B

CONSTRUCTION/GLOBAL

Building societies

From filling city skylines with farmland to rolling out comfortable flat-pack homes, here are 10 visionary schemes that could transform how our urban environments take shape.

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Sustainability is all the rage for companies these days and concepts relating to the idea of "green building" stand to gain more than most in the coming years. That's partly because the construction sector is a key emitter of pollution. According to a 2020 report by the European Climate Foundation, energy use in buildings accounts for more than a third of all greenhouse gases emitted into the atmosphere, yet the construction industry "is one of the sectors that has arguably seen the least progress to date" when it comes to reducing emissions. That reality has prompted economies such as the EU to press for tougher building codes as they work towards the ambitious goal of becoming carbon neutral by 2050.

But better building isn't really just about reusing materials, installing energy-efficient lightbulbs or using renewable energy sources. Nor is it always about pioneering technological advancements. As ever, it's also about the simple things, such as tending to a neighbourhood and adding shutters to windows. And for some in the construction business, it pays to look backwards to time-honoured traditions and long-forgotten building materials that, with a few modern updates, can prove to be surprisingly durable and effective in meeting the same goals.

On the following pages, we look at some of the imaginative businesses, architects and designers that are helping to make our world a better place, including a Norwegian firm turning plastic marine waste into simple new products, the rooftop farmers finding new space for agriculture, and the Indian companies that are helping us to breathe better air. — (M)

Time-honoured traditions and long-forgotten materials can prove to be durable and effective when it comes to meeting goals

1

Natural building remedies
Eelgrass roofs in Denmark

The craft of weaving dried eelgrass into roofs isn't a new housing solution on the Danish island of Læsø. The technique, which mimics knitting, dates to the 1600s when women used the grass to create cheap fireproof roofs. Today there are 19 historic hobbit-like houses on the island – and with a few innovators aiming to revive the technique, there should be more to come.

Eelgrass, which washes up on Danish shores in abundance, is a wonder material. Rot and fire-resistant, the wispy seaweed is nearly indestructible. "It can absorb carbon dioxide and sequester it," says Kathryn Larsen, a Copenhagen-based architectural technologist who was inspired by Læsø's houses and is developing contemporary seaweed thatch panels.

"When used in a wall or roof as insulation, eelgrass can create what's known as a 'breathable construction'," says Larsen. Eelgrass can absorb and release moisture, allowing air to pass through the construction, improving indoor air quality.

Henning Johansen, a master thatcher on the island, is also rejuvenating the ancient craft. Rather than twisting the dried eelgrass by hand, as Danes did in the 1600s, he uses a screwdriver to spin the strands into long, thick bundles that are packed together on roofs, resulting in a sturdy canopy. To ensure a healthy seaweed supply, farmers such as Kurt Schierup of Møn Tang are working to harvest more eelgrass.

For Larsen, one challenge is the stigma around the plant. "People think eelgrass is smelly and slimy but this isn't the case," she says. "I'm trying to change people's perceptions." — MHO

2

Cleaning up their act
Graffiti removal in the US

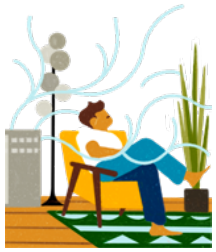
New York has a long and ambivalent relationship with graffiti. The metropolis is the seat from which the art form caught the world's attention in the 1980s but its golden age was a time of much deprivation and crime, and it's generally thought of as a nuisance by officials.

In 1999 the city sought to combat illegal graffiti with a programme called Graffiti-Free NYC. By dialling the number for non-emergency government services, business owners could summon a team of graffiti-removal specialists to scrub tags from their building at no charge. However, the programme has been suspended since March 2020 due to coronavirus-related budget cuts. Until it's restored, New Yorkers might look to another city for ideas.

In Pennsylvania, Graffiti Removal Experts (GRE) is a private company that exclusively employs homeless

and formerly incarcerated people. "We hire directly from a prison re-entry programme in Philadelphia and we've had very good results," says Todd Kelley, an army veteran who started the business in 2012.

Kelley condemns the "99 per cent of graffiti that's just squiggles," but believes that "talented artists should have the option to display their art in a public space". "We can often find them paid work or, at the minimum, permission to paint a large wall in our neighbourhoods," he says. A big wall with art on it doesn't get vandalised, he adds. But, Kelley says, "a big empty wall is just like a blank canvas." — HRS



3

Breathe more easily
Cleaning India's dirty air

There's a small but growing gaggle of activists and innovators trying to tackle the toxic air that is choking India, one of the world's most polluted countries. "The situation is only getting worse," says Barun Aggarwal, founder and CEO of Breathe Easy Consultants. His is one of several companies offering purification solutions to clean the air inside homes and offices. "India burns thousands of tonnes of rubbish, including plastic, which emits high levels of dioxins and furans that are extremely carcinogenic to the human body," he says.

Solutions such as Breathe Easy, although welcome, are unaffordable for the majority of Indians but there are some less expensive fixes too. Pi Green Innovations has won awards for its Carbon Cutter device that fits onto vehicles or generators and, it claims, captures 90 per cent of the dirty particulate matter emitted from exhausts. And a team of scientists from the Indian Agricultural Research Institute has developed a fungus and jaggery (an unrefined sugar product) capsule that can make rice fields decompose quickly, so that farmers don't have to burn their patches twice a year.

The ideas are there. The next step is building awareness and pushing implementation. That's why Jyoti Pande Lavakare, writer and co-founder of activist group Care for Air, says that pollution must remain top of the agenda. "Breathing the toxic air in New Delhi is like drinking sewage," she says. "You wouldn't drink toxic water so why should we breathe toxic air? Government and big business need to step up and do their part." — LLP

4

Constructive research
A living lab in Switzerland

Driving the use of research and innovation to construct the sustainable buildings of the future, Next Evolution in Sustainable Building Technologies (Nest) is a living laboratory near Zürich. A public-private partnership, its base includes apartments for researchers where new materials and building solutions can be tested.

The site is situated on the campus of the Swiss Federal Laboratories for Materials Science and Technology (Empa), and is run in conjunction with another government-backed institution and dozens of private corporate partners. "Nest's mission is to accelerate research and innovation for construction," says its managing director, Reto Largo. "You can validate your prototypes here in a real-life environment."

The site consists of a core building with platforms where experimental units can be built and later removed. One example is the Urban Mining and Recycling unit designed by German company Werner Sobek with

architects Dirk E Hebel and Felix Heisel. The apartment features reusable materials, while its façade includes aluminium and copper that can be separated, melted and recycled. "It was important to create a unit that can be fully disassembled, while showing that you can make something elegant and contemporary," says the project's manager, Bernd Köhler, a senior architect at Werner Sobek Group. — ABC

5

Reusing waste
Aion in Norway

With a coastline stretching just shy of 3,000km, Norway's economy has long relied on its fisheries. The country is the world's second-largest exporter of fish, an industry that racks up more than NOK94bn (€9bn) a year. Yet this economic boost has a price: the disposal of 10,000 tonnes of fishing equipment in the sea every year, mostly plastic ropes and nets.

Hoping to address the issue is Oslo-based Aker Biomarine, which has been producing Omega-3 supplements for the past 15 years. Last December it launched a sister company, Aion, with the goal of supplying businesses with functional products made entirely from plastic waste collected by Aker and its partner companies.

"Plastic is a valuable resource and we want full circularity," says its CEO, Runa Khoury, who has spent the past two years as Aker Biomarine's sustainability director. "We want to channel it into useful items for the retail and catering sectors."

After acquiring a company that had been in the business for some time, Khoury secured Aion its first commissions: recycling plastic waste into trays for McDonald's and shopping baskets for Norwegian supermarket chain Meny. With plans to expand its client base beyond Norway, Aion has partnered with Oslo-based architecture firm Snøhetta, which will bring its expertise in materials and product design to develop a range of fully recycled items for businesses to adopt.

"Most of us want to see the world produce less plastic but the incentive isn't there yet," says Khoury, stressing that sourcing virgin plastic is less expensive than recycling it. "We want to be the ones promoting quality offerings and closing the plastic loop." — GDE

6

Future-proof offices
Shimizu in Japan

Japan gets a bad name for its scrap-and-build culture. Houses are torn down after 30 years or so, while 1980s office blocks are considered ripe for demolition. Times, though, are changing thanks to a rethink of the ethics of short-term building.

Construction companies have an important role to play. Shimizu Corporation, one of Japan's biggest builders, is putting the finishing touches to a zero-energy office in Kanazawa. Due to open in May, the three-storey structure will use hydrogen energy, solar power, radiant air conditioning, geothermal heat and natural airflow and lighting to reduce carbon emissions. "Zero-energy building is going to be standard in the near future," says spokesperson Hideo Imamura. "We want to be ready for a new era."

The building will generate power too. Shimizu has been working to develop a system, Hydro Q-BIC, that uses the excess energy from solar power to make hydrogen, which is stored and converted into clean electricity.

The technology is hidden behind traditional elements drawn from Kanazawa's *machiya* townhouses. Wooden latticework exteriors double up as earthquake-resistant walls, while the ceiling uses fire-resistant wooden beams.

With more people working from home than ever before, large offices need to justify their worth. Builders such as Shimizu are incorporating the need for more flexible, paperless workspaces into their designs. — FW