruled out oil, and been concerned about the cost of electricity, Tony decided to investigate renewable heating options. He researched the technology and providers thoroughly before choosing to work with Finn Geotherm, as one of the longest established renewable heating companies in the UK.

The decision was made to use a ground source heat pump as the installation process would fit naturally within the build plan and it was cheaper to run than most other renewable technologies. Compared to an air source heat pump, or other renewable options such as solar or wind, there would also be no visual impact on the overall look of their new home.

As the UK's only approved installer of the award-winning Lämpöässä ground source systems, Finn Geotherm was able to install a single phase 11kW ground source heat pump to meet the 8.5kW output required.

Tony said: "Three years later we have no regrets. The fact it is green technology is fantastic, the running costs are lower and the money we get back through the Government's RHI is definitely a bonus. But the overall decision was simply based on what was best for our home."

BIOMASS

What: Construction firm goes green with biomass boilers

How: Factory waste used to fuel two Attack model boilers

Result: Company saves £10,000 in skip fees and receives £25,000 cashback in first year

Biomass boilers provide payback after one year

Hale Construction is cashing in from going green, with a £10,000 saving since installing biomass boilers to heat its Neath headquarters.

The family-run business, which incorporates Hale Construction, Hale Homes and Seven Oaks Timberframe, has won awards for its sustainability credentials and environmentally friendly building processes. It has employed a new recruit to operate the two Attack model boilers.

Timber frame from sister company Seven Oaks Timberframe is used to fuel the boilers, which heat the offices, timber frame factory and hot water system, saving an estimated £10,000 a year in skip fees. Waste is now being recycled as fuel rather than discarded.

Environmentally-friendly procedures have been a priority for Hale for some time: Trisowarm, which is a patented foam injection panel system that achieves extremely low thermal transmittance, is used as standard in Hale's homes, giving a valuable opportunity to future-proof the energy performance and thermal efficiency of the developments.

Managing Director Jonathan Hale said: "The initial outlay of £60,000 on biomass boilers is a real investment for us and we are very confident this sum will pay off. We also benefited from a 'kickback' feeding tariff of £25,000 this year.

"We decided to install biomass boilers as the offices were not warm with the previous system and the amount of waste we were using was incredible. We now have approved waste checked by Biomass Suppliers List (BSL) officials, which is a legal requirement, so we feed the boiler with our waste from the factory."

SOLAR PV

What: School plugs into free green energy from rooftop PV installation

How: 240 solar PV panels expected to produce 64,754kWh each year

Result: School generates enough green energy to power 21 homes

Primary school goes solar

A primary school in Portsmouth has become the latest to lead the charge for sustainability by completing an onsite rooftop solar PV installation, in partnership with several local organisations.

The project installed at Northern Parade Infant and Junior School in Hilsea, Portsmouth, means that the school will not only reduce its carbon emissions but will also benefit from the use of free renewable electricity that will be generated by the panels. This will significantly reduce the running costs of the school buildings, and allow budgets to be allocated to other key projects within the school.

The project was facilitated and funded by UK-based renewable energy investment company Low Carbon, in collaboration with local America's Cup sailing team Land Rover BAR and its charity, the 1851 Trust. Portsmouth County Council has also offered support for this project.

The solar installation is comprised of 240 solar PV panels and has an expected annual production of 64,754 kWh – enough to power 21 homes. This equates to a total of 30 tonnes of CO2 being saved by the school every year. There is a great opportunity for this school to help mitigate the negative effects of climate change while helping to educate school pupils as to benefits of renewable energy technology.

ENERGY EFFICIENCY

What: How efficient are low-carbon SuperHomes

How: SuperHome has 50mm wall insulation with solar PV and thermal and argon gas-filled double glazing

Result: 40% more energy efficient than normal UK home

SuperHome study finds energy bonus

According to new research undertaken by the National Energy Foundation (NEF), low-carbon SuperHomes are also low-energy homes, with the most efficient in the survey using 86 percent less energy than the average UK home.

Low carbon and low energy don't necessarily go hand in hand but a new study, Energy Efficiency Benchmarks For SuperHomes, has proved they do in the case of SuperHomes – which have to show that they have reduced their carbon emissions by at least 60 percent in order to join the network.

NEF researchers calculated the energy and carbon figures for a sample of the 205 SuperHomes, per person per year and per square metre of floor space per year. Using the 2012 National Energy Efficiency Data-Framework (NEED) sample, NEF was able to compare the average SuperHome to the average UK home with the same number of occupants or of the same size.

The report shows an average SuperHome:

- Is over 40 percent more energy-efficient than the average UK home in its energy use per square metre per year (104kWh compared to 177kWh)
- Consumes about 19 percent less energy than the average UK home each year, despite having a larger than average floor area and higher than average occupancy, and being older than an average house building (14,722kWh compared to 18,100kWh)
- Achieves an average reduction of 72 percent in carbon emissions, post-retrofit.

Simon Brown's 1930s house in Chester now has 50mm of internal wall insulation supplements, solar panels on the south-facing roof to produce electricity and hot water, an efficient gas boiler and argon gas-filled double glazing. He says: "After the first year, we were pleasantly surprised to find our total gas and electricity bill was slightly less than in our previous home, which was half the size."

Driving sustainability in the energy industry

Olaf Heil, CEO EMEA-CIS Social Innovation Business Platform at Hitachi Ltd, discusses how innovative approaches to energy are set to encourage a transition towards a low carbon world

Across the world, the need for a secure, stable and affordable energy supply continues to sharply rise. According to a new white paper from Frost & Sullivan and Hitachi, global demand for energy is set to grow by two percent each year up to 2020 and by a total of 55 percent by 2040. Much of this increased demand comes from the world's poorest communities, who need reliable and safe sources of energy to power economic growth. Yet, with society becoming increasingly concerned about both the environmental impact of the production and consumption of energy and how to meet spiralling demand, the energy industry is facing significant challenges. How does it meet this demand without harming the environment?

Innovation to power the future

One answer to this lies in Social Innovation, whereby new technologies and business models are leveraged across the energy industry to improve efficiency and sustainability. In doing so, this allows governments, businesses and individuals to satisfy the ever-increasing demand for energy whilst simultaneously minimising the impact on the environment.

As traditional fuels are phased out, the need to provide sustainable and clean energy offers a huge opportunity to develop and invest in smart technologies that can be used in the generation, distribution, consumption and management of energy. Increasingly effective renewable energy and electric vehicle technologies, alongside the integration of data into energy grids and management systems, are all examples of innovative technologies that are helping to provide cleaner and more efficient energy and helping to reduce emissions whilst meeting rising demand.

Smart is the new green

Demand for renewable technology is increasing, with governments, businesses and individuals increasingly investing in clean energy. For example, in Germany, 30 percent of electricity is generated from renewables and this is set to rise to 60 percent within the next decade.

However, we are also entering an era where green products and services are increasingly being enhanced or even replaced by 'smart' versions, which make the generation, distribution and consumption of energy more efficient. Smart grids are introducing digital technology to the electricity network so they can intelligently monitor and control the distribution of energy. They are interactive and can provide real-time feedback, which can reduce losses within the grid and make our energy consumption more efficient. Smart grids can also manage energy demand more efficiently than traditional electricity grids, as they have the power to distribute energy to where it is needed most. Feeding back to these grids, there is a move to get consumers using smart meters, which allow

for more accurate information on energy consumption and demand.

Smart meters aren't the only pieces of intelligent technology to help manage energy at home – smart thermostats also enable more efficient consumption, ensuring that the ideal temperature of homes can be managed remotely, thus allowing people to come back to a warm house without wasting energy to heat it when they are out. It is predicted that by 2020 there will be over 30 million smart thermostats in Europe alone as people choose to make their lives more comfortable. These are examples of home energy management systems, which allow smart products to be connected through a centrally controlled system. The system controls the distribution of energy from the smart grid to the utilities that consume it. Advances in energy storage technologies and integrated energy management systems will lead to more connected homes using the smart grid.

Charging forward with electric vehicles

The onset of electric vehicles (EVs) and the potential to integrate them into home energy management systems will encourage the transition towards a low carbon world. According to the latest research on the subject by Frost & Sullivan and Hitachi, there are already 1.2 million EVs on the road, and this number is expected to increase to 12.5 million in the next 10 years. In conjunction with other innovations in transport, the EV is capable of reducing emissions by up to 10 percent.

However, it is critical that the EV derives its power from low carbon energy; if energy generated from fossil fuels charges its battery, its ability to reduce carbon emissions is lost.

The different components of the energy management system are linked via a central data communications process that controls the distribution of clean power between the EV, the EV charging stand and the home energy management system. These systems will lead to energy savings of as much as 30 percent, as they reduce losses and allow generated energy to be shared via digital technology.

Sustainable, smart solutions offer tangible benefits to society as they lower emissions and air pollution. The value of these benefits can be seen in the positive impact they will have on public health. There are seven million deaths per year caused by poor air quality and smart, green solutions have the potential to eliminate these.

World picture

Sustainable energy is a particularly pertinent topic after the Paris climate change discussions. The representatives of 190 countries gathered in Paris in December last year and achieved a legally binding and universal agreement on climate change, in order to keep global warming below 2°c whilst encouraging economic growth. This demonstrates that it is more important than ever to pursue Social Innovation in Energy, which allows us to satisfy increasing energy demand via new smart technology whilst simultaneously ensuring that we produce clean and sustainable energy.

Figure it out

REI 10 – Share performance of UK's leading green energy companies

	52 week high	52 week low	February price	Current price	
Drax Group (DRX)	451.30	205.60	234.50	265.20	▲
Good Energy Group	255.13	200.00	186.10	199.00	▲
Intelligent Energy	151.50	67.00	43.00	45.00	▲
ITM Power	36.45	19.88	15.00	12.25	▼
Leaf Clean Energy	43.00	22.00	36.78	37.00	▲
PV Crystalox Solar	13.00	7.78	9.00	10.10	▲
Rame energy	11.00	5.75	9.50	8.80	▼
REACT Energy	9.00	2.00	2.10	3.90	▲
Renewable Energy Holdings	2.69	0.70		Suspended	
Rurelec	4.60	0.50	1.20	1.22	▲

Generation tariffs for solar PV

Tariff band	FiT rate (p/kWh) from 01/03/16	
< 10kW	Higher rate Middle rate Lower rate	4.39 3.95 0.87
10 - 50kW	Higher rate Middle rate Lower rate	4.59 4.13 0.87
50 - 250kW	Higher rate Middle rate Lower rate	2.70 2.43 0.87
250 - 1000kW	2.27	
> 1000kW	0.87	
Standalone	0.87	

* Currently subject to consultation

FiT Deployment caps that have been reached in tariff period 01 (08 February – 31 March 2016)

Deployment band	Cap limit (MW)	Cap reached?	Date and time of final installation to qualify	Capacity deployed (MW)
PV <10kW	48.4	No	N/A	14.465
PV 10-50kW	16.5	No	N/A	4.701
PV >50kW	14.1	No	N/A	9.261
PV standalone	5	Yes	08/02/2016 01:15	9.231
Wind <50kW	5.6	No	N/A	-
Wind 50-100kW	0.3	Yes	08/02/2016 00:15	0.833
Wind 100-1500kW	6.8	Yes	08/02/2016 00:18	24.255
Wind 1500kW-5000kW	5	No	N/A	-
Hydro 0-100kW	1.1	No	N/A	1.076
Hydro 100kW-5000kW	6.1	No	N/A	2.135
AD (All)	5.8	Yes	08/02/2016 00:15	18.72

Accurate as at 00:01 on 15 March 2016

Generation tariffs for non PV technologies

Technology	Band (kW)	Tariffs (p/kWh)
Hydro	< 100kW	8.54
	100 - 500kW	6.14
	500 - 2000kW	6.14
	> 2000kW	4.43
Wind	< 50kW	8.53
	50 - 100kW	8.53
	100 - 1500kW	5.46
	> 1500kW	0.86

(Source: OFGEM)

Cost comparison of heating fuels (not including RHI payments)

Fuel source	kWh provided per unit of fuel	Efficiency of system (%)	Units consumed by house (kWh)	Price per unit of fuel (£)	Units consumed per annum	Cost per annum
Heating oil (kerosene)	10 per litre	90	25300	0.31 per litre	2530 litres	£784
Wood pellets	4800 per tonne	94	24300	256 per tonne	5 tonnes	£1,280
Natural gas	1 per kWh	90	25300	0.04 per kWh	25300 kWh	£1,012
LPG	6.6 per litre	90	25300	0.38 per litre	3833 litres	£1,457
Electricity	1 per kWh	100	23000	0.14 per kWh	23000 kWh	£3,220
*Air source heat pump	1 per kWh	290	7931	0.14 per kWh	7931kWh	£1,110
*Ground source heat pump	1 per kWh	360	6389	0.14 per kWh	6389kWh	£894
Dual mode system 1						
Oil boiler (30% of heat load)	10 per litre	90	7590	0.31 per litre	759 litres	£235
*Air source heat pump (70% of heat load)	1 per kWh	290	5552	0.14 per kWh	5552 kWh	£777
Dual mode system 2						
Gas boiler (30% of heat load)	1 per kWh	90	7590	0.04 per kWh	7590 kWh	£304
*Air source heat pump (70% of heat load)	1 per kWh	290	5552	0.14 per kWh	5552 kWh	£777

Based on 23,000kWh needed to meet typical household's heating and hot water needs per annum. Prices and costs are indicative only and may vary.
*Calculations based on continuous operation at maximum efficiency. Fuel costs taken from Nottingham Energy Partnership and other sources.

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: 3.62 Tier 2: 0.96	20
Medium biomass	Solid biomass: Municipal solid waste (inc CHP)	200 kWth and above, < 1000 kWth	Tier 1: 5.24 Tier 2: 2.27	20
Large biomass	Solid biomass: Municipal solid waste (inc CHP)	1000 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	
Solar thermal	Solar thermal	< 200 kWth	10.28	20
Air source heat pumps	ASHPs	All	2.57	20

(Source: OFGEM)

Domestic RHI deployment

Technology	Accreditations (Apr 14–Mar 16)	% of total
ASHP	20,953	45
GSHP	6,803	15
Biomass	11,443	24
Solar thermal	7,521	16
TOTAL	46,720	100

(Source: DECC)

Number of MCS registered installers per technology

Technology type	Cumulative	Registered Feb 16
Solar PV	2173	9
Biomass	282	2
Air source heat HP	708	7
Ground source HP	517	0
Solar thermal	736	5
Small wind	66	0
Total	4482	23

(Figures supplied by Gemserv)

Number of MCS registered installations per technology

Technology type	Cumulative	Installed Feb 16
Solar PV	857,762	3,658
Biomass	16,408	312
Air source HP	44,517	735
Ground source HP	12,044	240
Solar thermal	8,351	72
Small wind	9,981	0
Total	949,063	5,017

Domestic RHI tariffs

Technology	RHI rate (from 1 April) (p/kWh)
ASHP	7.51
Biomass boilers	5.20
GSHP	19.33
Solar thermal	19.74

(Source: DECC)

Who are you? Joseph Fox, Sales Director at UK-based Magic Thermodynamic Box – manufacturers in the emerging solar-assisted heat pump sector

What do you do? Working to introduce the concept of solar-assisted heat pumps to the installer community

Jospeh Fox spends his week travelling around the UK introducing his company's products to the market

Introducing the concept of solar-assisted heat pumps

Monday

As a company we manufacture innovative energy saving products in the UK for the world market. Our core products focus on thermodynamics, with the Little Magic Thermodynamic Box along with a single aluminium panel that can be installed anywhere on the outside of the property to generate the user's hot water day and night. Our award-winning company's products have recently been installed in Starbucks and for a project on Channel 4's television series *Grand Designs*.

Monday always starts around 6am with drilling down on all the action points needed to implement within the business. We have a weekly meeting at 9am brainstorming and focusing on key areas of distribution. The later part of the day is a couple of hours on Skype calls, talking to current and potential clients across the world, as well as face-to-face meetings within our head office or externally. I also strategise with the marketing department on ideas for our website and digital marketing platforms, plus I will direct and contribute to ideas with regards to new marketing material such as flyers, banners and brochures that we are preparing.

Tuesday

I will normally be on the road visiting key clients new and old, working on relationships and training staff on product and increasing their knowledge; going over how the products work and the benefits of each system. These trips are usually in the UK, however I can sometime be abroad visiting clients or assisting at exhibitions. As a company we offer installation, sales and marketing support so I have to ensure that each client is catered for, which helps increase sales overall.

Wednesday

Most of my day will be taken up by internal meetings with clients who visit us to see our R&D division. Some clients come from Europe or even further away. I will end the day with the team looking at Key Performance Indicators where we will address areas that the team needs to improve on.

Thursday

Back on the road meeting new clients with other team members, introducing our product concept and explaining how resellers can move forward with us.

Friday

A day of meetings looking at business growth and strategy. I will also speak with all other distributors to see what assistance they need. Before the end of business we have a team meeting and look at the week's performance and year to date. Individuals targets and results are reported, giving appraisal on what who has achieved. We also summarise the week and look ahead and action plan any tasks that need to be done to ensure we are on course to continuous growth.

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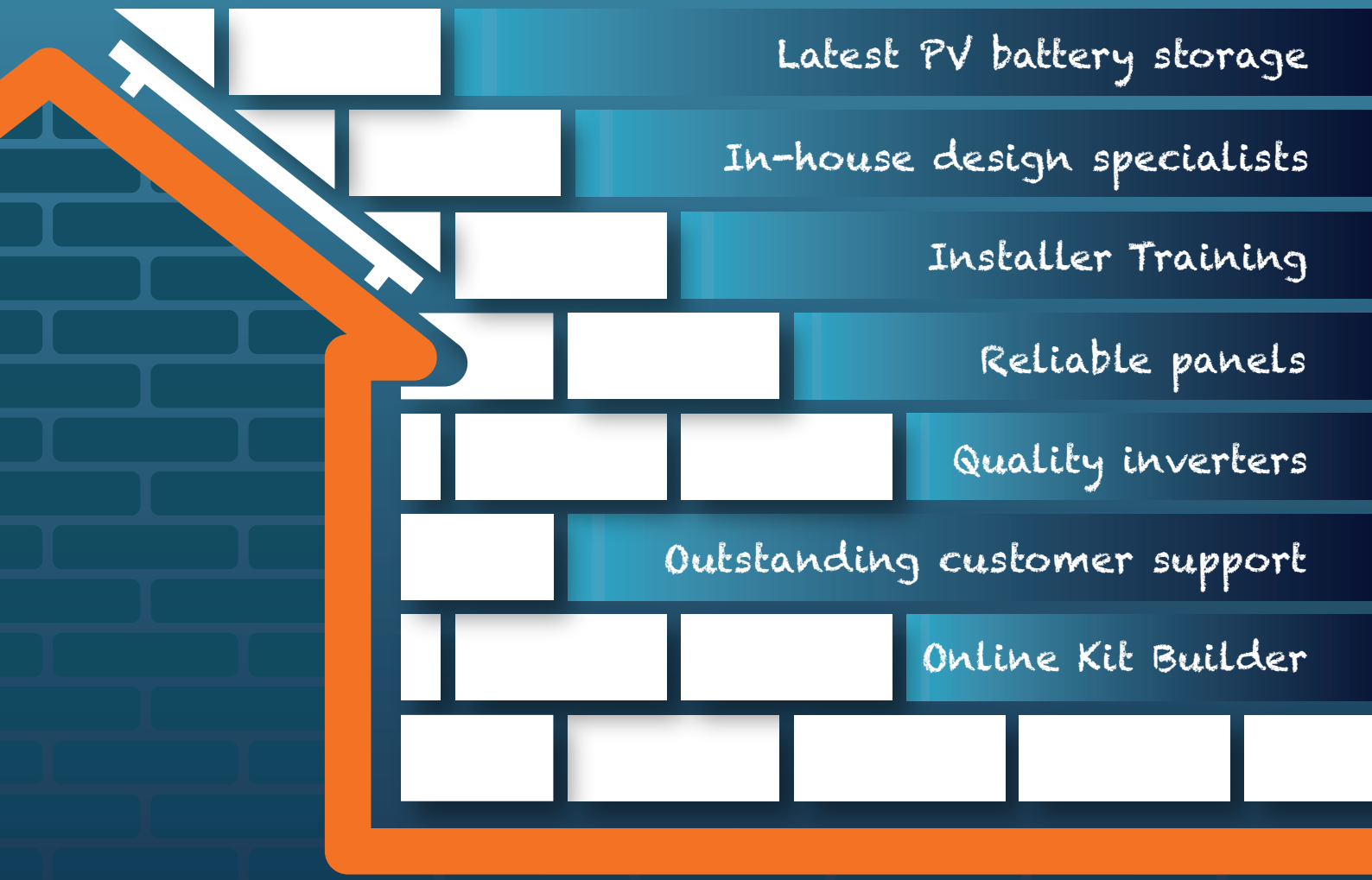

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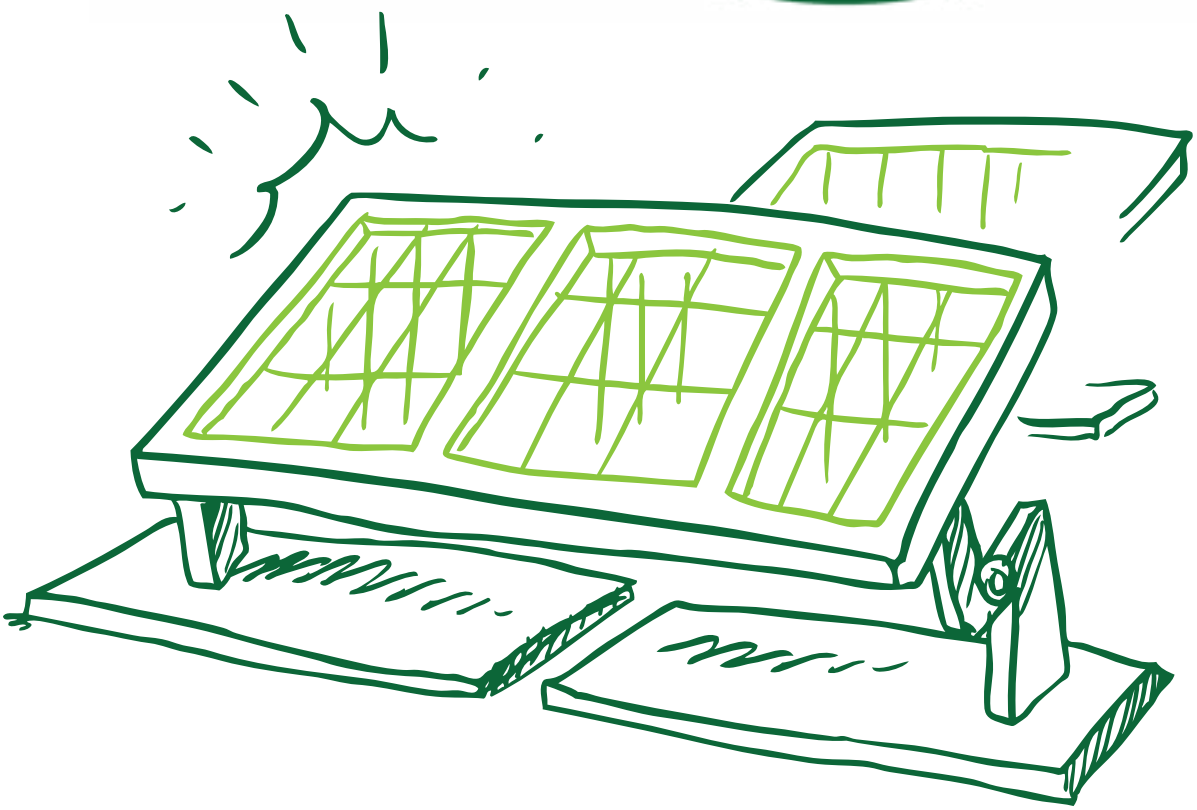

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