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Making renewable energy a key election policy

The REA has driven an excellent programme that aims to ensure that renewable energy is high on the agenda for all political parties at the next national general election in 2015. Putting together a manifesto that involves most of the key industry bodies is a welcome step in an industry sector that has spent more time protecting self interests than tackle renewable energy’s position as a genuine solution to the nation’s energy needs. Although it is a positive step it will not be enough on its own to dictate policy when large energy companies have such large lobbying processes at their disposal.

What the manifesto does provide is a common ground for every interested individual, company and institution keen on a greener energy future to continue the real work of convincing politicians and the public that renewable energies provide the best long term solution to future energy needs. Every interested party needs to be lobbying their local MPs and educating the public at every step if there is any chance of matching the lobbying power of the energy giants.

For those looking for proof that the industry needs to continue to push the realities of renewable energy, then look no further than the Prime Minister’s speech at the conservative party conference where he stated that the UK is leading and not following on climate change. While the rhetoric is nice, the reality is that the UK has slipped to third bottom on the EU’s chart for renewable generation and is real danger of slipping even further behind without strong policy commitments that encourage further investment. The changing direction of energy support was further confirmed as the government announced new budgetary measures to bring in the Contract for Difference (CfD).

A key issue of note was the reason given for pulling the Renewable Obligations (RO) subsidy from the solar industry, which was the drain on the RO budget. The same day the government tried to justify the policy shake up it was revealed that solar had eaten all of 1.4% of the RO budget.

This sort of data should be pushing interested persons to ensure their vested interests are part of the next election. Make no mistake that vested interests are behind every lobbying process.

Solar has delivered a viable path to sustainable energy for the UK quicker and more effectively than any other energy source. There is already a backlash to the policy tinkering with market size estimations been reduced after a slow mid year. It is in the nation’s best interest to foster and strengthen this growth with long term policy directions and commitment that enables strategic and sustainable growth.

It is interesting to note that the recent changes do not impact domestic solar but only impacts the growth of large scale projects, which are of course a bigger threat to energy monopoly and control.
By using the experience in semiconductor manufacturing the team at Seraphim have created one of the highest functioning manufacturing facilities in the solar industry. By applying the same high standard of manufacturing as can be found in the semiconductor world, Seraphim has achieved a standard of PV manufacturing that is fast becoming the industry benchmark. As they move into each new area they develop local infrastructure such as the Rotterdam site they have set up to feed European demand. The company is fastidious in achieving the highest quality product and have passed every test available. Including fire tests, ammonia certificate, salt mist compliance and on-site power measurement validation.
Cover Story
When SMA enters a market they bring an ethos of awareness and expertise to the whole value chain that underlies the success of the inverter company.

Crowdfunding
With unstable UK policies for PV comes uncertain investment but there are alternative financial paths that are worth investigating.

Local analysis
Uncertain government messages create questions for UK market says Finlay Colville of NPD SolarBuzz as he looks at the potential impact of industry changes.

Wonder material
The PV research community is abuzz with the potential of Perovskite structures for future PV.

Public concerns
The department of energy and climate control runs a continuous track of public perception of energy. The latest update reveals consumer thinking.

A roller coaster industry
A look back on the last fifteen years of solar and PV growth and what can spur further development.

Time line dilemmas
When a government announces a policy change, the expected date of change suddenly becomes the finish line in an unexpected race to completion.

Efficient differentiation
The UK market cannot sell solar as a financial package. Consumers are convinced the fiscal benefit has gone. High efficiency and energy output will be key drivers.

Political will power
The UK’s industry bodies in the renewable sector are finally realising their collective lobbying power as they attempt to make energy key to the next election.

news
07 Floating solar
08 RO solar on the rise
09 EUPVSEC
10 Grid scale storage
11 African success
12 Smart grid research
13 Solar focus
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UK’s first floating solar array

FLOATING SOLAR UK LTD, has announced that it has installed and successfully launched the UK’s first fully operational floating solar panel system. Located at Sheeplands Farm, Berkshire, the pioneering large scale HYDRELIO Floating Solar PV system is an innovative alternative to ground and roof mounted solar installations with numerous economical and environmental benefits.

With advancements in renewable technology becoming increasingly more important, Floating Solar UK is offering UK land owners, for the first time, the unique opportunity to adopt this exciting and disruptive new technology. The Sheeplands Farm HYDRELIO floating solar plant, also the first large scale system of its kind in Europe, features 200kW of solar photovoltaic panels across its brand new 60 million litre irrigation reservoir.

“We are extremely excited about this announcement and what it means for both Floating Solar UK and the larger renewable energy industry in the UK and Europe,” said Mark Bennett, CEO and Founder of Floating Solar UK Ltd. “The launch of our new installation signals what we hope is a revolutionary new alternative for owners of large used, and unused, bodies of water who are wanting to generate both renewable energy and sustainable income.”

The floating PV system was developed by French company Ciel et Terre, who have been involved in innovations in solar panel technology since 2006. Floating Solar Panel UK Ltd is the first official and agreed distributor of the HYDRELIO technology in the UK and is committed to helping promote the use of renewable energy sources that have a much lower environmental impact than conventional energy technologies, while also helping land owners maximise and unlock the potential of unused bodies of water.

“It is fantastic to see our innovative technology now being deployed in the UK for the first time. The floating solar installation at the Sheeplands Farm site is a real-world example how advancements in renewable technology can both easily be installed and deliver results so quickly,” said Alexis Gaveau, President of Ciel et terre “We are delighted to have chosen Floating Solar UK as our official partner to take this technology to market and look forward to seeing it being adopted further across the UK.”

While the new installation at Sheeplands will primarily be used to power the pump that sends water from the reservoir through to the farm to aid soft fruit production, the technology is so versatile it has numerous other benefits for those looking to install similar systems.

Higher electricity production due to the cooling effect of water. Increases lifecycle of a reservoir by reducing natural erosion caused by wave movement. Conservation of valuable land used for farming, leisure or industrial purposes.

Reduction of water evaporation to conserve irrigation or drinking water. Slower algae growth due to the shielding of the water by the floating island.

Low environmental impact: no excavation work, no impact on water quality, recyclable materials.

IPVEA now known as SOLARUNITED

IN AN EXTRAORDINARY MEETING in Amsterdam during the 29th EU PVSEC, members of the International Photovoltaic Equipment Association (IPVEA) unanimously approved the association’s new vision, expansion plans and associated re-branding.

“The concept behind IPVEA’S new name expansion is that we want to unite the whole solar industry value chain as well as associated industries, such as energy storage, utilities and grid operators, through a collaborative approach,” says “SOLARUNITED” President Eric Ast, who also serves as Senior Manager of Global Business Development at Multi-Contact.

“This organization unifies leaders across the solar industry and associations, and our company is proud to contribute to this important first ever global initiative,” notes CSUN’s EMEA General Manager Engin Yaman, one of the newest members of the growing organization.

“SOLARUNITED” Board Member Richard Moreth, Head of PV Sales at Vitronic adds that this is an important move for the organization.

“The association remains focused strongly on technology but now with the involvement of key stakeholders we can provide more opportunity to improve quality and reliability,” explains Moreth.

This move also allows the integration of more players. “The primary benefit of the new Solar United is that it provides a non-competitive environment for all national and regional organizations that have not collaborated yet in an official way,” says SOLARUNITED Managing Director Bryan Ekus.
Renewable obligation solar reaches 34 percent of capacity

THE UK GOVERNMENT has released figures for commissioned UK solar capacity and overall UK solar PV capacity at the end of August 2014 stood at 4,201 MW, across 594,487 installations, an increase of 0.9 per cent in capacity and 1.7 per cent in installations compared to the end of July 2014.

Capacity accredited under the Renewables Obligation stood at 1,420 MW at the end of August 2014, across 6,081 installations. In terms of both capacity and installations there was no change from July 2014. Renewables Obligation capacity represents 34 per cent of total solar deployment.

At the end of July 2014, capacity eligible for Feed in Tariffs (FiTs) (MCS, ROO-FIT and RO to FiT transfers) stood at 2,513 MW, across 584,988 installations. This is a 1.4 per cent increase on the July 2014 figure for capacity and a 1.6 per cent increase in installations. Capacity from FiT installations represents 60 per cent of total solar deployment.

Other solar capacity represented 6 per cent of total solar deployment. Overall solar PV capacity at the end of 2014 Q2 stood at 3,823 MW, an increase of 4.6 per cent (168 MW) on that at the end of 2014 Q1. This represented 571,960 installations in 2014 Q2, an increase of 5.3 per cent on that at the end of 2014 Q1.

Capacity commissioned and accredited under the Renewables Obligation stood at 1,318 MW, which is a rise of 2.8 per cent (36 MW) from 2014 Q1. Capacity accredited under the Renewables Obligation represents 34 per cent of total solar deployment.

Capacity commissioned and accredited under the GB Feed in Tariff stood at 2,248 MW, an increase of 2.7 per cent (59 MW) on that at the end of 2014 Q2. Capacity confirmed on GB Feed in Tariffs represents 59 per cent of total solar deployment.

Unaccredited capacity represented 6.7 per cent of total solar deployment.

Overall solar PV capacity at the end of 2013 stood at 2,805 MW, an increase of 59 per cent (1,041 MW) on that at the end of 2012. This represented 508,222 installations in 2013, which is an increase of 26 per cent (105,547 installations) on that at the end of 2012.

Capacity commissioned and accredited under the Renewables Obligation stood at 213 MW. Capacity accredited under the Renewables Obligation represented 18 per cent of total solar deployment at the end of 2013. Capacity commissioned and accredited under the GB Feed in Tariff stood at 2,075 MW, an increase of 26 per cent (425 MW) on that at the end of 2012.

Capacity confirmed on GB Feed in Tariffs represented 74 per cent of total solar deployment at the end of 2013.

Inadequate structure checking sees installer in court for roof accident

The owner of a solar panel business has been fined for safety failings after two brothers fell 15ft through a fragile roof that had not been identified as a risk.

Brynley Perrett, 37, suffered a compression fracture of his back and sternum in the incident at Llan-y-nant Farm, near Trellech, Monmouthshire, in June, 2013. His brother Anthony, was fortunate to escape injury.

They were installing solar panels on a building at the farm on behalf of Andrew Green, trading as Green Park Power. He was prosecuted by the Health and Safety Executive (HSE) after an investigation found there was no equipment or measures in place, such as nets or scaffold edge protection, to prevent or mitigate a fall. Cwmbran Magistrates’ Court heard yesterday (15 September) that Mr Green failed to make an adequate assessment of the risks of working on a fragile roof and did not take sufficient action to reduce those risks.

Andrew Green, of Maple Close, Abergavenny, pleaded guilty to a breach of the Health and Safety at Work etc. Act 1974. He was fined £4,500 and ordered to pay costs of £1,500.

HSE Inspector Steve Richardson, speaking after the hearing, said, “Both brothers were fortunate not to have suffered far more serious injury in this easily avoidable incident. Had nets or other safety measures been installed then the fall risk would have been significantly minimised and the likelihood of injury reduced. “Working on a roof can be dangerous, with falls accounting for more deaths in the construction industry than any other type of incident. The risks are well known, and guidance is freely available outlining how to work safely at height.

“The onus was on Mr Green to ensure the safety of those in his employment, but he failed to do so. Those in charge of the work must be properly qualified and competent to ensure that the work is carried out safely.
EUPVSEC wraps up in Amsterdam

THE 29th EU PVSEC 2014 has finished. The global PV community gathered in Amsterdam to network and to present and discuss the latest developments and innovations in PV. 48% of participates at the EU PVSEC 2014 had been represented by R&D specialists and 38% from the segment industry and engineering. About 6% of the participants came from the segment system integration and energy supply. More than 3,000 PV professionals from 74 countries attended the Conference Program, covering the entire scope of PV technologies. The EU PVSEC 2014 highlighted the impact that the growth of PV will have on our overall energy system.

Henk Kamp, Minister of Economic Affairs of the Netherlands, gave an introductory speech at the opening session of EU PVSEC 2014. “The success of solar energy does not only depend on technological innovation, it also requires social and economic adoptions. Last year the Dutch solar industry sector generated a turnover of one billion euro.”

Teun P. Bokhoven, Conference General Chairman and president of the Dutch Renewable Energy Federation concludes, “This conference provided new insights in the next steps for PV development. Apart from the ongoing need for emphasizing PV cell development, we also are more aware of the need to concentrate on the integration of PV in the electricity grid and the environment.

The strong growth expectation, expressed in the IEA roadmap for PV, proves the confidence in the technological development. It also makes it crystal clear that PV need to become an integral of our total energy system.”

PV has been deploying faster than anticipated. During EUPVSEC 2014 the IEA presented its Renewable Market Report forecasting PV to reach 2% of global electricity generation before 2019. The IEA also announced the latest long-term PV Technology Roadmap showing that by 2050 up to 16% of world electricity supply could be delivered by PV, compared with the 11% share indicated in the original 2010 roadmap. Installed cumulative PV capacity would grow to more than 4,600 GW, providing around 6,300 TWh.

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Today 79% of European citizens already could take advantage of the fact that PV electricity is already cheaper than residential electricity. Arnulf Jaeger-Waldau, Conference Technical Programme Chairman, stated, “We are discussing the technical components of PV systems costs which present only 40% of the total residential electricity costs. Another 20% are covered by the operation of the PV system. But administration fees, taxes and financing are another 40% of the costs. This fact must be discussed and checked. I am sure that there is some potential for more cost savings”.

Giovanni De Santi, Director of the Institute for Energy and Transport JRC, European Commission, “The European Commission will start soon a debate with stakeholders about the feasibility of the X-GWp project making the transition to a new generation of technology and thus exploiting the economies of scale made possible by gigawatt-scale production. The project would intended to help reinstate the competitiveness of the European photovoltaics industry at a time when global demand is beginning to pick up new speed”

Permission granted for Somerset solar farm

OPDE, a multinational solar company specialising in the development, investment, construction and operation of solar photovoltaic plants, has obtained planning consent for a new 10.8 MWp solar farm located near the town of Crewkerne in Somerset.

The planning approval consolidates OPDE’s position in the UK PV market, adding to an active and successful development pipeline. In March 2014, OPDE successfully connected a 12 MWp solar farm located in Aylesford, Hampshire, and construction works are due to start imminently on two further solar farms - a 7 MWp in Kent and a 9 MWp project in East Sussex.
Grid scale storage facility opens

BRITAIN’S FIRST NEW GRID-SCALE electricity storage facility for over 30 years has taken a major step nearer to its planned opening in 2018 with the success of a £3m interim funding round.

The injection of cash will enable scheme developer Snowdonia Pumped Hydro (SPH) to strengthen its delivery team for the 600MWh Glyn Rhonwy pumped hydro site, Llanberis, and to design and carry out ground exploration works prior to negotiating with potential construction company partners.

And the scheme has received a further boost with the news that it is eligible to bid for a 15 year contract to supply grid balancing services under the terms of the UK government’s Electricity Market Reform Capacity Mechanism.

Success in the auction which is due to take place later this year will enable the Glyn Rhonwy facility to earn a predictable annual top-up to revenues generated by trading in the market to supply National Grid with short-term balancing services.

Pumped hydro is the only proven grid-scale electricity storage technology. It stores electricity by using low-cost energy to pump water from a lower lagoon to a higher one. When the power is needed, the water is allowed to flow back downhill through a turbine which re-generates the electricity.

Pumped storage is being deployed by other countries around the world as an integrated part of their shift to intermittent renewable generation sources such as wind and solar. But despite an ambitious roll out of renewables, Britain has built no new storage for more than 30 years and now has a deficit in capacity of some two gigawatts, growing to six gigawatts by 2020. As a result, National Grid is finding it increasingly hard to balance electricity supplies to homes and businesses.

Meanwhile energy bills are being inflated by a costly grid reinforcement programme, and by constraint payments made to wind farms to cease generating when wind causes imbalances in supply.

More storage on the electricity network would enable supply and demand to be more easily balanced, lessen the need for grid reinforcement, and reduce constraint payments by absorbing over-generation for later use when demand is high.

SPH Parent Quarry Battery Company (QBC) was granted planning permission for the Glyn Rhonwy scheme in late 2013 and formed SPH to take the project through to completion.

More details have been revealed of the scheme which is expected to take three years to build, employ as many as 300 construction workers at its peak, and create up to 30 full time local jobs once operational.

QBC managing director, Dave Holmes, who is leading the SPH delivery team, said, “The confirmation that we qualify to bid in the auction for a contract within the Capacity Mechanism is a bonus.

It provides a significant and welcome addition to our fully worked trading model and means payback on the £100m-plus build cost of the site will be more quickly achieved.

“We believe the UK government now recognises the importance of more storage for the welfare of the economy. Storage is the only way to capture excess production on windy and sunny days and our Glyn Rhonwy scheme is right there at this moment of opportunity – we are currently the only company with the know-how and options on sites necessary to satisfy a significant percentage of the immediate need.”

Holmes said the ground investigations to prove the integrity of the slate geology under the site are expected to begin in the spring of 2015. “We’ll be looking at the ground where the upper and lower dams are planned, along the 1.5km length of the tunnelled connecting pipe that will run 50m or more below the surface, and at the intended location of the turbine house.

“Once we’ve completed this we will be shovel-ready, and able to invite contractors to tender for the construction phase. We are also working now to conclude negotiations with the District Network Operator over how underground cables will connect the site to the grid.”

Councillor Trefor Owen Edwards, Gwynedd Council member for Llanberis and chairman of the council’s Glyn Rhonwy Working Group, said, “This is very encouraging progress. It’s fantastic news for the regional economy and for the people of Llanberis.

The hydro scheme will deliver a huge uplift to our local economy during the construction work and support as many as 30 full time jobs once it is operational. The lower part of the site where the hydro scheme’s pump house is planned is already equipped with services and access roads. I and my colleagues on the Glyn Rhonwy Working Group are hoping that the hydro scheme will act as a catalyst and attract more companies to the site.”

Councillor John Wynn Jones, Gwynedd Council cabinet member for the economy, said, “The Glyn Rhonwy site has been identified as a strategic development site which has the potential to create new employment opportunities for the area.

The progress being made by Quarry Battery is welcome news indeed and we look forward to working closely with the company over the oncoming months.”

As part of the scheme, which is expected to have an operational life of more than 100 years, QBC is establishing an independent trust to manage initial grants totalling £250,000 and then on-going direct contributions of £10,000 a year to support community projects.
Solarcentury to build largest solar carport on continental Africa

UK BASED COMPANY Solarcentury is to design and construct continental Africa’s largest solar carport on the uppermost storey of a car park at Garden City Mall, part of the new 32-acre integrated residential, retail park, hotel and office development on Nairobi’s Thika Superhighway. The clean solar electricity generated by the 858kWp system will be used by the retail tenants.

The solar installation will be financed under NVI Energy’s Solar4Africa, a 12 year financed solution that enables Garden City to harness the power of renewable energy, overcoming many of the barriers that can frequently beset commercial solar projects.

As well as providing shade, the 3,300 solar panels on the carports will generate 1256 MWh per year, and cut carbon emissions by around 745 tonnes per year[1]. The dual-mode technology is a highly innovative energy solution that provides solar energy in the daytime meaning less is used from the grid; and when the grid is down, the system also reduces the consumption of costly diesel back up. Essentially, the system is able to operate in either mode. This dual-mode system ensures a consistent energy supply whilst reducing diesel and grid consumption, so as well as being a more environmentally friendly energy solution, it helps reduce energy bills for Garden City’s retail tenants.

Dr Dan Davies, Director for Solarcentury in East Africa commented, “We are incredibly proud to be bringing our second dual-mode solar system to Kenya, this time to build East Africa’s largest rooftop system. The unique dual-mode technology system we have developed is perfect for urban areas where land is at a premium yet energy needs to be supplied near to demand.

Installing the panels on the roof of a car park makes use of otherwise functionless roof space. The technology is also being used in East Africa’s largest ground mount system for Williamson Tea in Kenya, reducing the company’s energy bills by around a third. ”

The installation of the solar panels will help Garden City achieve its Leadership in Energy and Environmental Design (LEED) certification. The new development is set to be a showcase for environmental design, incorporating a range of energy saving solutions. Actis Investment Principal Koome Gikunda said, “We were looking for a turn-key solution that could produce clean power and pay for itself with the energy it produces.”

UK company picks up Rwanda contract

RWANDA has contracted Ignite Power Ltd, a British company, to provide solar powered electricity to Rwandan households. The company will start with a pilot of 1,000 households in four of Rwanda’s 30 districts, including Kamonyi and Gisagara.

Francis Gatare, Rwanda Development Board (RDB)’s Chief Executive Officer, said if the pilot yields positive results, the company will be allowed to roll out between 250,000 and 1 million panels. The two-year contract will enable energy access to remote places. The cost of the project will be determined after the pilot is completed, according to officials.

Yariv Cohen, Chairman of the Clean Access Initiative, an affiliate of Ignite Power Ltd, said the company is trying out renewable energy at large scale. Electricity remains Rwanda’s main concern, key to propelling the country into a middle income society by the year 2020. Over 70% of households are expected to be covered by 2017, up from the current 21%. Ignite Power Ltd will join several other solar energy projects as Rwanda seeks to explore renewable energy to serve the country’s increased energy needs.

Agahozo Shalom Village has just inaugurated a $23.7m project on a 21-hectare field covered with more than 28,000 solar panels emitting 8.5MW, the largest in East Africa. Another German-built solar plant on Mount Jali, on the outskirts of Rwanda’s Capital, Kigali, has been producing up to 250KW into the national grid since 2007. There are plans to upgrade the plant to a 1MW capacity. Rwanda Energy Group (REG), a state-owned utility company, says 85% of the overall primary energy consumption in Rwanda is from biomass, 11% from petroleum products and 4% from electricity.

Rwanda seeks to cut down dependence on biomass to 55% by 2017 and to 50% by 2020. The plan is to invest in and explore a more prudent energy mix including peat, geothermal, hydro, solar, biogas, methane gas and Liquefied Petroleum Gas (LPG). Rwanda’s installed capacity has significantly increased over the last two decades, from 25MW in 1994 to the current 115MW.

Currently, energy supply is generated from hydro power (53%), thermal (46%), and a negligible percentage from methane and solar. The planned generation mix by 2017 is expected to comprise mainly of peat (255MW), methane (75MW), hydro (140MW) and solar (18.5MW).

Issue III 2014 | www.solar-uk.net 11
A STATE-OF-THE-ART LABORATORY that will allow researchers to put the electricity grid through its paces – simulating events such as power cuts due to severe weather has been launched at Newcastle University.

Funded jointly by Siemens Energy Automation Division and the University, the £2m Smart Grid Laboratory will allow experts to test future worst case scenarios in real-time without any risk to customers.

By simulating changes in energy across the grid – both on a day to day basis as well as in extreme cases such as when part of the network is damaged following a storm – the aim is to further understand the demands on the system.

The technology will also be used to test how the anticipated electrification of the UK’s heat and transport networks will affect the grid. The rise in heat pumps and electric vehicles, together with the growing importance of solar panels for energy generation, will mean increased energy flows through the electricity grid which could push the ageing system towards its limits.

Dr Pádraig Lyons, Senior Smart Grids Researcher at Newcastle University, explains: “This new lab will allow us to push the system to these limits without putting the network and customers’ supply at risk.

“Computer models are good to a point, but they lack the realism to mimic constantly changing energy flows across the grid and state-of-the-art intelligent network control systems. With this new technology we are virtually linked up to the grid so the second by second fluctuations across the real network are also happening in real-time in our lab.

“We will be able to test a really tough day in a future scenario and then run it again and again under different conditions and with different energy demands to understand how the existing grid and a future intelligent grid would react and how we can overcome any problems before they happen in the real world.”

The lab at the University’s campus is part of a larger Smart Grid project which includes a grid-scale energy storage test bed being developed on Science Central - a major regeneration project being led by Newcastle University and Newcastle City Council and a centre of excellence on urban innovation and sustainability.

Experts from the University, in collaboration with Siemens and Northern Powergrid, will be trialling new technologies for energy storage to efficiently and sustainably manage delivery of energy across the UK electricity grid.

Commenting on Siemens’ support for this initiative, Dr Bernd Koch, Director of Siemens Microgrids, said: “With energy demand increasing, and new forms of energy generation like renewables becoming more widely used in the UK, it is obvious that we need to make sure that the corresponding energy infrastructure is able to cope.”

“The partnership we have established with Newcastle University, and the research that will be carried out in this new facility, will help us to do just that. What we learn can then be used to help in the development of new technologies and solutions to energy management, which will have the potential to benefit us all in the future.”

Once considered a luxury, the smart grid is now critical to the future of the nation’s energy supply. The existing UK infrastructure is inefficient, costly and unreliable and will struggle to cope with the substantial additional demands likely to be placed on it over the coming decades, such as decarbonisation, the electrification of transport and increased heat demand.

But replacing it is not an option - put end to end, it would stretch twice the distance from the earth to the moon.

Professor Phil Taylor, Director of the Newcastle University Institute for Sustainability and academic lead for the UK’s largest £54million Smart Grid project the CLNR (Customer-Led Network Revolution) explains: “In the past, electrical networks were operated in a passive manner, electricity flowing from high voltage networks down towards the customer at low voltages.

“But as low carbon technologies have come along all that has changed. Distributed generation such as wind farms right down to heat pumps and solar panels in the home means power is now flowing in both directions and in a relatively unpredictable way.

“We need to find a way of managing that power in real time such that the low carbon transition can be achieved at reasonable cost and without degrading power system reliability.

“That’s why this new lab is so important. By understanding fully the demands on the system we can start to make the grid more intelligent - matching supply to demand in real time and within network constraints.

“In addition, we need to find ways to store energy efficiently and effectively when it is in plentiful supply from a low carbon source so it can be released during periods of high demand – to keep the lights on after major storms have damaged the network or when everyone puts the kettle on before sitting down to the Great British Bake Off!”

As well as the real time simulator technology, the lab is also kitted out with the latest energy-saving technology for the home, such as smart washing machines, EV charging points and solar panels. The team will also be evaluating the pros and cons of using DC as well as AC supplies within homes.
Are solar owners losing value with the wrong focus

NEW ACADEMIC RESEARCH has shown that UK consumers with solar photovoltaic (PV) technology are often too focused on the financial benefits of selling the electricity they generate back to the grid when they could be using more of it themselves. The study, by the University of Durham as part of the Customer-Led Network Revolution (CLNR) project, found that solar PV owners were highly informed about their energy usage but that many were not aware they could be saving on their energy bills by using more of the power they generate in the home.

Currently, anyone with electricity-generating technology from a renewable or low-carbon source benefits from the government’s Feed-In Tariffs scheme (FITs), which pays the PV owner for the electricity they generate and for the electricity they export to the grid.

Dr Liz Sidebotham of Northern Powergrid, said, “Our research has shown that solar PV owners tend to be the most aware and informed when it comes to energy usage. We also found that the uptake of PV is being driven by new conventions focused on investment, with owners focused on the potential financial returns that PV can bring, based on the logic of ‘exporting’ electricity to earn a return from the FIT scheme.

Recent figures from UK trade body the Solar Trade association (STA) estimate that the UK’s total installed solar capacity generated from homes, buildings and solar farms is now around 4.7 gigawatts. The contribution of solar to UK electricity generation peaked at a record 7.8% of daytime electricity demand on 21 June this year. With greater use of renewable energy sources and the electrification of transport and heating playing a central role in government plans to cut carbon emissions by 80% by 2050, the CLNR project aims to help UK electricity network operators better understand and plan for the impact of solar PV and other low carbon loads on local electricity networks. Traditionally, network operators have dealt with new demands by reinforcing the network. CLNR is exploring smarter alternatives that will defer costly network reinforcement.

Dr Sidebotham added, “Solar PV has enormous potential as one of the most popular low carbon technologies in the UK and this study has provided us with some really interesting insights. For example, we have seen that by equipping PV owners with smart meters and in-home energy monitors they were able to better understand and manage their own energy use and generation.”

Led by Northern Powergrid and funded by Ofgem’s Low Carbon Networks Fund, the CLNR project is the largest of its kind in the UK, and is being completed in partnership with British Gas, Durham University, Newcastle University and EA Technology.
Continual excellence

SMA has been the global leader in inverters for years now but new technologies and a growing number of players has changed the dynamics of the global inverter industry. To maintain its leadership position the company has continued developing new technologies and approaches to meet its continuous improvement goals.
INVERTER SPECIALIST COMPANY SMA began in Germany in 1981 at a time when solar was only a kernel of an idea in the German energy industry. Since then the company has developed alongside the growing PV industry and became the number one source of inverters, firstly for Germany and then the world.

For a time there was little difference between the global and German markets and SMA grew along with its home country and then alongside new markets as they developed around the globe. In those early days of expansion, everyone would come to Germany for advice so SMA was in the prime position for the inverter side.

The growth of Asian manufacturing and markets should have been another prime opportunity for European solar players but the Chinese ability to develop its own manufacturing value chain occurred quicker than anticipated and many companies found themselves on the back foot. Markets grew rapidly in Asia and the burgeoning Chinese market began to eat into the share of the market.

Despite the changing market conditions, the company maintained its number one position in global inverter sales and made no effort to hide the changing fortunes with Chief Executive Officer Pierre-Pascal Urbon commenting, “For the first time in the company’s history, we had to post a high annual net loss due to the dramatic decline in the European market. Despite this difficult situation, the SMA Managing Board has not reduced investments in technology development.”

Maintaining innovation has been a key factor in SMA’s continued success with more than EUR100 million spent on development of future products. The company was also quick to take stock of the changing Asian market place and announced the acquisition of the Chinese inverter manufacturer Zeversolar. And the company also announced a new partnership with Danfoss providing a number of strategic developments.

“Thanks to our strategic alliance with Danfoss, SMA will significantly improve its competitiveness in the medium term and maintain leadership in the long term” said Jan Van Laethem, Regional Manager for SMA Western Europe.

Local variations
As SMA has grown it has set up a local version of the company and believes it enables them to better serve the local market. So in the UK the SMA inverter needs are met by SMA UK and they conduct their own standards and process to better align with the local market. The parent company recently announced a zero carbon manufacturing unit and SMA UK appointed independent verifier CICS to assess the carbon footprint of the company’s manufacturing facility in Germany.

The audit concluded that the factory produces zero carbon emissions thanks to a combination of energy efficiency measures and renewable energy sources. Providing that local assurance is a good example of the company ethics.

Inverters are truly at the heart of every PV plant and technologically speaking, the inverter is the most important component of a PV plant. It converts the direct current generated in the photovoltaic cells into alternating current compliant with the grid requirements. Or for self-consumption or feed-in to the power distribution grid. SMA allows the local company to determine the local needs and products. This ensures that SMA is not forcing solutions from other markets but actively looking at the local needs. Another good example of local interaction is the recent announcement that Sunny Boy Smart Energy integrated battery inverter is now available in the UK. This product is already a best seller for the company in other parts of the world but the
local company chooses the introduction and approach for the local market.

“The Sunny Boy Smart Energy fits UK’s emerging residential storage requirements ideally. It provides a sensible way to increase self-consumption, whilst it makes it easy to use self-produced solar power after the sun goes down,” said Van Laethem.

SMA UK has also responded to the growing large scale PV market with system developers and investors needing to complete their PV projects before the subsidy changes in April 2015. They have developed a system solution package tailored to meet requirements in the UK market. “With our complete package, covering everything from the String-Combiner to the grid connection, we want to ensure that our customers in UK can implement their photovoltaic projects quicker and without any complications. In addition to expanding our system solution to include the grid transformer station, we are also shortening delivery times and supporting project developers and investors with technical advice and a full range of services,” said Boris Wolff, Executive Vice President of the Utility Business Unit at SMA.

According to Wolff, SMA plans to add the grid transformer station to the system solution and launch it in additional markets over the medium term.

**Developing excellence**

SMA does not just enter a market but involves itself in that local market. SMA UK recently teamed up with British Photovoltaic Association (BPVA) to launch the first children’s PV book in the UK. The book brought alive SMA’s very own character, Smork, to engage children aged 5-10 years old and communicate the importance of using renewable energy sources such as solar energy and the impact that it will have on the environment. This level of local interaction is important to SMA as is developing a local network of approved installers, suppliers and distributors. As the world leader in solar inverter technology and manufacturing, SMA is focused on innovation, education and community.

Staying informed is critical for solar professionals in a constantly evolving and highly competitive industry. With this in mind, SMA Solar UK launched the SMA ADVANCE Installer Program for PV installers in the UK. The SMA ADVANCE Installer scheme aims to deliver a trained, qualified and competent installer network to the householder and consumer. This free program has been specifically designed to provide unparalleled access to information and resources to installers. PV installers who have already completed a series of mandatory SMA training modules,
can begin the SMA ADVANCE installer qualification process after completing the new SMA ADVANCE training module which includes deeper technical product know-how as well as and system troubleshooting and maintenance issues.

On completion of the SMA ADVANCE module, installers are then required to undergo an Evaluation, Knowledge and Skills process to ensure that technical knowledge and competence has been achieved. The final stage is to check MCS registration validation and references before they are qualified as members of the SMA ADVANCE Installer Program.

This level of training and education provides one of the highest rated company processes for consumer benefit. It also provides SMA with a greater level of visibility than most balance of system companies. SMA do not stop with providing detail and information for installers but have also enabled a consumer portal, www.lifeshinesbrighter.com, that features an SMA ADVANCE Installer area with a post code search engine, where the consumer can choose an SMA approved installer, safe in the knowledge that they have the competency, training and installation skills required to install SMA inverters.

In this regard, SMA Solar UK will facilitate UK consumer contact to SMA Advance Installers directly to discuss and quote for end-users’ SMA PV installation requirements.

“With many other installer schemes competing against each other,” Van Laethem added. “We realized the consumer needed accreditation and endorsement from the manufacturer.”

Public perception

With house-holder perception of PV ever changing, consumers are now more aware of PV and the benefits it can bring. SMA has also developed a series of easy to understand videos that explain PV systems and inverters in less than two minutes. Using a series of clear resources and tools, the aim is to raise public awareness of the importance of solar PV technology and the role of quality and reliability when choosing an inverter and PV system. When it comes to solar energy, most householders focus their attention on choosing the panels, however, it is the quality and efficiency of the inverter that determines how much energy is produced. So whether householders are looking to mitigate the impact of climate change or reduce the cost of their energy bills, choosing the right inverter is crucial for a reliable high performing system.

SMA UK has continued the lead set by the global parent company in identifying local needs and ensuring that not only the right product is available for the local market but that the right educational programmes are in place to enable informed choices by the local consumer market. SMA offers system solutions for all markets, module types and power classes. None of their competitors has an innovation rate that rivals SMA and the strong sales and service structure is well positioned to take advantage of the opportunities presented by a globally growing PV market to the best possible advantage.

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Is crowdfunding the future for community energy projects?

Investment opportunities in renewable energy continue to diversify as markets develop at different rates. Jonathan Richards of UK corporate commercial law firm, SGH Martineau looks at the growing investment opportunity of crowdfunding and looks into its viability for investors.
CROWDFUNDING is attracting a lot of attention for allowing entrepreneurs to get new businesses off the ground, or even helping novelists earn a place on the Man Booker Prize longlist. But what is perhaps less well known is the growing role it could play in supporting community energy projects.

Earlier this year the Department of Energy & Climate Change (DECC) announced in its Community Energy Strategy that crowdfunding was amongst the new and innovative measures that it was considering to help resolve the current funding issues faced by many community energy projects seeking to develop sustainable energy options.

There are a growing number of crowdfunding sites springing up, with almost every sector covered, from publishing to start-up businesses and currently it is a phenomenon that has captured the mind and interest of the public investor looking for new opportunities.

When structured correctly and marketed on the right online platform, to the right potential investors, crowdfunding is an efficient way of supporting projects, but the failure rate is high and when things go wrong, it can be expensive.

Interestingly, perhaps motivated by a national desire for lower
energy costs, the public are showing a willingness to get involved in supporting small to medium-sized community energy projects. The growth of crowdfunding coincides with a resurgence in community energy projects. One such success is Abundance Generation which has raised more than £6.5 million from over 1,400 investors to support various renewable energy projects including solar and wind.

So, if you are an investor looking to diversify your portfolio by investing in renewable energy or energy efficiency opportunities, or indeed a community energy project struggling to raise the necessary start-up finance, what do you need to consider before getting involved?

**What is it?**
Crowdfunding uses online platforms to promote projects, often grouped according to sector or interest, to raise investment, with typically four categories of funding:

- **Equity funding** – investors take shares/an equity stake in the project in return for investment.
- **Loan-based funding (peer to peer)** – investors loan monies direct to the project.
- **Reward funding** – investors receive a specific reward related to the project, like badges, T-shirts, tickets etc.
- **Donation funding** – investors receive nothing in return for their contribution (usually associated with charities).

Interestingly, Abundance Generation modified the loan-based funding structure they use, by offering unsecured debentures, with a 20 – 25 year life that pay a cash return twice a year. Although these debentures should not attract stamp duty on transfer, unlike shares in a company, anyone considering investing must understand that currently there is a limited secondary market, if they wish to realise their investment.

**What is a platform?**
The platforms usually take the form of a website, which is designed to present the projects looking for funding in such a way as to attract retail investors, as well as professional and institutional investors. There is usually a lot of information about what the project hopes to achieve, the investment required and what is offered in return.

These platforms generally undertake a rigorous review process of every project to ensure every claim made in the pitch is true and then make it easy for investors to contribute, with any funds received forwarded directly to the project owners seeking the funding.

In return, the platform will typically charge the project an upfront fee for the use of their platform to raise funds, typically ranging from 0.5% to 7.5% of the total sum raised, together with an ongoing monitoring fee depending on the type of crowdfunding arrangement agreed. Although many sites are free to join, some may charge investors per transaction or to become a member of the platform, together with an exit fee should the investor wish to
realise or transfer their investment. This is a typical crowdfunding arrangement for a community energy project where a local community group on a housing estate is looking to install and own roof-mounted solar PV panels on 35 houses.

What are the benefits?
Crowdfunding provides an alternative source of finance for community projects that might find it difficult to raise the necessary funds through the traditional banking, private equity via share offers, or governmental funding sources.

It could also bridge the gap by providing the start-up finance for the project, before a more localised community share offer is issued. An additional benefit is that depending on how the crowdfunding investment is structured, the project may not have to give security over its assets, which would be required by any bank providing the funds.

Equally, the project could avoid a heavy dilution in the equity share capital normally associated with financing from third party private equity/venture capital investors, and can set its own investment terms, allowing it to remain commercially attractive to crowdfunding investors.

For investors, crowdfunding is seen by many as a good way to diversify their investment portfolio and spread their investment risk. The fees required by platforms tend to be lower than those required by managed funds and the process and engagement with these projects gives the investor a more hands-on feel to the transactions, particularly if the structure is peer-to-peer.

Crowdfunding also offers the possibility for public investors to invest in projects that might otherwise have been restricted to only professional investors, either through a restriction on the type of investor or by requiring a high minimum investment – many platforms have minimum investment amounts as low as £10.

In the right circumstances, it is possible to wrap the investment tax efficiently, through the Enterprise Investment Scheme/Seed Enterprise Investment Scheme or SIPP, and still claim government incentives.

What are the risks?
The public investor must consider these opportunities as high risk. The Financial Conduct Authority (FCA) which regulates the crowdfunding sector suggests that all investors should research each opportunity thoroughly and understand what level of due diligence has been undertaken, the level of risk and the value for money offered by the individual project being considered (after charges, taxes and potential defaults).

Crowdfunding projects tend to be relatively small to mid-sized in scale and some may suffer because they have neither the necessary infrastructure nor the experienced personnel in place for the project to succeed and achieve the proposed returns. However, as with most community energy projects, if it has access to guaranteed government backed incentives, such as FITs, ROCs or RHI, this risk can be mitigated and offer a greater degree of confidence for the public investor.

Another risk is presented by the length of time that raising the funds can take. Even if the project is only seeking to raise £25,000 it can take many months for enough investors to show interest and contribute. This in itself is not the problem, as ordinarily investors will have their investment returned if the minimum fundraising is not achieved, but as many months may pass there is a risk that investors will lose valuable interest on their investment – but in truth, it’s unlikely many will be put off by this small risk.

Finally, investors should be aware that depending on the platform and the structure of the crowdfunding, an investor may have no right of complaint to the Financial Ombudsman Service and may not be able to apply to the Financial Services Compensation Scheme (FSCS).

Importantly for community energy projects, the risks of raising capital through a crowdfunding platform are low, unless the minimum investment amount is not achieved, when the costs of using the platform and preparing the necessary offering documentation and marketing collateral is wasted.

What are the legal and regulatory considerations?
As crowdfunding grows in popularity, platforms will increasingly need access to a wider pool of investors, particularly retail public investors. This need raises difficult questions of policy, namely whether this sort of investment is in fact suitable for the ‘general public investor’ and how the sector can be adequately regulated without stifling it.

In response, the FCA has published a statement which tries to ensure investors have clearer information about the risks involved, whilst requiring platforms to have safety features in place in case they run into financial difficulty. They also confirmed that full FCA authorisation will be required by platform operators for loan-based and equity-based crowdfunding.

Further regulation is expected so that firms have the necessary capital to protect against financial problems. However, currently the rather inconsistent situation is such that equity funding will be covered by the FSCS, but investors who contribute through these platforms will not have recourse to the FSCS should the platform run into trouble.

Whilst everyone, including the authorities, get to grips with crowdfunding, many of the legal and regulatory wrinkles are still to be ironed out. But for now, the advice for all investors and especially public investors, or for the community energy groups looking to finance a project through a platform, is simple; seek the appropriate legal, financial and regulatory advice. And ideally, find professional advisers that have experience of dealing with these matters.

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Recently, Solar UK the opportunity to catch up with Finlay Colville, team leader and vice-president at NPD Solarbuzz on the current status of the UK solar PV industry, and put some questions to him related to changes in the UK solar industry.

Change and growth in the UK
The UK solar has continued to grow at an impressive rate and recent data, published by NPD Solarbuzz, shows that cumulative solar PV deployed in the UK has reached the 5 gigawatt level. Compared to where we were 12 months ago, does this come as a surprise?

This time last year, we were embroiled in the midst of a trade case between the European Union and China regarding the import of Chinese silicon based solar modules to the European PV markets. And the outcome was far from clear. The UK had just had a strong first quarter at the start of 2013 for large scale solar farms, and many were concerned that the EU could limit the availability of Chinese panels.

As it turned out, the EU chose to go down the route of minimum price and quota levels and not to impose an import duty that would have been more damaging. While the minimum price required a reset in solar farm capex, it was not a show-stopper. The UK was also emerging as the key European market, with Germany and Italy seeing declining demand. Therefore, the very real possibility of the UK being the victim of the EU/China trade case was mostly averted.

The wise money was on the UK market being at about 4.5 gigawatts today, some 0.5 gigawatts below the actual figure. The growth to 5 gigawatts was largely a consequence of the very strong first quarter this year, before the 1.6 ROCs level declined at the end of March 2014. The UK managed to install well over 1 gigawatt in the final four months, leading up to the 1 April ROC decline. Much of this was due to solar farm deployment, and within this, Lightsource Renewables was certainly the over-performer.

The last twelve months certainly held surprises but overall market metrics were positive. What sort of year can the industry expect in light of changes coming up?

Well, that is much more difficult proposition, because there are now a host of swing factors that are all in the balance. But the best way to look at this is to go through some of the factors in the mix.

First, the small scale FIT segment, that includes all the domestic residential rooftop installation, has shown itself to be somewhat resilient, in comparison with the ups and downs of the large scale ground-mounted activity. Small scale FITs are not due to degress until 1 January 2015, offering installers 4-5 months of stable incentive rates.

The large-commercial rooftop market is not expected to see strong uptick over the next 12 months, mainly because there are still no changes to funding levels. The move to increase
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the capacity threshold that triggers a full planning application will help, but it does not change the economics of the segment. New financial drivers may allow more creative demand growth in this segment over time, potentially from more third-party leasing, but the big money is headed for large-scale solar farms until 31 March 2015 and this is more than likely to get priority over the large rooftop segment now.

Ground-mount deployment over the next 12 months is the key swing component. Before 1 April 2015, policies are set in stone and it will simply be build-build-build under 1.4 ROCs. This can be seen clearly in the increased applications and consultations going on even now, with new planning applications going in at a very high rate.

While many developers will be hoping to hedge their bets on options that may or may not be on the table after 31 March 2015, the goal will be to interconnect under 1.4 ROCs.

The question of ROCs after 31 March 2015 is not yet clear. Nor is the exact nature of what will be eligible to carry over under the grace term conditions finally released. Most have simply accepted that >5MW ground-mount solar PV farms will no longer be eligible under ROCs. The open questions relate to grace terms, and the final decision on sub-5MW ROC continuation.

The May 2014 outline from DECC is still a draft proposal. There is nothing final to work off right now, making ROC deployment after 31 March 2015 almost impossible to call.

The other issue on the table is the CfD auction in October 2014. This too has many questions, but mainly because it takes much of the UK’s renewable sector (solar and wind and other renewable energy types) into unchartered territory. It will not be until the end of this year that we really start to learn what the outcome will mean for large-scale deployment.

The solar industry is almost as dependant on the global market as it is the domestic. What is happening on the global PV scene and are there any changes that could have unexpected benefits or surprises for the UK solar industry?

Mainland Europe solar PV demand is still trending downwards. In fact, the UK is the bright spot this year, and will probably remain so in 2015 due to its strong residential segment and the sheer scale of ground-mounted shipments during Q1 2015. So, competition for Chinese supply under the quota is probably not something to worry about. If other European markets were to grow quickly, then questions would arise due to Chinese quota levels and whether there would be a shortfall of Chinese modules for UK solar farms.

Globally, trade wars are having some unexpected effects. The US/China case is now in round 2, following the 2012 ruling from the US Department of Commerce. The impact is actually more likely to be felt in Taiwanese manufacturing and Japanese end-market supply, in the short-term, than massive changes in supply to the US market. No country is totally immune to a full-blown US/China trade case, but the UK may only see secondary effects in the near term.

Otherwise, the UK will be the main European pull for US and Chinese equity, mainly from integrated suppliers that both ship modules and build solar farms.

The solar and PV industry is seeing a number of trade disagreements that seem more inline with protecting domestic manufacturing. This would seem likely to place more pressure on the development of any UK based manufacturing opportunities?

As of today, manufacturing is limited mainly to mechanical parts related to mounting of panels, with some other electronics or balance of systems parts – similar to most end-markets. Modules and inverters are imported. There are a couple of small module fabs. Sharp has been auctioning off its equipment recently, having closed module fabrication completely in Wrexham some months ago. PV Crystalox has been hit by Asian ingot manufacturing also, and have a fraction of the market share they had when the European market was strong 5 years ago. While highly unlikely, nothing can ever be ruled out. However, the odds are firmly stacked against PV manufacturers. Manufacturing needs significant support from governments, especially when starting up, and the same government needs to be wholly committed to the end-market the manufacturer is going to supply into. It would be hard to make that case in the UK today. Possibly, the best way to look at it is as a much longer play. Is there something that – while very high risk today, or largely blue-sky – might just offer a breakthrough in five or ten years. But anything short of five years, there is minimal hope.

20GW By 2020
Understanding the ROC and CfD opportunities for 2015

6 November
BRE, Watford,
United Kingdom
THE UK SOLAR and PV market passed 5GW in 2014 and joined a small but growing group of countries to achieve this target.

5GW represents a huge local investment but there is still a long way to go before solar is a substantial part of the overall energy mix. While this provides a positive foundation for future progress and growth, there are a number of factors that need to be taken into account when wondering what the next phase of growth will be.

As much as 80% of last year’s growth was driven by ground mounted solar arrays but changing support from the UK government leaves uncertainty as to which type of PV installation is going to maintain the growth rates. The new policy directions attempt to push the market towards commercial rooftops so we will see some initial growth on the rooftops that are able to structurally support a PV array.

There has been little discussion from the policy makers on how much of the rooftop opportunity being pushed is able to be used. With margins so tight in a challenging market, the extra costs of roof preparation will stop some potential projects before they begin.

The government has also announced a new approach to renewable energy development with different technologies now having to bid for renewable support and the lowest bids will succeed in most cases. This will hamper the development of a number of technologies and when wind joins the auction in force in 2015 solar will be hard pressed to compete in some regions for a share of the subsidy pie.

The latest tinkering of renewable policies seems to have galvanised the industry in realising there is strength in a collective force as the UK heads towards an election in 2015. Solar has been sold as a financial pack for so long that the consumers are starting to say no based on returns they can receive from pensions or other sources of investment. The industry has also lost the momentum of environmental issues that propelled the technology in the first place. By collectively approaching politicians and the public, the industry has the best chance to ensure solar and renewable energies are front and centre when the UK public next go to the polls.

One event will address all the key questions and help you move forward in 2015

**Topics include:** Solar Farms or Rooftops? How Will the UK Solar PV Industry Grow? Risk and Reward in UK Solar Farm Developments; Regulatory Update: ROCs FiTs and CfDs; Solar Under CfD’s – The Impact on Financing; Understanding the UK Utility Market Place, Stopping the Cycle of Boom and Bust: Why Tariff Digression is a Good Thing, Future Plans for the BRE National Solar Centre; Solar Strategy / Policy; The Road to Parity, Ideal Environment for Utility-scale Solar Plants; Changes in Support Schemes and How to Use the CfD to Your Advantage, Rated Solar Installer: Where Quality Matters

**Speakers include:** First Solar, Centrica Energy, NPD Solarbuzz, Conergy UK, SGH Martineau, EY, Grupotec, BRE National Solar Centre, Solar BIPV Ltd, Neas Energy Ltd, BPVA and more.

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BIPV opportunities with perovskite materials

BIPV holds the promise to transform the PV markets to a genuine energy contender but there are many technical challenges that have arisen with technologies. Perovskite has been making the news for the promise of the material and the crystal structure benefits. With façades a focal point in BIPV, wafer-thin solar cells could transform glass fronts into power plants.
CITIES ARE EATING UP an increasing amount of heat and electricity. In order to reduce this consumption, buildings have to become increasingly efficient and integrate more renewable energies. New, printable photovoltaic semiconductors could help to boost this trend. They enable solar films and modules to be produced, which transform windows or façades into electric power generators. A new market is being created for the manufacturers of solar glass and modules.

The race for the best solar cells material has a new candidate: Perovskite. No other semi-conductor has enabled researchers to succeed in achieving such a dramatic development in efficiency levels.

“There is now an absolute hype surrounding Perovskite,” says Thomas Unold, head of the Institute for Technologies (Institut für Technologien) at the Helmholtz-Centre Berlin.

The mineral promises to be efficient and at the same time inexpensive. Up to now it has not been possible to combine both these characteristics: currently the best silicon cells achieve an efficiency level of over 20%, but are expensive to produce.

Pigment and organic solar cells in turn can simply be printed on film, but often do not exceed an efficiency level just over ten percent.

Efficient improvement

With a Perovskite cell in contrast, the researchers at the University of California in Los Angeles (UCLA) recently achieved an efficiency level of 19.3 percent. Compared to the first Perovskite cells five years ago, the efficiency level has thus increased six-fold.

This is all the more remarkable as Perovskite can be easily and very economically processed. It consists of the universal commodities carbon, nitrogen, hydrogen, lead, chlorine and iodine, which can be vapor-deposited onto glass as a wafer-thin layer or printed on film and foils. The UCLA researchers produced a Perovskite layer of just around one millimetre thickness by vaporizing glass with organic molecules and lead crystals. Nevertheless, the cell generates almost as much electricity as a 180 micrometre thick silicon cell.

As a result, the high-performance light-weights could conquer the markets which were previously, to a great extent, taboo for photovoltaics. Building integrated photovoltaics for example, in short BIPV continues to be just a niche market, because the manufacture and installation of multi-functional BIPV modules is costly and expensive. Of the 3,300 Megawatt solar power output, which went online in 2013 in Germany, it is estimated that only around 100 Megawatt was integrated in building shells.

A market inhibitor: the BIPV elements are mostly project-orientated variations, which in terms of size, form, material, colour, varying transparency and design, are adapted to the respective building – individuality and the high planning expenditure have their price. Perovskite cells could help to reduce costs.

In addition, the technologies which come into consideration for BIPV have previously not been efficient enough. Often modules made of thin-layer silicon are available, but they rarely reach an efficiency level of 10% – too low to be able to compete with classic silicon cells on the roof, which convert almost twice the amount of light into electric energy. They themselves are only suitable to a certain extent for building integration: they are sawn straight out of blocks because they are simply too thick and inflexible for more complex BIPV applications.

BIPV breakthrough

Nevertheless experts are hoping for an imminent breakthrough in building-integrated photovoltaics, because it harbors immense climate protection potential. Although major cities only account for one percent of the Earth’s total surface, they consume 75 percent of the primary energy used and cause 80 percent of greenhouse gas emissions.

“With a large part of their processes they have to be carbon dioxide-neutral, otherwise there is a threat of climatic collapse”, warns scientist Christina Sager from the Fraunhofer Institute for Building Physics (Institut für Bauphysik - IBP) in Stuttgart.

In her view more efficient buildings and renewable energies could bring about the desired trend turnaround. She stated that solar technology, in particular, could be effectively integrated in domestic houses. In cases where the modules could not be fixed directly to rooftops, they could serve as power-generating windows or act as a substitute for the overall concrete façade, Sager explains.

However, until the promising Perovskite cells can be used commercially, the researchers still have to master several challenges. “The development is just beginning”, says Helmholtz researcher Unold.
The service life is regarded as the greatest hurdle. Perovskite is sensitive and degrades when it comes into contact with water. The cells must be designed in such a way, that even over a period of 20 years no moisture must be allowed to penetrate them. Leak-proof encapsulations, which were developed for organic light-emitting diodes are one possible solution.

In the meantime other promising technologies, which are currently ready for market introduction, have been able to drive forward the BIPV market. Dresden company Heliatek for example has developed an organic photovoltaic film, which can be produced both in transparent as well as tinted form. In non-transparent form it reaches an efficiency level of twelve percent, while the translucent variation has a reduced efficiency level down to around seven percent.

Compared to conventional silicon modules this is low, but in the area of organic photovoltaics it sets a new record. In addition, the flexible films can be embedded in curved formats such as glass car roofs or irregularly formed façades. As dimming films are, as a rule, also in demand in vehicles and offices, there is no additional maintenance expenditure, argues Heliatek boss Thibaut Le Séguillon. As a result, competitive prices are possible.

Flexible promise
Other companies are also banking on the concept of flexible and transparent cells in organic material. The Bavarian company Belectric as well as Crystalsol from Austria for example are working on printed polymer cells. Polymers are chemical combinations of long molecule chains, which can be enriched in a solution and then printed. Heliatek in contrast uses oligomers as light collectors, in other words shorter molecule chains.

In addition, it does not print, but vaporizes them in a vacuum onto a carrier film. Currently Heliatek is still operating pilot production. With solar films from this production line the company has just set up the first window façade in Dresden. The next step planned by the company is commercial production with an annual capacity of 100 Megawatt.

With BIPV a key, new area of operation could also be created for the glass industry. Among the module producers questions are being raised which they can only answer in cooperation with the glass sector: How can the solar films be integrated in the panes? How can the integration be effected as cost effectively as possible? Can work steps such as vapor-depositing on the photoactive materials be integrated in the glass finishing? “BIPV has not yet really asserted itself. But it is definitely essential for the glass and photovoltaics industry to come closer together”, says Timo Feuerbach from the Glass Technology Forum (Forum Glastechnik) within the German Engineering Federation (VDMA).

The first cooperations are already in place. In this connection, Heliatek and Brussels-based flat glass manufacturer AGC Glass Europe last year concluded a development agreement for the integration of solar films in construction glass. AGC technology boss Marc Van Den Neste says that the glass/solar façade solution created by the two companies is opening up completely new possibilities for the architects and designers to combine creativity and energy efficiency with each other.

It is not only due to the cooperation with Heliatek that AGC Europe is regarded as a trailblazer for the glass industry. Its factories are home to a fully-integrated production line which not only covers the production of glass but also its coating and further processing. Various functional coatings are available to photovoltaics manufacturers, for example electrical contact layers for thin-layer modules. A similar solar-oriented concept has otherwise previously been pursued solely by East German company F-Solar. They, too, have extended their production line at their own company to include coating systems.
It can’t control the sun, however it can monitor its energy.

The Solar-Log™ is the most intelligent data logger on the market today. It can monitor and control small to middle size photovoltaic plants accurately and efficiently. The TFT-Touch color display sets new standards in being most user friendly and performance oriented.

Get the experience of Solar-Log™ by the world market leader for photovoltaic monitoring at the Ecobuild or visit: www.solar-log.com
Convincing the public

The Department of Energy and Climate Control (DECC) has a continual process of keeping track of public perception of energy and how the department responds to it. The latest findings show a consumer base becoming savvy and leaning more towards renewable outcomes.
DECC set up a tracking survey in early 2012 to understand and monitor public attitudes to the Department’s priorities. The survey runs four times a year and consists of one longer, annual survey and three shorter, quarterly surveys which focus on a subset of questions where we think attitudes might shift quickly or be affected by seasonal changes.

The tenth wave of data was collected between 25 and 29 June 2014 using face-to-face in-home interviews with a representative sample of 2,087 households in the UK. The wave 10 questionnaire, includes a reduced question set from that in wave 9, which was the annual survey, but is essentially the same as the previous quarterly questionnaire (wave 8, December 2013), although it included additional questions on Geological Disposal Facilities that had only been asked previously in wave 6.

The headline findings of the June 2014 survey results are generally compared below with the last wave (March 2014 - wave 9), although bearing in mind that it is a tracking survey so trends over time are key in understanding long term processes.

Key findings
Summary findings from the June 2014 survey are broadly consistent with waves 1-9 and largely unchanged since March 2014 and December 2013. Renewable energy sources received continued high levels of support although there may be a seasonal decline when results are compared to the previous wave Over three-quarters of UK adults (79%) said they supported the use of renewable energy sources to generate the UK’s electricity, fuel and heat, a similar proportion to March 2014 (80%) and December 2013 (77%).

Support levels for individual renewable energy sources were lower than the previous wave but comparable to that reported at this time last year (Wave 6) which may be indicative of a seasonal effect; off-shore wind (72%), biomass (60%), onshore wind (67%), wave and tidal (73%) and solar (82%). For all technologies there was an increase in those that neither supported nor opposed these developments.

Controversial energy
Awareness of fracking was comparable to that from March 2014; but was coupled with a decline in support for shale gas extraction. Three quarters of people had some awareness of shale gas (74%), which is comparable to levels of awareness reported in March 2014.

24% of people said they support shale gas extraction which is a decline since the previous waves (29% in March 2014 and 28% in December 2013). Almost half (47%) say they neither support nor oppose it, and a quarter are opposed (24%).

Seasonal effects may occur with renewable technologies as a decline in support is observed between March and June on consecutive years, however the equivalent question for shale gas and oil was only introduced in December 2013 so we do not yet have sufficient data to consider long term trends.
Views continue to be broadly split on nuclear energy and wave 10 sees a decline in support for nuclear energy to generate electricity in the UK (36%) from that reported in March 2014 (42%), however there is little change to that reported in June 2013 (37%) so this may be a seasonal effect.

Level of knowledge of how the UK manages radioactive waste has declined with 15% now reporting they know a lot or a little and 85% saying they knew not very much or nothing at all, compared to respective figures of 19% and 81% for last year.
2nd Renewable Energy Systems and Energy Efficiency Exhibition

30th Oct. · 2nd Nov. 2014 Antalya TURKEY

Tourism and agriculture investors are meeting with renewable energy systems and energy efficiency industries at the south of Turkey, in Antalya. Increasing electricity costs of tourism and agriculture facilities is driving investors through alternative searches. Especially, producing electricity out of sun is on the agenda. Antalya’s claim to be the capital of electricity production out of sun in Europe is mentioned regularly. Seeking to convert the biowaste and biogas from millions of tons of organic plant waste of greenhouse industry and food wastes of tourism facilities into energy is on the agenda.

In this context; Antalya, the capital of tourism and agriculture invites energy industry to meet with potential investors in an efficient and joyful exhibition.

There Is Energy In This Exhibition!

This exhibition is organized with the consent of TOBB (The Union of Chambers and Commodity Exchanges of Turkey) in accordance with law no. 6174.

The Indian Renewable Energy Summit 2014, with the Institutional support of the Government of Gujarat

A step ahead for a vibrant economy!

"Fighting Climate Change calls for Innovation, Cooperation and Will Power to make the changes that the World needs. It is becoming increasingly critical to switch from traditional carbon emitting fossil fuels to renewable energy.

Renewable energy will be the lifeline for future generations. It is a legacy that will be valued and will enhance the quality of life.

I welcome you all to be part of The Indian Renewable Energy Summit 2014."

Shri Narendra Modi
Hon’ble Chief Minister, Gujarat

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9 | 10 October 2014
MAHATMA MANDIR GANDHINAGAR GUJARAT, INDIA
Consumer concern

Levels of concern about paying for energy bills was significantly lower; and likelihood of switching in the next year has also declined with the level of worry about bills (35%) and concern over steep rises in energy prices in the future (32%) are both at their lowest since the survey began. These results around energy tend to be lower in the ‘summer’ wave of the survey as energy consumption is at its lowest at this point in the year. These results are however lower than we have found at the same point in the past two years and seem to sit in a context of a decline in concern over prices more widely - from household shopping, mortgages and transport.

Of those surveyed 27% of people said they may or may not switch energy supplier in the next 12 months, which is a drop since March 2014 (33%), although there was not a drop in those who planned to switch in the next 12 months. This may be a seasonal effect as these figures are in keeping with those from June last year.

Nearly half (47%) of people trusted their energy supplier to inform them of the best tariff for them which is an increase since March 2014 (41%) however over the period in which this question has been asked no clear trend of trust has emerged.

Half of people (50%) also said they trusted their supplier to provide impartial and accurate advice on energy efficiency measures, equivalent to March 2014 (50%) and March 2012 (53%), when the question was first asked. The number of people who think about saving energy unchanged with three quarters of people (75%) gave a lot or a fair amount of thought to saving energy in their home, which represents a similar proportion to that reported in March 2014 (77%) and June 2013 (74%).

There has been a decline in the number of people who leave their heating on at least occasionally when they go out 42% compared to 46% in March 2014. However this effect may be seasonal as is comparable to June 2013. There was no change in the proportion of people who try at least occasionally to keep rooms they are not using at a cooler temperature: three quarters of people did this in June 2014(77%), March 2014 (77%) and December 2013 (76%).

Greener energy

Concern about likelihood of power cuts has declined with 48% of people were concerned about power cuts becoming more frequent in future, down from March 2014 (61%), which represents the lowest level since this question was first asked. Over two thirds of people were aware of renewable heat; with over a third positive about having a renewable heating system in their home. The survey found 69% of respondents were aware of renewable heat in June 2014 which is consistent with that reported in March 2014 (71%).

There was a decline in those positive about having a renewable heating system in their home (42% compared to 45% in March 2014), with 42% neither positive nor negative. However this question was only introduced in December 2013 and therefore we have no annual baseline with which to compare results.

There was an increase in those saying they had not heard of or thought about installing specific renewable heat measures; biomass boiler (53%), air source heat pump (67%), ground source heat pump (63%), replacing old boiler with condensing boiler (18%), installing micro CHP unit (71%), but again we only have two waves of results to draw on as comparison.

Friends and family (33%) were the most trusted source for advice on which heating system to install which was an increase since March 2014 (30%). The Energy Saving Advice Service (ESAS) was again the second most trusted source of advice (25%).

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Rises and falls of solar power throughout the last 15 years

The solar sector in the UK has seen steady growth and in April, Ed Davey, Energy and Climate Change Minister, even praised the UK solar industry for becoming the sixth largest market for utility-scale solar in the world. However, it has been a slow road to success with much more advances still to be made. Andrew Knapp, Director, Ecolution, talks about what has changed in the last 15 years and what could aid further progress.
When we started looking into the renewable sector in 1999, we attended a building services show in Sandown Park; the only companies showcasing renewable energy services were BP, Shell and Cholwell Energy Systems. We were so willing to enter the market; we offered installations free of charge. Hilary White, the managing director of Cholwell, arranged for our first PV installation. We were grateful for the few eco-enthusiasts who then kept our business growing.

At the time we would have been installing 100W panels with a limited choice of only two inverter manufacturers. Since then there has been a huge increase in the amount of inverter choices and nowadays the standard module generates 250W. In 2009 we started seeing a shift from installing solar thermal. Initially there was a great outlay for PV but as it thankfully became more affordable, it is now the default technology, accounting for 99% of our projects today.

All solar panel manufacturers claim their products are the most efficient but the industry has not been established long enough to measure the whole life quality of the products. However, we do notice the quality of some products by the way they are framed and their physical durability. With regards to inverters, we normally use string inverters and then use micro systems for two or three panel projects under 1kW. We recently became the sole UK distributor of ELTEK’s award winning THEIA HE-t solar inverter range which offers 97.3% efficiency with galvanic isolation.

Bespoke approach
When considering solar PV systems, many regular domestic installers and clients will think about aesthetics only, but a lot of our projects require compliance with Building Research Establishment Environmental Assessment Method (BREEAM) and Standard Appliance Procedure (SAP).

This means that once those calculations are completed, we choose the best system that adheres to both the calculations and budget. Therefore we need to have quite a bespoke approach to how we design our systems. Recently, for the heart of England NHS Foundation Trust (HEFT), we suggested installing 250KWP on each of the hospitals, instead of over 250KWP - as originally designed. Installing over 250KWP on these projects could have reduced Feed-in-Tarrif (FiT) levels by 35%.

Changing legislation
For the past 15 years, the renewable industry has evolved and grown tremendously in terms of technology, Government incentives, energy requirements and economic requirements. In 2002, the Merton Rule was introduced, allowing councils to introduce further renewable local targets for green energy on new builds above Building Standards. At the time, builders weren’t aware of this so we used our initiative and visited building sites in the Croydon area to talk to them - as a result we became inundated with projects.

This was a step towards our hope of renewable energy becoming part of the Building Regulations, as we’ve seen with so many other products such as double glazing and insulation that had shaped the industry already. The year 2004 saw the Government introduce the Clear Skies Renewable Energy Grant which was great news for all of our clients, with capital grants up to 50% being made available. However, as the grant started to be successful, the Government intervened and almost overnight in the South East and South West, the grants were stopped. This caused major disruption for the orders we had in the pipeline. DTI funding allowed our business to grow. In 2005, we had a steady workflow and our M&E business was doing well, however we decided to close it so that we could focus on renewables.

When the FIT was introduced in 2010, our products and distribution business saw an increase in orders. The FiT peaked quite dramatically thanks to Government intervention, and whilst the reduction in the FiT rates was totally necessary, the application and the way this was dealt with lead the industry to a ‘boom and bust’ scenario.

It’s not easy to navigate the plethora of constant legislation updates and keep revising your compliance in order to adhere to the requirements. From the Merton Rule, Clearskies and Low Carbon Building Programme, to the Code for Sustainable Homes, Allowable Solutions and Zero Carbon Homes, it is certainly a challenge to keep on top of all of these initiatives.

Changing observations
We hope that the public awareness and concern for energy security and energy efficiency will help push the Government along to make ‘green’ decisions. However, the Government has not grasped that the UK could become a very strong competitor or even a world leader in manufacturing, creating and distribution of energy. There is a great potential to nurture renewable energy and create many jobs in manufacturing, as at the moment most products are manufactured in Germany and China. The Government also creates too much legislation and should streamline their initiatives. Throughout the last 15 years we have seen very steady growth of the renewable and solar industry, with Government initiatives helping as well as hindering the progress. With unstable energy security we need to stress the importance and ease of renewable energy to the public more, and it has to be done with more urgency. Perhaps if the Government focused on one simple reward scheme for renewable energy, we would see it becoming the default energy much sooner.

We’re looking forward to seeing how the industry will move forward with technology and demand from the public. We will also be revealing some exciting news with some new technology which is the first of its kind.

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Subsidy timelines

An increasingly important dynamic for the solar industry is changing government policies. One of the challenges for the solar industry after a policy review is an urgency to complete projects in the pipeline before any changes come into play. Eaton describes how planning and supplier trust are key to meeting policy impacted timelines.

WHEN EPC CONTRACTOR, Econergy Europe decided to build a ground-mounted solar park in the grounds of Knepp Castle in West Sussex it turned into a race against time. The UK government had announced a change to the Renewable Obligation Certificates (ROC’s) and the time scale was daunting. With the value of the government’s ROC’s set to reduce on March 31st, the clock was ticking if the 856.80kWp solar PV park was to be connected to the grid in time to gain the full benefit of the incentives.

Knepp is a 3,500 acre (1400 hectares) estate in West Sussex just south of Horsham, which has been owned by the Burrell family for over 220 years. At its heart, overlooking Knepp Lake, is a castle built by the architect John Nash, which remains the family home to this day. Although the solar project had been on the drawing board for some time, the final planning permission was not expected.
until the end of January. That left a window of just six weeks to
get the park designed, built and connected, something that did
not appear feasible.

“It was a very tight timescale, particularly when you bear in mind
that a lot of the equipment is built bespoke to meet the differing
requirements of each particular project,” explains Richard Molloy,
Sustainability Segment Manager at Eaton UK who were brought
in to bring the project to completion. “They were confident that
they would get planning permission, but you can never be sure
until you have the paper work in front of you.”

Investor concern
Given that scenario the developer was naturally reluctant to put
pen to paper and commit to an order. The solution was for Eaton
to separate out the cost of the design phase, a relatively small
amount of the overall project value, and begin the design while
waiting for the planning permission process to take its course.

“Ecenergy Europe commissioned that allowing us to undertake
the cable calculations, the switchgear designs and the General
Arrangement (GA) drawings,” Richard continues. “We went right
to the stage of gaining approval on the drawings and had all the
orders ready to go as soon as the starting pistol was fired.”

Planning permission was duly granted and the order placed on
January 29th at which point the race began in earnest. Ecenergy
Europe were responsible for installing the 3,360 ground-mounted
panels along with inverters. Eaton’s task was to design and
install a turnkey package to take that low voltage power and feed
it into the grid.

The panels were split into strings of 24 that were connected in
series into the inverter, with four strings feeding each inverter.
There were seven AC sub collector distribution boards which fed
back to seven circuit breakers, which in turn fed a single Eaton
Capitole 20 LV switchboard with built-in G59 protection. This
fed a 700kVA 400/11,000V transformer, via a 1,250A air circuit
breaker and then on to an 11,000v Xiria ring main unit (RMU)
which connects to the UK Power Network grid.

Eaton’s Xiria MV switchgear system is a reliable, economic
and environmentally-friendly solution for RMUs and industrial
switchgear. With vacuum and solid insulation technologies, the
use of the environmentally harmful SF6 gas can be avoided. Xiria
is one of the most compact systems of its kind on the market
and is characterised by the high level of operational safety. The
switchgear is suitable for applications up to 24kV and used in
compact transformer stations for power distribution, as well
as in accessible stations in utility buildings and in industrial
applications. The switchgear is available in two, three, four and
five-panel configurations. All panels are integrated in a single
enclosed housing.

Planned outcomes
With the forward planning of Econergy Europe Ltd and Eaton’s
expertise in grid connection for solar installations, everything
went to plan and the power began flowing on schedule in the
third week of March. Not only was the solar park a success in its
own right, it also offers the Knepp Estate valuable opportunities
to continue its well established conservation work.

At present they are constructing a Glamping park adjacent
to the solar park, and when this opens this summer the solar park
land will be graded, ploughed and sown with a mix of wildflower
seed to attract wildlife. The bio-diversity benefits of large scale
solar are becoming increasingly recognised and can help to
contribute to reinstating Britain’s lost wildflower meadows. The
site conditions are ideal and there will be very little human footfall
for the life of the park.

Another reason Econergy Europe Ltd selected Eaton was that
the Knepp Castle project was on a different scale to that of
the normal commercial or domestic projects they had been
previously involved with. Eaton however had been involved in a
number of similar projects in the past.

“This was Econergy’s first project running the connection
process to the 11,000v grid connection,” Richard Molloy
explains. “We have installed more than 55MW onto the grid
ranging from a few hundred kW up to 10MW with voltages
of 400V, 11,000V and 33,000V and so this experience gave
Econergy confidence in our ability to successfully manage the
transfer of power from the LV switchgear to the grid for example.”
Solar has had little to differentiate products in the industry beginnings but innovation and reduced margins is changing that. Sven Armbrecht, Business Development Manager UK at LG Solar, explores how the UK is facing a solar sea change with consumers opting for quality and efficiency when picking solar modules.

Why high efficiency modules are the way forward

The BIG switch

Solar has had little to differentiate products in the industry beginnings but innovation and reduced margins is changing that. Sven Armbrecht, Business Development Manager UK at LG Solar, explores how the UK is facing a solar sea change with consumers opting for quality and efficiency when picking solar modules.

MORE THAN 5 million households in the UK have already installed solar panels. This number is set to grow even further in the next few years, with experts estimating that by 2020 almost 40 per cent of the UK’s annual electricity needs could be covered by solar panels. However, to reach this goal in the next few years, there needs to be a shift in the market’s perception of higher efficiency models.

Many installers in the UK still prefer the 250 watt modules and are hesitant to switch to higher efficiency modules. Our conversations with installers have shown that the key reasons for this are:

- In the UK, the solar incentive scheme supports smaller systems and PV systems with up to 4kWp get the highest feed-in tariffs in the country
- The solar market is still young (despite being a rapidly growing market), so people stick to what they know - 250 watt modules
- Price – modules with higher wattage are still slightly more expensive despite the narrowing price gap

These key myths can all be debunked. According to the DECC PV statistics, around 70 per cent of domestic installations within the 4 KWp boundary are in fact smaller than 4 KWp, using less than the required 16 panels.

Consequently, for households with less roof space it would make more sense to go for higher efficiency panels such as 280 kWp to get most out of their system and be eligible for the highest feed-in tariffs. Despite a higher initial investment for these solar modules, they will pay themselves faster. Throughout the day, these solar modules produce significantly more energy – this means higher pay back if the energy is sold to the grid or lower costs if the households energy consumption is very high.

Apart from return on investment, longevity is usually the most important factor for potential customers when considering buying a solar system. Solar systems are a longterm investment and customers therefore need to be knowledgeable about the best available quality and output. It is an installer’s responsibility to carefully evaluate the best solution for their customers to achieve optimal efficiency and performance with the available roof space.

Finding the best solutions for clients and offering the most efficient solar modules does not only benefit the customer. By adopting the latest modules and switching to high efficiency systems, installers have the opportunity to distinctly differentiate from their competitors. They are offering their customers a better product than the competition and can position themselves as solar experts. Ultimately, it’s all about customer satisfaction – and customers will definitely
be satisfied with considerably higher yields over as much as 25 years and longer.

Finding the right solution
In the end, there is no “one-size-fits-all” approach. Choosing a system depends on a number of factors such as sun exposure, roof size or budget.

To give you an example, recent studies have shown that solar systems with east-west orientation can be more efficient than panels that are facing south as commonly accepted. With the sun setting in the west, the solar panels produce more electricity when it is most needed: just as the sun goes down. With high efficiency solar modules, users can make most of those last rays of sunshine. As for the roof size: the smaller the roof, the less solar panels you can fit on it. So, it just makes sense to choose higher efficiency panels to make the most of the space you have available.

However, if the circumstances are right, then a higher efficiency system would be a better choice as it produces more energy and generates a higher return on investment. It is not a case of picking the best solar system, but rather enabling customers to make educated choices by giving them options and informing them about the diversity of the solar market.

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Connectors play a vital role in PV arrays, and their quality is paramount. Don’t be tempted to cut corners here says Selwyn Corns, MD of Multi-Contact UK, or you will be asking for problems down the line.

**PV CONNECTORS**

Cutting corners is too risky

**WHILE THE EFFICIENCY OF PV PANELS** is a prime element in the economics of solar power, another important factor is the connectors and cables that feed the power out. Connectors need to have a low contact resistance to minimise power losses and prevent overheating. They also need to have a long lifetime while operating in a hostile environment, which can include ultraviolet radiation, precipitation, temperature extremes and in some cases salt spray or other corrosive media such as ammonia.

**Mix and match – just say no**

Problems can occur with PV systems where connectors from different manufacturers are used together. Mixing connectors is a recipe for premature failure, as evinced by the fact that TÜV and UL certifications for example are invalidated if connectors of different makes are combined. Roman Brück from TÜV Rheinland warns: “Currently, the ‘compatibility’ of PV connectors can only be guaranteed for products in the same range from the same manufacturer or products from contract partners using the same materials and informing one another of any planned changes.”

TÜV Rheinland examined “crossover connections” with PV cables, and its interim report includes some sobering results. Connector temperatures in the mixed connections were significantly higher than maximum allowable levels, indicating power losses and the possibility of fires.

Also interesting is that the resistance of the mixed connectors started off very low when first fitted, but increased substantially under accelerated loading.
over time. Where connector ranges from the same manufacturer were fitted, however, resistance remained virtually unchanged. Even if the two different connector parts appear to fit well, tensile forces or mismatches in materials can lead to shortened lifetimes.

**Expensive damage**

Problems can also arise if poor connector tolerances cause the connection to have a lower IP performance, allowing moisture to degrade the connection. In extremes, water can even leak into the PV panel through the capillary effect, with the possibility of flashovers causing expensive damage.

Faults can also occur if installers don’t use the manufacturer’s crimping tools and inserts, as using the wrong tool can lead to a faulty joint, with the risk of disengagement, power loss or overheating.

“Fires are often caused when inexperienced installation teams install systems on a piecework basis,” according to Dr Heribert Schmidt at Fraunhofer ISE. “If solar connectors are fitted using combination pliers instead of a special tool, or if non-certified connector systems are used, then the weak point is built in from the beginning. System operators should not be making false economies.”

Another point to watch out for is counterfeit connectors, which while appearing similar visually, usually have considerable shortcomings when it comes to quality. Top of the list of these deficiencies are poor resistance to UV and high contact resistance, as well as a relatively rapid degradation of performance over time.

As solar panel systems can be expected to operate for a number of decades, it makes sense to avoid cutting corners with regard to cabling and connectors, as any initial savings through using cheaper components are likely to be considerably outweighed by the high costs of maintenance and repair over the lifetime of the installation.
UK could fall behind in renewables without clarity

Energy has become quite a political hot potato in the face of rising energy costs and global uncertainty for energy assurance. Renewable energy has tended to be relegated to the side when national energy issues are raised but now a collaborative effort by national renewable energy associations, and spearheaded by the Renewable Energy Association (REA) have developed a manifesto designed to have renewable energy as a major policy decider in the 2015 elections.
THE NEXT GOVERNMENT will be responsible for the UK succeeding, or failing, in meeting its 2020 renewable energy targets. It could also be the government that turns the budding renewable energy industry into the main economic engine for creating jobs and growth in the energy sector and reducing the UK’s reliance on imported fossil fuels.

The REA has set out a blueprint for the next government, outlining the key ‘manifesto asks’ for all the REA’s technologies across renewable heating, power and transport fuels. A common theme across all sectors is the need for clear, stable policy. Matched with ambitious government plans, this will create jobs, investment and growth, and help the UK catch up in the global clean energy race.

Renewables come from the wind, sun and the rain. From the energy crops, sewage, wood, food and farm waste we grow. They are essential to combat climate change, replacing carbon-emitting coal and gas with low and no carbon power, and directly tackle the global warming that has lead to destructive extreme weather. Providing 15% of Britain’s electricity today, renewables are set to provide nearly a third by 2020. And renewables will deliver 15% of the UK’s total energy needs by 2020. That’s 15% of all our heat, transport and electricity coming from renewables. And that could double by 2030.

Renewables are based on new and exciting technologies that are steadily getting cheaper for consumers. For example the cost of solar power has fallen by 65% during this Parliament. Renewables cost each household 71p a week, but provide more and more insurance against soaring bills when gas and oil prices surge due to an uncertain world. Whether through gas shocks from Russia or oil shocks from the Middle East, renewables can protect businesses and consumers from global changes.

**Diverse sources**

Renewable energy comes in many forms. We receive energy when the wind blows, the sun shines and when the tide comes in and out. But we can also generate electricity, fuel and heat at any time from sustainable supplies of forest and farm products, sewage and food waste. Biomass electricity and biogas can heat our homes, power our vehicles and keep the lights on when consumers want, assuring year-round security of supply.

Renewables are also creating new industries and jobs in home-grown energy. They have the clear objective of steadily reducing costs as they become mature technologies, and are determined not just to be environmentally beneficial, but also to be the cheapest source of energy, outcompeting gas, coal and nuclear on price. Overall, renewables are responsible for 100,000 direct jobs. Turnover in wind, wave and tidal power alone has nearly trebled in three years to £8.1 billion.

Much of this growth has been concentrated in small businesses, which are growing by leaps and bounds. This is helping to diversify the energy industry, and is providing more choice and competition for consumers. The creation of new renewables industries brings enormous opportunities which British small businesses are grasping: much of the increase in turnover is among energy suppliers, contractors, and machine makers who employ fewer than 100 people. In the wind and marine sectors over 80% of businesses have 250 employees or less, with half of all companies employing fewer than 25 people.

The growth of renewables makes Britain more self-reliant, capable of generating much more of our own electricity and gas without dependence on imports or even the national grid. Decentralised energy – where consumers and communities produce much of their own power - has great potential. We aim to make every British community a power station.

**Combined efforts**

Action for Renewables combines all the leading organisations that represent this growing sector, which are jointly calling for a new commitment to respect the Climate Change Act passed with the support of all three main parties. We ask for a pledge to respect the recommendations of the independent Committee on Climate Change, set up under the Act. In particular, the target for low and no carbon electric power by 2030 should be accepted to
SIX KEY PRIORITIES
In summary, our test of the parties’ commitment to a secure, green future rests on six pledges:

1. Support the Climate Change Act to keep us on course to meet our carbon commitments and back global efforts to tackle climate change
2. Set a new renewables target for 2030 of 30 per cent of UK energy
3. Back the independent Committee on Climate Change’s recommendation to set a binding target for low carbon electricity by 2030.
4. Fund the Renewable Heat Incentive for new applications after 2016
5. Boost the UK’s Renewable Transport Fuel Obligation to reach the 10 per cent renewable energy target for transport by 2020
6. Reform the EU emissions trading scheme to ensure the market takes account of all sectors’ polluting cost of carbon emission.

provide certainty for investors and lower costs of investment for consumers. To continue the rapid growth of renewable energy, we believe that the Government should reaffirm the national UK target for 15 per cent of our energy to come from renewables in 2020 and set a more ambitious target for 2030. The goal should be to set as a legally-binding requirement to meet at least 30 per cent of our energy from renewables by 2030.

The industry is now at a tipping point where greater certainty for investors will reap enormous rewards. Far from costing more subsidies, this firm commitment will ensure that renewables becomes the cost effective choice in a low carbon economy. Offshore wind and solar will be competitive even with environmentally damaging coal and gas by 2020. And the industry wants to see all renewables competing in an open market by 2030, where carbon-emitting energy pays for the environmental damage it causes.

The British government should back EU-wide efforts to reform the emissions trading scheme, so that the costs of carbon emissions are properly reflected in the market price of energy. In particular, the system of allowances must be tightened to ensure that the EU stays on track with its goals of a sharp reduction in greenhouse gas emissions. The EU has played a vital and pioneering role in tackling global climate change, and Britain must continue to show leadership within the EU and on the wider world stage.

Industry reactions
Commenting on the manifesto REA Chief Executive Dr Nina Skorupska said, “From clean power infrastructure to Zero Carbon Homes and from heat networks to sustainable transport, this is the most comprehensive guide a government could wish for if they’re seeking to maximise the value of this young, vibrant and innovative industry.

“Looking forward to 2020, the manifesto sets out how the next elected Government can keep up the progress on renewable electricity, and accelerate the roll-out of renewable heating technologies and transport fuels. Certainty beyond 2020 is also vital to enable industry to invest in innovation, expansion, skills and supply chains.”

The incumbent Energy and Climate Change Secretary Ed Davey was positive on the announcement of the manifesto and said, “In Government the Liberal Democrats have more than doubled renewable energy generation thanks to investment in the sector. We have been at the forefront of reforming the electricity market to help cut bills which is crucial to building a fairer society. And that’s not all, as part of creating a stronger economy, we are on target to produce 250,000 green jobs across the UK by 2020.

“But we want to do even more and introduce a legally binding decarbonisation target to green our electricity and boost renewable heating. The Liberal Democrats are looking ahead to a greener and reformed energy market, which benefits the consumer and puts the environment first.

“Pioneering work by the Renewable Energy Association’s members is vital to achieving these goals.”

MPs have already been presented with copies of the REA Manifesto at a series of breakfast seminars. The REA Manifesto builds on the Action for Renewables campaign launched earlier, which sets six top line key asks for the next government.

Tim Waterfield, head of operations at Savills Energy, echoed calls for clarity on energy policy to the 2015 general election and beyond and said, “The REA’s call for clarity and certainty over our future energy policy is one that we welcome. Indeed, it is something that Savills Energy has been calling for throughout the radical changes to the energy landscape that have taken place over the past two years. Experience across the UK and wider European energy landscape clearly demonstrates that delays and policy uncertainty have a significant impact on investment.

“We are now in a situation where our energy security is finely balanced. Risk in energy supplies affects every aspect of our economy and it is clear that whoever comes to power in 2015 needs to show clear leadership to drive the evolution in our energy mix forward with confidence. This will encourage much-needed investment in our long-term energy requirements.

“Ultimately, energy is too critical an issue to become a political football; it is clear that change needs to happen and happen quickly in order to secure the future prosperity of our country. In order to meet the legally binding target of 15% of our energy to be met by renewables by 2020, policy certainty is crucial.”
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