Issue 1 | October 2023

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ON THE COVER

09 Unpacking Clause 5.8:
has Octopus really removed the solar certification requirement to expand access to the Smart Export Guarantee?

FEATURES

NEWS ANALYSIS

INNOVATIONS

Renewable
ENERGY INSTALLER & SPECIFIER

CONTENTS
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KNOWLEDGE

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An exciting time to be in microgeneration!

WELCOME to this relaunch issue of Renewable Energy Installer. We are very excited to be reintroducing our popular magazine format with this solar & storage special issue. If there is anything that recent energy sector dialogue has shown us it's the power of consumer choice and we hope you enjoy the content whichever format you choose to consume it in.

The recent UK Prime Minister's policy update was very much couched around putting consumers in control, enabling them to choose their route to low carbon heating. The assumption has long been that politicians will make the choice for consumers, based on implementing the most thermodynamically efficient, lowest overall cost solution, with consumers happily assenting.

Two factors have served to stall that approach: firstly, consumers, driven by unhelpful influencers in both media and traditional energy, as well as concerns over the cost of making the change, have proved to be reluctant participants, and secondly, political leadership is seemingly not prepared to make unpopular decisions, choosing to kick the can down the road instead.

But, if given the choice, will consumers make the 'right' one – the one that delivers our net zero commitments? Arguably they will if the price is right, if the lowest carbon option is the least costly option and one that delivers clear consumer benefits.

Solar installations this year are at their highest post-tariff level and may well surpass even the tariff-fuelled highs. A recent study shows that, in the last decade, the cost of solar power has dropped by 87%, and the cost of battery storage by 85% driven by technological advancements, increased competition, and a greater emphasis on renewable energy sources.

There is also a shift towards the combination of granular technologies to form larger energy systems. It is this that is seeing solar cells, batteries, heat pumps and wind turbines benefiting from a greater pace of innovation than large-scale systems.

This issue focuses on latest developments in solar and storage. We look forward to taking an in-depth look at heat pumps, training and retrofitting in our next issue.

Welcome back!

New residential heat pumps unveiled by Octopus Energy

ENERGY market disruptor Octopus has unveiled its latest offering of a 6kW heat pump that is free for qualifying homes using the Boiler Upgrade Scheme, with CEO Greg Jackson claiming that it 'paves the way for heat pumps for everyone'.

Designed by Dr Jason Cassells, CEO of Octopus-acquired Renewable Energy Devices (RED – now Octopus Heating), the entry level 6kW heat pump is aimed at a typical three-bed home and will be available from December with 'more and larger models following over the next six months,' according to the manufacturer.

With the R&D team at Octopus described as 'second to none' by an installer who has worked with them we look forward to publishing real world performance data once available.

Newly unveiled heat pump is one of the quietest on the market

UNVEILED at this year's InstallerSHOW, Ideal Heating's monobloc heat pump, Logic Air, has been awarded a global rating that recognises the quietest central heating products.

The Quiet Mark certification is official recognition that the Logic Air is best-in-class for its quiet performance and minimal background noise – an attribute that is coming under increasing scrutiny.

Andy Farquhar, Senior Product Manager (Heat Pumps) at Ideal Heating, said: "Achieving Quiet Mark certification formally recognises Logic Air as being one of the best products on the market when it comes to noise levels."

Fast-growing energy efficiency installer celebrates solar milestone

A SWANSEA-BASED consumer energy efficiency company is marking a major milestone as it fits its 30,000th solar panel since it began installations just two years ago.

Consumer Energy Solutions (CES), began installing Solar PV as a single measure through the Local Authority Delivery scheme (LADs) in autumn 2021, before introducing them as double measures with loft insulation and as part of a multiple measure, whole house approach through the government's Energy Company Obligation (ECO4) in 2022.

Sam Wilson, Head of Solar, said: "As a business we only started installing solar panels in late 2021 and in that time, we have installed 30,000 units via just over 2,800 projects. We are proud to reach this milestone and thank our entire team of energy efficiency professionals who work together to identify opportunities and carry out the energy-saving modifications needed for each property."

The Great British Insulation Scheme launches

IN A positive step towards energy efficiency in the UK, The Great British Insulation Scheme (GBIS) has been launched, with the UK government committing a substantial £1 billion to assist families in reducing home energy bills through enhanced energy efficiency measures.

The scheme is open to homeowners, landlords and tenants, including those in private rentals or housing association properties, with support available for various types of home insulation.

Chris Friedler, Energy Efficiency Policy Manager at the Association for Decentralised Energy (ADE), said: "There's plenty more to do on energy efficiency for millions more homes, especially those in the owner-occupier sector, but this scheme is a firm step in the right direction."

Andersen EV boosts production for home chargers

ANDERSEN EV is doubling production capacity and increasing headcount at its Bedfordshire factory in response to the fast-growing demand for its premium home charger.

To facilitate its growth and fulfil order books, the company is doubling the footprint of its factory and investing in new advanced production equipment as part of a £1.5 million investment made by parent company EVIOS Plc. The upgraded Andersen EV and EVIOS headquarters and production site in Stewartby, Bedfordshire, will allow the organisation to continue hiring local talent.

EV sales are forecast to more than triple between now and 2030, increasing the demand for home chargers.

Green Building Renewables continues its rapid growth with the acquisition of Royston-based Eco-Energy UK Power Ltd.

THE ACQUISITION of the heat pump business by Green Building Renewables (GBR) furthers the company's ambition to be the UK's largest renewable installer by 2025.

GBR increases its network through the acquisition of reputable regional renewable installation businesses as Managing Director, Chris Delaney, explains: "We want to have a presence across the whole of the UK and to be the country's leading installer of renewable technology.

"People across the country are transforming their homes and businesses, and their relationship with energy, by embracing renewable technologies.

"Our growth reflects that more and more households are choosing to lower their bills, their dependency on the grid, and their environmental impact by choosing heat pumps and solar panels for their homes."

Heat pump award shines a light on Kensa's 'Heat The Streets' project

GROUNDBREAKING project, 'Heat the Streets', from Kensa Utilities has won this year's EHPA Lighthouse Heat Pump Award that highlights unique heat pump projects pioneering problem-solving with high levels of creativity.

Lisa Treseder, Director of Business Development, who collected the award at the ceremony in Brussels, said: "We are delighted to receive this prestigious award and for 'Heat the Streets' to receive such amazing recognition."

The award shines a light on how large-scale, street-by-street roll out of ground source heat pumps can be achieved using an innovative networked heat pump solution. 'Heat the Streets' decarbonised residential heating in new and existing homes across Cornwall by connecting ground source heat pumps to shared ground borehole arrays drilled into the roads – a UK first.

Now installed, the visually unobtrusive boreholes are providing homes with a reliable heat source all year round that will last over 100 years. The ground source heat pumps provide 100% of each property's heating and hot water needs, meaning that residents no longer use carbon-intensive oil or LPG fossil fuels.

UK first-ever heat pump apprenticeship

THE UK'S first dedicated low-carbon heating apprenticeship is poised to launch with the backing of government funding.

The low-carbon heating technician apprenticeship aims to equip a new generation of workers to support the government's ambitious goal of installing 600,000 heat pumps annually by 2028 but there is, currently, no specialised training provision for heat pump engineers. The low-carbon heating technician apprenticeship is a UK-first and tailored to develop the skills needed to design, install, and commission low-carbon heating technologies.

The Department for Education has now allocated a funding band for this apprenticeship, granting colleges up to £22,000 for each apprentice. Experts in the industry believe this generous funding will ensure that colleges have the necessary resources to support apprentices from diverse backgrounds seeking careers in the renewables sector.

Stephen McGreevy, Head of School, Sustainable Construction and Building Services, at the City of Liverpool College, said: "It is fantastic to see the delivery of the low-carbon heating technician apprenticeship. This course will be vital in providing learners with hands-on technical skill development for a future-proof career in the green sector while also allowing them to earn a living while learning.

"We are particularly pleased to see the apprenticeship receive the funding band it deserves from the government. It will allow colleges like us to take on learners at a time when every penny matters."

UK's first EV-only manufacturing plant opens

STELLANTIS has started electric vehicle production at its Ellesmere Port manufacturing facility as the first all-electric vans roll off the production line.

Ellesmere Port is the UK's first EV-only manufacturing plant and the first Stellantis plant, globally, dedicated to electric vehicles, following a £100 million investment to transform the plant for EV production.

Among the first electric vehicles produced at Ellesmere Port, the Vauxhall Combo Electric is powered by a 50kWh lithium-ion battery paired with a 100kW (136PS) electric motor. It can deliver up to 175 miles of range (WLTP), while a 0-80% charge can be completed in just 30 mins from a 100kW rapid charger.

Pump it up with Worcester Bosch's Compress 5800i AW range

WORCESTER BOSCH is inviting homeowners to step into the future of heat pump technology through its 5800i AW range.

The all-new Compress 5800i AW range presents a complete system solution tailored specifically for UK installers encompassing the outdoor unit, pre-plumbed cylinder and wall hung unit. The cylinder has been designed to be as installer friendly as possible as a complete 'plug and play' indoor solution, easy and fast to install, with a fully integrated micro-buffer, diverter valves, pumps and back-up heater.

UK launches discounted training for low carbon heating and insulation

THOUSANDS of new training places available for retrofitting, heat networks and heat pump installations are a significant boost to the green jobs sector.

Up to 8,000 people – including current installers and those who are new to the industry – will be able to develop the skills and knowledge needed to retrofit homes and install insulation through a host of training providers thanks to the Home Decarbonisation Skills Training scheme.

A further 4,000 people will also be able to get £500 towards training to install and maintain heat networks through the Heat Training Grant.

HPA urges Government to firm up commitment to phasing out fossil fuel boilers

WITH THE Government softening its stance on the 'boiler ban' in the Prime Minister's announcements on decarbonising home heating, industry has warned that the 2035 phase-out of fossil fuel boilers must become a firm commitment.

Reacting to the policy changes, Charlotte Lee, Chief Executive of the Heat Pump Association, said: "The Government has once again moved the goalposts for heat decarbonisation in the UK, and this risks damaging investor, installer and consumer confidence in this space unless this re-confirmed end date for fossil fuel boilers is strengthened from being an 'ambition' to being a firm commitment.

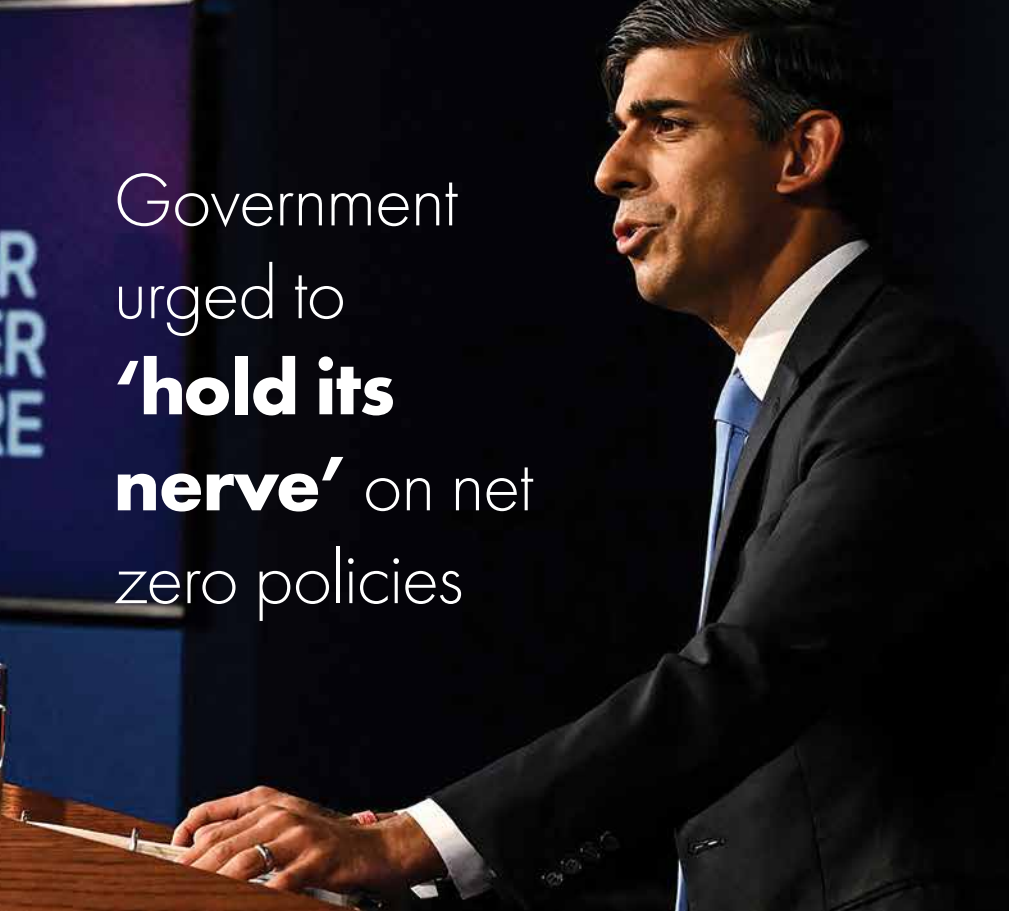
"The delay is yet another blow to the heating industry's confidence in Government policy as Industry – including boiler manufacturers, has invested in good faith in manufacturing facilities, training and innovation to support heat pump deployment in keeping with the Government's election manifesto and Heat and Buildings Strategy Commitments – particularly in line with the now abandoned end-date of 2026 for fossil fuel boilers off the gas grid."

A damaging approach

"Moreover, introducing and justifying possible exemptions by suggesting that many homes are not suitable for a heat pump is not supported by the most recent findings of Government-funded heat pump field trials. Consumers and installers may now adopt a damaging 'wait and see' approach based on incorrect information, thereby delaying the inevitable transition to decarbonised heat.

"Whilst we are pleased that the Boiler Upgrade Scheme grant has been increased, the current budget will now only support 20,000 heat pumps per year, just 3% of the 600,000 ambition for 2028. We urge the Government to take steps to increase this budget to allow all those who wish to install a heat pump to benefit from the grant.

"We call upon the government to take swift action to reassure the heat pump market – by making the 2035 end date for fossil fuel boilers a firm commitment, by introducing the Future Homes and Buildings Standards in 2025 for new build, by increasing the budget available for the Boiler Upgrade Scheme – and to take urgent action to reduce the price of electricity relative to fossil fuels."



Government urged to **'hold its nerve'** on net zero policies

IN RESPONSE to last month's policy update from the Prime Minister the Ground Source Heat Pump Association (GSHPA) echoed the thoughts of many in the sector alarmed by the roll-back of some of the UK's key climate policy and the potential consequences to sector growth.

GSHPA CEO Ken Gordon said: "We understand the complex considerations involved in such policy decisions. However, it is crucial to acknowledge that short-term leniencies might lead to long-term consequences that could be both environmentally and economically costly.

"We urge the government to reassess the implications of the delay and to continue its support for the renewable energy sector.

Increased support for heat pumps proves popular

Green Building Renewables (GBR) was among many welcoming the 50% increase in the Boiler Upgrade Scheme to £7,500 for air source heat pumps commenting: "Increasing the incentive to heat pumps is a small positive step to helping families and landlords install heat pumps."

But GBR also felt a lot more could have been done: "We were disappointed by the lack of discussion about solar energy and the missed opportunity to invest more in green jobs that would benefit the renewable energy industry."

"The people of the UK want to future-proof their buildings, cut energy costs, and reduce their environmental footprint. We feel that the government's announcements yesterday do not match the understanding and appetite of the British public on this subject and the challenges ahead.

"The extension of targets only creates uncertainty, reduces investment and slows the efficiencies and cost reductions needed.

"Consumers and businesses are embracing renewables and energy-efficient technologies. The government must match this ambition and provide consistent strategic policies that allow the sector to invest with certainty and develop the green jobs of the future."

Unaddressed issues

Jeff House, External Affairs & Policy Director at Baxi, also highlighted concerns over unaddressed issues, particularly with regard to sector skills. "As a manufacturer supplying multiple heating technologies including air source heat pumps, we have always been clear that consumer choice is paramount. We need to bring the public with us on a decarbonisation journey and driving consumer demand is a key requirement for developing the heat pump market in the UK. By increasing the grant, we hope that more homeowners will be encouraged to make the switch to heat pumps.

"What has not been addressed, however, is the critical skills challenge that faces our industry. We still need to focus on bringing installers with us on this journey towards a greater adoption of heat pumps, so helping both heating engineers and their customers to become more comfortable with the technology is vital.

"We must also encourage more talent into the industry to grow the number of installers required to reach the installation targets that remain in place."

Similarly concerned by the skills gap was Stewart Clements, Director of the Heating and Hotwater Industry Council (HHIC): "We welcome the time afforded to make a more thought out and successful switch to low carbon heating.

"The increase in financial support will undoubtedly incentivise the switch to heat pumps for more homeowners. Such a positive initiative, however, requires a significantly larger number of installers than previously estimated, which the government must work with industry to address.

"Data gathered by the HHIC suggests that, to meet the Government's ambitious heat pump installation target of 600,000, we require 100,000 installers more than the Government's prediction of 50,000 – a figure almost equivalent to the entire Gas Safe Register. This shows the need for further support in addressing the current skills gap to meet the expected rise in demand for low carbon heating.

The GSHPA expressed deep concerns over the potential damage to the 'growing but fragile' heat pump industry of delaying the boiler ban saying it poses 'significant challenges to the UK's 2050 climate targets' and fails to deliver the desired protection to homeowners.

"Postponing the phase-out effectively shortens the window to retrofit and replace millions of heating systems. A delay now will only compress the timeline later, making the challenge exponentially greater. This does not safeguard ordinary families; it means they will have to expect even more disruption in the future. Government should provide the funding required for transition, not families."

Prioritise energy efficiency

There were also calls to invest more in energy efficiency measures with Mark Krull, Director for Awarding Organisation, LCL Awards and building services training provider, Logic4training saying: "When it comes to improving the carbon footprint of our homes, we are still missing a trick. Whatever the heat source, energy efficiency should be the priority – keeping heat in and reducing bills for the most vulnerable in society.

"Affirmative action on insulation, draught proofing and glazing should be front and centre of the UK's net zero policy, something that will also help cash-strapped voters who care most about making ends meet."

This was echoed by Griff Thomas, from renewables training provider GTEC, who called for the government to 'hold its nerve' when it comes to net zero saying: "Right now, there are far simpler steps that will make the most inefficient of homes warmer and less costly. Insulation and draft proofing should be a priority.

"We need a pragmatic and proportionate approach to net zero that doesn't abandon targets, but better considers and supports the people that these targets effect."

DOMESTIC ENERGY EFFICIENCY:
understanding barriers to a nationwide roll out

THE Sustainable Homes and Building Coalition, made up of Worcester Bosch, NatWest, British Gas, and Citizens Advice, has completed a process of upgrading properties across the UK in their Home Improvement Pilot with the results detailed in the coalition's third report, entitled Home is Where the Heat Is: Outcomes Report.

Delivered in parliament last month, the report covers the experiences of real customers on their home improvement journeys.

The initial 'Home is Where the Heat is' report was released ahead of COP26 in 2021 and high energy bills and the cost-of-living crisis have made the issues even more pressing since then, highlighting the need for consistent long-term policy frameworks coupled with new forms of collaboration across the public and private sectors.

The pilot programme

The pilot demonstrates how rolling out energy efficiency across the UK could help bolster energy security and deliver positive impacts for consumers from a cost, carbon, and comfort perspective.

The report also sets out the growth opportunities for UK business in the energy efficiency sector, and how business and government can work together to facilitate a nationwide rollout of energy efficiency measures.

Designed to identify the key blockers, the programme has, in total, retrofitted nine households located in Pontypool, London, Kent, Swansea, Surrey, Tyne and Wear, Liverpool, and two properties in Merseyside, at no cost to the household/homeowners through a £250,000 funding pot. In return for the funding, provided by NatWest, British Gas, and Worcester Bosch, the households agreed to share their experience of the process, with their thoughts and comments detailed in the report.

Insights

Over the past two years, the coalition has worked to move the conversation around energy efficiency from the conceptual world to the real world. By studying the rollout of home improvement upgrades on a case-by-case basis, the coalition has uncovered valuable insights.

1) Whilst a home improvement process does involve disruption, consumers feel it is immediately worth the effort, although cost remains the main upfront barrier

2) Each consumer's journey will be different and, due to the variety in the UK's housing stock, some will require bespoke solutions

3) Planning restrictions can make home improvement projects complicated, and local councils also need to raise their awareness of home improvement measures.

Action on energy efficiency is critical to improving the UK's energy security, reducing the amount of energy needed to power UK homes, as well as reducing pressure on consumers from high energy bills.

There are also clear growth opportunities for policymakers and UK business to develop a substantial supply chain for the sector.

The challenges

The results of the pilot also shed light on some of the main challenges facing a national rollout of energy efficiency measures.

a) The supply chain – which needs to be developed further

b) The importance of improving social housing across the UK – not only to reduce energy costs, but also to stimulate scale in the market

c) The need to address the private rented sector – where tenants are often not in control of energy efficiency improvements.

Detailed analysis

Over the coming year, the coalition will carefully monitor the impacts of the home improvements to determine the exact benefits to each household, analysing how much consumers can expect to save on their bills, as well as looking at reductions in carbon emissions and how comfortable each household is – the coalition will report on these in 2024.

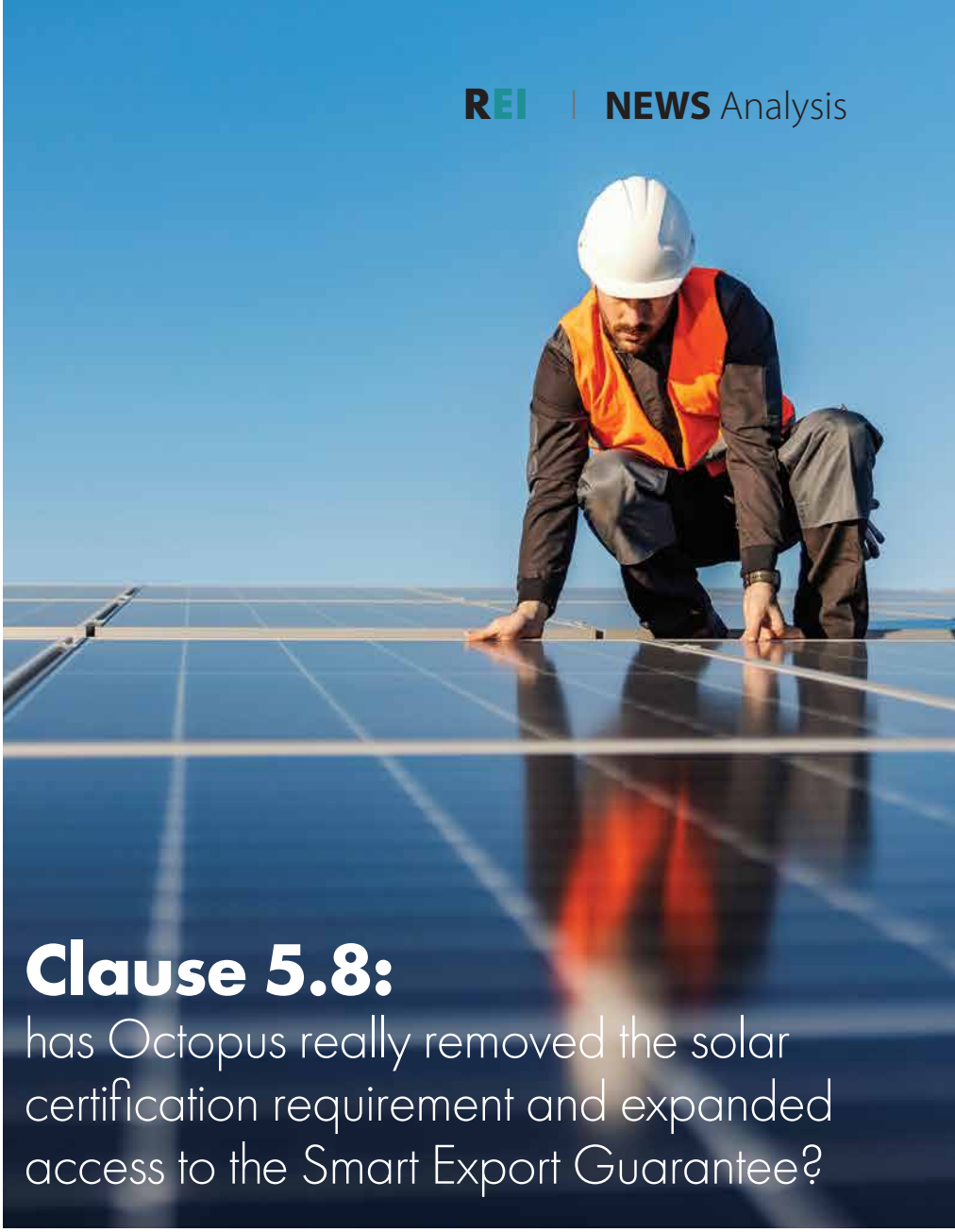
Importantly, the coalition is focused on keeping the customer experience central, maintaining that consumers must always be at the heart of the conversation, as it is real people, and their families, that will have to undergo a disruptive, albeit ultimately beneficial, home improvement process.

Gillian Cooper, Head of Energy Policy at Citizens Advice said: "Looking at energy costs that UK consumers are faced with, and the millions affected by fuel poverty, throws the benefits of improving homes into stark relief, a fact only backed up by these Home Improvement Pilots.

"We welcome the results and hope more can be done to support consumers up and down our country, especially in the private rented and social housing sector."

Describing energy efficiency upgrades as 'key to improving energy security and reducing financial burden for consumers' Lloyd Cochrane, Head of Mortgages at NatWest, said: "Our Pilot has shown that not only are energy efficiency upgrades desirable, but with increased collaboration between Government and business they are achievable, as well."

Carl Arntzen, CEO of Worcester Bosch, noted lack of readiness in the supply chain but felt that 'more action to stimulate demand will help overcome many of the barriers' urging immediate action to 'make this the decade of delivery'.



Clause 5.8:
has Octopus really removed the solar certification requirement and expanded access to the Smart Export Guarantee?

IN RESPONSE to our website article 'Clause 5.8 – how a paragraph from Octopus is opening up the solar PV market' Dave Stubbs, a consumer with twelve solar panels professionally installed under a Flexi-Orb certified installation, got in touch to share his own experience of trying to take advantage of Octopus' export tariff through the new clause.

The original article covered the thoughts of Griff Thomas, MD for GTEC on the 'small but, potentially, significant change to its terms for the Smart Export Guarantee (SEG)' that 'could mark a significant shift for consumers and, potentially, installers'.

Griff said: "Under Clause 5.8, it now states that installations can be self-declared as being compliant by an installer or the consumer meaning that there are options other than an MCS Certificate to allow consumers access to Octopus Energy's SEG.

"Any savvy, electricity-generating end user will recognise that, at the moment, Octopus is the energy provider of choice. And now, by simplifying access to its attractive tariffs, the average electrical contractor can potentially get going with solar PV without spending time and money on MCS certification."

Nothing has changed

Speaking with Renewable Energy Installer Dave Stubbs said: "In practice they aren't accepting anything different. When I've applied with my Flexi-Orb certificate they sent me this:

We've received your application, however there's no MCS certificate attached. We need this to verify that your solar installation has been completed safely and that it meets industry standards. We only accept MCS certificates and can't accept comparable certificates such as Flexi-Orb."

"I queried it as their new T&Cs state that they accept equivalents:

'Clause 5.5 For solar, wind and micro-CHP generation assets, you should be able to demonstrate that the generation asset is suitably certified via:

(i) the Microgeneration Certification Scheme (MCS) certification; or

(ii) an equivalent certification scheme recognised by Octopus Energy (an equivalent scheme is a scheme accredited in accordance with EN 45011 or EN ISO/IEC'

"And Flexi-Orb is an equivalent that meets that requirement.

"Then they came back to me with a new option," Dave continues. "Where I can join a list and pay £250 if I want to in order to finally get accepted."

The response from Octopus read: *I can confirm that we are currently trialling a new way to get on the export tariff without the need for an MCS certificate. This means that you may still be eligible to join our export tariff even if you do not have an MCS certificate.*

Please follow the link to register your interest.

Clicking the link took Dave through to a registration form with a landing page message: *Having an MCS certified installation with DNO approval is the quickest and most certain way of getting access to our export tariffs. If you do not have an MCS certified installation, we are trialling a new review process and may decide not to accept you (there is also a £250 charge). You can register your interest here."*

"So good luck with getting on it without an MCS certificate or via clause 5.8 as they don't stand by their change in policy at the moment," Dave concludes.

Concern for consumers

The recent policy change is intended to alleviate the bottleneck for solar installs.

Energy providers need to use consumers' homes as virtual power plants, in order to balance the grid which will ultimately leading to cheaper electricity for all. Since it takes around 6-9 months to gain MCS certification, those installers for whom the time and cost involved, as well as some of its requirements, are off-putting, suggest that MCS is currently stalling this process.

With Octopus wanting as many installers as possible fitting solar PV, the new clause is seen as an incentive for electricians.

However, there are concerns it may have a negative impact on consumers.

Instead of demanding MCS certification, Octopus Energy now only requires applicants to provide confirmation of DNO (Distribution Network Operator) notification under EREC G98 or the necessary permissions under EREC G99.

Furthermore, applicants are expected to confirm their satisfaction with the competence of the professional who installed the solar generation asset.

Rebecca Dibb-Simkin, Chief Product Officer at Octopus Energy commented: "MCS is an important assurance scheme which encourages consumer protection – and we strongly recommend anyone getting solar panels installed go through the MCS process.

"However, there are a small minority of customers who have had solar panels installed through a reputable but non-MCS accredited installer – and we don't believe they should just automatically be denied access to export payments.

"As we're constantly considering how we can best look after customers and best respond to their needs, we recently decided to start offering export payments to those with Flexi-Orb certification as well as MCS.

"We also launched a carefully limited trial to see how we could potentially provide customers access to export payments for solar panels installed without an MCS or Flexi-Orb certificate. For customers applying via this trial, we still require lots of detailed documentation about their installation.

"Based on this information, we then analyse each application to see if they're eligible. We also charge an administration fee as this requires some additional manual processing work."

Industry concerns

Nevertheless, the move has sparked concerns within the industry and among consumers, particularly with regard to quality and safety standards.

Ben Price, Co-Founder of Heatable Solar, shared his concerns about the changes:

"Octopus Energy has introduced a one-time fee of £250 for this service, while traditional MCS-certified installers may typically charge between £400-£600 more.

"Consequently, customers who opt for unregulated installers while still desiring SEG payments may find Octopus Energy as their sole provider, as no other providers have followed suit in eliminating the MCS requirement.

"It's important to note that MCS certification not only encompasses installation standards and assessments but also includes a range of consumer protections, covering aspects like selling, designing, and the mandatory requirement to house deposit or staged payment funds through third-party intermediaries. These consumer benefits may be compromised with the removal of the MCS accreditation."

Balancing accessibility and safety

While there is currently no legal mandate requiring installers to be MCS registered, the previous industry practice of SEG providers demanding MCS certification acted as a barrier against potentially hazardous installations and unskilled installers entering the market.

Despite its intention to open the market the £250 fee was enough to put Dave off: "I haven't applied as, even at £0.15 / kw which is what I would get, it would take me around 12 months before I have made that amount back in SEG payments."

In conclusion, while Octopus Energy's policy change aims to accelerate uptake of solar PV and streamline access to SEG tariffs, concerns have arisen. The decision has sparked a debate within the industry and among consumers about the balance between accessibility and safety in the solar installation sector.

That's assuming installs carried out by contractors without MCS accreditation can even get through the Octopus approvals process of course.

EcoFlow unveils PowerOcean DC Fit at Solar & Storage Live 2023

THE UNIQUE retrofit battery storage solution offers easier integration and installation, enabling homeowners who have already installed a solar system to connect a power storage solution.

EcoFlow, a leading provider of eco-friendly energy solutions, is set to unveil its innovative and cost-effective retrofit battery storage solution at the UK's largest renewable energy exhibition.

Marking EcoFlow's debut in the UK home solar energy industry, the new, one-of-a-kind PowerOcean DC Fit, that seamlessly integrates battery storage into existing residential solar systems, will be launched in the UK at Solar & Storage Live 2023.

Previously showcased at InterSolar in Germany, the PowerOcean DC Fit was well-received by industry experts and professionals with praise for its PV-coupling technology, unique product positioning, and innovative features.

Easy integration – no need for additional storage inverters

Unlike conventional DC-coupled or AC-coupled battery systems, PowerOcean DC Fit uses EcoFlow's PV-coupling technology to directly connect with existing home solar energy systems on the PV side – meaning users don't need to install additional storage inverters. In addition, because of the self-adaptive algorithm, the PowerOcean DC Fit is widely compatible with most solar inverters, so that users don't have to replace the existing ones.

Easy expansion – storage to suit everyone

Beginning at 5kWh per battery pack, the PowerOcean DC Fit is expandable up to 15kWh when needed. Each battery pack has 800V high voltage to independently start single-phase or three-phase inverters, making home energy autonomy more achievable and affordable.

Easy installation – no change to the AC wiring

Using EcoFlow's unique PV-coupling technology, the PowerOcean DC Fit connects its batteries directly with solar panels. Users can leave the AC wiring as it is and don't have to apply for an on-grid permit.

The PowerOcean DC Fit features a minimalist stack-up design with click-on battery terminals. These reduce the need for extra wiring work and guarantee ease of installation and use.

Making safety and reliability the priority

Besides the incomparably easy installation and system integration, the PowerOcean DC Fit offers an industry-leading 15-year battery warranty. This is thanks to its trusted LFP battery chemistry and a comprehensive range of active and passive safety measures, including fire-prevention and auto-heating modules.

Each battery pack is connected in parallel and equipped with the EcoFlow BMS (Battery Management System) to prevent any issues with one battery from affecting other packs.

There for local customers and partners

EcoFlow is dedicated to providing professional after-sales support for both business partners and consumers. A 1-to-1 customer hotline and live chat will be available from 8am to 8pm, five days a week – exceeding the industry standard – along with prompt 24-hour email responses.

A dedicated service support team will be available to help clients and customers with queries, as well as a committed local repair and logistics centre. Alongside this, EcoFlow provides abundant training resources and partner trial programmes.

Responding to users

Initially inspired by the proliferation of users retrofitting their homes with solar solutions, EcoFlow began to expand its footprint into home solar storage solutions in 2023 to maximise the potential. The strategic move demonstrates the energy solutions provider's commitment to providing eco-friendly energy solutions for everyone. With a vision for a future that mitigates for increasingly common climate disasters, ageing power grids, and rising energy bills, EcoFlow is on a mission to support families with reliable, safe, sustainable and smart energy solutions.

Craig Bilboe, Head of UK Business Development, Residential Storage at EcoFlow, commented: "At EcoFlow, we envision a future where everyone, irrespective of their living conditions or needs, can access reliable power solutions.

"The PowerOcean DC Fit is a firm stride towards it and a landmark in our mission to revolutionise home energy."

The PowerOcean DC Fit will be available early next year in the UK. Users can enquire and purchase through local installers.

Input (PV)	
Maximum PV input charging power	5kW (2.5kW*2)
Maximum PV input bypass power per string	15kW
Maximum input voltage	1000V d.c.
Operating voltage range	150V~800V d.c.
Start voltage	150V
Maximum PV current per string	20A
Maximum operating current per string	12A
Number of PV strings	2

Other specifications	
Operating temperature range	-20°C ~ 50 °C
Operating humidity	0~100% RH
Maximum operating altitude	3000m
Protection level	IP65
Communication method	RS485, Wi-Fi, WAN, Bluetooth
Noise level	≤35dB

OFGEM ECO APPROVAL

unlocks additional installer funding for solar module

OFGEM'S APPROVAL of the UKSOL optimised solar PV module as an ECO Innovation Measure will allow installers to claim extra ECO4 funding.

An independent British module producer with vision and ambition, UKSOL was incorporated in 2015 by president and founder, Andrew Moore. With many years of solar PV industry experience, Andrew sought to differentiate the company from the start and, by instilling twin pillars of passion and honesty, UKSOL has established a reputation for high quality, affordable solar PV technology delivered with integrity.

Developing markets

Supported by a secure 30-year British warranty, UKSOL products are exported to over 50 countries globally and rapid expansion continues. Andrew believes the future for UKSOL, which has been awarded Export Champion status by the British Government, will be at the heart of global developing solar markets.

"We believe Britain can be a world leader in delivering safe, low-cost solar energy and laying the foundations for economic freedom, carbon reduction and prosperity in the 21st century," he shares.

Solar panels must work efficiently for many years, often in difficult climatic conditions, and UKSOL believes that customers should expect local British support through the 30-year lifespan of the panel as Andrew explains: "We want our customers to benefit fully from their solar panel installation and to ensure that they maximise return on their investment.

"We believe that proper long-term British support is the best way to help ensure customer partnerships flourish and grow which is why UKSOL's 30-year UK warranty is trustworthy and claimable."

UKSOL produces high-quality solar modules using only grade A materials and the latest cell technology. Panels include the latest innovations in cell design and fully automated production methods, incorporating p and n type half-cell, flexible and bifacial modules. UKSOL has a daily production capacity of over 2MW.

Optimisation

Continually innovating to maximise output, UKSOL developed an optimised solar PV module pre-fitted with a Tigo optimiser which incorporates anti-shading technology, online monitoring and additional safety features to deliver higher performance.

- Reduces issues from shading
- Increases options for panel locations
- Can be used with any make/model of inverter
- Improves electricity yield by an estimated 5-10%

Use of a Cloud Connect can also provide:

- Individual panel remote monitoring
- Rapid safety shut down

Increased output

In Ofgem's list of approved innovation measures the system is described as consisting of 'MCS certified monocrystalline PV modules, with optimiser units built in during the manufacturing process to ensure quality and consistency.'

The optimised panel offers an increase in electricity production by allowing generation to continue if part of the string or array is shaded or develops a fault. Systems can be installed using multiple roof angles and orientations. The addition of the optimiser allows PV installations in properties that may previously have been unsuitable due to shading.

Enhanced safety

In addition to optimisation, the UKSOL/Tigo solar module provides optional module level monitoring, and rapid shutdown. The optimiser results in a reduction of any fire risk from the panels, which will be disconnected if the optimiser identifies a fire, or risk of a fire occurring due to a fault.

Approval boost for installers

The application for the system to be Ofgem approved as an ECO Innovation Measure was made by Happy Energy Solutions Ltd, in partnership with UKSOL and EDF.

With approval secured, the optimised module can now be deployed as a heating measure to improve the EPC rating of homes which contain an eligible form of electric heating system, or where such a heating system is installed alongside.

As an approved Innovation Measure, installers can also claim between 25-50% extra ECO funding.

Breaking news

At time of going to press, Andrew was delighted to confirm that UKSOL had received confirmation from Ofgem that the optimised panel, used in conjunction with Cloud Connect, meets the eligibility criteria for a 'substantial innovation measure'.

The decision letter, shared with Renewable Energy Installer, confirmed the approval of the application and the significant 45% uplift on ECO funding thanks to recognition of the substantial innovation the system offers.

The exponential growth in solar presents a significant opportunity for installers, sales agents, wholesalers and distributors and UKSOL is very happy to talk about the opportunity to work in partnership with this innovative producer.

ECO4 OR AGAINST?

Is the pain worth the gain for installers?

MARK HYDE, Sales Director of Ronnan Corporation (Energy) Ltd is a successful Managing Agent for the Government's Energy Company Obligation (ECO4) Scheme that delivers funding for energy efficiency improvements for domestic properties across the UK. Here he talks us through the difference for installers between working in the 'able to pay' sector and working with the ECO4 market

In this current climate, some installers of renewable energy sources are solely concentrating on the 'able to pay' market whilst others are enviously eyeing the £4bn government funding available as part of Energy Company Obligation phase 4 (ECO4).

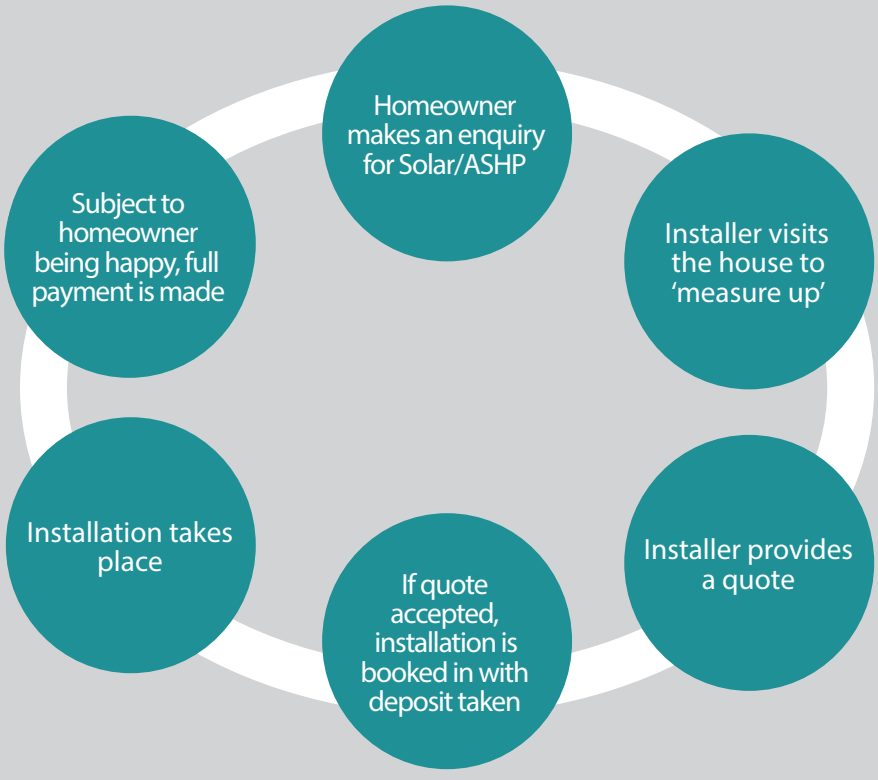
ECO4 is the latest version of the government scheme to improve the energy efficiency of certain homes but, before you load up the van with ASHPs or solar panels and go hell for leather, there is a framework to consider.

I must get three calls a day from installers who have heard about the scheme and, seeing their competitors undertaking ECO4 installations, they believe this to also be their best way forward. Whilst it's true that riches can be made from the scheme, the phrase 'no pain, no gain' springs to mind. The 'able to pay' and ECO4 market are, in my opinion, a world apart with vast differences.

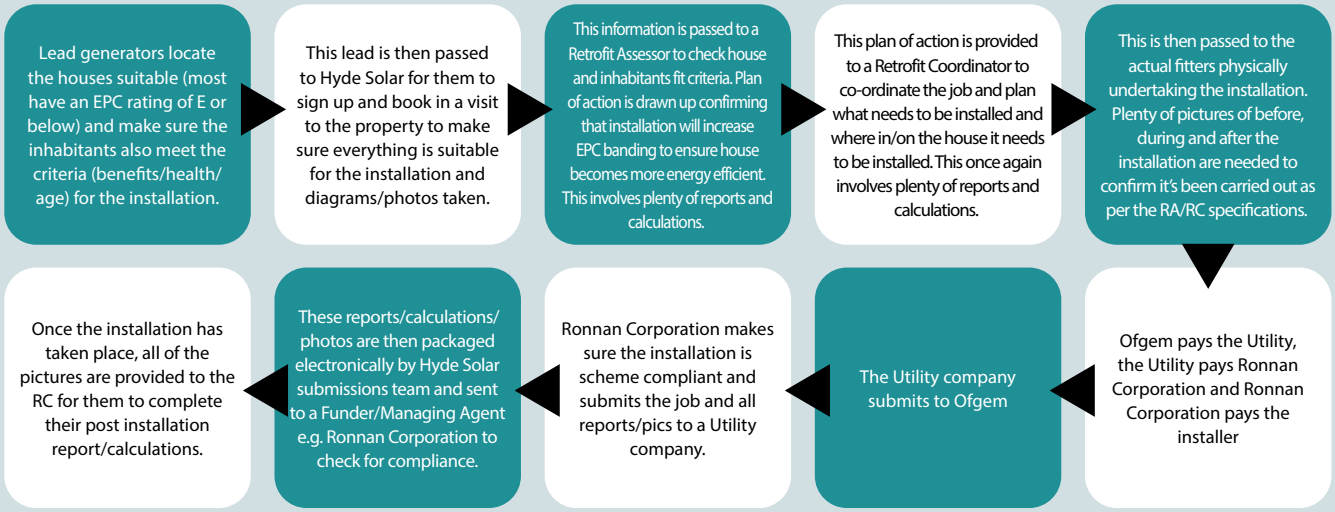
Rip it up and start it again

For an established renewable energy installer to be successful in ECO4, it requires ripping up the current business model and putting in place planning, strategy and very deep pockets at the start. Having had a call from an installer yesterday "wanting to get into the game", my advice straight away was to "Google: ECO4 Ofgem Guidelines…this will give you a riveting 280+ page turner guideline as to how the scheme works, what can be installed, who qualifies and what evidence is required to prove the installation has taken place".

I haven't personally worked within an installation business but, from conversations with those who do, I believe the current able to pay business model is something like this:



As I currently work alongside over thirty ECO4 installers, this, in a very brief nutshell, is the business model for an ECO4 installation business, such as Hyde Solar:



Significant differences

Hopefully this brief outline highlights the significant differences between 'able to pay' and ECO4. An Installer looking to decide if they are 'ECO4 or against' needs to have an understanding of a few key differences between the two business models.

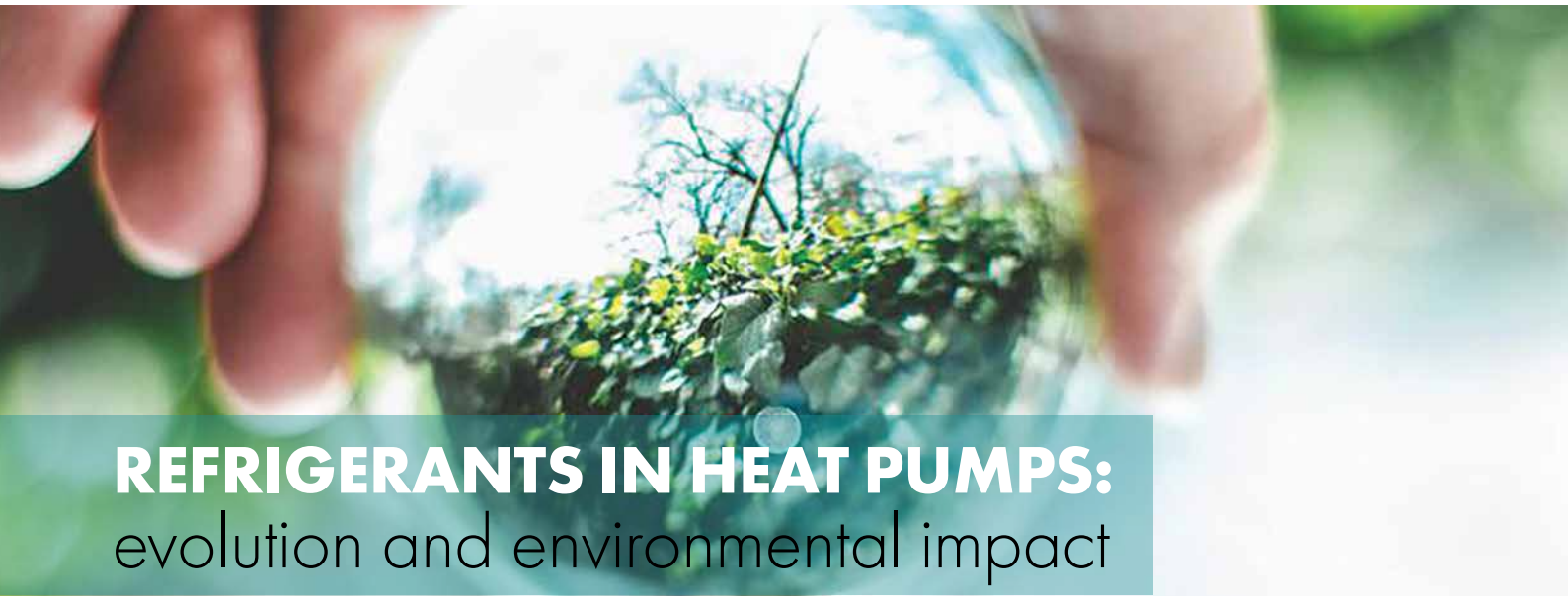
- Payments are received approximately 2/3 weeks after the installation has taken place so cash flow is a consideration.
- There is a potential increase in staffing costs i.e. Retrofit Assessor, Retrofit Coordinator, Submissions Team.
- ECO4 customers are different to those in the 'able to pay' market

Whilst there are challenges to making the switch into the world of ECO4 there is also a sizeable opportunity. With the potential for profit margins of 30-40% hopefully the above has given some insight and food for thought and not been too off putting.

As I stated from the outset: "no pain no gain".

If you have any questions related to working with ECO4 please contact REI Editor Margaret on ***margaret@renewableenergyinstaller.co.uk*** *so we can cover them in a follow up.*

Mark can be contacted directly via ***mark@ronnancorp.com*** *or on* ***07973 793878***



REFRIGERANTS IN HEAT PUMPS: evolution and environmental impact

ESSENTIAL to delivery of a low carbon future, heat pumps provide hugely energy-efficient climate control for homes and businesses. At the heart of these systems lies a critical element: refrigerants. In this article, we delve into the role of refrigerants in heat pumps, their evolution, environmental impact, and the quest for safer alternatives.

The role of refrigerants

Refrigerants are the lifeblood of heat pumps. They circulate through the heat pump system, absorbing and releasing heat to facilitate the transfer of thermal energy. Every heat pump uses either chemical or natural refrigerants.

The primary function of refrigerants in heat pumps can be summarised in four stages:

Evaporation: in the 'outdoor' unit, the refrigerant absorbs heat from the surrounding air or space, causing the refrigerant to evaporate from a low-pressure liquid into a gas.

Compression: the gaseous refrigerant is then compressed, which increases its temperature and pressure significantly.

Condensation: in the 'indoor' unit, the high-temperature, high-pressure refrigerant gas releases heat as it condenses back into a liquid.

Expansion: the liquid refrigerant returns to the outdoor unit, undergoing expansion on the way to

reduce its pressure and temperature to be ready to repeat the cycle.

Evolution

Over time, the choice of refrigerants used in heat pumps has evolved, largely due to environmental concerns. Early refrigerants were, most commonly, chlorofluorocarbons (CFCs) such as R12 and were very effective, but by the late 1980s it was discovered that CFCs were depleting the ozone layer and contributing to global warming.

To replace CFCs, hydrochlorofluorocarbons (HCFCs) like R22 were introduced which had significantly less ozone-depleting potential but still had a considerable global warming potential (GWP).

Today, environmentally friendly refrigerants are favoured for their lower impact on the environment.

The main refrigerants in use include:

1. R410A and R134a: Hydrofluorocarbon (HFC) refrigerants that have become popular replacements with zero ozone-depletion potential but still high GWP).

2. R32: Another HFC refrigerant gaining popularity for its lower GWP. It is considered more environmentally friendly, but it is still an HFC.

3. R290 (Propane): R290 is a hydrocarbon refrigerant with a significantly lower GWP than HFCs.

Concerns over Global Warming Potential (GWP)

The GWP of a refrigerant is a measure of how much heat a greenhouse gas traps in the atmosphere over a specific time period (usually 100 years) compared to carbon dioxide (CO2). Higher GWP values indicate greater warming potential. The goal is to use refrigerants with lower GWPs to mitigate climate change.

Impact considerations

The safest refrigerants in heat pumps are those with the lowest GWPs and minimal environmental impact.

Natural refrigerants like carbon dioxide (CO2, R744) and ammonia (R717), and hydrocarbons such as propane (R290) are among the safest options due to their low GWP and minimal ozone depletion potential.

They are gaining attention for their ecological credentials but come with their own challenges such as high working pressures or concerns over flammability.

Cost considerations

The cost of the refrigerants used in heat pumps is influenced by several factors including:

Type of refrigerant: Natural refrigerants like carbon dioxide (CO2, R744) and hydrocarbons (e.g., propane, R290) are often more affordable than synthetic refrigerants like some hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs).

Availability: The availability of a specific refrigerant can impact cost, with refrigerants that are widely used and readily available naturally more affordable.

Regulations: Government regulations and taxes can affect the cost of refrigerants. Some countries and regions have imposed taxes or restrictions on refrigerants with high GWP, which can increase their price.

In the choice of refrigerant for a heat pump system the initial cost of the refrigerant is a consideration, but it is also important to weigh the long-term environmental and efficiency benefits, as well as compliance with regulations.

The shift to propane

ISH, the world's leading trade fair for HVAC, held in March in Germany confirmed the new focus of the HVAC industry in Europe on offering an alternative to fluorinated gases in residential and commercial heating and cooling sector.

The last 12 months has seen a dramatic shift to the use of R290 and the manufacturers not exhibiting R290 were an absolute minority according to Jan Dusek, COO of ATMOsphere who commented: "We expect R290 air-to-water heat pumps to be deployed to market in the millions of units starting 2024."

Monobloc systems, usually located outdoors with the refrigerant hermetically sealed in the unit, are considered low-hanging fruit in the transition to natural refrigerants. Included in the European Commissions proposed EU F-gas Regulation is a ban of fluorinated greenhouse gases above GWP 150 in monoblocs from January 2025.

Panasonic launched its R290 heat pump in June and Jose Alves, Regional Director for the UK, Ireland, and the Netherlands, commented: "The Panasonic Aquarea L series of heat pumps introduces the natural refrigerant R290 to Panasonic's domestic air-to-water heat pump series (with a GWP of only 3). With the introduction of this exciting new unit, Panasonic is driving forward its GREEN IMPACT plan, as well as its vision for a carbon-free society."

The shift towards environmentally friendly refrigerants with lower GWP values further enhances the low carbon credentials of heat pump systems. As technology continues to advance, we can expect further innovations in refrigerants that balance performance, safety, and environmental responsibility.

Recom Technologies launches UK solar PV operations

INTERNATIONALLY renowned European solar manufacturer Recom Technologies has launched its range of solar PV in the UK as Recom Technologies UK.

According to MCS (the Microgeneration Certification Scheme), solar panel installations increased by 114% in Q1 2023, from the same period in 2022, with demand growth set to continue according to the certification body.

Targeting UK growth

Currently, the majority of solar PV installed in the UK comes from outside the EU, with around 80% of all solar panels and materials produced in China, despite solar tariffs imposed in 2018 and 2022.

Founded in 2007, Recom Technologies' top tier products, including PV modules, cells, inverters, and EV chargers, are designed and engineered in Europe. Launching its groundbreaking Black Tiger PV module range in June, hailed as the highest-performing panel on the global solar market, the France-based manufacturer is looking to the UK for growth.

Managing Director of Recom UK Jon Camp said: "There is a huge opportunity for solar installations in the UK, and we want to support the supply of high-quality, EU-manufactured products. At any given time, we keep 25mw of stock of PV solutions in Rotterdam ready to be shipped, which allows us to supply solar solutions to anywhere in the UK with a short turnaround time."

Jon, who has previously led major environmental innovation projects in the global petrochemical sector also has an eye on the commercial and solar farms market. "Recom is the only Bloomberg Tier One accredited solar PV manufacturer in Europe," Jon explains. "The growth of the solar market is increasingly attractive to investors, and we are ideally placed to support investors of large-scale projects."

Supporting UK customer base

As part of the UK launch, Recom UK has planned a series of keynote speaker sessions and is a main exhibitor and sponsor at Solar & Storage Live 2023, where the manufacturer will be showcasing its market-leading range of PV modules and renewable energy solutions.

Jon continues: "Since we launched our UK operations, we have been pleasantly surprised by how many inbound enquiries we have received from wholesalers, investors, and installers looking for high-performance European sourced solar panels.

'The solar PV market in the UK is set to continue to grow at pace. We are investing in UK-based storage and logistics to be able to supply the demand with a faster turnaround. We are listening to the market and working hard to support our growing customer base in the UK."

ESG: what does it mean for the industry future?

WITH Recom UK a main exhibitor and sponsor at Solar & Storage Live 2023, Jon Camp, managing director, is speaking in a keynote session on the subject of ESG, encouraging the solar industry to ensure ethical and sustainable principles are adhered to as demand grows at pace.

Seeing an opportunity to shape the future of renewable energy and create a more sustainable world, Jon highlights the importance of Environmental Social and Governance (ESG) in ensuring the reputation of the industry and delivering greater consumer confidence.

ESG is a set of standards covering environmental protection, social responsibility, and good corporate governance, and Recom is a company that is committed to upholding its own sustainability initiatives, providing the highest quality solar panels, whilst adhering to ESG principles.

As Jon comments: "We believe that, through continued innovation in the industry and increased focus on sustainability, the future of renewable energy is bright. That's why it's our mission to promote and support sustainable practices within the solar industry – for a brighter, more sustainable future.

"By understanding and actively engaging in ESG, the solar industry can be a beacon for responsible practices that benefit us all. Let's work together to make sure it stays that way!"

On pages 24 to 26 we consider in detail the challenges facing the industry if it is to deliver ethical solar.

Powering ahead: the UK's readiness for the EV mandate and the role of smart charging

THE UK government's commitment to achieving net-zero carbon emissions by 2050 and the introduction of policies, including the Electric Vehicle (EV) mandate, has accelerated the adoption of EVs. But is the UK ready for this electrifying transition? In this article, we explore the challenges posed by the growing EV population and how smart charging can alleviate pressure on the electric grid, boost consumer confidence, and promote a greener future.

The EV mandate: driving change

The EV mandate, set to be implemented in the UK, aims to ban the sale of new petrol and diesel cars, shifting the nation towards cleaner transportation alternatives. While this mandate aligns with environmental goals, it also places a substantial burden on the electric grid.

Despite the Prime Minister pushing the date of implementation back from 2030 to 2035, the UK is on the verge of a major transformation in the transport landscape as it gears up for the mandate. While the transition to EVs promises to be a significant step toward a greener and more sustainable future, it also presents unique challenges, particularly when it comes to the additional pressure it puts on an already creaking electric grid.

The grid challenge

Without proper infrastructure and management, increased EV adoption could strain the grid, leading to concerns about stability and reliability. As more individuals make the switch, the demand for charging stations will surge. Without smart solutions, this could lead to overloaded grids during peak hours, creating inconvenience and deterring potential EV buyers.

Addressing this is crucial to delivering consumer confidence and the integration of smart charging technology has a pivotal role to play in overcoming these challenges, boosting consumer confidence in making the switch to EVs, and driving demand for home charging solutions.

Smart charging: the solution

Smart charging technology holds the key to overcoming these challenges.

By utilising advanced technology to optimise EV charging the burden on the grid is reduced, delivering benefits to consumers and utilities alike.

Reducing peak loads: one of the primary benefits of smart charging is its ability to stagger the charging process, minimising the draw of electricity during peak hours. By spreading out charging sessions, smart chargers help reduce the strain on the grid. This not only ensures a stable and reliable power supply but also lowers the overall electricity cost for consumers.

Minimising energy waste: smart chargers are equipped with advanced algorithms that optimise charging based on factors like electricity rates, grid demand, and the vehicle's battery status. This means that EVs are charged when electricity is abundant, reducing energy waste during off-peak hours.

Promoting renewable energy: many smart chargers are designed to prioritise renewable energy sources when they are available. This not only reduces the carbon footprint of EVs but also supports the integration of renewables into the grid.

Grid integration

Smart charging is not just about optimising individual EV charging sessions; it also plays a crucial role in grid integration. Utilities can use smart charging data to better manage energy resources, forecast demand, and allocate resources more efficiently. As a result, the growing EV population will be better accommodated without the need for significant infrastructure upgrades, reducing the overall cost of the transition.

Smart charging technology integrates seamlessly with the electric grid, and delivers several advantages:

Grid flexibility: Utilities can remotely control and manage charging sessions, enabling them to balance grid demand and supply effectively.

Load management: By directing charging sessions to times when the grid is underutilised, utilities can avoid costly investments in grid expansion, ultimately benefiting consumers.

Consumer benefits of smart charging

Affordability: smart charging technology is becoming increasingly affordable, making it accessible to a broader range of EV owners. Additionally, optimising charging times can lead to cost savings on electricity bills.

Convenience: smart chargers can be controlled remotely through smartphone apps, allowing users to schedule charging sessions at their convenience. This flexibility fits seamlessly into users' daily routines.

Environmental responsibility: by prioritising renewable energy sources and reducing energy waste, smart charging promotes a more environmentally responsible approach to EV ownership.

Conclusion

The UK's readiness for the EV mandate hinges on its ability to manage the pressure on the electric grid effectively. Smart charging technology offers a promising solution to this challenge, by reducing peak loads, minimising energy waste, and promoting the use of renewable energy.

Furthermore, its integration with the grid allows utilities to accommodate the growing EV population without requiring massive infrastructure upgrades.

With its affordability, convenience, and environmental benefits, smart charging is set to play a crucial role in accelerating the uptake of EVs and driving demand for home EV charging installations, ultimately leading to a cleaner and more sustainable future for transport in the UK.

Hanchu 9.4kWh Blade lithium battery:

the first battery to integrate Blade technology

IN TODAY'S ever-evolving world, the need for efficient, reliable, and safe energy storage solutions is paramount. One name that's breaking ground in this arena is Hanchu, with its innovative 9.4kWh Blade lithium battery. This state-of-the-art battery is the only technology to pass every global standard for lithium batteries. The forefront of modern battery technology, ensuring both unparalleled efficiency and utmost safety.

Safety first: blade lithium cells

One of the most significant concerns with any energy storage solution is safety. Lithium batteries, while being incredibly efficient, have sometimes raised eyebrows due to the risks associated with their chemical makeup. However, Hanchu's Blade lithium cells stand out in this respect.

Blade lithium cells are known for their inherent safety features. Unlike traditional lithium-ion cells, blade cells minimise the risks of thermal runaway, a common cause for battery fires. Their unique design allows for better thermal management, ensuring that the battery remains cool during operations.

Integrated fire capsule: a protective shield

Safety isn't just about preventing incidents; it's also about minimising the impact should an unforeseen event occur. The Hanchu 9.4kWh Blade lithium battery comes equipped with an integrated fire capsule. This revolutionary feature ensures that, in the unfortunate event of a building fire, the battery remains protected from any interactions that could start a chemical reaction which can take many days to subside. This safety layer is a testament to Hanchu's commitment to user safety and protection of property.

Hanchu's unparalleled warranty and online support

The confidence in a product's durability and performance is often mirrored in its warranty. Hanchu Lithium batteries come with an impressive 12-year manufacturer warranty. Such a long warranty period speaks volumes about the quality and durability of the product.

Additionally, the company doesn't just stop at providing a physical product. Hanchu batteries are integrated with individual online and app monitoring. This ensures that users receive timely firmware upgrades and continuous manufacturing support, enhancing the battery's lifespan and performance.

Compact, lightweight, and user-friendly design

Despite its power and capabilities, the Hanchu 9.4kWh battery is 40% lighter and 40% smaller than its counterparts. This compact design ensures that it can be easily integrated into various settings without taking up significant space.

Moreover, the battery is equipped with an integrated DC battery breaker, ensuring safety during operations. The LCD display is a user-friendly addition, providing clear insights into the battery's performance and status. Whether you wish to wall mount it or place it on the floor, the choice is yours, thanks to its versatile design.

Depth of discharge and efficiency

One of the standout features of the Hanchu 9.4kWh battery is its 95% depth of discharge. This means that the battery can be discharged to 95% of its capacity without any adverse effects on its lifespan or performance. Such a high depth of discharge ensures maximum utilisation of stored energy, translating to better efficiency.

In conclusion

The Hanchu 9.4kWh Blade lithium battery is not just another battery in the market. It represents the future of safe, great looking, efficient, and user-friendly energy storage solutions. With its unmatched safety features, long-lasting warranty, lighter weight ratio, and state-of-the-art monitoring and support, it's clear that Hanchu is setting a new benchmark in the battery industry.

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UK launch for SOLAR MONKEY offers installers vital time savings

Following Netherlands-based Solar Monkey's launch into the UK market, Renewable Energy Installer speaks to Jan Pieter Versluijs, one of the company's co-founders, to find out how this innovative software came about and what it will bring to UK installers.

HERE JAN PIETER takes up the story of how it all began. The initial idea for Solar Monkey came in 2015, but we actually started in 2016. My co-founder and I, we basically had two passions, one being sustainable energy – solar energy in particular – and the second, entrepreneurship.

Guess where those two perfectly align? That's Solar Monkey.

Once an entrepreneur

I first met my co-founder Mels in Delft where we were both at the university studying for masters in sustainable energy technology and then I worked in the UK for three years for a UK consulting firm called Newton Europe.

Before that, I had run a few businesses and once an entrepreneur… it stays in your mind. I wanted to be an entrepreneur again because that's my biggest passion, having a vision and an idea, building something from scratch and seeing how this becomes reality and eventually starts living on its own. It's something I enjoy greatly as well as adding value to the delivery of sustainable energy – driving and accelerating it as much as possible.

So back to 2015, and Mels was working on a project developing algorithms to calculate the energy yield of solar installations to a high degree of accuracy. What was really special about it was that he created an all-side measurement, like a 360-degree image, allowing consideration of the effects of shade on the panels resulting in a very accurate yield calculation.

To be honest, it didn't seem a great idea initially because it wasn't scalable to visit every location to do on site measurements. Six months later we discovered there was already a 3D point cloud available – a 3D model of the whole of the Netherlands. That was a game changer as it enabled us to build software to do all those things remotely, removing the requirement to visit sites.

So that's really where Solar Monkey began – creating software that allows installers to do all their work remotely – remote design, calculation and quotation – but using the 3D modelling to do this with a very high accuracy.

Q Have you found that the same data is available for every country that you've expanded into?

Sadly not, it doesn't have 100% coverage, but, if there is no 3D data the software also runs on available aerial imagery. And I'm very happy to say that this 3D data is becoming more widely available every year which is very good news for us.

Although it runs without it, the addition of 3D data adds some very nice features because it's able to automatically calculate the roof tilt as well as the shading due to nearby obstacles, which gives you a more accurate energy yield calculation on your solar insulation.

Q What about the data available in the UK?

We are proud to say that we have recently released the functionality with 3D data to all our UK clients. This means that they also benefit

from automated shading analyses. We will also soon launch automated roof tilt detection.

Q With the modelling the Solar Monkey system does, are there additional steps that installers need to take to ensure the most accurate calculation and the best system design?

What we're aiming to do is to remove much of the need for a site visit by using the existing data.

We have a lot of clients who don't even visit the site prior to the installation. Some still do because you can't work out everything remotely, such as where to place the inverter, or the roof condition – some things are still nice to check on site. But a lot of the work, especially the calculation and quotation, can now be done remotely which is a huge efficiency gain for our clients.

Q How did you initially roll it out to installers in the Netherlands and get them on board?

It's always tough to start something new when your resources are very limited. There were just three of us – me and the co-founder, who made part of the software, and our Chief Technology Officer who joined soon after (and is still with the company). I was doing all the sales and marketing myself.

A mistake that a lot of very technical young companies make is to keep developing their product – too shy to take it to market. My approach is different. I will say 'let's just throw it into the market and get as much feedback as possible' even when the product is still very basic. With the feedback from those who initially took the leap, we've been able to develop the product much further towards the needs of our clients.

We still speak regularly with our first ever client, who is still a client and a very happy user, and, of course, they get a good deal.

We love involving our clients and engaging them in how we continue developing – they are who we built the product for.

Q How rapid was the growth once you had a finished product to take to market?

I would say the first good product version was in 2017, and things progressed rapidly from there with figures pretty much doubling every year. We saw 100% growth that first year and that has always been our target.

It's rapid growth but you still need to onboard new clients and further develop the product. There's a lot to consider in an expanding business but we're happy that we're growing quite rapidly, already active in five countries in Europe, and hoping to expand to the rest of Europe within a couple of years.

Q What have been the challenges in scaling across geographies?

There are many of them with differences between countries – subsidy schemes, hardware materials and also differences in culture.

It means you have to consider how best to do business. There are nuances to consider. Do you work with local people with boots on the ground over there? Do you run it from your home country?

We've learned a lot along the way.

Q Who is your typical customer?

There's a broad range. Anything from a business with a couple of people up to the huge utility companies, and everything in between.

Whatever the size of the business, the value proposition is very similar for all of them. Solar Monkey is an easy to understand, simple and quick to use piece of software that helps them to be much more efficient and effective. So, we help them to grow much more easily.

> "The time saving is definitely the key thing. It takes just 1 to 2 minutes to do a full design calculation and quotation compared to having to visit the location or using old school modelling software that would take hours to model. It's a huge time saving!"

It works with any panel specifications. In the background we make sure that we have the whole active portfolio of panels, inverters, etc., in our database, so clients can just say which panel type they intend to install and it will automatically calculate the right return on that panel for the system they're specifying.

The software enables them to drag and drop the panels on top of a roof, choose an inverter and choose a consumption profile. Then it calculates how much energy that client will consume and how much will be fed back into the grid. By using all this information, automatically calculated, it generates the quotation which can be customised according to the client's requirements and branding.

Generally, their customers wouldn't see the quote that is generated by Solar Monkey but some of our clients like to show that and use it as a quality stamp for accuracy.

Q You've obviously mentioned the increased efficiency; what are the other main benefits to an installer of using Solar Monkey?

The time saving is definitely the key thing. It takes just one to two minutes to do a full design calculation and quotation compared to having to visit the location or using old school modelling software that would take hours to model. It's a huge time saving!

Also, because it's very simple in its usage, anyone can use it. Most of our users are commercial people, not engineers. Some are not even very tech savvy, so we make it super simple to use. That simplicity also makes it super simple for our clients to scale-up because they can recruit commercial people to create the quotation even while they are on the phone with the client.

Another thing we pride ourselves on is good customer service and a good customer service team. We have people who proactively help our clients to get the most out of our software and to integrate it with existing processes.

Q Is it an online training system?

When a new client signs up, we will get in touch and organise online training courses for them. For larger clients, we can also provide on-site training courses if there are many users to onboard.

Q Is it based on a licence fee?

It's a usage-based licence. You can buy a certain number of projects per month, so that you commit to that number. The higher the commitment, the lower the price per project.

Q Is there any difference in the cost if a quote is used in an installation?

No difference at all. Once they've designed the system, if their customer goes ahead with it, there's no additional charge for that being a delivered project. To us the quotation is the value that is delivered by our software. Whether it's accepted or not, is up to them. We do our best to make the quotation as appealing as possible to help them to sell but after that, it's up to them.

Q As you expand into new markets, have there been any concerns or resistance to using the product?

It depends on the market. The UK has been very good. We first dipped our toe in the water with a very basic stand at a conference in the autumn last year.

We had people queuing up for our stand! The market has been pretty quiet from 2015 to 2020-2021 but now we see the market really picking up again. There are a lot of new entrants in residential solar so that, in combination with our research, this tells us the UK is a good growth market with lots and lots of installers that could benefit from our software.

Q There is a lot of talk in the UK about insufficient installer numbers. Time tied up with site visits, system specification and creating quotes means less time delivering installations. I guess Solar Monkey would be seen as way of alleviating that.

The time we save depends very much on the user. Some are quite efficient already but quite a few still work by visiting the location and measuring the roof dimensions by hand. Then they draw on a piece of paper how many solar panels that they can fit on the roof, do some calculations in Excel, copy paste all that stuff into a Word document with the whole process taking anything from half a day to a whole day.

Imagine their sales conversion might be one out of five so they have to do that five times, spending half a week to a whole week on this process alone, to get one install. Now imagine replacing that with a process that only takes a couple of minutes per quotation. That makes a huge difference, a huge impact!

Q Is the house specific data available for every house?

The aerial imagery, definitely, yes. With regard to 3D data, as we mentioned before, we have the data now in most urban areas. For a house at a very remote location, you can still use the software, but based on aerial imagery alone so a little bit less accurate, but still usable.

Q Does the product evolve all the time?

Yes, constant evolution. It's the big advantage of a web-based solution. We can continuously update, and our users will continuously benefit.

Q Tell us about your hopes for the UK market?

For us it's a new market, a new adventure. We have a local UK representative, and we were just very eager to dive in. For me personally I have a bit of history because I worked in the UK for three years, so it feels a little like coming home. .Also, solar is taking off in a big way in the UK, with rooftop installations doubling last year.

I'm really looking forward to visiting the UK more often, to meet old colleagues and I'm just very eager to be in the market as I truly hope that we can add a lot of value there.

Going back to my initial motivation, of accelerating the delivery of renewable energy, you can understand that.

We're a bit idealist here. Of course, we are running a business and the money we generate is the fuel to drive us forwards, but we are genuinely very passionate about solar energy and sustainable energy in general and adding value in any way we can.

Q What will success look like in five years' time?

When we enter a market, we want to have a significant impact. Our aim is that around 25% of all the installations in the country will have benefited from our software.

Testing times: solar safety and performance

ROB BARKER is the director of Power Quality Expert Ltd and has over 25 years' experience in electrical test and measurement. Specialising in power, energy and harmonics, Rob established Power Quality Expert as a specialist provider of Power Quality and Harmonic Surveys, BS:EN50160 Compliance Reports, UNIPEDE assessments, Energy Load Profiling and Power Quality Training.

Studying Information Technology at Salford University ignited an early interest that has grown into a passion for electrical test and measurement. From his early days in sales of electronic test equipment, Rob's deep technical understanding saw him involved in new product launches and the development of new electrical test equipment as well as educating distributors and end users on the benefits and applications of electrical test equipment, primarily in the power quality and high voltage sectors.

Realising that a lot of equipment sales were going to those who didn't understand the outputs, Rob took a decision, in 2007, to set up his own company – Power Quality Expert – to provide power quality and energy survey solutions direct to clients and electrical contractors as well as through a network of selected electrical test equipment distributors.

His passion for the subject also sees Rob provide power quality training, seminars, webinars and tech-talks to help educate and inform on power quality topics and issues as well as submitting and advising on technical papers on power quality and energy.

With accelerating growth in the solar sector and PV set to play an increasing role in energy delivery, Rob looks at the importance of testing installations for both safety and performance.

The very rapid and dynamic development of photovoltaic installations that has been taking place in the world in recent years is impressive. It is largely driven by a desire to move away from traditional, non-renewable energy sources. Greater social awareness and a desire by government to encourage people and businesses to take responsibility for the climate around us has forced a shift in the energy sector towards green energy.

Alongside the moral imperative, we have also seen the technology constantly evolving, which is resulting in lower costs for consumers to adopt solar PV solutions. This, combined with the constant increase in energy prices, makes an economic shift more and more favourable for the photovoltaic sector and is a key factor moving customers towards further investment in solar PV systems.

Safety and efficiency

With an increasing push for energy saving, and resultant sector growth, it is important to remember that testing the safety of the photovoltaic installation and the servicing of these installations is a growing business. Because of this, it is very important that the installation complies with all safety requirements after installation and that its operation complies with the applicable regulations.

We can only be sure of this by carrying out the appropriate test and inspections and periodic checks. The requirements for these are described in Section 712 of the 18th Edition Amendment 2 of The Wiring Regulations (BS 7671) along with the standard EN 62446 (Photovoltaic (PV) systems – Requirements for testing, documentation and maintenance).

These are the standards that set the minimum requirements for installations and safety. The standard also defines the method and scope of safety control of photovoltaic installations.

Measurements allow you to determine not only the safety, but also the efficiency of a photovoltaic installation. The EN 62446 standard divides the tests into category 1 and 2 tests and additional tests.

The right tool for the job

A meter such as the Sonel PVM-1020 allows you to carry out all measurements for the obligatory category 1, which include:

- Measurement of open circuit voltage (for a single panel or a string of PV panels) up to 1000 V DC
- Measurement of short-circuit current (for a single panel or a string of PV panels) up to 20 A DC
- Measurement of the operating current of PV panels with the use of external clamps
- Polarisation test
- Measurement of insulation resistance of PV panels with a test voltage of 250, 500 or 1000 V, simultaneous measurement of two values (plus to earth and minus to earth)
- Measurement of resistance of protective connections and equipotential bonding with ±200 mA current

Additionally, it is possible to perform measurements not included in category 1, which are found in everyday measurement practices. These are:

- RMS voltage of AC network up to 600 V and frequency
- Insulation resistance of AC circuits with the test voltage of 250, 500 or 1000 V
- AC current
- AC/DC power
- Low current resistance with audible and visual signalling

- Diode test with 200 mA current with automatic polarity detection
- Blocking diode test with 1000 V DC voltage

By measuring the parameters of the PV installation, such as the short-circuit current Isc or the open-circuit voltage Uoc, you can quickly verify the correct connections of the modules in the string, their polarity and operation.

Measurements can be made for the entire chain of panels or for a single module. The continuity of protective connections and the grounding resistance on the DC side are measured in the same way as in AC installations.

In the case of insulation resistance tests, the difference is that the measurements are carried out under voltage, therefore special care should always be taken.

The values of operating currents and power on the DC and AC sides must be checked during the operation of both installations.

Based on these measurements, we can verify the efficiency of the inverter and compare it with the efficiency declared by the manufacturer.

Standard test conditions

The manufacturer of the inverter will usually specify the parameters of individual elements of the PV system which are measured in STC (Standard Test Conditions: 25° C, 1000 W/m^2, AM 1,5). For comparison purposes, solar installation testers, such as the Sonel PVM-1020, can automatically convert the results to STC conditions.

This is done by the use of an irradiance and temperature meter such as the Sonel IRM-1.Both meters cooperate with each other and normally work over long distance through radio link. The automatically transmitted data is then converted to measurement values of short circuit current and open circuit voltage referenced to the standard STC conditions.

In any rapidly growing sector, there is always a temptation to increase profitability by reducing quality with a resultant decrease in the safety of the installation as well as an increase in the risk of operating and servicing the facility.

Acceptance testing and periodic checks are the only way to ensure both the safety and efficiency of an installation and significantly reduce the risk of poor performance or far worse, electric shock or fire.

Solar with a conscience: the path to ethical energy

The UK's solar energy output reached historic heights in 2022. With 111,500 new solar PV systems installed, renewable energy's share rose significantly to 41.4%. With more than a million homes now benefiting from solar panels, we can safely say that the benefits of solar are widely understood.

THIS MAY be cause for some celebration, but our work is far from done. For solar to be a genuinely ethical solution and a firm part of the move towards decarbonisation, it's time to get serious about the realities of the social and environmental impact at every stage of the solar journey.

While the industry was focused on generating demand, showcasing the benefits of wide solar adoption was the priority. It became easy to dismiss the challenges or complexities involved in the transition, or the ethical dilemmas at play. But as the world has become more solar savvy, it's up to everyone in the solar industry to champion a responsible transition to sustainable solar energy.

Here are some of the challenges we must consider to ensure that the rise of solar provides a lasting solution for our people and planet.

With the right education, goals and tools, every installation can truly contribute to a brighter, greener future.

Empower the consumer to make ethical choices

A recent report from the Royal Institute of Chartered Surveyors (RICS) revealed that solar panels now rank as the third most valued home improvement, behind only new windows, and bathrooms / kitchens. In the survey, over 33% of the consumers polled favoured solar over other renovations. However, this figure rises to over 50% when looking at the perspectives of homeowners between the ages of 18 and 30.

As younger and more environmentally conscious generations get on the property ladder and, with the same study showing that the lifetime value of a property is significantly increased after solar panel installation, this trend is likely to continue.

The same RICS survey showed that upfront costs are still the biggest barrier to uptake of domestic solar, with 46% of homeowners saying they would be more likely to move forward with a solar installation if they had access to a finance product such as a green mortgage or government loan that removes this financial hurdle. If such an option becomes available, we can expect popularity to further surge.

This rise in people seeking solar solutions is brilliant for our industry, but we can't let the service and education we offer suffer as uptake becomes more mainstream. Where consumers are looking for authoritative guidance, it's the job of trusted industry professionals to give advice that balances the benefits with the costs, as well as the ongoing ethical considerations.

Understand the carbon footprint of solar panel production

Amidst this surge in solar adoption, we must advocate for greener choices in panel production. The encouraging drop of more than 80% in global solar panel costs over the last decade offers an opportunity to prioritise low-carbon alternatives without price being a deal breaker.

This puts a burden on manufacturers, suppliers and installers to keep finding options for all budgets, with a focus on encouraging the greenest options.

While prohibitive pricing historically forced suppliers to prioritise affordability, we're no longer in an age where we need to cut corners or ignore important factors for the greater good of cementing the market presence of solar. Environmental costs are just as important.

It's time to interrogate the carbon footprint of every stage of the process.

- Seek out products with domestically produced materials to reduce the environmental impact of the transportation of goods.
- Look for factories using lower emission or renewable-powered manufacturing processes.
- Investigate products with advances in technology that equate to greater lifetime carbon efficiency, such as thin-film solar.

Demanding transparency from suppliers around how green their manufacturing methods and materials really are, where their products are generated and sourced, and switching to alternatives with a proven lower environmental impact are all key to lowering the lifecycle carbon footprint of panels.

Human rights and safety concerns in the supply chain

Is clean energy worth the potential human cost? As the rush for materials accelerates to keep up with the long-awaited demand for solar power, there is increased focus on keeping costs low.

Historically, these budgeting measures have often been at the expense of human rights. We must not let the social conditions of production go without scrutiny. This is important at every stage of the process, from the retrieval of raw materials through to assembly and distribution.

As the UK government aims to create 60,000 solar industry jobs by 2035, we must ensure these jobs come with fair wages, safe working conditions, and respect for human rights. Where possible, the same pressure should be put on our partners abroad.

2015's Modern Slavery Act provides a framework for organisations of all sizes to combat poor, dangerous or exploitative practices in the businesses they work with and is the minimum you should demand. Pushing further to demand proof of ethical treatment at all stages within the supply chain is crucial.

The recycling challenge of solar panels

With most reputable manufacturers offering production warranties for 25 years or more, the expectation of the life of a solar panel is currently around 30 years. The disposal process was a distant concern when domestic solar was new and uptake slow but is now becoming a pressing problem. The staggering growth of solar installations necessitates responsible end-of-life disposal solutions. Otherwise, we run the risk that the sheer amount of waste product generated will cause potential harm that far outweighs the environmental benefits in the long term.

Recycling can, and should, be built into the lifecycle of solar installations. Recoverable assets from effectively recycled panels can yield materials equivalent to two billion new panels by 2050, which has the potential to make this a truly sustainable ecosystem from end to end.

The announcement by the Biden-Harris Administration to invest $82 million in domestic solar manufacturing and recycling underscores the global importance of recycling in the solar industry. We should advocate for similar measures in the UK. This could include ensuring that there is adequate support for suppliers seeking to use recycled materials in their manufacturing process, and for those looking to implement effective recycling programmes as part of purchase plans.

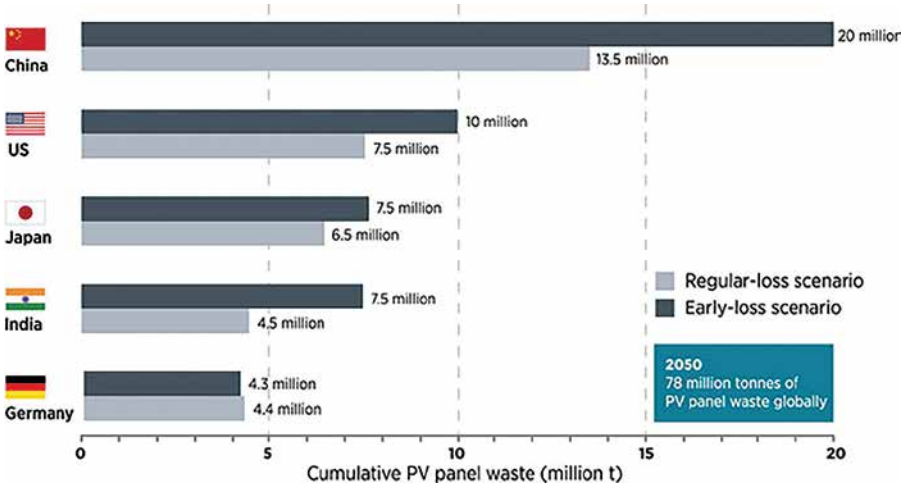
Products with a longer lifetime would also reduce the need for recycling at the pace we're currently faced with, reducing the burden on the industry. Evolving technologies with greater longevity, such as solar slate tiles, will improve in efficiency, enabling them to be more broadly considered as alternatives to panels.

The industry plan for truly ethical solar so far

The number of considerations needed to ensure long-term social and environmental responsibility can be overwhelming. Only through collective effort will we drive innovation, advance greener production methods, and ensure solar delivers its long-term potential ethically. It is good to see the industry is working towards this, laying out guidelines and expectations.

- **Solar Energy UK** states that one of its top priorities is 'to help ensure a sustainable and ethical solar supply chain globally' and its Responsible Sourcing Task Group works with experts to develop a robust and comprehensive programme, responsible procurement guidance is available online, with a more advanced toolkit available to members.
- **The UK's ESG** (environment, social and governance) reporting requirements, and the standards that frame them, are a key part of understanding the impact of the companies you work with. These are constantly evolving based on UK, EU and global regulations, and will soon include a necessity for disclosure of net zero transition plans for certain organisations.

You can be a part of the future of these goals, guidelines and regulations. It is the job of the grassroots and frontline community to provide ongoing, up-to-the-minute consultancy about the realities of domestic solar installation and maintenance. This ensures that any new proposals from government or industry bodies deliver long-term sustainability, and don't overlook key factors that could prohibit genuine results. Knowledge, practicality and on-the-ground impact are all key to a sustainable solution.



Be part of the future

How can we ensure that we're actively working towards a responsible UK solar industry? Here are 10 steps to get started.

1. Stay informed:

Stay updated on industry initiatives for environmental and social responsibility, and the latest laws and advice. Remain engaged with organisations like Solar Energy UK.

2. Have your say:

Be active in the solar community, engage in conversations with regulatory bodies, local government officials and campaigning groups.

3. Educate consumers:

Empower customers with information about the ethical complexities of solar panels, helping them make conscientious choices based on more than simply cost.

4. Advocate for recycling:

Support suppliers with recycling programs or incentives for the return of old panels. Get to know the latest responsible end-of-life solutions so you can utilise and promote them.

5. Consider new technologies:

Whether it's solar slate or thin-film technology, exploring the adoption of materials with increased longevity or a lower lifetime carbon footprint could be the key to responsible solar.

6. Support responsible production:

Whenever feasible, choose suppliers who offer domestically produced panels to reduce the carbon footprint associated with shipping, as well as prioritising products that have a lower emissions manufacturing process, or one powered by renewable energy.

7. Promote human rights:

Prioritise suppliers with ethical labour practices, fair wages, and safe working conditions in their manufacturing facilities. Use the Modern Slavery Act as a starting point.

8. Demand transparency:

Require detailed information on manufacturing methods, labour practices, and carbon emissions from everyone you engage with in the solar industry. Use the latest ESG standards to guide what you demand, and what you're looking for in response.

9. Keep suppliers aware:

Express your ethical expectations to the suppliers you work with to encourage them to adhere to high ethical and social standards.

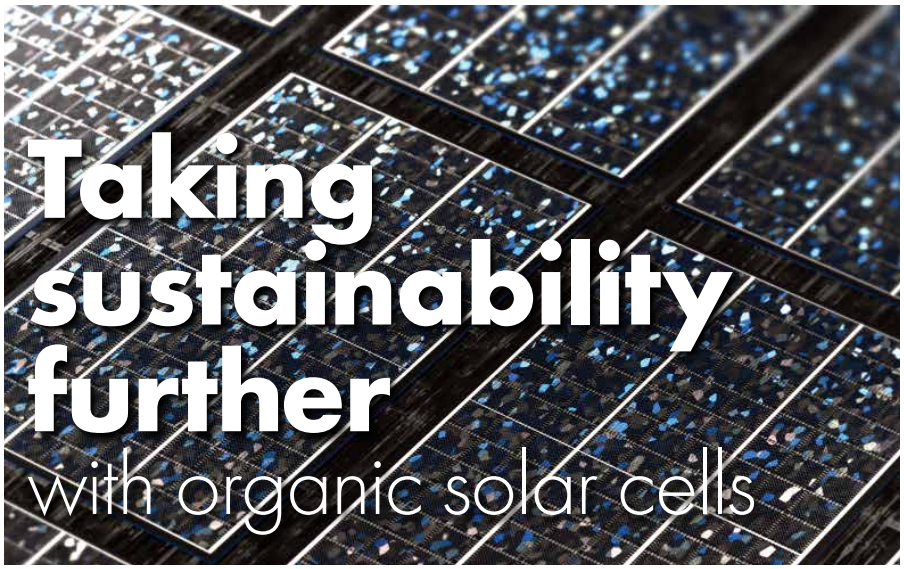
10. Be ready to switch:

If your current suppliers fail to meet ethical or social criteria, be prepared to switch to those aligned with your values. Explain your decision to send a clear message to the industry that ethical solar matters.

A truly green alternative

Our actions, as the solar industry, directly influence consumers. Prioritising ethical solar practices empowers customers to make informed, conscientious choices, and builds confidence in a sustainable energy transition. With a projected increase of over 450,000 UK residential solar PV installations per year by 2030, it's time for sustainable solutions now if we are to be successful in our mission to become a carbon neutral nation by 2050.

As long-term advocates of the switch to solar, it's great to celebrate the astounding recent growth in the sector as well as the progress made so far. But we cannot forget our shared responsibility. The glow of solar power will shine even brighter if we promote a legacy of genuine, sustainable decarbonisation – at installation and beyond.



Taking sustainability further with organic solar cells

THE UK government aims to increase solar capacity by nearly fivefold to 70GW by 2035 as part of wider plans to power up Britain with cleaner, cheaper and more secure energy sources. Although traditional silicon-based solar panels have paved the way for a cleaner future, there is a pressing need to address their environmental impact, particularly when it comes to end-of-life disposal and waste generation.

Here, Professor Franky So, Chief Technology Officer at solar technology specialist NextGen Nano, discusses the role organic solar cells (OSCs) can play in addressing the issue of solar panel waste.

According to Statista, widespread adoption of solar panel technology started in the early 2000s and has been increasing exponentially every year. With the average usable lifespan of solar panels being 25 to 30 years, we can soon expect to see a sharp increase in the number of panels needing to be replaced and recycled.

However, the BBC article – Challenge to stop solar panels becoming a 'waste mountain' – published in June 2023, highlighted the lack of recycling facilities specifically designed to process solar panels mainly due to the fact there has not been much waste to process until now. In fact, the world's first facility dedicated to this opened in June 2023.

A rapidly growing problem

In the article, Ute Collier, deputy director of the International Renewable Energy Agency states that: "By 2030, we think we're going to have four million tonnes of scrap – which is still manageable – but by 2050, we could end up with more than 200 million tonnes globally."

Traditional solar panels, particularly those based on crystalline silicon, pose challenges when it comes to recycling. Their complex structure, composed of multiple layers including silicon wafers, glass, metal conductors and encapsulants, requires specialised, energy-intensive processes to disassemble and separate materials. Additionally, some components, like lead and cadmium in soldering materials, are hazardous, demanding careful handling during recycling.

So, what can we do to make solar technology more sustainable from the start?

Making solar power organic

Organic solar cells are made from carbon-rich (organic) compounds, as opposed to the silicon in traditional solar panels. Their structure consists of a flexible and transparent substrate as the base, topped with a transparent conductive electrode to allow sunlight to enter.

The active layer absorbs sunlight and generates electron-hole pairs. On top of the active layer is the hole transport layer, which transports holes to the transparent electrode, and below is the electron transport layer, responsible for moving electrons to the bottom electrode. The bottom electrode collects the electrons, completing the electrical circuit.

The organic polymers that make up OSCs can be designed with recyclability in mind. Some of these organic materials can be broken down and reprocessed, enabling the recovery of valuable components. Additionally, the solution-based manufacturing processes used for OSCs, such as printing or coating, allow for the deposition of thin layers on flexible substrates. This characteristic makes it easier to separate and recycle different layers.

Due to this structure, OSCs can be compatible with existing recycling methods developed for plastic films and other flexible materials. However, it is important to note that the recyclability of OSCs is still an active area of research and development, with specific recycling technologies and infrastructure for them not yet fully established.

Currently, OSCs have lower efficiencies compared to inorganic cells, which generally range from between 15 and 25 per cent.

Ongoing research, like that conducted at NextGen Nano, aims to improve efficiency and stability. Pairing the benefits of organic cells with efficiencies that are comparable to traditional solar cells will facilitate their adoption, bringing a more environmentally friendly and recyclable solar power solution to the market while reducing future waste issues.

NextGen Nano's OSC technology replaces the rigid and opaque silicon substrates of traditional solar panels with thin, lightweight, and tuneable substrates based on fluorine-doped tin oxide (FTO). This shift empowers OSCs with versatile functionalities, allowing them to be integrated into nearly all surfaces, from windows, walls, car roofs and even portable electronics.

The company's organic solar cells have attracted significant attention for photovoltaic (PV) applications due to their special merits of intrinsic flexibility, lightweight, high throughput large-area printing, and low-cost and non-toxic raw materials.

NextGen Nano's mission is the efficient creation and use of energy whilst reducing all reliance on pollutants and finite materials, and thus having a deliberate positive environmental impact.

The company has three main divisions: organic solar, organic displays and superfluorescence for quantum computing.

Find out more here: https://nextgen-nano.co.uk

About the author

Dr. Franky So is a highly accomplished researcher with over 80 patents and 160 peer-reviewed articles. He is renowned for his editorial roles in prestigious journals and his distinguished career, which includes leadership at Motorola and a current position as the Walter and Ida Freeman Distinguished Professor at North Carolina State University.

Latest developments in solar PV: which are the game changers?

Solar power and, in particular, solar photovoltaics (PV), is quickly becoming one of the most rapidly expanding and exciting renewable energy technologies. The reason for this is the versatility of the technology. It can be utilised on a small-scale for individual homes, mid-scale such as large industrial rooftops, and large-scale such as solar farms both onshore and offshore.

IT ALSO plays a significant role in developing economies, where villages not connected to a local grid can be electrified using directly connected solar panels.

Rapid advancement in technological developments will see even greater proliferation of PV with the emergence of innovations such as transparent solar, which can be deployed in windows, and further developments in direct integration into devices such as smartwatches, phones and laptops to extend battery life without having to connect a charger.

Briefly visiting the history of solar PV, we look at what these technological advancements and breakthroughs could look like and what the future holds for this versatile technology.

A brief history

Solar PV has come a long way since the first solar panel was invented in 1883 by Charles Fritts with a meagre efficiency of 1%. While the first viable commercial silicon solar cell was first used by Bell Labs in 1954 using the design Russel Ohl created and patented in 1939 and 1941 respectively and is found in many of today's solar PV designs, we had to wait a while before the technology was meaningfully adopted.

The first meaningful use case for solar PV was 'out of this world' with the first commercial application being deployment on the Vanguard 1 satellite in 1958.

When US President Jimmy Carter installed solar panels on the roofs of the White House on the 20th of June 1979, it was regarded as a breakthrough for the technology. With the world starting to wake up to the threat of climate change and ecological damage his actions were primarily a political statement as the technology was still in its infancy with a low efficiency. But the intention was to demonstrate the arrival of an alternative to fossil fuels indicating that the creation of usable energy from the power of the sun was no longer an engineering idea, but a viable application making rapid progress.

It is believed the first grid-connected solar system was installed in the UK sometime around 1994. After this, it slowly started to pick up speed, but efficiency was still low and the economic case not that strong, partly because of the technology and partly because of the lower sun radiation the British Isles received compared to southern Europe and other warmer climates around the world. But over the course of the next decade, the solar PV industry experienced several technological breakthroughs such as efficiency gains and, combined with a rapid reduction in cost, the economic case became stronger. Various government subsidy schemes also contributed to solar PV's growing popularity.

In 2010, pledging to lead the greenest government ever, Prime Minister David Cameron introduced the feed-in-tariff scheme which paid homeowners for installing solar panels on their houses and enabled them to sell excess electricity production back to the National Grid.

Solar PV in 2023

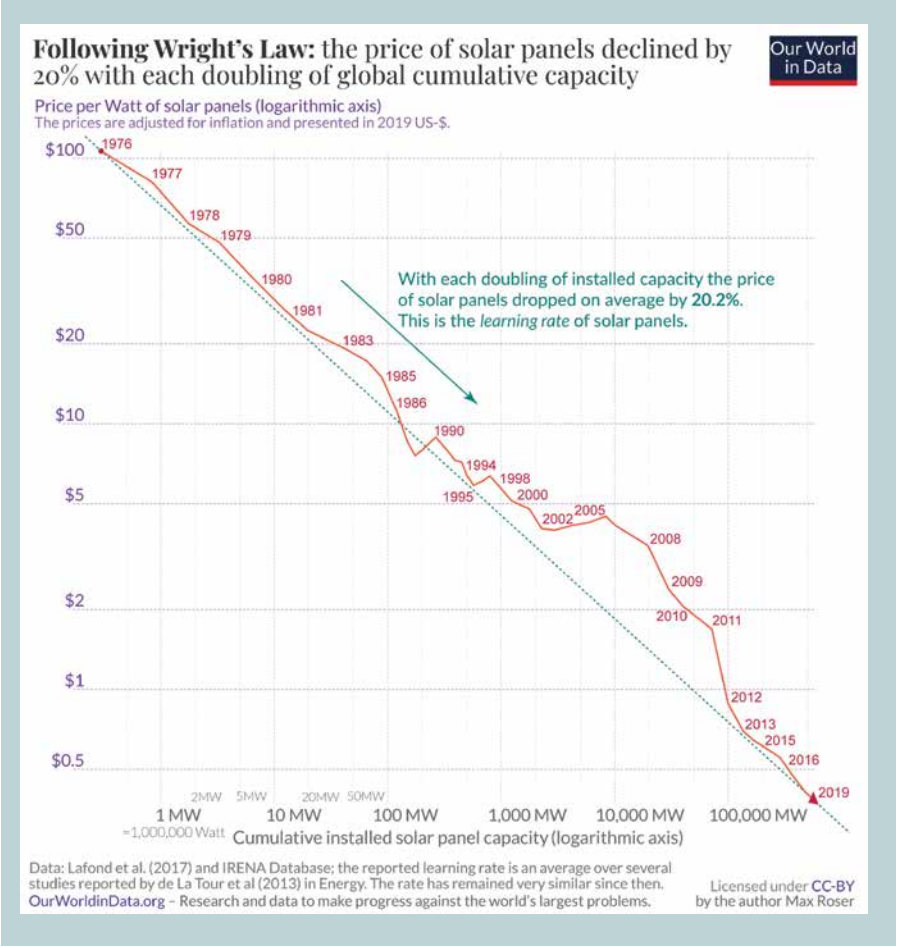
Today, around the globe as well as in the UK, solar PV is one of the most promising energy technologies around with huge scope for future growth and potential. There is a host of different panels to choose from with materials tailored to specific use case, environment and weather patterns. Today's efficiency gains bear little resemblance to the humble beginnings of the technology with the newest designs delivering 22% to around 29%.

In conjunction with this improved output, advances in battery technology and mass production and utilisation, cost is continuing to fall with solar PV installation rates 'going through the roof' as a result. Increased demand delivers the incentive for further efficiency gains and prospects for the technology have never been better.

Despite the cost-of-living crisis, British households are installing more domestic solar than last year with, on average, more than 17,000 households installing solar panels every month so far this year.

The surge in solar PV explained

According to the International Renewable Energy Agency (IRENA), solar PV is the fastest-growing energy source having grown 26-fold since 2010. At the end of 2022, globally installed solar PV capacity was at 1,047GW. The amount added in 2022 alone was 191GW which indicates the rapid growth of this technology.



The IRENA research also highlighted the downward spiralling cost. Between 2020 and 2021, where the most recent data is available, the cost of newly commissioned utility-scale solar PV projects fell from $0.055/kWh to $0.048/kWh. This was driven by a 6% decline in this technology's global weighted average total installed cost, from $916/kWh in 2020 to $857/kWh for the projects commissioned in 2021.

So how fast is it fair to assume the solar revolution will continue to grow? Data analysts have crunched the data based on how quickly the cost of solar PV has decreased and concluded it aligns with Wright's Law. Technologies that follow Wright's Law get cheaper at a consistent rate, as the cumulative production of that technology increases. For solar PV, with every doubling of capacity, the cost is reduced by 20%.

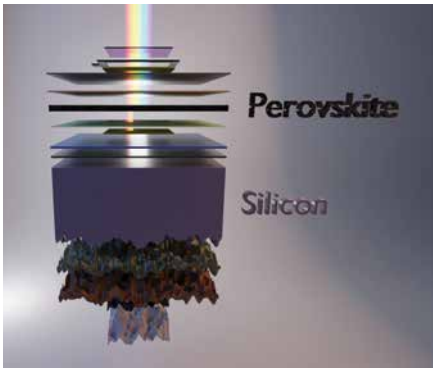
For instance, in 1976 with less than 0.5 MW of solar installed globally, the cost of 1 watt was $106, but with 1 MW installed in 1980, the cost had dropped to $30 per watt and in 2019 that was down well below $0.5.

The graph above shows the fascinating curve for added solar PV capacity and the correlation cost reduction.

Below we will take a look at some of the most promising advances in solar PV.

The solar PV material revolution

While silicon has long dominated solar PV, other more sustainable and efficient materials are now entering the field and creating a more diverse materials market.



Perovskite solar cells

Perovskite-based solar cells have gained attention due to their high conversion efficiency and low-cost production processes. Researchers are continually improving the stability, scalability, and durability of these cells, making them a promising alternative to traditional silicon-based PV cells.

Tandem solar cells

Tandem solar cells combine multiple semiconductors with different absorption properties to enhance overall efficiency. By stacking different materials in a single device, researchers have achieved efficiencies beyond the limits of individual materials. These cells are now being commercialised and have the potential to make solar even more cost-effective. For example, combining perovskite and silicon cells in a tandem structure has demonstrated exceptional efficiencies. By leveraging the high absorption of visible light by perovskite and the stability of silicon, scientists have achieved remarkable breakthroughs in conversion efficiency, pushing the limits of solar energy capture.

Transparent solar panels

Researchers have been working on developing transparent solar panels that can be integrated into windows and building facades. These panels allow sunlight to pass through while simultaneously converting it into electricity. With ongoing improvements, they have the potential to revolutionise building design by turning entire surfaces into energy-generating assets.

Coloured solar panels

Recently, research has focused on developing solar panels of different colours, enabling their integration into various architectural designs. This offers new possibilities for solar installations in residential and commercial settings where aesthetics is important.

Solar panel recycling

As the deployment of solar panels continues to grow, the need for efficient recycling processes has become vital. Scientists are working on improving recycling techniques to ensure the recovery and reuse of valuable materials, reducing waste and environmental impact.

Enhanced manufacturing techniques

New manufacturing methods, such as solution processing and 3D printing, are being explored to further reduce costs and increase production efficiency. These techniques enable the fabrication of solar cells on a wide range of flexible substrates, opening possibilities for novel applications like solar garments and portable solar devices.

Who is driving the solar revolution?

Solar PV has become a big business with recent decades seeing solar manufacturing companies transformed into large industrial players, traded on the world's stock exchanges. In common with many manufacturing sectors, China is dominating. Of the top ten manufacturers in the world, six are Chinese companies.

With a market capitalisation of $31 billion, Longi Green Energy Technology is the world's biggest and fastest-growing solar company in

the world. Based in Xi'an, China it is estimated to produce 30GW of high-efficiency solar wafers and modules per year. These modules are monocrystalline and use either the PERC, the bifacial technology, or both. The current generation cells of LONGi Solar have 30-year reliability and their P-type PERC cells have an efficiency of 24.06%.

Another large Chinese brand, Jinko Solar is based in Shanghai, China. The company owns nine production facilities globally and has an annual capacity of 31GW for solar wafers, 19GW for solar cells, and 36GW for solar modules. The company has a core focus on Half-Cell technology, Bifacial technology, and Tiling Ribbon technology, with the latter developed by the company. Jinko Solar has a market capitalisation of $1.74 billion.

South Korea's Kyocera Corporation, another huge player, has manufactured solar panels for 45 years since it was founded in 1978. While the company has a market capitalisation of $18.41 billion it is not possible to determine how much of this is attributed to solar as it offers many other products ranging from technology to healthcare.

First Solar is based in Tempe, Arizona, US. Founded in 2016, it has a market capitalisation of $21.81 billion making it the biggest player in North America. First Solar produces utility-scale solar modules often used in solar plants. The modules have a warranty of 25 years and use advanced Thin Film solar technology which has a higher temperature coefficient and lower degradation rate than conventional silicon-based solar modules.

Canadian Solar is also a big player in North America. Based in Guelph, Canada, and founded in 2001 the company has, over the course of the last 20 years, evolved into one of the global players in the solar industry with more than 63GW of solar modules shipped to over 160 countries globally. It enjoys a market capitalisation of $2.10 billion.

While Europe cannot compete with the major producers in Asia and North America, both REC Group and SolarWorld are considered prominent solar panel manufacturers in Europe.

SolarWorld is headquartered in Germany and dedicated to the manufacture and marketing of photovoltaic products all over the world. REC Group, headquartered in Norway, is known for its extensive global presence and reputation for producing high-quality solar panels.

The solar industry in the UK primarily relies on imported solar panels, with many panels coming from established manufacturers in countries like China, South Korea, and Germany.

The UK's solar industry is built around mid-sized companies who install solar panels both for residential use and commercial projects such as solar farms.

Solar PV breakthroughs

Efficiency

When talking about breakthroughs for solar PV, the first that comes to mind is efficiency gains with one of the biggest as recently as a few months ago, in July. Scientists achieved a significant breakthrough in solar panels efficiency using the exciting perovskite material described earlier.

By adding a layer of perovskite – another semiconductor – on top of the silicon layer the solar cells broke through the efficiency ceiling, passing the milestone of 30%. Perovskite captures blue light from the visible spectrum, while silicon captures red light, boosting the total light captured overall.

Location

Increased options for locating solar PV can also be regarded as a breakthrough. Until recently only wind power was seen as suitable renewable tech for offshore, but there are now several floating solar farms installed around the world opening the possibility of utilising the vast space of the ocean surface rather than land that could be needed for other purposes.

Combined tech

Combining solar PV and wind power can deliver a more consistent supply of renewable energy.

Several companies are now experimenting with this including Spanish energy giant Iberdrola which has started the commissioning in Australia of a wind-solar hybrid project.

Taking this to the next level, a project developed by the fossil fuel giant Royal Dutch Shell will see a combined offshore wind and solar farm built off the Netherlands.

Solar and storage

With the revolution in battery technology, combining solar PV with a giant battery would really take the use case of solar PV to the next level. Developed by Matrix Renewables, the launch of Rocío 1, 2 and 3 solar plants located in Andalusia, Spain will be the first project in Spain to feature a co-located battery storage system and is one of the earliest battery storage projects in the country.

Solar PV UK and global pipeline and prospects

There's no doubt that the trajectory is one in which solar will continue its growth both abroad and in the UK. But that growth will not be linear – there will be peaks and dips.

The current cost-of-living crisis coupled with Brexit implications are, in the short-term, harming solar in the UK. With energy bills soaring due to the spike in gas prices and households cutting cost, installing solar will not be the top priority for many.

With UK solar companies largely reliant on imported panels, the UK solar industry will be pushing government for deals with both the EU and further afield so that import and export tariffs do not make solar more expensive in the UK.

There are concerns about global supply chains and the impact of the battle being waged between the US and China, the world's leading solar material producers.

The tightening of tariffs on China by the Biden Administration is doing little to lessen dependence on China and doing little to help the market. In 2023 alone, China will install more new solar capacity than the US has deployed since Americans bought their first panels in the early 1970s – a seemingly unshakeable dominance.

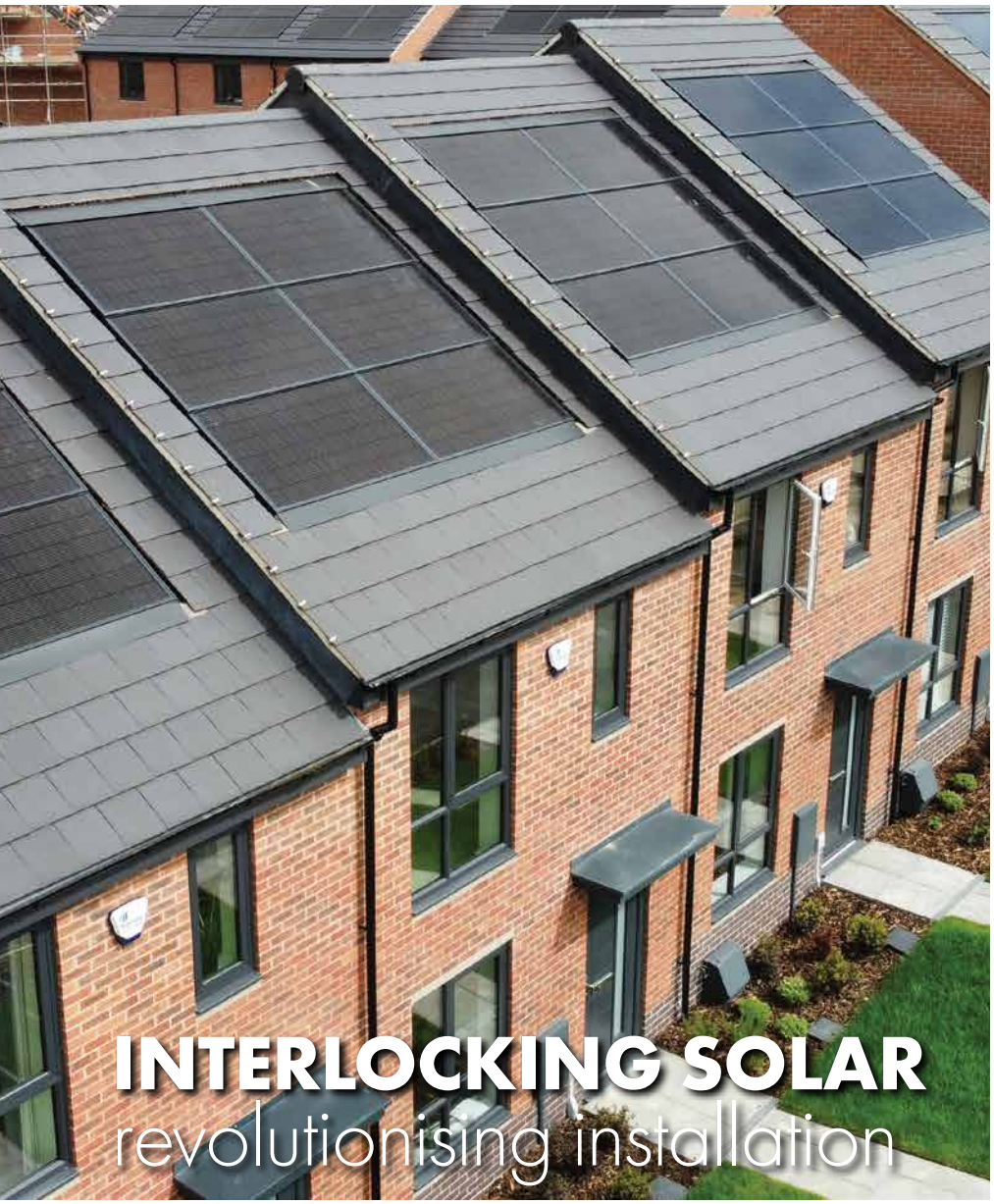
There are other influences to consider, such as the availability of rare earth minerals, a critical element in not only solar panels but also wind turbines, electric vehicles, mobile phones, flatscreens and much more.

As considered earlier, a move away from silicon as the core material for solar panels will shake up the materials and rarer earth elements required. Predominantly mined in China (97% of the global rare earth element supply is mined in China) and African countries, there are also known resources in the US, with recent discoveries in both and Greenland.

The outlook

Deployment, innovation and technology are only going in one direction and that is more and more capacity, increased efficiency, cheaper production and technological advancements delivering more sustainable materials.

The sector will continue to move forward, the only question is, at what speed?



INTERLOCKING SOLAR revolutionising installation

A SIMPLE UK manufactured solar system is revolutionising the in-roof industry with a system that is now comparable in price to a traditional on-roof system for the first time in industry history. Solfit is a highly innovative product developed by a small team of UK solar installation engineers who didn't find the solution they were looking for in the in-roof products already available on the market so set out to create what they had in mind.

The product they envisioned had to be fast and simple to fit, with minimum component parts, aesthetic, plastic free, strong, durable and watertight and be able replace the slates or tiles underneath it.

The resultant patented interlocking design of the Solfit modules is the driving force that has propelled the company to rapid prominence within the in-roof industry. The modules don't require large plastic trays or complicated flashing systems, each panel simply interlocks with the next creating a completely watertight seal.

And, when it comes to the installation, Solfit assures us that 'the fitting of the product could not be simpler'.

Fitted from the ridge down, arguably the greatest benefit of this method of installation, and that most frequently highlighted by impressed installers, is that it avoids the need to work over panels previously fitted.

It is compatible with all roofing types and can be fitted with a variety of bottom flashing. Whilst installation engineers are still discovering this highly advantageous product it's actually been around longer than many may realise; the first system was fitted seven years ago!

Solfit comes pre-framed with the PV double glass, tier 1 laminates and its ingeniously simple patented interlocking framing system also means it is not possible to install other panels with Solfit modules.

Initially developed for the new build domestic market, Solfit is finding favour in a whole new sector as it is also perfectly suited to the commercial over-clad market.

Commercial roofs at the end of their lives and afflicted with leaks and often weight loading issues can be easily over-clad in Solfit to provide a watertight solar PV roof over the existing roof, with or without additional insulation.

The option to have transparent glass modules fitted to span sky lights as well as to allow natural light into the building or to be fitted with aluminium panels to go over vents and roof furniture is another exciting development for this versatile solution.

Solfit is able to provide an ingenious car port using the same all-black, slimline design as the roof panels. The carport is scalable up to a 12m span – big enough to house an emergency vehicle – with limited footings and no sub-roof required. The watertight roof panels are also made from bifacial double glass, so that natural light can pass through whilst still being durable. The carport is able to withstand well beyond the highest possible UK wind speeds.

The panels themselves are manufactured in China by Jetion Solar while the flashings, profiles and additional parts are all UK manufactured.

SOLFIT

USPs

- UK designed and owned
- Fitted from ridge to eaves
- Fast and simple to fit
- Minimal component parts required
- No plastic, all metal
- Compatible with all slate and tile types
- Watertight to 5-degree pitch
- Compatible with optimisers and micro inverters
- Double glass laminates
- AA fire standard
- UK manufactured flashings and component parts.
- 15-year weather tightness guarantee
- Sold through Midsummer, Edmundson's, Amco
- Domestic, commercial & car port solutions

Rapid expansion continues with new partnership

A recently announced partnership with Edmundsons Electrical brings together SolFit's expertise in roof integrated solar systems and Edmundsons Electrical's extensive network and experience in the electrical industry.

Combining these strengths, they offer comprehensive, customer-centric solutions that empower businesses and individuals to embrace clean energy alternatives.

CASE STUDIES: Solfit in action

Solfit commercial over clad

An installation in Appleby, Cumbria
480 x Solfit 375Wp

Solfit domestic roof integrated PV

The game-changing in-roof panels won Solfit a contract for this 300-home site in Derby

Having come a long way since its humble beginnings over 15 years ago, Solfit is a company continually looking for ways to improve and remains excited by every big win.

Its most recent is back in the new build market where Wheeldon Homes has made the decision to switch to Solfit.

Specified for a 430 home site located in Derby, this is the second new build site that Wheeldon has specified Solfit's domestic product for and James Wheeldon, Director of Wheeldon Homes explains why the choice to go with Solfit again was an easy one commenting: "The ease at which this system can be installed in comparison to the rest of the market is making Solfit a powerful product when speed, quality and volume are the primary considerations."

Solfit car port

Translucent panel design lets sunlight pass through, so there is no need for expensive internal lighting.

The watertight roof panels are made from bifacial double glass, so natural light can pass through whilst still being durable enough to withstand well beyond the highest possible UK wind speeds.

Relay innovation enhances solar PV inverter performance

STEVE DRUMM, Strategic Marketing Manager, Omron Electronic Components Europe explains how innovative approaches to relay manufacturing is enabling designers to achieve higher outputs from more compact designs with no compromise in performance or safety.

In recent years, solar PV inverters have seen a considerable uptick among domestic and commercial electricity users, offering a convenient way of supplementing electricity from the grid. As well as reducing energy bills, they are also a highly sustainable solution. Indeed, it is estimated that installing solar inverters in every house in the UK would provide up to 60 percent of total electricity consumption. Moreover, based on the UK's climate it could even potentially generate a surplus against domestic demand between the months of April and September.

This makes solar PV an attractive proposition for those who are looking to make their properties more sustainable, while also reducing their energy bills. It can also help to achieve significant progress in facilitating the transition towards a greener grid. More recently, the growing adoption of electric vehicles (EV) has been a catalyst for greater interest in solar PV as an integrated power solution for EV chargers, providing additional

charging capacity and greater efficiency while harnessing clean energy.

Getting the technology to a point where solar PV is effective, efficient and affordable, has required decades of innovation. Systems not only need to provide the means to safely connect and disconnect the panels as required, but also convert the DC output into the AC at the correct voltage. Relays and switches are central to the design of such systems, and relay manufacturers like Omron have not been slow to innovate and address the needs of this rapidly growing sector.

Compactness vs heat performance

Heat dissipation underpins almost every facet of relay design. Heat is fundamentally bad for both the efficiency and longevity of electronic devices and components, and so the more that temperatures of components can be reduced, the better.

Complicating matters is the fact that, as inverter output power and functionality increase, dissipating generated heat effectively becomes more difficult. Relays are a current switching device, and so can generate lots of heat, potentially damaging themselves and components around them.

Meanwhile, solar PV inverter manufacturers require their relays to be increasingly smaller, while regulations on component and device energy performance are only becoming more stringent. If too many heat-generating components are too close together, or not adequately cooled, then this will compromise reliability and safety. As such, innovative approaches are required to squeeze every last drop of efficiency out of the system.

Reduced contact resistance

In a typical relay, contact resistance is key to managing heat dissipation. Omron's G9KA relay utilises an especially pure form of silver as its contact material. Silver has the highest electrical conductivity and lowest contact resistance of all known metals. Indeed, silver is in fact the standard against which all other metals are measured on these criteria. In practice, this means that the G9KA has a heat performance five to ten times greater to that of most other products on the market.

The G9KA also utilises a twin contact structure, which compared to a single contact reduces the current per contact to almost half, and in doing so generates less heat. In a single contact configuration, contacts must be a minimum of 4mm apart to achieve the required performance. With a twin structure, this gap can be reduced to 2mm, allowing the same performance in a smaller footprint due to the smaller magnetising coil, and reduced physical space required. Each

contact has high contact pressure, which when combined with low initial contact resistance, multiple connection paths and high conductivity, results in superior efficiency and performance. In turn, this allows relays to be used in more compact applications, while still accommodating an adequate contact gap.

Life in the field

Solar PV inverters typically have a lifespan of five to ten years and, in some cases, up to 15 years. Relays are not a component that can be easily replaced, so it is vital that any relay component is sufficiently robust to outlast the inverter itself and require zero maintenance during its operational life. Standard IEC 62109 also specifies that the performance of the relay must not drift over time. This is a challenge, as solar inverters can be installed outdoors exposed to the elements all year round.

A typical inverter can go through several switching cycles in a single day, most obviously between day and night, but also during periods of shade and planned or unplanned downtime. This can add up to tens of thousands of electrical operations in a typical relay's lifetime. Manufacturers must run rigorous testing to not only ensure its longevity, but also calculate its footprint and power budget at every point of its operational lifecycle.

In Omron's case, these calculations are done for the first 30,000 electrical operations, at which point the G9KA typically demonstrates only negligible drift in contact resistance of around 0.05 milliohms, far outperforming comparable products. With two relays in series for redundancy, the likelihood of failure in normal operating conditions is practically nil, with minimal change in performance from the beginning to the end of the inverter's operational life.

Safety and longevity

Even a small change in efficiency can make a big difference to the amount of heat generated. A load terminal and surrounding surface temperature above 115˚C will prematurely age components, while temperatures even higher than this can increase the risk of eventual arcing and even catastrophic failure. Internal forced air conditions typically deployed help to maintain temperatures, but a relay must also be part of a good overall system design to ensure that heat dissipation across all components is managed effectively.

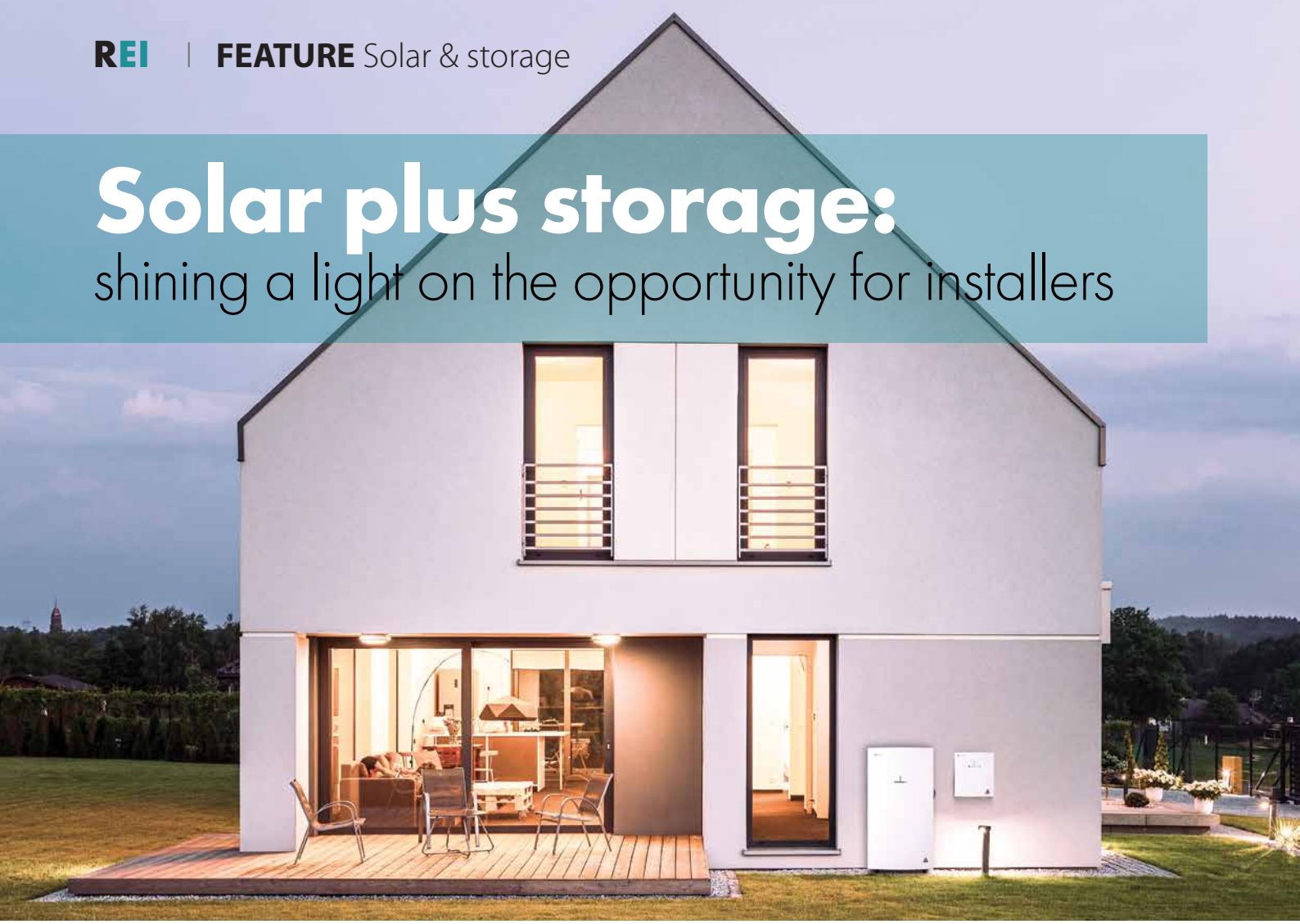
On the DC panel side and input to solar PV inverters Omron's G9KB uses arcing control technology, utilising permanent magnetism to stretch or elongate the arc. When stretched in the direction of the current flow, the arc can be extinguished more easily, improving system safety while reducing the likelihood of catastrophic failure.

In summary

PCB relay designs have opened up exciting new avenues for the evolution of solar PV technology. PCB systems can help to reduce design cycles and allow engineers to harness greater flexibility to improve their products. It also helps designers to achieve higher outputs within smaller designs. Against the backdrop of the drive towards net zero, relay manufacturers like Omron are helping to accelerate the transition towards a cleaner grid.

Steve Drumm is a Strategic Marketing Manager focusing on providing applications guidance and best practice in component solutions for energy and power management products and systems including, Solar PV Inverters (PVI), Energy Storage Systems (ESS) and EV Chargers (EVC). With a technical and commercial background spreading over many years he is well placed in contributing towards added value for customers.

Solar plus storage:
shining a light on the opportunity for installers



WE'VE all read the statistics about the increased uptake of domestic solar panels over the past 12 to 18 months, with several providers reporting record installation figures this year. And, while climate change has been on the agenda for a long time, it's fair to assume rising energy bills and growing fears about grid capacity have given consumers a bit of a push.

There's also the backdrop of a rapidly approaching net zero deadline which is resulting in more policy announcements, more research, and more investment – all serving to cement the inescapable direction of travel.

But solar panels are just one part of the story. The energy storage battery is edging further into the spotlight as more people get switched on to the power it wields; power to supercharge the efficiency of solar PV, to supercharge our climate change efforts and to help balance a struggling grid.

More providers of domestic energy storage solutions are entering the market, bringing a wider range of newer, better products to choose from. Costs are falling and awareness is rising of the humble battery as being at the heart of a truly efficient, low carbon home.

Which all serves to open up a whole new avenue of opportunity for installers.

Why a solar and storage combination is key to domestic decarbonisation

The nature of renewable energy such as solar means that, on its own, you have to use it at the time the energy is being generated or lose it. For that reason, it's thought that two thirds of renewable energy is going to waste. By pairing a solar PV installation with a storage battery, that green energy can be saved up and used later, such as in the evenings or on rainy days. Any surplus energy, once a battery is fully charged, can be exported back to the grid.

Nationally, the government has committed to increase our solar capacity five-fold by 2035 to 70GW, but it also recognises that this needs to be accompanied by the necessary battery storage capability. Not just to stop waste, but because shortages in grid capacity are currently hindering the creation of solar farms.

We have, as a result, seen the relaxation of planning rules, making it easier for large batteries to be constructed for the storage of energy from solar and wind farms. According to a report by the Climate Change Committee, grid storage output capacity will 'more than double' by next winter, putting energy storage on track to meet the goal of 8 to 9GW by 2028.

It's the same concept for the domestic property, where combining solar plus storage can not only lower bills and further reduce a home's carbon footprint, but also reduce grid reliance – something which might be an increasingly appealing benefit amid warnings about planned power cuts.

Thanks to the integration of AI, additional energy required by the grid can be imported during off-peak times when electricity is cheaper, with the green 'free' energy being used to power the home during peak price periods.

While installation costs and achievable energy savings are always going to vary depending on the size of the home and capabilities of the solar panels and batteries chosen, it's estimated that the efficiency of solar PV can be boosted by an additional 30% when paired with energy storage.

The current market picture

The domestic energy storage market is growing, with the battery becoming the integral element of a low carbon home system, which could also

include heat pumps, electric vehicles, and smart management.

This is supported by an increasing number of players, developing increasingly sophisticated products. GivEnergy, for example, has, this year, been busy launching a new generation of hybrid inverters and a combined battery and inverter product with a back-up capacity of 13.5 kWh.

The leading energy storage firm has also gone into partnership with Octopus Energy to offer a new smart tariff, specifically designed to unlock the benefits of solar power combined with battery storage, which the companies claim can deliver savings of £450 per year for customers. It enables homeowners to automatically receive the best rates for both the power they use and the power they sell back to the grid, with no need for manual programming.

Changing the energy management game

Earlier this year, GivEnergy CEO, Jason Howlett, told Renewable Energy Installer: "Fortunately, though awareness is still somewhat behind where it should be, we are seeing an uptick in home storage batteries. For instance, we at GivEnergy commission upwards of 1000 systems per week in the UK alone.

"Battery storage technology across the board is evolving at pace. Year after year, we're seeing new models and improved efficiency. The latest generation of home batteries includes features such as smart energy management systems, API access for custom automation, remote monitoring and control, and modular design for easy installation and scalability.

"In a short space of time, home storage batteries have changed the energy management game. The control and visibility that the billpayer now has over their energy usage are at an all-time high. So, it's fair to say that we are now seeing a revolution in the ease with which homeowners can manage their energy consumption and reduce their reliance on grid electricity."

Another exciting initiative that has developed this year is the new Zero Bills energy tariff launched by Octopus in partnership with housebuilder, Verto.

It guarantees zero bills for five years for new homes kitted out with the right combination of solar panels, battery, and heat pump. Following the success of a pilot with almost 600 homes, it aims to deliver 10,000 homes by 2025 by bringing more developers on board.

These products and initiatives demonstrate the pace of battery evolution and the industry-wide commitment to solar plus storage solutions.

Solar and storage installation

Notwithstanding the many variables involved, the costs associated with solar panels are falling, thanks in part to subsidies and more market choice. A BEIS report published in 2021 said the cost of solar panels in the UK had dropped as much as 60 per cent since 2010.

Solar Energy UK's The Value of Solar Heat report found that a typical home installing solar PV with a heat pump could save £1,217, while a gas heated home could save £1,428. In a best-case scenario, annual savings of more than £3,688 are possible in a gas-heated home and £4,283 in a heat pump heated home.

Adding a solar battery at the same time is becoming an increasingly attractive prospect. Not only can it bump up the energy savings achieved, it also reduces a home's carbon footprint even further by enabling more green energy to be utilised.

On a practical level, installation costs will be less by installing both at the same time. It also allows a more compatible solution to be provided from the outset, while fully future proofing a home for the addition of more renewable systems, such as a heat pump or electric vehicle charging point.

With solar panels generating DC electricity and can either be AC coupled, using an inverter, or DC coupled with a direct connection. If installing the battery at the same time, opting for a DC battery means it can be connected directly to the panels, reducing energy losses, but creating an 'off-grid' system.

Where the panels already exist and have a grid connection, it's easier to fit an AC battery afterwards, but this will require an additional inverter. Retrofitting can also mean the solar energy is converted twice, therefore resulting in additional loss over time.

Solar battery VAT consultation outcome awaited

There's also the VAT element to consider. The 0% VAT relief only applies to batteries when they are fitted as part of a system with a qualifying material, such as a solar system. An energy storage battery on its own doesn't qualify, as it stands, so a battery added at a later date is currently subject to VAT.

However, the government has consulted on this point following challenges from Solar Energy UK, as well as energy suppliers, business leaders, consumer advocates and parliamentary committees. The outcome of that call for evidence is currently awaited.

Solar Energy UK says it has 'every expectation' that this anomaly will be corrected in the forthcoming Autumn Statement.

The association's senior communications advisor, Gareth Simkins, said: "By providing solar power when the sun goes down, battery systems markedly increase the utility of solar energy systems, whether that's small units in homes or vast systems accompanying solar farms.

"So, we are pleased that our lobbying over the VAT issue has paid off, with the Treasury expected to dump the tax at the Autumn Statement. It makes no sense for the taxation of energy storage to depend on when it is installed, so we are very much looking forward to battery energy storage being added to the list of Energy Saving Materials (ESMs) and zero-rated for VAT.

"Solar Energy UK has previously called for the government to collaborate on designing a long-term retrofit support scheme for homeowners and occupiers, to increase the uptake of energy storage. We have also called for the Building Regulations to incentivise onsite solar generation and energy storage, which we hope to see in the forthcoming Future Homes Standard."

The scale of opportunity for installers

It's becoming increasingly apparent that generating renewable energy isn't enough. That energy must be captured and stored if we are to take full advantage of renewable technologies and achieve net zero goals.

Around 1.2 million homes have a solar system and just over 10,000 use home battery storage. With 14 million homes to target, opportunities for installers could be huge, as the various barriers to renewables continue to be overcome, both on a national and individual consumer level.

The new Solar Taskforce is looking at several of the challenges and all eyes will be on the much-anticipated outcome of its work early next year.

While battery storage can also be used without a renewable energy system, it's the solar market where much of the growth seems to be happening.

Going down this route should now be easier for electrical contractors following the announcement from Octopus Energy that solar PV installers no longer need to be MCS Certified in order to access its Smart Export Guarantee.

And with government aiming to create 60,000 solar industry jobs by 2035 as it seeks to achieve its 70GW capacity goal, it's clear to see the potential is there.

Taking this a step further to offer battery storage solutions at the same time could represent a lucrative way for installers to stay ahead of the competition and make more money.

Solar Energy UK's, Gareth Simkins, added: "Given the benefits, it's unsurprising that battery energy storage has become a very normal element of residential PV installations – and more of those are expected this year than ever before, due to the energy price crisis. But do enough people know about either? I think we can only say that when every home has the technology installed. Hopefully, the government-industry Solar Taskforce will come up with some answers on raising consumer awareness."

Battery-free wireless technology: the key to smart buildings

IN THIS article, Armin Anders, co-founder and VP business development at EnOcean, reviews the different options of wireless technologies that are key to creating future-proof and energy efficient smart buildings. As wireless technologies are established as a preferred solution for building automation and smart homes, Armin takes a step further by looking into battery-free/energy harvesting wireless solutions and how they further reduce installation and operating costs, whilst increasing energy savings and enhancing comfort.

In an intelligent building, sensors act as the nervous system capturing various data such as temperature, humidity, presence, or CO2 to intelligently control actuators. However, connecting these components can be cumbersome and expensive due to the need for wiring. Wireless solutions provide the required flexibility, especially during renovations. While some wireless solutions dependent on batteries require intensive maintenance, are more expensive, and create hazardous waste, those without batteries offer significant advantages.

Maximising flexibility with wireless

When it comes to integrating numerous sensors and switches into a system, wired solutions are impractical. It is costly and inflexible to connect each sensor with its own wire. Wireless systems offer a solution. Sensors for presence, temperature, air quality, light, as well as switches or smoke detectors can be placed exactly where they are needed without the constraint of cables. The strength lies in the ability to expand the system with new products and additional sensors without the need to break walls.

Wireless sensors and switches minimise coordination among various trades and reduce the interference in existing building structures. For instance, when repurposing an office building, there's no need to break walls for cabling or place power lines inconveniently. This reduces cost and is more appealing to building owners or future occupants.

Sustainable operations without batteries

A significant drawback of some wireless solutions is their dependence on external power sources or batteries for the energy required for sensors and communication. This results in increased maintenance costs and environmental concerns. In practice, batteries often deplete faster than their theoretical lifespan and need to be replaced by professionals annually. The replacement of batteries not only involves labour but also environmental considerations since batteries are hazardous and must be disposed of properly. With a large number of wireless sensors – in an office building, this can quickly amount to several thousand – the process of battery replacement and disposal can easily become a full-time job for a facility manager, from access coordination, device localisation, battery exchange, device testing, documentation, battery storage, and finally to disposal.

Energy harvesting

Modern systems leverage battery-free wireless components, offering a reliable and maintenance-free alternative to traditional wired solutions while retaining the flexibility and easy retrofitting of wireless systems. Products with battery-free wireless technology harness the energy available in their immediate surroundings—a concept known as energy harvesting. Three main forms of energy harvesting have emerged in building automation: kinetic, solar, and thermal energy.

Kinetic energy

Motion is a dependable energy source for various switches. A single press generates enough energy for three wireless messages. An electromechanical energy converter (EnOcean ECO 200) inside the switch housing converts the button press into electrical energy, making it available immediately after activation. The energy converter works similarly to a bicycle dynamo, where a small but powerful magnet drives a magnetic flux through two magnetically conductive anchor plates, which closes in a U-shaped core. An induction coil is wound around this core, which can be put

in two positions where it touches the respective opposing anchor plates. This movement results in a sudden change in the magnetic field, thereby producing a voltage pulse in the induction coil.

ECO 200 is an energy converter for linear

movement. Possible applications include miniaturised switches and sensors in building technology and industrial automation.

A single switch actuation generates an energy amount of 120 µWs, sufficient for three radio messages. At room temperature the electromechanical energy converter allows over a million switching cycles. The principle of kinetic energy harvesting can also be used for light or blind switches. Additionally, there are battery-less sensors that can warn of water damage. These sensors have swell disks at the bottom that expand when they come into contact with a liquid. This movement triggers the electromechanical converter and sends a radio signal. Due to this message, the line's valve automatically closes, and the building owner or facility manager receives a corresponding notification, for example on their smartphone.

Solar-based energy

Thanks to miniaturised solar modules, it's possible to power radio modules with electricity even with low interior light intensity. Solar-powered sensor modules operate extremely energy efficiently. A temperature reading that is to be transmitted every 15 minutes requires only 3.6 hours of charging time per day at a brightness of 200 lux for uninterrupted operation. At this brightness, the solar cell produces a voltage of 3V. An additional Poly Acenic Semiconductor (PAS) charging capacitor ensures that the module can bridge periods without ambient energy. When the energy storage is fully charged, the module can operate in complete darkness for about a week without interruptions.

Miniaturised solar modules enable

maintenance-free window contacts, temperature, gas, and humidity sensors, as well as light sensors and presence detectors.

Thermal energy

A significant temperature difference, for instance, between a radiator and its surroundings can provide a lot of energy that can be used not only for sensors but also for actuators. Energy harvesting is done using a Peltier element in combination with a DC/DC converter (EnOcean ECT 310 Perpetuum).

Even a small input voltage of 20 millivolts (mV), which corresponds to a temperature difference of about 2 °C, can be converted into a usable output voltage of over 3 V. The larger the temperature difference, the more energy can be harnessed.

This principle is currently mainly used in radiator actuator drives. The energy harvested is sufficient for both radio communication and the actuation changes of the valve. Combined with a solar-powered room sensor, a fully energy-autonomous individual room control can thus be realised.

With the DC/DC converter ECT 310 Perpetuum, battery-free radio modules can also use heat as a power source. In this process, heat – for example, from warm machine parts, radiators, or the human body – is converted into electrical current.

Products with EnOcean technology utilise, among other things, three different frequency bands that vary depending on the region: 868 MHz in Europe, 902 MHz in North America, and 928 MHz in Japan. Short messages (telegrams) are used for data transmission. These can be verified by the central system using a checksum. Due to the short duration of the telegrams (about one millisecond) and multiple telegram transmissions, the risk of data collisions is minimised. Interference with other systems such as WLAN or DECT is ruled out since frequencies outside the 2 GHz frequency band used by these devices are employed. The range is up to 30 metres within buildings, even through walls, and can also be further improved using repeaters. Communication between devices is secured with a 128-bit AES encryption, and the use of rolling codes prevents unauthorised tampering.

Wireless, maintenance-free, smart technology

Manufacturers worldwide have developed thousands of smart products based on battery-free EnOcean wireless technology, such as room thermostats, wireless window contacts, and solar-powered presence detectors. These products not only increase the energy efficiency of a building but also offer high flexibility since no wiring is required for installation. This reduces installation costs and enhances comfort, as the wireless switches can be placed anywhere desired. Another significant advantage is interoperability, as all EnOcean-based products can communicate with each other, irrespective of the manufacturer.

Conclusion

Intelligent buildings, with their energy-saving capabilities and enhanced comfort, are already a reality. By using battery-free wireless technologies, installation costs can be significantly reduced. It's crucial to choose systems with open standards and flexible ecosystems to ensure future-proofing and avoid potential pitfalls of short-term cheaper alternatives. With the flexibility of these solutions and open interfaces, smart buildings can adapt to the unique needs of their tenants.

Armin Anders VP Business Development and Co-Founder of EnOcean is one of the five founders and drew up the business plan for the company.

After graduating in electrical engineering – with a focus on information and communication technology – at Karlsruhe University, Armin spent a number of years as Marketing Manager for microcontrollers at Siemens AG. He then worked as a Project Manager for Siemens Corporate Technology, spent an interim period as Assistant to the Central Executive, and then joined Siemens Technology Accelerator GmbH as a Venture Manager responsible for startups.

Material matters:
the importance of specification in heat network design

A RECENT government announcement highlighted the vital role of heat networks in delivering the UK's net zero ambition. However, some networks haven't been upgraded since installation more than 40 years ago, meaning many are inefficient due to poor installation or maintenance or the equipment wearing out.

Government funding will see poorly performing heat networks improved, meaning fewer breakdowns and thousands of homes and businesses on old and inefficient heat networks benefiting from lower bills and a more reliable heating supply.

Twenty-four projects across England will receive a share of more than £13.2 million, while a further £667,000 will go to 31 projects to fund investigations into the improvements needed with heat network operators taking the required action.

The funding is the first round of awards to be made under the £32 million Heat Network Efficiency Scheme which forms an important part of the government's support for heat networks. This also includes the £288 million Green Heat Network Fund, to support the creation of heat network projects that use a low carbon heating source, such as a heat pump, solar or geothermal energy.

Stats from the Association for Decentralised Energy (ADE), indicate that there are 17,000 heat networks in the UK, supplying half a million customers – a substantial increase over figures from 2013, when there were only 2,000 heat networks in the UK, with 211,000 users.

Despite this growth, heat networks only contribute around 2-3% of the UK's total heat demand at present, which is much lower than European contemporaries. The government support for development of new heat networks, alongside retrofitting and expanding older systems, is part of a wider commitment for heat networks to supply a fifth of the country's total heat demand by 2050.

Close collaboration between suppliers will be essential to achieve these ambitious goals. Bringing these technologies online is one thing, but ensuring they are efficient and effective is another challenge which requires good design principles and high-performing materials.

Here Steve Richmond, Head of Marketing & Technical at REHAU Building Solutions, discusses the importance of material specification.

A material world

Once designers and contractors know which generation they're dealing with, they can make the correct choices in regard to material specification. For pre-insulated pipework, this is a choice between steel and polymer. The former has traditionally been the industry-standard, available in a large variety of sizes. Steel pipework is able to withstand operating constant operating temperatures of over 90°C, though with the lower flow temperatures of fourth and fifth networks, this is largely redundant.

However, steel pipework is heavier, so carbon emissions from freight are much higher, while installation involves welding, which requires both skilled workers and favourable weather or tents. As opposed to polymer, steel networks also need more joints due to the 12m pipe lengths and the requirements for ground expansion loops. Additionally, water ingress at the pipe join can lead to corrosion and even pipe failures.

This is where polymer pipework appears to better suit the needs of modern heat networks – particularly fourth generation systems. Lightweight and flexible, it is easier to transport, with less environmental impact. A 2022 study from REHAU indicates that polymer pipes can cut carbon emissions by up to 67% against steel, taking into account an average journey.

Polymer's flexible nature allows it to be coiled up to 570m for storage or transport with less joints will be required for the network. This also allows the pipework to be curved in the trench to avoid obstacles or other utilities. To further simplify installation, polymer pipework can be installed without need for welding. REHAU's RAUVITHERM and RAUTHERMEX pre-insulated pipework, for instance, use the bespoke Everloc compression sleeve jointing system.

Material specification for DHNs goes beyond simply the pipework; shrouds also affect both installation speed and performance. Complementing the flexible nature of polymer pipework REHAU has developed a new shroud that is universal with all REHAU pipe sizes between 90-250mm, while also able to support angle deviations of up to 22.5° in every direction. This gives contractors vital adaptability around the unique demands of each site.

Maximising benefits

A heat network is nothing more than the sum of its parts, and not all parts are equal. Material specification should be front-of-mind for any new district heating project. Selecting parts that suit the generation of heat network that is being created, while specifying high-performance materials, can facilitate a faster and greener installation and, more importantly, a longer lasting, more efficient system once in operation.

Solar & storage: a customer perspective

Liz's husband, Bill Peach, running cabling from outbuildings to the proposed battery storage location in preparation for installation of more solar panels.

IN ANY industry it is easy to find ourselves caught in an echo chamber, hearing only the thoughts of like-minded industry colleagues, sector suppliers and supporting bodies. In these customer perspectives we will be hearing directly from those on their own personal journeys into renewables.

Liz Rolf is the owner of a well-insulated eco house with photovoltaic panels (soon to be supported with a battery storage system) MVHR and air source heat pump (which replaced a wood pellet boiler that Liz did not consider to be a sustainable energy source). Even with these in place the current energy bills are £100 per month.

Liz considers herself a 'serious user' and is expanding solar energy provision on her property despite the cost in infrastructure, storage etc. because she sees the opportunity. Renewable Energy Installer spoke with Liz to find out more about her personal journey with solar – the opportunities and challenges – as well as her belief that fitting all buildings on industrial estates with solar PV is a 'no brainer' and that there is an urgent need to have a conversation around this opportunity to create a new 'prime producer'.

"If we continue to look at this from a cost perspective, we'll never get there. We need to see it as a contribution to ensuring power security."

We built an eco house eleven years ago and put in sixteen in-roof solar panels. Surely, all new builds should have solar panels included. Why is this not a prerequisite for developers?

Storage solutions have evolved sufficiently, so now we are ready to add more panels on our outbuildings, which we are fortunate to have. We have signed up for twenty more panels plus a battery. We want to be able to use our own electricity in the evenings and power our new electric car. We will also get the installer to enable us to direct electricity in the event of a power cut to, say, the lighting circuit. (Before we started on the build, we, as I expect many people do, thought that solar panels make us grid independent. We thought that only the surplus went back to the grid and we have learned that this is not the case and that there will always be a need for a two-way feed.

With the additions I am sure we will soon have even more surplus, which we would like to supply to the grid. We already get FIT payment for our current output and don't think there will be any more coming our way, but this doesn't matter. We have the opportunity to supply, so why not do it? We can contribute surplus at a crucial time which is probably not far off, when energy demand will put big pressures on supply. A no-brainer, right?

This is not a cheap enterprise; I must be honest. Fortunately, we have the cash at this moment in time and choose to spend it in this way. I don't expect we will ever recoup the total outlay, but we will be comfortable in the knowledge that we can account for our own energy use.

We realise that not everyone is able to do what we are doing – we are fortunate to be able to – and this got us thinking beyond the domestic setting to where other opportunities lie.

Industrial opportunity

Our thinking led us to consider industrial estates. In the main these sit on open sites with little or no shadow cast with buildings whose roofs are flat or low pitch and suitable to carry solar panels. Why not use this valuable space to generate energy and benefit from the gain? A no-brainer, surely? Some are doing so.

Of course, there are questions that need to be answered but it would be good to start a serious conversation around the best way to seize this clear opportunity.

Who will 'own' the solar panels? Ownership of a commercial building might not be a long-term commitment. They may change hands quite frequently, so why will the owner bother to invest in something that, potentially, only returns on its investment in the longer term?

The electricity generated may significantly reduce energy bills but what of owners who may not use the buildings themselves? How do we encourage them to care to invest? How about incentives for installations? What arrangement would be best to deliver benefit to the property owners in the long term?

There's also a need to consider the relationship between owners and tenants. The energy supply contract will presumably be between the tenant and the energy provider so there might need to be an agreement between tenants and owners about mutually benefitting. Could a possible solution be that the owner 'supplies' the electricity to the tenant?

Perhaps the responsibility could lie with councils to make this an income generator with the installations their responsibility. That still raises questions over array ownership and how the property owner would benefit.

The government could make it mandatory and cover the installation costs, but this again raises the issue of long-term responsibility.

These are not easy questions to answer but there is such a significant opportunity – the conversation has to start somewhere!

Let's get the conversation going – send your thoughts on the opportunity of large scale role out of solar in industrial settings:

margaret@renewableenergyinstaller.co.uk

IN CONVERSATION with the Ground Source Heat Pump Association (GSHPA)

REI SPEAKS with Stephen Bilby, Operations Manager & Secretariat for the Ground Source Heat Pump Association, to understand what this important industry body brings to those working in the sector.

Q What is the purpose of your organisation?

We are the focal point of the heat pump installation industry in the UK. GSHPA is the voice for the lowest running cost, lowest carbon, heating and cooling system for domestic and commercial buildings and heat sharing networks. We champion heat pump technology that is not based on combustion and emits no gases of any sort on site.

Q Who is the membership of the organisation?

As a trade association the GSHPA brings together members and interested parties from across the heat pump installation industry to develop a strong, dynamic and sustainable environment for heating and cooling systems that are based on heat capture, heat storage and heat transfer, including heat sharing networks and demand side management.

Q How many members do you have?

Over 170 member companies with around 300 individuals we communicate with within the membership.

Q What are the objectives of your organisation?

The GSHPA aims to electrify heat. We act as an advocate for our members by engaging with government and key decision makers to support cost effective and efficient solutions to industry, businesses and householders by:

- Developing a policy which puts the energy user's needs first
- Delivering a local, low carbon heating system at lowest cost
- Ensuring an understanding of heating and cooling, which makes up half of our energy use
- Taking an integrated and 'internet of heat' approach
- Helping users manage energy demand to limit the need for new generation capacity
- Strengthening the ground source energy industry's reputation through publishing GSHP Standards and best practice

Q Why should our community join?

The GSHPA becomes a stronger voice for lobbying for the industry with each new member who joins.

We welcome everyone aiming for high standards who serves the ground source energy industry and wishes to prosper with it including consultants, suppliers, drillers, trainers as well as installers of ground source energy systems.

We welcome utility companies who supply the electricity that runs heat pumps – they have an opportunity to demonstrate their commitment to renewable energy by supporting the high installation standards that the GSHPA promotes.

We welcome local authorities who have an opportunity to demonstrate their desire to see new construction projects incorporating green energy technologies.

Q What are the current challenges facing your membership and the broader sector?

To maximise the potential of ground source heat pumps, collaboration is key.

Governments must invest in research and development to improve technology and streamline installation processes.

Industry stakeholders should work together to educate consumers on the benefits of ground source heat pumps and drive down costs through innovation and economies of scale.

Q What are your main current activities?

The main activities currently are:

- To provide benefits to our members
- To share best practice and develop and disseminate industry approved technical standards, training criteria and codes of practice
- To promote the highest standards of integrity, professionalism and technical competence within the ground source energy industry
- To represent the ground source heating and cooling industry, promoting sustainable use of heat pump technology and engaging with government and other bodies to influence relevant policymaking.

Q What would you most like to see changed to accelerate growth in low carbon technologies?

Ground source heat pumps represent a game-changing solution in the battle against climate change. Their efficiency, reliability, and environmentally friendly nature make them a clear choice for a greener future. It's time for individuals, businesses, and governments to embrace this technology wholeheartedly, taking a giant leap toward a more sustainable and resilient world for generations to come.

IN CONVERSATION
with Low Carbon Homes (LCH)

Low Carbon Homes
All for retrofit • lowcarbonhomes.uk

GRAHAM LOCK, Founder and Director, Low Carbon Homes speaks with REI about the work of this nationwide independent retrofit network and its role in supporting those contributing to the low carbon transition.

Q What is the purpose of your organisation?

Domestic property energy consumption equates to 14% of UK carbon emissions. Low Carbon Homes exists to reduce this impact and highlight the wider social and economic benefits of retrofitting existing housing.

We are a nationwide market-led network of professionals and suppliers who we convene at events and through our online community platform to learn, share and showcase best-practice. We aim to unpack the complexities of retrofit-at-scale, reduce confusion and promote action.

Q Who is the membership of the organisation?

Our network consists of a wide range of professions – all of whom provide advice or guidance to householders, either directly or indirectly. Professions include engineers, installers, contractors, surveyors, consultants, landlords (private and social), architects, policy makers and community group leaders.

Q How many do you have in the network?

Our database consists of over 30,000 individuals, of which 15,000 subscribe to our fortnightly newsletter (Retrofit Review), 3,500 have attended an event and over 500 belong to our online community Retrofit Rendezvous.

Q What are the objectives of your organisation?

Low Carbon Homes brings industry together with local stakeholders across the UK to accelerate the take up of domestic property retrofit to provide warmer, safer and healthier homes for all. Our role is to convene those willing to play their part in decarbonising and improving our homes to facilitate collaboration and promote action.

Q Why should our community join?

Retrofit is a complex topic, and the market opportunity is not understood by many. There is a huge amount of high-quality, high-margin business to be won by those who can genuinely provide scalable solutions. Businesses in this space can differentiate themselves in the marketplace and work among like-minded professionals keen to play their part in decarbonising our homes, helping to meet our climate change challenges.

Q What are the current challenges facing your members and the broader sector?

Our network members face numerous challenges in retrofitting over 20,000,000 homes by 2050 to meet legally binding government targets.

The lack of long-term government policy is unhelpful, but significant funding is now flowing from government to help the most vulnerable upgrade their homes. The whole house approach to retrofit is widely advocated but is very complex and costly to implement, with many competing claims about methodology and product performance. Consensus is emerging, but the entire supply chain needs to move in lockstep if a uniform approach is to be adopted and supported by government.

A national retrofit strategy will provide a strong signal of intent from the government, unlock finance and encourage new market entrants. There are amazing career opportunities in the sector too, but these are not widely understood or promoted… yet!

Q What are your main current activities?

We have a series of regional retrofit-related events coming up, online summits and in-person Home Upgrade Show. These free-to-attend events will focus on Manchester, Birmingham, Liverpool and Glasgow – with many more in the pipeline.

Q What would you most like to see changed to accelerate growth in the adoption of low carbon technologies?

Consistent policy, communications, messaging and funding from central government, with empowered and adequately resourced local government would be a great starting point. A robust competency-based career and training pathway would help improve standards and consumer confidence, leading to faster take-up and the normalisation of low carbon heating.

A Day in the Life...

Name: Katie Jones
Organisation: The Heating People
Job title: Apprentice Heating Engineer
Location in the UK: The Heating People is based in Southport, serving customers all over the North West of England.

WE ARE pleased to introduce our popular online feature to our relaunched magazine. With people from many different roles talking us through their typical day we are delighted to welcome Katie Jones, apprentice heating engineer at The Heating People, who was crowned Screwfix Trade Apprentice 2023 back in May, after impressing the judges with her dedication and passion for renewable heating technologies.

Q Your company/business in one line

The Heating People design and install energy efficient heating systems, using next-generation boilers, solar power, and air source heat pumps, to help customers in the Northwest improve their home comfort whilst reducing their energy usage.

Q Why did you want to become a heating engineer?

"When I left school, I was keen to do something practical that allowed you to learn on the job. I had several jobs in different sectors until in 2020, when I was working on a Covid testing site, a colleague suggested I look at going into a trade.

"When I started to explore the professions you could go into, heating engineering and plumbing immediately stood out to me. I noticed it involved more maths and science than other trades, which really appealed to me as those were my favourite subjects in school. I also loved the fact you can go self-employed, choose your own hours and travel too.

"There's a big misconception in the industry about what a gas engineer does, I think I always thought of it as someone who does emergency plumbing jobs – unblocking pipes, fixing leaking taps etc. I've been on the tools for two years and not unblocked a toilet once!

"Since enrolling on the course at Southport College and working with The Heating People, I've really found my calling. I also love working with heat pumps and efficient systems.

"There's a lot more technical work required for these types of installs in comparison with boiler installations, particularly in terms of design, heat loss calculations, preparing the pipework and testing. For me this is an exciting part of the job, designing a system and seeing it come to life."

Q What is your experience of being a woman in the trade?

"I think heating engineering and plumbing is still very much seen as a 'man's job' and that outdated view is something that needs to be tackled – starting in school. It's a profession that I would have never considered in school, simply because it wasn't brought to my attention as an option. I did well academically, and I felt like university was pushed as the only viable option for me. But I knew I wanted to do something more practical, I just didn't have any information to help me explore that.

"When I was first looking for an apprenticeship, I remember meeting a tradesman who worked at a gas engineering company as I wanted some advice on getting into the industry. Considering this was my first impression of the industry, I was surprised when he asked me questions such as "how are you going to lift a boiler on the wall?", suggesting I wouldn't be able to handle the physical side of the job. Don't get me wrong, I've also had a lot of support from my peers – especially from my employer – which has been brilliant, but that wasn't a great first impression. "Now I'm out in the world doing it the reaction is generally positive, particularly from customers. They always notice that you're a woman in the industry as it's a bit different to what they're used to, but often the reaction is that it's great to see. Others have said to me that it's a real advantage as some customers feel more comfortable with a female tradesperson in their house – particularly if they live alone, are elderly or disabled, or have young children.

"I genuinely believe this job brings so many benefits, I can't really understand why more people aren't exploring it as a career option – particularly girls. I want to buy my own house one day and I'll be able to install the heating system, fit the bathroom, even hang shelves – I hadn't even used a drill before doing this job! It's really helped with my independence.

Q What's an average day for you?

"It really depends on the job we're doing, but usually I'm out of the house by 7.30am and at the first job by 8am. If we're doing a boiler installation for example, we meet with the customer, get all the tools out of the van and lay down the dust sheets to minimise any mess. With a boiler installation we then drain the system, do a tightness test and gas test, and start taking the old boiler off the wall.

"If the gas pipe or condense pipe needs upgrading, one of us will be taking down the boiler whilst the other works on the pipework. "Then it's lunch. After, we then do the flue, condensing pipe and commission the new boiler. We may also do a flush to clean the system of any sludge and debris, and ensure the new system is working as efficiently as possible.

"We're based in Southport, and we are in demand for more and more heat pump installations, which we do all over the North West region. As this involves more travel, we usually leave Southport around 7am and I'm home by around 6.30pm.

"It's a very physically demanding job, so I'm often pretty tired by the end of the day and ready for dinner and bed!"

Q Are you excited about the future of the heating industry?

"It's really exciting! I feel lucky because my boss is expanding into heat pump technology, so I'm able to learn from him and enhance my skills in the process. For example, I recently completed training on heat pumps and efficient systems which really helped me develop my knowledge and apply this to the growing demand we're getting for low carbon technologies. There are a couple of reasons for this shift – some people want to save money on their gas bills, and others want to invest for the environmental factor and to reduce their carbon footprint.

"Going forwards, the role of a gas engineer will completely change. I think it's great for the industry in terms of job opportunities and expanding your existing business if you're self-employed. Eventually, every gas boiler in the UK will need to be upgraded and there's something very exciting about that for the industry as a whole."

Realising savings with a solar storage combination

A CASE STUDY from Future Ready Homes – a joint project which gives householders access to all the help and advice they need to improve the energy efficiency of their homes as well as engaging with contractors and professionals working in retrofit.

£780 savings in first 5 months from solar and battery installation

A Shropshire homeowner has started his retrofit journey with the installation of money and carbon saving technology in the form of a solar PV and battery system after a suggestion from his brother. Below he shares the performance from its first five months of use.

"It was my brother who sowed the seed; he lives in Bolton. I contacted the supplier he used and another local supplier and eventually went with my brother's Bolton-based supplier. With the information I was given I was able to confirm the likely return on capital employed and the payback.

"My main driver was to reduce my carbon footprint. I was using 350KWH per month from the grid and am now at an average of 67KWH per month for the first six months of 2023."

The installation

- 14 x JA Solar 395W (5.530Kw)
- 1 x GivEnergy 5.0Kw Hybrid Inverter
- 1 x GvEnergy 9.5kWh Battery

Operation

The Solar PV satisfies the demand from the property first and any surplus is then transferred to the battery. When the battery is full, and generation is greater than the demand from the property, surplus power is sold back to the grid.

Price for export 10.6 -13.2p/Kw so far in 2023.

Savings

Usage

£700 = The total savings for the first five months of 2023 when compared to the usage during the same period in 2022. Based on current electricity prices without the energy price guarantee.

Export

£80 = Export credit for the first three months of 2023.

(Only paid for export from February 2023)

Return on capital employe

- **Savings** = 6.9% year to date
- **Export** = 0.45% year to date

Additional benefits that can be realised

The installation of an iBoost to the hot water tank will enable the heating of hot water directly from the SPV or from the battery, negating the use of gas.

Current gas price 16.72p/Kw less average price for export 11.9p/Kw = 4.82p/Kw

31.62Kw per day for 123 days during the summer = 3889Kw x 4.82p = £187 per year saving.

Pay back on iBoost 2.6 years.

Heat pump brings joy of central heating to 100-year-old farm

A HEAT PUMP from award-winning manufacturer Warmflow has helped provide heating to a 100-year-old farm cottage in Kirton, Lincolnshire. The cottage has been fitted with Warmflow's new Zeno ASHP and the newly renovated home is enjoying central heating for the first time.

The landlord of the 100-year-old farm cottage wanted a state-of-the-art heating system that could be adapted into this historical building. The ambition was a clean heating source that would efficiently and effectively heat this beautiful home as well as being environmentally sustainable.

Boston-based installers Len Breathwick & Son recommended the Zeno as one of the most intelligent and efficient heat pumps on the market commenting: "The Warmflow Zeno air source heat pump was a no brainer for this property. With the help of Warmflow's heat pump design team, we chose to go with the AS01 paired with a Warmflow Nero 170ltr cylinder. The air source unit was easy to install and commission."

For this smaller cottage the Zeno AS01 was the perfect solution with an output of 8kW of heat energy, providing hot water temperatures of up to 50°. This unit also supplies the underfloor heating and the low temperature radiators with hot water for efficient heating. Pairing it with Warmflow's new 170ltr Nero Heat Pump Cylinder ensures endless hot water. This was the installers first time installing a Warmflow Zeno air source heat pump and they 'wouldn't hesitate to do so again'.

A brilliant heating solution

The Zeno always proves to be a favourite of installers who receive training on the product at one of Warmflow's seven training centres across the UK.

The in-depth training included on the Zeno air source heat pumps includes installation, commissioning & troubleshooting.

Warmflow's GB Renewables Sales Manager Niel Rumbold said: "The Zeno Air Source Heat Pump units are a brilliant heating solution for all types of homes. They offer excellent energy savings and can help reduce the end user's carbon footprint.

"In this case, the homeowner wanted a sustainable heating solution for the cottage and has expressed their delight at the results.

"Underfloor heating had already been installed in the property, as well as radiators, making the ultimate heating solution when paired with our heat pump. This is because the underfloor heating and low-temp rads requires lower flow temperatures of 35 degrees, meaning the heat pump in turn uses less electricity."

Warmflow's range of uniquely designed air source heat pumps offer market leading efficiencies as well some unique features such as Warmlink.

Warmlink is Warmflow's remote control and diagnostic platform which comes as standard with all Zeno heat pump models. The installing engineer simply downloads the Warmlink app onto their phone, scans the unique QR code on the side of each appliance and is then able to remotely monitor, fault find and control the unit from anywhere in the world.

New to the technology, the landlord of the property was reassured by the backup that Warmlink offers commenting: "I like the look of the unit. And I feel safe knowing the installer can monitor and look after my heat pump through the Warmlink app."

WARMFLOW

Zeno

Renewable Energy

THE COMPLETE PACKAGE WITH WARMFLOW

WARMLINK APP CONTROL
Remote control & diagnostic capability through the cloud based app.

USER-FRIENDLY TOUCHSCREEN INTERFACE
Covering all aspects of heat pump and system control

3 MODELS
Zeno 8kW, 12kW & 20kW

ZENO AIR SOURCE HEAT PUMP

NERO HOT WATER CYLINDER

NERO BUFFER TANK

UNDERFLOOR

FREE DESIGN SERVICE

WarmLink
Remote control & diagnostic capability

A+++

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