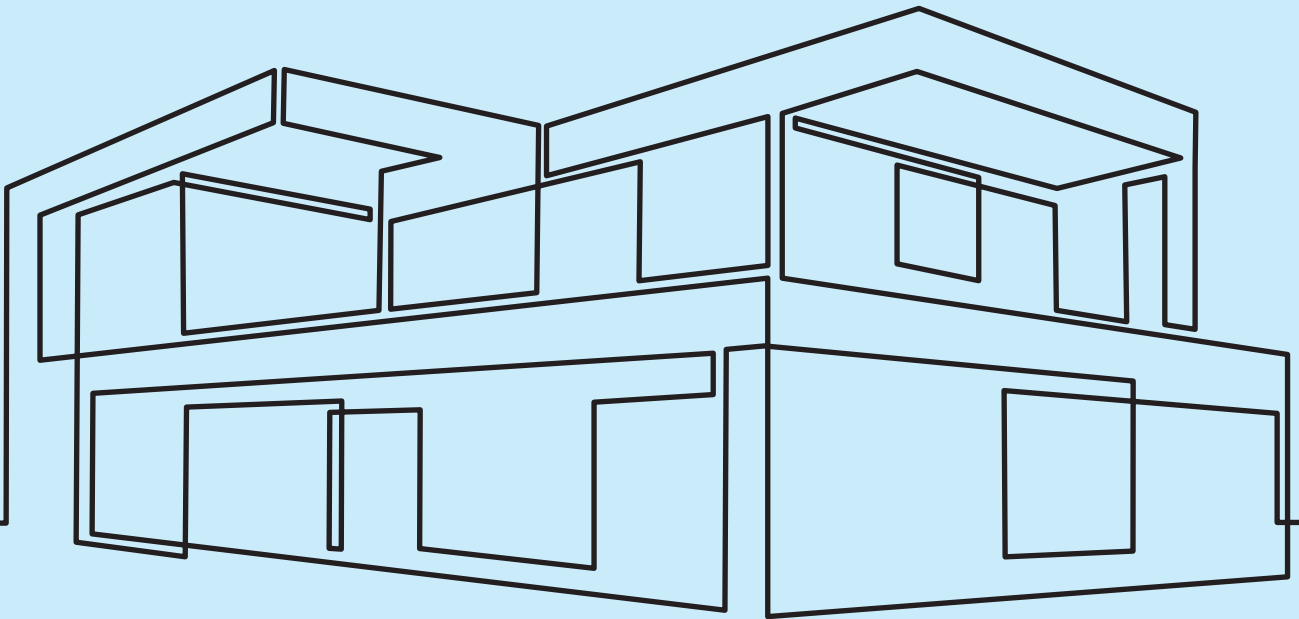


THE 100-YEAR HOME

From solar bricks to popcorn insulation – how innovators are helping to build homes to last the next century



ARITCO REPORT 2023



POWERED BY
**SPRING
WISE**

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 the concept of the ‘100-year Home’ – and the innovators who are making it a reality. For us, the 100-year home represents the idea that the homes we build and renovate today need not just to last *a* century but to survive *this* century amid the disruptions and dislocations caused by climate change.

- 4A Message From Aritco — Next level living
- 5A Message From Springwise — Innovation for accelerating change
- 6Building the 100-year home

INNOVATIONS



GENERATE

- 8How the homes of the future could generate their own power
- 10Designer creates bespoke wind turbine wall for home use (*Joe Doucet*)
- 11Solar panels that look like bricks turn homes into power generators (*Mitrex*)
- 12‘Invisible’ solar roof tiles (*Midsummer*)
- 13Renewable energy system harvests energy from fluctuations in humidity (*ThermoTerra*)
- 14A hydrogen power plant for the home (*Lavo*)



SAVE

- 16How innovations could save energy, carbon emissions and money in the home
- 18Startup converts existing buildings to net zero with innovative process (*Ecoworks*)
- 19Smart ventilation control system reduces energy bills (*AirEx*)
- 20Water-repellent building insulation made from popcorn (*University of Göttingen*)
- 21A new shower system combats climate change and water scarcity (*Flow Loop*)
- 22Underground car parks used to heat buildings above (*Enerdrape*)



SECURE

- 24How we can make our homes more resilient in the face of climate change
- 26Swedish appliance company designs new sustainable kitchens (*Electrolux*)
- 27Plant-covered noise protection barriers provide new animal habitats (*Naturawall*)
- 28Australian insurer creates extreme weather-proof home concept design (*Suncorp*)
- 29Filtering rainwater with porous upcycled bricks (*AquiPor*)
- 30‘Portable power stations for power independence (*EcoFlow*)

COVER CREDIT: ISTOCK

NEXT LEVEL LIVING

Aritco is a Swedish company that designs and manufactures lifts for homes, schools, offices and retail stores. Its lifts combine efficiency, aesthetics, Scandinavian design, safety and sustainability.

Sustainability has been a part of our DNA and ways of thinking since the company was founded. Our Aritco HomeLift, launched in 2016, is a truly sustainable product as each lift consumes less energy per year than a dishwasher or washing machine. Over 95% of its component parts are crafted from recyclable materials, and a magnelis coating is applied to steel elements to prevent rusting, thereby extending the life of the lift.

But beyond materiality and power consumption, the Aritco HomeLift is a sustainable solution because it can support regenerative architecture. We are all living longer, and as we get older, our expectations of great design, personalized aesthetics and intuitive functionality actually increase. The Aritco HomeLift can

futureproof our homes, allowing us to stay put for as long as possible by discreetly and safely connecting different floors without the need to negotiate stairs.

As we believe that all homes deserve the convenience and accessibility offered by a home lift, in late 2022 we launched the Aritco HomeLift Compact which has been designed with space-efficiency in mind. Its footprint takes up as little as a square meter, making it compatible with even the smallest house where space is limited. This new model will help make yet more homes fit for purpose for decades to come, reducing the cost, waste and energy of moving house.

The construction industry is responsible for **39% of global energy related carbon emissions** – 11% from the materials and construction of buildings and 28% from the energy needed to heat, cool and power them. Climate change, plus the current energy crisis, mean that there is added incentive to extend the

lives of our homes by making them accessible and liveable for more people for longer. The latest design innovations offer us the opportunity to make them yet more sustainable by generating power, saving energy and becoming more resilient to the storms, floods and power-cuts that we could potentially face in the future.

We hope you enjoy this report which highlights some of these global innovations which could future-proof our homes beyond our own lifetimes. At Aritco, we're constantly researching and developing ways that we can continue to revolutionize how we move around our homes and offices in safety, comfort and style. Watch this space for our own latest innovations.

David Schill
Marketing Director, Aritco Lift
aritco.com



INNOVATION FOR ACCELERATING CHANGE

As the home of innovation intelligence, Springwise regularly sees a string of technologies, businesses, and organizations that are looking to futureproof our homes against the shocks of climate change. Increasingly, this attention has also turned to preparing our spaces for a looming global financial recession. The two concepts are far from mutually exclusive: a more sustainable home can – and should – contribute to greater savings, more security, and regeneration. This report shows that the solutions are with us already, we just need to look around.

Indeed, horizon scanning is what we do at Springwise. As the global innovation intelligence platform for positive and sustainable change, we provide foresight into emerging ideas and solutions and have been serving our community by publishing the most interesting

business innovations since 2002. We provide a place of record for innovators, entrepreneurs, disruptors, and outliers across the developed and developing world, and bring their ideas to a wide readership. Access to our daily innovations, and extensive database of more than 11,000 solutions, is free for all via our website, daily and weekly email newsletters, and the Springwise Innovation App. We're a proud Certified B Corporation and a member of 1% For The Planet, and we take a purpose-driven approach to all the work we do, including this report, which we've proudly compiled on behalf of our friends at Aritco.

By equipping readers and businesses with a knowledgebase of solutions, we hope that they will be energised to put these innovations into action, help them scale and build a better world

for everyone. Imagine if every surface across our homes and offices was a source of power or taps everywhere recirculated their water. That every building was converted to net zero or was made completely weather-proof. These types of sustainable innovations could make our homes more efficient, and liveable, in every way. We believe the opportunities are endless – and that the home and spaces design sector will be a leader in bringing these opportunities to life and helping us build a better planet.

The Springwise Team,
springwise.com

POWERED BY
SPRINGWISE



BUILDING THE 100-YEAR HOME

How innovators are delivering a new generation of future-proofed homes for a changing world

With energy bills rising exponentially, the cost-of-living crisis biting, and the war in Ukraine rumbling on, it's tempting to bolt the door to our homes and go to ground until things blow over.

But with the long-term threat of climate change hanging over us, it's not possible to hide away forever – especially as the homes we live in today are unlikely to be resilient to the challenges we will face over the coming century. Designers, policymakers, and innovators will therefore need to answer some important questions when it comes to the next generation of housing. Are our homes fit for purpose? How can we build sustainably?

And will the homes we see today even be standing one hundred years from now?

The answers to these questions are likely to differ depending on where you are on the planet. In China, researchers have found that many buildings will reach the end of their lifespan in just **20 years' time**. So, for architects and builders in China, the challenge is how to build a new generation of homes that will last far longer than today's housing stock.

Outside of China, however, buildings tend to be more long-lasting. In fact, **80 per cent** of the buildings that will exist in

2050 are already standing. And in countries like the UK, many people already live in homes that are over 100 years old. This poses its own problems, as old, draughty buildings will need to be retrofitted to meet climate targets. In the UK alone, it is estimated that the retrofitting industry will need to grow by **ten times** to decarbonize housing at a sufficient pace to reach net zero by 2050.

Whether they are built from scratch or retrofitted, it's clear that the homes of the future will need to be built differently. And in this report, we delve into the concept of the '100-year home' and the innovators that are making it a reality.

For us, the 100-year home represents the idea that the homes we build and renovate today need not just to last a century but to survive *this* century amid the disruptions and dislocations caused by climate change. In our vision, the 100-year home will enable dwellers to generate their own power, save money, and remain safe and secure in the face of known and unknown threats.

The report is therefore divided into three key sections: **generate**, **save**, and **secure**. These echo the most important challenges society is facing and highlight the role that homes can play in addressing them.

CREDIT: ISTOCK

HOW MUCH ENERGY DOES IT TAKE TO POWER OUR LIVES?

Energy consumption is often measured in watt-hours. This unit tells us how many watts of power are expended over the period of one hour. A kilowatt-hour is equal to 1,000 watt-hours, a gigawatt-hour is equivalent one billion watt-hours, and a terawatt-hour is equivalent to one trillion watt-hours. But what does this mean in relation to our daily activities?

43.8 kilowatt-hours: The electricity required to power a lightbulb for a year

3,100 kilowatt-hours: The amount of electricity consumed by a typical domestic household in the UK per year

4,878 kilowatt-hours: The electricity required to charge an electric vehicle for a year

131.4 terawatt-hours: The amount of electricity consumed in Sweden in 2019

23,845 terrawatt-hours: The amount of electricity consumed across the world in 2019

GENERATE

How the homes of the future could generate their own power

For a long time, a home that generates all its own power would have been dismissed as the expensive pipe dream of a doomsday prepper. But that pipedream is increasingly appealing to ordinary people struggling with sky-rocketing energy bills. And as the world transitions away from fossil fuels, industry **participants** are increasingly betting that the energy systems of the future will be de-centralized, with energy generated closer to where it is consumed.

Industry insiders talk about distributed energy resources (DERs) – a term that encompasses a range of technologies located close to customers. According to the **International Energy Agency**, electric vehicles (EVs) and solar power are driving the growth of DERs, with 179 gigawatts of distributed solar added between 2017 and 2020 – enough to power around 1.6 million electric cars.

This decentralization of energy raises the possibility that the homes of the future will be entirely energy self-sufficient. To an extent, this is already a reality, as energy companies and homebuilders have begun teaming up to build **estates of self-powering homes**. Arguably, it's simply a case of self-powered homes becoming the norm rather than the exception.

When we talk about home energy generation, rooftop solar panels are often the first thing that comes to mind. In fact, great strides are being made in the development of **solar shingles**, such as those developed by Midsummer. These fit the shape of common roof tiles and

can be installed either as a retrofit or a whole new roof.

Greater efficiency, however, can come from combining different types of generation in one structure. **The Zeb Pilot House** in Larvik, Norway, was designed by architecture firm Snøhetta to incorporate a sloping roof clad with solar panels and ground-based energy wells. Its system generates enough energy to run the entire house, sauna, and pool, year-round, with plenty left over to charge an electric vehicle for every-day use. And the sloping roof makes water

“Accessibility and affordability is another vital component, especially in areas with little government support for renewables

harvesting easier too.

Innovators are also looking at new ways to store and use energy efficiently. This is important because seasonal variations in the supply of wind and solar energy, combined with the inability of current battery technology to store energy for long periods, means that full independence from the grid remains challenging.

Some, like **LAVO Green Energy**, are focusing on new battery technology that will allow users to store energy from solar panels in a hydrogen fuel cell. Others are

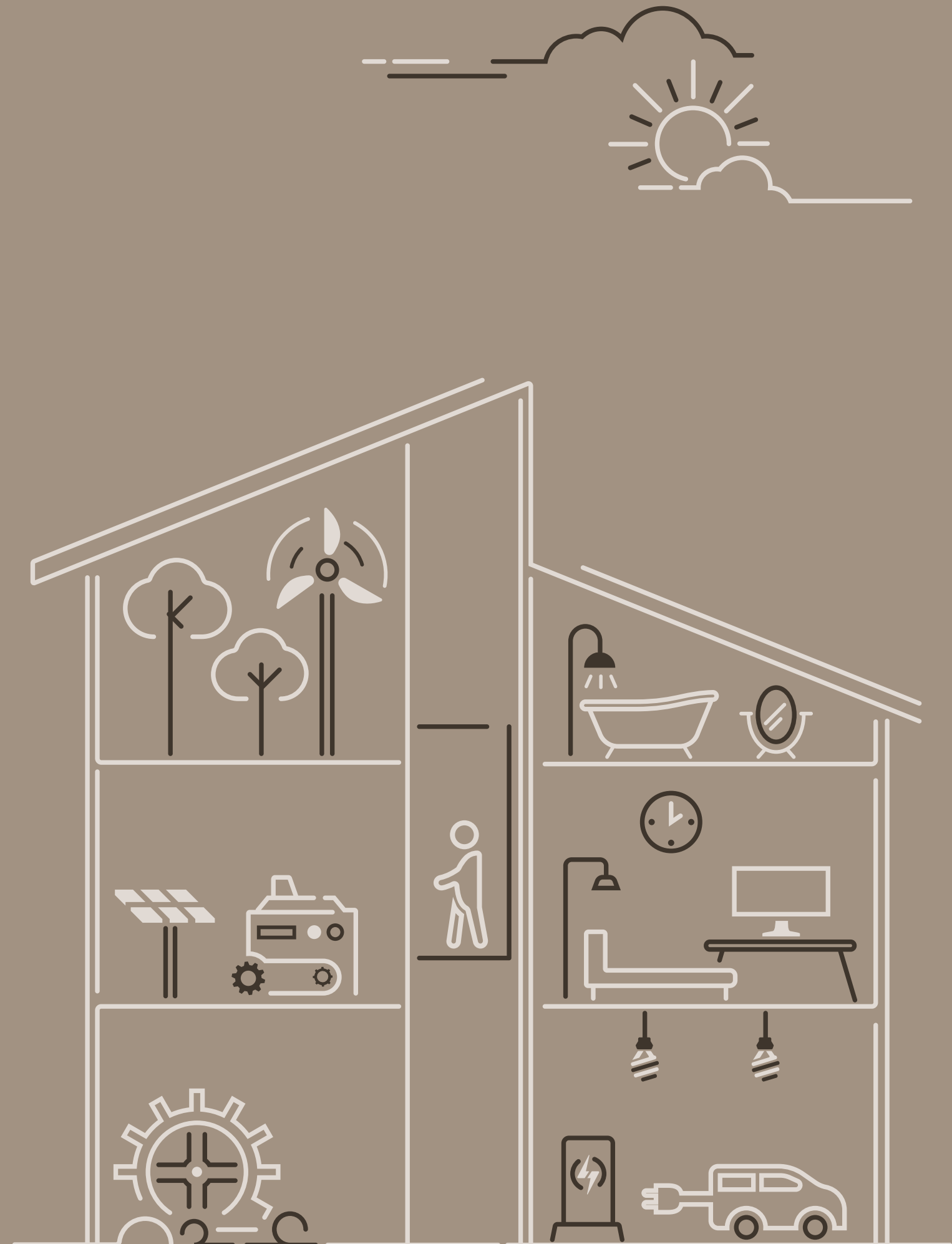
exploring new ways of distributing energy through a space, through means such as **heat-emitting wallpaper**. Another potential solution is micro-sized combined heat and power (CHP) systems, which generate both electricity and heat simultaneously. While most micro-CHP systems are gas-powered, in the future they could also be powered using renewable biogas generated from food waste and household sewage.

Accessibility and affordability is another vital component, especially in areas with little government support for renewables. Companies like **Solar Panda** are tackling this with home solar systems for rural African communities that use a pay-as-you-go model to allow millions access to affordable electricity.

Whatever systems are eventually developed, it is clear they will need to be tied together with smart control systems. These will eventually be used to control almost everything in the home, from deciding when to switch on the wind generator, or when to route power from the EV back to the home, to turning on the washing machine at the most opportune time and turning off lights and electronic devices when not in use.

One thing is certain, the future of energy in the home will look very different from how it looks today. Generating power in the home will make energy provision more reliable and less prone to outages from storms and accidents. Solar, wind, batteries, and other innovative solutions will give each home its own microgrid and democratize access to energy.

CREDIT: ISTOCK





CREDIT: JOE DOUCET

WHAT
A wind turbine wall for the home

WHO
Joe Doucet

WHERE
US

DESIGNER CREATES BESPOKE WIND TURBINE WALL FOR HOME USE

The installation can be scaled up or down and can fully power a home

SPOTTED

Designer Joe Doucet has created a wind turbine wall designed for the home. The design concept uses off-the-shelf wind turbine generators set within a 2.4- by 7.6-meter frame. Installed vertically, the turbines take up minimal space and are intended to be as inconspicuous and simple to use as possible.

Using an aluminum frame as a base for custom cladding, the turbine structure is relatively lightweight and easy to maneuver into position.

The turbines drive a small generator, creating electricity that can be used directly, stored in a battery, or sold to the local grid.

The size and color of the installation, as well as the shape of the blades, can be personalized to give a distinct look and feel to each wall. Owners can also scale it up or down as needed, with the initial size capable of producing more than 10,000 kilowatt-hours per year, enough energy to power a typical family home. Depending on an owner's use, the turbine wall could generate both electricity and income.



TAKEAWAY

The new turbine wall could bring wind power within the control of individuals – without destroying the aesthetic of their homes. This is extremely important if home wind power is to take off. Wind turbines have a much bigger visual impact than rooftop solar panels – an impact that many consider undesirable.



CREDIT: CNW GROUP MITREX - INTEGRATED SOLAR

WHAT
Solar panels that look like bricks

WHO
Mitrex

WHERE
Canada

SOLAR PANELS THAT LOOK LIKE BRICKS TURN HOMES INTO POWER GENERATORS

The photovoltaic system can be designed to match almost any facade

SPOTTED

New photovoltaic technology can turn almost any vertical surface into a source of power. These new systems, created by Mitrex, could bring solar power to homes previously unsuited to renewable self-generation – such as those with no access to a rooftop or garden.

The Canadian solar experts created a building integrated photovoltaic (BIPV) material that looks like a regular stone, brick, glass, or wood facade. The material provides architects and government planners with near limitless options for integrating

solar panels into new or existing structures.

Used as cladding, BIPVs can cover old sidings or be used as a first choice in new builds. From the simplicity of a high-rise balcony railing to the scale of a road noise cancelling wall, the BIPVs make it possible to generate power from any surface that gets sunlight.

A single panel generates up to 350 watts of power, enough to run a household appliance like a TV or Hoover, and the company offers several different pricing options. Customers choose between owning the entire system and the power, or just the installed hardware. Mitrex handles the full installation process.



TAKEAWAY

Green designs nearly always incorporate some type of solar power, making renewable energy an integral aspect of many new structures. Mitrex's new panels bring solar power to more buildings in a way that fits into the overall look and feel of a structure – addressing hang-ups around the visual impact of solar panels.



CREDIT: MIDSUMMER

WHAT
'Invisible' rooftop solar panels

WHO
Midsummer

WHERE
Sweden

'INVISIBLE' SOLAR ROOF TILES

The integrated solar panels are designed to blend in with the aesthetic of a house

SPOTTED

Solar power is the third largest source of renewable energy on earth behind hydropower and wind. And in many places around the world, it is becoming the lowest-cost option for new electricity generation. This cost advantage is expected to drive significant investment over the coming decade.

One of the distinguishing features of solar power, compared to the other major renewable energy sources, is its adoption at the domestic level. According to the [IEA](#), although large-scale solar plants accounted for just over half the new solar capacity added in 2021, the residential sector accounted for 28 per cent. The sight of solar panels installed on roofs is already familiar in many parts of the world, and innovators are making

solar power ever more attractive for homeowners.

One way that they are doing this is by making solar panels more aesthetic, and Swedish solar technology company Midsummer is leading the way on this front. The company's discrete panels, known as the Midsummer Wave, fit the shape of roof tiles and are compatible with Sweden's most popular tile – the Palema from construction company Benders.

All the cables supplying the panels are hidden beneath the tiles and the system can be installed either as a retrofit to existing tiles or as a complete roof renovation. In addition to looking good, the Midsummer Wave tiles are manufactured in a particularly sustainable process and have a 90 per cent lower carbon footprint than traditional solar panels.



TAKEAWAY

By removing the concerns homeowners may have about how a solar installation will change the look of their home, Midsummer's panels address an important barrier for the adoption of domestic solar power. Exactly how important aesthetics are for solar adoption is not a straightforward question to answer. But one [study](#) from the Netherlands found that, in a survey of 231 people, 40 per cent of respondents saw aesthetics as the most important factor when deciding between different types of solar panel.



CREDIT: UNSPLASH

WHAT
A system that generates energy through fluctuations in humidity

WHO
ThermoTerra

WHERE
Israel

RENEWABLE ENERGY SYSTEM HARVESTS ENERGY FROM FLUCTUATIONS IN HUMIDITY

A novel energy system can heat and cool buildings using changes in the humidity of the air

SPOTTED

Think back to the last time you got out of a swimming pool on a hot day – remember the cooling feeling of the water evaporating off your skin? That coolness came from the transfer of energy from water to air as it evaporates (the same thing happens when we sweat). Now, what if this same principle could be used to cool and heat your house? That is the question that is being answered by Israeli startup ThermoTerra.

ThermoTerra is developing a renewable energy system that heats and cools using humidity.

The system embeds a hygroscopic material such as hempcrete, silica gel, or wood wool inside building walls. When the surrounding air is drier or wetter than the hygroscopic material, the potential energy difference between moisture in the air and the material would transport heat from the material to the air and vice versa.

So, on a hot, dry day, water in the material evaporates, creating a cooling effect. On a cool, wet day, water is re-adsorbed into the material, producing heat. The entire system would be controlled by sensors and smart monitors embedded in the walls.



TAKEAWAY

ThermoTerra will be collaborating with other companies on the design of the insulation and is currently seeking companies and engineers to help with the product development phase. The company has received funding from the Israeli Ministry of Energy and the Israel Innovation Authority. Given the hot, dry conditions in Israel, and the lack of traditional energy sources in the country, this concept could prove to be a gamechanger, if successful. The technology could even be used to cool vehicles.



CREDIT: LAVO

WHAT

A home hydrogen powerplant

WHO

Lavo

WHERE

Australia

A HYDROGEN POWER PLANT FOR THE HOME

An energy storage system connects to rooftop solar panels to power a home using hydrogen fuel cells

SPOTTED

Australian energy company Lavo has built an integrated hybrid hydrogen battery that links to rooftop solar panels to keep the home lights burning. The Lavo Green Energy Storage System connects to the homes’ solar inverter and mains water through a water purifier. Solar energy is used to electrolyze the water, splitting the oxygen and hydrogen. The oxygen is released, and the hydrogen is stored in the LAVO’s patented metal hydride ‘sponge’.

The system includes a DC converter and a small, 5-kilowatt lithium

buffer battery as well as Wi-Fi connectivity and an app that allows direct monitoring and control. All this means that the systems essentially acts as a small power plant able to store around 40 kilowatt-hours of electricity – enough to power the average home for two days. Anyone needing more power can run several LAVO’s in parallel.

The company expects each LAVO to last around 30 years – roughly double the life expectancy of a lithium-ion battery setup. It could also work as a solution for rural villages, to replace diesel generators, or for those cut off from the main grid by natural disasters.



TAKEAWAY

LAVO uses metal hydrides to store the hydrogen, which is safer than chemical and gas hydrogen storage methods. This is because the hydrogen is stored as a solid, at low pressure and ambient temperature. Despite the technology’s promise, some hurdles remain. For example, the system’s maximum continuous power output of 5 kilowatts could limit its use. Air conditioning is common in hot climates, and many systems draw more than 7 kilowatts – which could be a problem when the grid connection is not active. Nonetheless, LAVO gives us a glimpse of what the future of self-generating homes might look like.

SAVE

How innovations could save energy, carbon emissions and money in the home

Running a home is expensive, for both people and planet. But new approaches and innovations are already delivering houses that save on carbon while also delivering financial savings for residents. Take [The Arbour](#), in Walthamstow, London. Homes in this small development generate more energy on site than they use, resulting in zero fuel bills for their owners and a negative carbon footprint.

The savings begin with construction, which incorporates reused materials, walls made from earth blocks, wood fiber insulation, solar panels, and timber cladding. It continues on the inside of each home, with tables made from spent coffee grounds, shower panels constructed using recycled yoghurt pots, and kitchen worktops created from wood shavings and chippings.

These and many other developments around the world are driven, in part, by a new emphasis among architects and designers on building in zero-carbon and energy savings right from the start of a project.

For example, in Spain, [Husos Arquitectos](#) created an apartment layout that maximizes ventilation to eliminate the need for air conditioning. The design includes the use of “breathable mortars”, lightweight materials and a vertical garden that passively cools the living space.

And architect [Robert Konieczny's](#) Quadrant House in Poland moves during the day to follow the sun, reducing the need for heating and cooling.

In the future, savings will also be generated by manufacturing homes centrally, and shipping them to where they are needed. Canada's [Intelligent City](#) is already working on this, with a turn-key system for delivering prefabricated, carbon-neutral,

“**Heating and hot water is one of the biggest energy uses in any home, and one of the biggest expenses for the homeowner.**”

multi-family urban buildings that incorporate mass timber, passive heating and cooling, and automated manufacturing systems. The company's platform provides data on the energy life cycle and performance of the building before construction even begins.

Building new ways of living into the design is another part of the ‘save’ agenda. This might include community food gardens,

common ‘reuse’ areas that allow residents to share and store expensive or infrequently used items, and [green spaces](#) that manage ventilation and heat exchange naturally.

While replacing energy-intensive concrete and steel with sustainable materials like bamboo and [cross-laminated timber](#) will lead to big energy savings, hi-tech solutions also have a big role to play in saving. Heating and hot water is one of the biggest energy uses in any home, and one of the biggest expenses for the homeowner. Very soon, artificial intelligence (AI) platforms, like that developed by South Africa's [Plentify](#), will be included in every home. These will use smart technology to learn users' habits and ensure heat and hot water is available only when it is needed, minimizing energy consumption – and cost.

All of these innovations point to a trend among housing developers for more energy-efficient homes. But there is still some way to go. Recently, when British developers were asked why they were not building all new homes to achieve the most energy-efficient ‘A’ rating, most said doing so would add too much to the price. The next challenge then is scaling up energy-saving innovations, like those mentioned above, to create a blueprint for savings.

CREDIT: ISTOCK





CREDIT: ECOWORKS

WHAT
Net zero building retrofits

WHO
Ecoworks

WHERE
Germany

STARTUP CONVERTS EXISTING BUILDINGS TO NET ZERO WITH INNOVATIVE PROCESS

A German company has developed a system for retrofitting existing buildings with a second skin that can significantly reduce emissions

SPOTTED

One of the big barriers to reaching net zero is retrofitting existing buildings to reduce their carbon footprint. It is not feasible to either replace all existing structures with purpose-built net zero buildings, or to add insulation or heat pumps to all older buildings. In response, German startup Ecoworks is tackling this problem from the outside. The company develops a second skin with built-in insulation designed to help buildings radically cut energy use.

Ecoworks uses a 3D scan of the building to create

a digital twin. Using this twin, the company develops panels which will fit over the existing walls. Robots then assemble the panels, which are complete with windows, ventilation, channels for pipes, and solar panels. On-site, skilled workers can install the panels rapidly, completing the project in a few weeks.

This approach works best with buildings that have a simple exterior structure, such as apartment complexes. However, Ecoworks has plans to expand the concept to less uniform buildings, such as schools and single-family homes.



TAKEAWAY

Building retrofits will play an important role in reaching net zero by 2050, but progress needs to be sped up. In the UK, for example, the retrofit industry must **grow ten times to retrofit 29 million homes** by 2050. Ecoworks' process is one way that this may be achieved. And investors agree – in the past three years, the company has raised almost €9 million in seed funding from a consortium of venture capital firms and angel investors focused on real estate technology and sustainability.



CREDIT: AIREX

WHAT
A smart ventilation control system

WHO
AirEx

WHERE
UK

SMART VENTILATION CONTROL SYSTEM REDUCES ENERGY BILLS

The system deploys technology to tackle the problem of houses built with low energy standards

SPOTTED

In the UK alone, there are **tens of millions** of homes with poor energy standards. And this causes several problems. Poorly insulated homes retain less heat, and therefore require more time with the heating turned on, using more carbon and leading to higher bills. But energy efficiency measures to tackle this problem can reduce ventilation, leading to damp and mould.

Now, British company AirEx has come up with a solution. The startup's smart ventilation system uses a range of sensors to measure temperature, humidity, and air quality. This allows for automatic airflow regulation.

The AirEx system replaces traditional air bricks with vents that open and close in response to local weather data and indoor air quality conditions measured by the sensors. The whole system is connected wirelessly to a central hub plugged into a standard home wi-fi router.

The system reduces draughts, and improves thermal efficiency so rooms warm up faster. Not only is this more comfortable, but it also results in less time spent with the heating on, leading to lower energy bills. At the same time, the system's flexibility means that it is better than existing measures in terms of indoor air quality, damp, and mold.



TAKEAWAY

Despite the promise of technologies such as heat pumps and hydrogen boilers, home heating remains largely dependent on fossil fuels. In the UK, where AirEx is based, the government has laid out plans to **ban** gas boilers for new build homes from 2025. The International Energy Agency has raised the stakes even further by saying that no new fossil fuel boilers should be sold after 2025. Innovations like the AirEx system will play an important role in the interim, by reducing the demand for fossil-fuel-derived heat.



WHAT
Insulation made from popcorn

WHO
University of Göttingen

WHERE
Germany

WATER-REPELLENT BUILDING INSULATION MADE FROM POPCORN

The new product provides a direct replacement for petroleum-based materials

SPOTTED

Salty or sweet – popcorn is a snack loved by many. It may be tasty, but it’s not exactly what you would think of for a building material. Yet this is exactly how scientists from Germany’s University of Göttingen have used it. The team created an exterior building insulation material using granulated popcorn. The new insulation is efficient, water repellent, and provides good protection from fire.

Used as part of the exterior shell of a building, the popcorn-based insulation is of

a quality equivalent to that of commonly used petroleum-based versions. As a sustainable material made from plants, not only does the popcorn insulation help reduce thermal waste – it also reduces carbon emissions.

Working closely with building material company the Bachl Group, the University has signed a licensing agreement for the product itself and the production process. With petroleum-based insulation covering around 90 per cent of the global market, eco-friendly alternatives are desperately needed.



TAKEAWAY

From cleaning the air to providing a variety of medicines, plants are important aspects of human and environmental health. As their benefits are studied and better understood, additional uses are found. With growing numbers of people and organizations attempting to live more harmoniously with nature, such closeness helps inspire innovations that mimic or utilize the structures and characteristics of plants. The results contribute to more sustainable products and processes, all of which are much needed and in vast quantities.



WHAT
A recirculating shower system

WHO
Flow Loop

WHERE
Denmark

A NEW SHOWER SYSTEM COMBATS CLIMATE CHANGE AND WATER SCARCITY

The technology reduces water use by 85 per cent and energy use by 75 per cent compared to a standard shower

SPOTTED

A warm shower may be one of life’s simple pleasures. But it comes with an environmental price. The average showerhead uses **12 liters** – and it isn’t just water that’s wasted. Heating water requires energy, which means carbon emissions. The UK’s Energy Savings Trust reports that hot water use emits **875 kilograms** of carbon dioxide per household per year.

To reduce the impact of showering, Danish company Flow Loop has developed a new recirculating shower. Unlike a conventional shower, a recirculating shower doesn’t let all the

warm water go down the drain. Instead, water is recovered from the shower floor and passes through a filtration system. It is then re-circulated through the shower head. The water continuously cycles through the system until the user is done.

To ensure hygiene, the reclaimed water goes through several layers of filtration, including a micro filter, ultrasonic descaler, and a UV filter to eliminate bacteria and viruses. Flow Loop’s system can also be retrofitted. In fact, the company claims that it can be placed in an existing shower and connected to water and electricity in less than 30 minutes.



TAKEAWAY

Flow Loop’s system is a hi-tech solution, and its significant up-front cost will not be affordable for everyone. However, installing simpler devices such as water-efficient taps and showers can also save both water and energy. According to non-profit Waterwise, a typical low flow shower head uses around **six liters** of water per minute. This is more than the one to two liters per minute used by Flow Loop’s recirculating shower, but just half the amount used by a conventional shower head.



CREDIT: UNSPLASH

WHAT

Panels that capture heat from underground car parks

WHO

Enerdrape

WHERE

Switzerland

UNDERGROUND CAR PARKS USED TO HEAT BUILDINGS ABOVE

Modular geothermal panels provide year-round heating and cooling

SPOTTED

Rather than drab grey walls, underground car parks can now feature stylish, colorful panels that are also sustainably heating the buildings above. Seeking to harness the power of shallow geothermal energy, Swiss startup Enerdrape has created modular, renewable energy panels that are customizable with any look, and easy to install and manage.

Currently being tested in an underground parking lot in Lausanne, the company expects to supply the apartment building above with around one-third of its energy needs. The metal panels are the same thickness as a

painter’s canvas and can be retrofitted to any structure with a wall in direct contact with the surrounding soil.

The panels absorb heat from the ground as well as ambient air from the underground structure. This is why car parks are an ideal location. Rather than waste the heat given off by vehicles after they have been driven, the panels absorb it, and the connected piping system sends it to the structure’s heating and cooling system.

The Enerdrape system can work for a single building or can connect to district heating and cooling lines. It can also be used alongside other heat and energy sources as part of a suite of power options.



TAKEAWAY

Retrofitting is becoming more popular, with projects across the UK investing millions of pounds into reducing the operational emissions of scores of buildings. If, as part of that work, underutilized spaces are turned into renewable power sources, it might be possible to meet the country’s 2030 and 2050 emissions goals. Experts believe the rate of retrofitting needs to at least double to meet those targets.

SECURE

How we can make our homes more resilient in the face of climate change

As climate change picks up pace, security takes on new meaning. Homes need to be not only flood-resistant, but also drought-resistant, energy self-sufficient, and able to handle a wide variety of challenges.

Energy efficiency is taking on new meaning as nations and regions begin to eliminate the use of gas. Not only is the switch to electric appliances more energy efficient – it is also safer. Eliminating gas mitigates risk from leaks and can also improve air quality. And today’s sleek, highly functional electric appliances are a far cry from earlier models, like the dangerous, red-ringed electric hobs many of us grew up with.

The addition of renewable energy, such as home solar and wind systems also means that homes can be self-sufficient should the electricity go down due to a flood, drought or wildfire-induced shut off.

However, while energy is often the first thing people think of when considering security and self-sufficiency, it is not the only consideration. Water reclamation, or grey-water systems, are growing in importance, especially in drought-prone areas. These recapture and filter used water from washing machines, showers, and baths for outdoor irrigation and indoor use.

Coping with increasingly common emergencies may also mean integrated air-filtration

systems to help with smoke from wildfires, or high pollution levels. Other add-ons could include a metal roof for fire-prone areas, cladding that burns off or **erodes in a flood** while protecting the walls underneath, or garage doors that can withstand fire and act as a barrier.

Architects are also working on solutions that incorporate traditional building techniques, including the use of windcatchers

“Flood security also continues inside, with the use of finishes that prevent mold growth and the use of wood instead of drywall.”

and thermal mass to absorb and store useful heat during the day, and release it at night in order to maintain a comfortable indoor temperature. Thermal mass could also be added on to existing homes using exterior thermal cladding.

Traditional building has also been used to deliver passive cooling, as in a school in India that incorporates design elements hundreds of years old, such as high ceilings and lattice brickwork

to cool the structure naturally.

Building for security in storm-prone areas also needs to consider the design of the building itself. For example, in Florida and California, where **some experts** predict that climate change has doubled the chances of an event “capable of producing catastrophic flooding”, architects are making use of terraces to elevate homes and low retaining walls to deflect storm waters. Flood security also continues inside, with the use of finishes that prevent mold growth and the use of wood instead of drywall.

In China, urban planners are taking this even further, with entire “**sponge cities**” that integrate the natural water cycle into urban planning. They build ponds, vegetation, and wetlands to absorb rainfall, slow surface runoff and purify water as it moves.

Innovators are also working to deliver affordable, climate-resilient homes at scale with **modular**, pre-fab designs manufactured in hi-tech **automated factories** now being used to deliver secure, energy efficient homes quickly and at affordable prices.

While we may not be able to predict exactly how climate change will affect the weather, we can use design and technology to change how we cope with climate emergencies, and to make every home secure in the face of whatever comes.

CREDIT: ISTOCK





CREDIT: ELECTROLUX

WHAT
A sustainable AI-powered kitchen

WHO
Electrolux

WHERE
Sweden

SWEDISH APPLIANCE COMPANY DESIGNS NEW SUSTAINABLE KITCHENS

The range aims to reinvent the traditional kitchen using modular solutions powered by advanced sensors and AI

SPOTTED

Is the way we cook just as important to the future of our planet as the food we eat? Swedish appliance company Electrolux thinks so, as it has just launched GRO, a reimagining of the traditional kitchen that encourages sustainable and healthy cooking.

GRO, which means ‘to sprout’ in Swedish, is a new smart kitchen range composed of modular compartments that can be adapted to any home, creating infinite personalized combinations. In addition, the range includes a grain and pulse library designed to showcase the visual diversity of protein sources; a Nordic smoker

that infuses food with flavor; and GRO Coach, a smart cooking companion that tracks eating habits and helps make more sustainable choices.

While companies such as Miele and Samsung have created smart appliances, kitchen robots, and sustainable storage solutions, few have created an all-encompassing kitchen like GRO.

“By challenging conventional thinking of what a kitchen is, we have rethought everything from the start – aiming to help change behaviors by making planet-friendly eating effortless and enjoyable through groundbreaking design,” explains Tove Chevalley, Director CX Innovation Hub Electrolux.



TAKEAWAY

One of the biggest threats to our planet is food waste and overconsumption. According to the UN, every year, **1.3 billion tonnes** of food, approximately one third of all food, is discarded. GRO can help individuals personalize and adapt their cooking, working towards a less wasteful, healthier, and more purposeful eating experience. With the help of artificial intelligence, advanced technology, and human-centered design, we can learn to explore more protein options, think about balance and quality, and cook with pleasure.



CREDIT: NATURAWALL

WHAT
Plant-covered noise protection barriers

WHO
Naturawall

WHERE
Germany

PLANT-COVERED NOISE PROTECTION BARRIERS PROVIDE NEW ANIMAL HABITATS

The green walls are easy-to-install, long-lasting, and recyclable

SPOTTED

Noise pollution is a sometimes overlooked but extremely serious issue. In fact, the European Environment Agency **estimates** that, in Europe, environmental noise contributes to 48,000 new cases of ischemic heart disease a year as well as 12,000 premature deaths. But now, one company, Naturawall, has developed a nature-friendly new solution – plant-covered steel barriers that block noise.

Requiring less material than traditional concrete barriers, Naturawall barriers provide protection from sound pollution and additional

habitats for animals and insects. The barriers are filled with soil and plants can be added over time. Customizable features, including color, height, and base width, make it easy to adapt the walls to a variety of locations and sizes. Each installation includes a water management system and a weed prevention fabric to support initial plant growth.

As well as blocking noise, the barriers also absorb airborne pollutants, and the living wall continually cleans the surrounding air. Set-up of the barriers is minimally invasive, with prefabricated pieces fitted together on site. Should a wall no longer be needed, the steel it is made from is recyclable.



TAKEAWAY

Urban populations across **Europe** and **Asia** are expected to continue growing through 2050, with Asia’s urban-rural divide diverging most sharply. Despite population growth generally slowing, overall increases suggest continued intensification of residential density in already busy cities. Living walls, such as those developed by Naturawall, could provide peace and respite as well as a host of additional benefits for those living in increasingly crowded and noisy urban areas.



CREDIT: UNSPLASH

WHAT
An extreme weather-proof home concept

WHO
Suncorp

WHERE
Australia

AUSTRALIAN INSURER CREATES EXTREME WEATHER-PROOF HOME CONCEPT DESIGN

The house is affordable, insurable, and highly resilient to rain, wind, and fire

SPOTTED

Citing the statistic that only **three per cent** of disaster funding is spent on prevention, Australian insurance company Suncorp has introduced a prototype home designed to withstand bushfires, floods, and cyclones.

Built in partnership with teams from James Cook University, Csiro, and Room11 Architects, the 'One Home To Save Many' concept includes a number of resilience-related design elements, including raised wiring and outlets which prevent damage from

intruding water, and retaining walls that divert flooding from the home.

High performance mesh screens and supporting balustrades protect the home from flying debris during a cyclone. The flat roof withstands high winds better than a peaked shape, and PVC plastic gutters melt in the event of a fire and fall away from the home, helping to prevent embers from entering the building. All materials in the build are fire resistant or retardant, and as technology provides new construction options, they too will be included in future versions of the home.



TAKEAWAY

In Australia, The World Weather Attribution (WWA) initiative has found that the risk of weather that makes fires significantly more likely has **increased by 30 per cent** when compared to 1900. Meanwhile, insurers in the UK expect to pay out **£500 million** to support customers hit by damage from Storms Dudley, Eunice, and Franklin. As natural disasters become more common and devastating, innovators are responding in kind, producing new materials and products to help communities survive. Suncorp's campaign provokes consideration about how and when the costs of increasingly common extreme weather events are borne.



CREDIT: AQUIPOR

WHAT
Porous upcycled bricks

WHO
AquiPor

WHERE
US

FILTERING RAINWATER WITH POROUS UPCYCLED BRICKS

The new material is a direct replacement for concrete

SPOTTED

Fresh water is a finite resource, yet pollution is endemic. Concrete-heavy urban areas have no way to absorb stormwater, so pollution-carrying runoff can be extensive. And as extreme weather conditions increase in frequency, so too does the volume of runoff.

US-based AquiPor is a startup reconsidering the problem from the very start – when rain hits the ground. Using patented technologies, the company's paver material is porous enough for water to filter down to the soil, yet dense enough to capture many

of the pollutants that would otherwise end up in drainage systems.

AquiPor's new material is a direct replacement for concrete and could be installed in curbs and gutters for immediate impact. Anywhere where water gathers or runs along the surface is a candidate for replacement with the permeable paver. As strong or stronger than concrete, the pavers also make use of leftover materials from other industries, reducing the product's carbon footprint. Additionally, AquiPor provides a customization option for clients seeking different levels of porosity and temperature ranges.



TAKEAWAY

Pakistan, Russia, Austria, Turkey, Spain, and France are some of the countries that have experienced **extreme flooding** in 2022. At the same time, many other areas in these countries are concurrently experiencing extreme drought. The dramatic swings in temperature and weather conditions are creating myriad challenges for governments who must protect their citizens while also planning future-proofed communities. Technologies such as AquiPor's pavers could be an important tool in more sustainable living in a changing climate.

CREDIT: ECOFLOW



WHAT
Portable power stations for grid independence

WHO
EcoFlow

WHERE
Australia

PORTABLE POWER STATIONS FOR POWER INDEPENDENCE

A startup has released most of the components of an entire ecosystem for power backups and off-grid living

SPOTTED

With the public power grid in many countries increasingly under threat from climate change-driven fires, floods, heatwaves, and drought, many people are looking for a backup power source. Options such as the EcoFlow Delta Pro – a battery on wheels that can keep an entire house going are becoming more common. However, the Delta Pro is just one element of an entire ecosystem designed to keep you up and running in an emergency.

The company has developed what it calls the EcoFlow smart home ecosystem – bundles of products that can be combined to achieve power independence. For example, customers can

combine the 3.6 kilowatt-hour EcoFlow Delta Pro, with expansion batteries to boost capacity to 10.8 kilowatt-hours. Users can charge the batteries with EcoFlow solar panels and manage the system with an EcoFlow smart home panel and app. There's also a dual-fuel generator, a portable AC unit, and turnkey power kits to outfit an off-grid cabin or live-in vehicle, such as an RV.

The Delta Pro can be charged using solar panels, wind turbines, level 2 electric vehicle charging stations or through the EcoFlow Smart Generator. Its lithium iron phosphate battery will still be at 80 per cent capacity after 3,500 cycles. Even if used every day, this would take almost 10 years.



TAKEAWAY

The Ecosystem was launched on Kickstarter in 2021, breaking Kickstarter's record for the most funded tech project before being named as one of TIME's 100 Best Inventions of 2021. EcoFlow's approach is to create the ecosystem by developing products that build on each other, allowing users to add products as their needs evolve.

CREDITS

Compiled by the
Springwise editorial team

QUESTIONS FOR ARITCO?

marketing@aritco.com
+46 8 120 401 00

Aritco Lift AB
Elektronikhöjden 14
175 43 Järfälla
Sweden

ARITCO PRESS ENQUIRIES

Belinda Fisher
Belinda@friendsandco.co.uk



QUESTIONS FOR SPRINGWISE?

info@springwise.com

Springwise
New Wing,
Somerset House,
Strand, London
WC2R 1LA

Copyright © 2022
Springwise Intelligence Ltd.
All rights reserved.

