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See page 34

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Editor's comment

Knowledge is key

Listening to discussions at the Oil & Renewable Energy Show, it's clear there are knowledge gaps when it comes to both the Renewable Heat Incentive (RHI) and the Green Deal. The show highlighted just how much work needs to be done to ensure we get the message across - not just to the consumer but to the industry at large as well.

Opportunities within the off-gas areas have much potential for the installer. Householders in these regions are struggling with high energy costs, supply issues in extreme weather conditions and in some cases, a lack of choice when it comes to a heating system that provides year-round comfort and affordability. These householders are perfect for renewable heat technologies and energy saving measures. And what better way to present those benefits then by explaining the additional bonus brought about by the RHI and the Green Deal?

Whilst we should be promoting the overall benefits of renewables and not be focussing solely on the financial plusses of tariffs and subsidies, these do of course help the installer sell the concept of a renewable technology to an undecided consumer. However, what has become clear is that there is confusion, lack of clarity and even scepticism as to how these schemes will pan out for the industry and what work needs to be done.

Now is the time to hone your kmowledge. Ensure that you are aware of the technologies and criteria of the RHI. If you are unsure or feel your expertise has not been met fairly under the scheme, have your say. The consultation ends on 7 December and there are a range of DECC roadshows through the UK to enable the industry to voice its opinion.

As for the Green Deal. It is complicated but hopefully, it will be worth it. Get to grips with the scheme – how it works, what it covers and most importantly, what you need to do, and you can pass this onto the consumer and take your place at the forefront of this very exciting industry.

Erich Sherer, assistant director of renewable energy corporate finance at BDO LLP, is now recruited to the speaking line up at REI's Business Strategy Conference p8

Green Deal cashback plan - industry reaction

Money talks: Early adopters of the Green Deal will receive up to £1,000 cashback

The government's announcement that early adopters of Green Deal will benefit from cash payments of up to £1,000 has received a muted response from some in the industry.

The scheme, which will be run on a first-come first-served basis, will see homeowners in England and Wales offered cash sums to participate in Green Deal once funding becomes available on 28 January 2013.

Designed to encourage uptake, the incentive has been branded as 'short-term' and 'piecemeal' by installers who would like to see the £125m set aside to fund the package used in a more sustainable way.

Garry Worthington, head of Green Deal at Climate Energy, led the criticisms by calling for a nationwide marketing campaign which, he says, is needed to prevent a sharp fall in uptake once the cash back offer ends: "We are concerned that it doesn't go far enough to encourage long-term participation in the scheme. We have real concerns that when this £125m is spent there will be a slump in take-up of Green Deal.

"Instead of this short-term solution we would like to see more money spent on a nationwide marketing campaign by DECC that will demonstrate the long-term financial benefits of participating in Green Deal," he said.

Rupert Higgins, md, The Green Electrician, added: "We naturally welcome initiatives that encourage the take up of renewable technologies amongst businesses or consumers. That said, the government continues to take a piecemeal approach when a more comprehensive and considered strategy is required if the UK is to meet its targets and take a leading role in the development and adoption of renewable technologies."

Please your plug

A nationwide social media campaign highlighting the benefits of solar power is set to kick off early next year. 'Please your plug' is being funded by solar manufacturers, distributors, installers and other supporting organisations to drive a boost in consumer and business confidence in solar.

With the help of Our Solar Future and CleanTech PR consultancy CCgroup, the industry aims to combat a perceived decline in interest in solar. Targeting residential owners, commercial owners and investors, the social media campaign will use high impact, entertaining and online video to drive consumers to a 'one stop shop' for information. Charlotte Webster, head of CleanTech, CCgroup, said: "It's been a hard year for solar, but now it's time to turn things around. There's a time to complain and there's a time to get down to growing the market we have by drawing on the positives of this fantastic industry. Good communications will make the difference.

Plugging the gap: The 'Please your plug' campaign aims to drive 80,000 potential sales leads to supporter's websites by September 2013

"We're all quietly optimistic about this, but the success of the campaign is entirely dependent on support and funding from the industry. We aim to attract over 500,000 video views and more than 250,000 new visitors to the website by September 2013, driving 80,000 potential sales leads to supporter's websites."

Howard Johns, managing director of Southern Solar and chairman of Our Solar Future, added: "The industry needs to get moving again and we have bought together companies who are keen to do something about it. We really need a fresh take on communications for the industry to wake people up to the opportunity that still exists. As with Ecotricity's video which attracted over 1 million views in weeks, we are hoping our campaign will have similar reach. All that's needed is for 300 organisations to each contribute £500 to make a real difference to the future of the solar industry."

Survey shock on PV installations

Caplor Energy has announced the results of a recent survey carried out by Seaward Electronics which reveals some 'shocking' revelations regarding the installation of PV systems.

The survey listed the electrical tests which should be carried out on all PV installations and asked the respondents to confirm which ones they completed as part of the commissioning process. In order to comply with MCS requirements, which all installers subscribe to, the answers should have been 'yes' to each of the tests. However, the results ranged from just 49 per cent to 75 per cent suggesting that many PV systems installed around the country have not been adequately tested and therefore may not be safe.

Paul Hollingsworth, operations manager at Caplor Energy, said: "We are only too aware that there are companies out there who cut corners in order to gain a competitive edge. A company prepared to install a system without using scaffolding for example, is quite likely to not complete the relevant safety checks.

"At Caplor we pride ourselves on the quality of our installations and each completed system goes through a rigorous testing procedure. We take the safety of our customers extremely seriously and completely support the call for rogue installers to be ousted from the solar industry."

If you have any concerns about a PV system you have had installed, you should contact your supplier and ask for confirmation that the full electrical testing was carried out.

Training toolbox for installers

Services4Contractors has launched a web directory called Courses4Contractors which the company says will change the way in which installer training is bought and sold in the UK.

Courses4Contractors is designed to enable contractors to compare training and assessment providers in one easy-to-use website. Contractors have the option to register on the site for free and make use of several functions such as the 'Certificate Expiry Reminder' feature which will indicate when assessments are due and provide a list of assessments running in their area. Users can also leave feedback upon completion of their course to rate their experience, building up valuable information for industry colleagues.

User friendly: The Courses4Contractors website pledges to change the way in which installer training is bought and sold

From £250 per training centre for a first year's subscription, Services4Contractors says that clients will benefit from: Increased promotion of your training centre; new customers and increased sales; promotion of special offers; selling last minute places on courses to boost profit margins and displaying feedback from your satisfied customers.

The company also pledges to promote training centres and courses through social media; search engine optimisation; pay per click advertising; viral marketing; PR & advertising in industry publications and by offering a dedicated sales team

News in brief

Scottish-based solar thermal manufacturer Sustainable Technologies has signed a nationwide supply agreement with AVC Alternative Energy. The deal is an early success for the Highlands and Islands Bioenergy Region initiative that covers the area in which both firms are located.

GN Energy Solutions has acquired wood fuel specialist Forest Fuels as the company looks to strengthen its position in the biomass sector. GN Energy Solutions is also in the process of purchasing biomass installers GG Eco Solutions.

PV distributor Segen has added 245W and 250W Virtus modules from ReneSola to its product portfolio aimed at the UK market.

Yorkshire-based distributor Waxman Energy has signed a partnership agreement to stock PV products from Conergy. The Waxman Group specialises in supplying PV, biomass, air and ground source heat pumps and solar thermal to UK installers.

Large-scale solar specialist Wirsol Solar has relocated its UK HQ to West Sussex. Sascha Klos now heads up the UK arm of the German business and is joined by Jason Nicholls, former global communications director at Power-One.

Nathan Shaw has won SkillBuild 2012's Roof Slating and Tiling category for his roof display featuring Solarcentury C21e plain roof tiles. Skillbuild is the largest multi-trade competition in the UK for construction trainees and apprentices.

Heat pump manufacturer Danfoss has made new appointments to its technical and sales teams. Graham Vail has been appointed area sales manager for the South-East, whilst James Bailey joins as technical advisor and trainer. Vail and Bailey bring with them over 43 years of experience in the heating and renewable energy sector, which should enhance the services offered to installers and end users by Danfoss.

Events

Homebuilding & Renovating Show
2-4 November Northern Show, HIC Harrogate
17-18 November South West Show, Bath & West, Somerset
www.homebuildingshow.co.uk

Green Deal Interactive Series
8th November 2012 – Addagrip House, Uckfield
22nd November 2012 – Blakesley Hall, Birmingham
www.greendealinteractive.co.uk

Phex: Plumbing and Heating Exhibition
14-15 November Stamford Bridge, London
www.phexshow.co.uk/

A Profitable Future in Renewables
21 November British Museum, London
www.reiconferences.co.uk

Ecobuild 2013
5-7 March London Excel
www.ecobuild.co.uk

Solar Power: The way forward
28 November IET Birmingham: Austin Court
http://conferences.theiet.org/solar-power/index.cfm

The Eco Technology Show 2013
14-15 June The Brighton Centre
www.ecotechnologyshow.co.uk

Retro Expo
30 Oct – 01 Nov NEC, Birmingham
www.retro-expo.co.uk

Support for biomass and solar thermal installers now available

Zero Carbon Future is offering free system design and support for domestic and commercial installers of biomass boilers or solar thermal.

Zero Carbon Future, located in Exeter, Devon, supplies fully accredited MCS biomass boilers and solar thermal systems, including all ancillary parts and components (plate exchangers, heat meters, valves, controls, buffer tanks, flues and hot water cylinders), from its 2,500 sq ft warehouse. It will also be adding underfloor heating and PV to its product portfolio in 2013.

According to the company, support is one of the key philosophies behind Zero Carbon Future and installers can benefit from technical support from experts in the field. Queries can be answered by talking to an experienced trade team support advisor via webcam or over the telephone, or, if the preferred method is in person, a site visit can be arranged.

The company also offers short courses on its products at its training facility in Exeter, giving installers the opportunity to familiarise themselves with the technologies.

PV plant operators get fully covered

Eighteen months after its introduction, Winaico says an increasing number of PV system operators are turning to its insurance package for solar plant protection.

According to the company, following the purchase of Winaico PV modules, plant operators now receive free insurance protection for a period of two years. The insurance policy covers the complete PV system against almost all property damage, operational interruptions and any possible reduced yields for the first two years. The operator can also extend the insurance cover by an additional eight years.

"With over 2.000 registered insurance packages we are witnessing an extremely positive interim upshot after 18 months," said Winaico managing director, Sascha Roßmann. "Product quality and wide-ranging plant protection are the ideal combination for satisfied PV plant operators."

High voltage: Liberty Energy were big winners at the recent Renewables Roadshow Awards where managing director David Blount was presented with the Renewable Installer of the Year Award by host Gabby Logan

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Speaker line-up for REI conference grows

A *Profitable Future in Renewables* Business Strategy Conference, organised by REI is a few weeks away. With Erich Scherer, assistant director of renewable energy corporate finance at BDO LLP, now recruited to the speaking line up, there are more reasons than ever to attend and the event offers the quickest route to maximising the business potential offered by the Renewable Heat Incentive, for example. It takes place at the British Museum, London, on November 21.

Corporate finance expert Erich Scherer is the latest key speaker to be added to an already impressive conference line up covering all the issues currently facing installers, investors, manufacturers and other renewables professionals alike.

Other key speakers include DECC's Alastair Granger and former chair of the Solar Trade Association Howard Johns - who will show you how to drive your business forward and identify additional revenue streams in a rapidly changing market place.

Industry support for the event has been strong, highlighting its value as the only conference of its kind, aimed at providing information and business advice to the renewables industry.

DECC's proposals for the domestic RHI are already high on the agenda and Erich Scherer will provide delegates with a valuable insight into securing large-scale returns from the commercial RHI. As with the Feed-in Tariff, there is massive potential for aggregation in the heat market and your business could benefit.

"This is an exciting time for on-site renewable energy businesses," he said. "The Feed-in Tariff allowed the on-site generation market to develop for solar PV; with the arrival of the Renewable Heat Incentive the sector can grow beyond PV to the even bigger heat market. Funders are already switching their focus from financing PV projects to financing RHI projects. It's highly appropriate that the Business Strategy Conference focuses on these opportunities specifically from the point of view of on-site renewable installers."

The Business Strategy Conference focuses on opportunities specifically from the point of view of on-site renewable installers

Going places: The British Museum will play host the UK's only conference aimed at meeting the on-going business needs to grow the small-scale renewables market

The Green Deal is another topic hot on everyone's lips which will be analysed in-depth at *A Profitable Future in Renewables*. Steve Griffiths, Tritec Energy's sales and marketing director, said the eye-catching schedule of expert industry speakers and wide breadth of issues being scrutinised was the key factor in his decision to attend.

"For me and Tritec Energy, we're both enthusiastic and concerned about the part PV will play in the Green Deal," he said. "But furthermore, is the Green Deal the saviour of the renewables industry in this country?

"Either way, it's important to get a handle on how the Green Deal works, how we should approach it and ultimately, how we mould our business to meet any future demands."

Cathy Debenham, YouGen founder, added: "It's very easy to get bogged down in the day to day running of a business, and the immediate challenges of keeping the cash flowing; but if we are to succeed, we need to take time to look beyond the short term requirements of our own businesses, examine the big picture and plan strategically for the long term. I'm confident that the Business Strategy Conference will help me to do that. There are also some interesting keynote speakers, so I'm hoping to come away inspired and fully of ideas!"

Tickets for A Profitable Future in Renewables Business Strategy Conference cost £295. Numbers will be limited to allow genuine networking opportunities at this prestigious venue in central London.

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These key industry names are going to be there, are you?

"Riomay is thrilled to be involved with the REI Conference. We have seen massive changes in our business, the market and legislation over the last couple of years and know the importance of events like this in helping the industry robustly survive both economic and organisational challenges.

After 35 years in the renewable industry we have weathered many storms and understand the nuances of parliamentary legislation and what that means from a business perspective, for the domestic market and larger scale commercial projects. The REI Conference offers us a great opportunity to share this knowledge."

Tony Book, Riomay

"This is a critical time for the future of the renewable industry in the UK. Continuing policy uncertainty has spooked investors, and the general public is understandably confused. Yet one thing remains crystal clear: the industry has a vitally important role to play in delivering a secure, low-carbon energy future for the UK."

Jonathan Porritt, Forum for the Future

"I'm happy to speak at the conference because renewables are the future. I will be speaking on how the solar industry gets through the challenges that lie ahead."

Howard Johns, Southern Solar Ltd

"It's very easy to get bogged down in the day to day running of a business, and the immediate challenges of keeping the cash flowing; but if we are to succeed, we need to take time to look beyond the short term requirements of our own businesses, examine the big picture and plan strategically for the long term. I'm confident that the Business Strategy Conference will help me to do that. There are also some interesting keynote speakers, so I'm hoping to come away inspired and fully of ideas!"

Cathy Debenham, founder, YouGen

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Sowing the seeds of change

With a third of UK farmers planning to invest in renewable energy in the next two years, why is RHI uptake lagging so far behind its Feed-in Tariff counterpart? – asks **Paul Stephen**

New research from Barclays Bank shows that large numbers of farmers will be making the move in to renewables to mitigate rising energy bills whilst generating a valuable secondary income. Solar PV and wind power dominate in the popularity stakes, however, with only 15 per cent of respondents favouring biomass projects and merely two per cent wishing to invest in a ground source heat pump.

The NFU says it has actively been encouraging its members to diversify into renewable energy but that they currently face an uphill battle to apply for the heat incentive.

The statistics don't lie, with the total number of accredited RHI installations standing at just 20 in March and only 121 by the end of June.

And it's clear where the NFU lays the blame after the organisation's chief adviser for renewable energy, Jonathan Scurlock, hit out at DECC and scheme regulators Ofgem, for making the application process unnecessarily difficult.

"It is the level of awareness which tends to drive uptake and the RHI came out to a muted fanfare in November last year," said Scurlock.

"The majority of Feed-in Tariff applications are straightforward to rubber stamp. With the RHI that's not the case and I'm not sure if there's enough capacity at Ofgem. The processing time is killing it.

"The question to Ofgem has to be what are they doing to turn around applications faster? The system clearly is not working."

Installers and consultants alike seem to share these concerns that the RHI approvals process is an administrative nightmare. Uptake could certainly be improved if greater efforts are made to simplify application forms and procedures at Ofgem.

"From both public and private clients for whom we are working with, quite simply the process they are finding is arduous to complete. The Feed-in Tariff is very simple to administrate and is chalk and cheese compared to the RHI," said Bruce Boucher, Bruce Boucher Consulting.

Neil Schofield, head of external and governmental affairs at Worcester, Bosch Group, added: "Feedback from the industry is that Ofgem isn't making life easy for applicants. The length of the documentation itself bears a resemblance to *War & Peace*, which limits its appeal for potential applicants and is so risk averse, it is difficult for the installer to take advantage of what is on offer.

Ofgem isn't making life easy for applicants. The length of the documentation itself bears a resemblance to War & Peace

"I'd suggest that in order to allow the scheme to reach its full potential, the complex administration of the scheme needs to be cut to make it simpler for applicants to register their interest."

Andy Boroughs, managing director of Organic Energy, says that the success of the RHI for homeowners, and its planned launch next summer, could be placed in jeopardy if efforts are not made urgently to improve matters for non-domestic customers.

He said: "Unless more is done to promote the scheme and educate businesses, it is hard to envisage a significant increase in the uptake, especially if the application process is not improved. It is too early to predict uptake of the second phase of the RHI for domestic installations, but I hope lessons will be learned from the current issues which make it an easier process for homeowners to apply for the incentive."

Warning sign: Organic Energy's Andy Boroughs questions the future of the domestic RHI if significant issues are not resolved within the commercial scheme first

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DECC turns up the heat

The domestic RHI has taken a stop closer to becoming a reality following the publication of proposals by **The Department of Energy and Climate Change**

The government intends to support the installation of air (6.9-11.5p/kWh) and ground source heat pumps (12.5-17.3p/kWh), biomass boilers (5.2-8.7p/kWh) and solar thermal panels (17.3p/kWh) and pay the tariff to homeowners based on anticipated levels of heat generation over a seven year period.

DECC states that it is 'fully committed' to a summer 2013 launch and will open the scheme to householders who have installed eligible technology since 15 July 2009. Installations need to have been installed by MCS certified installers and minimum energy efficiency standards will apply.

The closing date for the consultation is 7 December 2012 after which the scheme will take its final shape and begin its passage through parliament.

Industry bodies have widely welcomed the consultation as a further stride towards the launch of a domestic scheme which DECC says will provide the catalyst for 380,000 installations by 2020.

REA's head of policy Paul Thompson said: "We are delighted that the government has published these proposals on time and we are looking forward to engaging further with DECC on the details to make the RHI work."

Dave Sowden, chief executive of the Micropower Council, said: "Today is a real milestone for the microgeneration sector. These long awaited proposals have the potential to transform the renewable heating market and enable numerous properties to benefit from greener systems that are cheaper to run."

However, concerns remain with some over the generosity of proposed tariff levels with both the STA and Micropower Council calling for a rethink.

"We have some serious reservations regarding the proposed tariffs for biomass and solar thermal which are unlikely to provide the necessary boost," added Sowden. "There is an urgent need to take a close look at how these aspects can be improved."

STA ceo, Paul Barwell, said: "The tariff level proposed for solar thermal will concern many of our members, but following sustained lobbying from the STA, the door has been left open for flexibility on this support level. The STA will continue to press DECC to reflect the unique benefits of solar thermal in the final support level decision."

Installers and industry professionals have given the proposals a cautious acceptance with Dimplex Renewables business development director, Chris Davis, calling the consultation period 'a useful opportunity' but remaining sceptical on whether the numbers would appeal to homeowners.

"There are concerns that the proposed rates for ground source heat pumps and solar thermal are slightly lower than we had anticipated. We have looked at the figures in detail, and are unconvinced that the typical return on investment on these technologies will be enough to tempt households under pressure to invest in renewables," said Davis.

Tempting offer: Chris Davis, Dimplex Renewables, remains unconvinced that the tariff levels are high enough to tempt homeowners to join the domestic RHI

"There remain areas in the proposals where we feel adjustments are needed and we urge installers and other interested parties to visit the DECC website and make their views known."

Ben Halfpenny, a specialist lawyer in the Dickinson Dees energy team, added: "The scheme should not be seen as a quick win for those who are looking to profit from going green. The cost of the technologies which will be eligible to receive the payments varies considerably and those hoping to make a quick win by recovering the cost of purchase and installation within the seven year eligibility period will need to consider the figures carefully and factor in all potential variables."

Proposal tariff ranges for the domestic RHI

Technology	Proposed tariff rate (p/kWh)
Air source heat pumps	6.9-11.5
Biomass boilers	5.2-8.7
Ground source heat pumps	12.5-17.3
Solar thermal	17.3

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Trial and error?

Graham Hazell, Heat Pump Association consultant, examines heat pumps, the Energy Saving Trust trials and the Microgeneration Certification Scheme (MCS)

Heat pumps are one of those technologies that have almost mystic properties. How can you get more power out than you put in? Performance efficiency of >100 per cent - is that really possible? They are further complicated by the way performance (both efficiency and output) varies with both source and delivery (flow) temperatures, which is even more pronounced with air source heat pumps (ASHP) but still valid with ground source heat pumps (GSHP). Understanding these interdependent characteristics can appear harder than understanding the European debt crisis, but it really is much easier and the simple laws of physics apply!

Why does there appear to be such variations in viewpoint on performance?

Firstly there is the issue of determining the base criteria. Because the numerous factors involved in calculating efficiencies (source and supply temperatures, seasonal temperature variations) it is possible to arrive at a range of conclusions. True, it is common practice that manufacturers and suppliers often quote values at slightly unrealistic but favourable 'standard' conditions (eg. air on @7°C/ supply at 35°C to BS EN 14511) whilst those less enthusiastic with the technology pick very low figures and exaggerate the weaknesses, resulting in confusion. This has been heightened by the perception by many of the field trials organised by the Energy Savings Trust which seemed to show performance in-use vastly lower than industry claims. The non-industry press and those ideologically opposed to heat pumps had a field day, but seasoned professionals understood the reasons.

EST trials

As always, the 'devil is in the detail'. These trials had a number of limitations:

- they were conducted in existing properties (ie. not constructed to current standards)
- installed with existing systems not optimised for heat pumps
- did not incorporate controls designed to optimise heat pump performance
- the report itself highlights poor design, installation deficiencies and user inexperience/lack of understanding/training as being the main reasons why they fell short of performance expectations.
- even exactly the same units gave vastly different results depending on what systems they were connected to and how they were installed/operated!

  At the time of the installations there was little guidance as to good practice for design and installation.

Need for quality standards

A clear need to set down quality standards for both the design and installation of heat pump systems has been highlighted and was supported industry-wide, spearheaded by trade associations such as the Heat Pump Association. They have long advocated moving from a 'gold rush' attitude to a more orderly and structured approach with appropriate guidance..

The Microgeneration Certification Scheme (MCS), with its associated product testing and assurance element, for the first time would lay down quality standards and provide certification for both products and installers (Microgeneration Installation Scheme - MIS). Months of development from a broad cross section of the industry has resulted in a scheme considered by many in Europe to be a blueprint for responsible mass deployment of heat pumps, particularly small to medium duty duties ie. domestic and small commercial. So what exactly does it do?

Continued on page 16

Present and correct: Graham Hazell, HPA, looks at the findings of the Energy Saving Trust trials finding several errors of limitations

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Equipment

- have certified performance at uniform standard conditions, enabling better comparison of products and selection of units according to the situation
- For the first time a minimum unit performance criteria are being introduced which will evolve into seasonal efficiency to link in with European renewable Energy directives once these standards are finalised.

Design guidelines are provided:

- 100 per cent heat output must be provided at design temperatures - to prevent under-sizing of units
- Minimum Design Temperatures are provided by CIBSE Table 2 to cover >99 per cent of the year, to prevent excessive use of back-up heaters.

Installation and procedural standards are laid down and general quality management regimes

Why should the client insist on an installation to MCS standards?

Unlike natural gas installations there is no legal requirement to be MCS registered or use MCS registered product or installers*. However there are two good reasons why it should be utilised, in particular MIS 3005 v 3.1a for heat pumps:

1. It makes it much more assured that the system will be designed and installed to meet clearly stated requirements and at least ensures the client is made aware of the design parameters or deviations from standard practice.

2. It ensures the system will benefit from any longer term funding from the government relating to the technology under the Renewable Heat Incentive as it becomes available but also allows granted support under the Renewable Heat Premium Payment (RHPP) scheme.

Why is there such different and polarised views on the benefits of heat pumps?

This has partly been covered above, in the difficulty of determining the unit efficiency over a season. Then there is the issue of what values do you take in terms of both cost and seasonal efficiency, and this is both for the heat pump technology and for the technology used as a comparison (necessary if payback is being considered). The table below attempts to summarise the range of inputs which can be compounded to make the situation much better or if the poorest values are used to make it appear much worse (oil is used as a comparison as it too has great variation in efficiency and cost).

Notes:

1. This should be the lower figure representing the marginal cost of the unit i.e. excludes standing charge because this will be charged just for having electricity which is normally required for lighting or small power;

2. These figures range from pre Quality Standard EST Trials, Current Good practice typical figures, DECC accepted figures for GSHP for RHI purposes, through to Best practice (e.g. RHPP Phase II results).

3. Figures range from old boilers to modern condensing boilers to Sedbuk standard 2009- hence if replacing/comparing with an old oil fired boiler the figure will be the lower of these!

Hence both sides of the argument can choose a scenario and set of base criteria which are favourable to their view. The outcome can be a very different set of performance figures from each other. Much depends on the particular circumstances of a project, for instance, is it new build or retrofit, if the latter is this refurbishment or replacement due to age, since with the latter some capital costs can be offset by the imminent need to replace with something on any case?

How do we know things have changed since the introduction of MCS Quality Standards after the EST trials?

The initial results from the RHPP installations are demonstrating that much higher average efficiencies for ASHP and GSHP are readily achievable compared to the EST trials. At these efficiencies heat pump technologies provide both carbon and running cost savings compared to direct-use fossil fuels and these are even more pronounced when compared to off-gas grid fuels such as LPG or oil.

Thus the real benefit of the EST trials was the highlighting of the need for quality standards for design and installation to ensure that the efficiencies of future installations would be vastly better experienced by the schemes. To use the results of a non-optimised historic trial as proof of performance for new installations would be a backward step.

What all of this demonstrates is the project specific factors that should be considered in the selection and analysis of systems and the need for implementation of robust quality standards going forward.

*Please Note MCS 020 Planning Standards covering noise related to Air Source Heat Pumps is a planning requirement to satisfy if Permitted Development rights are being sought but does not automatically mean acceptability

Range of input table

	Oil	GSHP	ASHP
Cost of fuel	5.5-6.3p/kWh)	12-14.5p /kWh(1)	12-14.5p/kWh(1)
Efficiency	70- 85%(3)	180-360%(2)	240-400%(2)
Install/refurb costs	0 - £5,000	£9,000-17,000	£6,000-12,000

Updating the industry

As you may be aware, one of our main priorities at MCS is to ensure that the technical standards are still relevant for each technology. Since the scheme's launch, there have been major updates to solar PV technologies for both products and installers. It was concluded that the current associated PV Installer Guide required extensive updating to reflect current products and installation techniques. In light of this, the MCS Solar PV Working Group has undertaken a major project to comprehensively update the DTI Guide for PV Installations, and to ensure the MIS 3002 Solar PV Installer Standard is aligned with the measures introduced in this document. Some of the requirements in the existing version of the standard will be included in the new Guide.
Some of the key updated areas are:

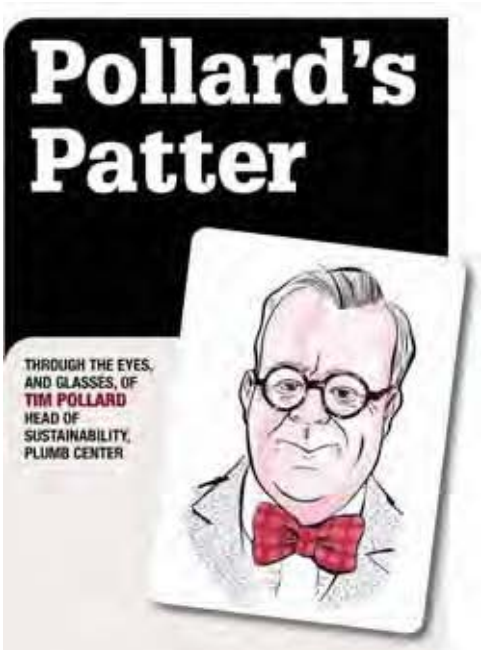
Performance calculations
An improved calculation has been developed which is based on irradiance data drawn from PVGIS and is also regional (as opposed to a single dataset for the whole UK). The method for accounting for any shade has also been updated and improved.

Dead load and wind uplift requirements
More guidance in relation to dead load and wind uplift requirements has been detailed and the necessary calculations installation companies will need to undertake. This includes the link back to the MCS 012 scheme document such that installation companies will need to ensure that from September 2013 (as currently detailed, but may be subject to change) they use mounting kits approved to the MCS 012. This standard also considers weather-tightness and fire spread.

Clarification on requirements for RCD's, Earthing and Bonding
Where appropriate, clarification is now given in the form of decision trees for installation companies to follow. It is intended that the decision process is now simpler and will lead to less confusion and better compliance.

The new PV Guide is in the final stages of development is going through its final proof checks before publication. Once published, we will inform all installation companies and there will be a period of implementation given to installers to comply with the new requirements. As this is a significant document update for installer companies to comply with, MCS will be organising a series of events around the UK to allow delegates the chance to hear further details about the update, and to ask questions to those involved in the writing of the new Guide. These events will be publicised shortly so please keep an eye on **www.microgenerationcertification.org** for further details.

MCS
The Certification Mark for Onsite Sustainable Energy Technologies



Well, no marks for guessing the subject of my column this month. At long last, we have the consultation document on the Renewable Heat Incentive (RHI) for the domestic market. The Department of Energy and Climate Change (DECC) issued the documents on 20 September and industry reaction has been broadly encouraging.

As ever, there are a few 'buts'! The pace of introduction is probably one of the biggest, with a launch date of 'summer 2013'. The published timeline (page 77) seems to suggest September as the key date. Is September summer?

What is apparent is that many of the proposals are there to stimulate comment and I would urge you to have your say. I understand that there will be a number of events around the UK to allow us all to participate in the process (we may well run one ourselves) but your official response must be submitted before 7 December. Equally important is the legacy arrangements for those who have already benefited from the Renewable Heat Premium Payments (RHPP) scheme to ensure that they still receive the RHI when it is introduced. I don't think that it would be unfair to say that the RHPP has not been wildly successful. But it may well become a key issue if we are to maintain a viable market until the RHI introduction, and if the government is to maintain the confidence of the industry and consumers.

Renewable ENERGY INSTALLER THE BUSINESS OF MICROGENERATION

Opinion

Two minutes with . . .

Who are you?
Finian Parrick, managing director at Zero Carbon Future

What do you do?
Zero Carbon Future supplies biomass boilers and solar thermal systems and as managing director for the company it is my responsibility to make sure we have everything in place to grow the business, satisfy demand and give a first-class service to our installer network. In a nutshell, I'm responsible for the overall strategy and vision and also take a keen interest in research and development. I guess you could call me an eco-geek!

Where are you?
Zero Carbon Future's premises are just off the M5, Exeter, Devon.

How's business at the moment?
Thankfully, business is really good at the moment. We launched the renewables warehouse a few months ago but have been really pleased with the interest from installers and it seems the word is spreading fast. We recruited Joanna Snell a couple of months ago as account manager who has really helped bring the business on a stage further.

How could it be better?
Without wanting to wish my life away, it would be good to have the first year of ZCF under my belt. Although sales are good right now, you just don't know what the future holds. So, I guess what I'm looking for is a crystal ball....

Who do you admire in renewables?
ETA Heiztechnik is our chosen biomass boiler supplier and I admire its dedication to research, development and product improvement.

What's the best business advice you have received?
Don't just plan for the here and now, make sure you have a long term vision for your business, and importantly, know how you are going to get there.

How are you going green?
I installed biomass boilers at our training facility and this is used to heat the warehouse too.

Integrating expertise

Steve Pester, BRE, discusses the latest solar PV related issues and news

BRE held the 3rd in its series of Building-Integrated Solar conferences in October: *BIPV3 - Separating Fact from Fiction. Building*-integrated PV is a small but rapidly expanding niche within the solar industry, which we at BRE passionately believe is the future for PV on buildings.

At the larger scale, eg office tower facades, installing Building-integrated PV (BIPV) requires a high level of skill and knowledge from installers, and many parties are involved, typically, client, architect, consultant, building engineer, BIPV manufacturer, installer, glazing contractor, electrical engineer, etc. However, simpler installations, such as small PV roof tile systems, can often be carried out by an MCS-approved electrical contractor and roofer team with minimal extra training.

Inspired designs

Some truly inspirational designs are now starting to pop up across the country. Our conference was in London, so London designs were prevalent: an amazing PV louver array planned for the Frances Crick Institute was one of many projects presented. This unusual design adjusts its angle to balance the requirements for daylight and solar gain control within the building, whilst at the same time generating electricity. The Heron Tower, London, which has one of the largest glass PV facades in Europe, is also a must-see for anyone with an interest in BIPV. Next time you pass through Kings Cross Station, or approach Black Friars Bridge, take a look up... the list is expanding rapidly.

You may think that this has little to do with the average installer (especially if you do not live in London), but some interesting points came up at the conference:

- BIPV installations, whilst eligible for Feed-in Tariffs (FiTs), are starting to be driven by national regulation (e.g. planning requirements coupled with building regulations), and this trend is set to continue.
- More retrofit BIPV solutions are starting to emerge, especially where glazing or façade or roof coverings need to be replaced, so the market is potentially larger than just new build.
- With the standard module retrofit market becoming so competitive, installers with BIPV capability may start to have an advantage over the next few years.

Cost is still perceived to be an issue, but many are still just looking at the price tag and FiT return, without appreciating the value of BIPV as a building material offering multi-functionality and aesthetic design options. Whilst the cost of BIPV will always be higher than for standard framed modules, it has fallen to some extent with the fall in silicon prices. What is needed now is solid, reliable, easily accessed information for the whole industry, along with high quality training. These are some of the aims of the National Solar Centre currently being set up by BRE.

Q&A

Dr Shawn Qu

Canadian Solar

REI: What have you got planned for the rest of the year?

SQ: We expect to gain further market share as we deliver reliable, high-performance PV solutions, and expand sales of our high efficiency ELPS modules in key solar markets. And we will expand our total solutions business. Canadian Solar will also continue to invest in R&D for promising technologies and in our sales and business partner network to create and support trustworthy, long-term relationships.

REI: What do you see as the growth areas in renewables?

SQ: In general terms we see storage technologies as being the next big growth area for the whole renewables industry. Canadian Solar has just started a program for testing such technologies in Japan for residential and small commercial PV systems.

REI: How is your company cutting its carbon footprint?

SQ: Canadian Solar is committed to reducing the global carbon footprint and supports this goal through its continued efforts to make clean solar energy affordable for everyone, offering cost-efficient, high-performing solutions for multiple market sectors. The company is also a supporter of initiatives which demonstrate strategies for an emission-free future.

Dr Shawn Qu is ceo of Canadian Solar

Weather warning

Manufacturer of wind turbine structures, **Hutchinson Engineering**, is reminding renewable energy firms to ensure their equipment can withstand the harsh weather forecasted this winter

Hutchinson Engineering is advising companies to ensure that wind turbine monopoles are designed and manufactured by a company experienced in structural analysis and fatigue monitoring. The warning comes after 15ft-long turbine blades flew off three structures during 112mph winds in Scotland last year.

With the gale season fast approaching, Ivan Brocklehurst, technical director of Hutchinson Engineering explained: "Our monopole towers are designed and built to robust specifications in accordance with current Eurocodes and relevant international standards, combining to form arguably the most stringent structural benchmark in the world relating to wind turbine support structures.

"We apply scientific principles to the design of all our wind turbine structures. This includes comprehensive 3D Finite Element Analysis (FEA) to allow detailed visualisation which indicates the distribution of any potential stresses and displacements under various loading conditions.

"FEA also allows entire designs to be constructed, refined, and optimised before the tower is manufactured."

Dean Drinkwater, managing director of Hutchinson Engineering, explained: "One of our clients, Nova Wind, tests the tower behaviour during simulation research in locations such as the freezing temperatures of Alaska and the high winds of the Scottish highlands. With this, we are able to evaluate intended function, strength capacities of each section, economics of operation, safety elements, and the life span of the tower.

"Environmental factors should be considered during the design process – but unfortunately this is not always the case in engineering. We are lucky to have a strong design team at our fingertips."

Hutchinson Engineering says it is the market leader in wind turbine support structures for 1kW to 50kW technologies – and the company has been operating for over 25 years. A patent has recently been awarded to the firm for its mast invention.

Forewarned and forearmed: Renewable firms need to ensure equipment can withstand harsh weather conditions

OUR SOLAR PV TILES PRODUCE 90 WATTS AND SOME IMPRESSIVE QUOTES.

"Weathertightness is not an issue, and completed roofs come with a 25-year Power Output Guarantee and Redland's 15-year Roof System Guarantee."
James Robinson, Senior Estimator, Steadfast Roofing

"We needed to satisfy the sustainable element of the Building Regulations and installing solar PV technology from Redland was the best way to do this. What impressed me most is how aesthetically pleasing the completed roofs are … from street level you hardly notice them."
Richard Lotherington, Director, Chase Green Developments

"With the strong wind and rain in Scotland, we recognised the importance of the fixings and installation process in ensuring the long-term security and weathertightness of our roof … incredibly easy to install and the whole job was completed within a week."
Steve Scott, MD, Forster Energy

"The Redland Solar PV Tile is a superb product which is quick and easy to install and integrates fantastically into the roof to leave it aesthetically one of the best photovoltaic systems on the market."
Nick Turnbull, Director of Eco Solutions, Kingsley Group

Fully integrated, our Solar PV tiles are easy on the eye, easy to install and are guaranteed weathertight with our 15-year Roof System Guarantee. They're compatible with eight of Redland's most popular tile ranges, including slate, profile and plain.
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Redland

Opinion

"A bivalent heat pump remains the only solution available for a weak single phase supply and, if sized carefully, can undoubtedly save carbon and cash " John Felgate, P28

Talking Ten to the Dozen

Leading renewable experts reveal their opinions

What would be top of your renewables Christmas wish list?

Susannah Wood, **Solarcentury**

"A resurgence in the consumer market for solar. The economics really stack up for solar, with recent research from ING showing that it's now the most attractive 'value added extra' for house hunters. As an industry, we really need to work together to get these positive messages out there."

Daniel Roca, **Panasonic**

"A wider understanding of the benefits of microgeneration, solar self-consumption and energy efficiency. For each home and business owner to understand their yearly energy consumption in kWh and view PV as a real chance to cut bills in half."

Adam Pearson, **NIBE**

"At NIBE, we're keen to see MCS accreditation introduced as a legal requirement for all installers working with heat pumps. This would help ensure all installations were carried out to the highest possible standards. It would also allow the technology to perform to its true potential, playing its important role in helping meet government targets."

Terry Doherty, **Absolute Solar and Wind**

"I would like the government to do something to bring back consumer confidence in the sector, as the constant chopping and changing of policy has been really unhelpful. I'd also like to see regulation tightened up to stamp out rogue traders, and much more clarity on the Green Deal please."

Martin Cotterell, **Sundog**

"Better promotion of PV and the Feed-in Tariff – bad press over the past year has taken its toll on some sectors although the rate of return is still very good. Also, better regulation of the industry - a few bad players and poor installations can inflict lasting damage to consumer confidence."

Chris Dale, **Danfoss Heat Pumps**

"This year on my wish list, I would like our customers to be able to enjoy the festivities with confidence that when they return to work, there will be certainty that the RHI will be launched in 2013 without any further delay, with confidence in the construction sector returning to enable housebuilding to return to pre-2008 levels."

Tim Bennett, **Hybrid Heating Systems**

"Clarity not claret! We install ASHPs to do the job of a boiler – simple! We spend nearly as much time advising the customer on the Renewable Heat Incentive as we do specifying a system. So, simple clarity for the homeowner and the installer so we can use renewable products to change the way we heat our homes."

Gary Cook, **Sungift Energy**

"Having spent the last year trying to convince the public why we all need renewable energy, whether you make a profit from it or not, my ideal present would not be from Santa but from the government. I would ask for carefully thought-out, robust and uncomplicated policies so the public can have confidence in our industry."

Phil McVan, **Myriad CEG Wind**

"I'm wishing for an end to the uncertainty from the public sector and government. DECC says wind is the way forward and wants it to deliver 30 per cent of our energy by 2050, while planners continue to turn down good projects. I want someone to lock down the rules and give us a fighting chance."

John Peters, **Engage Consulting**

"Storage on the electric grid is the best way to reliably add large amounts of intermittent renewable generation, such as wind and solar. So top on my list is high capacity storage that is affordable, compact and better than 80 per cent efficient."

Cheaper panels lead to price-driven buyers

Jason Hobbins, managing director of EnergyMyWay discusses the hazards of a solar price war

Since early 2011, solar PV panel prices have dropped by around 60 per cent and continue to fall. This may be good news for the industry as it means consumers can still achieve very healthy returns from the current Feed-in Tariff (FiT)rates. But this rapid and well-publicised price drop has also led to a deluge of marketing from installers promoting cheap panels. This price driven advertising is in turn leading to the emergence of a highly price-sensitive purchaser.

Jason Hobbins, managing director of EnergyMyWay explains why customers should be urged to think beyond the price when investing in solar PV: "On one hand, it's good news that we can offer our customers a lower-cost option for solar PV, but there are other factors such as quality of manufacture, reliability guarantees and installer credentials that should be a consideration when purchasing something that is going to be on their roof for at least 20 years. Taking time to establish what really matters to our customers and showing them the range of options available always leads to a more educated purchase and it's rarely the cheapest."

Hobbins expresses concerns with the solar industry entering a 'price war' and losing site of the genuine benefits of the technology. He explains: "There is a sense of frenzied competition amongst solar installers at the moment, which is doubtless a result of the panic caused by the sudden drop in demand with the tariff cuts. We must remember to look after the customer at the heart of our industry, it is our responsibility to give them best advice and long-term reassurance."

A marketplace based on price cuts is an uncomfortable place to run a business. Solar PV continues to be the most popular domestic renewable energy and the stability of the Feed-in Tariff should lead to the PV market settling down and selling on benefits other than simply price.

Positive push: Jason Hobbins, EnergyMyWay, says we should be urging customers to think beyond price when investing in solar PV

TECH TALKING

Something in the air

Tim Bennett, Hybrid Heating Systems, asks if air source heat pumps have now come of age

In a survey we commissioned, we discovered that 40 per cent of enquires for ground source heat pumps (GSHPs) were actually better suited for air source heat pumps (ASHPs).

The Seasonal Performance Factor (SPF) ratings for these two technologies have changed dramatically since the introduction of the inverter driven compressor mono block ASHPs; essentially, this allows the compressor speed to drop as the ambient temperature increases, resulting in higher efficiencies for moderate heating demands.

A GSHP will typically have a coefficient of performance (COP) of around 4.1 with the ambient temperature having little effect. At 7ºC, a fixed speed compressor ASHP could deliver just under 4.0 while an inverter product could be over 4.2. Think how many days we have in the UK where the temperature is above this, about 300!

These inverter products are ideal for regular sized dwellings and can be used in a bivalent installation with existing boilers and heating systems for retrofits, to ensure adequate heating on the most severe days. 70 per cent of our enquiries suit ASHPs used in this configuration, resulting in a viable return on investment, as there is generally only a need to partially upgrade and not replace the existing heating system. Mono block ASHPs are considered as 'plug and play' installations. It typically takes two-three days to mount the ASHP outside and connect up to the distribution system compared to a GSHP, where there are costly ground works and the need to accommodate an internal unit.

Taking that into account, the "better" GSHP efficiency may only equate to £300 pa saving on running costs so it could take 20 years to recover the additional investment!

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ubbink

Going for growth

Having announced a bold vision to become the world's number one green innovation company by 2018, **Paul Stephen** visited Panasonic UK's HQ in Bracknell to find out more

Panasonic might be a strong consumer brand name in the world of electronics, but it would admit that further progress is required if it is to lead the way in renewables.

Formed in Japan in 1918, the company launched its first heat pump model in 1973 before moving into the European market two years later. 2010 heralded the arrival of its Aquarea heat pump range to these shores but bringing matters firmly into the present, it now has a growing number of new products and innovations to promote to UK installers.

Paul Taylor, UK sales manager, is particularly proud of the new M Series of gas-powered heat pumps which he says can run off just 100W electricity supply.

"Panasonic is most excited about this product which is ideal for projects where power restrictions apply. It has been well received by our client companies," he said.

The company is also applying a strong focus on its Air to Water (A2W) heat pump range with a winter advertising campaign targeting the estimated two million UK homes in off-gas areas.

Fully MCS-accredited, the Aquarea T-Cap A2W range uses Panasonic's patented heat extraction technology to guarantee output down to an outside temperature of -15°C.

The Aquarea range promises to reduce a household's CO2 emissions by up to 50 per cent and slash electricity expenditure by a maximum of 78 per cent.

Crowning glory: Panasonic's head office in Bracknell is home to the company's PRO Academy for installers and now a 49.9kWp PV rooftop system

Being a PRO

Installers are invited to join Panasonic's PRO Club and experience these products at first hand at the company's PRO Academy based in Bracknell.

"Our PRO Academy reaches out to designers, consultants, engineers, installers and commissioners of heating and air conditioning systems," said David Livingstone, technical manager.

"Our PRO Club has 678 members but we are targeting 1000 by the end of the financial year," he added.

Benefits of membership include access to training at the PRO Academy and to a members' area of the company's website where installation manuals, promotional literature, software for controls and a loyalty programme can all be found. Points are given to installers who purchase products through the site which can be redeemed for prizes.

Popular training

"Our A2W training has proven to be very popular and over 100 companies have sent their staff here," added Livingstone. "Seventy eight per cent of the available training room seats have been used and Panasonic has trained 252 engineers. We predict another 5-600 will come through by March 2013."

Training sessions are free. The room has an interactive whiteboard for software training and working models of equipment are at head height to allow east inspection.

Installers must be recommended by at least one Panasonic distributor and an accredited installer to become a PRO Partner. Members are not tied to using Panasonic's products but will benefit from a point incentive scheme, website listing, sales and marketing support and the prospect of work filtering down.

Cutting own carbon footprint

Also known for its solar panel range, Panasonic has installed 208 of its own panels on the roof of its Bracknell head office to lower greenhouse gas emissions and showcase the products to clients and customers. The 49.9kWp system is expected to generate over £500,000 under the Feed-in Tariff over the next 25 years and will add to the energy efficiency of the building which has already seen all its traditional lighting replaced with LED bulbs.

Best of both

Hybrid systems have a strong case for inclusion in the RHI, argues **John Felgate**, head of UK technical, Stiebel Eltron

Hybrid (or bivalent systems) are those that provide heat, water or energy from both a renewable source and a traditional one. Such systems are ideal for remote properties where the rising cost of fossil fuels, particularly in off-gas areas, make an alternative source of energy attractive.

Yet heat loss in such properties is often too high for a single phase heat pump to be a good solution on its own, and the cost of installing three-phase supply can be prohibitive: thus systems which use a heat pump in combination with another energy source are often the only solution.

Heat pumps can be sized in one of three ways:

- The first option is as a stand-alone renewable technology. "Mono mode" where the refrigerant circuit is large enough to supply all the heating demands of a system using the compressor to extract environmental heat. This is the most energy and carbon efficient option, but requires a large heat pump.

- Alternatively "Mono-energetic" mode is a kind of hybrid solution in which the compressor is sized to provide energy up to a given percentage of demand (or supply heating until the outside temperature drops below a given threshold) at which point the heat pump's internal electric element will switch on to make up the shortfall.

- Finally, there is the "Dual mode" in which a heat pump is paired with a fossil fuel boiler, again switching over to the boiler at a given point when demand exceeds the supply of renewable energy available.

Debate about these latter two systems as regards their eligibility under the RHI and Green Deal has been ongoing for some years now. Whilst these systems are popular, they have been subject to some scrutiny. This was often due to the failure to manage customer expectations about the cost and carbon savings and consequent payback periods that these systems would offer.

However a bivalent heat pump remains the only solution available for a weak single phase supply and, if sized carefully, can undoubtedly save carbon and cash.

The reason I'm writing this piece now, is because bivalent systems will be permitted to receive the domestic RHI except in the case of biomass. These systems need to be metered, all products must be MCS accredited and there is a maximum output of 45kW

In my capacity as chairman of the Domestic Heat Pump Association, I have been working with DECC to find a way forward on the issue of how to meter a contribution made by a heat pump.

Firstly, the new MIS 3005 legislation has placed a requirement on installers to ensure that customers are properly briefed on the contribution of a heat pump in an installation in dual mode.

the way forward for metering hybrid systems has become clearer and I see no barrier to them now being included in incentive schemes

Green light: John Felgate, Stiebel Eltron, says the path is clear to include bivalent systems in the RHI following advances in heat metering and new legislation

The same legislation has laid down guidelines that state that where a heat pump is the sole source of heating it is always 100 percent sized for the property it is heating, preventing customers from being misled into assuming an installation is in mono mode, when it is in fact mono-energetic.

The clarity should help with industry and consumer confidence.

Secondly, with the publication in May of the outline strategy for Smart Metering (now in the consultation phase), the way forward for metering hybrid systems has become clearer and I see no barrier to them now being included in incentive schemes.

But the detail of the RHI agreement is still being set, and I feel it is critical that we now approach those of you at the sharp end of the market for your thoughts.

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SOLFEX energy systems

Service plan

When correctly specified, ground source heat pumps can be expected to perform efficiently for decades. However, like any heating system, the lifespan and efficiency of a heat pump system is improved when it is regularly serviced. **Nu-Heat** explains

For their own peace of mind, most customers want a service package that covers all parts of the system. Unfortunately, at the moment there are only a relatively small number of heating engineers available to provide servicing, and, as a result, some suppliers provide a service contract ensuring the customer's system is adequately maintained.

Although minimal maintenance is needed for heat pump systems, there is a requirement for more comprehensive checks during a system service. Servicing of renewable systems should always be performed by a fully trained and qualified renewable heating engineer in order to ensure the system continues to operate safely and efficiently and that any warranties remain active.

Typically, most heating systems require an annual service. Subject to the exact specification of the system installed, this should take between two and three hours.

The service of an air source heat pump and solar thermal system will include various checks dependant on the manufacturer's recommendations. However these will typically cover three main areas: safety, efficiency and warranties.

1. Safety

All components in a heating system that have any relevance to safety require checking. Typically, these components include:

- Heat pump: Refrigerant charge level
- Cylinder: Temperature pressure relief valve, high limit thermostats, inlet safety group, expansion vessel charge pressures, all discharge pipes are free from obstruction, etc.
- Heating system: Pressure relief valve, expansion vessel charge pressure, etc.
- Solar thermal: Pressure relief valve, expansion vessel charge pressure, antifreeze level, etc.

2. Efficiency

- Heat pump: All inlet and outlet grilles are free of debris, electrical components function correctly, service menus are set correctly, heat pump system temperatures are within correct range, any strainers are free of debris, etc.

Keeping up appearances: Although minimal maintenance is needed for heat pump systems, there is a requirement for more comprehensive checks during a system service, says Nu-Heat

- Cylinder: Blending valves are set correctly, pipe lagging is intact, etc.
- Heating system: Underfloor heating flow gauges set correctly, inhibitor in system at required level, system pressure at required level, etc.
- Solar thermal: Service menus set correctly, system flow rate set correctly, etc.
- Additionally it is important to make sure that the customer hasn't altered the controls – this can often happen with a heat pump system, as the customer is probably unfamiliar with the technology. The installer should have properly explained the controls and their settings as part of the formal handover, so, in theory control settings should not need to change.

3. Warranties

Manufacturers' warranties only remain valid if annual maintenance checks are carried out. Warranty duration depends on the manufacturer – for example, Hitachi offers a five-year warranty on its heat pumps.

The service book for the system components must be completed, and in some cases manufacturers require notification that a service has been carried out in order for the warranty to remain valid.

Inevitably there will be wear and tear on components, and in a heat pump system there are likely to be more components than in a traditional heating system; some of these will be covered under warranty.

4. Maintenance

Many manufacturers and suppliers are currently providing maintenance support to installers and end users while installers undertake the training required to service the systems they have installed. Nu-Heat has recently developed a new service contract for the company's Hitachi heat pump systems that will also cover underfloor heating and solar thermal where these are also supplied by Nu-Heat. This makes sure that system support and maintenance is immediately available to customers, providing complete peace of mind.

Potential energy

The government's Renewable Heat Incentive (RHI) has the ability to make the renewable energy sector take off – but skilled workers will be lost if it fails to deliver due to a lack of clarity, says **Rob Gardiner**, managing director of ground source heat pump (GSHP) specialist Econic, part of Myriad CEG

If it is delivered correctly, the RHI will provide fantastic opportunities for the sector. With proposals for the RHI phase 2 tariffs now in the public domain, there is less uncertainty surrounding the financial support scheme but as yet, still no definite time of launch announced.

An important part of that is fulfilling the pledge to allow homeowners to take advantage of payments next year – enabling GHSP to take its place alongside other renewables as a mainstream technology.

First and foremost, the RHI phase 1 and phase 2 are fantastic opportunities to boost the installation of ground source heat pumps.

They increase public awareness and enable it to become more mainstream technology for both domestic and commercial heating and cooling applications.

The RHI's introduction and proper utilisation will support development of businesses within the sector and provide the necessary financial support to ensure that such businesses are able to develop and improve structure and service to clients.

A number of manufacturers have geared up quite heavily to cater for the demand expected by the RHI

Deliver a robust and efficient RHI and the sector will really take off

The main concern is that if the RHI is not promoted correctly and is not user-friendly for designers, installers and the end-user, that this badly-needed support will not occur and a significant number of skilled people will be lost from this specialised industry. This is a real and present danger.

There is a real fear within the sector that if RHI support doesn't take hold this will happen and it would be massively damaging.

A number of manufacturers have geared up quite heavily to cater for the demand expected to be driven by RHI. However, the current Phase 1 RHI needs to be clarified in a number of areas.

The industry needs clarification on the approvals process - particularly the more bespoke schemes and those which involve cooling. It also needs a number of schemes to be fast-tracked through RHI phase 1 in order to bench-mark and test the principles and rules of the scheme.

The industry needs to understand just what is permitted and what is not and Ofgem and the Department of Energy and Climate Change need to start approving.

The industry needs rapid action – Phase 1 was already very overdue when it came into force. We cannot sustain further delay.

What we need is clarity and speed and a period of real stability. We also need to see commitment to making this work. Deliver a robust and efficient RHI and the sector will really take off.

Seeking clarity: Econic's managing director, Rob Gardiner, says it is vital the government ends uncertainty surrounding the RHI

Following lengthy discussions, air source heat pumps are also now being allowed under the RHI. While we recognise they have a place within the renewable industry, we have concerns that the performance of this technology, together with its ease of installation, may propagate the same short term boom as seen under Feed-in Tariffs.

If that was to happen, the result would be a legacy of both problematic and short-lived installations.

News: Nationwide system data collection

A measured approach

Renewable Solutions UK Ltd. announce details of its ambitious plans to collate what it believes will be the country's largest multi-technology live data collection exercise

Lee Stewart, Technical Director, outlines the Company's ambitious plan

When it comes to system performance, companies and end-users alike are reliant on generic generation examples provided by the likes of SAP. In addition, component manufacturers often use simulated or accelerated-tested data to support their products.

"The problem with 'standard' or 'generic' performance examples is that installers of high-end equipment like ourselves can be somewhat shortchanged", explains Lee Stewart, from the Company. "We know from our own client feedback that our PV installations are often outperforming SAP by over 10%. This is because of the level of design and software that we use pre-installation, and also reflects component quality. It is obviously frustrating to be viewed collectively with Companies who are not as particular about how an installation is designed or what components it comprises".

"We will be interested to see how geographical location effects both PV and Heat Pump Technologies, in respect of irradiance and climate, so the intention is to carry out data collection on regional and district levels".

The problem does not stop with PV. "Heat Pump technology has moved on dramatically in recent years, but SAP relies on averages that include bottom-end performing Heat Pumps that must barely scrape through as MCS approved products. A standard COP of 2.5 is applied, when we know that units like Mitsubishi's Ecodan will far outperform this".

"There seemed to us to be a general lack of factual data from live systems around the Country. Being National MCS installers of every technology range, we knew we were ideally placed to carry out our own data collection of systems of all types and sizes, and in all Geographic locations".

"Orsis, part of the world's largest data management company, are going to assist with data-capture requirements and we are in touch with Southampton University Science Department to assist in data analysis".

So why go to the expense of such an exercise? "It is true that it will be costly", says Lee, "but clients will sign to give us rights to all data and case-studies, allowing it to be sold by the Company to Manufacturers and third parties, and this will offset our up-front costs".

So how will it work? " The scheme will run for 12-months depending on the technology installed, and clients will have the opportunity to provide their own input. We are also keen to collate case studies on all technologies".

"We will be interested to see how geographical location effects both PV and Heat Pump Technologies, in respect of irradiance and climate, so the intention is to carry out data collection on regional and district levels".

"We should have the ability, if we choose, to go as far as comparing performance of two identical Air Source Heat Pumps with identical loads in the same Geographic location, but with one installed on a southerly elevation and one on a northerly elevation".

"Orsis, part of the world's largest data management company, are going to assist with data-capture requirements and we are in touch with Southampton University Science Department to assist in data analysis"

"We are not for one minute saying that our data can be used as a replacement for SAP and alike – that is not the point and it will not be offered as such. In an industry filled with assumptions and maybe's though, it is thoroughly worthwhile that there is factual evidence showing that installations and components can live up to expectation".

If you are a Manufacturer or other interested party and would like to register your interest in Data Collection, please contact the Company on 0845 224 7001

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Model answer?

German solar power producers have once again set a new record in solar energy production by pumping 14.7 TWh of electricity into the power grid during the first 6 months of 2012. That's 4.5 per cent of the total power production during that period. Can we get anywhere close to achieving this here in the UK? And if so, how, asks **James Woollard**, Evergreen PV

Earlier this year German solar power plants announced they produced a world record 22 gigawatts of electricity – equal to 20 nuclear power stations at full capacity – through the midday hours of a Friday and Saturday May weekend, which met nearly 50 per cent of the nation's midday electricity needs. That's right – half of Germany powered by electricity generated by solar plants!

Last year Germany decided to phase out nuclear power by 2022. Renewable energies are set to generate 30 per cent of the electricity by then, and 80 per cent by 2050.

Germany is pretty much singlehandedly proving that solar can be a major, reliable source of power – even in countries that aren't all that sunny!

And it's the result of two main factors: Fukushima and a Feed-in Tariff. The German government started to cut off nuclear power long before the Fukushima disaster happened in Japan, but the event did show how important it is to rely not only on 'classical' energy sources. So the country made a promise to shut down all of its nuclear plants, and replace them with clean sources.

Germany, similar to what we've done here, also instituted a Feed-in Tariff system, which requires utilities to buy solar power from producers, large and small, at a fixed rate. So basically anyone can buy solar panels, set them up, plug them into the grid, and in addition, get paid for it.

Germany is singlehandedly proving solar can be a major, reliable source of power

The German feed-in tariff does make electricity more expensive, as the cost of subsiding that higher fixed rate is absorbed by all electricity consumers. But to be fair, Germany doesn't really mind. In the wake of Fukushima, a poll showed that 71 per cent of the German public said they'd pay 20 Euros more per month for clean, non-nuclear power. Essentially, Germany, and its people have agreed that producing non-nuclear clean power is worth shelling out for.

The truth though, is that solar PV is actually both viable at scale and cheap. For example, Spain is installing large-scale capacity at a basic cost of $0.03/Kwh next year. Here in the UK, there has been some drop in demand for solar, as a result of our Feed-in Tariff cuts, but I believe that's more to do with a lack of consumer confidence. There have been a lot of mixed messages around solar, solar panels, and solar investments.

Powerhouse of engineering

Germany is a powerhouse of engineering, technical know-how and a willingness to invest in future technologies. Given the fact that in Bosch and Siemens Germany has two of the world's major power conversion specialist manufacturers, I think it eminently believable that Germany will achieve a very high proportion of its electricity generation needs from renewables.

Solar is relatively predictable and the next step is to develop energy storage. Energy storage will obviously add cost, but as is starting to be realised, solar is not expensive and is getting cheaper all the time. Add energy storage, and solar is not just an alternative, it is the best solution. And we can make it happen. We just need to want it more, but we've got to act now. Germany has chosen solar, because the people want it, and we need to be the same.

Copy cat: James Woollard, Evergreen PV, looks at the German model for PV and whther it is achievable in the UK

It is solar that is bringing prices down now in Germany due to merit order effect on peak prices and we can choose to do the same here, or not. We can choose to bring prices down or not. We can choose to bring down emissions or not. We can choose to move away from importing energy or not. We can choose to be controlled by energy companies or not. We can choose to replicate Germany.

It is not a debate about what is possible, it is a debate about what we want, and what world we want to leave our children.

The fact remains that Germany has achieved something remarkable here, and its experiment need not be anomalous. We should be striving to replicate its success – Germany has proven that solar power isn't just some daydream, but an engine that can power the world's most industrious and advanced nations.

Making a splash

Renewable energy installer **Source Renewable** has helped a North Devon company improve its environmental credentials further by having commercial solar PV arrays wfitted at both of its offices in Barnstaple and Braunton

Reed Chillcheater, which keeps its business green by manufacturing its products in the UK, designs and manufactures superthermal wetsuits. It was looking to not only reduce its carbon footprint and secure its future energy needs, but also lower its electricity costs and generate significant income from the Feed-in Tariff. So it contacted South Molton company Source Renewable to design two bespoke solar PV arrays.

The result is an 8.4 kWp system at its factory in Barnstaple, and a 9.6 kWp system at its headquarters in Braunton.

"It's always been important for me to move my business forward in a positive way," said Chris Reed, managing director of Chillcheater, "and the solar PV arrays are proof that it is possible to protect the environment while investing in the future of your business. They are already proving to be an excellent asset, generating renewable electricity, reducing my energy bills, and dramatically reducing Chillcheater's carbon emissions."

Chill factor: Chris Reed, managing director of Chillcheater - the company designs and manufactures superthermal wetsuits

Instant online monitoring

One of the most important aspects of Reed's systems are the EnaSolar inverters, which include wireless technology to instantly connect to his PC. This allows him to instantly monitor the up-to-the-minute performance of both of his systems, using a comprehensive statistics package. It also means that he can see if there are any issues with the system that need attending to by Source Renewable.

"I've been able to closely monitor the electricity we've generated," added Reed, "and even with the poor weather we've experienced this summer our systems have exceeded what we expected.

"Source Renewable did an exceptional job in installing my two commercial solar PV systems. In the past I have used trades people that did an 'acceptable' job, but Source were exceptional, doing everything they promised and more. Not only were their staff neat and tidy, but also they were timely, efficient and a pleasure to have around – it's not often you can say that about a contractor. The thing that most impressed me was there was no disruption in any way to my business when they were installing the systems, which meant that our operations could continue to run smoothly.

Reed added: "I was so impressed with the work that Source Renewable did on my business that I have also used them to fit a domestic system on my house."

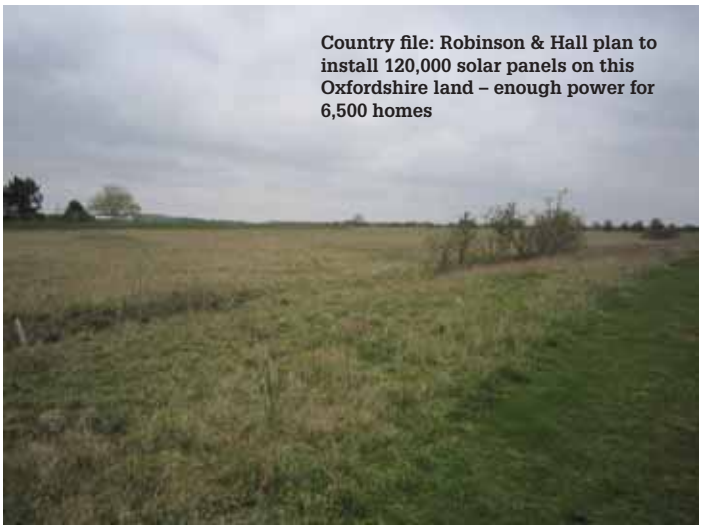
Key facts and figures

Solar PV array 1
Location: Barnstaple
System: 8.64kWp solar PV array
Cost of installation: £24,000
Annual income and savings: Annual Benefit of £2080.35 (in savings on electricity, FiT and Export Tariff)
Return on investment: 7.43% pa
Payback time: 13.45 years
Carbon offset: 4,212.62 kg
Specification: 36 x Sungrid 240 W panels, 3 x EnaSolar 3 kW inverters

Solar PV array 2
Location: Braunton
System: 9.6 kWp solar PV array
Cost of installation: £26,000
Annual income and savings: Annual Benefit of £1,966.82 (in savings on electricity, FiT and Export Tariff)
Return on investment: 7.11% pa
Payback time: 14.06 years
Carbon offset: 4,275 Kg
Specification: 40 x Sungrid 240 W panels, 3 x EnaSolar 3 kW inverters

Power plant

Robinson & Hall is a firm of chartered surveyors, auctioneers, planners and estate agents have achieved planning consent for what it says is the UK's largest solar farm



Country file: Robinson & Hall plan to install 120,000 solar panels on this Oxfordshire land – enough power for 6,500 homes

Robinson & Hall's renewable energy department, has recently achieved planning consent for what it believes will be the largest solar farm project in the UK. With over 120,000 solar PV panels covering 125 acres of disused land, the Oxfordshire-based solar farm will have an electricity generating capacity of 27MW, sufficient to power around 6,500 homes.

Working to a strict timetable, planning permission needed to be obtained by the end of June to allow time for the necessary investor agreements for the project to be secured. Permission was granted on 20 June 2012 and it is envisaged that the scheme will be commissioned in Spring 2013.

Andrew Barr, head of renewable energy at Robinson & Hall said: "We were thrilled to be involved in this exciting project which is making good use of otherwise derelict land with minimum visual impact on the countryside."

Barr continued: "The solar PV industry has seen a number of changes since the introduction of the Feed-in Tariff in 2010. Falling costs of solar panels means that good returns on investment are still very much achievable, both for small and larger scale projects."

Getting to grips with energy costs

Plumb Center's renewables director **Simon Allan**, takes stock of the consultation on proposals for RHI, in light of the latest figures on energy generation

Recent announcements by four of the 'big six' energy firms of inflation-busting increases in gas and electricity tariffs are no longer the surprise they used to be. But with approximately 5.5 million homes already classed 'fuel poor' (defined as spending at least ten per cent of income on heating and lighting) the issue of spiralling energy costs looms large for many. One of the results of this is that renewable and energy saving technologies are enjoying a surge of interest, as householders look to gain a degree of control over their spending on energy.

Despite the mixed reaction to the recent reduction in Feed-in Tariff rates, this is the pragmatic view that is gaining ground. Certainly it was the feeling of many I met at the recent Renewables Roadshow. There was also a great deal of interest from customers in our Green Deal Advisor course, with many believing that Green Deal could help them keep their customer base, or increase it.

The latest energy generation and consumption figures released by DECC make interesting reading in this regard. Even when the effect of this year's unusual weather patterns are stripped out, annual primary energy consumption in the UK rose by 0.8 per cent, despite domestic electricity and gas prices rising over the same period by an eye-watering 5.5 per cent and 13.0 per cent respectively in real terms.

It appears that continually rising prices are not resulting in a reduction in our energy usage. So what's to be done? Well, there is some positive news buried in the DECC figures. Renewables' share of electricity generation rose to 9.6 per cent of the total by mid-2012. This total though comprises wave and tidal, offshore and onshore wind, hydro and bioenergy, as well as a relatively small contribution from solar PV. The FiT-driven surge in popularity of PV installation over the last year resulted in an increase in generation from 0.05 TWh to 0.5 TWh. Though this growth is impressive, the current figure still pales in comparison with the 51.6 TWh of gas used to generate electricity in the second quarter of 2012. It's clear that there is still much long-term potential for PV generation, irrespective of levels of FiT subsidy rates.

Renewables' share of electricity generation rose to 9.6 per cent of the total by mid-2012

Which brings me on to the current government consultation on domestic Renewable Heat Initiative (RHI). DECC plans to publish its response to the consultation early in 2013, with the scheme itself launching in the summer. Given recent experience with government measures to promote the uptake of renewables, I hope they achieve that timetable, and in the meantime look at including micro-CHP in the scheme.

The aim of RHI is to promote the adoption by households of certain renewable heat technologies – currently ground and air source heat pumps, biomass boilers and solar thermal panels - by helping to create a level playing field with conventional sources of energy. With no 'heat grid' to export to, subsidy payments will be made on notional usage of heat for each household.

As with Feed-In Tariffs, these payments will diminish over time, as the popularity of the technologies grows, and fuel prices rise. Interestingly, there is a link to Green Deal in that Green Deal assessments will be used to set qualifying minimum energy efficiency requirements. Despite some misgivings about the way the scheme was executed, FiT has undoubtedly been a major factor driving the proliferation of solar PV panel on domestic rooftops. A similar boost to solar thermal and the other renewable heat technologies has to be good news for the industry.

Speak up: Simon Allan, Plumb Center says the industry should respond to the RHI consultation document

Climate change minister Greg Barker says he's interested in hearing your thoughts on the PRI proposals, so why not take him at his word? You have until December 7 to respond to the consultation, documents for which, along with DECC's detailed proposals, can be found on the DECC website (www.decc.gov.uk).

High energy prices look set to be with us for the long term. And, in the long term, regardless of government schemes, renewable technologies will help both households and businesses get a stronger grip on energy bills.

Hot lead

Forth Valley College has installed 360 Kingspan Renewables Thermomax solar thermal vacuum tubes at two of its newest campuses, Alloa and Stirling. The HP200 tubes were fitted to new builds at each campus to service students' hot water needs whilst also significantly cutting carbon emissions and heating costs

Designed with environmental responsibility firmly in mind, the new campuses have been awarded a BREEAM rating of 'Excellent'. Just one of a whole host of sustainable features integrated into the developments, the 36m^2 solar thermal install at each site caters for students' everyday use as well as courses with particular hot water demands, such as beauty therapy and hairdressing. The tubes are expected to contribute an annual 17.36MWh to each campus's hot water requirements with carbon savings of around 4,667kg.

When specifying for the project, FES Renewables was faced with the challenge of meeting both stringent new build energy efficiency regulations as well as the demanding hot water needs of the two large campuses. FES Renewables' technical support manager explained: "It was vital we found a cost-effective and reliable solution that met both these requirements. Our T*SOL energy performance calculations showed that Thermomax collectors were clearly the best choice – delivering the energy efficiency required to meet regulations matched with the high performance levels needed to fulfil up to 70 per cent of the campuses' hot water needs all-year-round."

Thermomax solar thermal vacuum tube collectors from Kingspan Renewables are specifically designed for use in Northern European climates – making them the ideal solution for the Scottish colleges. The vacuum inside each tube protects it from outside influences such as cold, wet and windy weather. This delivers an unrivalled transfer of solar energy into heat, making the tubes up to 50 per cent more efficient than traditional flat plate solar panel equivalents.

Cameron Holroyd, managing director at Kingspan Renewables, said: "The double installation at Forth Valley College is a great example of how our Thermomax collectors can be integrated into large-scale new build projects. Not only do they boost the sites' green credentials in line with building regulations, they also cut energy costs substantially and deliver dependable, optimum performance – whatever the weather outside. This is particularly important for projects like this, where large volumes of hot water are consistently needed."

The technical support manager added: "As leading solar thermal installers we are committed to specifying and fitting technologies that best meet the bespoke needs of each of our projects – providing the highest levels of service from start to finish. Now that Alloa and Stirling campuses have opened their doors to students, we look forward to seeing the Thermomax installations play an important part in a lower-cost, lower-carbon future for Forth Valley."

Positive power: Cameron Holroyd, Kingspan says Thermomax boost the sites' green credentials in line with Building Regulations

This double installation is a great example of how Thermomax collectors can be integrated into large-scale new-build projects

Hot property : Forth Valley College. Kingspan has installed 360 solar thermal vacuum tubes at two campuses

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A healthy return

Green Energy Solutions UK has provided Doncaster's new NHS health centre with two solar arrays

The Doncaster-based firm has installed a 1.29 kWp PV system and a solar thermal system that covers 9.69m2 of roof space on the landmark building in the heart of Doncaster town centre.

Standing five floors high at the corner of Trafford Way and St. Sepulchre Gate, the Flying Scotsman Centre rises above the traffic close to the interchange and railway station.

The centre was built through the Local Improvement Finance Trust (LIFT), and has been designed to be light and welcoming with strong green credentials. The centre opened last autumn, is open throughout the year, and provides high standard accommodation for Doncaster's health centre.

Marcus Payne, managing director of Green Energy Solutions, said: "We have provided the Flying Scotsman Centre with two sustainable energy systems that will generate the NHS an income through the government's generous feed in tariff.

"Another positive is that the centre's gas and electric bills will be significantly lower thanks to these renewable energy technologies.

"We were delighted to work on this prestigious project and we hope the centre proves to be a success for the residents of Doncaster."

Green light: Doncaster's Flying Scotsman NHS health centre now boasts PV and solar thermal systems

The long view

Anyone opting for biomass today should evaluate it as a 20 year investment and put quality first, says **Nigel Jefferson**, sales director for commercial and renewable products, Viessmann

Sending out the message that quality is important won't make the headlines. We all know it makes sense. However, in the process of weighing up capital outlay, payback periods and lifelong fuel and maintenance costs, compromises on product quality and efficiency are naturally made.

When it comes to biomass boilers and the commercial Renewable Heat Incentive (RHI), opting for the highest quality product is more important than ever. If end-users are to receive the tariff level guaranteed to them at the start of their agreement, the boiler needs to last the full 20 year-long contract. Moreover, to earn the highest possible amount for strictly metered energy production at the point of use, the boiler needs a superior efficiency rating. A 100 kW boiler operating just two or three percentage points down on efficiency requires 25p of additional fuel for one's hour loss but this equates to £400 to £500 over a year.

Customers should easily expect biomass boilers that are installed and maintained correctly to last 20 to 25 years. Yet many shop with only the next 12 months in mind. Cheaper, inferior products are only going to disappoint and cost more over the duration of the RHI contract.

Premium player: Nigel Jefferson looks at the investment and quality of biomass boilers

Boiler specification

There are various ways to assess quality. Efficiency ratings, technical features and the grade of materials are just some indicators of whether a price tag is justified. The quality of manufacture can be seen from material thickness (and therefore overall product weight) which correlates with longevity, as well as the standard of welding. Customers should always ask to see the product physically installed and working.

We recommend boilers with a pneumatic or self-cleaning function and a moving as opposed to a static grate. This helps to dispose of ash and other clinker (unburnt material). Blue gas recirculation will get better combustion. Viessmann's Pyrot, 90 per cent efficiency biomass range features a rotating combustion chamber and automatic cleaning of the heating surfaces.

A familiar mistake is oversizing the boiler, which greatly affects efficiency. Too big and the cycling of the boiler produces incomplete combustion, the amount of heat transfer is reduced and clinker (unburnt excess material) is created, which builds up rapidly.

Another common error is the undersizing of the essential thermal store. Biomass boilers can't be turned on and off; they need to complete the combustion cycle and lose the energy to achieve their optimum system efficiency.

Maintenance

Those used to conventional boilers can be naive to the amount of regular, manual maintenance required. With most maintenance on contract these days, there is often no one on site overseeing a regular maintenance regime. Even a boiler with pneumatic cleaning that has been run for 3,000 hours with no maintenance will fail and shut down due to the build-up of ash.

Ensure you buy from the boiler manufacturer, rather than a supplier and choose a known brand that can be trusted to provide service and spare parts for the next 20 years. Good service enables the longevity of the boiler.

Can a quality fuel supply be maintained for 20 years? The UK is not a huge consumer of wood and is somewhat at the mercy of fluctuations in quality from abroad and changes in supplier over the life of the boiler. Boilers should therefore be selected that are able to occasionally handle recycled and waste wood pellets, as these will inevitably work their way into the supply chain.

Centre of thinking

Firmer plans for the RHI are now in place. **Dr Geoff Hogan**, the Biomass Energy Centre says it's time to think about woodfuel

With Phase 1 of the Renewable Heat Incentive (RHI) now up and running, and Phase 2 set to bring in domestic installations when it launches in 2013, it is time for renewable heat to prepare for a step change in deployment, as we've seen with PV following the introduction of the Feed in Tariffs (FiTs). There is no doubt that under some circumstances a woodchip boiler replacing an oil boiler can achieve simple payback in a short time, even with no government incentive, but for the majority of situations this could not be achieved on a timescale that was sufficiently attractive to motivate widespread deployment. With the introduction of the RHI all this could change.

In the UK biomass is still regarded as an unusual heating option. In other countries however a wood pellet boiler is a mainstream and popular choice. Bulk pellets in the UK are already lower in price per kWh than mains gas, and woodchips cheaper still, but the significantly higher capital cost of a fully installed system is sufficient to deter many.

And when people look closer at biomass they often find that it can be a very attractive option. A wood pellet boiler with a separate bulk fuel store can be filled up by tanker once a year, offering the convenience of an oil boiler with modern levels of sophistication, if desired, such as remote monitoring and control by mobile phone. A separate pellet store and fuel feed adds to the cost of the system, but this can be avoided by choosing a boiler with a built in hopper.It will need to be refilled manually on a weekly or fortnightly basis by tipping in bags of pellets, conveniently packaged so they are not too heavy.

At the other extreme of both cost and manual intervention are the gasifying log boilers. They require manual loading with a batch of logs on a daily basis in cold weather, so will never have universal appeal. But for those who have their own supply of firewood and for whom loading the boiler can be incorporated into their daily work schedule this can be an attractive option. Even without incentives this can offer payback in a few years when compared with oil, but with the RHI available on many such products it can be financially attractive.

Woodchips tend not to be a suitable option for most small-scale and domestic users as the cost and space required for a fuel store and handling are not justified by the lower fuel cost, but for users with a significant heat load they are worth considering, and for those off the gas grid, especially with access to woodland and the possibility to self supply fuel, it can be very attractive.

There is no doubt such systems can work reliably, efficiently and economically, but this requires properly trained installers who really understand that a biomass boiler is not just another heat source. A biomass boiler needs to operate for prolonged periods of time, rather than in short bursts, if it is to deliver high efficiency and low emissions. It will deliver greatest efficiency at maximum output and is also typically unable to modulate below about 20 per cent output. This means that it is very important that the boiler is specified correctly and not oversized. When combined with an appropriately sized accumulator tank a biomass boiler can be of much lower rating than the gas or oil boiler which might have been chosen for the same building. This allows it to operate at maximum efficiency for the maximum amount of the time, even in warmer weather. The use of a suitable accumulator tank allows short duration peaks to be met without difficulty. Correctly designing and specifying a biomass heating system is not rocket science, but without good training there are a number of things that can be got wrong that will impact efficiency and usability.

Biomass already delivers reliable, cost effective heating throughout the UK. With support from the RHI and a well trained workforce it has the potential to deliver significant quantities of low carbon, renewable heat over the next few years.

Burning ambition: Biomass has great potential for reliable, cost-effective heating, says Dr Geoff Hogan

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Fresh thinking

Partner and specialist construction lawyer **Neel Mehta** from national law firm TLT, offers advice to installers working on wind farm projects

When working on wind farm projects, installers must know what is expected of them by the developers or face costly consequences. Developers of wind farms use a wide range of procurement contract structures to deliver the project, including multi-contracting and turnkey contracting. It is vital that installers understand the differences between these two structures as they can expose installers to different risks. The current market trend favours the turnkey approach. With these two contract structures in mind, there are five key areas installers should be aware of when appointed to wind farm projects.

Degree of responsibility

Under a multi-contracting structure there is no single point of responsibility. The developer will be responsible for managing a multitude of installers, who are required to accept responsibility for integrating their services. This structure requires the developer to put in place strong project management to ensure that the supply chain is aware of every role.

In contrast, under the turnkey contract structure, there is a single point of responsibility. The developer requires the installer to take on complete responsibility for design and construction of the works. This structure requires robust contractual terms to transfer complete responsibility to the installer, with the risk to installers potentially greater than under a multi-contracting structure.

Number of installers

Under the multi-contracting structure the developer engages with a number of installers who deliver different services. Although the developer is responsible for acts of these installers, frequently the developer attempts to transfer the risk of default of installers to the other installers. This could expose the individual installers to increased costs.

With a turnkey contract structure the developer engages with a single installer to carry out all works. The installer may be allowed to sub-let part of the work to others but will remain responsible for the acts and omissions of such subcontractors. This structure limits the risk to the developers but increases the risk for installers.

installers must know what is expected of them by the developers or face costly consequences

Liability caps

Under both structures installers should seek to cap their liability to a fixed sum, for example, capping the level of delay damages payable. The level of the cap will frequently be linked to the price of the works referred to in the relevant contract. This means that in multi-contracting structure, where the works have been fragmented in various packages, the level of the cap may be lower than in a turnkey structure.

Project scope

With multi-contracting there will be multiple scopes of works. The developer ensures that the scope of works under each contract is properly linked to avoid any gaps in responsibility. Installers should be aware that the developer could attempt to transfer the risk of omissions in the scope of works to installers, which could potentially increase the cost of delivery of the works for the installer.

Advice line: Neel Mehta, TLT, looks at the areas of consideration for installers when involved with wind farm projects

Installers need to ensure that their scope of works is properly defined so as to avoid any ambiguity.

Unlike the multi-contracting structure, there is a single scope of works. With a turnkey contract the risks of gaps in responsibility are limited.

Programming

There will be a separate works programme for each installer with a multi-contract structure. The developer will be responsible for ensuring that all individual programmes are aligned. The developer will attempt to transfer the programme risks to the supply chain with a view of minimising its costs but increasing the installer's costs for carrying out their works.

With turnkey contracting there is a single programme of works, which makes the installer responsible for maintaining the programme. The installer should ensure that the programme shows all items that are the responsibility of third parties.

Of course, there are other issues for installers to be aware of, including performance security, when working on wind farm projects or face costly consequences.

Safety net

Improve your business with insurance backed service contract, says industry expert, **Harry Wolkenfelt**, Solarif

An industry which formerly only went upwards, is now undergoing uncertain times. Reduced Feed-in Tariffs, loss of subsidies, price wars and several solar manufacturers going bankrupt: It is all leading to investors becoming risk averse and demanding more secureness in PV-projects. Investors require extremely high-quality product and performance over the long term in order to fund projects and plan for the future. Anything that reduces their risk will increase potential for funding.

Insurance is essential to develop new PV projects. Investors are looking for an insurance that transfers risks to a third party (the insurance underwriter) and lenders are looking to the project and it's revenue stream in comparison with the project debt. Making sure that PV projects are safeguarded against damages due to external causes, inherent defects and production loss will give bankers and investors peace of mind. It should also allow project developers to negotiate better credit terms, securing more future PV projects and adding to the solar industry's growth and employment.

Insurance backed service contract for customers

But not only investors and bankers need quality and certainty. Owners of private PV installations also are looking for ways to get the most out of their solar investment by maximising the revenues and increasing the lifespan of their panels through regular maintenance. But what they do not want is a load of work to accomplish that.

An increasing number of PV owners want all post-purchase worries to be taken off their minds. A PV installer can do this for them by offering a service contract. Adding solar PV insurance to that service contract will optimise it, enabling the installers to give their customers a complete service package with cleaning, maintenance, monitoring and insurance.

For customers this all-in-one package is ideal. It means one contact person, one invoice and less hustle. It also means that customers are offered double security. Firstly, they can be certain that the maintenance of their PV installation is done regularly and with care. Secondly, in the event of a damage, they are insured.

For PV installers there is also a great advantage. Offering an insurance backed service contract will give you the opportunity to build a lifelong relationship with your customers. Over the lifetime of the PV installation, equipment has to be maintained, cleaned and repaired. Securing service contracts has therefore become a highly lucrative source of on-going revenues. Establishing relationships with commercial PV system owners also provides the scope for system expansion or new project development in the future.

Safe and secure: Harry Wolkenfelt, Solarif, explains the importance of insurance for PV projects

Types of insurance

There are different types of risk-reducing insurance options for both commercial and home installations. For example:

- All risk insurance - compensates the costs of damage caused by external forces like fire, hail, storm, snow pressure, lightning, overvoltage, vandalism and theft.
- Production loss - compensating the loss of production if a panel is not producing electricity as a result of damage or theft.
- Insured warranty and inherent defect - Insurance of the product warranty for solar panels and inverters against damages caused by or resulting from inherent defect in case a warranty claim is being rejected or if liability is being disputed by a manufacturer or supplier or in case a manufacturer or supplier has failed to fulfil its warranty obligations due to insolvency.
- Performance output guarantee – Guarantees the minimum output of modules for 20 or 25 years and compensates the loss in case the electricity production falls below the predetermined percentages.

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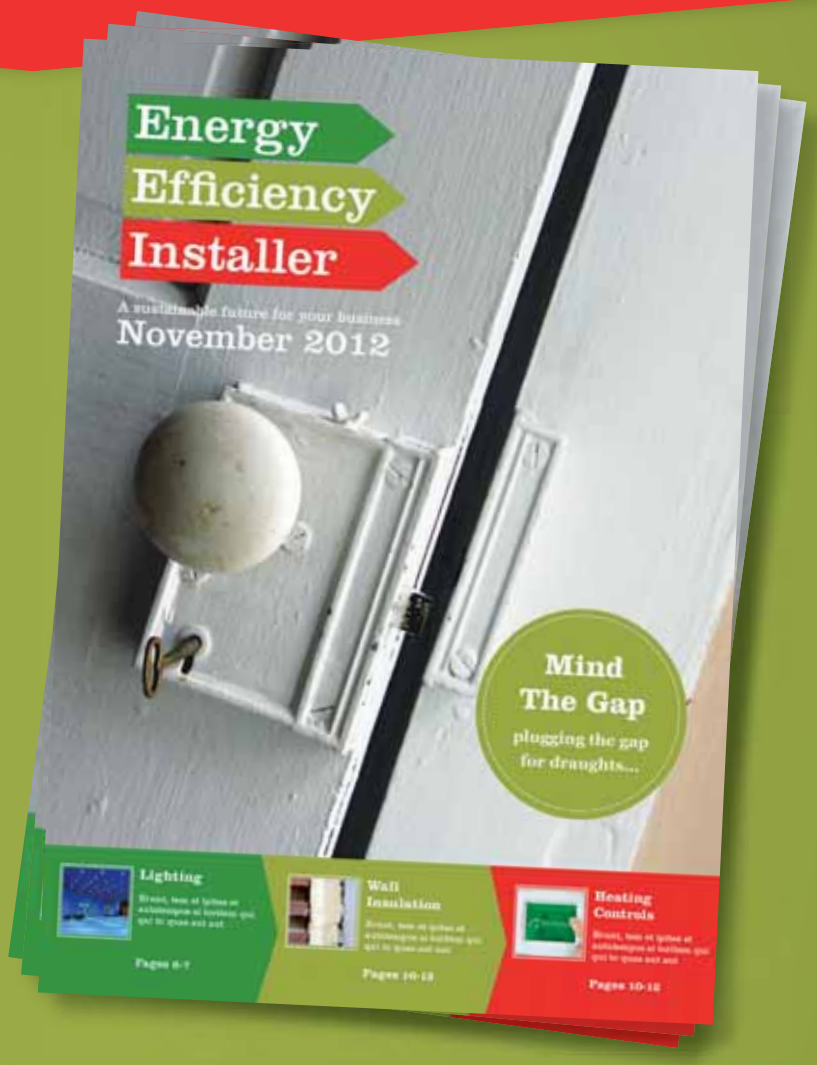


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ENERGY EFFICIENCY

What: Lancashire foundry slashes energy costs

How: Installation of energy efficient lighting

Result: Lighting usage reduced by 85,000kWh per annum

Lupton & Place, a family foundry business based in Burnley, will see its electricity bill cut by almost £8,000 a year as a result of installing energy efficient lighting.

The installation, which will see the company's lighting usage reduced by 85,000kWh units and CO2 emissions cut by 46.3 tons annually, was carried out by Eco Environments.

It means that the payback time for the £20,000 project is just two and a half years. In addition, the scheme is eligible for the government's Enhanced Capital Allowances with 100 per cent of the project cost being written off in the first year ensuring an even better payback.

Lupton & Place has been at the forefront of the European die-casting industry for more than 100 years and employs 150 people. Capable of producing over two million castings a year the company services a diverse range of clients across Europe.

John Bardgett, foundry manager at Lupton & Place, said: "We chose to invest in energy efficient lighting across the foundry as it had a quick payback and limited interruption to our business during installation.

"Most work was completed over a weekend and we are now not only more energy efficient but have a far better lit and improved working environment."

Bright idea: Lupton & Place foundry's £20,000 investment in energy efficient lighting should payback in just 2.5 years

Eco Environments said it is seeing huge demand from businesses, particularly those with high lighting usage, for energy efficient lighting installations. It adds that the return on investment for such schemes is eye-watering and there are further incentives with funding available from the Carbon Trust as well as the Enhanced Capital Allowances which Lupton & Place was able to take advantage of

SOLAR PV

What: Largest church PV system in Scotland

How: 120 panels installed by Absolute Solar and Wind

Result: 20,500kWh of green energy generated per annum plus £95,000 gain over next 25 years

Heaven sent: Local MSP Johann Lamont and Father Neil McGarrity admire the construction of Scotland's largest church solar PV system

HEAT PUMPS

What: Reduced energy bills for housing association residents

How: NIBE Exhaust Air Heat Pumps installed in 264 affordable homes

Result: Average daily energy bills of £3 and significant reduction in carbon emissions

Orkney Housing Association (OHAL) has installed NIBE exhaust air heat pumps across 264 of its affordable homes, designed to provide its residents with comfortable, energy-efficient living environments matched with significantly reduced energy bills and carbon emissions.

The exhaust air heat pump system from NIBE recovers warm stale air from inside the property in 'wet rooms,' such as kitchens and bathrooms, and feeds this back to the heat pump through a ducting system. The energy from this air is then reused to heat the property and hot water. Once the heat pump has extracted the energy it needs from the recovered warm stale air, the used cold air is released outside and fresh air is drawn back into the building via a system of external wall vents. The vents deliver the required air changes to provide the property with sufficient ventilation.

Mr and Mrs Young were among the first tenants of OHAL's sustainable housing stock, and live in a two-bedroom mid-terrace bungalow close to the seafront in Stromness on the mainland: "In our previous house, we used to get our heating and hot water from a combination of electricity and oil, which cost us hundreds and hundreds of pounds a year," said Mrs Young. "Now we're using around £3 a day of electricity and that includes everything from heating and hot water to all the electrical appliances we use – we're delighted!"

Fan club: NIBE's exhaust air heat pumps are now lowering energy bills in 264 of Orkney Housing Association's homes

NIBE UK managing director, Phil Hurley, added: "We're delighted that NIBE Exhaust Air Heat Pumps are making such a positive impact on OHAL homes and are significantly reducing energy bills for residents. These heat pumps are perfect for sustainable homes like this that have been constructed to such high insulation standards. Not only do they cover a building's heating requirements, they provide continual, vital ventilation so homes can stay dry and healthy as well."

120 solar panels have been fitted to the roof of St Robert Bellarmine's Parish church in the Househillwood area of Glasgow by renewable energy company Absolute Solar and Wind -understood to be the largest PV array on a church in Scotland.

It will generate 20,500kwh of green electricity per year and the parish is expected to benefit by around £3,800 annually when electricity bill savings and payments from the Feed-in Tariff scheme are taken into account.

CO2 savings

That means St Robert's can expect to gain by £95,000 over the next 25 years – while also saving approximately 216 tons in CO2 emissions over the same period.

Johann Lamont, Scottish Labour Leader and MSP for Glasgow Pollok, said: "I would like to congratulate St Robert Bellarmine's on this forward-thinking and innovative measure to reduce the area's carbon footprint and bring down energy costs in the church.

"This is now the third church in the Archdiocese of Glasgow to use solar power technology to bring down costs and sets a great example for other organisations and businesses in the community."

Long term benefit

Father Neil McGarrity, Parish priest at St Robert Bellarmine added: "The parishioners have been very supportive of the plans, which they see as being to the short term and long term benefit of the whole community. The process has been well managed and inconvenience has been minimal. I would recommend it to others who may be considering it."

Mark Newall, managing director of Absolute Solar and Wind, said: "This is the latest in a series of very innovative and forward-thinking projects we have carried out for the Glasgow Archdiocese. Renewable energy is an ideal solution for the church, allowing it to save energy on its traditionally high heating bills and make an ethical contribution to the environment s well.

Better rate of return

"Solar panel systems like the one on the church offer a better rate of return for both personal and business energy users than most other investment in the current climate, and we're seeing uptake increase all the time as customers realise the wide range of benefits," asid Newall.

Previous solar system installations in churches carried out by the Archdiocese include St Joseph's in Cumbernauld and Christ the King in Glasgow, meanwhile a wind turbine has been installed at the Archdiocese's cemetery, St Peter's, Dalbeth.

Figure it out

Current and new generation tariffs for non PV technologies

Technology	Band (kW)	Current generation tariffs (p/kWh)	Consultation tariffs from Oct 2012 (p/kWh, 2012 prices)	Final tariffs from 1 Dec 2012 (p/kWh, 2012 prices)[2]	Community energy tariff
Hydro	≤15	21.9	21.0	21.0	21.0
	>15-≤100	19.6	19.7	19.6	19.6
	>100-≤500	12.1	12.1	15.5	15.5
	>500-≤2000	12.1	12.1	12.1	12.1
	>2000-≤5000	4.9	4.5†	4.48	4.48
Wind	≤1.5	35.8	21.0	21.0	21.0
	>1.5-≤15	28.0	21.0	21.0	21.0
	>15-≤100	25.4	21.0	21.0	21.0
	>100-≤500	20.6	17.5	17.5	17.5
	>500-≤1500	10.4	9.5	9.5	9.5
	>1500-≤5000	4.9	4.5††	4.48	4.48
AD	≤250	14.7	14.7	14.7	14.7
	>250-≤500	13.6	13.7	13.6	13.6
	>500-≤5000	9.9	9.0	8.96	8.96
Micro CHP	≤2	10.5	12.5	12.5	12.5

(Source: DECC)

†2.2 from April 2013 ††4.1 from April 2013

Number of FiT registered domestic installations per technology

Technology	Total numbers of installations	Added last month available (August 2012)	Total installed capacity (kW)	Added last month available (August 2012) (kW)
PV (<50kW)	368,707	3,168	1,293,777	9,869
Wind (<50kW)	2,801	112	29,369	1,104
MicroCHP	510	1	512	2

(Source: MCS Database & Central Feed-in Tariff register)

Generation tariffs for Solar PV

Tariff band	FiT rate from 1st Nov (p/kWh)
<4kW	15.44
>4-10kW	13.99
>10-50kW	13.03
>50-100kW	11.5
>100-150kW	11.5
>150-250kW	11.0
>250kW-5MW	7.1
Standalone	7.1

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

The closing date DECC's consulation is 7 December 2012. Domestic RHI is expected to be introduced in summer 2013 and will apply to all elligible installations installed since July 2009

RHPP grants

All house

Solar thermal - £300 – cash voucher valid for three months

Houses not heated by gas from the grid

Biomass boiler - £950 – valid for six months

Air source heat pump - £850 – valid for five months

Ground source or water source heat pump - £1250 – valid for six months

(Source: Energy Saving Trust)

Eligibility criteria can be found online by visiting: **http://bit.ly/RENUVD**

Proposed domestic RHI payments for an off-gas property / gas area property

	Biomass	ASHP	GSHP	Solar thermal*		Heating oil	Gas
Tariff (p/kWh))	5.2	6.9	12.5	17.3			
Installation costs (£)	12,000	8,000	15,000	5,000		3,500	2,000
Annual cost of fuel (£)	1,016	1,150	878	1,442[1]	1,153[2]	1,518	1,214
Annual RHI income (£)	1,196	1,587	2,875	197			
Annual fuel bill savings (£)	502	368	640	76			
	198	64	336	61			
Annual benefits incorporating RHI (£)	1,698	1,955	3,515	273			
	1,394	1,651	3,211	258			
ROI (%)	14.2	24.4	23.4	5.5			
	11.6	20.6	21.4	5.2	Key		
Payback (years)	7.1	4.1	4.3	18.3	Compared with oil		
	8.6	4.9	4.7	19.4	Compared with gas		

23,000kWh annual heat load
Based on lower proposed tariff levels
*Solar thermal: 1,140kWh output (energy saving trust) ie 5 per cent of total heat load subject to DECC Consultation [1] with 95 per cent oil; [2] with 95 per cent gas

Carbon emissions of heating fuels

Fuel source	Carbon dioxide emitted (KgCO2)	Carbon emitted (Kg)
Heating oil	5,060	1,360
Wood pellets	759	207
Natural gas	5,060	1,380
LPG	5,060	1,380
Electricity	11,500	3,136
Air source heat pump	2,380	649
Ground source heat pump	1,210	330

Based on 23,000kWh needed to meet household's heating and hot water needs per annum. Conversion factors obtained from The Carbon Trust

RHI non-domestic rates

Tariff name	Eligible technology	Eligible sizes	Tariff rate (pence/kWh)	Tariff duration	Current installed capacity (MW)
Small biomass	Solid biomass: Municipal solid waste (inc CHP)	Less than 200 kWth	7.9	20	
Medium biomass	Solid biomass: Municipal solid waste (inc CHP)	200 kWth and above, less than 100 kWth	4.9	20	
Large biomass	Solid biomass: Municipal solid waste (inc CHP)	1000 kWth and above	1	20	47.094 (all sizes of biomass)
Small ground source	Ground source heat pumps, water-source heat pumps, deep geothermal	Less than 100 kWth	4.5	20	
Large ground source	Ground source heat pumps, water-source heat pumps, deep geothermal	100 kWth and above	3.2	20	0.162 (all sizes of heat pumps)
Solar thermal	Solar thermal	Less than 200 kWth	8.5	20	0.063
Biomethane	Biomethane injection and biogas combustion, except from landfill	Biomethane all scales, biogas combustion less than 200 kWth	6.8	20	0

(Source: OFGEM)

My working week

Who: Simon Willett, Simon Willett Heating Engineer.

What: Simon Willett Heating Engineer is a small design and installation business based in St Albans Hertfordshire.
A family run business with Willett at the technical helm and his wife Rosie, running the office, it covers most aspects of domestic and light commercial heating and hot water utilising both traditional and renewable sources.

Customer service: Simon Willett works unsociable hours to get a15kW hydro electric system back into service

Learning lessons, gaining feedback and overcoming bird life

Monday
Van-fuelled and equipped, I head off round the M25 at an early hour to check over a recently installed solar thermal system in Berkshire. It was checked for leaks, fluid pressure, glycol concentration and the overall performance was reviewed with the customer.
All is well and, in spite of the poor summer solar yield, it has been sufficient to provide all their hot water requirements since installation.

Some of the controller parameters were adjusted to take advantage of lessons learned on an earlier system. The panel mountings were checked and the solar collector temperature sensor cable was modified to make it less attractive to bird life seeking nesting material.

Tuesday
Off along the Thames and through Henley heading for the next customer in Oxford. This was the first solar thermal installation we undertook back in the New Year. We have been in regular discussion with the customer, a renewables enthusiast, who has provided useful feedback on how his system operates and performs helping us provide even better service for our other customers.

The panel connections were reconfigured to top and bottom opposite ends from top and bottom same end as an experiment to see if this improved yields.

The system pressure was increased as this system was originally filled with a flushing pump pressed into service.
As on Monday, the solar collector sensor was secured more fully as this one has been pulled out twice by an eager blackbird.

Wednesday
The morning was spent making my way down to West Dorset to a customer who owns a fish farm, industrial buildings and water mill with a couple of residential properties included. We were heavily involved in the installation of a 15 kW hydro electric generation system here in 2008 alongside the watermill.

After four years of continuous service, some weaknesses had shown up in the design of the turbine, which was to be removed in order to fit some improved parts.

Additionally the customer has recently completed the external structure of a new residential unit and plans to provide heating and hot water to this unit from a water source heat pump powered by the turbine. We were there to review the choice of heat emitters (UFH, fan convectors or radiators) and to discuss the location and design of the water source heat exchanger.

Thursday
The turbine is situated three quarters of the way down an eight metre deep well and the morning was spent removing the alternator and its drive train, disconnecting the turbine from the penstock and draught tube and then raising it to the surface. A damaged water guide vane shaft had to be carefully cut out and whilst the turbine rotor and inlet was exposed, the chance was taken to make a thorough inspection and measurement.

Friday
The turbine was reassembled with its new parts and then lowered back into place. Inlet and outlet flanges were bolted up, a painstaking and laborious process, with difficult access, and then the guide vane actuators were replaced followed by the delicate task of setting the limit switches.

Finally, alternator and drive train were replaced. Over the weekend the turbine was recommissioned and generation was resumed after some long hours put in to ensure timely completion.


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