



102

innovations
that are
changing
construction



LMC has been helping the innovators and changemakers in construction tell their stories for over 20 years.

Whether trying to lower the carbon impact of the industry, deliver projects faster, safer and more effectively, or attract a new generation of diverse talent into the sector, we've been helping organisations to communicate about their progress and inspire others.

When we celebrated our 20th anniversary in 2023, we published a list of 101 materials, technologies and ideas that were moving construction forward.

Now, we're back with Vol. 2, and we've gone one better, with 102 innovations.

Read on to find out about some of the interesting things happening in the world of construction.

If you can think of anything that we've missed, please get in touch with dan@lizmale.co.uk - we'll add it to Vol.3.

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001

3D-printed



wood

Researchers in the US have developed a large-scale 3D printing process using entirely wood-based materials, creating fully compostable building components.

002

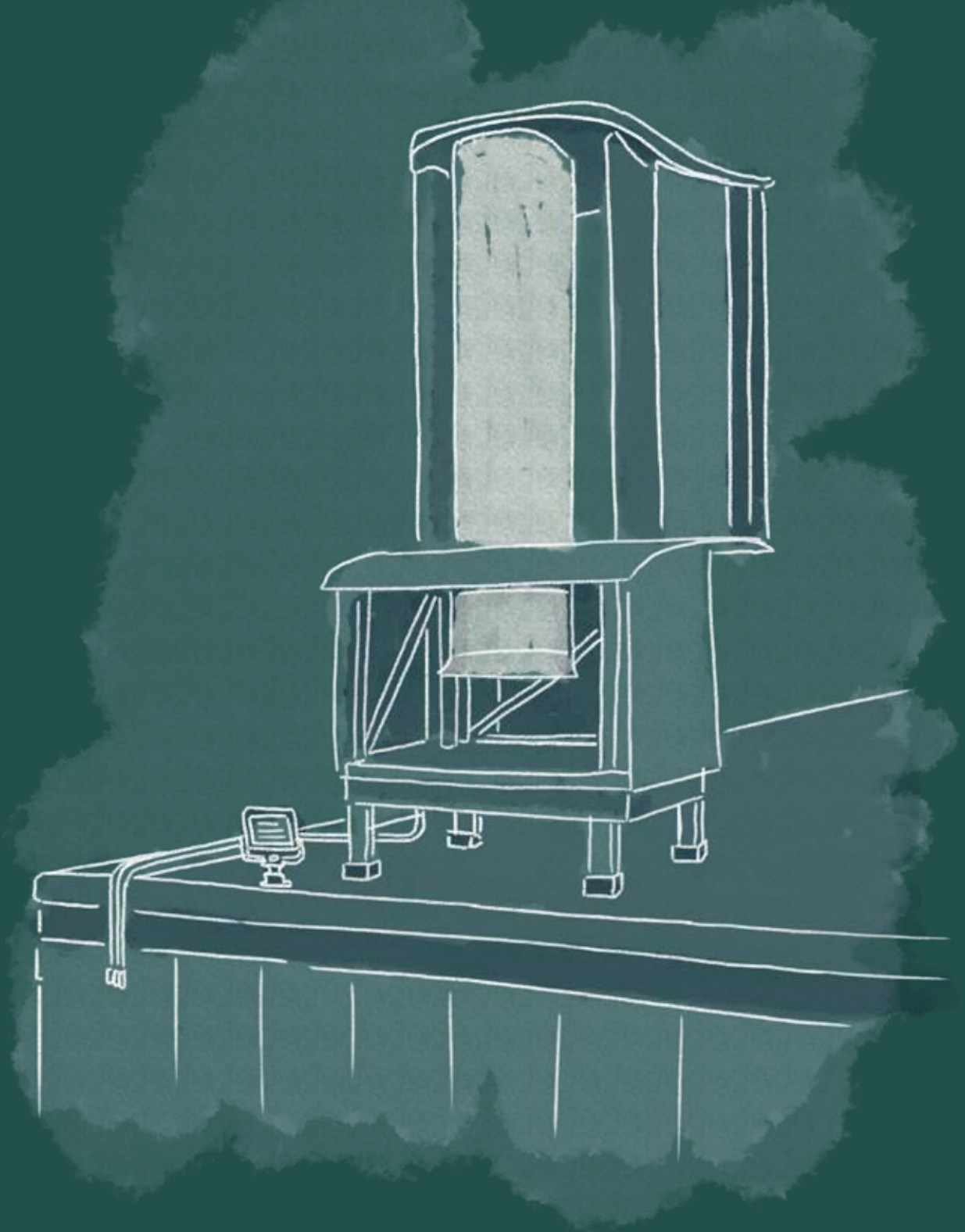
A Beam



An innovative 'clip and pin' ground beam system for housing foundations that can be installed in a matter of hours, releasing multiple plots to brickwork trades in half the time of other systems.

003

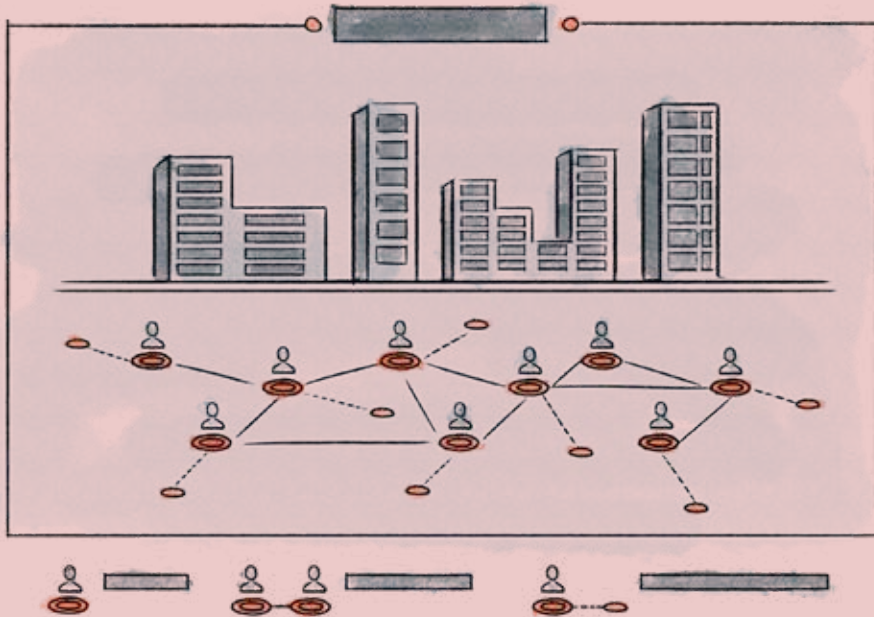
Aeromine bladeless rooftop wind energy system



Working in a similar way to the airfoils on a race car, Aeromine's technology captures and amplifies the natural airflow up the front of a building to generate power.

004

Agent-Based Modelling



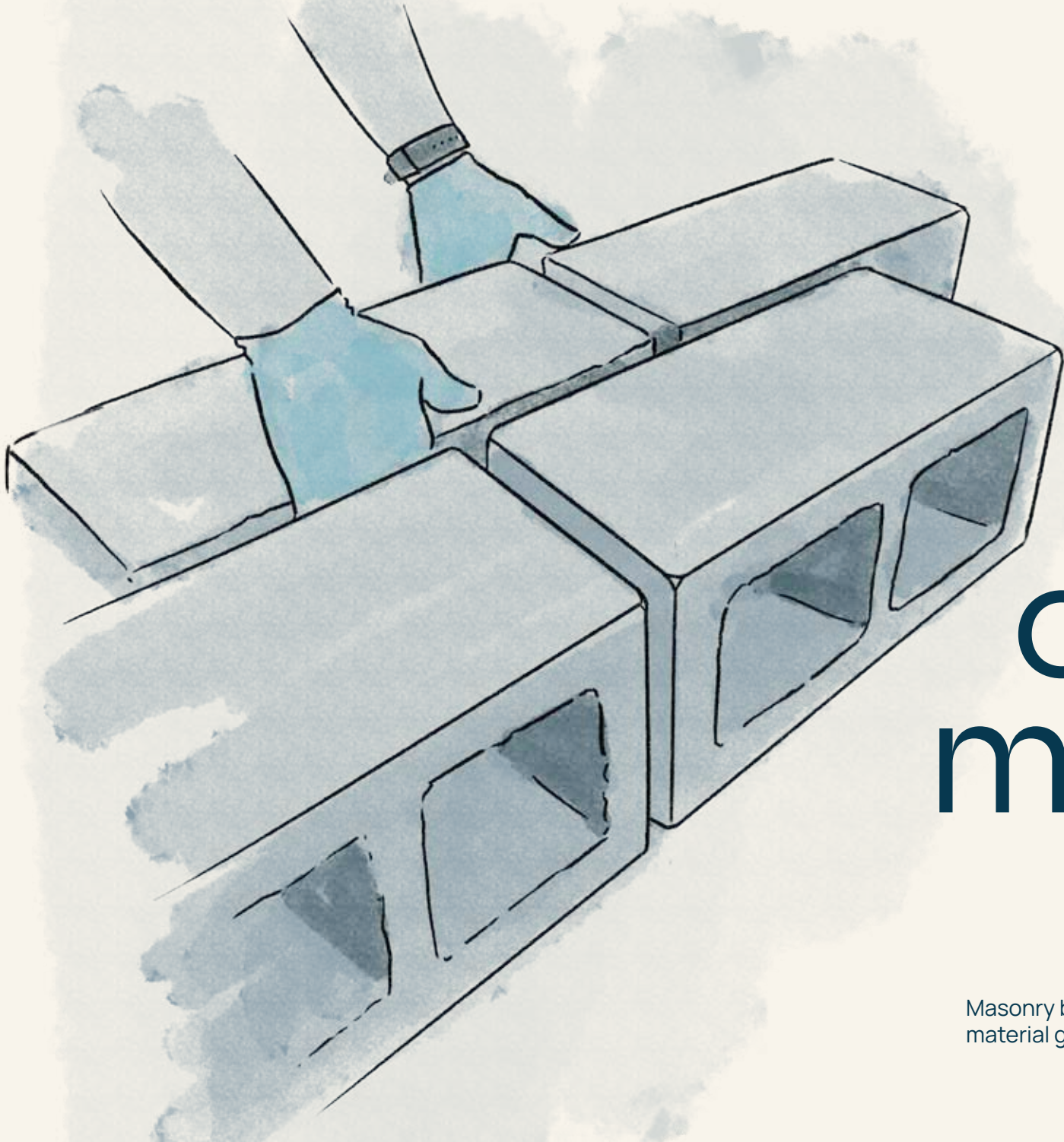
Agent-based modelling simulates complex building usage. Thousands of virtual people with unique needs navigate a 3D model, testing wayfinding, emergency exits, and congestion in large structures.

005



AI powered robotic excavators

Using sensors and AI, excavators can follow CAD drawings with high precision and perform tasks autonomously, improving efficiency on construction sites.

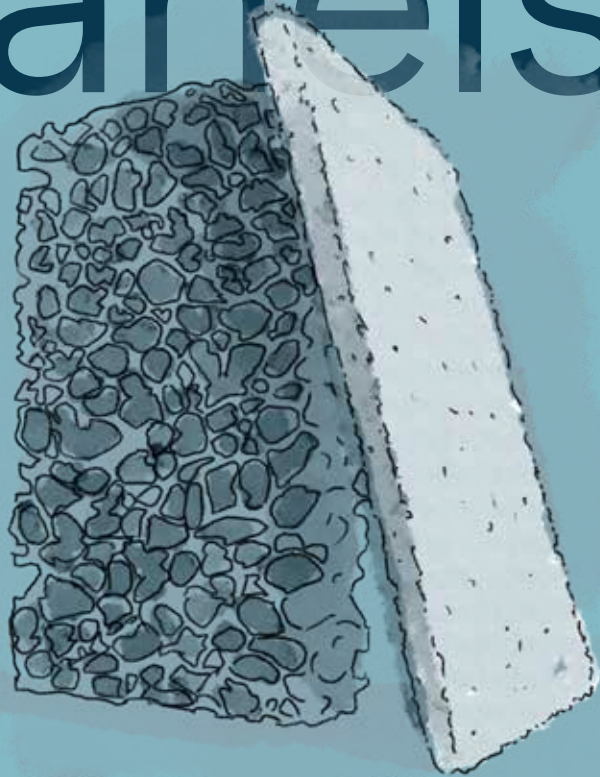


Algae-based cement masonry blocks

Masonry blocks developed from a low-carbon cement-like material grown from micro-algae.

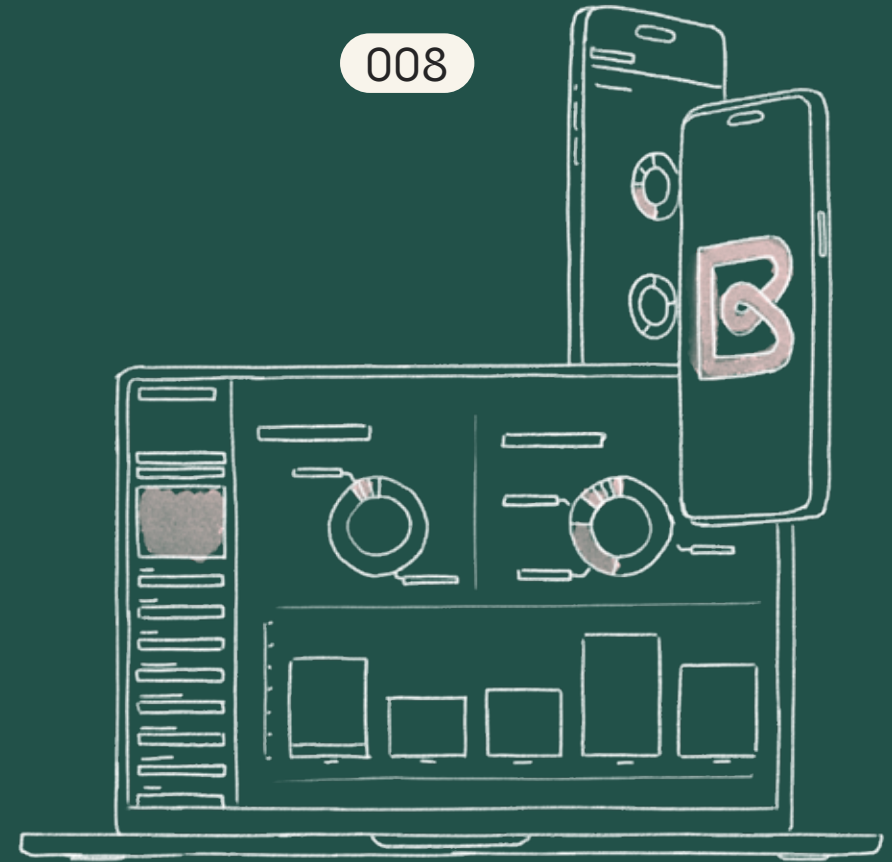
007

Alusion Panels



Architectural stabilised aluminium foam is produced by injecting air into molten aluminium, which contains a fine dispersion of ceramic particles. These particles stabilise bubbles formed by the air, creating lightweight, strong panels with unique patterns.

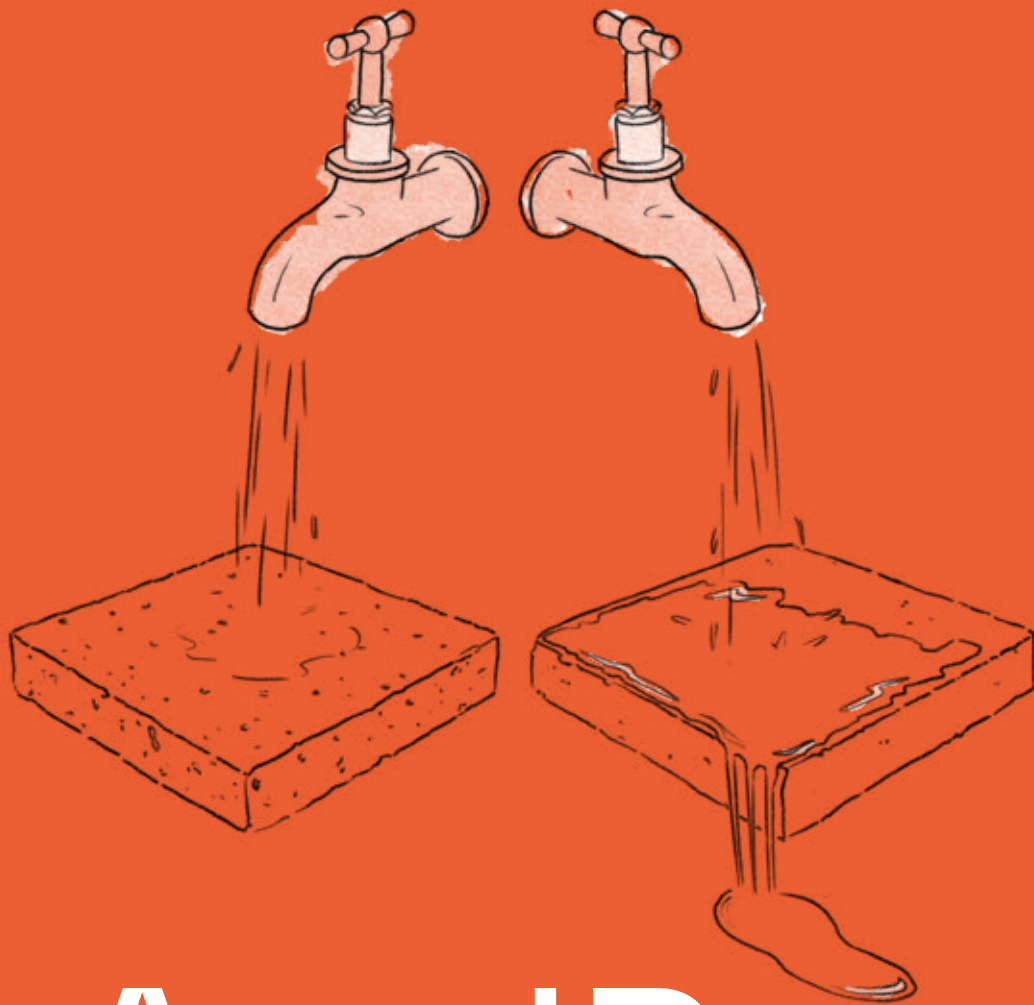
008



Analytics by Barbour ABI

Analytics is a bespoke dashboard platform designed to transform how construction companies make strategic decisions. Key features include project pipeline analysis, average project timings, competitive tracking, and detailed company views.

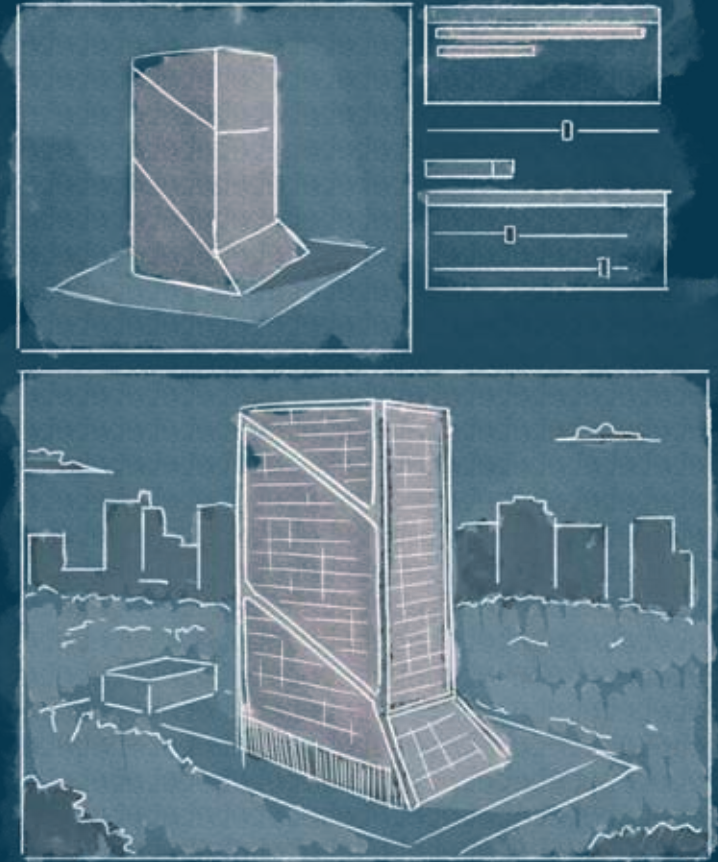
009



AquiPor

A porous concrete for filtering rainwater and absorbing rain.

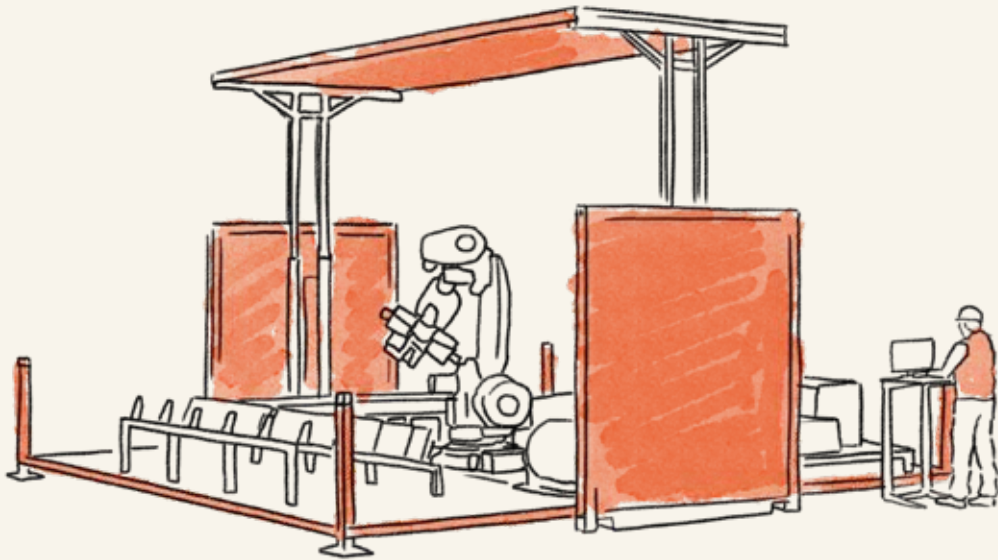
010



Archicad AI Visualizer

Powered by Stable Diffusion, Archicad AI Visualizer enables architects to create multiple design options with simple AI text prompts.

011



Automated Architecture (AUAR)

Automated Architecture (AUAR) licences its tech stack of robotic micro-factories and AI to enable home-builders to deliver affordable, low-energy, timber homes.

012

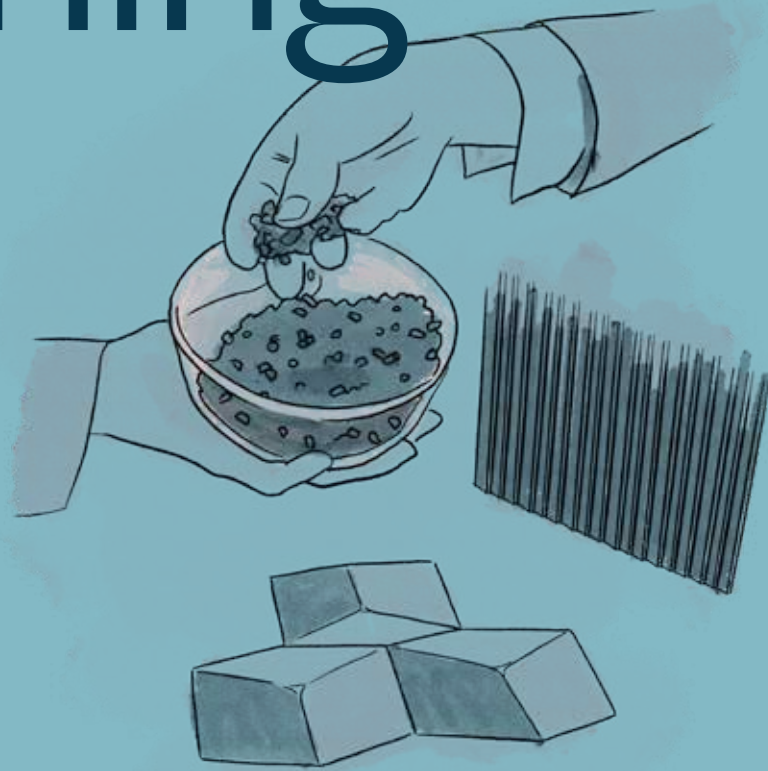


BAUX Acoustic Pulp Panels

Panels made from a blend of spruce, pine and wheat bran. 100% bio-based, these panels eliminate the need for the synthetic or chemical-laden materials typically used in acoustics.

013

Bio-coal lining



A special non-toxic bioplastic made of biochar from forest and agricultural waste. It captures carbon and can be used for everything from building facades, furniture, interiors, transport and urban infrastructure.

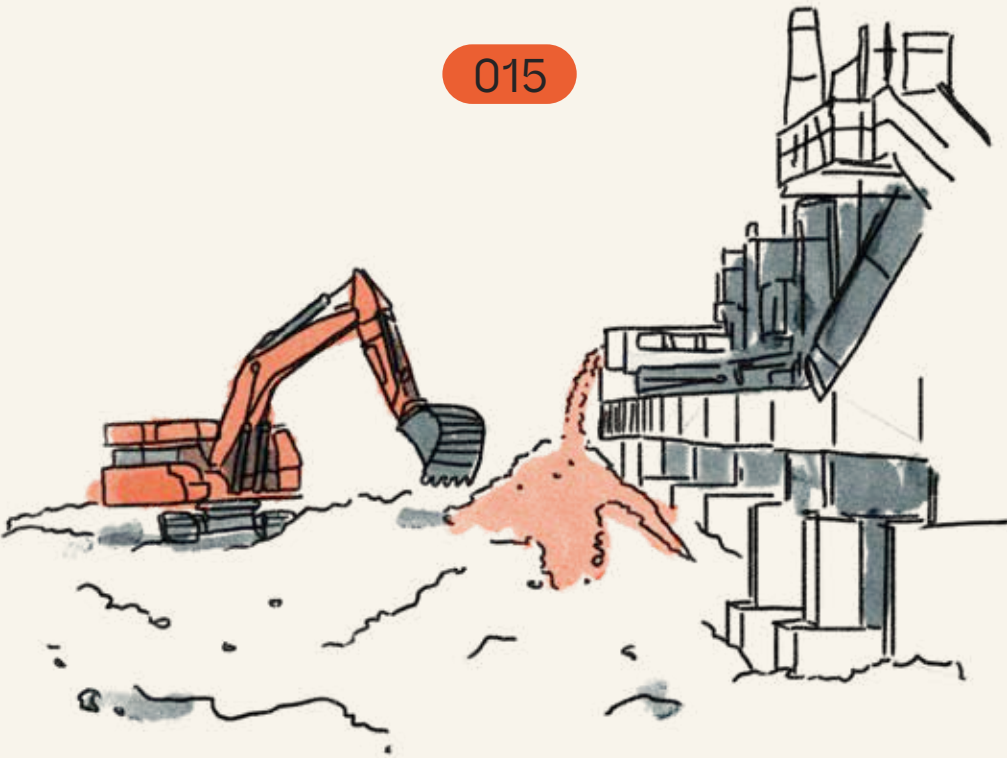
014

Breath- aboard



A low carbon alternative to plasterboard, Breathaboard utilises by-products from food and fiber crops, combined with minerals and minimal water, to form a flat board material that is 4kg lower in CO₂ per 1sqm.

015

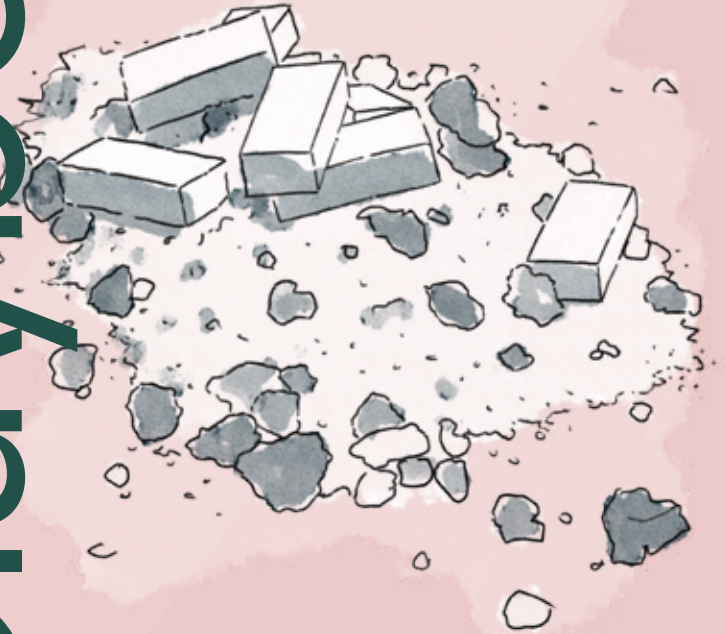


Clay-based concrete

The Skanska Costain Strabag joint venture is trialing calcined clay as a low-carbon alternative to cement on HS2 London tunnels.

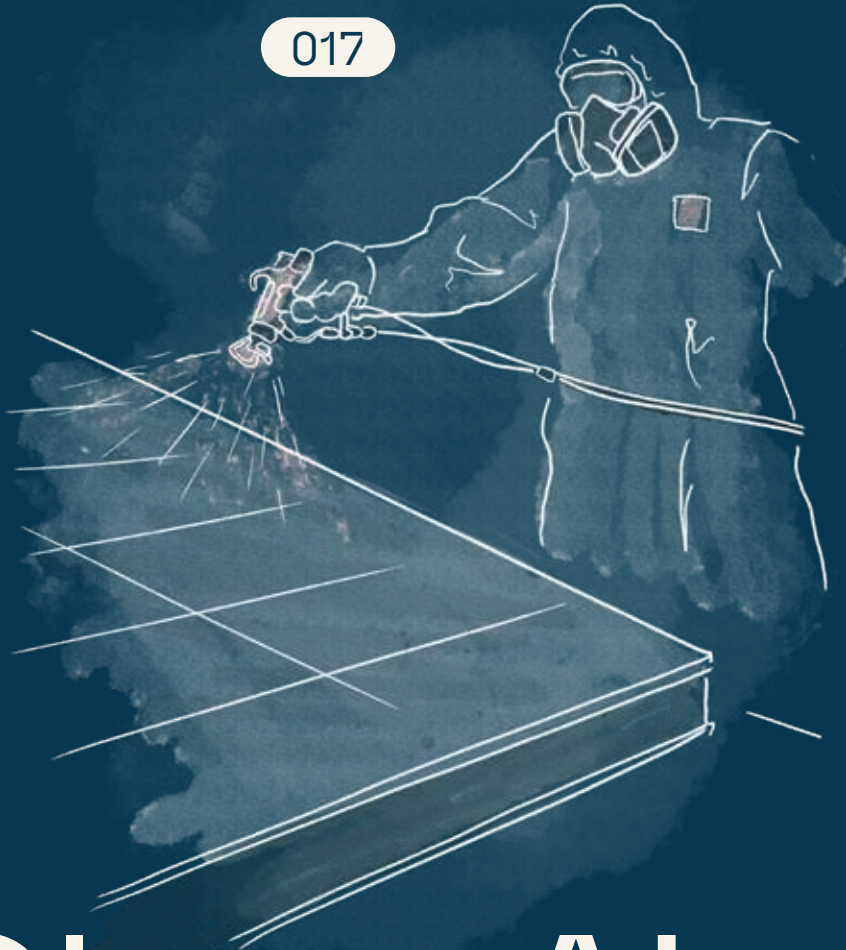
016

Clayboers



An innovative Dutch start-up is working on a method to convert PFAS-contaminated clay soil and sludge into clean bricks. PFAS, which are commonly found in products such as non-stick pans, umbrellas and waterproof mascara, are now known to be toxic.

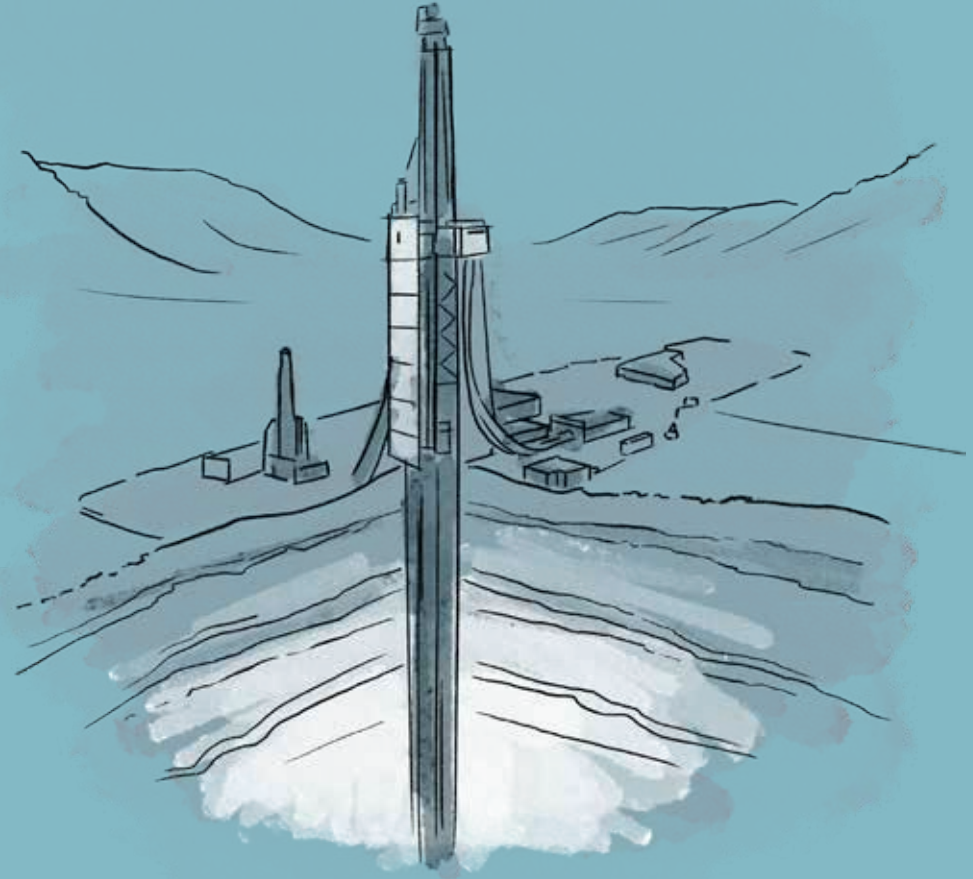
017



Clean Air by Resysten

A spray which is applied to external surfaces, such as hoardings and buildings. When exposed to light, it breaks down dangerous substances like nitrogen oxide (NO), sulphur dioxide (SO₂), and volatile organic compounds (VOCs).

018



Clean energy from magma

In a world first, the Krafla Magma Testbed (KMT) at the Krafla volcano in Iceland will tap into geothermal energy to power the country's homes and buildings.

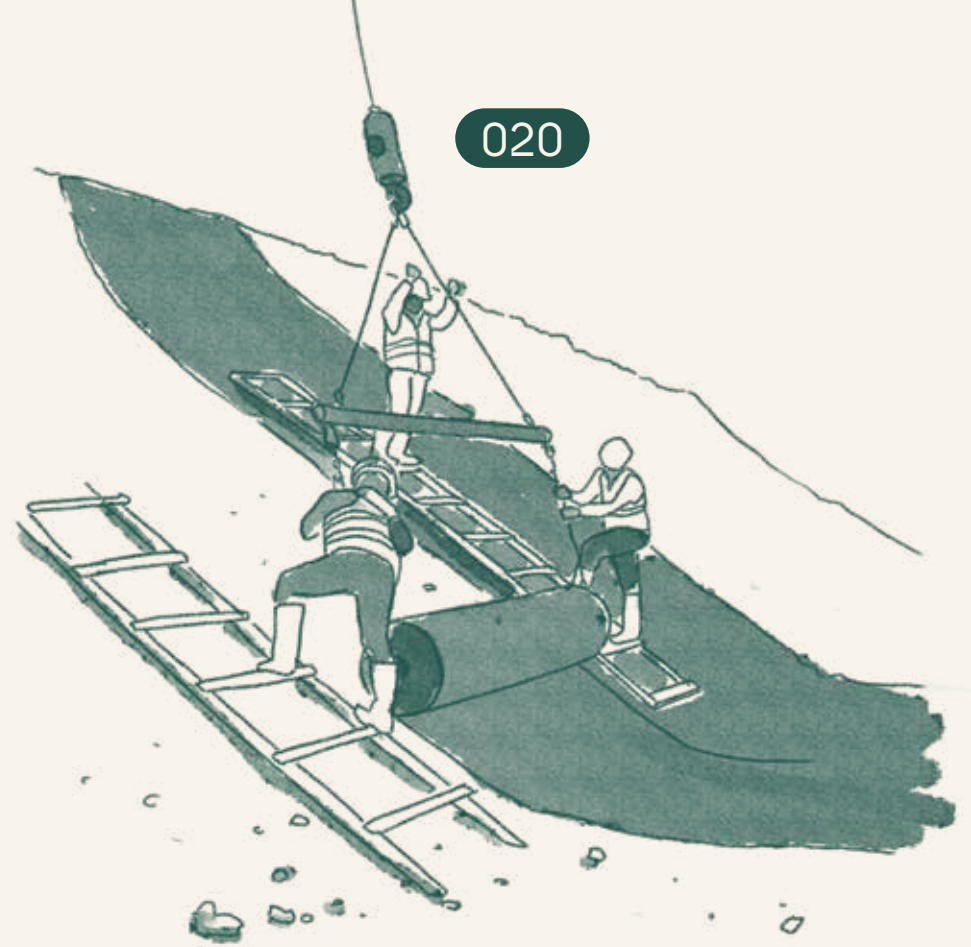
019



Coffee-based concrete

Waste coffee grounds are dried and heated to create biochar, a charcoal-like substance. When 15% of sand in cement is replaced with biochar, the compressive strength improves by 30%.

020



Concrete Canvas

A flexible, concrete filled geosynthetic which ships to site on a roll like a carpet. It hardens on hydration to form a thin, durable, waterproof and lower carbon alternative to conventional concrete.

021

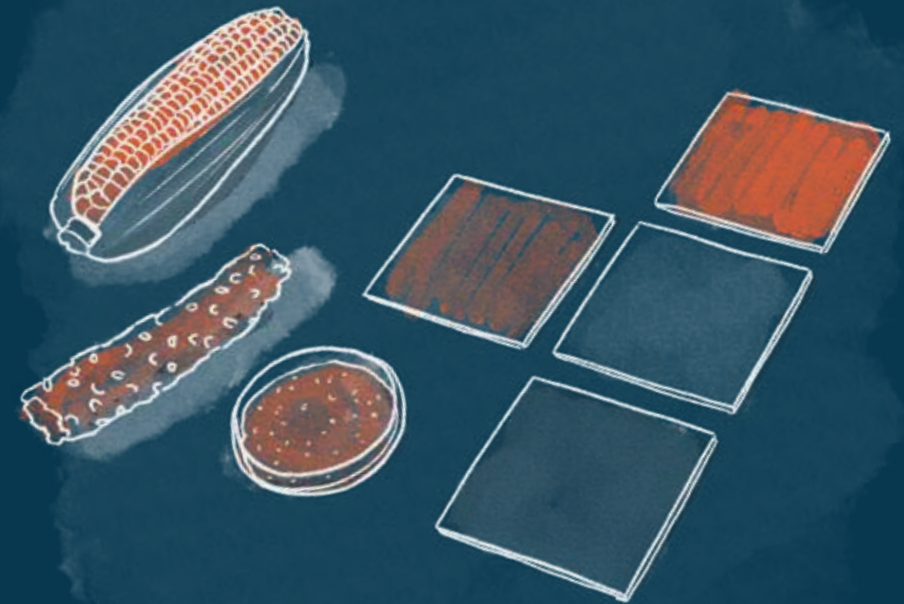
Cork staircase



The world's first self-supporting staircase made of cork was installed at the Building Centre in September 2023. Built from solid cork blocks that were rejected by the cork stopper industry, it can be disassembled and fully reused.

022

Corn Wall



A reusable interior cladding made from corn cobs. It offers a sustainable alternative to ceramic tiles or plastic laminates and emits less CO₂ in its production than was captured by the corn as it grew.

023

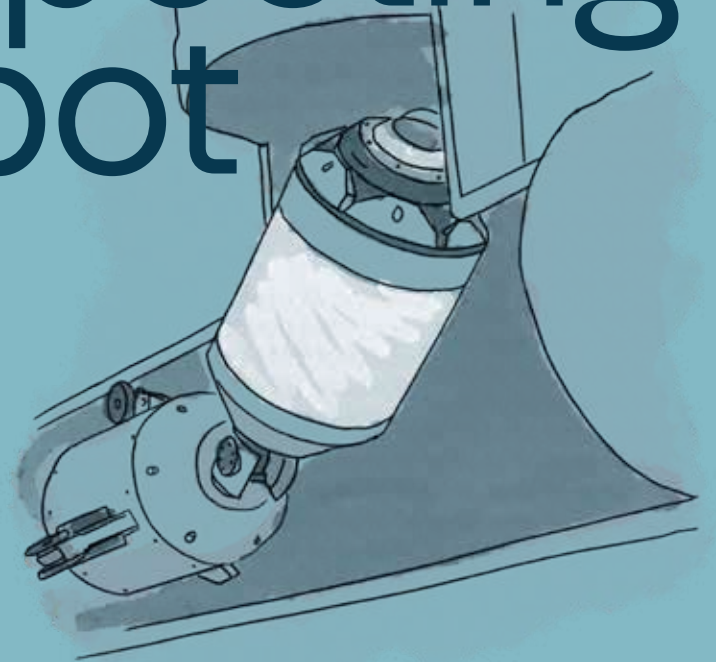
CosyWool insulation



Thermafleece's Cosywool insulation combines natural sheep's wool with recycled fiber for a sustainable and efficient material that is also biodegradable.

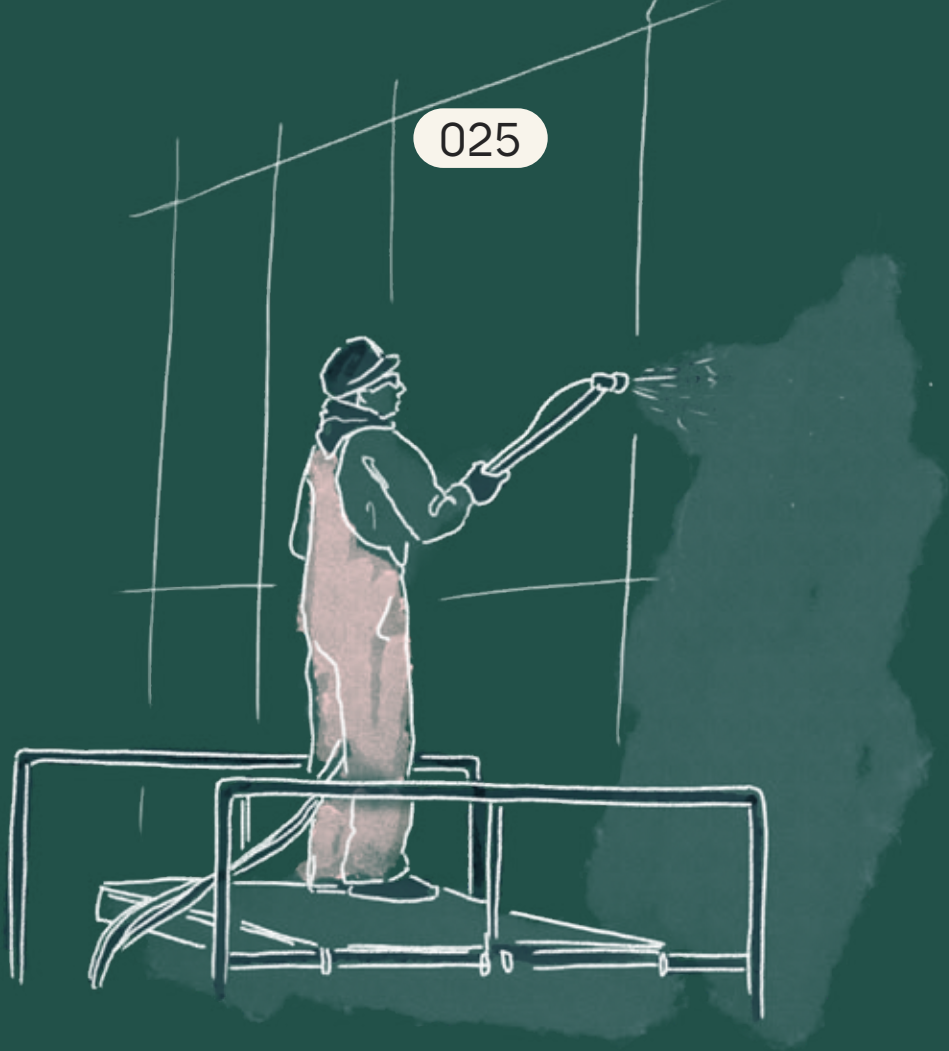
024

Crawling pipe- inspecting robot



Researchers at Carnegie Mellon University's (CMU) Robotics Institute have developed a crawling robot to inspect and repair natural gas pipelines.

025



Crystalline waterproofing

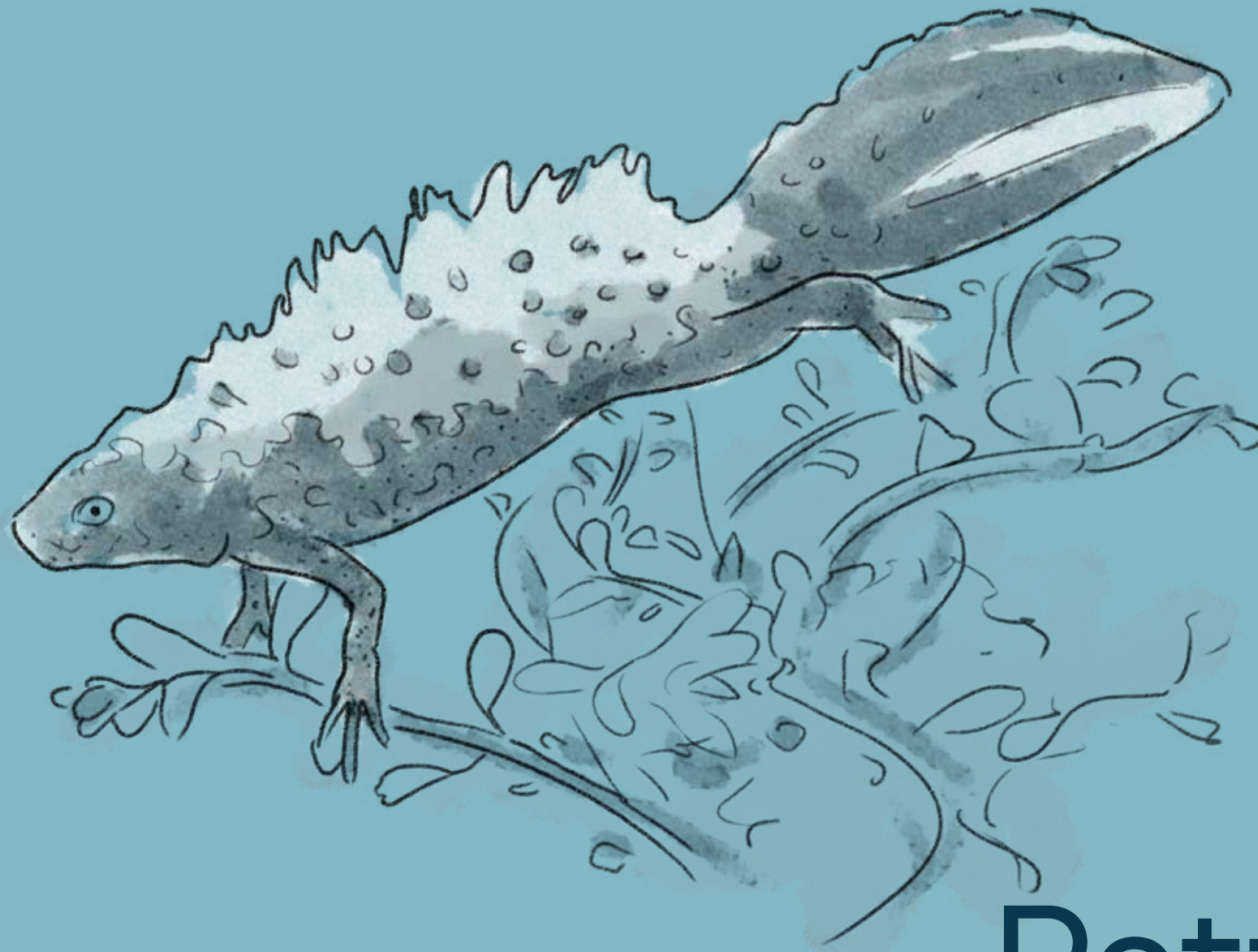
Applied to the surface of concrete, this helps to achieve watertight structures.

026



Data centre heated swimming pools

Up to 150 public swimming pools in the UK could be offered an innovative way to cut their energy bills by recycling heat from computer data processing centres, following a £200m investment by Octopus Energy into tech startup Deep Green.



Eco-Patterns

Monitoring of habitats using AI pattern-recognition to drive policy and best practice around the management and protection of these spaces.

028



Ecovon

An alternative to wood, utilising coconut husks which are milled, dried and hot-pressed into a board.

029

Electrochromic cladding



A cladding material that changes its infrared colour based on the outside temperature to help with heating or cooling. The composite material consists of several different layers including copper foil, plastic and graphene.

030

Energy harvesting trees



Finnish researchers have developed a prototype of a tree that harvests solar energy from its surroundings, stores it and turns it into electricity to power small devices such as mobile phones, humidifiers, thermometers and LED light bulbs.

031



Forest- bank

A new type of wood made from forest debris such as small trees, leaves, bark, seeds, and soil, mixed with a reactive mineral base and water-based acrylic resin.

032

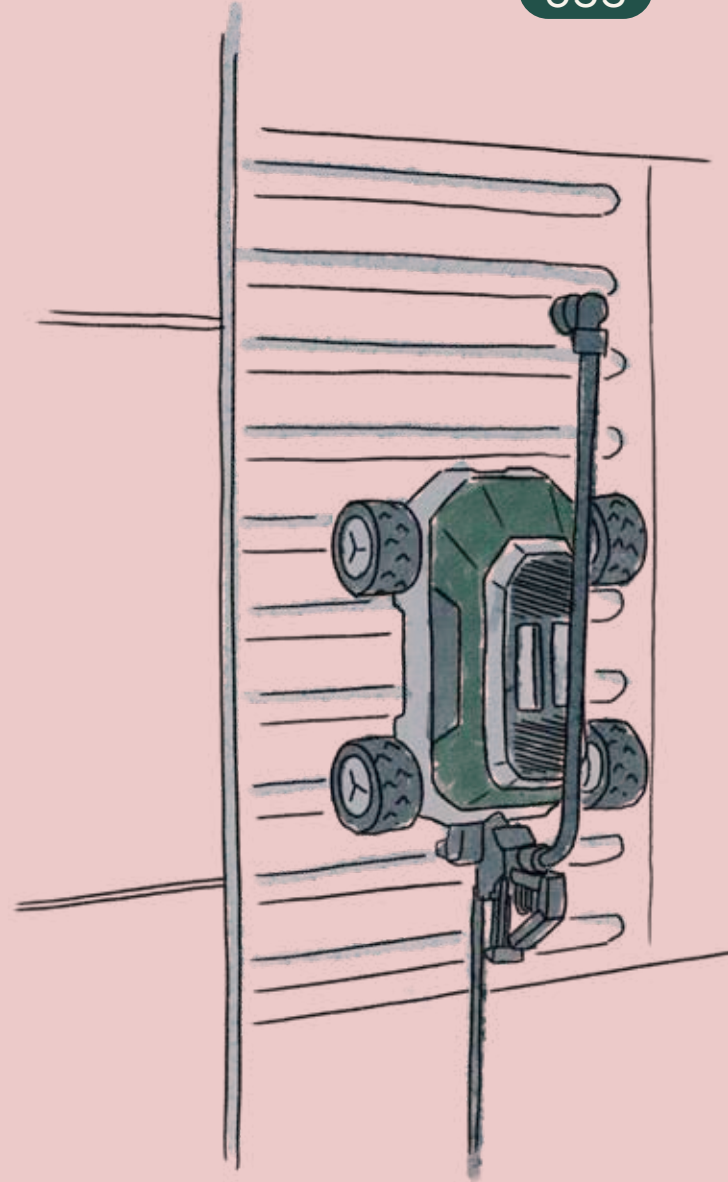
Giraffe360



The Giraffe360 camera combines visual, spatial, and data elements to understand conditions within a building and create a 3D model.

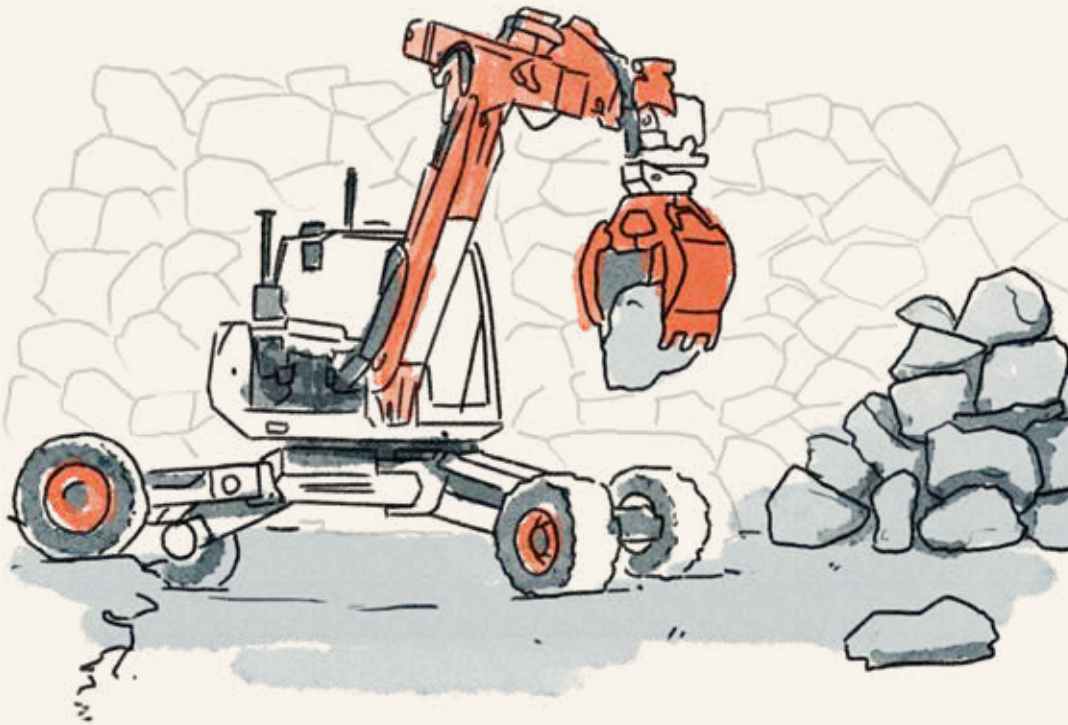
033

Hausboots



These wall climbing robots are being used to inspect and repair hard to reach locations. An in-built fan creates a large volume of air across its surface which generates over 45kg of adhesion force.

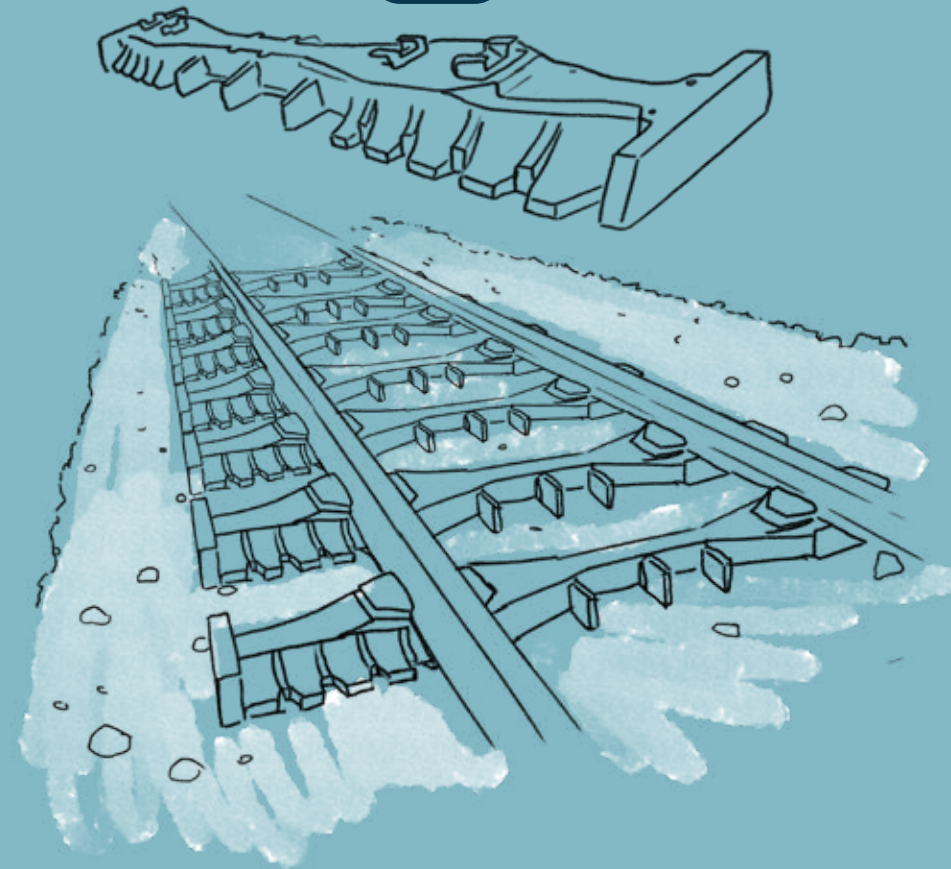
034



HEAP

Using sensors, the excavator can autonomously draw a 3D map of the construction site and construct a dry-stone wall up to six metres high and sixty-five metres long.

035



Hedgehog sleepers

A new type of composite sleeper with 90% less embodied carbon than traditional wooden or concrete ones - and they last twice as long.

036



Hemp rebar

An alternative to steel reinforcement, which avoids the problem of corrosion and reduces carbon emissions during construction.

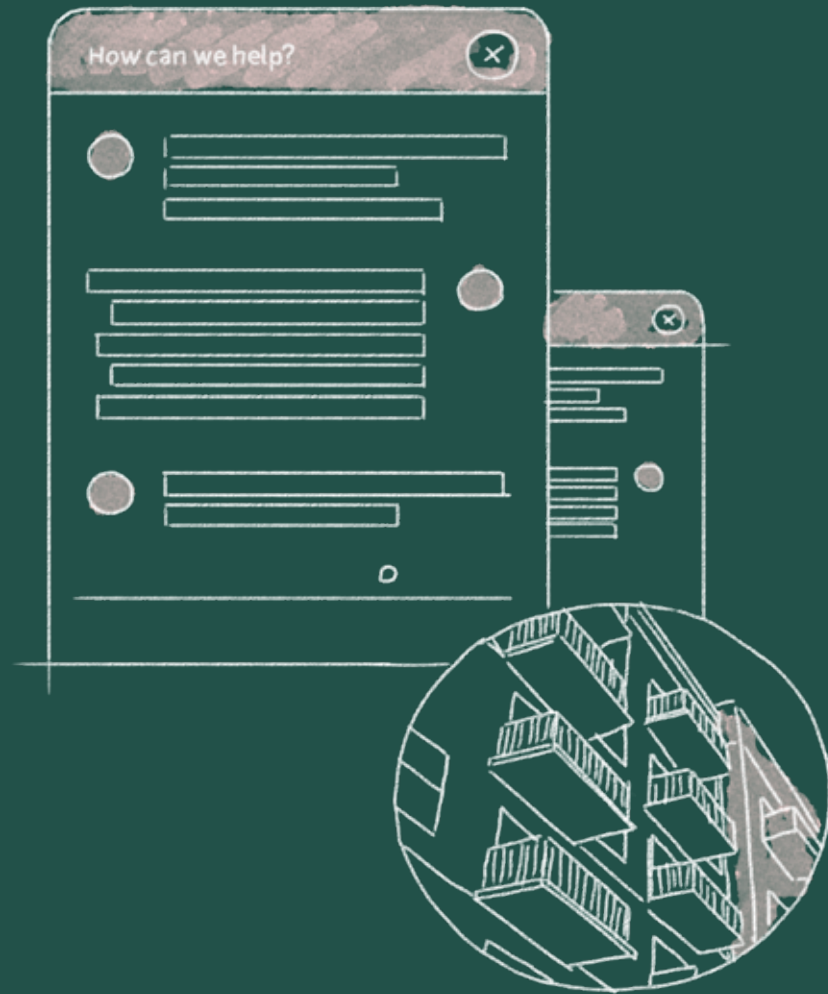
037



Home Energy Model

At the time of writing, consultation results are expected on the Home Energy Model (HEM) – the new methodology (updated from the Standard Assessment Procedure (SAP)) for calculating the energy efficiency of new homes, in line with the Future Homes Standard (FHS).

038



HousingSage

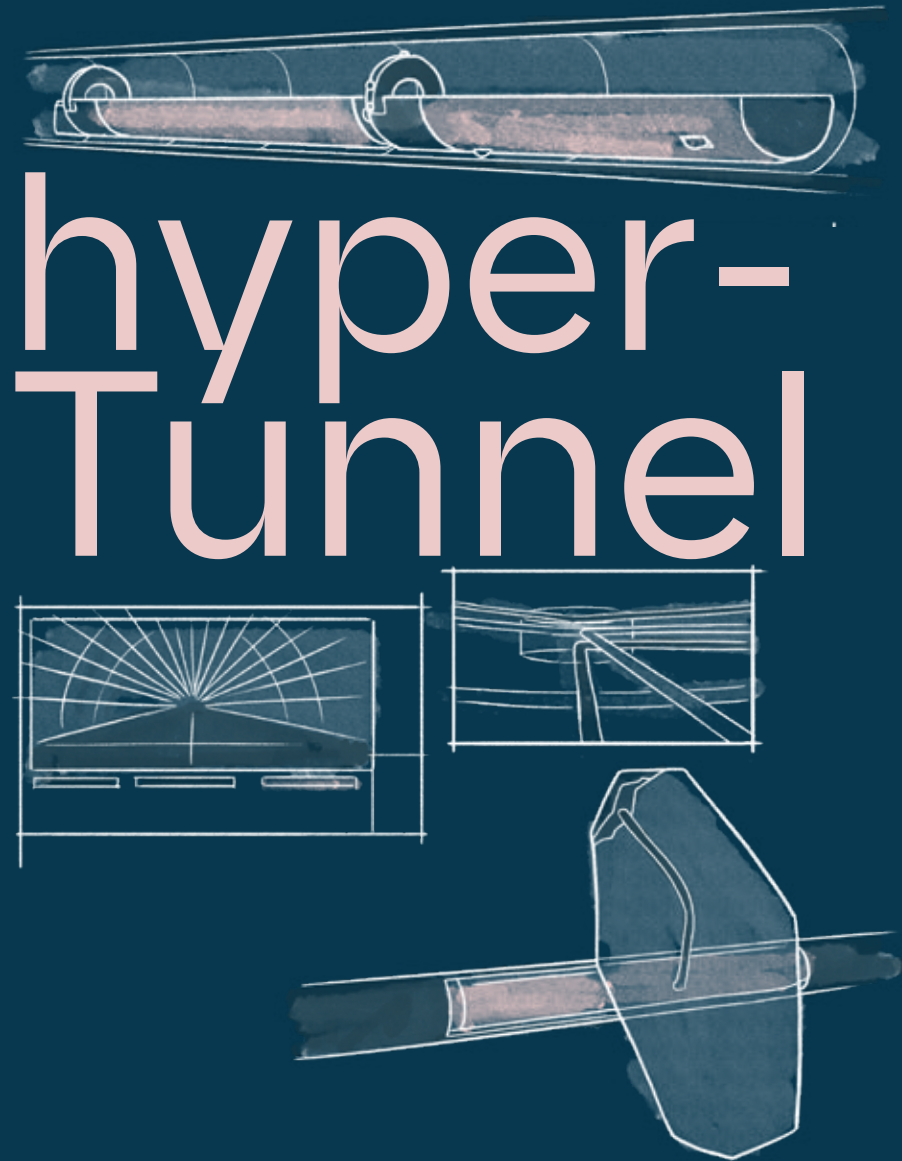
A virtual AI assistant designed to help those working in the social housing sector, with access to content around regulations, research and best practice.

039



The HS2 project is using digitally enabled excavators and dump trucks to reduce fuel consumption by monitoring and optimising earth movements.

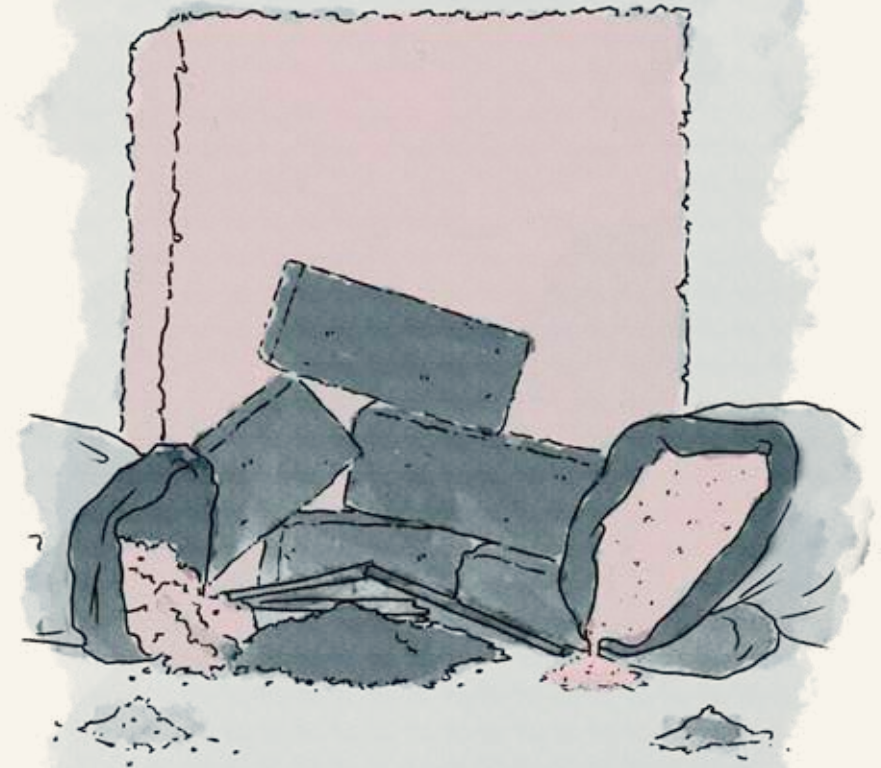
040



hyperTunnel uses AI and swarm robotics to survey sites, develop digital twins and construct tunnels faster, safer and at lower cost.

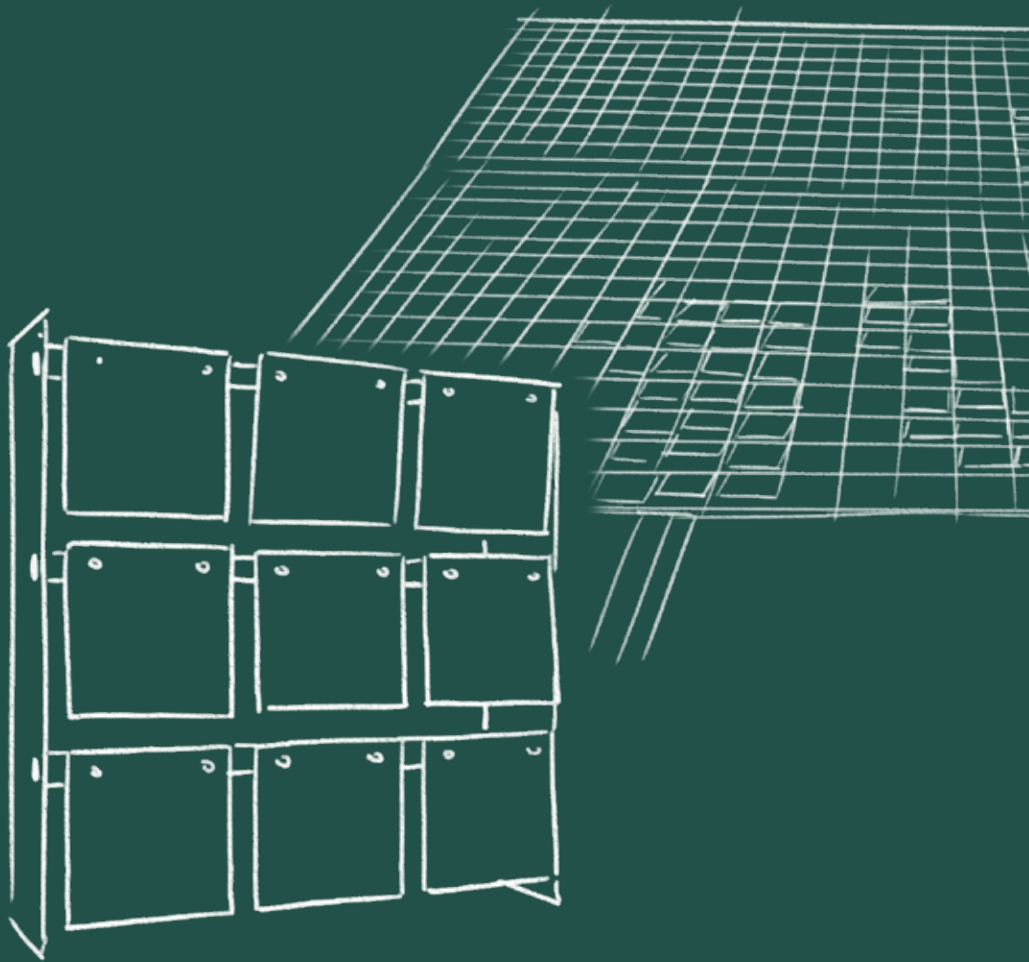
041

INBUILT



Horizon Europe's INBUILT project is researching and testing 10 sustainable alternatives to construction materials, including fungus-based insulation and hybrid straw and clay boards.

042



KineticWall

Made from hundreds of secured but freely moving metal tiles, Extech's KineticWall facade helps with shading and ventilation.

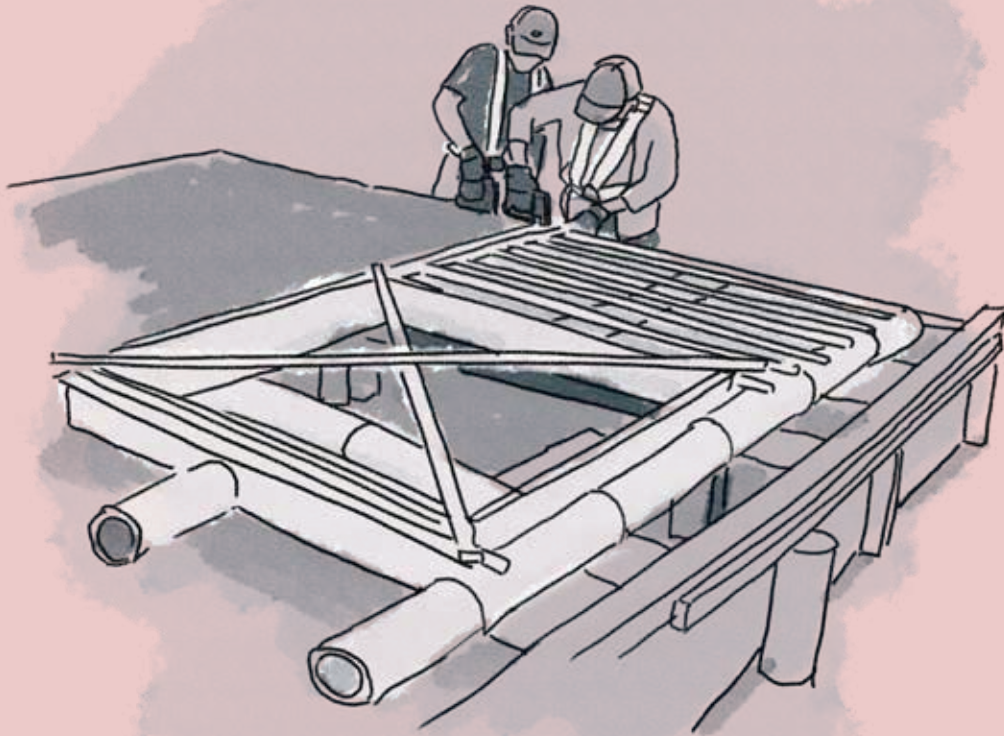
043

KOPE



KOPE is a purpose-built software platform for offsite construction which connects suppliers and designers, allowing products and systems to be compared easily.

044

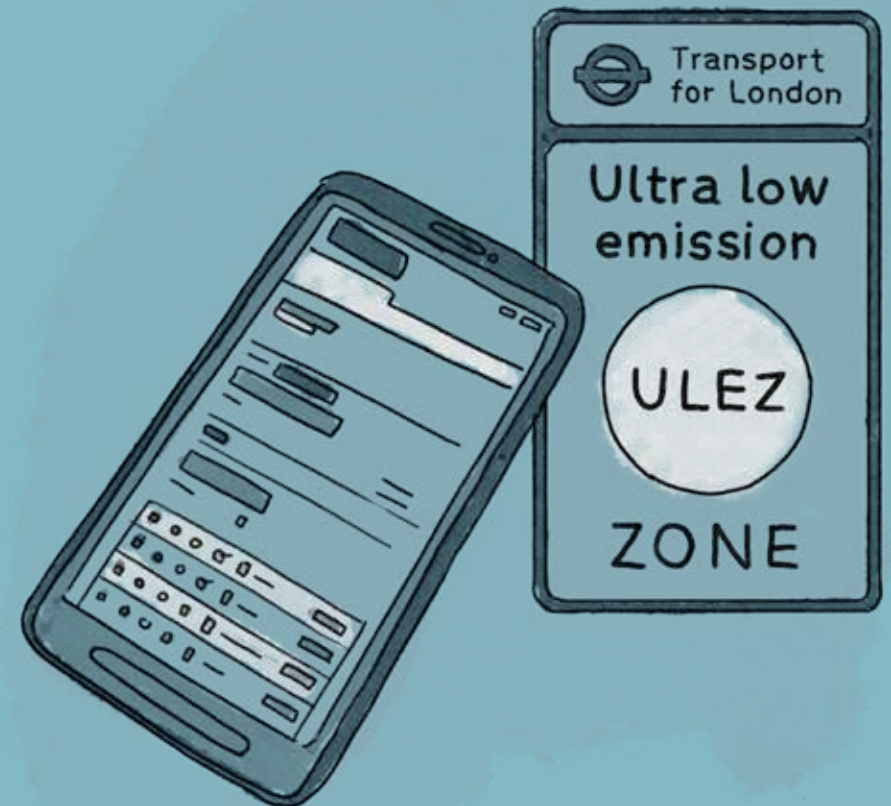


KuNa

Casa Congo is building homes made from bamboo, utilising its own prefabricated system.

045

Lattice



TfL's ULEZ sign installation project used Lattice to improve communication and data collection. It features a navigation app, automatic photo capture with GoPro cameras, and an asset library for information sharing.

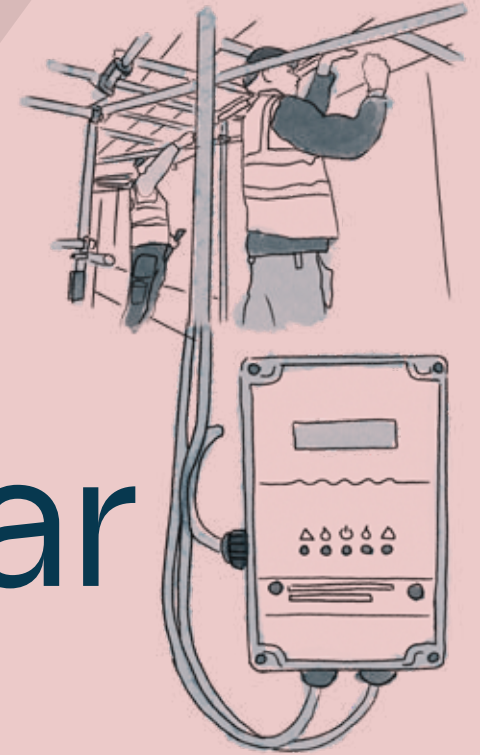
046

Light-emitting cement

A green construction material designed to illuminate highways, roads, and bicycle lanes without using electricity. The cement absorbs solar energy during the day and radiates light at night.

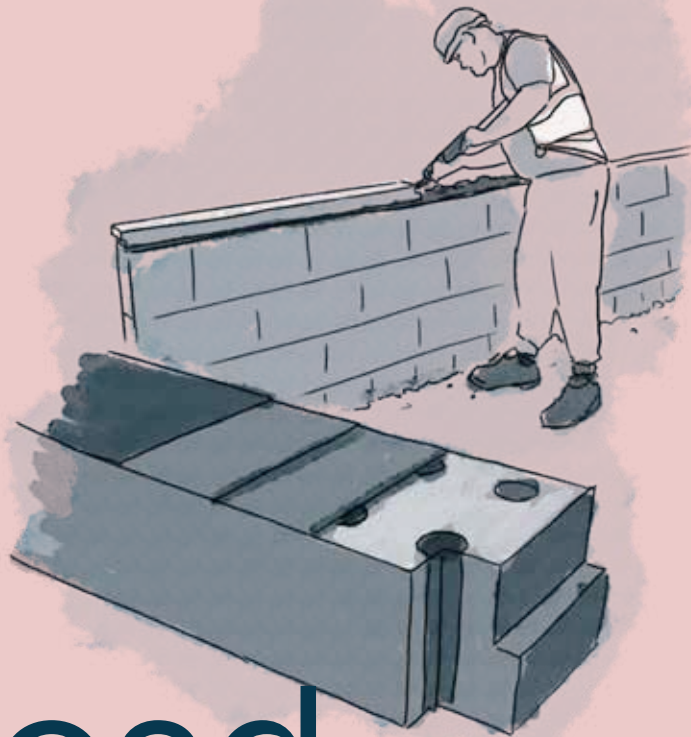
047

Linear fire detection system



Wireless technology company Ramtech worked with Thermocable, a manufacturer of linear detection cable and monitoring systems, to develop this linear fire detection system, tailored for safety on scaffolding structures. The product is a response to the need for enhanced fire safety measures during cladding remediation projects in the wake of the Grenfell Tower tragedy.

048



Load bearing insulation

A load bearing thermal insulation block which eliminates the cold bridge at the wall/floor junction.

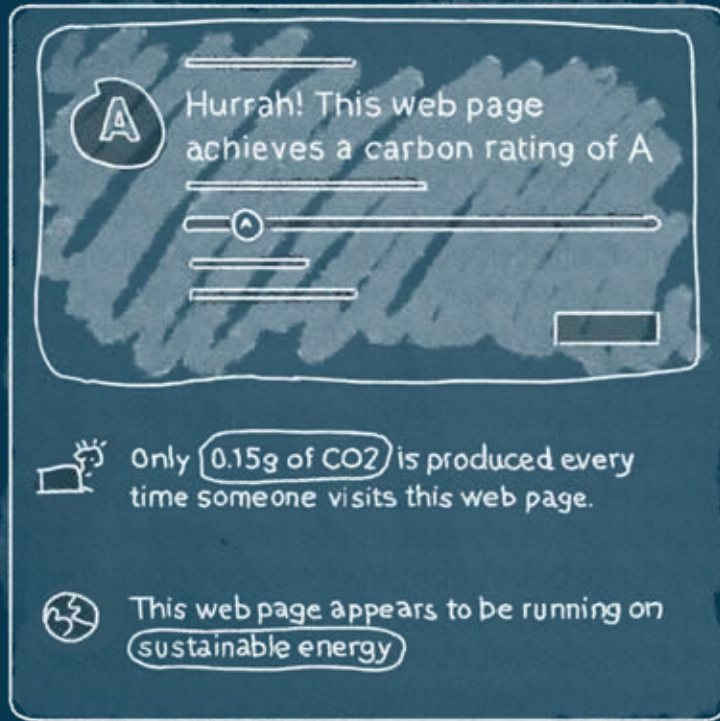
049



Looq AI

Looq AI's Q camera can be used for fast, near 360° reality capture which is then processed by AI and converted into a highly accurate 3D model.

050

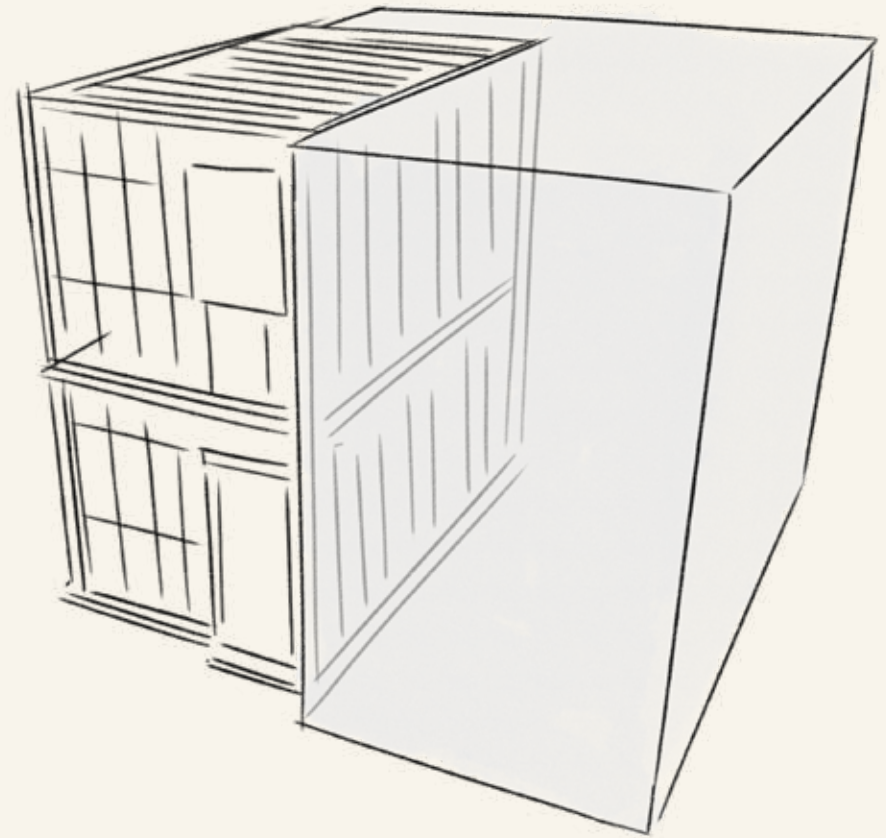


Low carbon marketing

An approach that involves optimising digital channels and producing content with a lower environmental impact. Speak to LMC to find out more...

051

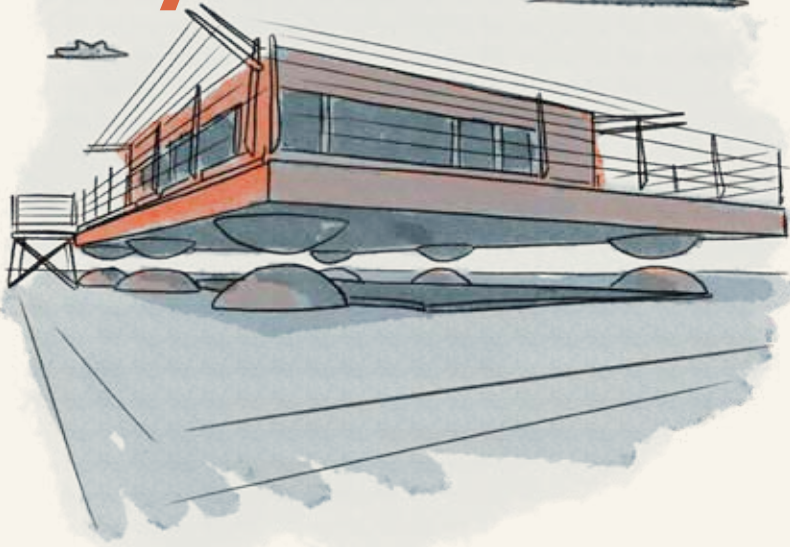
M-Dock



M-Dock offers a hybrid approach to housebuilding by combining volumetric modules developed within a factory environment with elements that have been built on site.

052

Magnetic Levitation Systems



Japanese company Air Danshin has developed a new technology that could revolutionise the way we think about disaster-proof housing. Using magnetic levitation, their homes are able to float above the ground and withstand earthquakes of up to 7.0 magnitude without suffering any damage.

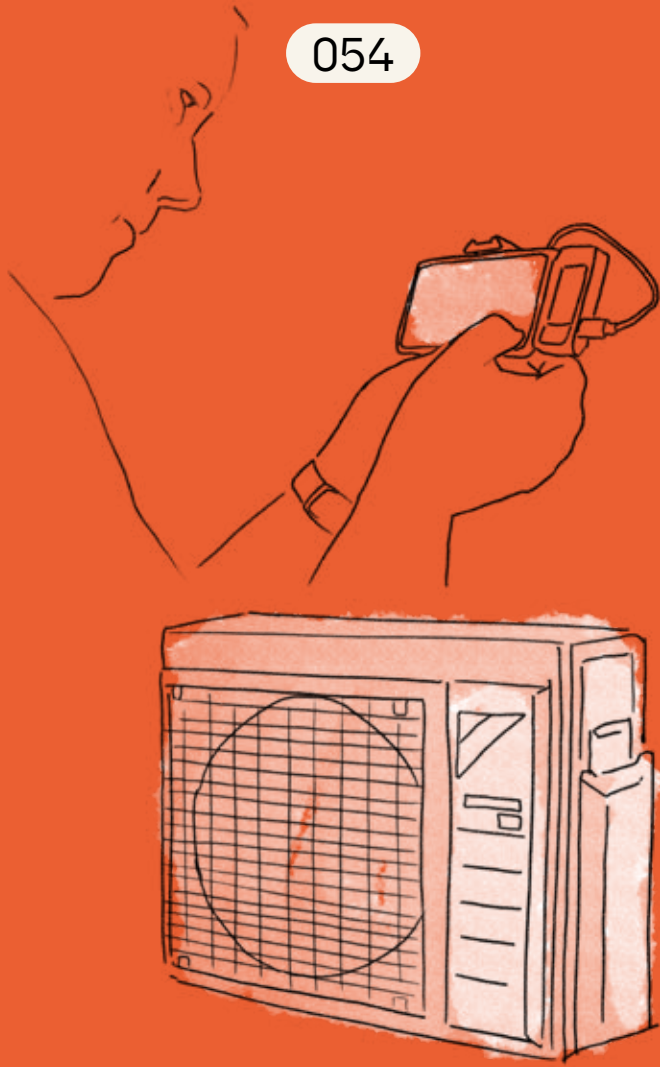
053



Materials passport

These digital records of building materials provide a reliable source of information that allows contractors, clients and the supply chain to track materials used during construction and throughout the life of a building.

054

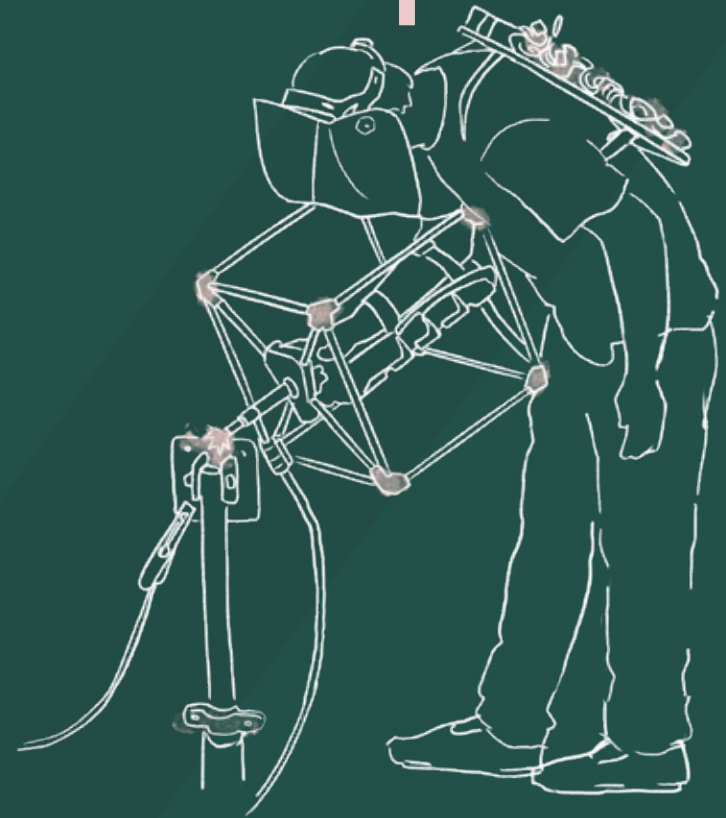


MEASURED

A study from Build Test Solutions (BTS) and Elmhurst Energy demonstrated how vital heat loss measurement is in accurate heat pump specification and sizing. The field trial of 56 homes found that 70% of heat pumps installed were the wrong size.

055

Mecha-morphis



A prototype lightweight, wearable CNC machine that can be controlled by a human operator or fully automated. Able to move on six axes, the aim is to bring digital fabrication methods to construction sites.

056

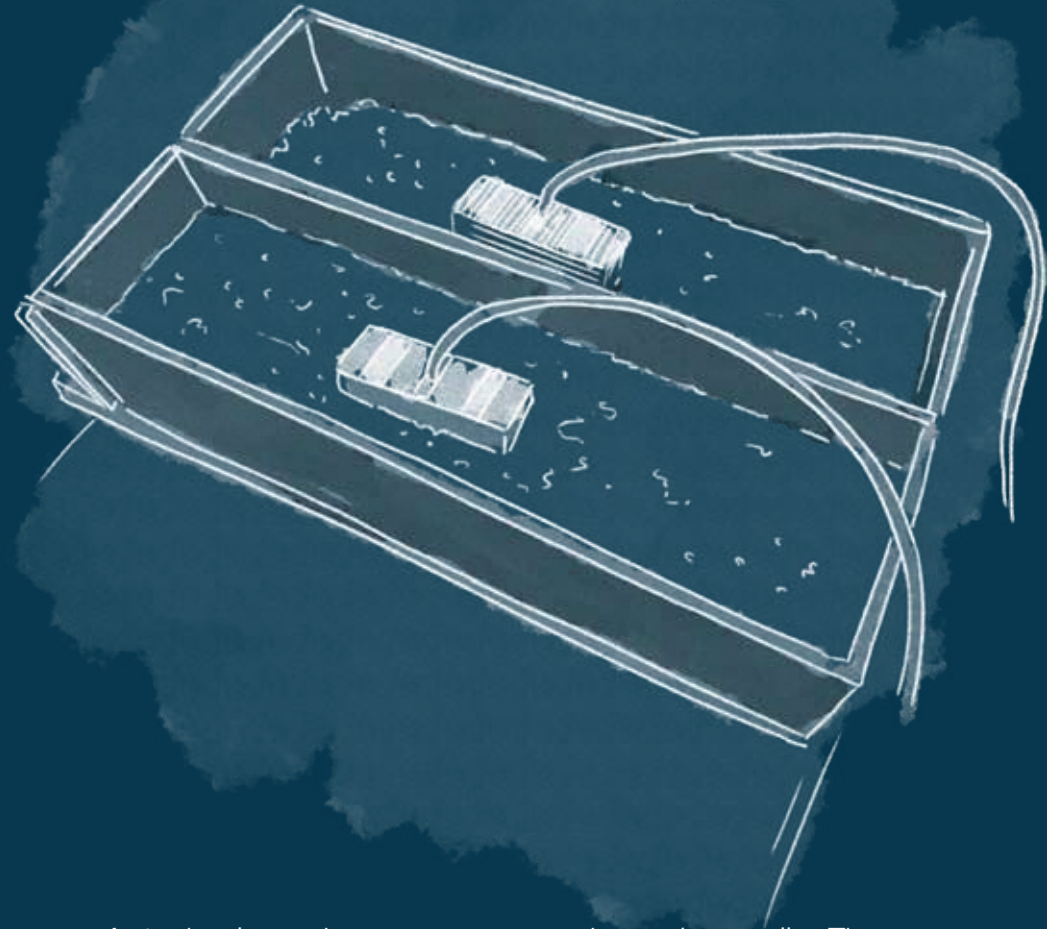


meta material

meta-material's unique lattice structure is made from titanium alloy, with tests showing that it is 50% stronger than the next strongest alloy of a similar density.

057

Microsensors



As technology advances, sensors are becoming smaller. They are increasingly being embedded in construction materials to provide real time monitoring of performance.

058

Moss



chandelier

1 Hotel in London's Mayfair features a 'living chandelier.' Designed by Studio Patrick Nadeau, the four-meter diameter dome is covered with 50,000 strands of *Tillandsia usneoides* (Spanish moss) that thrive on air moisture and light.

059



Mycelium bricks

Organic waste is cleaned and combined with mycelium, which grows around the waste and digests the material. The remaining material is placed into a mould and grows to fit the shape, before drying into a brick.

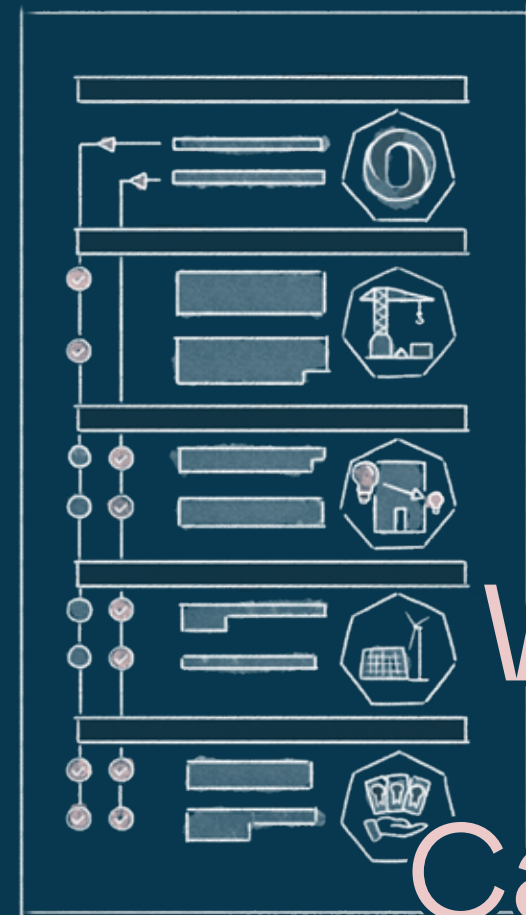
060



N2116

Known only as N2116, a new material discovered by AI could significantly reduce lithium use in batteries - providing battery alternatives for laptops, smartphones and a range of equipment and plant.

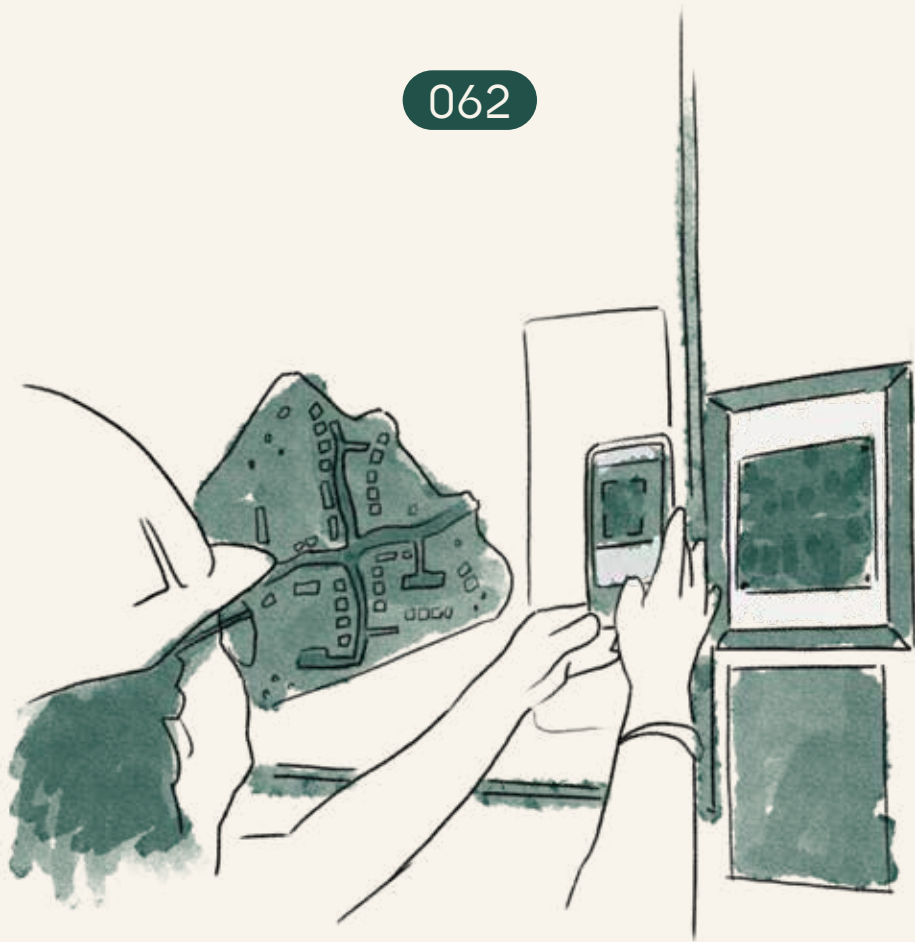
061



Net Zero Whole Life Carbon Roadmap

Led by UK Green Building Council (UKGBC), this sets out a common vision among industry to achieve net zero carbon in the UK's built environment, delivering a pathway, policy guidance and stakeholder action plans.

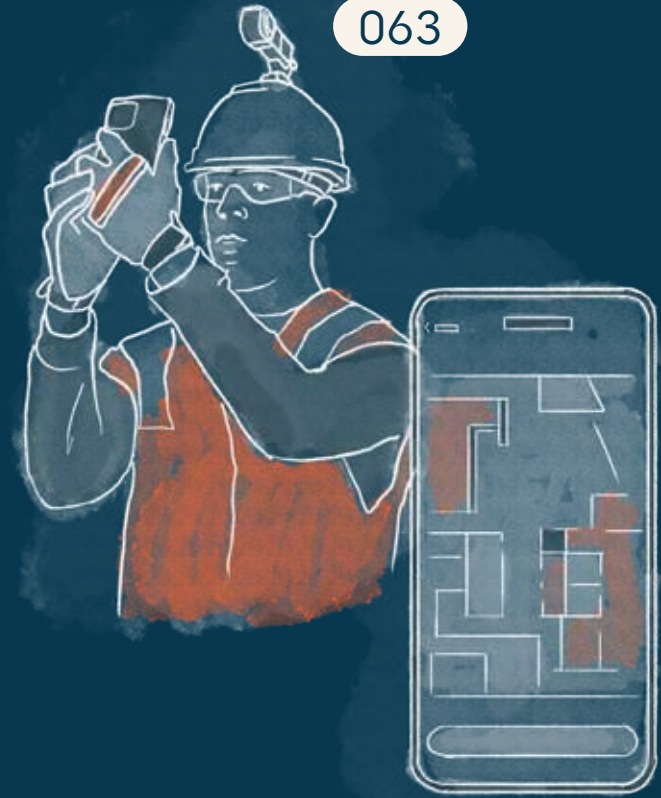
062



One Creative Environments

ONE Engage connects residents, landlord safety teams, and fire and rescue services digitally, addressing post-Grenfell obligations and helping to ensure safety-critical assets are compliant.

063



Openspace 360° reality capture

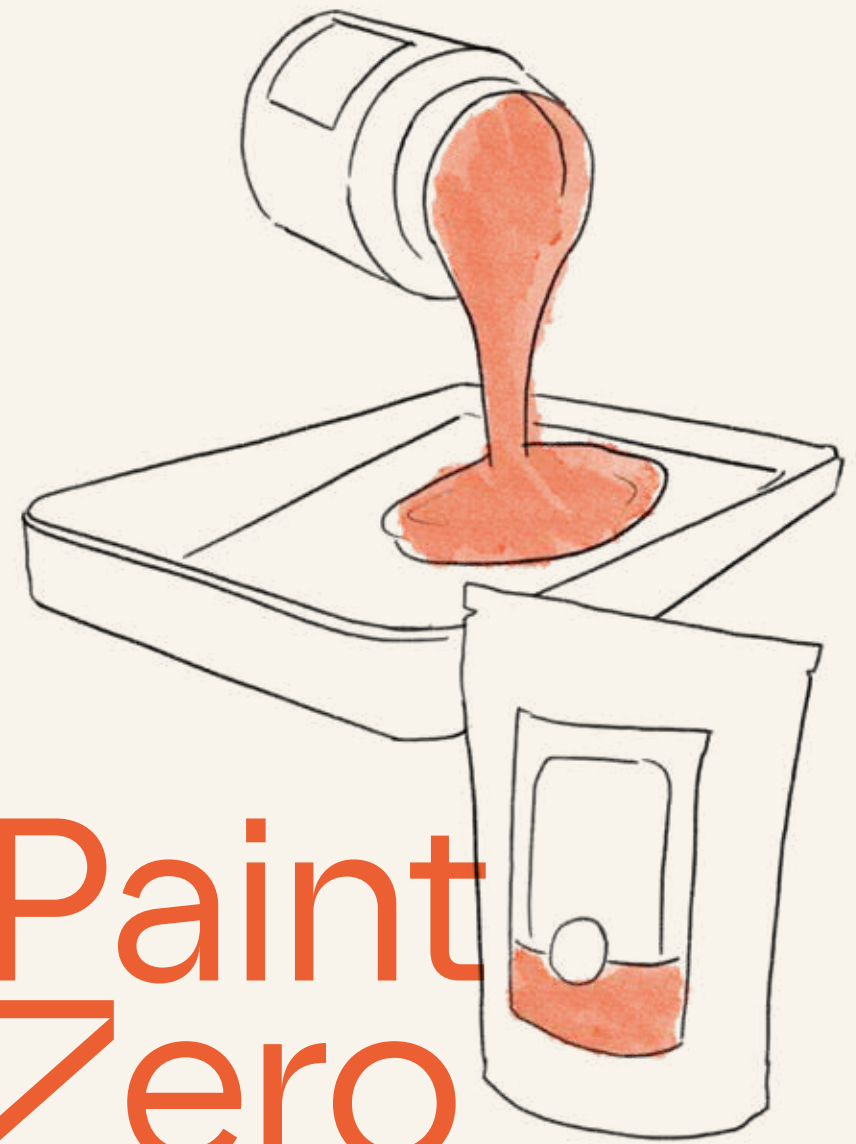
Quickly and easily captures a comprehensive visual record of a construction site to verify work-in-place, mapped to a floor plan. The system uses AI to compare BIM to the as-built record and track progress against plans.

064



The PACO robot works by making a 3D scan of a space and using AI to recognise and navigate around obstacles while it carries out painting tasks.

065



Paint Zero

A Somerset-based company has developed a vegan paint made from 100% sustainable plant extracts, natural minerals and salts.

066



Passive cooling paint

Created by researchers at Purdue University, this whiter-than-white paint reflects 98.1% of sunlight, reducing air-conditioning needs by as much as 40%.

067

Permeable YiBrick



A porous brick made from 90% recycled ceramic waste that could be used to reduce flooding in urban areas.

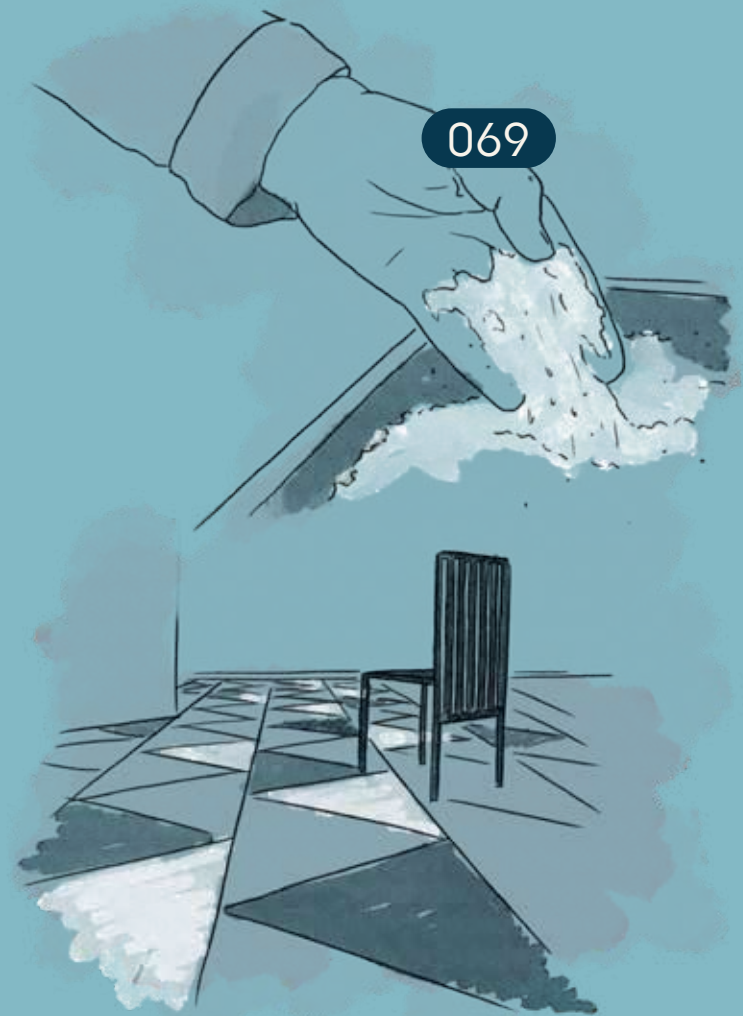
068

Re:Imagine London



A joint co-op game developed by Epic Games and Zaha Hadid Architects using the Fortnite engine, with players able to create their own architectural designs.

069



Recycled flooring

Swedish company Bolon offers a range of climate-neutral flooring, including durable vinyls and hardwearing rugs - all containing at least 68% recycled material.

070

Recycled tyre concrete



Traditional stone aggregates are supplemented with recycled material from vehicle tyres, reducing landfill waste.

071

Reef Rocket



A bio-cement structure developed to mimic naturally occurring oyster reefs that is used to mitigate coastal flooding, filter seawater and promote biodiversity.

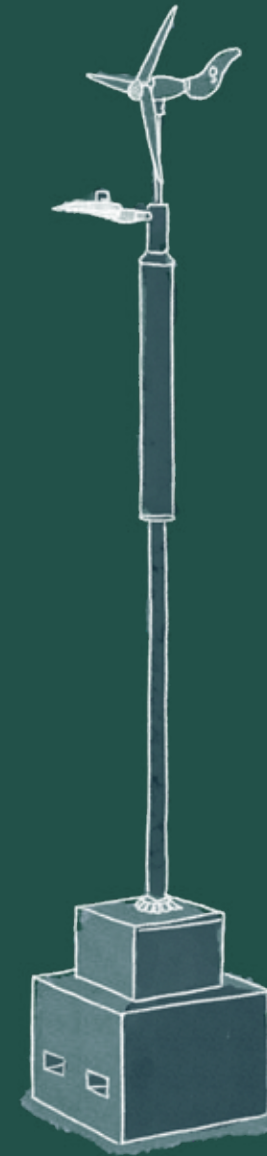
072



Refurbished telecoms cabinets

BT's digital incubator, Etc., has started a trial where it is adapting old broadband cabinets into EV chargers. If successful, there are plans to retrofit up to 60,000 cabinets.

073



ReLuminate

Combining solar and wind power, this standalone off-grid streetlight provides a true zero-carbon solution, eliminating the use of grid energy and the installation of power infrastructure.

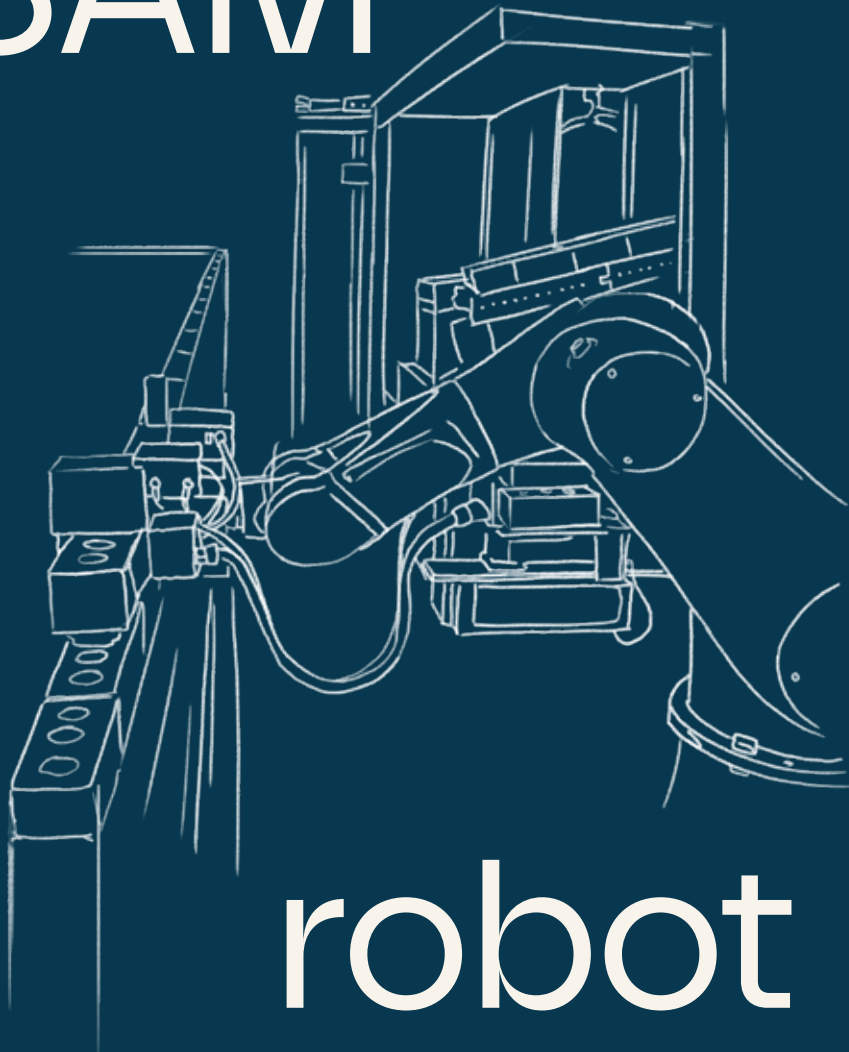
Resilio rooftop



A roof surface that stores rainwater for drought periods to encourage green roofs and reduce the heating impact of the sun.

075

SAM

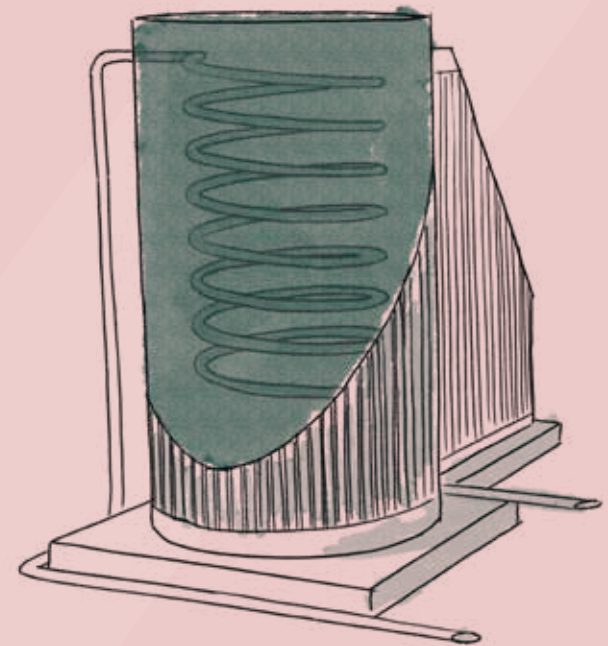


robot

Construction Robotics has developed a robot called SAM that can lay bricks up to 10 times faster than a human.

076

Sand battery



Finland's Vatajankoski power plant is home to the world's first commercial-scale sand battery. Enclosed in a 23ft-high steel container, it consists of 100 tonnes of low-grade builders' sand, two district heating pipes and a fan. Once heated to 600°C, using electricity generated by wind turbines and solar panels, it becomes a battery.

077



Seashell concrete

The University of Central Lancashire (UCLan) has developed a sustainable and pervious concrete which utilises whelk and scallop shells.

078

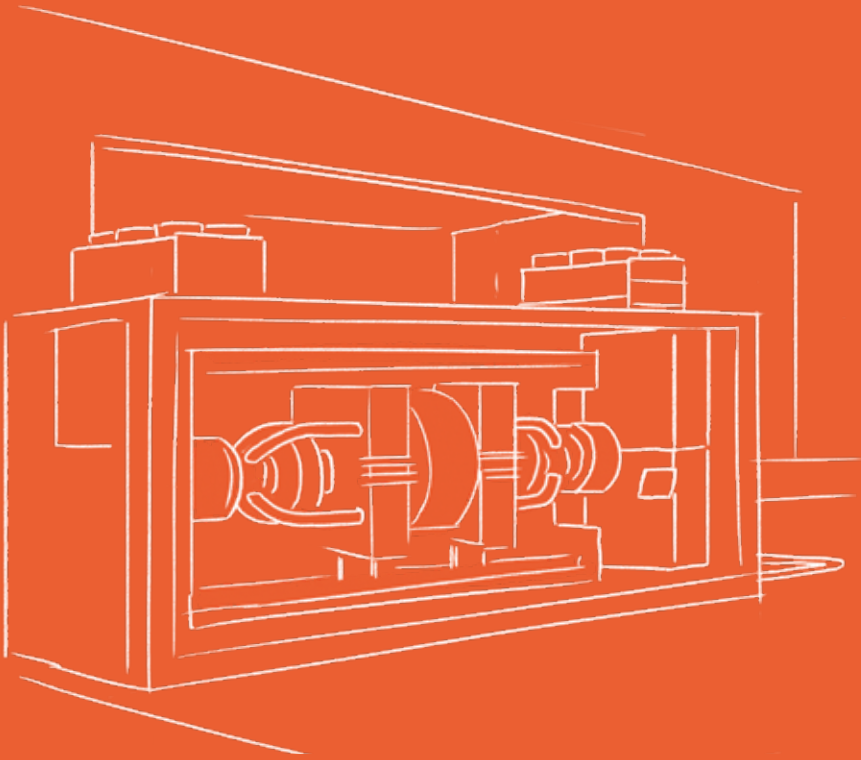


SkillGuard

A digital passport for field workers that tracks their skills, competencies, training, and even commuting distance, saving time and cost on construction projects.

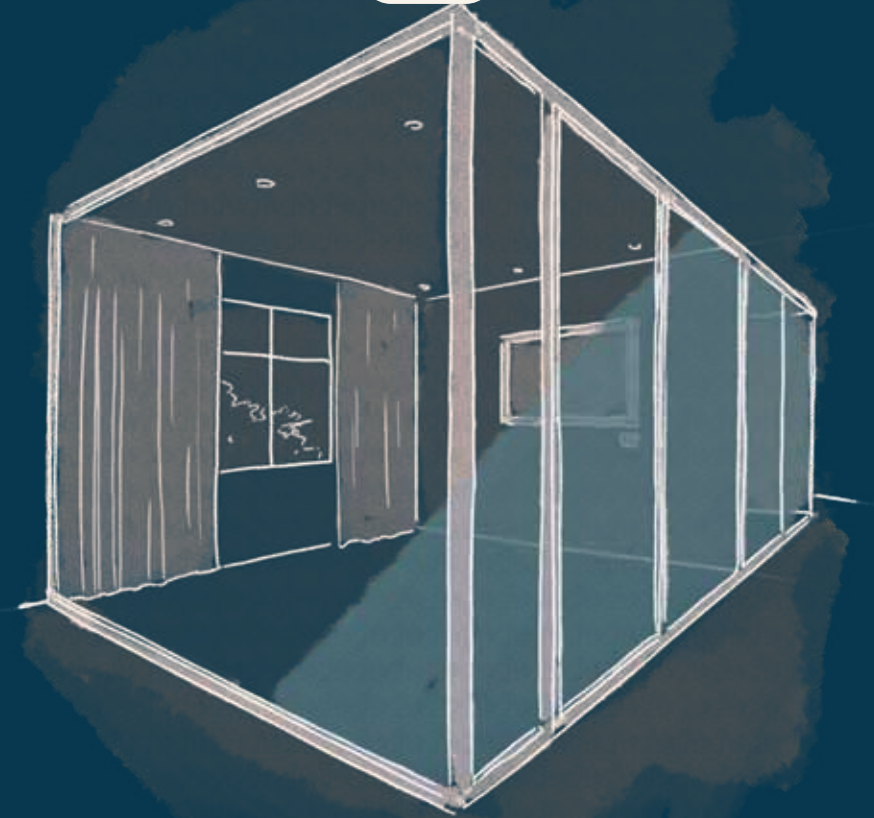
079

Small Modular Reactors and Micro Reactors



Small Modular Reactors (SMRs) and Micro Reactors can be manufactured offsite and transported to off-grid locations to power large construction projects or, in the case of SMRs, used to power rural areas with clean energy.

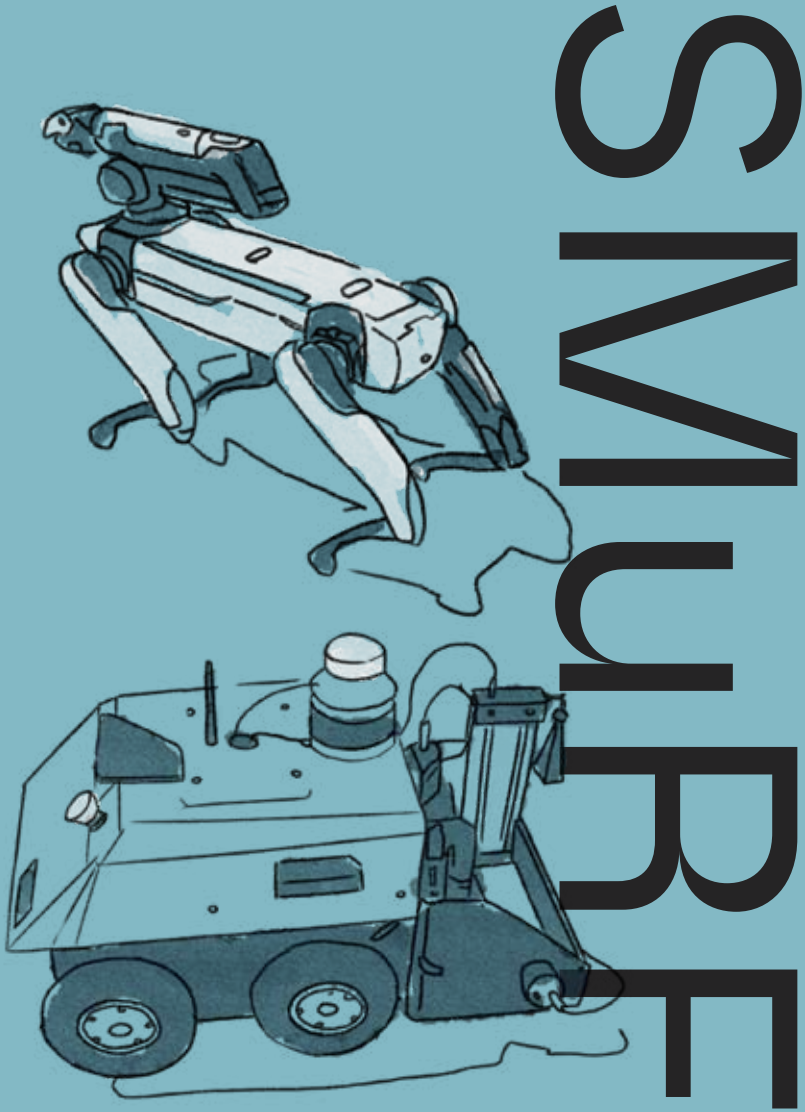
080



Smart glass

Smart glass enables windows to switch between clear and opaque, controlling sunlight, heat, and privacy while offering natural light and UV/infrared protection.

081



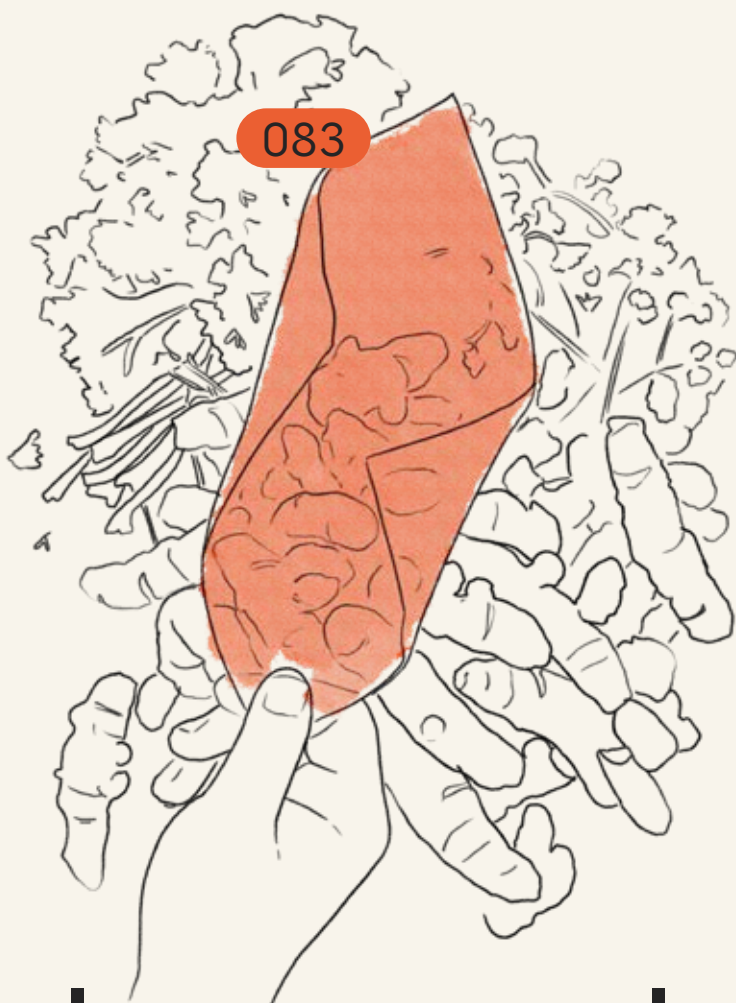
The Symbiotic Multi-Robot Fleet (SMuRF) system enables wheeled, four-legged and airborne robots to collaborate and complete tasks that could be difficult or harmful for humans to undertake on their own.

082



Innovate UK and Defra are trialling a project which utilises machine learning to monitor soil health and biodiversity.

083

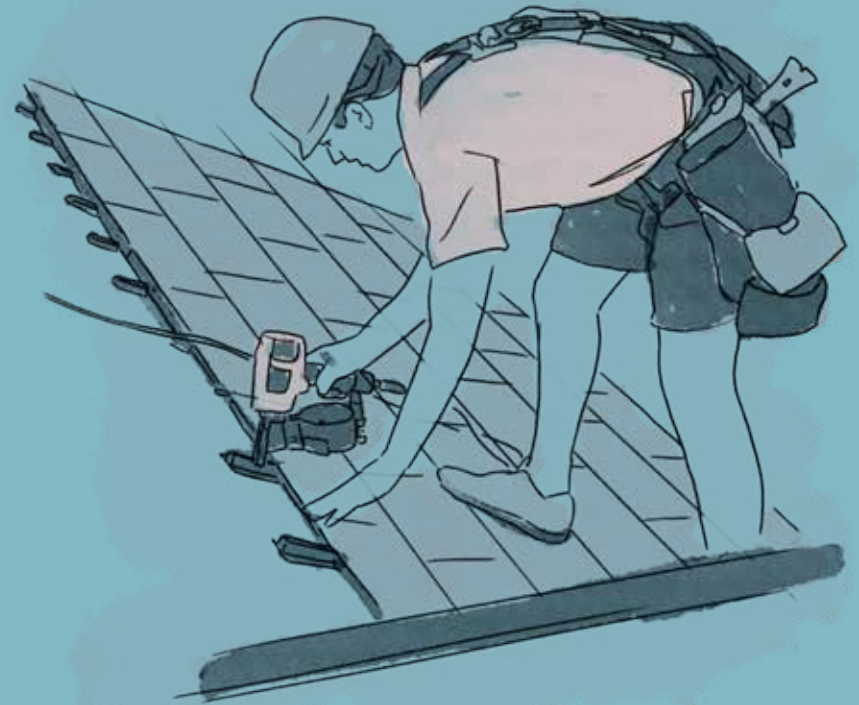


Solar panels from food waste

The AuReus system turns waste crops into cladding that can generate clean energy from ultraviolet light.

084

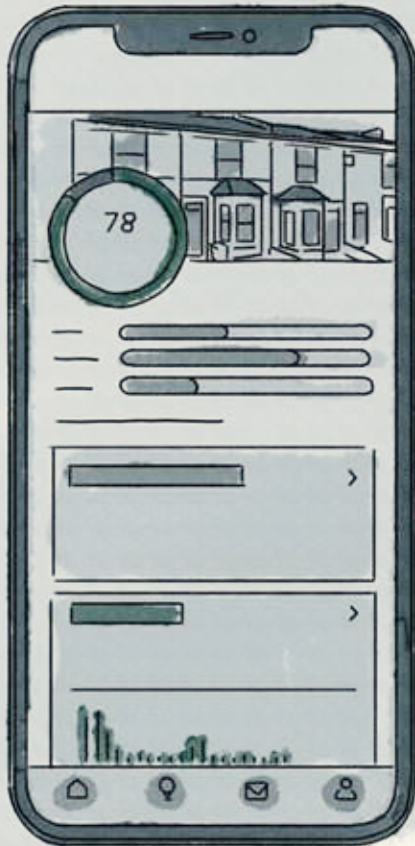
Solar Roof by Tesla



Designed to blend seamlessly with existing roof designs, the Tesla Solar Tiles provide all-weather protection. Made from tempered glass, they are three times stronger than standard roofing tiles.

085

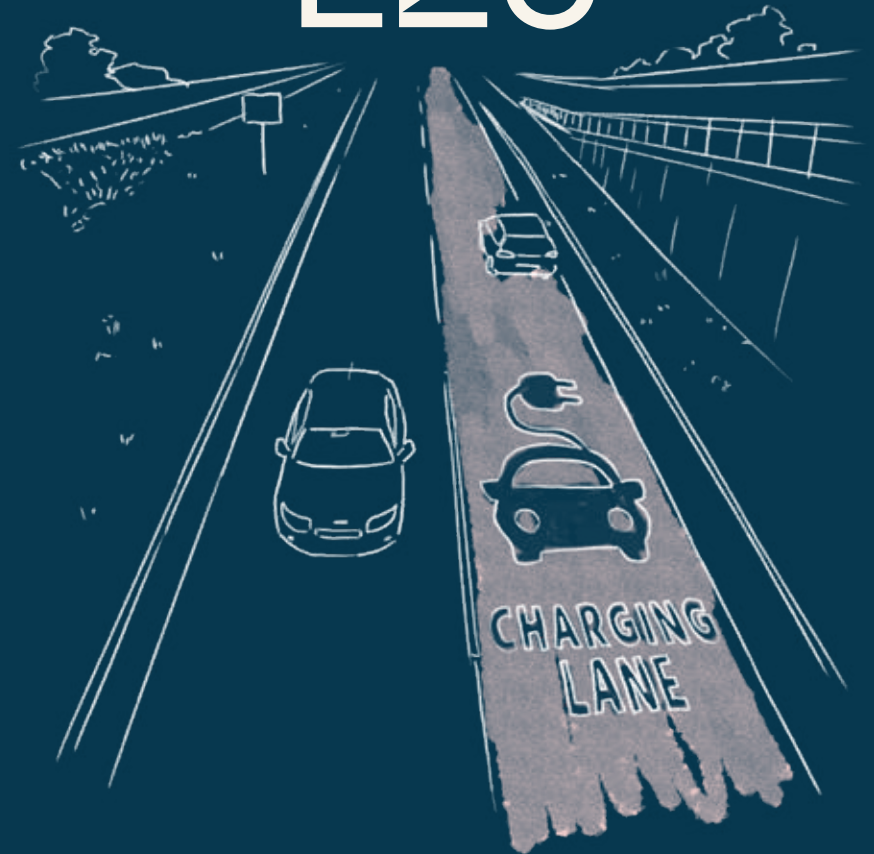
SuSy



SuSy is an online virtual consultancy service for homeowners who want to make their homes more sustainable.

086

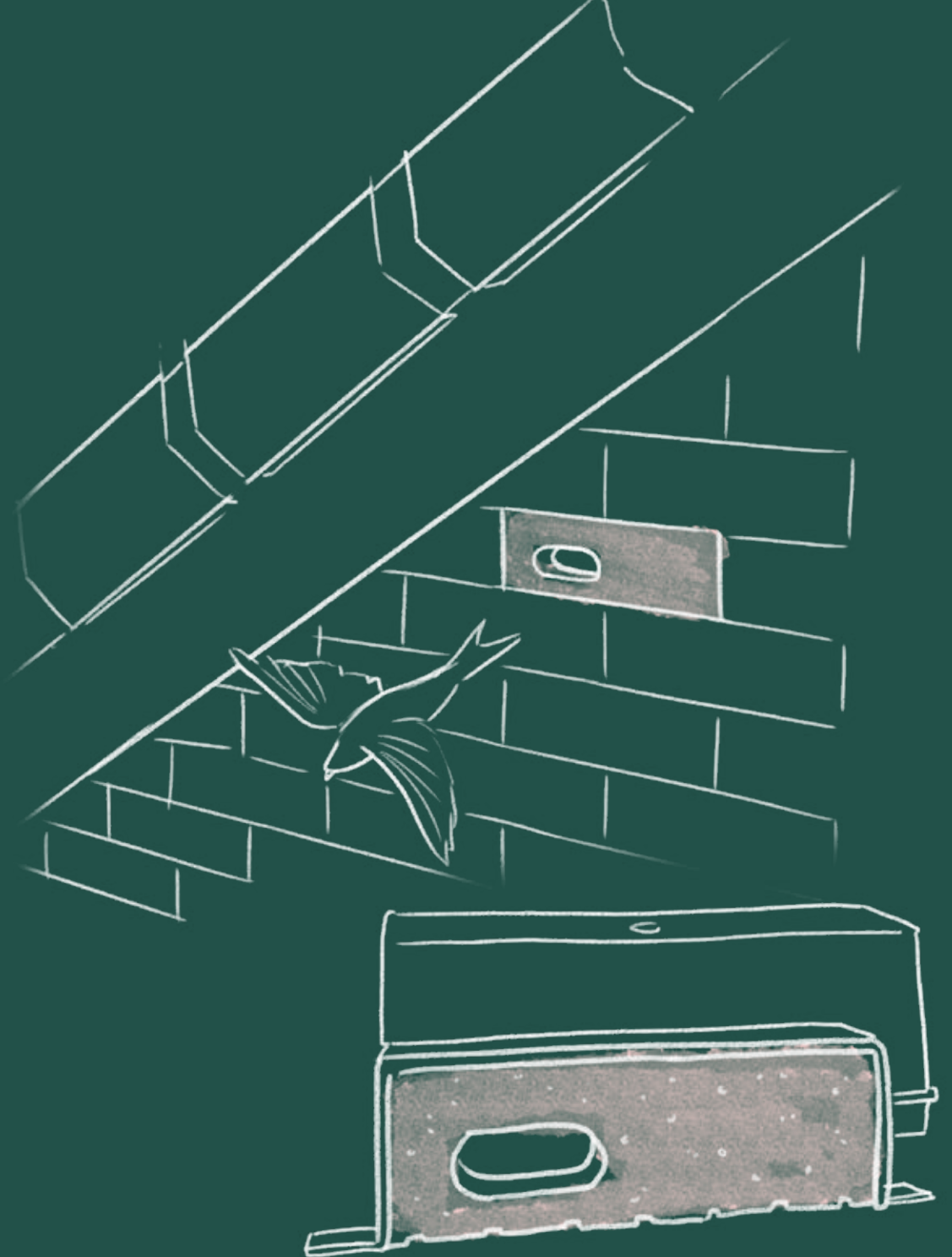
Sweden's E20



Sweden is set to build the first e-motorway, turning the E20 highway into a permanent electrified road so cars and trucks can charge while driving. It works using conductive charging and is planned to be built by 2025.

Swift bricks

An unobtrusive hollow brick that provides a home for cavity-nesting species including the endangered house martin, starling and house sparrow. Better known as 'bird friendly bricks'.



088

The Future Home

The Future Home is a testbed for new technologies to drive smarter, more efficient homes that use less energy and water. To test climate resilience, it is being exposed to temperatures as high as 40°C and low as -20°C, to understand how materials perform.

089

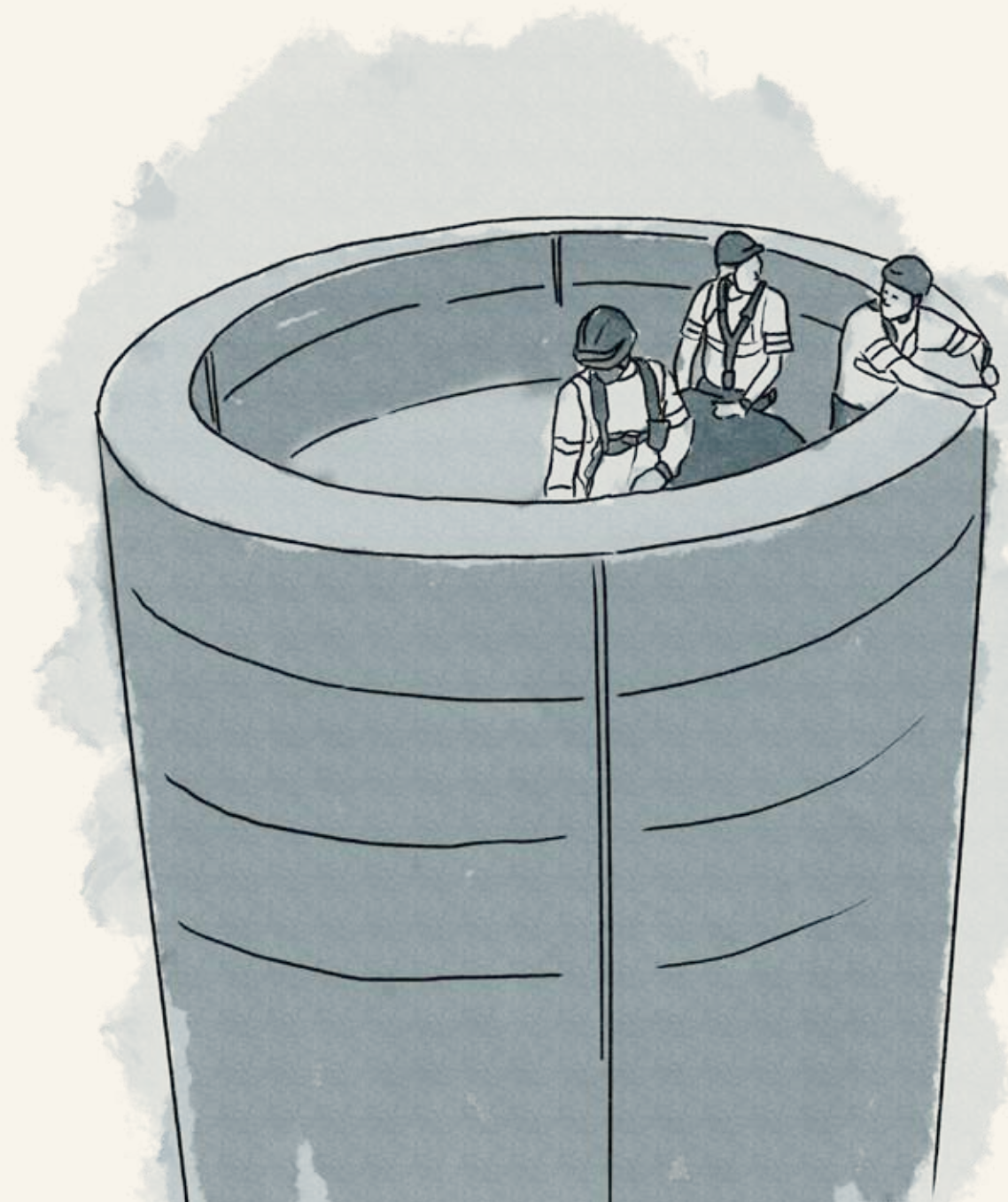


The Pallet LOOP

These reusable pallets use RFID tags to allow the easy tracking of building materials as they pass through the supply chain.

Timber wind turbine

3mm layers of wood are glued and compressed together to make curved modular sections. These are then glued together on site to form cylinders which are stacked on top of each other to form a tower.



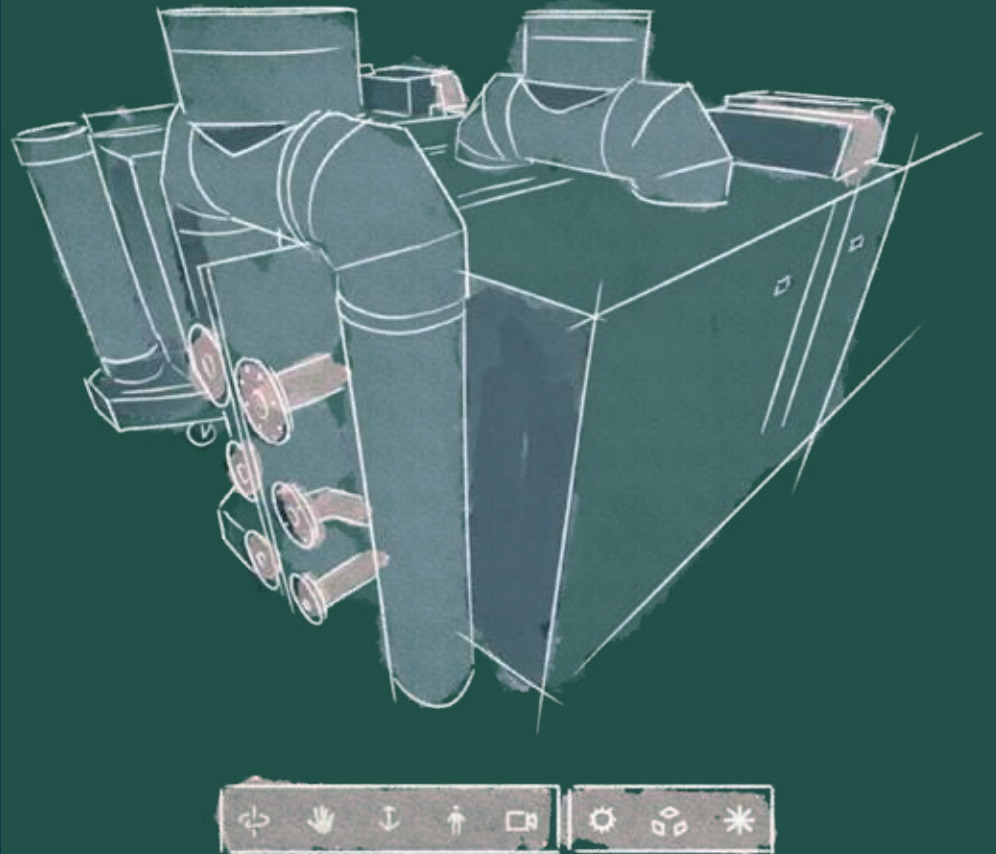
091



Transparent aluminium

Transparent aluminium is highly durable and can withstand heat up to 2,100°C. It is resistant to radiation, acids, alkalis and water. It's used for impact-resistant windows, domes and other elements that require transparency and strength.

092

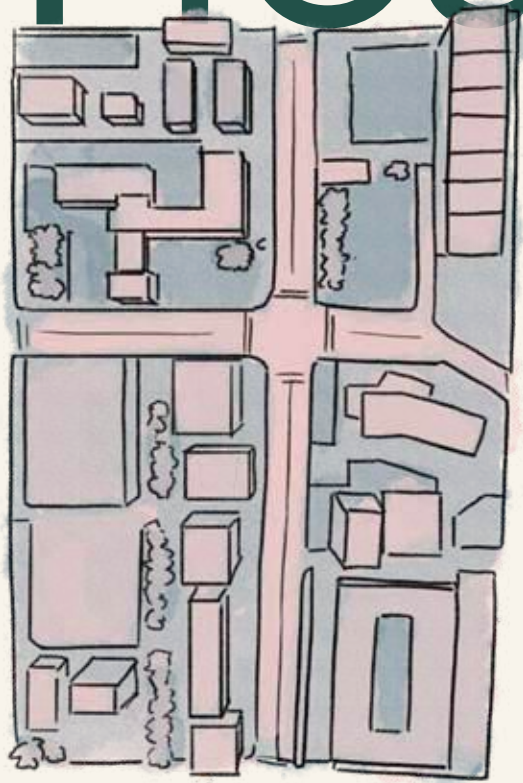


Twinit

Twinit describes itself as the first 'composable' digital twin services cloud. It integrates tech services such as GIS, CAD, BIM, BMS, IoT and immersive experiences.

093

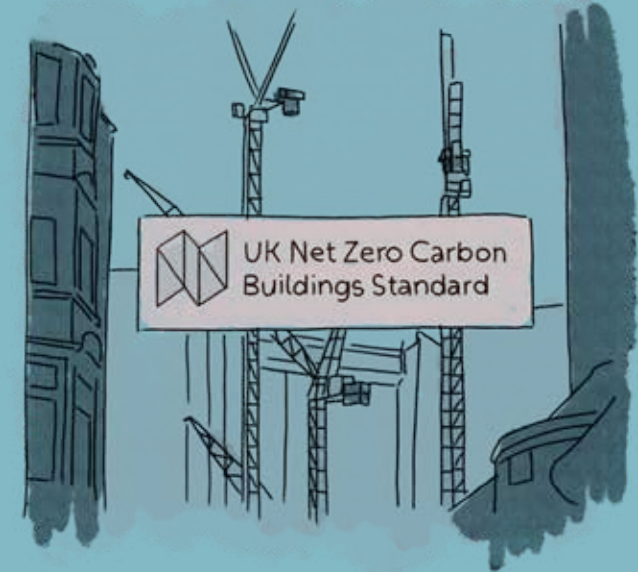
UHeat



UHeat uses a combination of satellite imagery and open-source climate data to analyse huge areas of cities. According to Arup, it can be used to identify the specific buildings, structures and materials that are causing temperatures to rise.

094

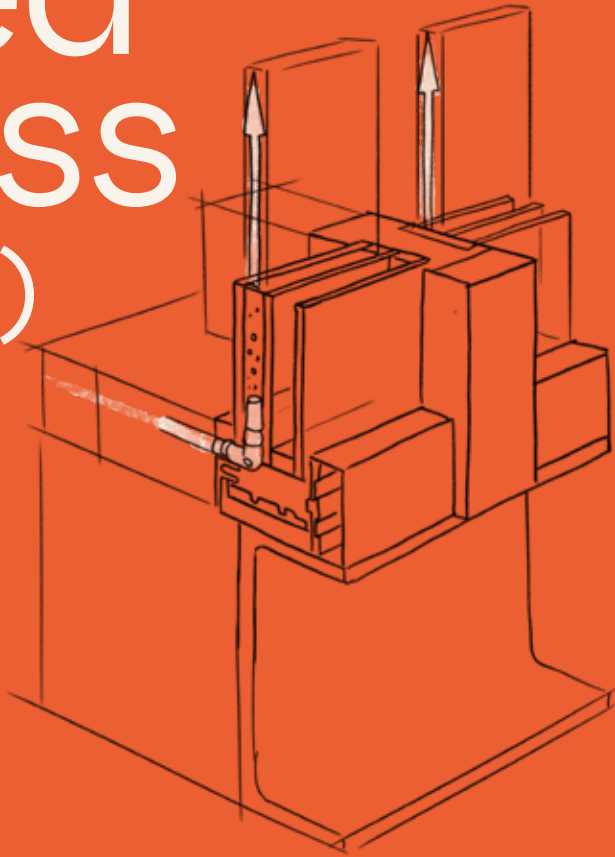
UK Net Zero Carbon Buildings Standard



A pilot is taking place to measure buildings against a single, agreed methodology to drive consistency of reporting when it comes to making net zero claims.

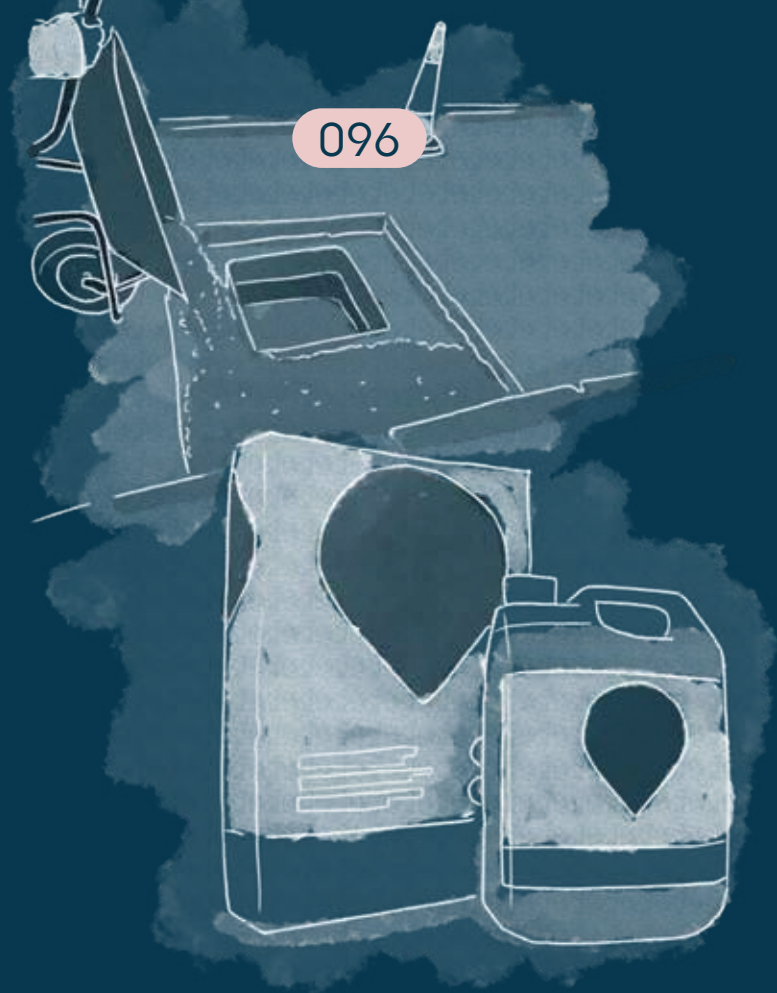
095

Water Filled Glass (WFG)



Windows contain a thin layer of water between glass panes, which absorbs heat from sunlight to reduce solar gain and energy bills related to cooling by up to 25%.

096



webercem Install Plus

A three-in-one highways ironwork repair and installation system from Saint-Gobain PAM and Weber. Its damming and flowing bedding mortar sets to a strength that allows road traffic in just one hour post-application.

097

weberwall brick



A fast fix, lightweight brick system which is suitable for internal and external use and significantly cuts down installation time on site.

098

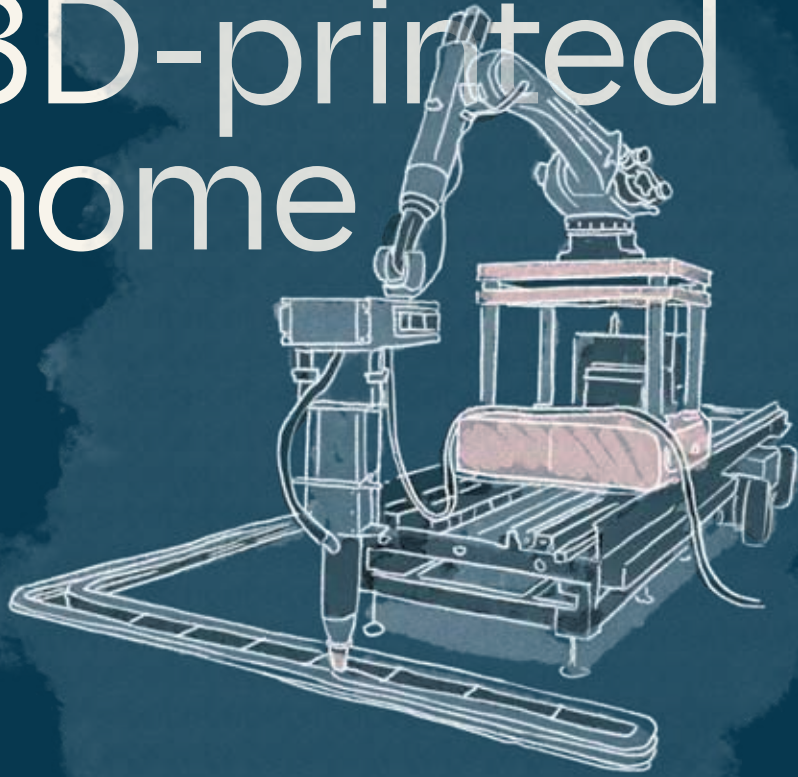


WholeHouse, by Travis Perkins

A platform that allows users to plan, design and configure an entire home in a matter of hours. It has 2, 3 or 4-bed house types available, with over 1m customisable options.

099

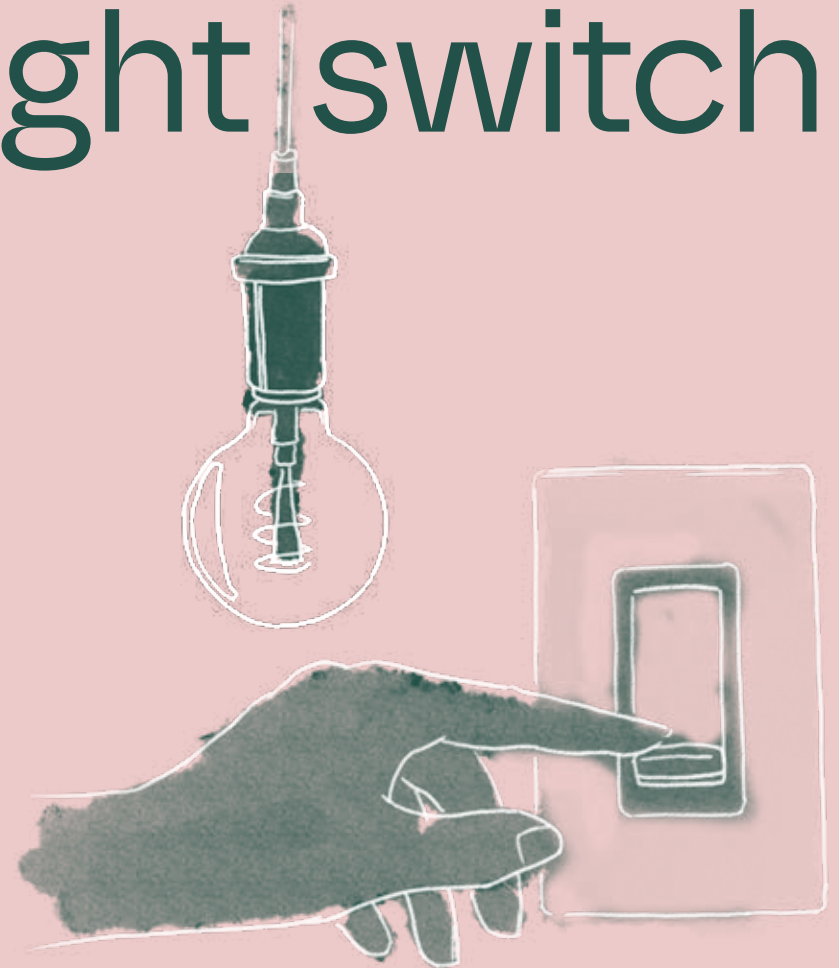
Wildfire-resistant 3D-printed home



A 3D-printed concrete home under construction in the United States is said to be the first such wildfire-resistant structure in the country to be built on site using the technology.

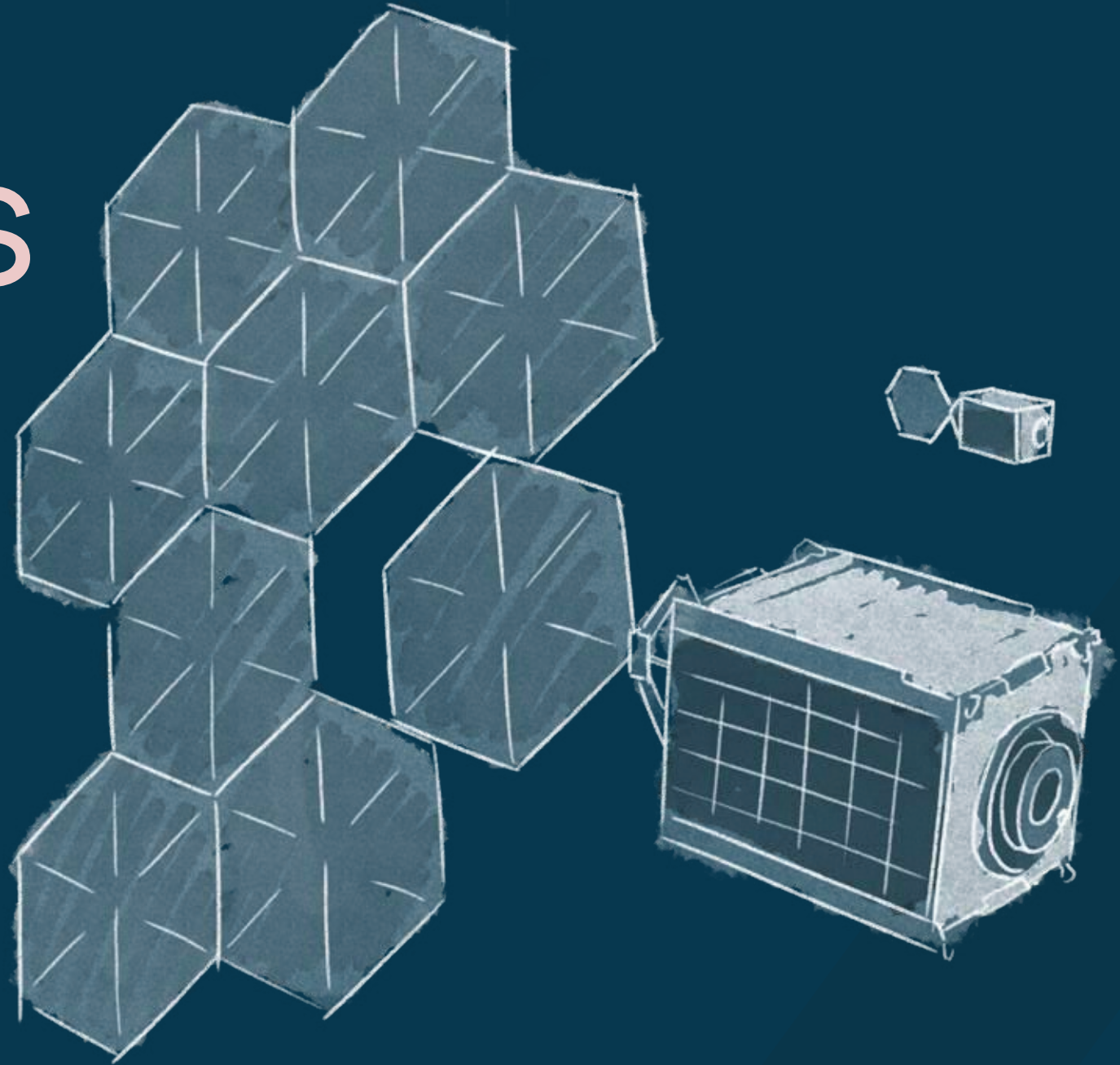
100

Wireless light switch



A University of Alberta engineering researcher has developed a wireless light switch that could reduce the cost of wiring a house by as much as 50%.

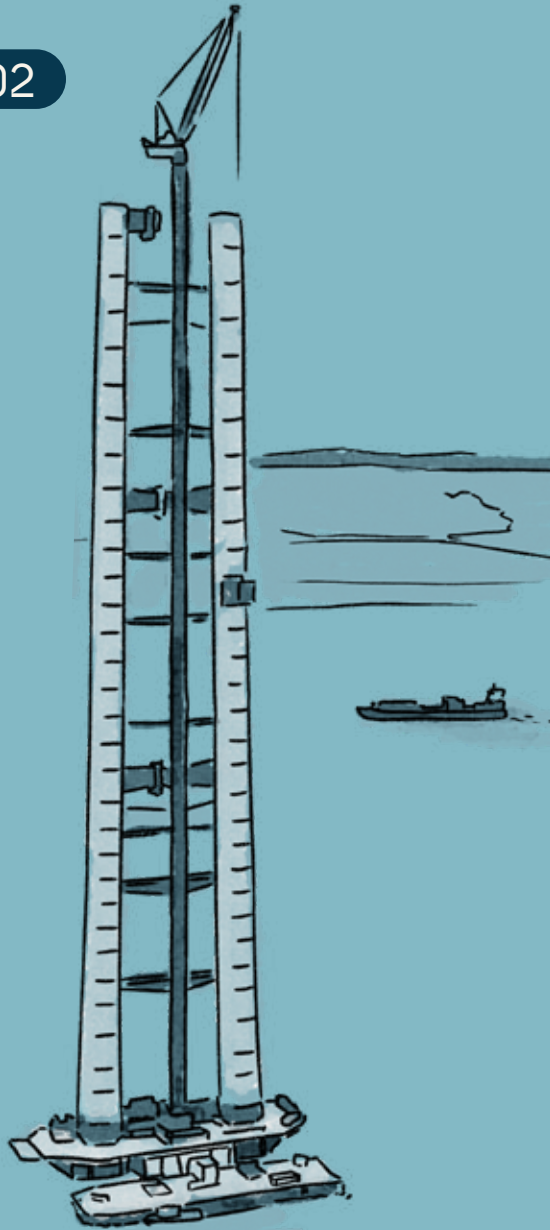
World's first space solar farm



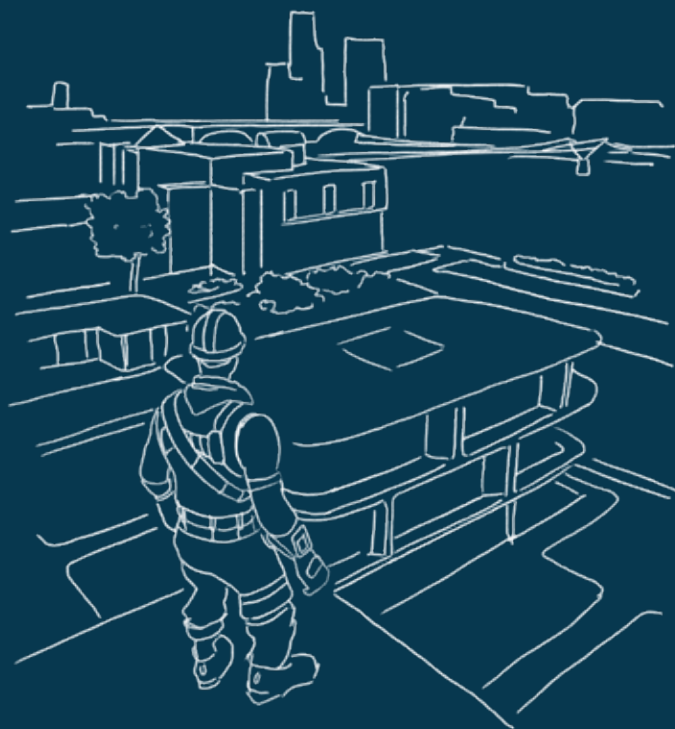
Oxfordshire-based Space Solar plans to power a million homes by the 2030s, by installing a complex of mirrors and solar panels orbiting the earth.

World's largest crane

102



The Marr 2480D Heavy Lift Luffing (HLL) tower crane is the largest capacity luffing tower crane in the world. With a standard lift capacity of 330 tonnes at a 15-metre radius, it increases site productivity significantly.



LMC

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