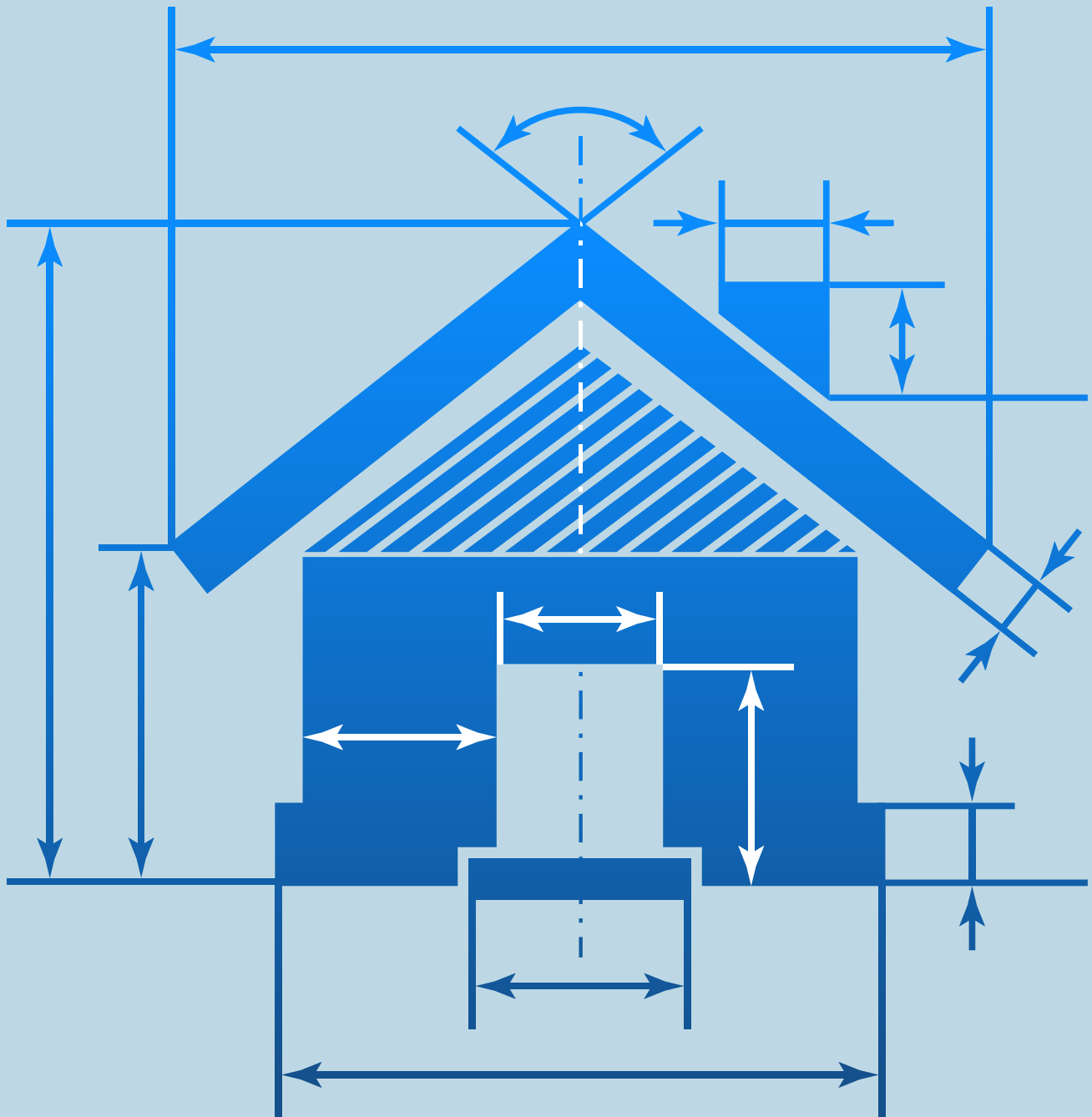


ACCELERATING RETRXFITTING

How innovators are accelerating the sustainable transformation of our homes



ARITCO REPORT 2025



REPORT OVERVIEW

PURPOSE

This report was co-created by Springwise and Aritco to explore the ways sustainable design is impacting the places where we live. It offers valuable insight into key trends, the latest technologies, and innovations from around the globe – revealing how our most familiar places and spaces are being transformed in the most exciting ways.

CONTENT

This report explores how the world can accelerate the retrofitting revolution to deliver on global climate goals. It will focus on the ‘facilitating’ solutions that can help us to transform our built environment, both to reduce our homes’ contribution to climate change and to make them more livable in a climate-impacted future.

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NEXT LEVEL LIVING

We are preparing ourselves for the future. Are you?

It is a matter of fact that most of the buildings that we have around us today, are the same ones that will be there in the coming 25-30 years. The UK Green Building Council (UKGBC), has calculated that **80%** of today's UK buildings will be there in 2050. Add to that the fact that two-thirds of UK homes have an Energy Performance Certificate (EPC) rating of 'D' or below (A equals very efficient, G equals very inefficient), and we have a sizable housing stock that is wasting precious energy on a daily basis.

Retrofitting existing buildings can reduce their life-cycle carbon emissions by up to 83%, and for the UK to meet net zero by 2050, one million houses would need to be retrofitted each year for the next thirty years. No doubt, then, that the challenge is huge.

The aging population is another challenge facing our world. We are generally becoming healthier, and we are generally living longer. This also means that the number of people who need elderly care is going to grow. The cost of care in elderly homes will be a hard nut to crack for all countries, and most

countries are therefore supporting different initiatives to make it possible for elderly citizens to stay in their existing houses longer. And two-thirds of these homes have bad energy performance.

Retrofitting and future-proofing is clearly a focus for the future, and making our houses accessible, durable, and fitted to future needs is essential.

Every year we get together with Springwise to produce a trend report on the things we identify as high up on the agenda for future thinking. In this year's report, we want to highlight ideas, innovations, and ways of improving and retrofitting our housing into the future. I hope you will find this report interesting, inspiring, and useful. We are preparing ourselves for the future. Are you?

Ida Lindvall
Head of Sales & Marketing,
Aritco Lift
aritco.com



INNOVATION THAT DRIVES ACCELERATION

At Springwise, our role is to provide our clients, readers, and library members with a means of discovering the most exciting global innovations: those that are tackling the world's toughest challenges. And, as challenges go, the need to retrofit our built environment is a big one.

Every day, we see many creative ideas and innovations. All of them have enormous potential, but they are also at varying stages of development. With progress on retrofitting stalled globally, and a suite of well-established clean technologies already available, this report focuses specifically on those that remove hurdles and speed up implementation. In the world of retrofitting today, we need facilitators more than moonshots.

By equipping readers with an insight into some of the tools, programs, and initiatives that are available, we hope to answer the question: what more can we do to accelerate the retrofitting revolution?

We believe there is an alternative future where all have access to comfortable energy-efficient homes, powered by clean energy. The practical challenges to achieving this vision are not inconsequential, but, through this report, we hope to convince you that they can, and will, be overcome.

The Springwise Team,
springwise.com

POWERED BY
SPRINGWISE



ACCELERATING THE RETROFITTING REVOLUTION

CREDIT: PIXABAY

How innovators are facilitating the necessary transformation of the built environment

Home may be where the heart is, but it's also a major component of our carbon footprint. According to the International Energy Agency's (IEA) most recent figures, buildings account for one-third of total global energy system emissions.

Going one layer deeper, the bulk of these emissions are the result of building operations: heating, cooling, and powering appliances. Investing in sustainable construction materials and cutting-edge techniques for new builds will play an important role in decarbonizing the built environment. But a bigger question is how we can make our

buildings more energy efficient, and less carbon intensive to run.

Around 80% of today's buildings will still be with us in 2050, and a large proportion of these are old, drafty, and dependent on polluting energy sources. Upgrading our housing stock with improved energy efficiency and clean power is therefore an important area of focus for decarbonization, just as it's imperative that we future-proof homes for an aging population. In fact, there are links between the two issues. Inefficient homes come not only with a carbon cost but also a financial one, and Age UK's latest estimates show that

one in six older households in the UK are in fuel poverty.

Many of the technologies we need already exist and are affordable if we can find ways of addressing the remaining challenges. While solar panels and heat pumps have high upfront costs, they are typically cheaper to run. And well-insulated homes pay for themselves in energy savings over the long term.

Nonetheless, progress is not going fast enough. According to the Global Retrofit Index interim report by sustainability advisors 3Keel, current retrofitting rates are below what is necessary for national net-zero targets – even in

higher-performing G20 countries.

For this reason, this report is focused on what we can do to unblock the bottlenecks and accelerate retrofitting rates. It is split into four sections: Plan, Upskill, Energize, and Adapt, which reflect the key areas of innovation that are necessary to remove hurdles on both the supply and demand side. The following pages provide examples of practical and tangible 'facilitating' solutions. Taken from the public and private sectors, they enable stakeholders to scale up retrofitting to the levels necessary to get back on track.

TOP 5 PRIORITIES FOR FUTURE-PROOFING YOUR HOME

With the world changing faster than ever, it's never been more important to ensure your home is future-proofed. The disruption and cost of renovations can be daunting, and projects are typically driven by several aims – from accessibility and energy efficiency to aesthetics. With so many considerations, we've highlighted five priorities to bear in mind.

1. Make your home suitable for every life stage

Today, we are living longer than ever, with more of us wishing to age in place. Features like an Aritco home lift can ensure your comfort into the future. In this report, we feature France Renov (page 10), one example of the kind of services available for those wishing to make changes for the future, with others available in different countries.

2. Take stock of your home's energy efficiency

When it comes to energy efficiency improvements, it's important to know your home's status quo so you can make informed decisions. Tools like Kestrix (page 12) and Climative (page 13) can help to do this.

3. Explore available grants and tax credits

In most countries, financial aid is available for energy efficiency projects. It can be difficult to keep track of what you're entitled to, but some manufacturers, such as Aira (page 24) will offer to help you with the paperwork.

4. Find the right option for electrifying your heating

Heat pumps are increasingly common and are growing more affordable. And companies like Aira (page 24) are developing service models that remove many of the hurdles and costs associated with making the switch. Others, like Hestiiia (page 23), are exploring exciting new ways to electrify home heating.

5. Consider investing in rooftop solar

Rooftop solar panels are becoming cheaper and more common. But choosing the right system and financing option can be complex. Here, tools like Prêts (page 11) can help.

PLAIN

How governments, local authorities, and property owners can plan retrofitting projects

The world needs to renovate the built environment on a large scale – a task that can seem daunting when you look at the numbers. In Britain, which has some of Europe’s oldest and leakiest houses, the UK Green Building Council (UKGBC), reports that nearly 29 million homes will need to be retrofitted by 2050. And, on a global level, the International Energy Agency argues that 20% of the existing building stock needs to be renovated to be zero-carbon-ready by the end of this decade – a target it describes as ‘ambitious but necessary.’

In the face of such big challenges, paralysis can easily set in and it’s important that decision-makers – whether they be individual homeowners, local authorities, or large institutional landlords – know where to begin. Thankfully, there are a growing number of tools available to help with this process of prioritization.

In France, the government has set up France Rénov, a free service that helps people plan upgrades to their homes. And, in other

markets, private sector startups are similarly providing tools to help plan renovation work.

In the UK, Loughborough University spin-out Kestrix is helping housing developers,



20% of the existing building stock needs to be renovated to be zero-carbon-ready by the end of this decade

utilities, and local governments direct spending on energy efficiency retrofits. It does so by using drones and AI to scale up the process of assessing how heat leaks out of buildings.

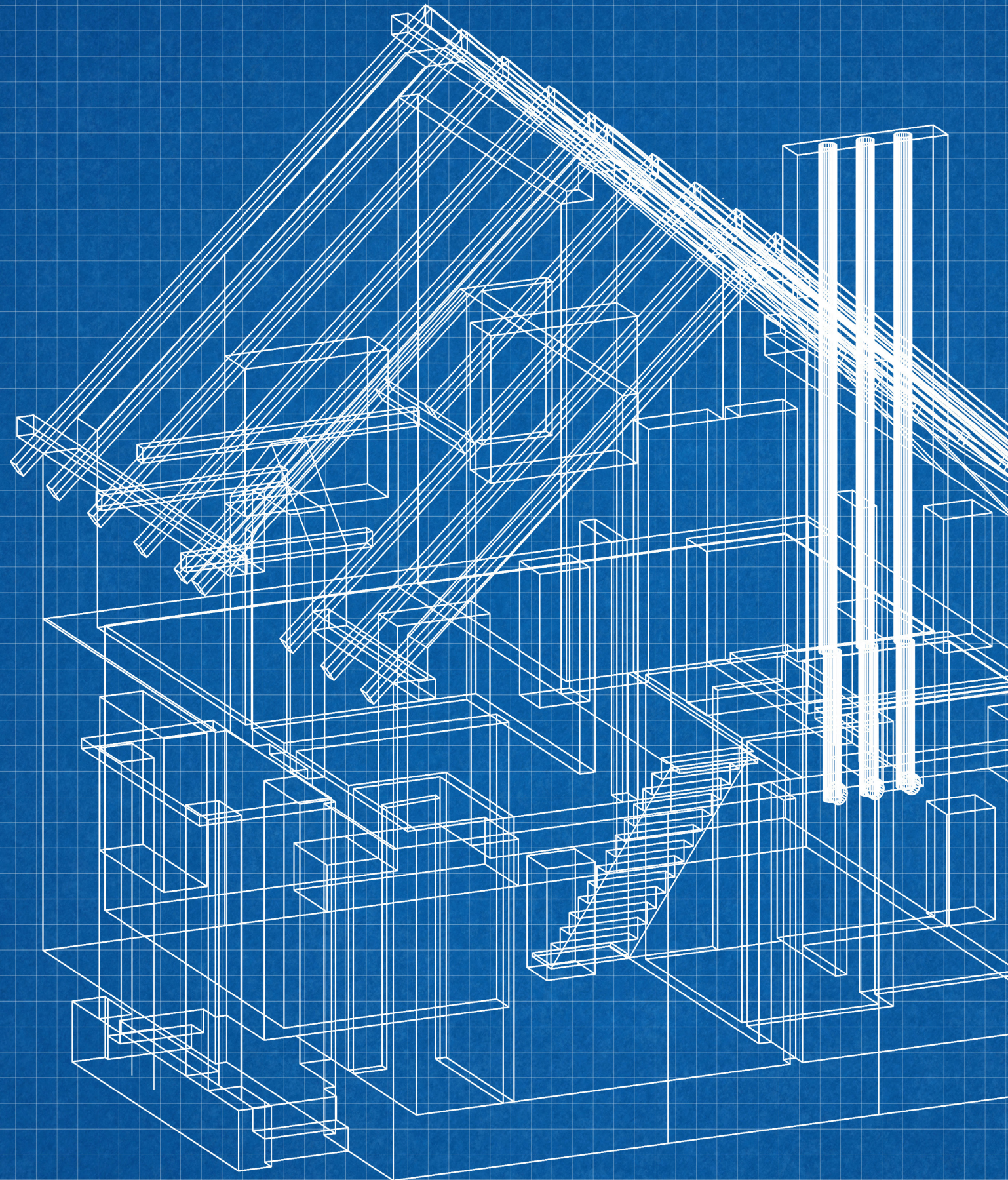
Meanwhile, in Canada, Climative is leveraging AI to create virtual home energy assessments at pace, while also providing customers

with an engagement platform that provides personalized low-carbon advice and offers.

Finally, when persuading budget-aware homeowners to make changes to their homes, making sure the finances add up is an extremely important part of the planning process, and here Dutch startup Prêts can help. It provides customers with estimates of financial savings and return on investment within the familiar online platforms of energy retailers. Its embedded finance solutions then simplify the funding process and help users make the best choice of investment.

The global upgrade of the built environment that is necessary if we are to hit global climate targets is an enormous and complex endeavor. And, so far, the world is not on track. But planning is the first stage of any undertaking, and here there is cause for optimism. The innovations in this section demonstrate that there are tools available to help us know where to begin as we rise to the challenge.

CREDIT: ISTOCK



FRANCE PROVIDES FREE SERVICES FOR THOSE EXPLORING RENOVATION

The France Rénov service guides homeowners on how to cost-effectively improve energy efficiency

The French government has a history of providing advice to homeowners exploring renovation projects, and, since 2022, many of these services have been consolidated into a single public program called France Rénov. With the tagline *le bon réflexe pour rénover son logement* (the right way to renovate your home), the free service provides tailored advice on how to cost-effectively improve energy efficiency. It also advises on how to adapt homes for aging or disability and on how to bring buildings up to health and safety standards.

At the most basic level, the France Rénov website includes an interactive tool that provides information on different types of projects, such as insulating floors and installing hybrid solar panels. This can be adjusted for houses, apartments, or co-ownership.

The service also provides more

personalized support, however. Advisors located at France Rénov advice centers across the country offer independent advice to individuals, whether they are owners, tenants, or members of housing associations. This includes support in developing projects, advice on obtaining financial support, and guidance on finding trusted craftsmen to carry out the work. Support is also provided through a telephone helpline and an online chat service.

For quicker insights on financial support, the website includes a feature called 'SimulateurRénov', where users input personal details and discover their eligibility for national aid schemes, with an indication provided of how much support they might expect. Finally, there is an online directory listing trusted professionals who are competent to carry out renovation work.



The free service provides tailored advice on how to cost-effectively improve energy efficiency



CREDIT: PIXABAY



WHAT

A platform simplifies financing for home upgrades

WHO

Prêts

WHERE

Netherlands



CREDIT: PIXABAY

DEMYSTIFYING FINANCE FOR SUSTAINABLE HOME RENOVATION

A Dutch startup makes it easy to understand energy savings and financing options for home upgrades

Prices for sustainable home technologies have dropped significantly – by over 80% for rooftop solar systems in the last decade, according to the IEA. But navigating the complexities of financing and calculating long-term savings from these solutions can still be daunting.

Enter Prêts, a Dutch startup revolutionizing the energy transition for homeowners with its innovative embedded finance solution. The company makes sustainable home upgrades like solar panels and insulation both accessible and budget-neutral, ensuring that homeowners can invest in their future without financial strain.

The platform is built around two key components. First, it features a return-on-investment calculator that allows homeowners to see exactly how much money they will save by making energy-efficient upgrades. These insights

are personalized based on each home's specific energy usage and budget.

Second, Prêts simplifies the financing process by offering independent, easy-to-understand insights into available lending options. The platform ensures that loan repayments align with the energy savings generated from the upgrades, making most projects effectively budget neutral. This approach empowers homeowners to improve their properties without increasing their monthly expenses.

Prêts integrates seamlessly with utility companies, allowing customers to access the tools directly within their energy provider's app or website. By partnering with the startup, utilities position themselves as energy transition leaders. Meanwhile, Prêts handles all the back-end operations.

TAKEAWAY

Alongside upfront cost, the complexity of choosing the right technology and securing financing has long been a barrier to home energy efficiency upgrades. The intuitive tools provided by Prêts help to take away this source of uncertainty. With the startup's platform, homeowners can confidently invest in future-proofing their homes, safe in the knowledge that their upgrades will be both environmentally and financially sustainable.



WHAT

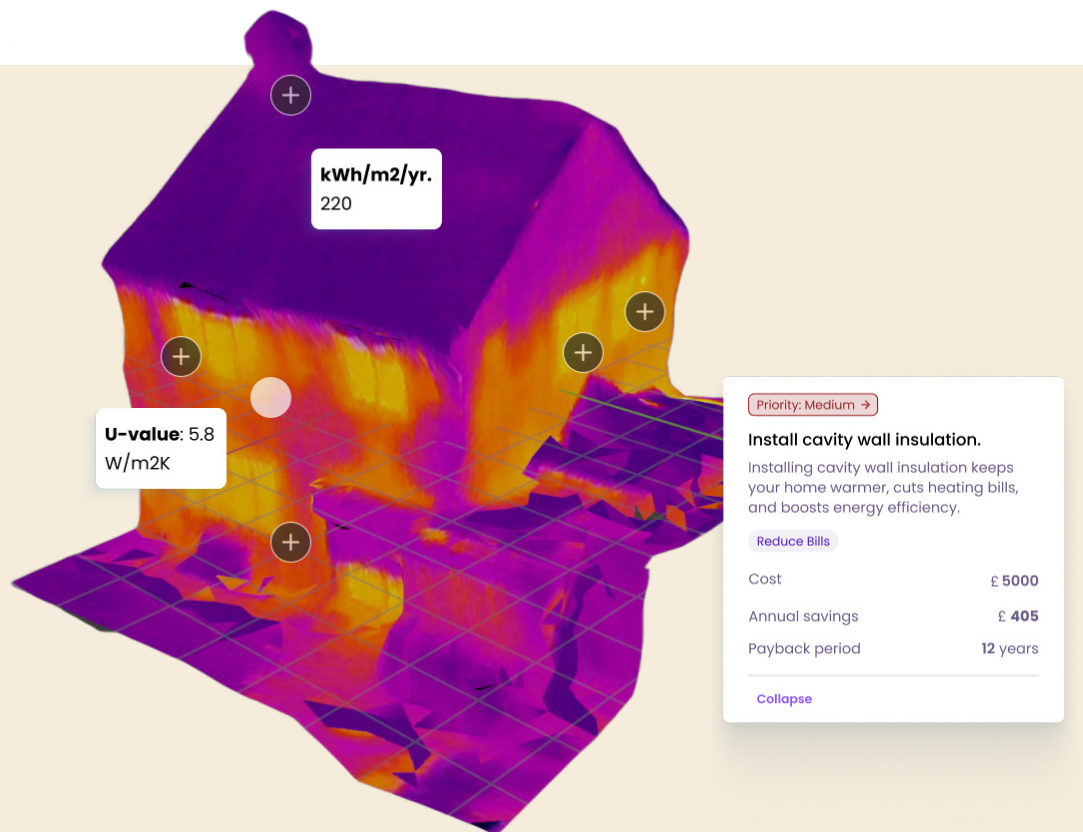
Drones and AI map the thermal efficiency of homes at scale

WHO

Kestrix

WHERE

UK



CREDIT: KESTRIX



WHAT

AI helps to generate low-carbon plans for buildings

WHO

Climative

WHERE

Canada



CREDIT: UNSPLASH

MAPPING HOW HEAT LEAKS OUT OF BUILDINGS WITH DRONES AND AI

This startup provides essential data for retrofitting at scale

According to startup [Kestrix](#), the UK needs to retrofit 1.8 homes every minute to reach net zero by 2050. To facilitate this transformation, the sector needs energy efficiency data, yet on-site surveys cost hundreds of pounds, and qualified surveyors often have weeks-long waiting lists. What is more, research by [CarbonLaces](#) points out that the data from today's Energy Performance Certificate (EPC) ratings lacks accuracy, with some EPCs overstating energy use by up to 344%.

A new approach is required to supplement existing methods, and this is where Kestrix comes in. The company maps where and how heat is leaking from buildings at scale using drones fitted with thermal cameras. Its soon-to-be-launched Rapid Thermal Performance Assessment (RaThPA) algorithm will interpret the thermal images to predict

U-values for different materials (these measure the rate at which heat is transferred). The algorithm, which was developed with funding from InnovateUK, will also identify faulty insulation and estimate the rate at which a building, as a whole, leaks heat.

By combining these quantitative heat loss insights with geometric data, the startup can then identify the best interventions for each home, while estimating how much these upgrades will cost. Scanning buildings before and after interventions, meanwhile, validates the work done and provides data for impact reporting.

The overarching idea behind Kestrix is to direct energy efficiency efforts where they will make the biggest difference, and the company's proprietary heat-loss datasets can also be used to build tools that streamline energy performance benchmarking.

TAKEAWAY

We already have the insulation technology to improve building energy efficiency, but what we do lack is a way to deploy limited financial, time, and labor resources in an efficient way. By pinpointing, at scale, exactly where retrofitting will have the biggest impact, Kestrix is hoping that its technology will be able to unlock the most efficient allocation of scarce retrofit resources.

'BUILDING-BY-BUILDING' PLANS FOR A LOW-CARBON FUTURE

Machine learning helps stakeholders collaborate to reduce carbon emissions from the built environment

Traditional home energy assessments are slow. In fact, Canadian startup [Climative](#) highlights that, at current rates, we won't be able to assess and then retrofit all homes to net zero until after 2150.

To speed up the process, the company leverages AI to create virtual home energy assessments at a rate of over one million buildings per day. These help governments, utilities, and homeowners collaborate on low-carbon solutions.

The core of the technology is Climative's algorithm, known as the Automated Carbon Model (ACM). This rapidly generates insights, such as estimates of a building's energy usage and emissions, as well as recommendations for energy-efficiency upgrades. The ACM has been trained on more than a million on-site assessments conducted by human experts, and

the low-carbon plans it produces are based on trusted public data such as weather, energy costs, and property assessments. Additional data can then be added for further refinement.

When insights are being generated for an individual house, the ACM produces a 'first pass' of the plan, with homeowners then providing further information by linking billing data, answering questionnaires, and uploading any existing assessments. The startup recommends that customers still consult an advisor before committing to any upgrades.

Climative's platform consists of three components. Climative 'Insights' supports regional data aggregation and impact tracking, while Climative 'Navigate' offers customers personalized low-carbon advice and offers. There is also Climative 'Advisor', which provides web-based tools for energy advisors.

TAKEAWAY

By simplifying stakeholder collaboration, Climative hopes to speed up the decarbonization of the built environment. In addition to providing individualized energy plans, the startup's platform helps users develop advanced insights into carbon use, which can then inform policy decisions and program design. It can even create 'what if' scenarios for entire cities, neighbourhoods, or individual homes. One final way the analysis can facilitate progress is by helping banks to certify retrofit loans.

UP2KILL

To deliver the global retrofitting revolution, the world needs more skilled workers

Buildings are built and renovated by people – and this remains true even as we see new innovations in robotics and automation. A lack of workers with key skills could therefore be a stubborn bottleneck as the world progresses towards climate and retrofitting targets.

Today, the numbers show there is work to be done. The construction sector as a whole faces skills shortages in many markets – the UK, for example, will need an extra 251,500 construction workers by 2028 to meet the expected levels of work, according to the Construction Industry Training Board. And, more specifically, there is a particular issue with ‘green skills gaps’ – a shortage of workers needed to fill new roles created by the green transition, such as heat pump installers. According to LinkedIn’s Green Skills Report 2023, job posts requiring ‘green’ skills are growing twice as fast as the share of green talent in the workforce.

One of the unique challenges when it comes to securing the skilled workers needed for the climate transition is the fact that many of the roles are new. And some may not even exist yet at all. There is, therefore, an important need to focus on upskilling or reskilling workers from other industries. This has the additional

political and social benefit of providing employment for workers in traditional industries that are set to wind down as the world moves off fossil fuels. At the same time, while the reskilling process takes place, there is a shorter-term need to ensure that the skilled workers that are available today are deployed where they are most needed.

“
Job posts requiring ‘green’ skills are growing twice as fast as the share of green talent in the workforce

Innovators in both the public and private sector are busy applying themselves to these challenges. The EU, for example, has launched the BUILD UP Skills initiative, which supports projects building skills intelligence, development, and uptake in the bloc. And, in Ireland, the government has funded the Digital Academy for the Sustainable Built Environment (DASBE), an industry-academia

partnership that has developed a digital skills hub for the construction industry. This has a particular focus on energy efficiency, circular economy, and digital skills.

Elsewhere, startups in Germany are taking the lead in solving the green skills challenge. One example is Montamo, a highly digital skills academy that is rapidly training those who wish to enter the renewable energy industry, particularly migrants. The platform is initially focused on heat pump installation but expects to later expand into solar power. For the insulation industry, meanwhile, VARM is training installers and providing them with ‘a-business-in-a-box’ so they can become their own boss.

Yet another German startup, Crafthunt, has built an AI-powered matchmaking platform that connects companies to workers with the right skills – in their home markets and beyond. The software provides automatic translation, democratizing access to foreign skilled labor.

Skills shortages provide a short-term headache. But they also present opportunities for individuals to gain meaningful employment in industries that are helping us to live more sustainably. And innovations such as these are helping more people to grasp them.



CREDIT: ISTOCK

IRELAND OFFERS A DIGITAL ACADEMY FOR UPSKILLING THE CONSTRUCTION SECTOR

Irish residents can receive funding for the digital courses

Like many countries, Ireland faces construction skills shortages that threaten its energy transition. In 2023, an EU-funded initiative called [BUILD UP Skills Ireland 2030](#) found that, to hit climate and building targets, the country will need to recruit up to 120,000 new construction workers and upskill a further 164,000 existing professionals. The research, which was led by the Technological University of the Shannon, further found that 26,000 current students will also need to be upskilled.

Interestingly, the same study found that the number of construction and engineering courses has risen tenfold in the country in the last two years, yet take-up of those courses remains low. This suggests that there is a further need to disseminate information about the sector and to design training that fits the needs of the modern world.

Founded in 2022, [DASBE](#) is an

attempt to address these issues and upskill the Irish construction workforce for the future. The digital platform offers a range of subsidized courses, modules, and programs, ranging from micro-accreditations to major awards. These are all designed to meet the specific needs of the sector, such as low-energy building design.

DASBE offers a mix of short learning experiences, including courses on specific topics that take only a few weeks or months to complete, and longer, structured programs that result in formal accreditation such as certificates, diplomas, or degrees.

To ensure learners have access to the most cutting-edge expertise, DASBE draws on research from a network of 20 national and international expert organizations in sustainable building, such as the World Green Building Council and the European Heat Pump Association.



To hit climate and building targets, the country will need to recruit up to 120,000 new construction workers



CREDIT: PIKABAY



WHAT

Digitalised training for migrant skilled workers

WHO

Montamo

WHERE

Germany

CREDIT: ANDREAS FOSBERG



CLOSING SKILLS GAPS WITH DIGITALIZED TRAINING FOR MIGRANTS

This startup promises to train new skilled workers fast with its hybrid approach to learning

The European Heat Pump Association estimates that Europe needs to install 7 million heat pumps every year to the end of the decade to hit ambitious EU targets. That will require the continent to train some 500,000 full-time workers by 2030 – a challenging task.

Now, however, German startup [Montamo](#) hopes to provide a blueprint for how we can train new workers fast. The company provides courses for career-changers, taking a hybrid approach that combines app-based digital learning with a physical training academy in Munich. The digital learning platform is available in multiple languages, with migrants being a particular target group for the programme.

Current training is focused on heat pumps, and the startup will be offering B2B pump installation carried out by its newly trained

workers as the first step in its development.

Trainees will receive both theoretical and practical instruction, accompanying experienced workers on heat pump installation jobs before being assigned a permanent job on the team.

The course's strong focus on digitalization means that workers can be trained much faster than traditional approaches: candidates will be qualified to install heat pumps in as little as six to eight weeks.

For the clients it hopes to attract, Montamo promises a comprehensive installation service that includes the removal of old gas-based systems and electrical connection and commissioning work – all in addition to the actual installation of the heat pump. In the future, the company also plans to expand into solar power and wallbox installation.

TAKEAWAY

Central to Montamo's offer is the idea that the craft sector, which will be key to the energy transition, is earlier in the process of digitalization than other parts of the economy. The company's bet is that by deploying digitally enabled learning and lowering language barriers, the training process will be unlocked for more people. This, in turn, will help to fill skills gaps while offering workers fulfilling and purposeful roles that build on old ideas of pride in craftsmanship.



WHAT

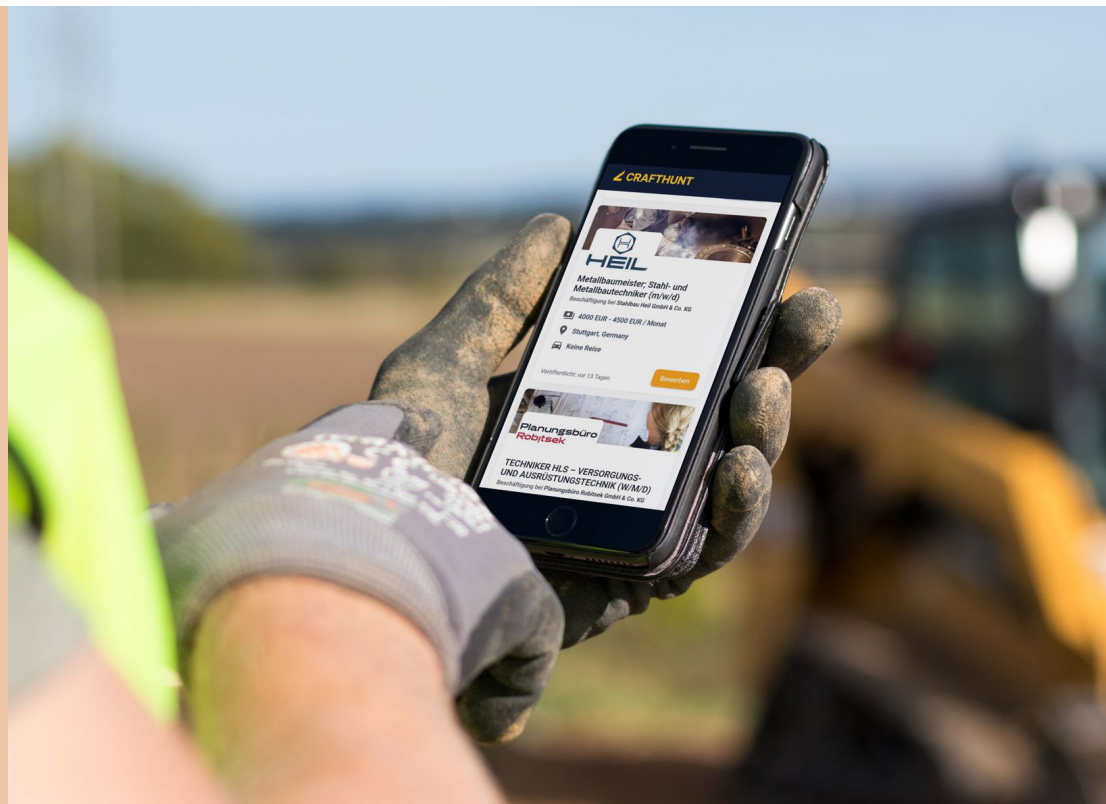
AI matchmaking for companies and skilled workers

WHO

Crafthunt

WHERE

Germany



CREDIT: CRAFTHUNT

MATCHING CONSTRUCTION WORKERS TO ROLES WITH AI

This AI-powered platform matches companies to skilled workers in their home markets and beyond

The challenge of ensuring there is sufficient talent for the retrofiting revolution is exacerbated by demographic shifts – the retirement of older workers with experience and expertise. To help combat these emerging generational changes, and keep projects like green retrofits running smoothly, German startup Crafthunt is turning to AI.

Improving domestic training schemes will play an important role in plugging the green skills gap, but efficient recruitment that finds the right individual for a role is also essential. Crafthunt hopes that its AI-powered app, which automatically matches candidates with relevant vacancies, will make this task much easier.

Organizations upload their company profile, including information on location, available positions, machinery used, vehicle fleets, and yearly construction volume. Crafthunt’s algorithms

then identify both domestic and international workers who could be a good fit, taking into account factors such as expertise, experience, and distance from the job. The app then sends the role to these profiles in a targeted way.

During the recruitment process, employers and prospective employees communicate via an in-app chat feature. And, to remove language barriers and improve access for foreign workers who have valuable skills, the chat can automatically be translated into multiple languages, including Polish and Spanish.

In addition to its AI matchmaking, Crafthunt also offers a free career counseling service. The company already boasts a network of more than 25,000 construction workers and over 700 companies. And, in June 2024, it closed a seed funding round that raised €3 million.

TAKEAWAY

Crafthunt’s co-founder, Dr. Patrick Christ, argues that to solve Germany’s shortage of skilled laborers, cross-border talent sourcing cannot be avoided. And getting skilled workers to where they are needed is a broader factor for retrofiting targets. Construction remains under-digitalized, and cross-border recruitment in the sector faces specific challenges, such as the translation of industry-specific terminology. Crafthunt is hoping AI will enable us to overcome these constraints.



WHAT

A platform helps insulation installers become their own boss

WHO

VARM

WHERE

Germany



CREDIT: PEXELS

HELPING INSULATION INSTALLERS BECOME THEIR OWN BOSS

The company provides training and support to those wishing to start their own insulation business

While there is significant variation between countries, in the EU, 13.2% of the workforce is self-employed on average – a significant proportion. And, in countries like the UK, the construction trades have a particularly high number of self-employed workers, although numbers have been falling in recent years.

Now, German startup VARM is helping to tackle green skills gaps by training insulation installers and helping them become their own boss.

The company’s solution is three-fold. First, its programs give trainees the essential skills they need to install insulation and make buildings more energy efficient, expanding the pool of skilled talent.

Second, VARM gives its trained installers the option to start their own building insulation business through its ‘Cloud Installers’ initiative. This ‘business-in-a-box’ solution connects installers with homeowners – helping to provide

access to sustainability upgrades.

Finally, the company connects installers with its technology. The company’s blow-in insulation, which can reduce a building’s heating costs by up to 50%, is recyclable, mold-resistant, and non-flammable. The insulation is made using sustainable materials that include byproducts such as wood fiber from other industries, as well as recycled glass bottles and wastepaper.

From the customer’s perspective, VARM’s focus on air-gap – also known as cavity wall – insulation promises lower costs and shorter installation times, making it more attractive for businesses and homeowners to make energy-efficiency investments.

The company recently raised €5.7 million in seed funding, which will help it expand its training capabilities and business programs.

TAKEAWAY

VARM CEO and co-founder Christian Gruener argues that insulation is the most effective way to make high-emission buildings more energy efficient – even more so than heat pumps and solar power. The startup’s offering not only expands the pool of people who can deliver these projects, but its approach also provides workers with long-term career prospects. By providing customers with a local pool of independent installers, VARM aims to insulate one million homes in 10 years.

A DUTCH APPROACH TO RETROFITTING IS GOING INTERNATIONAL

The methodology comes with a new funding model for social housing

Retrofitting social housing is one way that the authorities can stimulate development in the wider market. And according to the OECD, social rental housing accounts for nearly 28 million dwellings in OECD and EU countries – 6-7% of the housing stock on average.

Originally developed in the Netherlands, Energiesprong is an approach to delivering and financing whole-house energy renovations that taps into this market. Insulating elements are manufactured off-site and installed on the roof and facades of the home, enveloping it in an energy-efficient shell. Solar panels are then installed so that the building has net-zero energy consumption. One of the key benefits of this approach is that it minimizes disruption for tenants, with retrofits delivered in as little as ten days.

A crucial feature of Energiesprong is how it's financed. Today the approach is viable for, and aimed at, social landlords, who pay the installation costs, sometimes supported by

government grants. This outlay is then offset over the long term by the energy savings, which are guaranteed by the manufacturer. After installation, instead of paying energy bills to a utility, tenants pay an energy fee to the landlord, who thereby gains an extra revenue stream. The tenant, meanwhile, has the same or even lower monthly costs than when they were paying to a utility. Savings from reduced maintenance and repair also help to cover the upfront cost. While the initial focus is on social housing in this way, many of those promoting Energiesprong hope to scale to the private homeowner market in the future.

So far, 5,700 Energiesprong houses have been delivered in the Netherlands and other countries are also showing interest. On a global level, the approach is promoted by the [Global Energiesprong Alliance](#), but there are also national-level organizations, including in the [UK](#), [France](#), and [Germany](#).



CREDIT: JAKUB ZERDZICKI



Social rental housing accounts for nearly 28 million dwellings in OECD and EU countries

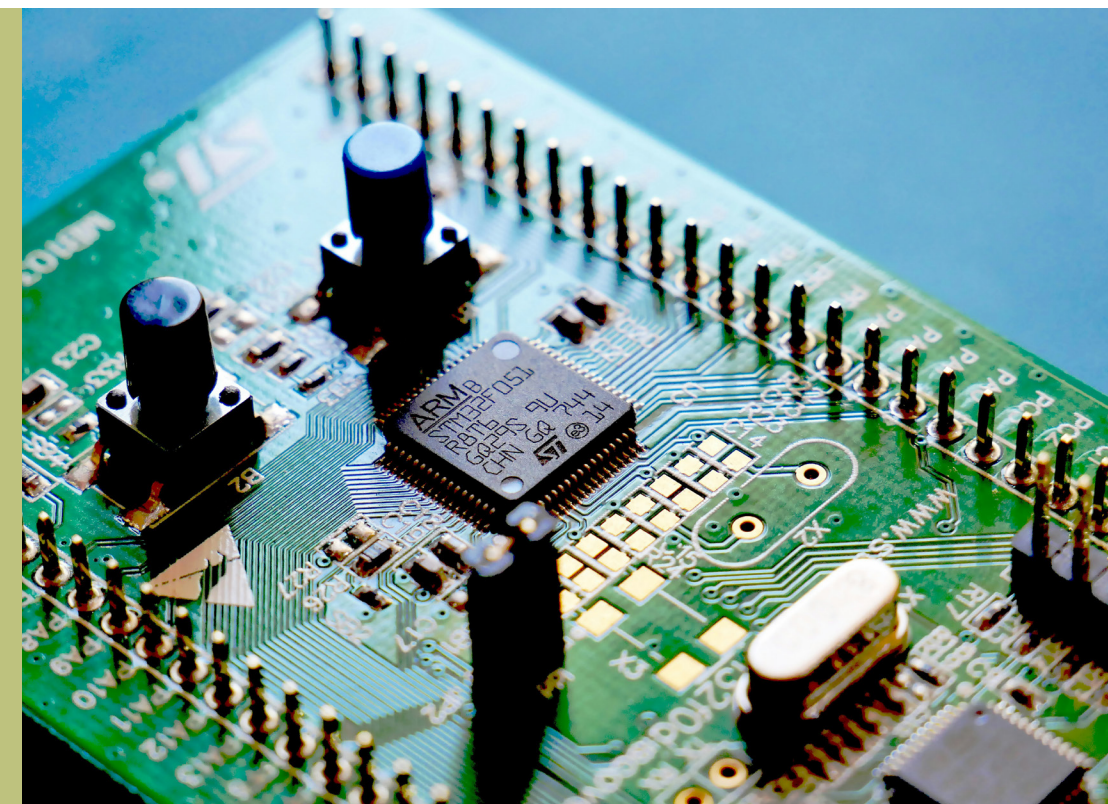


WHAT
Radiators powered by computer calculations

WHO
Hestiia

WHERE
France

CREDIT: VISHHNU MOHANAN



HEATING HOMES WITH COMPUTING POWER

This startup is putting computer chips in radiators to utilise waste heat from calculations

Computer processes generate a lot of heat, with cooling systems accounting for a significant portion of a typical data center's energy consumption. This is one of the reasons why data centers and transmission networks account for roughly 1% of global greenhouse gas emissions.

French startup [Hestiia](#), however, looks at 'waste' heat from computing differently, using it to create a new kind of domestic radiator called the myEko. The startup collects and upgrades used chips from data centers and puts them into the core of its radiator.

The chips then perform useful heavy computing workloads for companies such as 3D modelling, scientific research, and blockchain calculations, with the resulting heat transferred to the room via a radiant facade made of Corian, a brand of solid surface material commonly used for wash basins.

The homeowner thereby gains an efficient home electric radiator that utilizes heat that typically goes to waste when computing is performed in a standard, centralized data center.

In addition to having a novel heat source, myEko is also smart, using sensors to automatically regulate the temperature of a room. Users also have the option to tweak their preferences on an accompanying app. For example, they can program the system to automatically adjust temperatures depending on the time of day. Temperature changes from actions such as opening a window are also detected, with users sent alerts telling them to turn the temperature down to avoid wasted energy.

TAKEAWAY

Through the combination of its dual-heat design, smart automation, and utilization of computing power for efficient heating, Hestiia claims that myEko can deliver energy savings of up to 30%. The startup's creative solution provides another option for decarbonizing domestic heating that can supplement established technologies like heat pumps. Meanwhile, other startups, such as [Heata](#) in the UK, are also exploring the heating potential of cloud computing.



WHAT
An all-inclusive plan for air-source heat pumps

WHO
Aira

WHERE
Sweden



CREDIT: AIRA

AN ALL-INCLUSIVE PLAN FOR AFFORDABLE HEAT PUMPS

This startup wants to make its smart heat pump systems as accessible as possible

Heat pumps can help building owners boost their energy efficiency and cut down on bills at the same time. But many homeowners are put off from investing in this clean solution by high upfront costs and the hassle of making the switch from fossil fuels. Now, Swedish company Aira wants to remove these barriers.

Doing away with the often-unaffordable upfront costs altogether, the startup offers its intelligent air-source heat pumps via a convenient subscription model. Aira customers get access to a hassle-free, all-inclusive plan with flexible monthly payment options. This includes a free home energy assessment and a price-locked initial quote.

To make the transition away from gas boilers as convenient as possible, Aira helps customers apply for government grants

and planning permission before handling the installation of its indoor and outdoor units. It also removes and recycles the old boiler as part of its all-in-one offering. Once installed, customers have a 15-year comfort guarantee, meaning Aira will come and repair the system if anything isn't working as expected.

The heat pumps are powered by the Aira Intelligence platform, meaning the system will adapt to changing conditions - including the weather, a building's insulation, and the number of people inside - to make sure the temperature stays stable and comfortable. It also learns a home's particular routine and shower schedule to make sure enough hot water is always on standby.

TAKEAWAY

Aira's seamless, all-inclusive offering could play a big role in the roll-out of heat pumps. In June 2024, the company opened its production site in Wrocław, Poland, which has the capacity to manufacture 500,000 heat pumps a year and will help bring the company closer to its goal of decarbonizing five million European homes by 2034. Aira's heat pump systems are already available across England and Scotland, as well as certain areas in Italy and Germany.



WHAT
A new model for rooftop solar

WHO
GRYD Energy

WHERE
UK



CREDIT: GRYD

SOLAR POWER WITH ZERO UPFRONT COSTS

By installing solar-plus-storage systems across entire developments, this startup reduces cost and risk for homeowners systems

Regulation is a major driver of change in how our houses, whether existing or new build, are powered. In the UK, for example, organisations with large property portfolios, such as housing associations, must pursue sweeping home energy retrofits to meet increases in Energy Performance Certificate (EPC) rating requirements.

UK startup GRYD Energy is hoping to take advantage of this trend, while reducing costs and risk for homeowners. Central to the company's offer is finance. Institutional investors are already pouring money into utility-scale solar projects that serve the power grid. GRYD Energy is now trying to tap into this pool of institutional capital for rooftop projects. Its plan is to own and operate rooftop solar-plus-storage systems across an entire development or property portfolio. This approach

unlocks economies of scale to provide investors with stable and predictable returns, as with a utility-scale project. The homeowner, meanwhile, pays no upfront costs and does not have to purchase the hardware. Instead, GRYD Energy sells the customer the electricity generated on their roof at a price lower than traditional power from the grid.

Beyond novel financing, the startup uses AI to model the energy use of a home. Its systems then optimize the time that appliances like EV chargers are operated to align with power generation, thereby maximising energy self-sufficiency.

By owning many rooftop solar and storage assets, GRYD Energy can also create a 'virtual power plant'. This means that homes fitted with the startup's assets can share electricity independent of the public grid, meaning that the entire network can be optimized.

TAKEAWAY

By owning and operating systems across many homes, GRYD Energy is taking a fresh approach that doesn't require a big outlay from customers. Much of the startup's work is with new builds, but it also has an important role to play in the retrofitting revolution. The company is currently engaged with housing associations and registered providers to assess how its model can help them bring tens of thousands of their managed homes in line with more stringent energy standards.

ARAPT

**The world is already experiencing the impacts of climate change.
How can we adapt our buildings to cope?**

Global warming is measured in terms of average temperatures, but its impact is felt most acutely through increasingly common extreme weather events, such as flooding and heatwaves, both of which Europe experienced during 2023. We therefore need to update our building stock, not only to mitigate the causes of climate change, but also to adapt to its effects.

According to the World Weather Attribution group, (WWA), a global team of academic researchers from multiple institutions, heavy rainfall is becoming more intense and frequent because of man-made climate change, particularly in Europe. This is likely to lead to more frequent and severe flooding, although other human factors also play a role.

With flooding risks on the rise, there is a need to find new ways to protect homeowners and properties. In the UK, for example, FloodRe, a joint initiative between the government and major insurers, is helping to make flood cover more affordable, while also sharing information on practical steps to protect properties.

Meanwhile, companies are coming up with new retrofit-friendly solutions. UK startup BioScapes has developed planting units that connect to a home's gutters and use natural soils to slow and filter rainwater running off the house. FloodFrame,

meanwhile, uses a discreet and power-free pneumatic system that deploys heavy-duty cloths to protect a house from surface water flooding.

Heatwaves too are becoming more intense and frequent thanks to climate change. The WWA, whose task it is to rapidly assess the impact of human-induced climate change on specific weather events, recently found that the extreme heat experienced



Heavy rainfall is becoming more intense and frequent because of man-made climate change.

across the Mediterranean in July 2024, would not have occurred without man-made global warming. More broadly, the research group outlines that there has been a shifting baseline effect – temperatures previously considered 'extreme' are now just 'unusual', while those that were once thought to be nearly impossible are today classified as 'extreme'. The Intergovernmental Panel on Climate Change, meanwhile, highlights that heatwaves that would have

occurred once a decade in pre-industrial times, now happen 2.8 times every 10 years – and this could increase to 5.6 times if the world hits global warming of 2.6°C.

Extreme heat has a very real impact on human lives. The previously mentioned July heatwave, for example, caused 23 fatalities. And the International Labour Organization forecasts that increases in heat stress will bring productivity losses equivalent to 80 million jobs by 2030. It is therefore important that we find ways to heat-proof our built environment – without relying on energy-thirsty air conditioning. One thing in our favor is the fact that heat pumps provide both heating and cooling, but beyond this, innovators are exploring the best way to implement 'passive' cooling strategies. FortyGuard, for example, is helping to do this through its technology platform that provides tailored insights and recommendations on the most effective cooling techniques such as green roofs or reflective materials.

All of these innovations reflect a growing realization that homes built for today's climate may not be suitable for the increasingly extreme weather of coming decades. Fortunately, they demonstrate that there are solutions to create a comfortable home environment into the future.

CREDIT: ISTOCK



THE UK PROVIDES AFFORDABLE FLOOD COVER AND ADVICE FOR HOMEOWNERS

A government-industry joint initiative keeps insurance premiums affordable and helps people become flood smart

In England, around 5.5 million homes and businesses are at risk of flooding. And with climate change likely to increase the flood risks, hundreds of thousands of UK homes could become difficult to insure.

This is where FloodRe, which brings together the UK government and major insurers, comes in. Every insurer that provides home insurance to the UK market must pay a special levy into the joint initiative, which raises roughly £135 million annually. When a homeowner buys a home insurance product, the insurance provider can transfer the flood risk element of the cover to FloodRe for a fixed price. If a flood claim is made, the insurer will pay upfront but will later be reimbursed by FloodRe. This financial mechanism helps to keep premiums affordable for consumers.

But FloodRe's remit includes more than just finance. For one, it has championed Build Back Better, a proposition whereby participating

insurers reimburse homeowners up to £10,000 for installing new flood resilience measures when they are repairing their property following flood damage.

Information-sharing is also an important part of FloodRe's role. The initiative encourages people to be 'flood smart' by explaining the benefits of installing property flood resilience measures. And, in a recent project, FloodRe teamed up with environmental expert Dr. Ed Barsley and garden designer Naomi Slade to create a 'flood resilient garden', which was displayed at the Chelsea Flower Show.

The physical garden, which has since been relocated to Howbery Business Park in Wallingford, Oxfordshire, was designed to practically demonstrate how we can better manage water in residential areas. Linked closely to the Build Back Better program, homeowners can learn about the different elements that make up the garden, and how they can apply them to their own property.



With climate change likely to increase flood risks, hundreds of thousands of UK homes could become difficult to insure



CREDIT: MIKA BAUMEISTER



WHAT

A power-free system protects homes from surface flooding

WHO

FloodFrame

WHERE

France

CREDIT: PIXABAY



A POWER-FREE FLOOD DEFENSE SYSTEM USES CLOTHS TO PROTECT HOMES

The discrete installations deploy automatically when water levels rise

In 2023 alone, 32 million people around the world were impacted by floods. And as well as posing a risk to life, floods can have long-term, expensive effects on buildings, including mold and structural damage. Many flood defenses are large-scale municipal projects, but homeowners are increasingly exploring their own measures. FloodFrame, for example, has a solution to help keep individual buildings safe.

The company has created a unique, permanent flood resistance barrier, which is installed around a home or other structure and stays hidden in a buried, concrete container until it's needed, at which point the barrier automatically deploys within seconds.

During a flood, a plastic tube in the container inflates, pushing out a heavy-duty waterproof cloth. As water levels rise and the pressure

from the incoming flood increases, the cloth unfolds and rolls up around the building's walls. The cloth is tailored to a specific site, so can be designed to unfold as high as needed depending on the specific flood risk of an area.

The deployed system protects building walls from any flood damage, while the underground container prevents water from reaching and compromising a structure's foundations. Once a flood has eased, the cloth is either rolled back into the underground storage or replaced.

TAKEAWAY

Between 1980 and 2022, extreme weather events across the EU resulted in €650 billion in economic losses - with over 40% of that total caused by flood damage. With FloodFrame's technology, homeowners can ensure that disruption and damages are kept to a minimum, with an electricity-free solution that doesn't compromise the desired look of a property. FloodFrame has licensing agreements with companies around the world that are responsible for installing the systems locally, including in Denmark, France, the UK, Germany, and the USA.



WHAT
Planters prevent flooding and boost biodiversity

WHO
BioScapes

WHERE
UK



CREDIT: BIOSCAPES

A NATURE-FRIENDLY DOMESTIC PLANTER FIGHTS FLOODING

The units reduce flow rates helping to prevent sewers from becoming overwhelmed

In unaltered wetland ecosystems, natural plants and soils slow down the flow of water through a catchment. For this reason, there is growing support for the use of 'nature-based' flood management solutions. Typically, these solutions are implemented on a scale larger than an individual home through initiatives such as tree planting and soil enhancement. But what if the same principles could be applied on a smaller, residential scale, and in a modular way?

This idea has been taken up by UK company [BioScapes](#) through its patented Sustainable Drainage System (SuDS) and Biodiversity Net Gain (BNG) solution. This consists of planters filled with a specialist soil blend that connect to a home's guttering. These units slow the flow of water into sewers, thereby helping to manage rainwater run-off and lessen the risk of flooding and sewage discharges. And, in addition, the soil naturally filters the rainwater through biological activity,

reducing contamination.

Customers also have the option to integrate a choice of ten habitats into their planters through the base and front sections, thereby supporting local biodiversity. These habitats include hedgehog and invertebrate hotels, deadwood zones, and planting areas, with the units able to support a range of wildflowers, herbs, or vegetables. In addition to slowing rainwater run-off, BioScapes planters can therefore attract beneficial species and provide cooling benefits to tackle urban heat islands.

The units, which are available across the UK, are quick and easy to install and are ideal for retrofitting. And, as well as being suitable for domestic use, the planters are also key to the company's work with organizations, including schools, universities, developers, and architects as well as water companies and councils.

TAKEAWAY

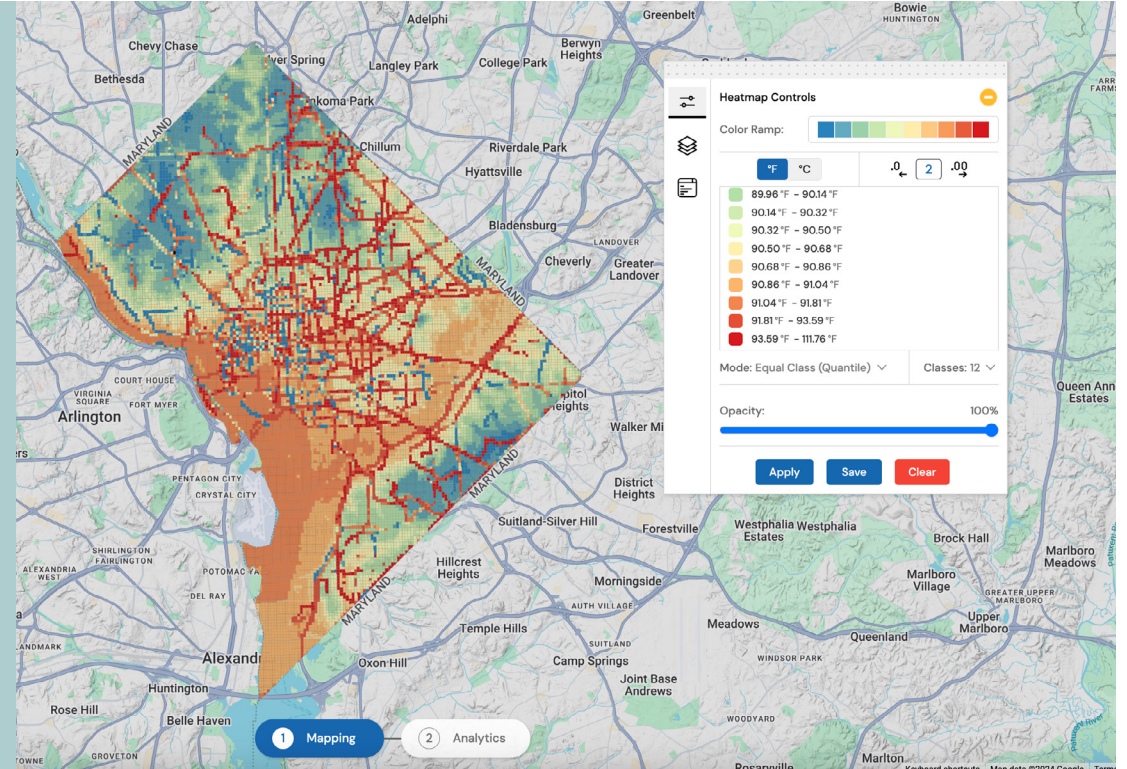
BioScapes' units enable homeowners to contribute towards natural flood defense, even in compact spaces with no access to the ground. Equipped with an integrated habitat, the planters are under a meter in height and under 2 meters long. Multiple units can also be installed and connected to provide a larger water catchment. The company argues that its system is a cost-effective way to deliver multiple benefits including improved water quality, a gain in biodiversity, and, of course, reduced flooding risks.



WHAT
AI intelligence on urban heat

WHO
FortyGuard

WHERE
UAE, US



CREDIT: FORTYGUARD

AN AI PLATFORM HELPS PLANNERS BEAT THE HEAT

The interactive dashboard identifies at-risk areas and suggests practical ways to minimize overheating

Building up our towns and cities has generally meant reducing the size of green spaces. Greenery has a natural cooling effect, and when we replace it with dense concentrations of pavement, buildings, and other heat-absorbing surfaces, it creates 'heat islands'.

This urban overheating will only worsen as global warming intensifies, increasing demand for energy-intensive air conditioners and putting inhabitants at greater risk of heat-related illnesses. Making cities resilient to hot weather is essential, but it can be hard for urban planners to know where to start. This is where cleantech startup [FortyGuard](#) comes in.

The company's AI-powered SaaS platform, called the Temperature Dashboard, acts as a search engine for temperature, allowing users to access detailed analytics about an area's temperatures with a ground-level altitude accuracy

between 0.5 and 10 meters. The interactive temperature map helps planners visualize specific hotspots in real time, as well as flag areas that will likely overheat in future based on heat patterns.

To get an accurate snapshot, FortyGuard uses data from various local and global sources, including satellites, on-the-ground sensors, and weather stations. These tailored insights, which include actionable recommendations, can then be used to guide designers, engineers, and contractors as they attempt to make cities cooler and more comfortable – whether that's by avoiding placing schools and hospitals in hot areas, or installing passive cooling systems like green roofs, reflective materials, and extra shading.

TAKEAWAY

Near-surface temperatures in cities can be up to 10-15°C higher than those in surrounding rural areas. And, as cities grow, it becomes increasingly important to reduce the effects of extreme heat and protect the comfort and health of residents. FortyGuard's platform helps planners do just that. The company's insights have already been used in the design of Masdar City in Abu Dhabi, including the recent introduction of a shading 'Solar Tree' in the city's Eco Plaza.

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