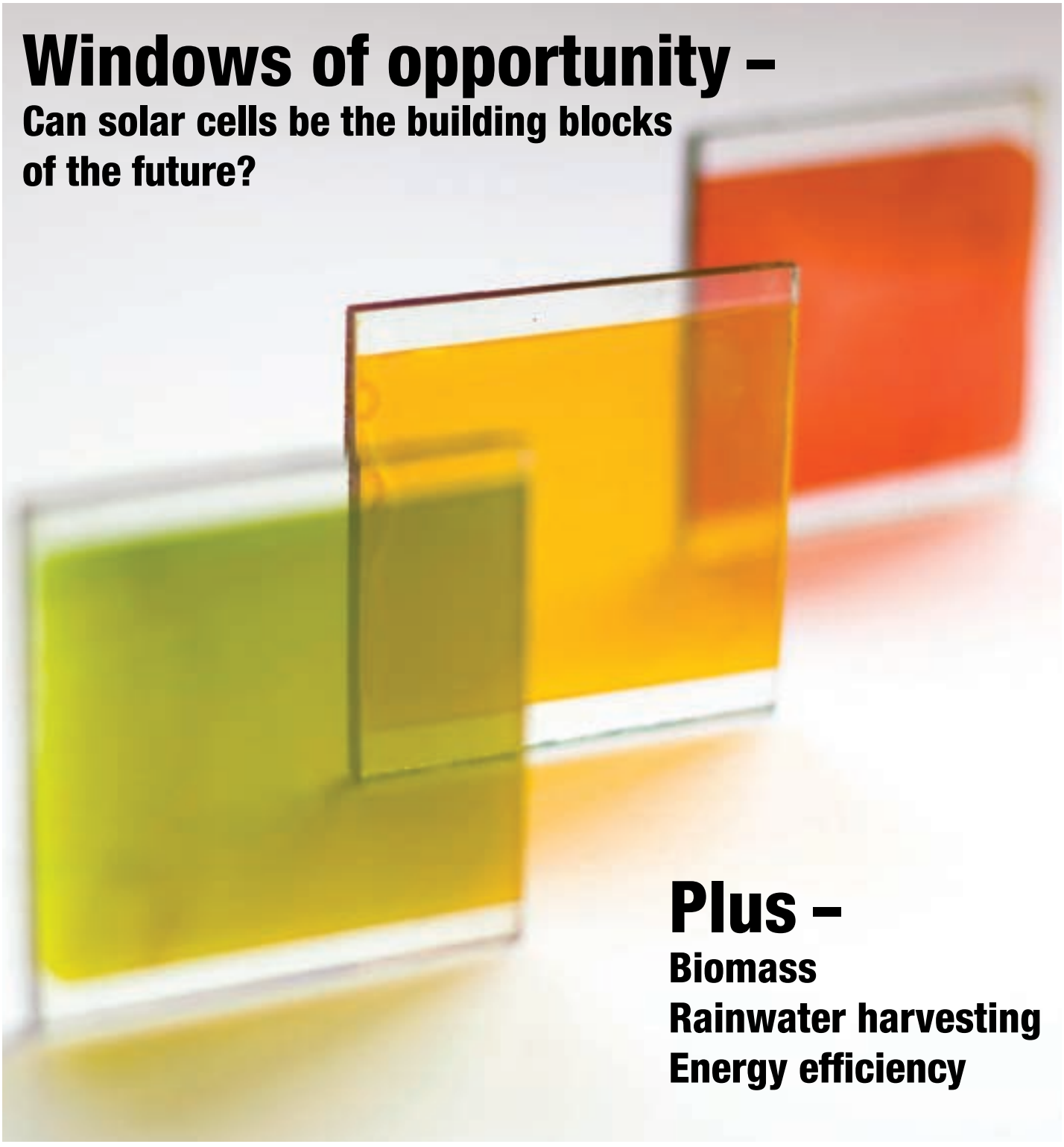
Renewable ENERGY INSTALLER

THE BUSINESS OF MICROGENERATION

SOLAR THERMAL SOLAR PV BIOMASS HEAT PUMPS WIND HYDRO June 2013



Windows of opportunity –

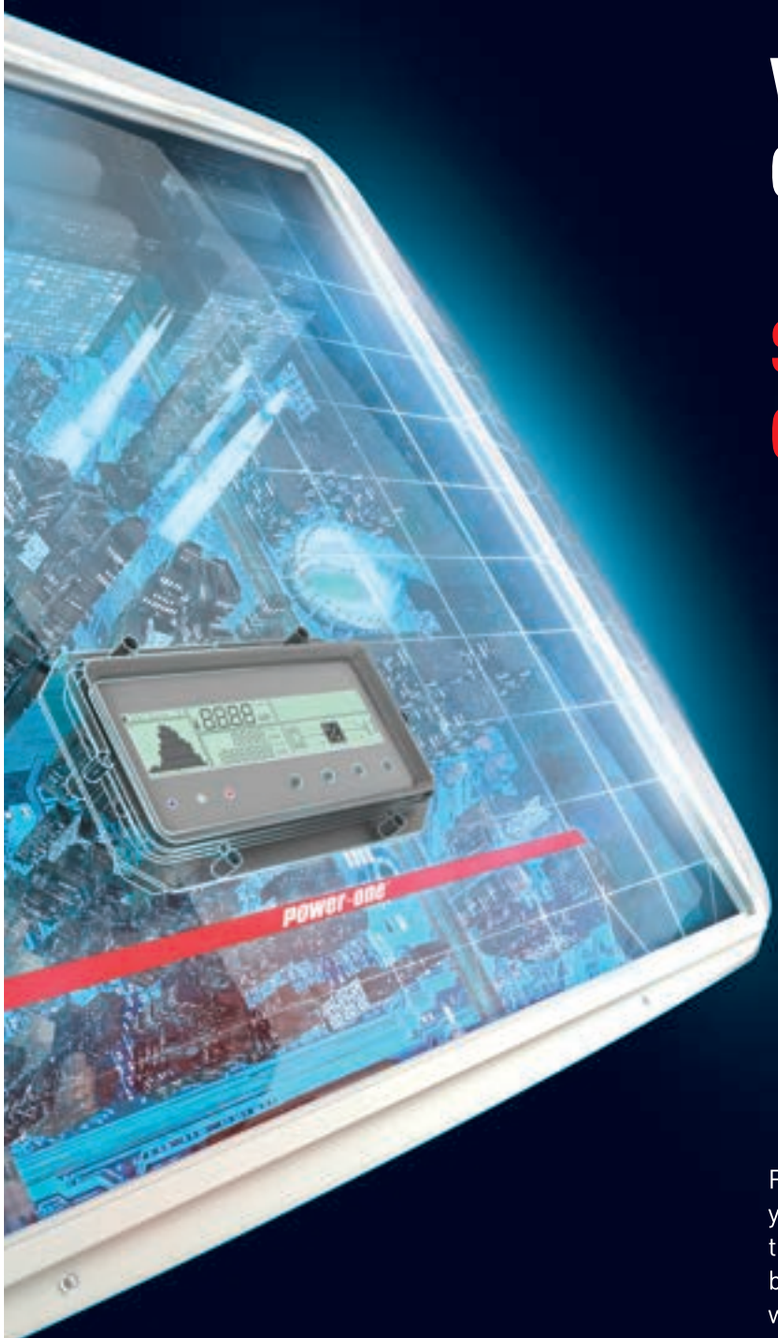
Can solar cells be the building blocks of the future?

Plus –

Biomass

Rainwater harvesting

Energy efficiency



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Something to shout about

If you want a quiet life, the world of renewables is not for you. If you came into this sector with the aim of pulling in a profit easily, without breaking a sweat – what were you thinking? Renewables and energy efficiency is like no other sector we know of. From one day to the next we seem to be experiencing changing legislation affecting renewables business throughout the UK. Indeed, as I'm writing this, DECC's latest announcement is that the RHPP payment is set to double.

Keeping up to date with the myriad of announcements is one thing but what really keeps this sector ahead of others is its ability to react to those changes. Over recent months business models have changed as installers, manufacturers and suppliers incorporate changing legislation into forecasts and marketing campaigns. Changes to the Feed-in Tariff, the slow burn of the Green Deal and the delay of the RHI have all served to make this sector re-evaluate their budgets, business plans and lead generation in coming months.

DECC's latest news is welcome. In addition to the RHPP increase, we hear that the increase is now linked to a Green Deal assessment to qualify. This concept has been discussed for some time within the sector and should hopefully help boost the awareness and take up of the Green Deal, especially as we wait for details of the RHI to be firmed.

So once again, the industry is determining ways it can maximise on this latest news. For once, it's all positive and thanks to the many times before the sector has had to adapt to change, at least this time it's all moving in the right direction.

On a last note, this is my last issue of REI as I'm off to pastures new. It's been a pleasure being part of this sector and getting to know you all. My new venture is still renewables-related so maybe our paths will cross again soon.

Editorial panel members

Andy Buchan, CEEC, Future Renewable Energy

Andy Boroughs, Organic Energy

Garry Broadbent, heat pump specialist

Cathy Debenham, YouGen

Ryan Gill, Evoco Energy

Liz McFarlane, Zenex Solar

Steve Andrews, Ecoskies

Phyllis Boardman, Green Deal Consortia

Robert Burke, HETAS

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Designed to empower you and your business

"The opportunity to generate low carbon electricity and offset energy costs via the Feed-in-Tariff, without compromising on design, is likely to prove extremely commercially valuable." Kevin Arthur, Oxford Photovoltaics p12

RHPP set to double

The Renewable Heat Premium Payment (RHPP) is to double for homeowners, the government announced on May 20.

Increasing the grant levels will come as a welcome boost to the renewable heating industry following the disappointment of continued delays to the domestic RHI.

The Department of Energy and Climate Change (DECC) has bowed to strong calls from within industry to make the RHPP more generous in order to support the market as a stopgap until the RHI takes over next summer.

Also announced is a new rule that all future recipients of the RHPP must undergo a Green Deal assessment to qualify – a process which will typically cost homeowners £100-£150.

Therefore, payments for ground source heat pumps will nearly double from £1,250 to £2,300 whilst those who install air source heat pumps will now receive £1,300, up from £850. Biomass support has increased from £950 t0 £2,000 and solar thermal £300 to £600.

"The news that the RHPP is set to double must be seen as a positive move for the sector. And with the link to the Green Deal, increased awareness of this flagship scheme should help build take-up numbers which of course, is good news for the renewables and energy efficiency markets. Installers in these sectors have been working hard in anticipation of the business growth they would experience through the RHI and the Green Deal. With the delay to the RHI recently announced and the Green Deal off to a slow start, this RHPP announcement is a welcome step in the right direction," said Lu Rahman, editor REI.

Senior citizens 'put off' by Green Deal

Large sections of the UK population are reluctant to sign up to Green Deal and take on extra debt, according to new government research.

A focus group commissioned by the Department of Energy and Climate Change to study perceptions of the scheme has found the elderly and disabled people to be the most wary amid fear of Green Deal's complexity, despite these social groups being more likely to suffer from fuel poverty.

Tim Pollard, Plumb Center's head of sustainability, said that any image problems could be rectified through education and increasing understanding of the net financial gains available through Green Deal.

"I cannot be surprised that the research indicated that older and disabled people are put off Green Deal," he said. "However, this seems to me to be less about issues with the scheme and more about how the Green Deal and Eco are presented and explained.

"We really need to re-establish the value of energy efficiency and help consumers understand that whilst there are more 'attractive' uses of finances, that the spectre of ever-increasing energy bills will only be managed by using less energy."

Adrian Pike, ceo of national energy efficiency solutions company Anesco, added: "The Green Deal is still very new. Decision criteria generally is not about age or disability, it is about acting responsibly with money, making sure that any measures you put in the home will make a real difference and ultimately save you money – which the Green Deal 'golden rule' guarantees.

"If you have considered these points thoroughly and you have a good understanding and belief that you will be in a property for a number of years, then Green Deal provides an excellent opportunity to improve the energy efficiency of your home and to save money."

GD Assessments hit 19,000 mark

The latest Green Deal assessment statistics published by the Department of Energy and Climate Change (DECC) have been met with a mixed response.

Although news that 18,816 assessments had been carried between the scheme's launch on January 28 and the end of April was welcomed by climate change minister Greg Barker, two energy efficiency providers say that this number is not as impressive as it sounds.

"The Green Deal market is showing healthy signs of growth since its launch at the end of January," said Mr Barker.

"It's still early days for this long term initiative, but this is a clear sign of growing interest from consumers, with people keen to improve the efficiency of their homes to make them warmer and help save money on bills."

But Paul Hutchens, managing director of Kidderminster-based Eco2Energy, says that providing data on the actual number of measures installed would provide a more accurate indication of the uptake of Green Deal than looking at assessment numbers alone.

He said: "9000 plus assessments in April sound impressive, but that doesn't mean measures will actually get installed. Given 5,000 gas boilers alone are installed daily, this just scratches the surface. And if it is gas boilers that are installed, they are usually a distress purchase, so the Green Deal may simply be an alternative financing option for what would happen anyway.

"Ultimately, this is a good flag waving exercise for energy efficiency, but may only produce results long term."

Adrian Pike, ceo of Anesco, added: "I see the numbers as positive as the uptake is increasing, which is the aim. I think there will be a large take up but in a controlled way, rather than a mad rush. Overall I think we can only judge performance over 12 months, not on a month by month basis."

The release of assessment statistics in May came at the same time Which? published results of its survey examining the views of potential homebuyers on purchasing properties which had Green Deal loans attached.

Almost half said they would want a Green Deal loan paying off before buying a property whilst 21 per cent said they would reconsider buying a property which had an un repaid Green Deal loan attached.

Number of GD assessments lodged by month
Source: DECC

July FiT rates announced

Ofgem has confirmed the Feed-in Tariff rates for solar PV starting from July 01 2013. Despite installation rates in the sub 50kW range being insufficient to trigger any degression, tariffs will reduce automatically by 3.5 per cent under the Department of Energy and Climate Change's (DECC) automatic degression model.

DECC stipulates that if there is no degression for nine months, as has been the case since November 2012, tariffs must drop by 3.5 per cent automatically.

New rates from 01 July 2013 are as follows:

Tariff band	FiT rate p/kWh
0-4kW	14.90
>4-10kW	13.50
>10-50kW	12.57
>50-100kW	11.10
>100-150kW	11.10
>150-250kW	10.62
>250kW-5MW	6.85
Stand-alone	6.85
Export tariff	4.64

Chinese import tariffs announced

The European Commission has decided to impose import duties of 47 per cent on Chinese PV products, according to industry sources.

The EU had been investigating allegations of Chinese manufacturers dumping panels in Europe at below cost price following complaints from European manufacturers of unfair trading. An announcement was widely expected earlier this month as the commission deliberated over whether to follow the USA in levying the tariffs.

At the time of going to print, the European Commission had not yet officially commented but Reuters understands from two officials that tariffs will be imposed between 37.2 per cent and 67.9 per cent on Chinese solar panels exported to the EU – a market worth $77bn last year.

The commission will now need to consult EU member states before formally publishing tariffs in the Official Journal of the European Union next month.

The UK PV industry has reacted with disappointment to the likely price rise in panels which will follow and be passed down the value chain to the consumer.

Sean Collier, general manager of Access Renewables, said: "The imposed import tariff will raise module prices and we believe that demand will decline across Europe as installing a PV system will cost more for the end user."

STA ceo, Paul Barwell, said: "These duties, if imposed, will damage the UK solar market, particularly the large scale ground-mount sector. The cost increases resulting from these duties will throw the UK off course from its solar roadmap. We will continue lobbying DECC to ensure the UK votes 'no' to these proposed duties."

Orta Solar managing director, Nick Pascoe, added: "We're tremendously disappointed to hear this proposed news. We invest many millions in surveying, planning, legal, financial and technical design work typically twelve months prior to constructing these

projects and, as of today, we no longer know whether it will be economically viable to construct UK commercial scale solar farms later in 2013 and beyond."

Learn and earn with EcoSkies

EcoSkies Renewable training courses now come with sales leads worth up to £150 upon completion of a training course. The training expert has teamed up with a sales leads provider to help installers get enquiries once an EcoSkies training course has been completed

EcoSkies recognises that many installers find it difficult to find work when they complete a training course. Entering a market place can be a huge obstacle for anyone so EcoSkies has teamed up with a sales lead provider to help get its customers' businesses off to a profitable start.

Steve Andrews, MD, EcoSkies, said: "There is a potential supply of work in the renewable and energy efficiency market. Many of our customers are doing exceptionally thanks to our training courses. Installers have found taking the plunge and diversifying is giving them a wider scope for increased revenue. However, we also have customers that come back to us to help them with marketing and lead generation. What better way to help give our customers their first sales leads to cut their teeth?"

Google searches are a great indicator of popularity. In the last month, says Ecoskies, more people have searched for renewable technologies than for the FA Cup. Clearly, there is no shortage of interest in the renewables sector. The problem lies in the fact that many companies find it hard to communicate their new services effectively and attract strong leads.

"This is a fantastic offer that will give EcoSkies a huge competitive advantage in a very saturated market, while giving our customers a fantastic opportunity that cannot be matched anywhere else. In fact I believe in it so much, that I have provided £50 of the £150 credit" said Andrews.

Autumn watch

This autumn, the award-winning Energy Efficient Exhibitions for trade professionals return to your region

As energy bills for our living spaces and workplaces go through the roof, energy efficiency is becoming increasingly critical for owners of commercial and domestic properties. The Energy Efficiency Exhibitions are designed to deliver everything trade professionals need to get up to speed in a single day.

Formerly, the Renewables Roadshow, the Energy Efficiency Exhibitions have evolved to incorporate energy efficient technologies, while retaining the very best in renewables. After nine months in development, the event organiser is understandably excited to get the show on the road this September.

Event director, Dan Caesar, had this to say: "After a long, cold winter, energy saving is as important as it has ever been to customers. Over the next few years, our industry has a once in a lifetime opportunity to offer our customers, significant financial savings thanks to energy efficient and renewable technologies. We are delighted to be bringing our best exhibition yet to Scotland, the North-East, the North-West, the Midlands, the South-West and the South-East."

Day tripper: The Energy Efficiency Exhibitions are designed to deliver everything trade professionals need to get up to speed in a single day

Whatever your needs, whether it's energy monitoring or insulation; energy efficiency or renewables; or finding funding for projects, all of the solutions are under one roof at the Energy Efficiency Exhibitions. "We are delighted with the exceptional quality of this year's line-up of exhibitors. It's an exciting blend of traditional and non-traditional, national and regional brands, with a few, new notables including Gas Safe, GE Lighting, Knauf & Natwest. What's more, we invest more than any other organiser in our educational programme of attractions, demonstrations and presentations, so we can genuinely guarantee visitors an invaluable day," said Caesar.

This year's visitor attractions include four theatres filled with presentations – the Commercial & Green Deal Theatres will be returning and they will be supplemented with the RHI & Policy Theatres. Plus, this year the Energy Efficiency Exhibitions will include an increased number of demos, hosted in the Energy Efficiency & Renewables Demo-Stations and there will be a new interactive visitor attraction entitled, Hands-on Heat Pumps.

This year's dates for your diary are:

10th September
South-West Westpoint Arena, Exeter

12th September
Midlands Ricoh Arena, Coventry

17th September
North-East Metro Arena, Newcastle

19th September
Scotland Highland Centre, Edinburgh

24th September
South-East Sandown Park, Surrey

26th September
North-West Event City, Manchester

To register for your FREE tickets, visit **www.EnergyEfficiencyExhibitions.co.uk**

Home comforts

Just when the UK solar industry appears to be enjoying a period of calm, could international events send it spiralling into confusion again? **Stephen Davies,** founder of renewables supplier GreenKit, suggests that in future we may need to buy closer to home

When the government committed in 2008 to cutting 80 per cent of greenhouse gas emissions by 2050 in a bid to tackle climate change, the renewables revolution was born. Coupled with a relentless rise in fuel costs and the allure of payments for producing clean energy, businesses and consumers turned to renewable technologies, creating a sector with annual revenues in excess of £12.5bn.

However, the industry has seen many ups and downs as the government announces changes to the tariffs available as well as developments in technologies and changes in pricing. This has made it hard for customers to commit and difficult for installers to make the right buying decisions.

For the solar PV installer, the purchasing process is heavily led by cost in a fiercely competitive market

For the solar PV installer, the purchasing process is heavily led by cost in a fiercely competitive market. The choice of buying locally-made modules is often dismissed when compared to the price of modules from the Far East. However, with recent international events, the balance is set to swing back towards European manufacturers.

The European Commission has investigated solar panels coming from China and whether they are being sold below cost, due to process known as 'dumping', with Chinese manufacturers benefitting from unfair government subsidies. In the US this has led to anti-dumping taxes of 18-250 per cent being imposed on Chinese made solar products, preventing cheap solar imports from harming the US industry.

With this looking likely to go through in Europe, how will it affect the UK solar industry? Some estimate that it will have a severe impact with price increases and job losses. Around 80 per cent of our solar equipment originates in China and could lead to a shortage of modules forcing a price increase.

The EU must decide for definite by early December 2013 whether to impose anti-dumping and anti-subsidy duties on Chinese solar panels and components, including solar cells and wafers. Indeed, the commission has reportedly already opted to levy tariffs at an average level of 47 per cent but is yet to confirm this.

This latest upset follows a period of stabilisation in the UK solar industry as we adjust to the more predictable quarterly Feed-in Tariff reviews.

Advantage Europe: Tariffs due to be levied on Chinese PV products by the European Commission will be a welcome boon to European manufacturers, says GreenKit founder Stephen Davies

The current tariffs have been balanced with the cost of installation and deployment, anything that forces a price increase will reduce the rate-of-return needed to make solar PV an attractive investment.

There are many choices for European solar panels, although those that use Chinese solar cells or wafers could be affected to differing degrees. At GreenKit we are increasing our range of locally produced products and will be keeping our customers in touch with market developments to help them remain competitive. What is certain is that this can only be good news for European manufacturers.

We very much hope that, despite the concern over solar imports, the renewables market in general has a more settled and sustainable outlook, in part due to increasingly stable incentives and a wider choice of more affordable products. As the industry continues to consolidate and mature, it will be better placed to react to international upsets, so should enjoy a less turbulent time going forward with less peaks and troughs.

Let there be light

Installers working in the Building Integrated Photovoltaic (BIPV) sector will soon be able to offer transparent energy-generating glass facades. **Kevin Arthur,** ceo of Oxford Photovoltaics (OPV) gives the low-down on the company's innovative new solar cells

A spin-out of the University of Oxford, OPV is rapidly commercialising solid-state dye sensitized solar cells, which can be printed directly onto glass panels prior to installation. The cells themselves are made from abundant, benign materials, offering a more sustainable solution than standard Photovoltaic units.

Printing the new solar cells directly onto glass, in a range of colours, requires a far less carbon-intensive manufacturing process than that of standard PV technology. Simultaneously, the application of energy generating solar cells significantly offsets the embodied energy of glazing materials used.

We estimate that applying the cells onto glass panels prior to installation will only add approximately 10 per cent onto the cost of building fenestration. With glass panels priced at a rate of £600 - £1,000 per square metre, the extra cell treatment would only add an extra £60 - £100 per m².

Increased efficiency

Calculations suggest that at current efficiency levels (11 per cent), our new Mesosuperstructured Solar Cells (MSSC) could contribute 20 per cent or more towards the energy requirements of an office building, without negatively impacting design aesthetics. The next generation of cell is scheduled to achieve 14 per cent efficiency within a year.

In addition, through the diminishment of solar glare and heat passing through the coloured glass panes, air conditioning requirements in commercial buildings will also be reduced.

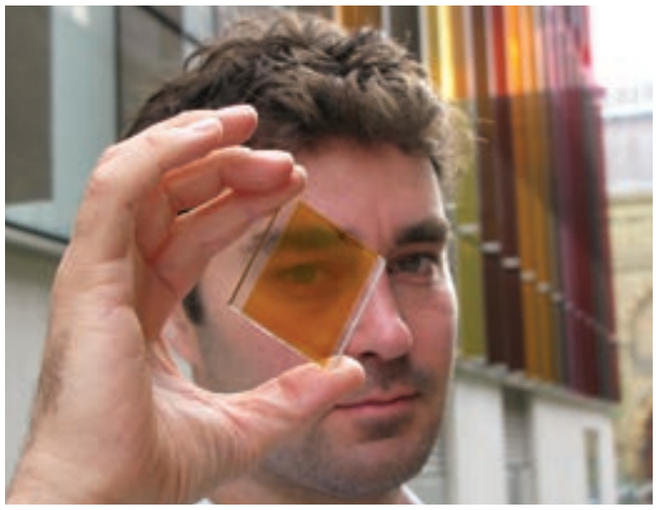
Rather than attaching solar panels to the side or roof of a building we open the possibility of constructing a building entirely out of the photovoltaic material.

Our technology will soon allow buildings themselves to become independent power stations, without making a significant impact on integration costs.

Full integration

The range of colours available and the transparency of the cells mean that renewable energy can be fully integrated into building design, whilst having a positive aesthetic impact on the urban environment.

We open the possibility of constructing a building entirely out of the photovoltaic material



Kevin Arthur, ceo of Oxford Photovoltaics, says his company's next generation of solar cells can be directly printed onto glass creating a positive aesthetic impact

OPV's technology has resulted from the world-leading research work of Dr Henry Snaith and his team of 20 scientists at the University of Oxford's Physics department.

Our company is making huge strides in the scale-up and commercialisation of this technology, our new facility at Begbroke will incorporate state of the art printing techniques to enable us to manufacture larger modules and begin the technology transfer of our new, high efficiency MSSC technology.

In addition, our new test and qualification facility will fast-track our programme to deliver modules that meet internationally accepted standards and specifications for photovoltaic products.

Viable solution

Although we predict the majority of immediate demand will be coming from commercial buildings such as offices, increased efficiency in the next generation of solar cells would make them a viable solution for residential buildings in future.

We estimate that within 24 months, we will begin shipping our first full sized modules for commercial buildings, and discussions about sub-licensing opportunities with significant players in the value chain have already begun.

The opportunity to generate low carbon electricity and offset energy costs via the feed-in-tariff, without compromising on design, is likely to prove extremely commercially valuable.

Partner organisation MCS presents its regular column for REI

Safety First

In its regular column this month, the MCS takes a look at solar PV installations fire safety

Over the past 12 – 18 months, the issues surrounding fire safety and solar PV installations has become a more prevalent topic of discussion for both the fire and rescue service industry and those in the renewable technology field. There are several reasons for this, with the main driving force being the increased number of solar PV installations since the launch of the Feed-In Tariff Scheme back in April 2010.

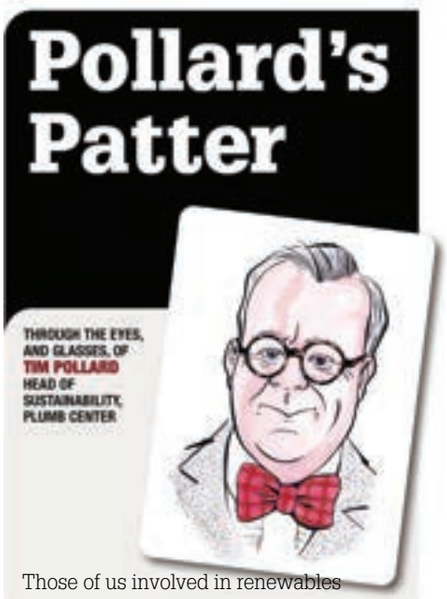
MCS and Kent Fire and Rescue Service recently undertook an awareness day with fire and rescue services from across the UK, to draw out and discuss some of the key issues experienced by fire crews when they are required to tackle fires, or other incidents, on buildings where solar PV panels have been fitted. The result of this awareness day is that this is a complex issue, as Fire and Rescue Service are often dealing with dynamic situations and must consider a number of factors which may impact of their method of response. It was felt that there is a strong need to develop national guidance with inputs from both industries, which could be used by both fire and rescue services crews and MCS installation companies. There has been a lack of scientific testing of the different scenarios involving PV panels and fire, which has meant that the methods or guidance for tackling incidents have not been fully documented amongst the relevant regulatory bodies in the UK.

It should be noted, however, that there is also a continuing, wider debate in the international standards arena. Discussions around updates to standards, and the process for developing new standards focussing on fire and renewable technologies is taking place. Whilst there are international standards available to some degree, and some testing has been completed in other countries such as Germany and the USA, questions have been raised as to whether it would be applicable to transfer this learning into the UK industry. Particularly in the case of incident response methods, German and US fire crews use different equipment which UK Fire and Rescue Services may not have access to.

MCS and the Fire and Rescue Services are currently working closely to begin to gather as much information on the safety issues associated with solar PV installation. This information gathering exercise and further knowledge sharing amongst the relevant bodies and stakeholders, in both arenas, will hopefully lead to the development of more comprehensive national guidance.

Opinion

Pollard's Patter



Those of us involved in renewables are familiar with the commute on the fast train from exhilaration to despair, without stopping at reality. Yet the basic proposition of providing access to lower carbon heat and power remains unshakeable. Energy costs continue to rise and most informed voices continue to forecast significant increases for the foreseeable future as world energy demand rises and outstrips world supply.

The carbon targets written in law means that we cannot continue to burn fossil fuels. Progress to date in reducing carbon has not been good. The Parliamentary Committee on Climate Change stated in their 2012 Progress Report that, 'This rate of underlying progress is only a quarter of that required to meet future carbon budgets.'

It is these basic market circumstances that keep renewable energy commercially attractive. However, we need some confidence of immediate action to justify our investment and evidence of government willing and encouragement.

I'm sorry if this is obvious. That's why we are keen to see an incentive to help customers bridge the gap between conventional systems and renewables. Increased demand will lead to reduced unit costs which will help establish a sustainable market. It would be foolish to express certainty on the establishment of an incentive programme after our experience of the last two years, but I remain optimistic of some better news in the not too distant future. **Honest**!

Two minutes with . . .

Who are you?
Karlheinz Koeing , UK export manager, **Solarfocus**.

What do you do?
We are an Austrian manufacturer of wood-fuelled boilers and solar thermal systems.

Where are you?
We have our headquarters in Steyr; but with our distribution and service partners we are able to provide a nationwide service network all over the UK.

How's business at the moment?
The UK is an emerging market for wood-fuelled heating solutions – as more end customers learn more about the different renewable technologies available to them, and with the increasing cost of fossil fuels – our business is increasing.

How could it be better?
The delay in UK government policies is causing uncertainty and delay in the market, as the end customer cannot be sure whether they should go ahead and install systems without confirmation of scheme details.

Who do you admire in renewables?
I really admire our director Johann Kalkgruber – he set up and shaped the company from the start and has a wealth of knowledge and enthusiasm for teaching others about renewables.

What's the best business advice you have received?
"Every day's a school day" – we are always learning and listening to our installers and customers to make our products even better.

How are you going green?
One of our company philosophies is "Conscious Sustainability – shaping the future with products that serve mankind and protect the environment." We are always working to make our products more efficient. Personally, I just installed a biomass boiler at my new home.

Q&A

PIPPA WIBBERLEY

Glow-worm

REI: What have you got planned for the rest of 2013?
Our focus for this year is to help installers move into renewables. We plan to launch a new programme called Renewability which will support installers with discounted and free training, business development tools and rewards through our Club Energy loyalty programme. We also have a heavy focus on developing our range of intelligent controls.

REI: What do you see as the growth areas in renewables?
Although the domestic RHI has been delayed again, the recovery of the new build housing market and social housing funding means we are likely to see an increase in demand for solar thermal. The challenge to the industry now will be promoting the genuine return on investment of solar thermal in the long-term, without relying on short-term financial incentives to attract interest.

REI: How is your company cutting its carbon footprint?
We have an environmental mission statement (SEEDS) in place which aims to improve and track our environmental performance continuously. Central to this is a zero waste target by 2020; our focus is on increasing efficiency by eliminating solid and hazardous waste, process wastes and wastes in production operations.

Pipperley Wibberley is commercial director at Glow-worm

"For installers offering local maintenance and repair services for RWH systems, demand already exceeds supply." Steff Wright, UK Rainwater Harvesting Associaction P23

Talking Ten to the Dozen

Leading renewable experts reveal their opinions

Is Feed-in Tariff automatic degression of 3.5 per cent justified in July when module prices have reportedly risen?

Paul Nightingale, UK managing director, Enphase Energy

"It's unfortunate that module prices have risen recently as a result of anti-dumping legislation. However, if we were to call for a change in the Feed-in Tariff, it would mean a return to instability. At the end of the day, we have the stability we fought long and hard for."

Robert Goss, managing director, Conergy UK

"The FiT was designed to respond to the vagaries of the market, but only downward vagaries. We must remember though that without it, 85 per cent of Britons wouldn't support solar. Customers want independence from the grid and that is where solar's strength is."

Steve Griffiths, sales & marketing director, Tritec

"The FiT tariff could be index linked and so increase or decrease. The 3.5 per cent reduction is inevitable but why not also link technology price levels to the review process - this would keep the ROI consistent with the initial investment for the technology."

Brian Marsh, sales director for distribution, Solarcentury

"Rising prices will slow down the uptake of solar so future degressions will be delayed. We've had zero drops in the last three quarters, so in my opinion this is completely fair. Energy prices continue to rise and we are ever closer to grid parity so degression is a logical step."

Richard Waxman, chairman, Waxman Energy

"Clearly the government has set a rate of FiT degression based on their assumption that the price of PV would fall. The current situation (with EU tariffs) is quite different. With 80 per cent of imports being Chinese, it would be logical to put on hold any further reduction in FiT."

Ged Rowbottom, director, Solarlec

"No – it's unfair. Last year's FiT was too high but at least the industry was expanding, a bright spark in the gloomy economic climate. Now, with costs rising and a cut in the subsidy looming, the government have mismanaged the situation again."

Kim Mann, ceo, Krannich Solar

"The FiT degression mechanism has, despite its bad press, stabilised the UK PV industry. Module prices were never going to remain so low, even without additional tariffs, so the industry needs to look past the short term issue of purchase price and sell the long term ROI opportunity."

John Wade, technical director, A Shade Greener

"The 0-10kW automatic degression mechanism should be removed and the 3.5 per cent degradation cancelled. The 0-50kW range has fallen short of the stated capacity triggers. The effect of this pails into insignificance compared to that of the 47 per cent import duty that the EU are about to impose."

Liz MacFarlane, director, Zenex Solar

"The industry will be reeling from the proposed anti-dumping duty. There will be a shortage of modules and therefore an increase in price. The FiT degression should be re-considered to enable the market to adapt."

Sean Collier, business development manager, Access Renewables

"Automatic degression is just that…it's automatic. But additionally it's not linked to module prices. It's something which DECC should look at more closely when considering future degression as this latest cut is going to hurt the industry more than usual."

Talking point

Liz MacFarlane, Zenex Solar, struggles to choose the worst of the industry's ineptitudes

Must do better: Liz MacFarlane can't choose which is the worst of the industry's latest mishandlings

So who is the most unpopular in our eyes this month? There are three hot favourites, and I'd struggle to choose who I'd put in the village stocks. Bringing up the rear, we've got DECC and the government's general mishandling and ineptitude around the Green Deal. I've lost track…..surely we're still at 'soft launch' stage? And while we're on the subject of DECC, we mustn't forget the endless moving goalpost that is the RHI. In its favour we have the recent announcement of the RHPP increases. Let's hope this creates some positive movement in the sector.

In second place, let's take our hats off to ProSun whose allegations of Chinese Solar PV 'dumping' into Europe mean that between 115,600 and 242,000 jobs may be lost as a result of the ensuing import tax. Not to mention the international trade war likely to follow.

But in winning position this month, maybe because he's such an easy target, please all give a round of applause to Colin Dunne, who brought the very worst of Daily Mail journalism into our midst on 13 May. My colleagues on Twitter were in uproar as Dunne's article entitled *Don't Fall For The Solar Panel Flannel*, purported that his system which does give him some luke-warm hot water had been mis-sold because it hadn't reduced his electricity bill. Give me strength, my head is in my hands, I surrender.

Good on all of you who left your own responses on the Daily Mail website. *Spooner of Nottingham,* thanks so much for brightening my day with your comment *"Colin is clearly too bewildered to be allowed to manage his own money. He has apparently spent £5,000 and doesn't even know if he's bought electricity panels or hot water panels."*

And to *SunSmart Energy* for its insight *"If you had bought a TV but opened the box to find a radio would you a) contact the seller to ask them to give you what you had ordered? b) write in a national newspaper about how these 'TVs' were a complete waste of money because you could only get sound out of them but no picture."*

Boosting business

Steve Pester, BRE, says installers could be missing a trick when it comes to electricity-generating renewables

Report card: Steve Pester, BRE says there is an opportunity to be had for installers as part of an installation package

The Energy Saving Trust produced an interesting report last year: "Powering the Nation: Household electricity-using habits revealed". The report, based on a monitoring exercise, presented the electricity consumption of individual appliances within UK households, thus allowing an understanding of the make-up of electricity bills over the year, including the useful and the wasteful use of power.

One surprising aspect of the breakdown of usage is that the typical range of running costs of entertainment devices based in the living room reaches higher than the range of running costs for cooking and cooling costs from the kitchen: kitchen, cooking and cooling: £150-£185 p.a; living room, entertainment: £70 – £300 p.a.

The also report states: "Given that the average power bill for the average home in the study was approximately £530, we can see that standby power demand could account for 9-16 per cent of a household's power bill".

This leads me to wonder if installers of electricity-generating renewables could be missing a trick. As part of the installation package, could an audit of appliances, combined with a short survey of usage patterns, put together in a nicely presented report, help to inform householders on how they can reduce their overall demand, thus getting even better value from their PV or wind turbine installation? I'm sure the same could be done for heat technologies as well. It's a double-whammy – they commission an installer to come along and install a green technology and, as a result of their experience with the company, they save even more money than they expected. Net result: lots of brownie points and recommendations to friends for the installation company.

TECH TALKING

Anticipated output and stark reality

Heat pump trouble shooter **Bob Long** addresses the importance of responsible sales practices in the heat pump market

By the time your client has eventually decided to invest in a heat pump system, it is likely they have carried out a considerable amount of research.

If your client's decision is driven by minimal land availability and/or cost, they will likely favour an air source heat pump.

Your client could have been enthused by "Stop-press!" styled statements in brochures, and pamphlets, or possibly been targeted by an over-enthusiastic sales person, who states an impressive "COP 4.2" or "COP 3.8",while in the same sentence boasting output temperatures of +55°C and, in doing so, creates an unachievable expectation.

No matter which heat pump is chosen, or whoever the installer, the high COP figures stated in glossy brochures need a lot of living up to.

The heat pump manufacturer has, of course, every right to print the most attractive performance figures achievable, although the impressive results they claim are usually produced under ideal, stringently controlled test conditions.

Trying to achieve these performance figures in the field can be further compromised by less than text book conditions of the actual heating system.

There is, perhaps, far more sincerity in a manufacturer including output and efficiency data at substantially lower values, such as -2°C air temperature, and perhaps even 50°C output, meaning that clients will have no false expectations.

Under sub-zero conditions, don't be surprised if the efficiency is below COP 2:1 and that the rated output of the unit is no longer a boastful 14kW as advertised, but perhaps low as 8 or 9kW in reality.

It is the responsibility of us all to ensure that we retain our rightful place as providers of a good, sound, economical, renewable-energy heating solution.

Therefore, we need our customers to get exactly the result they anticipate, and not some over-stated, unachievable target.

Moving times

Lu Rahman, looks back at her five years on REI

After five years at the helm of the leading renewables publication, it's time to pass the mantel on to someone else. It's been a rewarding and enjoyable time working in this sector and in many ways, I'm sad to leave, especially as I have been involved with the magazine from its birth back in 2008. Fortunately, my new magazine isn't a million miles away in terms of subject matter so hopefully I'll be able to meet up with many of you again.

Of all the sectors I have worked in, this one stands out. Its drive, determination and forward-thinking puts it streets ahead of others and the potential for growth and profit is immense. The innovation within the sector, the pioneers and the technological advancements, not to mention the ever-changing legislative challenges with which the market has had to deal, have served to make my stint in REI engaging, stimulating and exciting.

Several moments stand out – meeting many of you at Ecobuild and learning about the ups and downs you face progressing your businesses in this fantastic market; the REI Business Strategy Conference at the British Museum and unfortunately, the Feed-in Tariff fiasco have all shaped my time on the magazine. It has been a privilege to be party to the insights you have into the sector and the knowledge you have kindly shared over the years.

Looking ahead to the remainder of the year and beyond, hopefully the latest RHPP announcement will provide a welcome boost to your business over the coming months and the RHI will be kick-started into action bringing a much-needed boost to profits. In the meantime, it's onwards and upwards with the Green Deal for many of you. Good luck and keep up the great work!

Domestic RHI – a scheme worth waiting for?

Reaction to the announcement by DECC of a delay in the timetable for the introduction of domestic Renewable Heat Incentive (RHI) has been greeted with widespread resignation, and even hostility by the industry. But, says **Simon Allan**, Plumb Center's renewables director, the picture is not entirely bleak

I won't pretend that the delay of the launch of domestic RHI until the spring of 2014 isn't a great disappointment. We, like many others in the industry, had been looking forward to the boost that we hope the scheme will give heat-generating technologies, in the same way that Feed-in Tariffs (FiTs) helped establish solar PV as a viable option in the UK market. It's also a key element in the government's strategy to supply 15 per cent of the UK's energy demand from renewable sources by 2020. This may sound distant, but it's only six years from the planned launch of RHI.

Let's not forget that this is a scheme that was announced in 2009. Following last year's consultation, an announcement on the detail of how it would work was expected around now. The launch itself was planned for the summer of 2013, enabling households to benefit from their home-generated heat next winter.

Despite this setback we do, however, welcome the news that government has set aside £250,000 for a voucher scheme to boost renewable training. The scheme will focus on SMEs, which is great for Plumb Center's core customer group, the local heating installer business. Training vouchers will be worth up to £500, or a maximum of 75 per cent of the cost of the training course, per person. This is a positive move from the government, and should encourage many installers who have not yet engaged with renewable heating technologies to add these complementary products and services to their customer portfolio.

While not compensating fully for the absence of an exciting RHI offer to householders, the extension of the Renewable Heat Premium Payment (RHPP) will continue to provide some support for the market in renewable technologies such as biomass, solar thermal and heat pumps, which will be especially useful for our off-grid customers. However, to date RHPP has not had a significant impact on the take-up of these technologies, and despite its extension, renewables will continue to be unaffordable or uneconomic for many people. It should also be remembered that RHPP monies have to be repaid from RHI income, when this arrives eventually.

Details of the RHI scheme – including whether it will cover social housing – are now expected to be unveiled this summer. The delay means there's still time for installers to add the skills they may lack in these technologies, equipping them to capitalise on the opportunities generated when the scheme is launched next year.

It is also to be hoped that good use is made by DECC of the added time before launch to tighten consumer protection, especially in such areas as mis-selling and installer qualifications. Intelligent promotion of RHI and the availability of in-depth, objective consumer advice are also needed to make sure consumers get a fair deal – and feel that they have done the right thing.

While any delay is frustrating, we hope the government learns the lessons from both the introduction of FITs and the Green Deal. A negative initial consumer reaction would be far more damaging to the industry in the long run than a few months' delay before launch.

Waiting game: Despite the delay to the RHI, Simon Allan, Plumb Center, highlights the positives to be gained once the scheme is up and running

Some may question the government's commitment to domestic renewables, but the £250,000 investment in training for 100 apprentices working in the renewables industry is a welcome boost for the future of the sector. With or without government incentives, renewables offer a vital option to many homeowners facing spiralling energy bills. And their contribution to meeting households' power and heating needs can only increase in years to come.

School of thought

An award-winning sustainable college has opted for **Remeha** biomass heating with positive results

Pentref Addysg @ Glynllifon or Education Village @ Gynllifon (PA@G), an £8 million eco-teaching centre at Glynllifon, Coleg Meirion-Dwyfor's land-based campus near Caernarfon, is scooping awards for its sustainable design and use of renewable energy technology. At the heart of the building, providing a warm and comfortable learning environment for the students, is a low carbon Remeha 120kW biomass boiler.

The new Learning Centre, which houses a range of land-based courses from animal care and equine studies to veterinary nursing and forestry and countryside management, represents the College's commitment to further developing the land-based facilities in the area, investing in the rural economy and moving towards creating the first truly 'green' campus in the country.

In addition to the Remeha 120kW biomass boiler, the BREEAM 'Excellent' building adds structured insulated panels, cedar cladding, a green roof, solar panels, photo-voltaic panels, a rainwater harvester system and a passive ventilation system to its green credentials.

When it comes to heating, biomass systems using woodchips or pellets are an increasingly popular low carbon alternative, typically giving carbon reductions of up to 90 per cent compared with fossil-fuel alternatives. The PA@G Learning Centre is set in the Glynllifon Estate amongst 500 acres of woodland. Coleg Meirion-Dwyfor manufactures woodchips from its own timber to fuel the Remeha biomass boiler and ensure sustainable, low carbon heating.

"Our aim throughout has been to create the most environmentally-friendly, sustainable building possible," commented Sam Faire, estates manager for buildings, operational and rojects at Grwp Llandrillo-Menai, the overseeing body for the three colleges of Llandrillo, Menia and Meirion-Dwyfor. "So it's a satisfying achievement to be able to use our own natural resources to fuel the heating system."

Certainly, for the college, using their own solid biomass for heating represents an economical, renewable solution, particularly at a time when fossil fuel prices are continuing to soar.

The college is in the process of installing a heat meter ahead of applying for accreditation from the Renewable Heat Incentive (RHI) scheme. "Once RHI payments kick in, we anticipate that payback times on the biomass boiler will fall even faster," added Faire.

A fossil fuel system is often specified alongside the biomass boiler to manage peak demands. At the PA@G Learning Centre, the Remeha biomass boiler is backed up by two low NOx Remeha Quinta Pro condensing boilers in a 'green' heating system that guarantees energy efficient heat delivery at all times.

With over 500 biomass heating systems installed in the UK to date, Remeha Commercial is well versed in all aspects of supplying biomass boilers, often in conjunction with its eco-friendly, low NOx, commercial gas boiler ranges, to deliver maximum efficiency, low carbon heating into schools and colleges, new and old.

Factors for consideration when choosing biomass

- Space: a biomass heating system is considerably larger in volume than an equivalently rated fossil-fuel plant. Ensure you have sufficient free space around the boiler for maintenance and cleaning
- Fuel supply: for maximum carbon savings, try to locate a local, sustainably-sourced fuel
- Fuel storage: above or below ground, within an existing building or in an external container. A well-designed system for delivering, storing and transferring solid biomass fuel is essential to ensure a smooth-running biomass heating system
- Operation and Maintenance: look for a manufacturer offering automated de-ashing and heat exchanger cleaning mechanisms to save time on the periodic removal of ash and cleaning of heat exchanger surfaces required. Features such as automatic error messaging, touchscreen control and remote monitoring via the internet will also make for easier operation. It should be recognised that even the most sophisticated biomass systems do require more looking after than oil or gas-fired systems
- RHI: accreditation is via Ofgem. Apply online. Applications can take up to six weeks to approve
- 1MWh biomass installations: under the RHI, this capacity and above will be required to report quarterly on the sustainability of their biomass feedstock

Walk this way: With a Rehema biomass boiler in place, PA@G eco-teaching centre near Caernarfon, is scooping awards for its sustainable design and use of renewable energy technology

All in the planning

TGC Renewables, an independent renewable energy project developer, has secured planning permission for a 4.8MW project in Devon

The 4.8MW project marks the start of the business's plans to develop up to 100MWs under the current 1.6 ROC initiative.

With solar panel costs potentially rising in the short term due to the uncertainties surrounding the European solar panel anti-dumping initiative, the requirement to develop efficient and high quality projects is key.

The 20,680 PV panels will be installed on a site comprising 12 hectares, near the village of Haberton, Totnes, Devon.

TGC Renewables has worked closely with the landlord and the local authorities do develop the site – through its dedicated in-house development team – including project management, legal, financial and electrical support

"Our pipeline of UK solar projects is a real indicator of the interest and demand from the rural and investor community for solar developments. With traditional assets not generating the returns of previous years, clean energy projects are increasingly attractive,' said Rob Denman, Director, TGC Renewables.

'Each project is different and like all of our projects this one created its own challenges. We had to work closely with the local county archaeologists to assese and mitigate any possible impact on any archaeological remains. By working with them we developed a solution that satisfied their concerns and enabled us to obtain planning'.

'By keeping all the required development skills inhouse we know all the details of every site so that TGC and our partners can plan and invest safely without unwanted surprises,' said Denman.

TGC Renewables has developed over 30MWs of solar power in operation or under construction, with plans to increase this total to over 100MWs during the next twelve months.

TGC Renewables has a 100% planning and financing success rate for its UK solar projects.

Money talks

Roof mounted solar PV offers companies huge benefits, but only if the funding is right, says **Lightsource Renewable Energy**

Lightsource Renewable Energy (Lightsource) recently announced the development of the UK's largest rooftop solar PV array. 20,000 solar panels were installed on the rooftop of Bentley Motor's factory in Crewe, with a combined capacity of 5 megawatts peak (MWp) across 3.45 hectares of roof space. That's enough capacity to produce up to 40 per cent of Bentley's energy requirements and reduce CO2 usage by over 2,500 tonnes per year.

The announcement comes after the company revealed at the end of last year that its first roof mounted array – a 1.7MW 7,000 panel installation for Promens Packing in North Suffolk – had generated over 1 gigawatt hours (GWh) of green electricity in its first year, saving over £50,000 on the company's energy bill.

These installations are examples of the potential the UK's rooftops have for harnessing the power of the sun. 10,000 square metres of roof space is enough to house solar panels that will generate 1 megawatt (MW) of power. The UK has around 2,000 roofs of 10,000 square meters or larger – in short, the potential is enormous.

What's more, when we look closely at that roof space, much of it lies above high-intensity energy users. From manufacturers trying to take control of their energy bills, to airports looking to offset a high carbon footprint, solar PV rooftop arrays offer significant benefits.

However, despite the clear and substantial benefits, there are challenges in seeing the potential of commercial solar PV realised. Unlike ground mounted solar PV, where the 25 year lease of a solar farm is protected by law, if the landlord under a rooftop array comes into financial difficulty, the legality is less well tested. So whilst ground mounted systems offer certainty of return on investment, the same cannot currently be guaranteed for all rooftop arrays.

Germany has successful managed this challenge, with a funding arrangement that underwrites investment in renewable technologies. Unless the UK government puts in place a similar system to underwrite losses, it will prove difficult to get to a bankable solution for roof mounted solar arrays.

So whilst projects such as Bentley Motors demonstrate the huge potential of the UK's commercial solar PV sector, it remains to be seen whether the financial guarantees will be in place to enable companies to exploit the opportunities.

Quids in: Whilst they can prove profitable, unless the UK government puts in place a system to underwrite losses, it will prove difficult to get to a bankable solution for roof mounted solar arrays, says Lightsource

Reaping the harvest

For any installer looking to add other environmental technologies to their portfolio of products and services, rainwater harvesting (RWH) is well worth a second look, explains **Steff Wright**, a director of the UK Rainwater Harvesting Association

Supply and demand: With pressure mounting on the UK's water supplies, there is plenty of scope for the rainwater harvesting sector to grow, says Steff Wright, director at the UK Rainwater Harvesting Association

The business opportunity

Modern systems are a straightforward environmental technology to install and maintain, and one which can be wholly relied upon to fulfil its specification promise.

Aimed at addressing the stresses on national water supplies, around 100,000 systems have been installed to-date in the UK, a figure dwarfed by the two million already operational in Germany. With similar pressures on water supplies in both countries, there is clearly ample scope for the UK market to grow, particularly as stresses on water supplies intensify under climate-change impacts and forecast population growth.

As always, a key requirement in a new and growing market is to develop national coverage of associated service infrastructure. This requires trained installers who can advise end-users, oversee the installation process, and provide ongoing maintenance services.

Getting it right

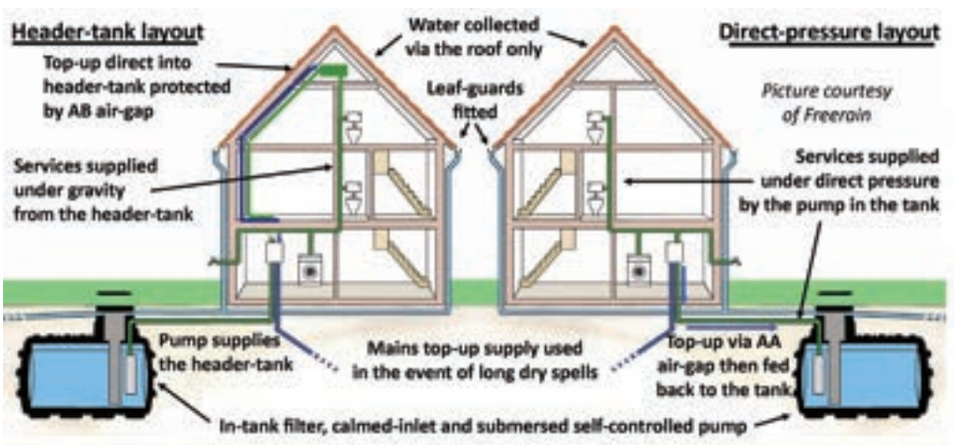
To assist development of this infrastructure, system manufacturers are currently offering low-cost one-day training workshops aimed at qualified tradesmen. The workshops are designed to cover the generic principles of the technology which are easy to grasp. Backed by manufacturers' comprehensive instructions, the workshops make all aspects of overseeing a RWH project straightforward.

The first and possibly foremost requirement on a new project is to establish a good dialogue with the system manufacturer; this makes sure that they fully understand the operational requirements of both the project and the end-user. Systems work on either "direct pressure" or "header-tank" principles (as illustrated), the implications of which need to be understood by all concerned before a system is ordered.

Having ordered the right goods, the installation itself then breaks down into two main phases of work, the first of which is likely to take place early in a build-programme. This involves the ground-works needed to install the tank between the roof drainage system and associated soak-aways or storm-drain connections.

The remainder of the installation takes place at the 1st and 2nd-fix stages of the project, and mainly involves the very straightforward plumbing tasks needed to install the distribution pipe-work and connect together the various components that make-up the whole working system. Only minor electrical works are then required to provide a power-supply and complete system electrical connections.

This basic sequence, involving three different trades whose work takes place at different build phases, needs to be well-integrated; team-working and overall project management are therefore important ingredients in every successful installation.



Grand designs: Systems work on either direct pressure or header-tank principles

Industry drivers

For installers offering local maintenance and repair services for RWH systems, demand already exceeds supply. Future market growth in the sector is also assured to address the fundamental issue of stresses on mains-water supplies.

These stresses feed through into Government policies and are reflected in Building Regulations and building standards such as the Code for Sustainable Homes and its commercial buildings equivalent, BREEAM. These place demands upon designers and developers to limit mains-water consumption on new projects.

Where these limits cannot be achieved by careful choice of fixtures, fitting and appliances, measures of much greater significance to end-users may be required.

As an alternative to an undersized bath, for example, substituting harvested rainwater for mains-water to feed non-potable services such as toilet-flushing, clothes washing and garden irrigation might be far more welcome to the consumer, making RWH both environmental and economic good sense.

Exercise plan

Viessmann's sales director for commercial and renewable products, **Nigel Jefferson**, outlines the top factors installers need to know when specifying biomass systems

Biomass has been by far the leading technology for applications under the commercial Renewable Heat Incentive (RHI). With hundreds more applications than the second most popular technology type, biomass remains the true success story of the scheme so far.

When the domestic RHI arrives, attentions are likely to turn to what renewable technologies can offer this new group of customers. Installers need to be prepared to correctly specify biomass systems if the products are to deliver the benefits manufacturers promise and the potential returns of the RHI tariff.

Upfront considerations

The very first thing to consider is whether a biomass system is suitable for the particular application. Is there available space at the property for the boiler and thermal store? Biomass boilers require a regular supply of wood chips or pellets, so there must also be room to house the fuel store. Biomass systems are also more maintenance intensive than other technologies (e.g. regular removal of ash), so the installer must assess whether the customer has the capability to carry out required maintenance tasks.

Regulatory requirements

There are a raft of regulations and directives which control how and where biomass derived fuels and conversion technologies can be used. These regulations must be understood before any biomass project is initiated.

One of the most crucial pieces of legislation to consider is the Clean Air act. Under this law, local authorities may declare the whole or part of their district to be a smoke control area. In such areas, it is an offence to emit smoke from a chimney, furnace or boiler. Local authorities may also have laws pertaining to the location or appearance of chimney systems so as to keep the aesthetics of the district consistent.

It is also imperative that the technology itself complies with regulations. Under the RHI, all boilers of 20 MW or less fitted in the UK must come with an 'RHI emissions certificate.' This demonstrates that the boiler can comply with necessary emissions limits (eg 30 g/GJ net for total particulate matter).

In spite of nearly all Viessmann's products meeting this requirement, currently only 10 percent of registered biomass boilers meet the new emission target.

Sizing the system

When sizing a biomass system, first consider whether the boiler is to take the full heating load of a property, or whether it will be part of a bivalent system with fossil fuel back up, or include solar thermal for hot water heating. Incorrectly calculating the load of the system will reduce the technologies' efficiency, increase maintenance and lead to a reduction in payments under the RHI.

Step by step: Viessmann's Nigel Jefferson, is aware of the opportunities within the biomass sector and outlines the steps an installer needs to know to maximise on this opportunity

The next step is to accurately calculate the heat load for the building and also its base load, as this will determine the size of thermal store required to support the boiler. Unlike some other manufacturers, we believe thermal stores should generally be installed alongside biomass boilers if the system is to work at its optimum efficiency, especially for larger output systems. Biomass products aren't designed to cycle, they run for long periods of time. Thermal stores enable longer running of the boiler by storing heat , in doing so, thermal stores improve efficiency and reduce maintenance requirements. The sizing of the heating circulating pumps is also paramount and installers should be using variable flow to enable a better balancing of the system.

Handing over

The commissioning and handover stage is especially important when installing a biomass system. The service requirements of biomass boilers are greater than gas boilers or other renewable options, so it's crucial the customer understands how to maintain the system. Biomass isn't fit and forget, the customer needs to be aware of what's ahead of them and where to get support should they need it.

The points in this article are an introduction to what installers need to know when specifying biomass systems. But when it comes to the wealth of information relating to biomass, the insights are just skimming the surface. At Viessmann, we offer in-depth training on biomass systems, to fully equip installers with the product and industry knowledge they need. Any installer considering working with biomass should consider taking up this opportunity.

Team talk

Solar PV and voltage optimisation are complementary technologies that can benefit from being installed alongside each other, resulting in a reduction on payback periods, improved return on investment and optimum energy efficiency for consumers. **Geoff Clifton,** business development manager at VO4HOME explains

Solar PV plays the important role of reducing demand for power from the grid by allowing homes and businesses to consume power that they produce themselves. This self-consumption, in combination with revenue from Feed-in Tariffs, can result in major savings on electricity bills. As such, solar PV installs are popular in the domestic sector, with homeowners keen to take full advantage of the benefits whilst contributing to a more sustainable future.

But to enable the electricity generated by the solar PV system to be fed back into the grid, the solar PV invertor will have to step the voltage up above the existing mains voltage. The problem this can have is that all the appliances within the home are now subjected to an even higher voltage than the original mains voltage.

Geoff Clifton, VO4HOME discusses the benefits of installing solar PV and voltage optimisation technologies alongside each other

For electrical dependant loads this can mean the consumption of more power due to the increased voltage being above and beyond what is needed to function correctly. To the consumer this means higher electricity bills, a reduction in the lifespan of expensive household appliances, and even a reduction in savings from their solar PV investment.

This is where voltage optimisation comes in. The technology works by eliminating electrical over-supply on incoming voltage to homes. The average current voltage supplied to residences by UK energy companies is 242V, while electrical equipment in the home is designed to operate on 220/230V, which leads to excessive losses in many types of electrical equipment. Optimising to 220V prevents users from having to pay for the excess energy through electricity bills.

By combining voltage optimisation technology with solar PV systems, installers can offer consumers an even greater reduction on payback periods, improved return on investment and optimum energy efficiency for the home.

What makes voltage optimisation a particularly smart choice in terms of complementary services is that it doesn't involve additional finance or extensive training; solar PV installers already have all the skills necessary for the installation procedure. In also offers a quick an easy way to boost the bottom line – installation takes less than an hour; it simply requires two wires in and two wires out to make it fully operational.

While installers can benefit from voltage optimisation in terms of adding an additional revenue stream to their existing service offering, customers also stand to gain as the technology delivers immediate and significant money and energy savings across the whole home without compromising quality of living. In addition, a voltage optimisation system will help protect domestic appliances and increase equipment efficiency. It also offers protection from electrical surges and reduces the frequency with which equipment needs to be replaced.

There is an environmental benefit, too. Voltage optimisation helps cut carbon emissions from electricity generation, which are currently around 1lb for every kilowatt hour consumed. By using less energy householders will directly reduce the amount of carbon emissions they produce, and can save around 330-500lbs of CO_2 emissions per year.

As energy users continue to look for cost effective solutions to rising energy costs, installers are ideally placed to take advantage of the enormous opportunities presented by voltage optimisation technology – opportunities that will benefit their customers and their pockets.

By combining voltage optimisation technology with solar PV systems, installers can offer consumers an even greater reduction on payback periods

Centre stage

Pippa Wibberley, commercial director Glow-worm, looks at the rise of solar thermal and its central role going forward, in the growth of renewables

Solar thermal – watch this roof space

It would be easy to consider solar thermal a technology under threat. Challenges such as lack of awareness, tangible return on investment and a fear of entering the unknown mean homeowners are still not buying into the benefits, but this is a technology that is coming into its own.

It is true that the absence of domestic Renewable Heat Incentive (RHI) for solar thermal has left it out in the cold, failing to compete against the financially attractive Feed-in Tariff (FiT) incentives offered by solar PV. It is also the case however that the initial stir caused by FiT is now flattening, and the impact it originally inspired is wearing off. And with talk of combining PV with solar thermal in one panel becoming a more likely prospect for the UK market, it could be that the problem of competition for roof space becomes non-existent.

Installers who learn about the longer-term cost savings of solar thermal, rather than just the general product benefits and installation, will set themselves apart

Although solar thermal hasn't exactly taken off, it will be central to renewables in the future, especially considering that the government intends to reduce greenhouse gases by 80 per cent by 2050. Such ambitious targets mean renewable technology in general will see more prominence in the market place, and with the recovery of the new build housing market and social housing funding, we are likely to see an increase in demand for solar thermal over the remainder of 2013 and into the future.

The challenge for the industry now will be promoting the genuine return on investment of solar thermal in the long-term, without relying on short-term financial incentives to attract interest. Installers therefore, would do well to keep abreast of developments within the sector and equip themselves with the right training and education needed to overcome consumer resistance to solar thermal.

Training courses for solar thermal and renewable technologies are becoming more readily available. Installers who learn about the longer-term cost savings of solar thermal, rather than just the general product benefits and installation, will set themselves apart from their competition as more consumers look for advice on how to reduce their carbon emissions, increase their energy efficiency and save on fuel bills.

And with fossil fuels continuing to deplete, solar thermal remains one of the most effective ways of future-proofing homes against the rising costs of running traditional heating and hot water systems. Advanced solar thermal systems are delivering between 50 and 60 per cent of a property's domestic hot water every year. In the summertime it can be as high as 100 per cent which means that the boiler may never have to fire up – significantly reducing a home's dependence on costly fuels.

Installers should also promote the additional benefits of programmable and intelligent controls when introducing solar thermal to a property. With a simple user interface and automatic heating selections, weather compensated controls provide a system which homeowners can easily understand and interact with – with minimal input from themselves. The intelligence of these controls can prove particularly beneficial when it comes to addressing concerns consumers may have around their lack of understanding about how solar thermal operates.

Glow-worm's Pipps Wibberley, says it would be good for installers to use the time before the RHI begins to educate themselves for the questions consumers may ask

All of this means that solar thermal has a very real place in the future of the ordinary home. Therefore, installers should address the current barriers and educate themselves on the long-term tangible benefits to the consumer, so that they are prepared for when the questions begin.

Solar thermal has a very real place in the future of the ordinary home

Duty Paid Panels Available

“Fortunately, thanks to Zenex’s experience working in markets where duty has already been introduced, we have developed a pro-active approach to business. This means you can be sure of an endless supply of panels. We stock panels so you don’t have to.”

Liz

Liz MacFarlane
Sales Director

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Bright light

Paul Hutchens, managing director of Midlands based Eco2Solar, explains stability is in sight for the solar sector as solar panels continue to offer significant returns on investment for UK businesses

The UK solar market has grown significantly in the last three years alone. So much so it has now become the sixth largest solar market in the world. The recent changes to the Feed-in-Tariff (FiT) system reflect solar energy's popularity and prove that solar is still an extremely viable source of power in the UK.

More and more businesses today are looking for that competitive edge and innovative, cost-effective solutions to reduce energy bills. That's why more and more organisations are turning to solar power to generate their own electricity, dramatically reduce their energy costs, whilst at the same time boosting their green energy credentials.

Although there is an initial capital expense when buying a solar panel system, the benefits speak for themselves. Overheads are reduced and importantly businesses no longer have to rely on an electricity supplier.

Crucially with the cost of solar panels coming down to almost half of what it was in 2010, it has never been more affordable or attractive for businesses and owners of non-domestic buildings to invest in solar PV. However to be viable, the solution must also offer a sound return on investment.

Whereas the cost of electricity will continue to increase and rise in the future, solar PV provides immediate savings on energy costs and protection from future rises.

Return on investment (ROI) relies on factors such as initial cost, grants, loans and incentives. What businesses should also bear in mind is the longevity of solar power systems. When these factors are built into an ROI calculator, current industry research shows businesses could receive a 10 per cent – 15 per cent return.

There are of course plenty of ways to minimise the initial capital outlay, for example with an interest loan which can offset capital costs with regular payments from the government's Feed-in Tariff (FiT) scheme.

Budgetary issues are always a concern when investing in new technologies or approaches, which is why it is important to consider all financial options available. For example, Carbon Trust low interest loans; available from Siemens Energy Efficient Financing.

Businesses installing solar PV can take advantage of the FIT scheme. This is not as generous as it once was – but system prices have reduced to ensure the return you get is just as good with a lower initial financial outlay – and businesses can still receive money for the solar electricity produced. It is important to be aware if government funding has been awarded to contribute towards or pay for the cost of a solar energy system, there is no access to the FIT scheme.

However, the government does allocate additional payments for excess solar electricity which is sent to the National Grid.

Furthermore, if the European Union's Emissions Trading System (EU ETS) affects your company, or you are part of the Carbon Reduction Commitment (CRC) energy efficiency scheme, solar power helps you meet energy saving targets.

Team players: Warwick Hospital installation - Chris Begg from Community Energy Warwickshire, Paul Hutchens, managing director, Eco2Solar and Siobhan Hill, energy manager, South Warwickshire NHS Foundation Trust

There is still much confusion amongst homeowners and businesses about the benefits of solar electricity and future of the market. There is a common misconception that solar is no longer a worthwhile investment. In fact with the on-going cost reductions in place, solar energy systems are showing better ROI and faster payback than ever.

The most likely cause of this is the government's well publicised mishandling of the FiT programme, which has caused confusion and led homeowners and businesses to believe that it is too late to get onboard.

The levels of governmental subsidies for commercial solar PV installations have decreased since the introduction of the FiT in April 2010 in line with falling costs – this was always meant to be the case. Furthermore, the Department of Energy & Climate Change (DECC) has brought long-term stability and predictability to the market by introducing a new system for the FiT that will no longer reduce the tariffs on a strict percentage basis as before, but instead adapt them more flexibly.

The future of solar PV for commercial businesses in the UK is bright and solar panels will continue to be as cost effective as they have ever been, and unquestionably cut reliance on electricity suppliers. It will continue to be a simple investment for businesses looking for a less expensive and greener energy source, and that is why we can be confident the market will continue to grow.

Micro management

Tom Edwards, photovoltaic technical sales for Solfex Energy Systems takes a look at micro-inverters within the UK market, demonstrating how adding micro-inverters to your product portfolio can increase sales

Until now the UK's PV market has been ruled by string inverters which have proved to be successful due to their simplicity and adaptability to suit a variety of modules and configurations. They are also cheap to purchase and reliable. But what about properties that have a restricted roof space with room for only a few modules, or properties with shadings issues? The answer is micro-inverters.

Micro-inverters have been in the UK for approximately 18 months and are firmly established within the US. The PV market has moved fast both in product developments and hardware price reductions coinciding with reductions in the Feed-in Tariff (FiT) so companies are looking for ways to distinguish themselves from their competition. One way is to offer something new - the micro-inverter. On a small scale this proved to be a success and has prompted other mainstream brands such as Power-One to release an offering to the market. Soon SMA will also join the race for share of this growing market.

The concept

A micro-inverter works on a panel by panel basis. One is required per module which in turn provides a single maximum power point tracking (MPPT) for each module in the array which has its own tracker. You are no longer governed by string inverters' V-start (start up voltage) or any potential shading issues affecting the string's performance. Homeowners with tight roof areas can now have a small number of modules installed or any shading issues will be negated.

The benefits

Micro-inverters only rely on the power from one module so have a much lower V-start compared with a string inverter. The V-start of a micro-inverter can be a low as 12v; the most common modules on the market generally supply 36v at peak performance so the modules would only have to provide a third of their potential power output to start the inverter to provide electricity in to the home.

Micro-inverters offer a longer warranty period (up to 20 years) due to electrolytic capacitor. A capacitor is commonly used to store the energy that is retrieved by the inverter. This is usually located on the PV bus, and has to be large enough to control the voltage ripple across the bus, this ripple would be determined to MPPT accuracy otherwise. Electrolytic capacitors are well suited to control the ripple because of their low equivalent series resistance (ESR) and high capacitance per volume.

Plug and play connection

When using micro-inverters, the design process is important, particularly the trunk cable length as this must run from the first to last module in the array in one piece only. The trunk cable comes in portrait or landscape; the difference will be with distance between each pre-wired connection where the micro-inverter simply plugs straight in too. Typically when two modules are installed in portrait side by side, the distance between each connection point needs to be approximately 1,025mm. In landscape it's more likely to be around 1,700mm. So remember to allow for any gaps between arrays.

As each module has its own MPPT you are able to monitor the performance of each individual module via a central device. For example, Enphase Energy's solution comes in the form of the Envoy communications gateway.

Installer's perspective

In2gr8ted Solutions introduced micro-inverters to its product portfolio as an alternative to the string inverter. Paul Caffery, managing director commented: "Following our research we believed that the micro-inverter had a number of key features that would benefit our potential customers. Firstly, the micro-inverter comes with a 20 year warranty which is fantastic compared to the five year warranty with most string inverters.

Line dance: Tom Edwards, Solfex Energy Systems, looks at the growing popularity of micro inverters

"The performance of the system should be higher. We anticipate an increase in yield in excess of 10 per cent of the estimated SAP calculation - this shouldn't be unrealistic. During recent case studies we found the micro-inverter system started generating before the string inverter each day and performed consistently better over the duration. When you consider that all wiring is done in AC throughout the premises with the only DC connections being done behind each panel, the micro-inverter is a considerably safer option for our domestic and commercial clients as there is no hazardous high voltage string cables being installed. Online monitoring is also a key feature of any new product as most potential customers have access to the internet and would like to watch their investment grow. 95 per cent of our installations are now micro-inverters."

There are clear benefits to installing micro-inverters. Although the initial outlay for a micro-inverter system is higher compared with string inverters, the ROI is higher, which is one of the key reasons why most homeowners invest in PV in the first instance. Micro-inverters mean properties not previously suited for PV can have a small number of panels and/or overcome the shading issues.

We will certainly see the micro-inverter become a mainstream choice.

Glowing report

Despite the somewhat low uptake for the market in recent years, affected by occasional negative press around the poor performance of air source heat pumps, there is still no denying that, when correctly sized and installed, air source heat pumps are a cost-effective method of heating a property, says Grant

Warm front: Under the Renewable Heat Premium Payment (RHPP) scheme the Hebridean Housing Partnership installed 77 Grant Aerona heat pumps across the Western Isles of Scotland

From Grant's perspective, the greatest hurdle has been the need for installers to carry out room by room heat loss calculations, based upon a correct design temperature for the location and ensuring the heat pump is correctly matched to the property's heating demand. This was born out by initial studies from the Energy Savings Trust, looking at the performance and overall running costs of early installations across the UK. The good news is there are now many free design tools available to help installers and now heat pump manufacturers like Grant have also focused their training courses on this topic to ensure units are correctly specified and installed.

Recent fluctuations in the price and supply of fossil fuels have meant that heat pumps offer both an environmentally and economically sustainable alternative. Despite the promised Renewable Heat Incentive (RHI) tariffs being delayed this technology is being chosen more often as a replacement for older inefficient systems and where a complete building upgrade is undertaken.

For Grant, the market is split into two distinct camps – the first being social housing contract work, which is probably the most buoyant sector at present generally requiring smaller output units, and the second being one off installations in off-gas areas, typically involving larger output models.

If we look at the social housing sector, the drivers for this are benefits like the domestic RHI, less annual maintenance, lower carbon emissions and when correctly sized and installed, reduced fuel bills. More financial investment is generally needed in the building structure (better insulation, double glazing, larger radiators/underfloor heating, etc) to enable a renewable technology like this to be installed, but for housing associations much of this work is already being undertaken in order to bring the properties up to speed with current legislation and comply with the Carbon Reduction Programme that they are governed by.

As an example, under the Renewable Heat Premium Payment (RHPP) scheme the Hebridean Housing Partnership installed 77 Grant Aerona heat pumps across the Western Isles of Scotland. Replacing existing solid fuel systems with the low carbon form of heating is literally transforming the life of tenants in this unique part of Scotland where fuel poverty is at its highest as 82 per cent of homes have no access to gas. Figures from January-May 2012 confirm that the total weekly fuel cost of a typical Western Isles property has been reduced by 38 per cent (from £42 to £26) along with a dramatic cut in carbon emissions and system maintenance.

Grant first entered the heat pump market in 2010 with the Aerona range of single phase air to water heat pumps with outputs up to 13kW, as it was felt that the company needed to offer an ancillary renewable product that could be used alone or combined with fossil fuels to cater for homes wanting to improve energy efficiency. Featuring weather compensation, dual temperature controls and a 3kW immersion backup, the idea behind the range was to combine tried and tested technology with sophisticated control equipment to give customers the benefit of efficient and reliable heating with every unit.

The second area of growth is one-off rural properties, where complete refurbishment is taking place. As an off-gas specialist, Grant has experienced a demand for larger output air source heat pumps for use in such applications, either installed to meet the total requirements of the home, or to supplement an existing fossil-fuel appliance (bivalent system). Typically, houses in this sector require unit outputs between 15-20kW, even after building insulation has been improved.

Following the success of the standard Aerona models, and in response to ideas from the trade, the Aerona HE was developed and launched at Ecobuild in March 2013 and is available in five single phase outputs up to 21.5kW (tested to EN14511 at 7°C air/35°C water). This enlarged range will cater better for the demand in the off-gas sector. To achieve higher efficiencies the Aerona HE was designed with larger evaporator surface areas, increasing the amount of air flow through the unit. The models also use R410a refrigerant, which allows the heat pumps to operate at lower ambient temperatures.

Figure it out

Generation tariffs for non PV technologies

Technology	Band (kW)	Tariffs from 01 April 2013 (p/kWh)
Hydro	≤15	21.65
	>15-≤100	20.21
	>100-≤500	15.98
	>500-≤2000	12.48
	>2000-≤5000	3.23
Wind	≤1.5	21.65
	>1.5-≤15	21.65
	>15-≤100	21.65
	>100-≤500	18.04
	>500-≤1500	9.79
	>1500-≤5000	4.15

(Source: OFGEM)

Number of MCS registered installers per technology

Technology type	Cumulative number	Registered April 13
Solar PV	3495	36
Biomass	258	03
Air source heat pump	880	12
Ground source heat pump	741	11
Solar thermal	1151	07
Small Wind	138	02
Total	4134	82

Number of MCS registered installations per technology

Technology type	Cumulative number	Installed Apr13
Solar PV	423540	7457
Biomass	2520	70
Air source heat pump	13301	240
Ground source heat pump	4140	29
Solar thermal	4020	54
Small Wind	3925	11
Total	462684	8080

(Figures supplied by Gemserv)

Generation tariffs for Solar PV

Tariff band	FiT rate (p/kWh) from 1st July 2013
<4kW	14.90
>4-10kW	13.50
>10-50kW	12.57
>50-100kW	11.1
>100-150kW	11.1
>150-250kW	10.62
>250kW-5MW	6.85
Standalone	6.85
Export Tariff	4.64

Proposed tariff ranges for the domestic RHI

Technology	Proposed tariff rate (p/kWh)
ASHP	6.9-11.5
Biomass boilers	5.2-8.7
GSHP	12.5-17.3
Solar thermal	17.3

Domestic RHI is expected to be introduced in spring 2014 and will apply to all eligible installations installed since July 2009

Number of Green Deal assessments

Month	Assessments
January	74
February	1729
March	7491
April	9522
Total	18816

(Source: DECC)

Cost comparison of heating fuels

Fuel source	kWh provided per unit of fuel	Efficiency of system (%)	Units consumed by house (kWh)	Price per unit of fuel (£)	Units consumed per annum	Cost per annum
Heating oil (kerosene)	10 per litre	90	25300	0.60 per litre	2530 litres	£1,518
Wood pellets	4800 per tonne	94	24300	245 per tonne	5 tonnes	£1,225
Natural gas	1 per kWh	90	25300	0.048 per kWh	25300 kWh	£1,214
LPG	6.6 per litre	90	25300	0.48 per litre	3833 litres	£1,840
Electricity	1 per kWh	100	23000	0.146 per kWh	23000 kWh	£3,258
*Air source heat pump	1 per kWh	290	7931	0.146 per kWh	7931kWh	£1,158
*Ground source heat pump	1 per kWh	360	6389	0.146 per kWh	6389kWh	£933
Dual mode system 1						
Oil boiler (30% of heat load)	10 per litre	90	7590	0.60 per litre	759 litres	£455
*Air source heat pump (70% of heat load)	1 per kWh	290	5552	0.146 per kWh	5552 kWh	£811
Dual mode system 2						
Gas boiler (30% of heat load)	1 per kWh	90	7590	0.048 per kWh	7590 kWh	£364
*Air source heat pump (70% of heat load)	1 per kWh	290	5552	0.146 per kWh	5552 kWh	£811

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

RHI non-domestic rates

Tariff name	Eligible technology	Eligible sizes	Tariff rate (pence/kWh)	Tariff duration
Small biomass	Solid biomass: Municipal solid waste (inc CHP)	Less than 200 kWth	Tier 1: 8.6 Tier 2: 2.2	20
Medium biomass	Solid biomass: Municipal solid waste (inc CHP)	200 kWth and above, less than 100 kWth	Tier 1: 5.3 Tier 2: 2.2	20
Large biomass	Solid biomass: Municipal solid waste (inc CHP)	1000 kWth and above	1	20
Small ground source	Ground source heat pumps, water-source heat pumps, deep geothermal	Less than 100 kWth	4.8	20
Large ground source	Ground source heat pumps, water-source heat pumps, deep geothermal	100 kWth and above	3.5	20
Solar thermal	Solar thermal	Less than 200 kWth	9.2	20
Biomethane	Biomethane injection and biogas combustion, except from landfill	Biomethane all scales, biogas combustion less than 200 kWth	7.3	20

(Source: OFGEM)

Green Deal Cashback Scheme example rate

Energy Saving Measure	Cashback level
Loft insulation	£100
Cavity wall insulation	£250
Solid wall insulation	£650
Draught proofing	£50
Heating controls	£70
Condensing oil boiler	£310
Condensing gas boiler	£270
Double/triple glazing	£20 per m² (up to £320)

A full list and further details can be found online at: http://bit.ly/RKmr50

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HEAT PUMPS

What: Dumbarton pub replaces immersion heater with heat pump technology

How: Ariston NUOS FS 200 heat pump water heater

Result: 65 per cent reduction in electricity consumption

An Ariston NUOS FS 200 heat pump water heater has been installed to cater for the hot water demands of The Glencairn pub and restaurant in Dumbarton, Scotland, following a consultation between its owners and local plumbing and heating company Alternagas Ltd.

The decision to fit the NUOS arose after Alternagas Ltd's director, John Lavery, set up an energy monitor on the venue's old immersion heater in November 2012, following concerns from the pub's owners about water heating costs. He was dismayed to discover that, on average, 38kWh per day was being consumed to heat the hot water.

The NUOS was installed in January 2013 and fitted with an energy monitor. John added: "The average reading is now down to 13kWh a day on the AUTO setting, so there are even better savings to be made when the air temperature goes up and the GREEN mode is activated. These savings, in addition to solving the water delivery issues and legionella compliance, have made the NUOS a first class answer to the water heating problem."

Plus, as the NUOS is installed in the cellar area, the pub's owners have also reported cooler beers and the need for less refrigeration, as the exhaust air from the product is helping to keep the room temperature at the level required.

With a CoP of 2.8, the NUOS is designed to raise the water temperature to 55°C with just the heat pump (a back-up immersion is present to bring the temperature to 65°C) making it a solution for off gas properties or as a replacement for existing electric only cylinders.

Last orders: The owners of The Glencairn pub and restaurant in Dumbarton, Scotland, have not looked back since calling time on their immersion heater for an Ariston NUOS FS 200 heat pump water heater

SOLAR PV

What: Passing shade issue overcome on curved roof

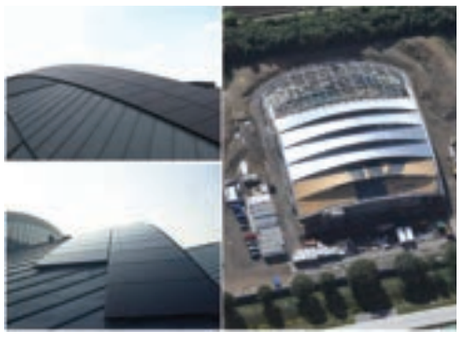
How: Solon SOLraise system designed by Ecolution

Result: Fully functioning 78.75kWp PV system on University of Cambridge Sports Centre

The roof of the recently-completed University of Cambridge Sports Centre posed every challenge for Ecolution's engineers. The team installed a 78.75kWp PV system on a multi-directional curving roof; therefore, each module has a different orientation and pitch. A Solon SOLraise system was designed using SolarEdge optimisers on every panel to ensure peak efficiency and achieve CO2 offset targets.

The roof falls in multiple directions, resulting in passing shade which would affect a conventional system's performance and yield. With SOLON SOLraise the SolarEdge optimiser is embedded into each module to achieve up to 25 per cent higher output through module level MPP tracking. The energy of each module is harvested individually; therefore, there is no need to maintain conformity between modules. The different orientations and tilts have no effect on the system's efficiency.

The Sports Centre's roof covering is a Rheinzink standing seam using S-5!-E clamps with two setscrews. The SOLON SOLraise black 230/02 modules are embedded with optimisers and SolarEdge inverters were used as they



University challenge: The curved roof of Cambridge University's new sports centre posed a design challenge for the Ecolution team

are specifically designed to work with power optimisers. SafeDC technology provides system safety during installation, maintenance and emergencies. A web-based monitoring system detects faults on all areas of the installation and provides an automatic message for precise fault recognition.

Paul Squire, Ecolution's designer on the project, said: "This was an extremely difficult design and accuracy has been essential throughout. Much time was spent in order to achieve the BREEAM Very Good standard."

My working week

Who: Suzanne Burgess, director, Solway Renewable Energy

What: Solway Renewable Energy is a family-run PV installation business based in Bowness-on-Solway, Cumbria

Quality street: Providing excellence in the field and a personal service are the mainstays of Cumbria-based Solway Renewable Energy, says director Suzanne Burgess

The good, the bad and the ugly side of business

Monday
Every day is a blur of talking to customers, wholesalers and manufacturers. Ordering supplies, haggling with wholesalers and the constant treadmill of trying to shave a few £'s off here and there to get the best possible price to customers.

Making sure we're adhering to new guidelines is very important, as is evaluating new products and wholesalers. Oh to have the luxury of a sales & marketing team, accounts department and logistics manager.

In addition to all of this, today I'm reviewing our marketing plan. My husband and I decided long ago that we wouldn't enter the race to the bottom on pricing. Quality and personal service are the mainstays of our business which has repaid us many times with referrals from our existing customers.

Tuesday
Disappointing news today, we've lost a job on a tricky roof that I'd spent many hours working on. It's important to understand where we are going wrong so I always contact customers like this to see how we can improve. It turns out that another installer has convinced the customer they can fit two extra panels on. They loved our knowledge and customer service but we were 0.5kWp out so we lost the job. I have mixed feelings; I'm infuriated by the time I spent working on the project, I built a real rapport with the customer. I'm frustrated that others blatantly disregard basic standards but have the consolation that the customers felt we'd provided a good service. I guess if you stick to quality and principles you'll lose out to others who don't hold them as dear.

Wednesday
Threw the new DTI Guide out of the window in sheer frustration. The new shading guidelines just don't make sense and I can't find anyone who thinks they do. Grrrr!

Today it's time for our quarterly directors' meeting which I always look forward to. Working on solar together 24/7 means we rarely get time to discuss anything unrelated to solar (doh!) and being forced to sit down and look at each other for half an hour is always an interesting situation. At our last MCS visit our inspector wasn't happy because we'd written our own Mission Statement – he told us to get one off the internet rather than use one with our values and ethos. Do we tick the box or stay true to our values?

Thursday
Had a great day today meeting with a countywide Green Deal group of which I'm a member, followed by a local business networking group. Micro businesses can become quite isolated, especially in rural areas so it's important to meet up with other local businesses and exchange ideas and often business. It seems that times are particularly tough in our area this year.

Friday
Today I've got on top of the accounts again. It's my least favourite part of the job. Don't get me wrong, I love working with figures, but the monotonous checking of invoices and statements drives me mad!

Great way to end the week – a third order from one of our customers. I say it's the end of the week but in-line with many other SMEs, we'll work over the weekend to make sure our customers are happy and we're prepared for the following week.

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