





Clean creations:

Six ingenious tech innovations that may help save the planet



Introduction

Necessity, they say, is the mother of invention. And when it comes to climate change and green technologies, this proverb has never rung truer.

As the climate clock ticks, the world needs practical solutions that help us chart a course to a more sustainable future.

The battle against climate change is being fought on multiple fronts, with more than 100 countries now having committed to reaching netzero emissions targets. Regulatory mandates, along with widespread commitments from governments, industry and entrepreneurs, have started paving the way for new ways of living and working.

With the transport sector contributing more than a quarter of global greenhouse gas emissions, Bridgestone's and Webfleet's R&D teams are rising to the challenge with mobility innovations that are already delivering meaningful environmental benefits.

Our planet's decarbonisation toolkit, however, is not yet complete. As things stand, it's not yet powerful enough to solve the net-zero equation. New approaches are still required, and more low-carbon innovation is needed, if our collective, existential aims are to be achieved.

Thankfully, science and technology never stand still.

The following guide outlines some of the exciting innovations – from the world of transport and beyond – that may help minimise our environmental impact and usher in a brighter, more sustainable era.



Wwebfleet



2



Guayule: a new source of natural rubber

Guayule, a drought resistant, desert shrub shows promise as a new, domestic source of natural rubber for tyre production. Bridgestone visionaries have recognised its potential and have invested more than \$100 million to date in efforts to commercialise it.

More than 90 per cent of the world's natural rubber supply is currently extracted from the Para rubber tree, which primarily grows in Southeast Asia. Guayule, which originates from southwestern USA and northern Mexico, is considered a cheaper, more sustainable alternative that requires less water than other crops and can be harvested in just three years.

The shrub also opens the door to opportunities for localising production for Bridgestone Americas of a key raw material, enabling transport-related emissions to be reduced.

Bridgestone debuted Firestone Firehawk race tyres, made with guayule, at the 2022 Indy Pit Stop Challenge while the U.S. Department of Energy Joint Genome Institute has recently awarded the company a research grant to further advance the company's guayule natural rubber research.

Bridgestone currently operates a guayule processing and research centre along with a 281-acre guayule farm in Arizona. The shrub is an integral ingredient of the company's plan to achieve carbon neutrality and make tyres from 100 per cent renewable materials by 2050. 90% of the world's natural rubber is currently extracted from the Para rubber tree







Magnetisable concrete tech for electric vehicle charging

Electric vehicle (EV) charging has become one of the most significant challenges to transport electrification. Thankfully tech boffins are finding solutions, including the clever developers at Webfleet, who have developed an award-winning telematics solution to help optimise charging strategies for business fleets.

And now, researchers at Purdue University in Indiana, in partnership with the Indiana Department of Transportation, are testing magnetisable concrete technology for road surfaces that enables EVs to recharge wirelessly, while in motion.

The concrete, made from cement and magnetic particles from recycled electronic waste, has been developed by German startup Magment, in partnership with building solutions company Holcim.

"The field of transportation is in the midst of a transformation not experienced since the invention of the automobile," said Nadia Gkritza, Professor of Civil Engineering and Agricultural and Biological Engineering and ASPIRE Campus Director at Purdue University.

"We envision opportunities to reduce emissions and near-road exposures to pollutants, coupled with other transportation innovations in shared mobility and automation that will shape data-driven policies encouraging advances."

Other applications under development include the electrification of industrial floors to recharge robots and forklifts as they work.

Wireless charging technologies are also being explored by an array of other companies, with 'inductive charging' developments behind the Arena Del Futuro test circuit in Italy, cited by Time magazine as one of the one hundred most important inventions of 2021.



Read our guide to innovations in electric charging for more insights:

READ GUIDE







Hydrogen power in the skies

Aviation is responsible for around 12 per cent of CO2 emissions from all transport sources¹. Just one flight can emit as much CO2 as many people do in a year².

Thanks to innovations in hydrogen-powered aviation however, aircraft passengers may one day fly anywhere in the world with zero carbon emissions.

Airbus has already announced plans to develop the world's first zero-emission commercial aircraft by 2035. Reinforcing its commitment, the company has now launched a Zero Emission Development Centre (ZEDC), to be based in Bristol, for hydrogen technologies.

The FlyZero project meanwhile, led by the ATI and funded by the government, has also developed a concept for a midsize aircraft powered by liquid hydrogen. It is capable of flying 279 passengers halfway around the world without a stop, or anywhere in the world with just one stop, to refuel.



Watch the FlyZero webinar video to discover more about the future of zerocarbon emission air travel:



1 CAA International, Equipping aviation regulators to decarbonise air transport and tackle climate change, United Aviation, 2022

2 BBC, Future Planet, 2021







Turning hills into batteries

Thousands of hillsides across the UK could soon be used to generate renewable energy through an innovative, underground hydropower system.

British company RheEnergise has taken one of the oldest forms of energy storage – pumped-hydro – and has come up with a solution for storing and releasing electricity from slopes less steep than those usually needed for hydropower dams.

It uses a fluid, which has two and a half times the density of water and which can provide two and a half times the power of conventional hydropower systems.

The high-density fluid is pumped uphill between storage tanks that are buried underground and connected by underground pipes.

The company, which has recently received government funding to help develop the solution, is aiming to have its first commercial system operating in 2024 and more than 100 systems within the next decade.









Wind power wonders

Offshore wind farms have become a familiar sight around the world. Most employ what are known as Horizontal Axis Wind Turbines (HAWT) that are anchored to the seabed in shallow waters.

With stronger and more consistent winds found further offshore, however, energy companies have begun turning their attention to floating systems for deeper waters. The innovations are a sight to behold.

The Windfloat Atlantic project, 20km off the coast of Viana do Castelo in Portugal, uses semi-submersible floating platforms to carry three towering turbines that stand 210 metres above the water's surface – taller than a 60-storey skyscraper. It is now producing enough energy to supply 60,000 households and is saving up to 33,000 tons of CO2 annually.

The Windcatcher meanwhile – from Norwegian company Wind Catching Systems, in collaboration with Aibel and the Institute for Energy Technology (IFE) – adopts an all-together different design. It features a radical interlocking grid of turbines that at 300 metres is almost as tall as the Eiffel Tower.

According to the company, one Windcatcher unit is five times as efficient as a conventional offshore wind turbine and can produce enough energy to power 80,000 households. What's more it reduces the surface area taken up by traditional turbines by 80 per cent.



Discover more about Windfloat Atlantic here:

READ GUIDE







Farming the oceans

Offshore sustainability opportunities may also extend to the amazing power of seaweed. Seaweed is believed to sequester nearly 200 million tonnes of CO2 a year³, equating to the annual emissions of New York State.

The marine algae also benefits the ocean environments by oxygenating seawater, removing excess nutrients and providing a habitat for marine life. And according to Vincent Doumeizel, a senior advisor at the UN Global Compact, if livestock were fed on seaweed-based foodstuffs, rather than soy, methane emissions could be cut by 90 per cent.

An Indian start-up, Sea6 Energy, has now developed a prototype 'sea combine' – an automated catamaran that can harvest seaweed and simultaneously replant it in the ocean. The innovation could help the seaweed industry scale up and increase its potential to help fight climate change.

Closer to home, Scarborough-based seaweed farming company SeaGrown has developed a method of seaweed farming that can withstand the challenging environment of the North Sea. It now plans to expand its farm site, off the Yorkshire coast, by 4km – enough, the company says, to absorb the equivalent CO2 emissions from more than 200 flights to Spain.

Elsewhere, the UK's first dedicated seaweed industry facility, The Seaweed Academy has now opened near Oban, to support and promote seaweed production, notably as a means of bioremediation to mitigate the impacts of climate change. "12,000 years ago, human beings moved out of prehistory when they began cultivating plants on land. Today, our growing population and pressing ecological concerns lead us to look once more at this forgotten ocean treasure."

Doumeizel

3 Substantial role of macroalgae in marine carbon sequestration, Dorte Krause-Jensen and Carlos M. Duarte, 2016











Discover more about Bridgestone's sustainability journey **here**.

For information about how Webfleet can help your business decarbonise,

call 0208 822 3605 or visit www.webfleet.com