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March 2019

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Welcome to the March 2019 issue

The message from the IPCC last year could not have been more clear: we must slash carbon emissions by 45% by 2030 and completely decarbonise by 2050 or risk climate catastrophe as world temperatures rise above the critical threshold of 1.5C.

The latest assessment from the world's leading climate scientists made the 2015 Paris Agreement to limit temperature rises to 2C seem woefully inadequate for the task, even if governments follow through on their promises. It's clear that business is going to be required to do much of the heavy lifting, in collaboration with governments and NGOs, if we are to stave off this existential threat.

In this month's magazine we look at the extent to which the corporate world is stepping up to its responsibilities in a 1.5C world. We start in hope, by looking at the Green New Deal movement in the US. Michael Levitin reports on how the Trump climate narrative is under threat as the clean energy revolution in cities and states makes inroads in Washington.

With carbon capture and storage seen as the only technology capable of decarbonising industrial processes such as steel-making and cement, Angeli Mehta looks at the UK's Acorn project and assesses progress on scaling up the technology around the world. She also reports on the Drax power plant in North Yorkshire, which claims to be the world's first to go "carbon-negative" by capturing CO_2 generated by burning biomass.

Mike Scott, meanwhile, takes a long look at blockchain, and assesses whether the technology can overcome concerns about energy use and live up to its much-vaunted potential to accelerate climate action.

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7-9 Fashion St, London E1 6PX UK

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From technology we turn to corporates, as Martin Wright investigates how the most ambitious signatories to the Science Based Targets initiative are turning sustainability from the art of the possible to a corporate route-map to a 1.5C world.

He also looks at the catalytic role being played by investors, explaining why the Climate Action 100+ group of investors are working to push the world's biggest greenhouse gas emitters to address climate risk.

We also report on CDP's first-ever ranking of fast-moving consumer goods companies on their preparedness for a low-carbon world, with Unilever, Danone, L'Oréal and Nestlé coming out on top, and Kraft Heinz and Estée Lauder at the bottom of the table.

Expert comment rounds off the issue, with Richard Tarboton and Annabell James from Carbon Credentials arguing that companies will only achieve ambitious action on climate change if they can tap into a growing desire by employees to do their bit.

And CDP's Alberto Carrillo Pineda explains how the over 500 companies that have committed to the Science Based Targets initiative are already reaping business benefits, including bottom-line savings, innovation, strengthened brand reputation, improved investor confidence and resilience against regulation.

Although most companies have set their SBTs in line with a 2°C warming pathway, he says this spring the SBTi will release new technical resources to enable companies to set targets in line with a more ambitious 1.5C pathway.

I hope this month's issue will give readers some guidance and inspiration to lift their own ambition.

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LEV RADIN/SHUTTERSTOCK

Why even Republicans are backing a Green New Deal

Michael Levitin reports on how the Trump climate narrative is under threat as the clean energy revolution in cities and states makes inroads in Washington, DC

When New York's firebrand 29-year-old Congresswoman Alexandria Ocasio-Cortez unveiled the Democrats' Green New Deal resolution on 7 February, America took notice. The sheer scope and ambition of the proposal jolted a Washington political establishment that, unlike cities and businesses across the country, has made little effort – not to mention progress – addressing the climate crisis.

The six-page blueprint tackles climate, jobs and social inequity all at once, committing the US to dramatically invest in a clean energy economy along the lines of a 10-year national mobilisation comparable to President Franklin Delano Roosevelt's New Deal, which lifted the nation out of the Great Depression and set it on course to lead the global economy for a century.

From massive investments in clean transit and sustainable farming practices, to the creation of millions of green jobs, the plan seeks to make America run on 100% renewable energy by 2030.

The Green New Deal (GND) is already so popular that five Democratic candidates for the 2020 presidency have endorsed it, along with more than 60 co-sponsors in the House of Representatives and nine in the Senate.

The Green New Deal is already so popular that five Democratic candidates for the 2020 presidency have endorsed it

Polls show that four-fifths of the country's registered voters support a Green New Deal – including, incredibly, two-thirds of Republican voters, which helps explain why Senate Majority Leader Mitch McConnell made the surprise announcement on 12 February that he would allow the GND measure to come before the Senate for a vote.

As Ocasio-Cortez said at a press conference announcing the resolution: "To combat the threat [of climate change] we must be as ambitious and innovative in our solutions as possible. This resolution is our first step to define the problem and define the scope of the solution. Today is also the day that we choose to assert ourselves as a global leader in transitioning to 100% renewable energy and charting that path."

While news of the Green New Deal might have shocked Washington insiders and dismayed mainstream political pundits, it elicited loud cheers from the nation's broad and diverse coalition of business leaders and local and state governments, which have already aligned their missions behind a transition to 100% clean energy. Since President Donald Trump announced in June 2017 that he was pulling America out of the Paris climate accord, the We Are Still In coalition of investors, businesses and local governments has committed to aggressively fight climate change and garnered more than 3,600 signatories. The coalition represents people and organisations in all 50 states, and covers nearly half the US population and around $9.5trn in GDP.

30 SECOND READ

- The Green New Deal blueprint unveiled by Congresswoman Alexandria Ocasio-Cortez tackles climate, jobs and social inequity, and seeks to make America run on 100% renewable energy by 2030.
- Five Democratic candidates for the 2020 presidency have endorsed the GND and four-fifths of the country's registered voters support it, including two-thirds of Republican voters.
- The We Mean Business coalition is working with some of the world's biggest corporations to push for stronger climate policies. So far, 860 companies worth nearly $17trn have committed to reduce their carbon footprint.
- City governments have accelerated emissions policies. Chicago is screening its $8bn investment portfolio for GHG-emitting factors, while Philadelphia has helped retrofit 17,000 homes for energy efficiency. On the state level, Illinois, New Mexico and Michigan joined the US Climate Alliance.
- Attitudes are also changing; 48% of Americans believe the impacts of climate change are being felt "right now". Meanwhile, solar and wind turbine technicians are the two fastest-growing jobs in the US.

Businesses stepping up

The coalition, is "becoming a political force for change at the state and federal level, creating a crescendo of activity, and the Green New Deal is adding to the many game-changing moments we've seen over the last two years," said Anne Kelly, senior policy director of Ceres, an NGO that founded We Are Still In, along with World Wildlife Fund and Climate Nexus.

CERES

Four-fifths of America's voters support a Green New Deal

In January, Ceres, which works with businesses and investment leaders on Capitol Hill to shape legislation making renewable energy easier and cheaper to purchase, spearheaded an investor coalition representing $6.5trn to pressure six fast-food industry giants, including McDonald's, Domino's, Burger King and KFC, to drastically cut their greenhouse gas (GHG) emissions and water use.

Kelly said her group is "optimistic and energised" by the youthful leadership and messaging behind the Green New Deal. "They are trying to create clean, green, well-paying jobs, and to really make certain that climate remedies take into account the stunning, disproportionate burden that is carried by low-income individuals and communities of colour in terms of economic dislocation, air quality and pollution," she says. "As we design climate solutions, we have to think about a just transition for workers and those who are caught in the middle of [the crisis]."

'As we design climate solutions, we have to think about a just transition for workers and those who are caught in the middle of the crisis'

Putting a price on carbon has growing appeal in Washington, and the momentum generated by a Green New Deal could finally make the long-awaited carbon market a reality.

Meanwhile, the We Mean Business coalition is working with some of the world's biggest corporations pushing for stronger climate policies that will provide clarity for companies and enable them to act more boldly on their emissions goals and targets.

The aim, said the organisation's policy director, Jen Austin, is for government policies and private-sector leadership to reinforce one another.

So far, some 860 companies worth nearly $17trn in market capital, equal to 20% of global GDP, have committed to steps reducing their carbon footprint, from food and beverage giants like Nestlé, Kellogg and Coca-Cola, to Gap, CitiGroup, General Motors and L'Oréal.

And since Trump's announcement of the US withdrawal from the Paris treaty, more than 50 US companies have committed to the Science Based Targets initiative, committing to setting science-based targets for cutting their emissions in line with the Paris goals to keep warming below 2C. Many more firms are committing to the RE100 programme to make their production and supply chain operations 100% renewable. (See 'We're rethinking every part of our entire business, from supplier agreements to future technologies')

CLEER/FLICKR

Colorado is aiming to be 100% renewable by 2040

"What we're talking about around the world is momentum and action on the corporate side, and political will and policies that give clarity and confidence from the government side," said Austin. "We're seeing the signals that we can get there, both on the supply side and the demand side, really across the board."

She adds: "The Green New Deal isn't just a piece of climate policy, a sustainability question or just one corporate decision. You're talking about building infrastructure, planning for zero-carbon economic growth and creating zero-carbon jobs."

'The GND isn't just a piece of climate policy. You're talking about building infrastructure, planning for zero-carbon economic growth and creating jobs'

Cities act to slash emissions

Working with businesses and investors, city governments across the country have been accelerating emissions-cutting policies that put them at the forefront of a blooming Green New Deal. Take Chicago, America's third largest city, which became the first in the US to custom screen its entire investment portfolio – around $8bn in assets – for GHG-emitting factors, as it seeks to go carbon neutral by 2020. Some $12trn in assets nationally are subject to environment, social and governance screening, but Chicago has shown leadership by also becoming the world's first city to sign onto the UN Principles for Responsible Investment.

"No city can afford to sit back and wait for the Green New Deal to come to them from Washington, DC," said Chicago City Treasurer Kurt Summers. "Our office has developed a first-of-its-kind public environmental, social and governance (ESG) screening for all of our corporate securities, taking into consideration everything from carbon emissions to renewable energy, water conservation, workplace protections and other issues crucial to the expansion of the green economy. Our hope is that Chicago's work in ESG investing can lead the way for more government portfolios to consider the risks of not taking these factors into consideration and align themselves with the Green New Deal."

CITY OF CHICAGO

Chicago City Treasurer Kurt Summers: 'No city can afford to wait for the Green New Deal to come to them'

Philadelphia is another large US city that is making GND-style climate leadership a priority. Between 2008 and 2014, a city-run programme helped retrofit 17,000 homes for energy efficiency, and the city boasts over 200 miles of bike lanes, encouraging people to get out of their cars.

It has also issued a plan to become entirely zero waste by 2030. Philadelphia is now tackling dozens of energy reduction projects and it recently committed to building a 70 megawatt (MW) solar facility, seven times larger than any current solar project in Pennsylvania, to supply the city with more than one-fifth of its energy. "This will create economic opportunities for local companies and workers," Mayor Jim Kenney told Ethical Corporation, adding that he committed Philadelphia to keep working towards the goals of the Paris climate agreement after the Trump Administration announced its intention to withdraw from it.

"The Green New Deal is working to address two issues at once: the need to act swiftly on climate change, and the need to create family-sustaining jobs for the future. As the poorest large city in the US, where one in four of our residents live in poverty, Philadelphia must also ensure that our climate plans are developed equitably and lift those who are most vulnerable. Having an ambitious federal climate plan is critical, and we plan to voice our support for legislation that will help us achieve our goals."

Another East Coast city that intends to live up to the spirit and substance of the Paris climate agreement is Hoboken, New Jersey. "We've come to realise in this context, where we have a president who believes that climate

'We've come to realise, where we have a president who believes climate change is a hoax, that it is incumbent on cities that can take action to do so'

change is a hoax, … that it is truly incumbent upon cities that can take action to go ahead and do so," Mayor Ravi Bhalla said. The city's climate action plan calls for municipal operations to be net zero by 2025, and the entire city net zero by 2030.

During 2012's Superstorm Sandy, 80% of Hoboken was under water. "We know by way of personal experience that climate change is real, that it is not a hoax. The flip side was that we didn't sit down: we looked for a solution to the problem and took measures to make ourselves more resilient and adaptable to the impacts," continued Bhalla, citing the city's Rebuild By Design initiative, a $230m federal plan to build flood-protection infrastructure.

BRIAN DERR/SHUTTERSTOCK

During Superstorm Sandy, 80% of Hoboken was under water

Bhalla says the Green New Deal may sound overly ambitious to some, but "you've got to start somewhere," he said, "and things rarely start with majority support, so just the fact that we have the Green New Deal on the radar is a significant start because it signals to me that we could have a symbiotic relationship at the federal, state and local levels addressing climate change."

'Things rarely start with majority support, so just the fact that we have the Green New Deal on the radar is a significant start'

States press for change

The early weeks of 2019 also saw great strides taken on the state level as Illinois, New Mexico and Michigan joined the US Climate Alliance, bringing the number to 20 of US states committed to upholding the principles of the Paris agreement. Last November, voters in Michigan, Illinois and Wisconsin voted to replace Republican governors with Democratic ones, resulting in stronger climate leadership.

In Minnesota, Governor Tim Walz, a Democrat, has supported aggressive reductions in greenhouse gases while Governor Tom Wolf of Pennsylvania recently announced his state's first comprehensive climate targets. Meanwhile, Governor Andrew Cuomo of New York has backed ambitious renewable energy goals and set a target of 100% clean power by 2040. And Colorado's new governor, Jared Polis, campaigned explicitly on a platform to make Colorado 100% renewable by 2040.

Last month, Michigan's newly elected Governor Gretchen Whitmer created a new state office of climate and energy to tackle emissions and other climate-related issues. The fact that climate policies are catching on even in this Rust Belt state – a critical swing state that Donald Trump barely won in 2016 – shows the degree to which the Trump narrative on climate change is being challenged.

CLEER/FLICKR

Solar installation is one of the US's two fastest-growing jobs

"We see this as part of a larger trend we're seeing across the country with new governors who ran on climate, who ran on transitions to 100% clean energy," Sara Jordan, manager of the League of Conservation Voters' Clean Energy for All campaign, told InsideClimate News. "I think you're seeing a lot of these governors not wanting to be left behind in this transition."

Last November, two-thirds of voters in Portland, Oregon, passed a measure to tax some of the city's biggest corporations – companies generating at least $1bn in sales nationally – and use the money to fund clean energy and climate adaptation projects. The city anticipates the tax will provide $30m to $80m in annual revenue to increase rooftop solar, energy-efficient buildings and green jobs training: all measures that fit with the broader goals of the Green New Deal.

In fact, solar installers and wind turbine technicians are now the two fastest-growing jobs in the US with around 100% annual growth.

Some say the nationwide popularity of the Green New Deal reflects a profound change in the American electorate, which previously failed to recognise the severity of the climate crisis. According to a survey in December by the Yale Program on Climate Change Communication and George Mason University's Center for Climate Change Communication, 48% of Americans believe the impacts of climate change are being felt "right now", up 9% points since last spring and double the response to the same question in 2010.

With young leaders like Ocasio-Cortez speaking out loudly and forcefully on the issue, and activist groups like the Sunrise Movement and Justice Democrats reflecting a more pragmatic, aggressive approach to climate, the question now is how well, and how quickly, the federal government can catch up to the work already under way at the business and local government levels. ■

Michael Levitin is a journalist based in Berkeley, California, covering climate and clean energy financing among other topics. He has written for The Atlantic, The Guardian, Time and Newsweek.

TATA STEEL

Can UK Acorn carbon capture project grow into solution to industry emissions?

With CCS seen as critical to reaching net zero by 2050, Angeli Mehta looks at prospects for scaling up the technology around the world

Every new report on climate change makes depressing reading, but scientists have given us route maps to get to net zero by 2050. Nearly all of these rely on a technology called carbon capture and storage (CCS). It's being used today, and it works, but it urgently needs to be scaled up if we're to prevent catastrophic climate change within the next 12 years.

"We need to stop burning fossil fuels or start sequestering carbon dioxide – or both. That's it: conversation over," says Chris Stark, chief executive of the UK's Committee on Climate Change. "We've said to the government that they mustn't plan for any 2050 scenario without CCS."

'We need to stop burning fossil fuels or start sequestering carbon dioxide – or both. That's it: conversation over'

Stark was speaking in January at the launch of the findings of an EU-backed study identifying a potential UK hub for transporting and storing emissions. Project Acorn has examined the UK's huge carbon dioxide storage potential, and homed in on the St Fergus gas-processing plant on the north-east coast of Scotland, where one-third of the UK's gas supply comes ashore.

Several nearby pipelines, which would otherwise be decommissioned as gas fields run out, could be repurposed to take carbon dioxide in the opposite direction, storing it in deep geological formations under the North Sea.

Reuse of the onshore and offshore pipelines that serve St Fergus could save £730m compared with building new ones, as well as avoiding

decommissioning costs and reducing environmental impacts.

Acorn's first phase allows for a capture plant and development of transport and storage to handle at least 2m tonnes of carbon dioxide per year, at a cost of £276m. With the right support it could be operational by 2023. It could also help get other carbon capture projects off the ground, as 16m tonnes of carbon dioxide a year could be imported at the neighbouring port of Peterhead from other parts of the UK and Europe.

"If you're a developer of an industrial plant and you're looking for a decarbonised solution for that plant, having a transport and storage infrastructure that is there and operating makes the investment decision for that plant much easier," suggests Alan James, managing director of Acorn project manager, Pale Blue Dot Energy.

Offshore, the UK has enormous potential for CO_2 storage, some 78 gigatonnes. That's 200 times the UK's 2016 emissions, according to Hazel Robertson, a geophysicist and senior energy consultant at Pale Blue Dot Energy. How do we know the sub-sea rock formations will provide secure storage? "We have a wealth of data from oil and gas exploration and production, which all helps to build up a picture of the rocks," says Robertson. Modelling enables scientists to work out how the gas will move through the rock. Ultimately, she says, "the proof is that oil and gas was held there for tens of millions of years".

30 SECOND READ

- The International Energy Agency (IEA) calculates that CCS projects must capture 850m tonnes of carbon dioxide by 2030 to meet Paris commitments. So far, the 18 large-scale projects operating globally would get us 4% there.
- Offshore, the UK has 78 gigatonnes potential CO_2 storage – 200 times 2016 emissions. The EU-backed Project Acorn has homed in on the St Fergus gas-processing plant on the Scottish coast repurposing pipelines to take CO_2 to deep offshore geological storage sites.
- Industry is experimenting with CCS. The Al Reyadah plant at Emirates Steel near Abu Dhabi, captures 800,000 tonnes of CO_2 each year. On Teeside, in the UK, the Clean Gas Project aims to capture 2m tonnes of CO_2 annually.
- In China and India, where coalfields are young, CCS offers a pathway that doesn't require abandoning that investment. In China, more than 20 CCS projects are in development.

Accelerating CCS

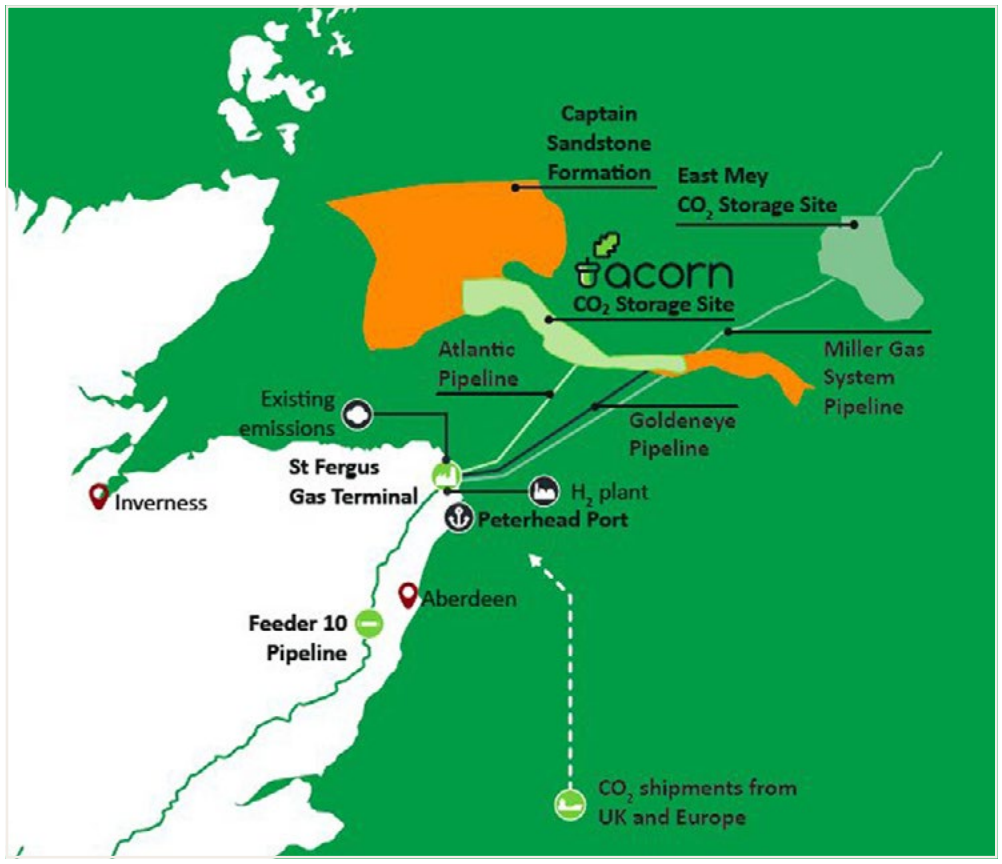
The industrial sector accounts for about a quarter of global emissions. Huge swathes of industry – steel, cement, and chemicals, for example – rely on carbon either as the source of energy for their processes or as an essential ingredient. The International Energy Agency (IEA) calculates that CCS projects must capture 850m tonnes of carbon dioxide by 2030 to keep the world on track to meet its Paris commitments. So far, the 18 large-scale carbon capture, usage and storage (CCUS) projects now operating across the world get us just 4% of the way there.

'If you're looking for a decarbonised solution, having existing transport and storage infrastructure makes the investment decision much easier'

Many of these are capturing carbon dioxide from the emissions of power plants and refineries and injecting it into partially depleted oilfields to force out more oil, leaving most of the carbon dioxide permanently stored deep underground, a practice known as enhanced oil recovery. The largest example is Petra Nova in Texas, a joint venture between NRG and JX Nippon with funding from the US Department of Energy. According to the company CCS and has cut CO_2 emissions at the coal power station by 90%.

Environmentalists slate EOR for promoting the extraction of fossil fuels, but it has helped to make CCS commercially viable.

In 2017, Archer Daniel Midland's ethanol plant in Illinois in the US began operating a 1.1m tonne per year capture plant, injecting the CO_2 into sandstone rock over 2km below ground. Researchers estimate that the sandstone formation could store over 250m tonnes of CO_2 each year.



PBD ENERGY

Project Acorn aims to re-use decommissioned pipelines for CCS

A summit in Edinburgh, UK, last November hosted by the IEA and UK government brought together representatives from oil, gas and finance corporations alongside governments from across the globe. All were united in their desire to accelerate CCS projects.

The IEA's executive director, Fatih Birol, told the summit that it was "no longer an issue of overcoming technology barriers but securing investment", and that would require global co-operation and new business models.

'CCS is no longer an issue of overcoming technology barriers but securing investment'

Claire Perry, minister for energy and clean growth, sees CCUS as a "fundamental part of post-Brexit Britain". She launched a UK action plan and put money behind it: £20m for CCS, from a £45m innovation fund, as well as a share of a £315m pot for decarbonising industry. Just a week later, at the climate talks in Poland, she announced another £170m – to be matched by industry – to develop the first "net zero carbon" cluster of heavy industry by 2040.

Her department has committed to developing the policy and regulatory framework this year to get projects to scale. According to Perry, CCUS is no longer viewed as a bolt-on to power stations. She said CCUS has be integrated into industrial clusters "because we can't work out how to decarbonise industrial activities without it".

There are models the UK can draw on: Norway's carbon tax provided the impetus for Statoil [since renamed Equinor] to begin sequestering carbon dioxide 20 years ago. And in early 2018, the US announced a progressive increase in its 45Q tax credit for storing carbon dioxide.

By 2026, CO_2 locked away in geological storage will receive $50 per tonne of carbon dioxide, compared with $22 today, while utilisation of CO_2 in products, including enhanced oil recovery, would receive $35 per tonne.

At the time, the IEA suggested the increase could lead to 10-30 million more tonnes of CO_2 capture capacity over the next six years.

The director of the Scottish Carbon Capture & Storage (SCCS) research group, Stuart Haszeldine, who sat on the CCUS Cost Challenge Taskforce, argues that "we need to find a way of spreading the decarbonisation out and aggregating it across the whole of the economy".

He advocates a certification scheme that would oblige anyone extracting or importing fossil carbon to store increasing amounts of carbon dioxide at a ramp-up rate that can be calculated to reach net zero, or even negative emissions by a specific date. That demand for storage would, he argues, lead to the emergence of a system operator to create a transport and storage network.

PETRA NOVA

The Petra Nova CCS venture in Texas has cut coal plant emissions by 90%

The CCUS taskforce has also proposed that a system of financial incentives that has been used to guarantee a return for developing critical electricity and water infrastructure be applied to carbon dioxide storage and transportation.

'We need to find a way of spreading decarbonisation out and aggregating it across the whole of the economy'

Decarbonising heavy industry

Demand for cement and steel is expected to almost double by 2050. Both production processes are highly energy-intensive. In the case of cement, almost two thirds of emissions come from heating the main ingredient, limestone, to produce the chemical glue that is cement. As yet there is no alternative that can replace the limestone at scale.

Twenty cement plants around the North Sea basin – from Estonia to Scotland – emit 20m tonnes of carbon dioxide annually. Given the tremendous storage potential in the North Sea, there is a viable home for all those emissions if a flexible hub infrastructure could be created.

Germany's HeidelbergCement Group is one of the world's largest cement makers. Its Norcem plant in southern Norway is committed to zero lifecycle carbon emissions of its concrete products by 2030. Per Brevik, director of alternative fuels and sustainability, told a recent webinar that his industry was responsible for 5%-7% of global emissions. "We have to do something … and although we are substituting a lot of the coal, we must do much more than that."

TONY PHILLIPS PHOTOGRAPHY

UK Energy Minister Claire Perry is championing CCUS as a 'fundamental part of post-Brexit Britain'

Norcem has been investigating different carbon-capture technologies since 2013, and is now competing to be part of a Norwegian government-backed programme to establish the full chain of CCS for industrial emissions, with storage under the North Sea. The other project in contention is a waste-to-energy plant outside Oslo.

If Norcem is successful, the plant could be operational by late 2023. The technology it has chosen would capture 400,000 tonnes of CO_2 a year initially. The capture process is itself energy-intensive, so Norcem's plan is to use the excess heat from cement production, so saving energy and cutting costs.

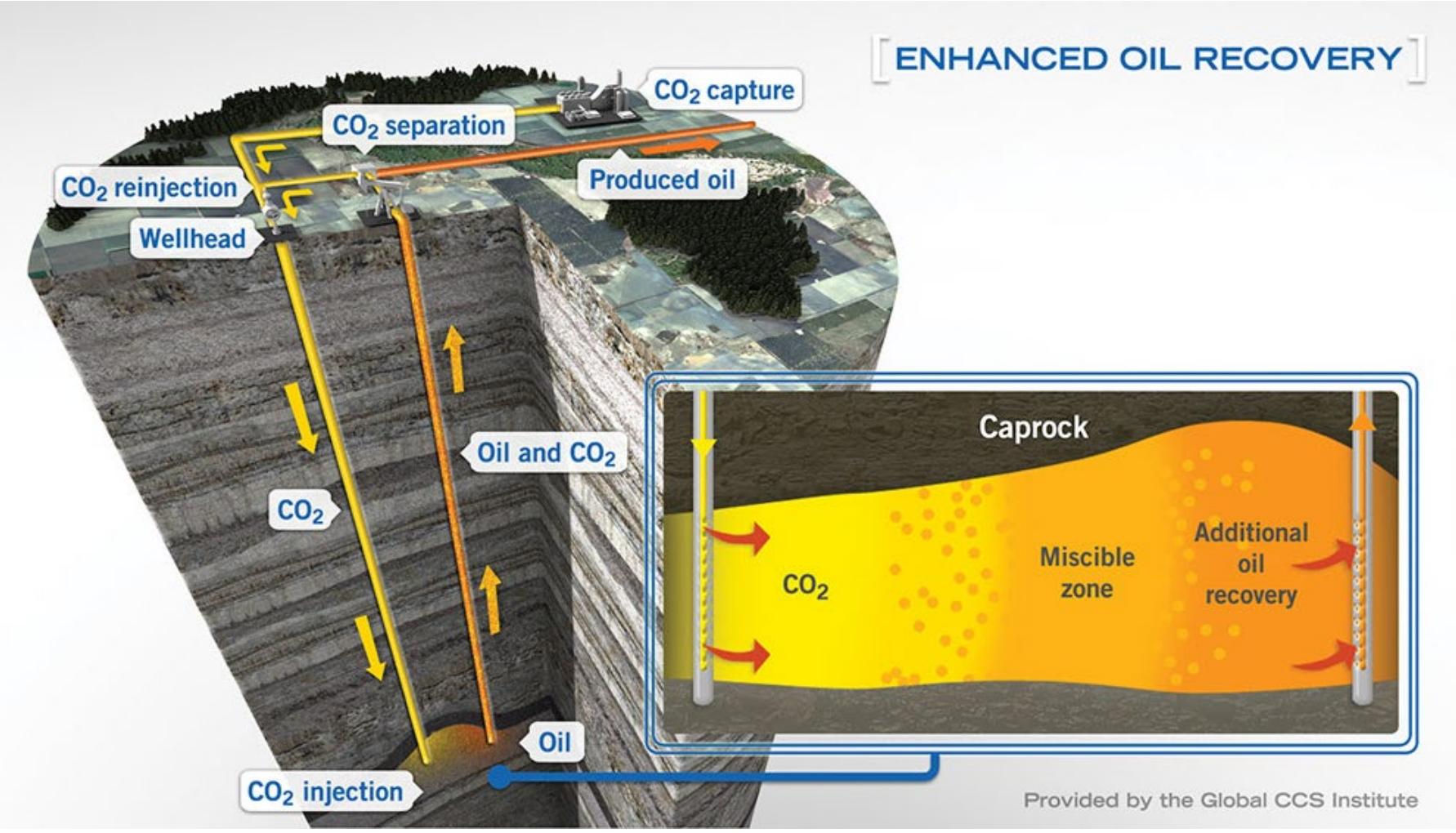
'We have to industrialise this if we're going to succeed. We can't build tailor-made solutions all the time'

Other process industries, are watching Norcem's progress with interest, adds Brevik.

To get wide take-up of CCS, Brevik argues that modular solutions for different-sized plants are needed. "We have to industrialise this if we're going to succeed. We can't build tailor-made solutions all the time. That's too expensive."

Meanwhile, China's first cement CCS demonstration plant began operations last October, and is expected to capture 50,000 tonnes a year.

The first commercial CCS project in the steel industry began operating in 2016. The Al Reyadah plant at Emirates Steel near Abu Dhabi, captures 800,000 tonnes of CO_2 each year for injection into nearby oil and



gas fields. The company says it's commercially self-sustaining, with no government subsidies.

In Europe, Tata Steel has plans for CCS on its journey to carbon neutral steel-making by 2050. It ultimately expects to be able to replace coal with hydrogen from renewable energy. Before then, CCS would help it cut emissions by up to 80% when combined with a new energy-saving steel-making process it is pioneering through an EU-backed project at its Ijmuiden steelworks in the Netherlands.

In Europe, Tata Steel has plans for CCS on its journey to carbon neutral steel-making by 2050. CCS will help it cut emissions by up to 80%

The process has the added benefit of producing flue gas with a higher concentration of carbon dioxide that will improve capture efficiency, says Peter Quinn, head of environmental policy and strategy at Tata Steel Europe. So far there's "nothing tangible in terms of [CCS] infrastructure, but over the last 12 months there's been a real ramp-up of activity … and technology scoping with different providers". While its Port Talbot plan in South Wales doesn't have easy access to offshore storage, Tata is working with other substantial emitters to explore how an industrial cluster could decarbonise using shared infrastructure.

Other clusters are more advanced in planning. The Oil and Gas Climate Initiative (OGCI), a £1bn-plus investment fund created by the oil and gas industry, has announced that it will back a project on Teesside, home to essential chemicals and process industries. Six OGCI members – BP, Equinor,

ENI, Occidental, Shell and Total – are putting up the cash to help progress the development of the Clean Gas Project, whose aim is to develop a natural gas-fired power plant, with 2m tonnes of carbon dioxide captured for use and storage annually.

The resulting transport and storage infrastructure is intended to encourage Teesside industry to decarbonise, and could help create thousands of new jobs, as well as export opportunities. The OGCI is keen to attract companies that will use CO_2. "Enhanced oil recovery (EOR) opportunities do exist in the North Sea that could use quite a lot, beneficially," says OGCI stakeholder manager Jonathan Briggs. There are no decisions yet, but use will help reduce running costs. The earliest the project could be up and running is 2025.

GREENPEACE

Emissions from heavy industry areas could be offset by creating CCS hubs

"CCS is well within our technological capability – all the components exist," says Haszeldine. And the main barrier, cost, is falling, with a new study suggesting that a second generation of SaskPower's Boundary Dam project in Canada could see capital costs per tonne of CO_2 captured cut by 67%. The feasibility study, to retrofit its newest coal-fired power unit, demonstrates the lessons learned from the company's Boundary Dam CCS project.

To demonstrate leadership, the UK and Canada have launched an alliance of states, cities and organisations committed to phasing out unabated coal by 2025. Both countries will work with the World Bank to provide the financial, technical and advisory support.

China, the world's largest coal user, hasn't signed up, but a new national CCS strategy is expected later this year. Overall, the country has more than 20 CCS projects at different stages of development. China Resource Power has just begun trials at its large-scale testing facility for post-combustion capture.

"It's about building confidence, to show that CCS can be done in China – and cheaply – in a coal-fired power plant," says Jia Li, strategy co-ordinator for full-chain CCS projects at the Asian Development Bank. She's also technical director at the UK-China CCUS centre in Guandong, and has been exploring the use of CCS in power plants and heavy industry.

'It's about building confidence, to show that CCS can be done in China – and cheaply – in a coal-fired power plant'

The Asian Development Bank's two-year project to facilitate a national CCUS programme began in December, and involves experts from the UK,

Netherlands and US. "Everyone is working together," says Li. "It needs a global effort."

Different regions in China are taking different technology approaches to CCS, and exploring different pathways, from carbon trading to subsidies.

"The focus is to evaluate different technologies … and to make people aware that there are different technology providers. What works well in a power plant might not be the best in another sector," suggests Li.

GREENPEACE

China is the world's largest coal user

A route to hydrogen

The H21 Leeds City Gate project envisages switching the city's entire gas network from methane to hydrogen: CCS can help deliver that plan, providing another impetus for a CCS hub on Teesside. Although hydrogen combustion produces only water as a by-product, it's usually made by steam reformation of methane, and that creates large amounts of carbon dioxide.

The Acorn project also envisages natural gas coming in at St Fergus being converted to hydrogen. Capturing the carbon emissions there and piping them offshore would make a lot of sense, suggests Alan James of project leader Pale Blue Dot Energy. If the government were to legislate that 5% of the gas network should include hydrogen by 2025 "that would switch the market on – and start to decarbonise a whole bunch of activity in the UK," James says.

CCS and hydrogen are now central to Japan's future energy plans after it abandoned nuclear power in the wake of the Fukushima plant meltdown in 2011. The Tomakomai demonstration project, off Hokkaido island, has sequestered over 215,000 tonnes of CO_2 from hydrogen production at a nearby refinery.

Last year, Japan signed an energy co-operation agreement with Australia that will see hydrogen produced from its extensive reserves of lignite coal. Brad Page, chief executive of the Global CCS Institute, said the project could anchor a CCS hub and allow the technology to prove its worth: "The CCS hub and cluster concept is already gaining momentum in the UK, Norway and the Netherlands, where diverse industries are seeing the huge value in sharing CCS infrastructure for commercial and climate change advantage." ■

Angeli Mehta is a former BBC current affairs producer, with a research PhD. She now writes about science, and has a particular interest in the environment and sustainability. @AngeliMehta

DRAX

Drax targets negative emissions with world's first biomass CCS project

The Drax power station in North Yorkshire has become the world's first to capture carbon dioxide generated by burning biomass. The bioenergy carbon capture and storage project (BECCS) could enable Drax to become one of the world's first "negative-emissions" power stations. The demonstration project will capture one tonne of CO_2 a day, using a novel technology developed by C-Capture, a spin-out from Leeds University.

C-Capture's solvent can be recycled, and its process uses less energy than traditional capture technologies. According to its director of engineering, Caspar Schoolderman, "the challenge now is to get all the information we need to design and build a capture plant 10,000 times bigger. It's only really when we get to those sorts of scales that we can start to have an impact on the climate."

Drax can't yet store the CO_2 captured, so it is exploring markets for it, including fizzy drinks and synthetic fuels.

In Japan, Toshiba is currently constructing a 500-tonne a day capture unit at the Mikawa power station, on Kyushu. It's expected to be operational next year. The power plant is primarily running on biomass from palm kernel shells, left after extracting palm oil from plantations in Indonesia. Drax is burning pellets made from sawmill residue, and from tree tops, thinnings and residues from established forests, mainly in north America, which are being grown for timber. It says responsible, active management of these forests boosts carbon stock.

The biomass will have sequestered carbon dioxide as it grew, and capturing the emissions when burnt means that, in theory, more carbon dioxide is removed from the air than is emitted. The Intergovernmental Panel on Climate Change (IPCC) has highlighted the importance of BECCS in meeting commitments under the Paris Agreement, but this would entail massive land-use change if BECCS is deployed at the scale it envisages.

Environmental groups have voiced concerns about which crops can be deemed to be carbon neutral, and which will create more pollution than burning fossil fuels.

The UK's Committee on Climate Change wants to see global governance strengthened, and no new subsidies for large-scale biomass to power plants without CCS.

Angeli Mehta

NEXLEAF ANALYTICS

From cookstoves to carbon markets: how blockchain is supercharging sustainability

Mike Scott assesses whether the technology will live up to its much-vaunted potential to be the Holy Grail of climate action

Blockchain is one of the world's most overhyped technologies, but there are hopes that it may help to tackle one of our most intractable problems – climate change.

Blockchain, also known as distributed ledger technology (DLT), is the enabling force behind cryptocurrencies such as bitcoin. One of the main things people know about cryptocurrencies is that it takes huge amounts of energy to "mine" the coins.

PwC economist Alex de Vries estimates that generating bitcoin uses 2.55 gigawatts (GWs) of energy a year, almost as much as the Republic of Ireland. Miners use this energy by running computers to solve complex codes, known as a proof of work, to earn the currency. To limit the amount of currency in circulation, these proofs of work are becoming more complicated over time, requiring ever more computing and electrical power. In addition, many miners are in China, and use electricity produced by coal-fired power stations, the most polluting form of energy.

However, blockchains in general do not have to use a lot of power, says the Climate Ledger Initiative, which explores how distributed ledger technology can help to tackle climate change.

It is estimated that generating bitcoin uses 2.55 gigawatts of energy a year, almost as much as the Republic of Ireland

And PwC believes blockchain could potentially transform many existing processes in business, governance and society, without breaking the energy bank.

In a report for the World Economic Forum, it says that "as blockchain matures, its energy intensity will reduce and the opportunities for blockchain to help the planet may well far outweigh its energy-use limitations".

PwC describes blockchain as "a foundational emerging technology of the fourth industrial revolution, much like the internet was for the previous [or third] industrial revolution". Its defining features, it adds, are "its distributed and immutable [or unalterable] ledger and advanced cryptography, which enable the transfer of a range of assets among parties securely and inexpensively without third-party intermediaries".

There is nothing inherently "clean" about blockchain – the energy majors have embraced the technology across their operations, seeing it as a multi-billion-dollar opportunity to improve performance in every part of the industry as it digitises all of its processes and operations. The applications range from energy trading to grid management to optimising supply chains.

But it can help reduce the impacts of climate change, according to Alastair Marke, director general of the Blockchain Climate Institute. "It's the Holy Grail for implementation of various climate change policies, including renewable energy deployment, carbon markets, international financial transfers and enforcement of climate regulations."

But, Marke clarifies, "blockchain itself is not a solution to all these policy, regulatory or implementation issues. It is an enabler of many other innovative solutions that were not possible in the past."

The Climate Ledger Initiative says there are three main benefits of blockchain technology:

30 SECOND READ

- Blockchain, the technology used to underpin bitcoin, could potentially transform many existing processes in business, governance and society, because it enables the transfer of assets securely and inexpensively without third-party intermediaries.
- Because distributed ledger technologies such as blockchain are decentralised and immutable they are seen as the "Holy Grail" for implementing climate-change policies, providing solutions to tracking, measuring, reporting and verifying data and bringing trust and transparency.
- One project involves using blockchain to monitor the use of cookstoves attached to carbon credit schemes to check if they are having the impact that is claimed. Unilever is using a blockchain system to track and reward tea suppliers for sustainable farming practices.
- Blockchain also paves the way for consumers and small clean-energy producers to buy and sell energy through "smart contracts", which allow real-time pricing and make the grid more flexible and secure. There are more than 70 demonstration projects globally, including the Brooklyn microgrid project.

- Data records on a blockchain are immutable through a permanent ledger, increasing transparency
- Blockchain technology brings trust to peer-to-peer transactions, which is particularly important where regulation is weak or governance is decentralised
- Smart contracts – applications that can automatically execute the terms specified in a contract on a blockchain – increase efficiency and reduce transaction costs.

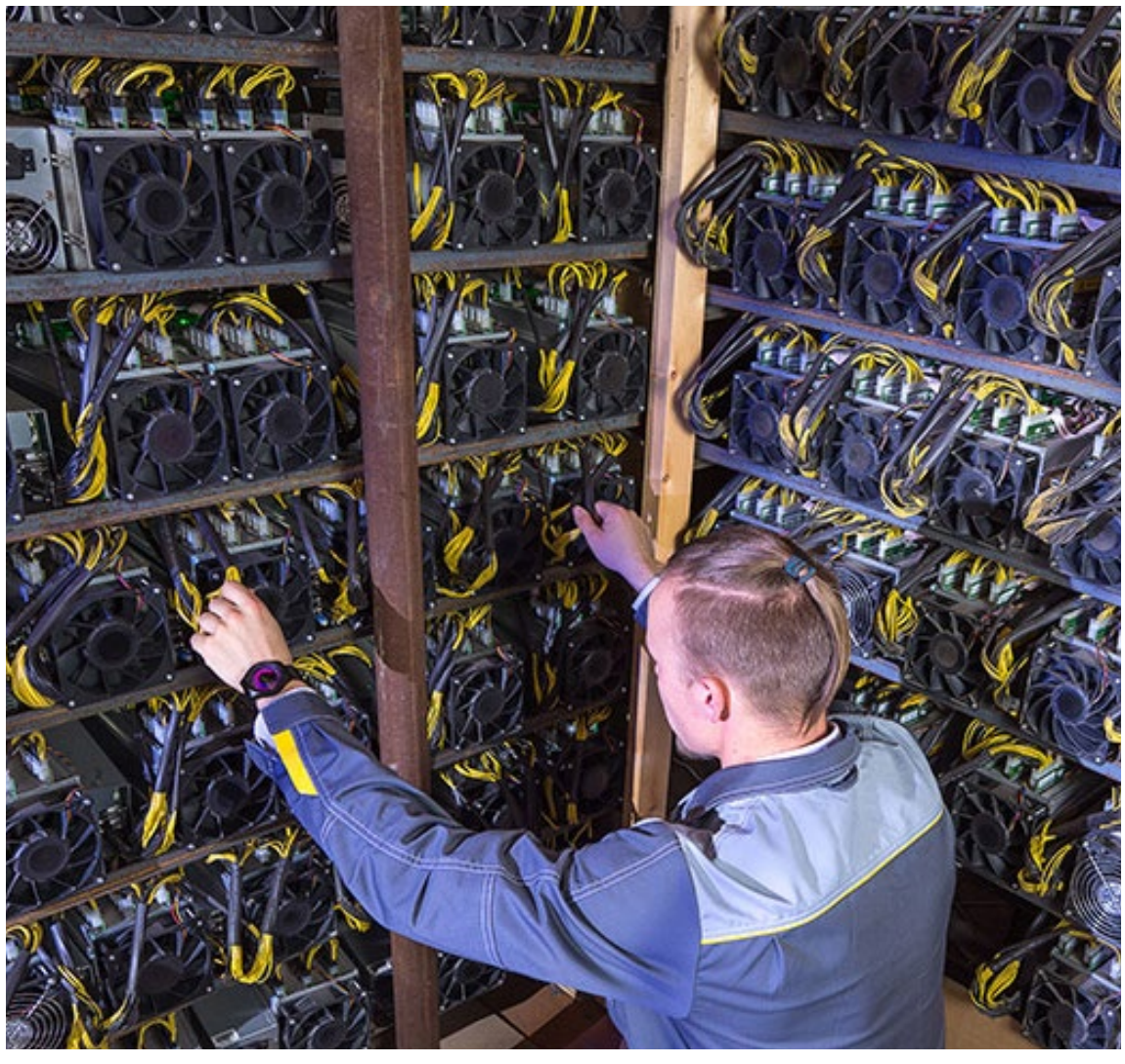
Distributed ledger technologies can help unlock new ways to ensure that emissions-reducing projects are having the impact they claim

Owen Hewlett, chief technical officer at The Gold Standard voluntary carbon offsets scheme, says the potential of blockchain as a climate tool started to emerge at the Paris climate conference in 2015.

The decentralised nature of the Paris Agreement and its governance structure, whereby countries are responsible for setting and monitoring their own climate solutions, requires new approaches to registries and tracking systems to handle a wide range of rulesets for accounting and reporting and to allow for trusted, networked carbon markets.

Distributed ledger technologies can also help in measuring, reporting and verification (MRV) processes, unlocking new ways to ensure that emissions-reducing projects are having the impact they claim, in ways that are more accurate, transparent and cost-effective.

"Because a blockchain is decentralised and immutable, we can use it to gather data at a project level and have it time-stamped," Hewlett says. "That's a big improvement on what happens now, which is that a lot of data is collected by hand, by survey or through meter reading."



MARK AGNOR/SHUTTERSTOCK

Cryptocurrency mining farms use a lot of energy, but blockchain does not have to

He cites the example of cookstoves, which reduce greenhouse gas emissions and premature deaths from local air pollution. To earn carbon credits, cookstove projects need to show how much the stove has been used so its impact on emissions can be measured. Using a blockchain-based stove

use monitoring system "can take all of the pain out of collecting the data, automate parts of the verification process and makes the whole process much more credible because it is tamper-proof," Hewlett says. This also allows credits to be issued almost in real time, rather than at the end of the three-year compliance period, which is what happens now.

However, there is still a significant cost issue: cookstoves cost up to $35, while a monitor currently costs between $75 and $300, although some of this cost is recouped in reduced labour costs, and the cost of monitors is likely to fall as usage increases.

WWF

WWF is using blockchain to tackle human rights abuses in the Pacific tuna trade

Unilever has a pilot project investigating blockchain's potential in its supply chain, according to the Climate Ledger Initiative. Working with a retail firm, a packaging firm and several banks, the consumer goods company is developing a system to track and reward tea suppliers for sustainable farming practices. Information about their produce, including quality, sustainability metrics and price, is stored on the blockchain, enabling them to be rewarded by banks with preferential terms.

And Blockchain developer ConsenSys is working with WWF and Fiji tuna processor Sea Quest to test a traceability tool to help stamp out illegal fishing and human rights abuses in the Pacific Islands' tuna industry.

'Using a blockchain system to monitor cookstove use makes the process more credible because it is tamper-proof'

Consumers turn producer

Blockchain also allows consumers to buy and sell their own energy. Historically, national energy systems relied on large, centralised power plants to produce electricity and send it over transmission networks to households or industrial and commercial customers.

But new clean-energy technologies such as wind and solar, energy storage and smart grids, along with digital tools such as the internet of things, artificial intelligence and machine learning, are allowing a greater number of smaller producers to generate and transmit electricity.

The growing complexity of power management requires new solutions, of which blockchain is one. One way it does this is through "smart contracts", which allow real-time pricing and make the grid more flexible. They automatically execute the terms specified in a contract on a blockchain as long as certain conditions have been met, increasing efficiency and reducing transaction costs.

Blockchain also enables consumers to sell excess power to the grid at wholesale rather than retail prices, and to sell to buyers in their local communities.

"Blockchain shines a light on energy demand and supply, and helps to match it up better," says Mark van Rijmenam, a blockchain strategist. "It enables peer-to-peer trading by taking away the need for intermediaries and cutting costs." This same characteristic also means that it could be used to link carbon-trading schemes from different countries.

PHIVE/SHUTTERSTOCK

Blockchain can be used to monitor the sustainability of supply chains

Energy security

Increased digitalisation and interconnection have led to greater concerns over security risks such as hacking and cybercrime.

Blockchain, due to its distributed nature, can make networks much more secure, if implemented correctly. In co-ordination with burgeoning technologies such as AI, blockchain can help secure networks and grids, the International Renewable Energy Agency (Irena) points out, because it is managed by a distributed group of peers, rather than by a central server or authority.

"This technology is enabling a new world of decentralised communication and co-ordination, by building the infrastructure to allow peers to safely and quickly connect with each other without a centralised intermediary," Irena says in a report on blockchain and renewable energy. Cryptography ensures security and data integrity, while privacy remains intact, it adds.

The potential of the technology has led to a surge in the number of companies looking to become involved in the sector, with Irena reporting that between the start of 2017 and September 2018, more than 50 start-ups

'Blockchain shines a light on energy demand and supply and helps to match it up better'

were launched that are working specifically on blockchain applications in energy, raising more than $320 million.

"Today, there are more than 70 demonstration projects deployed or planned around the world, such as LO3's Brooklyn Microgrid project, where customers can choose to power their homes from a range of renewable energy sources, and people with their own solar panels can sell surplus electricity to their neighbours," the agency says.

"The Energy Web Foundation (EWF) is building an open-source, blockchain-based digital infrastructure for the energy sector with a growing portfolio of cutting-edge pilots. Innogy, a subsidiary of German power giant RWE, is using EWF's Energy Web Blockchain to authenticate users and manage billing at electric car-charging stations."

SIEMENS

LO3's Brooklyn Microgrid uses blockchain-enabled 'smart contracts'

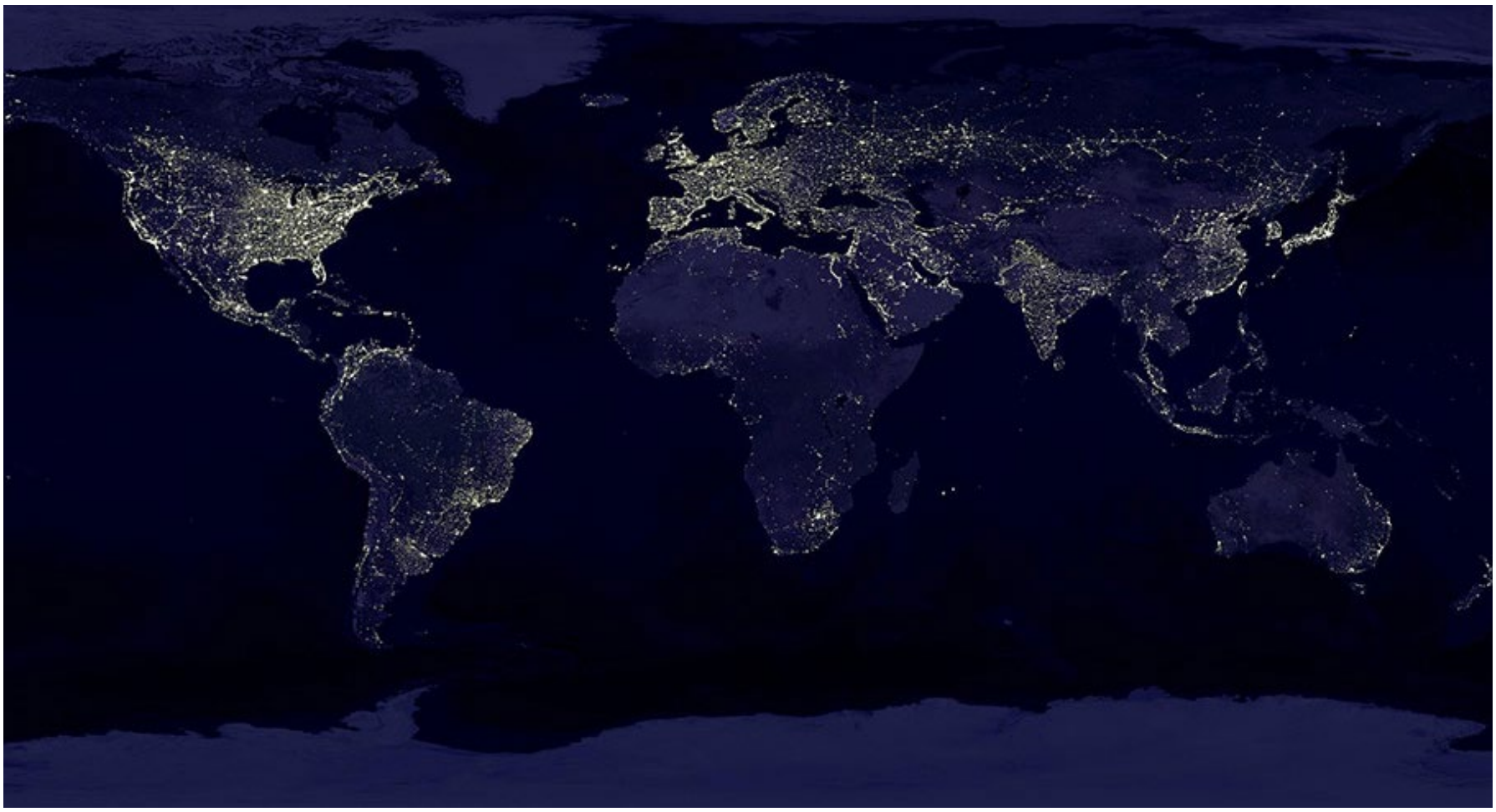
However, the technology remains in its very early stages and there is a long way to go before we will know whether its potential will be realised. "If harnessed in the right way, blockchain has significant potential to enable a move to cleaner and more resource-preserving decentralised solutions, unlock natural capital and empower communities," PwC says.

"However, if history has taught us anything, it is that such transformative changes will not happen automatically. They will require deliberate collaboration between diverse stakeholders ranging from technology industries through to environmental policymakers, underpinned by new platforms."

'Transformative change won't happen automatically. It will require deliberate collaboration between diverse stakeholders'

Barriers to blockchain

Barriers that still need to be overcome include a lack of user trust and adoption, security risks, legal and regulatory challenges, challenges in scaling up the technology in a way that makes it able to operate on multiple systems, and blockchain energy consumption.



ABL

Blockchain will come into its own in a world where the energy system is facing many challenges

There is already a lot of progress being made in this area, with blockchains such as Ethereum using a "proof of stake" protocol that uses about 12-14 times less energy than bitcoin transactions.

Others are developing "proof of importance" protocols, which are simpler and more accessible, while next-generation computers will help by offering higher computing power for less energy usage. "There are many ways to construct and operate blockchain networks, and the mining process is not always necessary for private key networks," PwC says. "Consensus can be achieved in a much more energy-lean way. 'Proof of authority' networks, for example, only allow authorised authorities to validate networks. When authorities don't have to compete for access, as in crypto-mining, there is less energy consumption throughout the network as a whole."

Even so, established stakeholders will be slow to accept what is a revolutionary technology, says Marke. "Bureaucracies around the world have been working with centralised systems for the past century. It will take some time for them to change to a decentralised model.

"Another issue is that blockchain is an invisible infrastructure, so psychologically the value is not very tangible to the general public until there are some promising use cases out there that demonstrate the potential."

Nonetheless, in a world where the energy system will be subject to the triple forces of decarbonisation, decentralisation and digitalisation, blockchain is a technology that is likely to come into its own before too long. ■

Mike Scott is a former Financial Times journalist who is now a freelance writer specialising in business and sustainability. He has written for The Guardian, the Daily Telegraph, The Times, Forbes, Fortune and Bloomberg.

CARLSBERG

‘We’re rethinking our entire business, from supplier agreements to future technologies’

Martin Wright investigates how signatories to the Science Based Targets initiative are turning sustainability from the art of the possible to a corporate route-map to Paris

Fingers on buzzers, here’s your starter for 10: what do sustainability heavyweights Ben & Jerry’s, Danone, L’Oréal and Marks & Spencer have in common with Auckland Airport, Turkish tyre manufacturer Sabanci Holding and Stanley Black & Decker?

They are all among over 500 companies who have signed up to the Science Based Targets initiative (SBTi) for reducing their greenhouse emissions (See Science based targets are Paris for the corporate world).

And if the very phrase “emissions targets” is second only to Brexit for sending you into a catatonic daze, then reach for the smelling salts. Because behind the bland words is an initiative that many see as our best slim hope of hitting those elusive Paris targets, and so starting to tame the tiger of climate change.

Why? Because it’s a quiet revolution in corporate responsibility. Until recently, for most companies, emissions target-setting was an exercise in the art of the possible: working out what was feasible to achieve without creating a hostage to fortune – and then making that their declared ambition. Sometimes, if emerging technologies fell into place, or a business model shifted, that could result in some pretty impressive ambitions. Others, however, were distinctly modest.

Many see science-based targets as our best slim hope of hitting Paris targets, and so starting to tame the tiger of climate change

The Science Based Targets initiative chucks such incremental caution out the window by saying: commit to doing what the science requires, rather than what you think you can manage. "It gives absolute clarity to the scale of the challenge, and what needs to be done to meet it," says the Carbon Trust's Guy Rickard, a member of the initiative's technical advisory group. And coming face-to-face with that clarity can be a bit of a shock to the system. Rickard advises companies adopting SBTs, and "when we present the numbers to our clients, there's often a sharp intake of breath".

It's a view echoed by those at the sharp end. "It's totally different from how we did things before," says Simon Hoffmeyer Boas, sustainability director at Carlsberg. "We're stretching every single part of our business in the way we think about everything, from supplier agreements to future technologies."

And Carlsberg's goal of zero-carbon breweries by 2030 has meant a stretch in the corporate event horizon, too. "We used to look three years into the future – that was the absolute maximum. Now we're dealing with a much longer timespan, and that's impacting investment decisions."

WORLD ECONOMIC FORUM

Anind Mahindra issuing a challenge to companies to sign up to SBTi at Davos 2018

For Caroline Hill, head of sustainability and public affairs at property manager Landsec, the shift has been equally profound. "We used to set targets in a very bottom-up way: we'd tot everything up and work out what we thought was possible. The SBTs have completely turned that approach on its head."

'We used to set targets in a bottom-up way: we'd tot everything up and work out what was possible. The SBTs have turned that approach on its head'

India's giant Mahindra Group conglomerate, which signed up in 2018, is so enthusiastic about the initiative that its CEO, Anand Mahindra, issued a challenge at Davos last year for 500 companies to sign up to the initiative in time for last September's Global Climate Action Summit in California. Although they didn't quite meet the target, more than 130 companies heeded the call.

Anirban Ghosh, chief sustainability officer of the Mahindra Group, said previous to joining the initiative: "Most of the [group] companies have been reporting on emissions for some time, but no-one was in a position to say they were doing enough, because 'enough' wasn't defined."

But once a SBT is firmed up, adds Carbon Credentials CEO Paul Lewis, who advises leading companies on the issue, "it provides a guiding light for

future strategy. Say your target requires you to commit to zero net emissions by 2045: you can almost annotate the curve leading up to it, to say, 'OK, this is the point where we need to go all-electric in our vehicle fleet'."

Such interim targets are part and parcel of the SBTi approach. Carlsberg's zero-carbon deadline is 2030, but it also has an interim goal of a 50% cut by 2022. "So we can't just rest on our laurels and let someone else fix it in 2028," says Hoffmeyer Boas. "We really need to start our transition today."

Sometimes, SBTs serve to confirm programmes already under way – like BT's pursuit of 100% renewable electricity (it's currently on around 96%). In other cases, they spur new commitments, like Carlsberg's aim to use biogas or sustainable biomass where possible as a replacement for thermal coal by 2022.

And sometimes they promote new thinking entirely. At Landsec, says Caroline Hill, "we're starting to explore battery storage [to complement large-scale onsite solar], which is very exciting."

LANDSEC WHITE ROSE

Landsec has the biggest retail site photovoltaic system in the UK

Domino effect

One of the initiative's most striking impacts to date has been to cascade tight emissions targets down value chains, encouraging companies and customers alike outside the "usual suspects" to embrace them. That's because they are designed to cover both scopes 1 and 2 emissions (ie, those directly under the company's control, such as from energy consumption) and scope 3 (covering indirect impacts, such as emissions generated in the supply chain, or by a company's products when in use).

Alex Farsan, global lead on SBTs at WWF International, says: "There's been a virtuous cycle by which companies have engaged their suppliers: sometimes a single supplier is engaged by multiple customers, and that can drive change very quickly indeed … We recently ran an SBT workshop in China, and it was apparent that many of the companies attending were only there because of [pressure from] their customers."

'There's been a virtuous cycle by which companies have engaged their suppliers'

This domino effect can be very powerful, says Owen Hewlett, chief technology officer at The Gold Standard. "If you can persuade key nodal companies to adopt rigorous SBTs, many others will fall in behind. For example, when

Mars and Ben & Jerry's set really aggressive targets, you got the likes of Cargill and General Mills effectively saying 'oh, right, well we'd better do that too if we want to keep the business'. Get the big actors on board, and a lot of the others will come into line."

And that's not surprising, since contracts can depend on it – and sizeable ones at that. "We spend quite a bit of time talking to the big construction players and encourage them to follow suit [on SBTs]", says Landsec's Hill. "We make it clear that this is part of how we make our decisions as to who we'll be working with in the future." So there's a touch of the stick as well as the carrot? "Absolutely. But it's not just the stick, it's also about partnership – about how much more we can achieve if we work closely together on it."

CARLSBERG

Carlsberg has a zero-carbon deadline of 2030

Such partnerships are core to BT's scope 3 target of cutting supply chain emissions by 29% over the next decade, explains Gabrielle Ginér, BT's head of environment and sustainability. "We run a 'Gamechanging Challenge', where suppliers come in and pitch ideas of how to deliver their products and services to us in ways which cut emissions." But if that doesn't motivate them, there is a new sustainability clause that requires suppliers to do so over the term of their contract – "and we benchmark and monitor progress". BT talks to its customers too – including such mammoths as the National Health Service – to discuss how they can collaborate on carbon cuts.

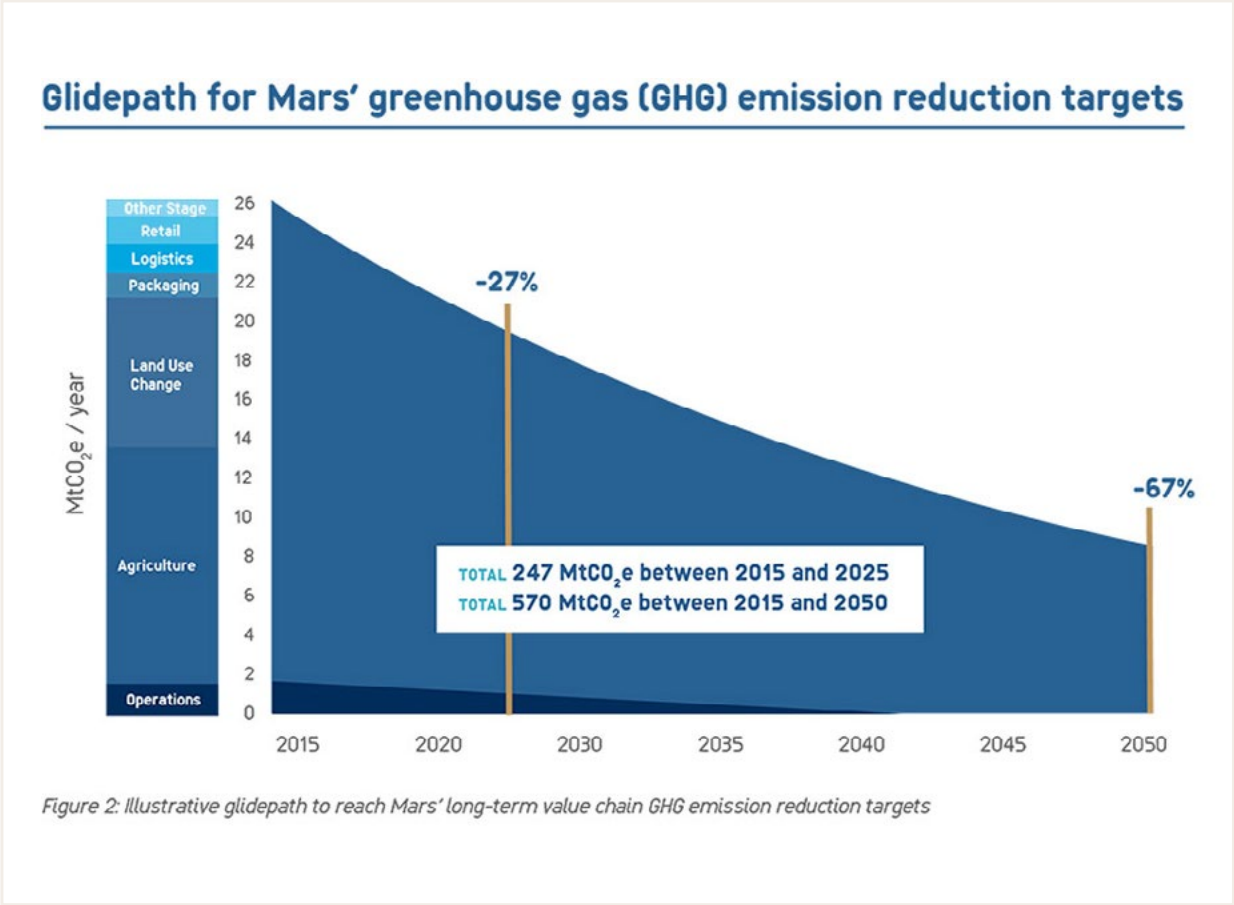
Customers of a different scale altogether are in Carlsberg's sights: its scope 3 target is 30% by 2030, with half of that to be achieved by 2022. Packaging suppliers account for some of that, but so do customers such as retailers and pubs and the people who actually drink the beer. And that needs a light touch, says Hoffmeyer Boas: "After all, who wants to worry about the state of the planet when they just want a beer?"

Cue more playful messaging, such as the "bike power" bar – "if you don't pedal hard enough, you don't get a beer!" There's a serious point behind the play, though: "Beer is not elitist; it's something everyone enjoys," Hoffmeyer Boas points out. "And that actually gives us the chance to reach more people, and so have a bigger intrinsic impact than some other companies."

'Beer is something everyone enjoys. And that gives Carlsberg the chance to reach more people, and so have a bigger intrinsic impact'

Key to securing buy-in at board level, of course, is the business case. So does it stack up? At Mahindra, Ghosh is confident. "Most of the initiatives you take to reduce your carbon footprint have a payback of nine-24 months. That's nothing that a good, healthy corporation can't afford to invest in." Gabrielle Ginér agrees. BT adopted an early version of an SBT back in 2008, since when "our finance director has seen the cost savings that result – over £250m in energy costs alone."

For many corporates, energy use is one of the biggest emissions sources, and here, the recent plummeting cost of renewables, particularly solar and wind, have been the finance director's friend. It's brought once-expensive options into the low-hanging fruit category, notes Lewis, making a shift to green power "a smart investment decision, never mind all the other factors at play."



When companies like Mars set aggressive targets, other start to follow suit

Another virtuous cycle is under way, and it goes like this: booming corporate demand for low-carbon energy, driven by climate commitments, helps drive down the costs, which encourages corporates to sign up to more ambitious climate goals, and so on. The same cycle is spurring rapid electrification of transport, Lewis points out: "If car companies had committed themselves to SBTs 15 years ago, we'd have seen electric cars happen a lot faster."

He cautions against a purely financial interpretation of the business case, though. Sure, there may be swift paybacks in some areas, but it won't always be the case. "If you're purely talking in terms of ROI, you've got an uphill conversation." Better by far to focus on issues like brand, reputation, engagement with clients, and above all recruitment, retention and motivation of staff. (See If companies want to meet ambitious climate targets, they have to take employees on the journey)

"There's an incredible amount of untapped energy and motivation in the workforce for this, and that's especially true for millennials." A strong climate target can put flesh on the bones of the whole purpose agenda,

'There's an incredible amount of untapped energy and motivation in the workforce for this, and that's especially true for millennials'

Lewis suggests. "If you can add percentage points of productivity and ability to recruit the best staff [by committing to an SBT] then it's a no-brainer; you do it."

Necessity is the mother of innovation

Some of the biggest business opportunities, though, says Mahindra's Ghosh, are those that may not occur to you until you're forced to think out of the box. "If you adopt one which is a little bit beyond what you think is possible, then it will of necessity trigger innovation. You start looking for new ways to make it happen – and that's where the fun starts. It dovetails nicely with the circular economy. So, our steel services business has got into making transformer cores from little bits of steel left behind when they cut large sheets of it. They're treating slag and using it in construction. They wouldn't normally have thought about this, but since they've got these mavericks sitting in head office trying to make miracles happen, such opportunities are opening up."

LANDSEC

Caroline Hill of Landsec: Partnership is key to achieving science based targets

And as stringent targets become the norm, more will follow, he says. "There will be opportunities in all sorts of green businesses – micro-irrigation, energy-efficient motors, electric cars, green building technologies – all fantastic businesses to get into, and likely to turn into multi-billion ones in the medium to long term."

At Carlsberg, Hoffmeyer Boas openly talks of the need for a leap of faith. "We hope and expect that by 2025 the range of technologies and solutions available to help us achieve these targets will be very different from today. We cannot know for sure. But our starting point is that if nobody sets [such demanding] goals, then we won't have those solutions. Our role is to help create the demand for the solutions, which can then make the targets achievable. And that's what makes leadership. If more people take the lead like this, then fixing climate change becomes a self-fulfilling prophecy."

'If you adopt a target which is a little bit beyond what you think is possible, then it will of necessity trigger innovation'

Paul Lewis sums it up by recalling an earlier period of great leadership ambition: the 1960s, and specifically John F Kennedy's resolve to have a man on the moon by the end of the decade. In effect, he was saying: 'I don't know how to get to the moon. That's not my job. My job is to decide that we're going to get there.'

"And they did." ■

TTSTUDIO/SHUTTERSTOCK

Science-based targets 'are Paris for the corporate world'

Launched in the run-up to the Paris COP in 2015, the Science Based Targets initiative is a collaboration between the Carbon Disclosure Project (CDP), the UN Global Compact, the World Resources Institute and WWF, in partnership with We Mean Business. It has the suitably immodest aim that SBTs become standard business practice by 2020 – and with sign-ups running at around two per day, that's well within sight.

Initially, the targets were pegged to the 2 degree limit decreed by Paris, but in the light of alarming evidence of the acceleration of climate change, as summed up in the latest IPCC report, the SBTi is working on a revised protocol to support targets compatible with a 1.5 degree goal. (See We can only achieve a 1.5C world if business and science work together) A few pioneering companies – BT, Carlsberg and Tesco among them – have already embraced that aim, and others are sure to follow, which is just as well: given the scale of the task, many think our best hope of even coming close to 2 degrees is to shoot for 1.5C.

Targets are determined through a fairly rigorous process, the detail of which is best left to climate wonks. Essentially, it breaks down the available global carbon budget into different sectors – taking into account the fact that some will be easier to decarbonise than others, which gives a note of realism to the process. Depending on which sectors they operate in, any given company can then work out its individual carbon budget, typically using a tool called the Greenhouse Gas Protocol Corporate Standard. The SBTi then reviews the target against the methodology and – all being well – approves it. To date, just over a third of companies committed to SBTs have received approval.

To some extent, the process mirrors the Paris Accord's provisions for each country to set its own goal (the so-called INDCs – individual nationally determined contributions), but with one crucial difference: unlike the SBTs, these aren't subject to independent assessment and approval, which doubtless explains why, taken together, they would result in a substantial overshoot of the 2 degree goal. So the SBTs are, in effect, Paris for the corporate world – and Paris done properly.

Martin Wright

IDPHOTO/SHUTTERSTOCK

‘Divestment isn’t a badge of honour; it’s a failure of engagement’

Martin Wright explains why the Climate Action 100+ group of investors is prioritising carrot over stick as they seek to push the world’s biggest greenhouse gas emitters to address climate risk

It sounds appealingly simple. Cut off the flow of funds to the bad boys – the coal companies, say, or the tar sands extractors – and watch them collapse from capital starvation, then lie back on your halo.

Cue some rather extravagant claims around divestment (or disinvestment – to all intents and purposes the same thing). It makes for good copy, but the truth is both more subtle, and in some ways more dramatic. Yes, the stick of divestment is there, but there’s also a hefty carrot. It takes the form of that old, familiar phrase “constructive engagement”. Whether it’s divest, or engage, or (more commonly both), it’s clear that, driven by a healthy mix of ethics and self-interest, investors, lenders and insurers are getting stuck in as never before, and coal is the first casualty.

In the last year or so, a clutch of banks and investors, including Lloyds, RBS, Standard Chartered and HSBC, announced they will no longer finance new coal plants. Miners and utilities appear to be reading the writing on the wall. Rio Tinto agreed a deal to sell its last coal mine in March 2018, and last month, Glencore, Australia’s biggest coal miner, announced it will cap production at no more than present levels. That may not sound much, but for a company that until recently was happy to promote the supposed sustainable

In the last year or so, a clutch of banks and investors, including Lloyds, RBS, Standard Chartered and HSBC, announced they will no longer finance new coal plants

virtues of coal, it's a massive shift. Its statement announcing the new policy pretty much sums up the business case for changing gear. "We must invest in assets that will be resilient to regulatory, physical and operational risks related to climate change," it said. And it specifically cited engagement by investors – including Climate Action 100+ as a motivating factor.

Some of the sharpest pressure is coming from insurers – unsurprisingly, perhaps, given their increasing exposure to climate risk. According to a report from Unfriend Coal, a coalition of NGOs active on climate, 19 major insurers with more than $6trn in assets representing 20% of the global market have divested from coal, an increase of 50% over the year. Among them are Lloyd's, Groupama, AXA, Allianz and Munich Re.

GREENPEACE

In the last year more investors and banks have announced they will no longer finance new coal plants

Insurers may be at the sharp end, but it's increasingly apparent that anyone investing for the long term is vulnerable to climate disruption. Aviva's Climate Change Stocktake (2018) report sums it up: "If we do not take urgent action to limit global temperature increases, the impacts upon the economy, society and our business will be nothing short of devastating. Aviva is determined to make its own contribution to tackling climate change. This is not at odds with business or investment. In fact, it is a business imperative."

To which its chief responsible investment officer, Steve Waygood, simply adds: "This is an existential crisis to our sector."

And the sector is starting to respond with unprecedented collaborative clout. Enter Climate Action 100+, an alliance of 300 investors with a cool $32trn in assets under management. Set up in December 2017 by an alliance of concerned investor groups along with US NGO Ceres and the Principles for Responsible Investment, it targets a rogue's gallery of 100 or so companies responsible for around two-thirds of global industrial emissions, a spread that takes it well beyond coal.

The list includes such greenhouse giants as Anglo American, BP, the China Petroleum & Chemical Corporation, EDF, Exxon Mobile, GM, Nestlé, PepsiCo, Shell, Proctor & Gamble and Volkswagen.

19 major insurers with more than $6 trillion in assets have divested from coal – an increase of 50% over the past year

The message to investors is simple, explains Kirsten Spalding, senior director for investor programmes at Ceres. "We're seeing more and more data which says: 'These are companies who are not going to produce long-term value'. And that means [continued exposure to them] is a risk to your portfolio."


AVIVA

Steve Waygood of Aviva says the insurance industry as faces an 'existential crisis'

Renewable rewards for investors

It's not just risk that motivates; reward plays a part, too. The collapse in the cost of renewable energies like wind and solar, making them directly competitive with fossil fuels in some markets, has strengthened the business case dramatically.

So much for steely-eyed self-interest: do ethics get a look in? For sure, says Spalding. Many asset managers have among their clients a significant swathe of "family money, wealthy individuals, endowment foundations – and they're increasingly asking managers to address climate issues. They're saying, 'we expect you to produce [investment] products that have a direct, measurable impact'."

It's a trend set to grow, Waygood adds, thanks to impending regulatory changes in both the UK and Europe. In effect, this should mean that individuals who once had no say, and little clue, as to how their pension fund and other savings are being managed will now get to express a preference as to where the money being invested on their behalf ends up.

Given increasing public concern about climate change, it's inevitable that this will lead to a further wave of pressure on investors. When the school kids who went on the climate strike in February take up jobs with pension plans in a few years' time, it's hard to imagine they'll not seize that opportunity. (See Companies are protecting their stakeholders on climate risk. What about their employees)

Ethics were certainly to the fore last July, when the Church of England's General Synod voted overwhelmingly in support of a motion to divest from fossil fuel companies that had not aligned their activities with the Paris climate accord by 2023. It was the latest in a series of commitments by the church to use its investing power for good. Their implementation is led by Adam Matthews, who as well as having a key responsibility for how the church's own funds are deployed, is also co-founder of the Transition Pathway Initiative, and

'We're seeing more data which says: "These are companies who are not going to produce long-term value'

as such, at the heart of the latest thinking on how best to use investor pressure to shift corporate behaviour.

The CofE approach is very much a "carrot and stick" one, including both direct divestment from companies with significant dependence on revenue from thermal coal and tar sands, but also sustained engagement with others, particularly in energy-intensive sectors. Matthews makes clear that straight divestment is rarely a first preference, and that's the overwhelming majority view, held by everyone from campaigners, like ShareAction's CEO Catherine Howarth, to corporate figures like Waygood.

Why? Because divestment is a card that, once played, can't be used again. It might bring a rush of principled vindication, but once you're out, you lose your say over the company's future – literally, in the case of a shareholder with voting rights at an AGM. And if there's money to be made out of a business, then someone will buy the shares you're selling. Someone with a lot less scruples, a lot less concern over long-term impact.

EVIART/SHUTTERSTOCK

The competitive cost of renewables has made the sector more attractive to investors

As Waygood puts it: "Divestment isn't a badge of honour; it's a failure of the engagement process." Robust engagement can be a lot more effective. "Imagine you're running a listed coal firm. You're concerned about your re-election at the AGM, concerned about your pay packet, concerned about keeping your job … And if large institutional investors are coming to you and saying 'you are not doing your job in relation to climate change, so we are going to withhold support, table a resolution at the AGM, vote against you, against your pay package' – these are much harder problems to deal with than someone just divesting."

That said, disinvestment remains a necessary threat – and one that has to be wielded on occasion, to keep it real. Aviva has, says Waygood, "reluctantly walked away" from 17 companies whose continued activities in coal earned them a place on its ultimate "stop list".

Divestment is a card that, once played, can't be used again

Waygood adds a cautionary note over excessive reliance on investors as influencers, as it can enable politicians to say "oh look, they're doing stuff, so we don't need to worry" – and hence they neglect their vital role in shaping market fundamentals by, for example, setting a robust carbon price.

TERRY BOUCH/SHUTTERSTOCK

HSBC's decision to exempt Vietnam, Bangladesh and Indonesia from its ban on new coal has drawn criticism

None of which detracts from the need for sustained, patient engagement – and that is where conscious investors are putting in the hard yards. Matthews is closely involved in discussions with the likes of Anglo American, Occidental, Shell and ExxonMobil – he's one of the prime movers behind the shareholder resolution on emissions targets to be tabled at Exxon's forthcoming AGM. (BP has announced that it will accept a similar resolution at its AGM in May.)

He readily acknowledges that "in some cases, it will be a multi-decadal transition". That's the sort of timeline that even major emitting companies should be able to plan for. For its part, Shell has taken a step along the road with its commitment to halve the net carbon footprint of its energy products by 2050, with a series of interim targets along the way.

Matthews sees this as a "hugely significant step", with welcome clarity around metrics and a strong commitment to disclosure – but with room to ramp up ambition as the science demands it. "Do I want to see them go further in due course? Yes, and we need to continue engagement on that."

Shell's plan to link executive remuneration to achieving the carbon target, which will be put to a forthcoming AGM, drew particular praise from campaigners, even those who questioned the extent of the company's ambition. Ceres's Spalding gave it two cheers: "It's a good example of significant movement as a result of deep engagement, and of why investors should continue to collaborate … So my message to them is: 'Keep going – it's working!', and my message to the companies [like Shell] is: 'It's not

'The message to investors is "keep going, it's working", and to companies like Shell it is "you're not going far enough"'

far enough, not fast enough, not deep enough – you have more to do'."

All across the piece, the pressure to go further, faster, is accelerating. "There's been a real shift in the last year or so in terms of investors having a much more robust strategy," says Howarth. "I'm particularly proud of developments in the banking sector, where we've been pushing them to have really tough policies on coal in particular."

Progress doesn't come without some hiccoughs along the way. HSBC's announcement that it would pull out of financing new coal plants drew widespread plaudits, which became somewhat muted when the bank qualified the commitment by excluding Bangladesh, Indonesia and Vietnam. Instead, it said, "a targeted and time-limited exception will apply in order to appropriately balance local humanitarian needs with the need to transition to a low-carbon economy".

Campaigners were sceptical. Christian Aid pointed to one of the bank's own research papers, which cited all three countries as among the 20 most vulnerable to climate change, and suggested it was failing to demonstrate sufficient commitment on the issue. (HSBC did not respond to repeated requests for comment for this article.)

Overall, though, there's no doubting the degree to which the needle is moving. Aviva has felt the pressure, says Waygood. "In the last 18 months or so, this stuff has just caught fire. Every single one of our tender documents for our large institutional clients now has ESG questions for us," many of them relating to climate change. "In virtually every case, if we hadn't been able to say that my [responsible investment] team exists, and explain what it does, then we wouldn't have won the business. So this is an absolutely seismic shift."

Matthews cautions that "we still have a long way to go: I'm not naïve about the degree of change we need to see", but points to a combination of factors that is building the momentum for change, notably "the falling cost of renewables, government moves against fossil fuels, and investors becoming clearer in their expectations and beginning to really use the stewardship tools they have to drive change."

"We're certainly moving in the right direction, put it like that." ■

CHURCH OF ENGLAND

The CofE's Adam Matthews believes 'we are moving in the right direction'

Martin Wright (@martinfutures) is a writer, adviser and public speaker specialising in environmental solutions and sustainable futures. He is a former Director of Forum for the Future.

JEN WATSON/SHUTTERSTOCK

Unilever, Danone, L'Oréal and Nestlé lead on tackling climate risk

Danone comes out tops among multinational food and beverage companies in its preparedness for the low-carbon transition, according to CDP's first investor research report on climate risk in the consumer sector. Second and third place go to Nestlé and AB InBev. Among major household and personal care companies, Unilever tops the climate risk leader board, followed closely by L'Oréal.

Kraft Heinz and Estée Lauder, meanwhile, are the biggest climate laggards among the 16 fast-moving consumer goods companies (FMCGs) assessed in CDP's report Fast Moving Consumers.

CDP pointed out that FMCGs are responsible for over a third of global greenhouse gas emissions. Unlike many other sectors, 90% of their carbon emissions lie in the value chain, leaving companies exposed to both raw material risks and to changes in consumer preferences.

Importantly, they also have the opportunity to drive behaviour change among consumers to more climate-friendly choices.

CDP says consumer companies are investing in transformative innovation, particularly in the development of alternatives to plastic packaging and in plant-based alternatives in food and personal care products. But the report adds that innovation is not being applied to their biggest-selling products.

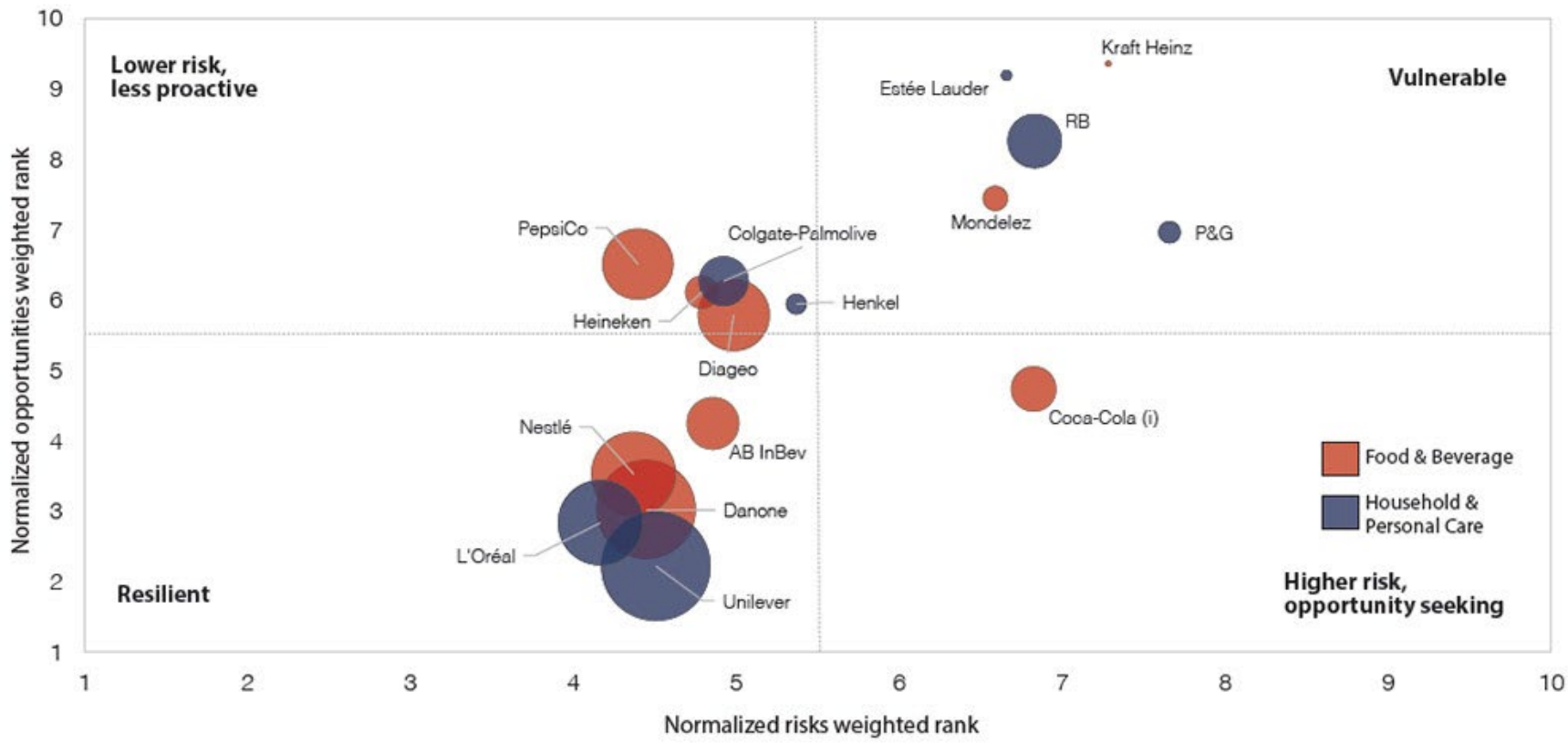
"Almost 60% of the top 10 revenue-generating brands for each company have failed to deliver low carbon innovations in the last 10 years. Given most companies (88%) generate over 50% of their revenues from these key brands, including Nescafé, Budweiser and Dove, they must up their game or risk falling foul of changing consumer demands."

It also notes that R&D expenditure is low, but merger and acquisition spending is high as FMCGs increasingly buy niche, environmental brands, such as Nestlé's recent acquisition of Sweet Earth and PepsiCo's purchase of Bare Foods. But the report warns that "this approach will not be sustainable if their fundamental business models, which are based on driving more consumption, remain unchanged".

The report points to impending regulation that threatens the sector, including more robust rules on packaging and waste from the EU, and the proposed introduction of labelling and carbon footprinting.

CDP

Figure 3: Opportunity vs. risk for low-carbon transition



"The sector is also highly exposed to the physical risks associated with climate change. For example, heat stress and water scarcity have the potential to disrupt agricultural supply chains and cause price volatility," CDP says.

"This poses a real threat to the sector, especially for diversified food companies like Nestlé and Kraft Heinz which rely on a variety of raw materials. When it comes to physical risks in the consumption phase, personal care and home care companies are most exposed, due to the amount of water it takes to use their products."

The report points out the deforestation risk posed by palm oil, pointing out that companies have been slow to respond to intense media scrutiny in the past year, with less than 45% of palm oil bought by personal care companies coming from physically segregated certified sources, and only Danone and L'Oréal sourcing 100% of their palm oil in this way.

Carole Ferguson, head of investor research at CDP, said: "As consumer-facing brands, at risk not just from climate change but water scarcity and deforestation too, these companies have a unique role to play in driving forward the sustainable economic transition. Ongoing activism around plastics and packaging is just the tip of the iceberg, and we expect to see more environmental issues come to the fore as consumers start to question what goes into the products they buy, use and dispose of."

She added that the efforts of leading companies "need to be replicated by others in the sector, if they are to justify their role in a society that can no longer be based on fast paced, rising consumption and linear business models".

Terry Slavin

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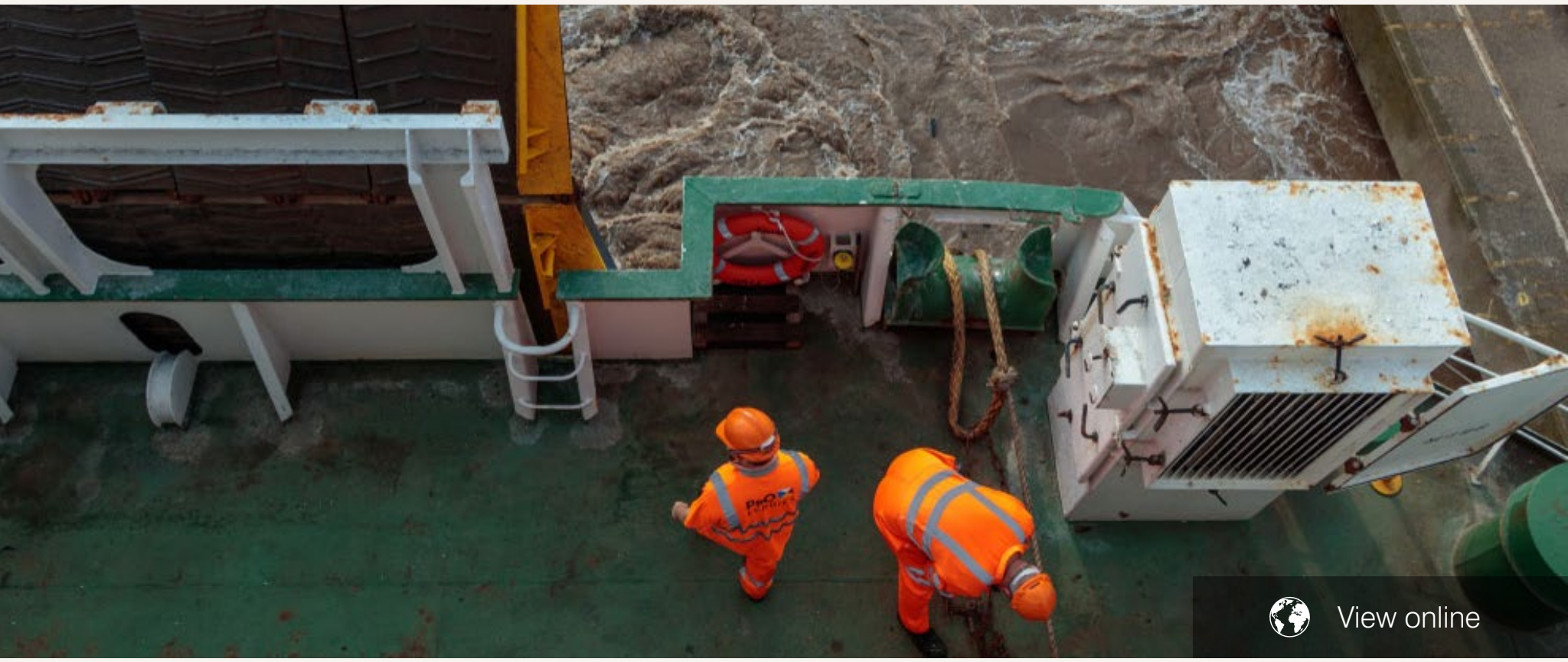

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‘If companies want to meet ambitious climate targets, they have to take employees on the journey’

Richard Tarboton and Annabell James from Carbon Credentials argue that companies will go much further if they can tap into a growing desire by workforces to do their bit for the planet

The story of sustainability in 2018 was of extreme change – from weather events, to variable political action and a sharp increase in the expectations of businesses on key issues; for example the war on single-use plastics. It was also a year that brought clarity about the scale of the challenge, and the opportunity climate change presents.

The IPCC report was the most extensive warning yet on the risks of rising global temperatures, with leading international scientists announcing that we have 12 years left to limit temperature increase to 1.5C and avoid a climate catastrophe. To avoid some of the worst impacts of climate change, globally we must slash carbon emissions by 45% by 2030, and completely decarbonise by 2050.

Preventing world temperatures rising dangerously above 1.5C requires urgent collaborative action, from everyone and from everywhere.

Some businesses have started taking action by setting science-based carbon reduction targets, aligned to the objectives of the Paris Agreement, a pledge signed by nearly 200 countries to tackle climate change and keep

‘To avoid some of the worst impacts of climate change, globally we must slash carbon emissions by 45% by 2030, and completely decarbonise by 2050’

global temperature rise "well below" 2C. (See 'We're rethinking every part of our business, from supplier agreements to future technologies')

Overall, 505 companies from 38 countries have now committed to set an approved science-based target, with four firms committing to targets aligned with 1.5C – namely our clients supermarket Tesco and tea brand Pukka Herbs – as well as brewer Carlsberg and telecoms giant BT. But beyond these leading companies, are businesses doing enough to address climate change?

To answer this question, we recently commissioned the Carbon Commitment Report, and the results were eye-opening. We found that beyond large corporates, carbon targets are rare; and employees aren't impressed.

Of the 1,000 heads of sustainability and business owners questioned, only 10% had set carbon emissions targets, and none was science based. However, employee appetite for tackling climate change does exist. A thousand junior employees were also questioned and more than half (57%) said their employers aren't doing enough to involve them in cutting their carbon footprint at work. In fact, even when targets do exist, 74% of employees have no idea what their organisation's carbon reduction targets are, and 57% of those questioned said they don't, or don't always, trust UK organisations to deliver on their sustainability claims.

CARBON CREDENTIALS

More than half (66%) of employees would support a bonus incentive scheme to cut carbon use at work, but only 4% of companies have these in place. A mere 14% of organisations have set staff personal goals and targets to cut their own workplace carbon footprint, only 9% incentivise staff to save energy at work or reduce their individual carbon footprint with benefits such as increased annual leave, or financial incentives for cycling to work. Just 13% offer an official company car-share policy and 12% have a cycle-to-work scheme.

This lack of action by organisations has meant nearly three-quarters of employees (71%) are taking their own initiatives to cut their carbon footprint at work, but not necessarily in the right areas.

Shockingly, when Carbon Credentials asked employees what their most innovative ideas were for cutting workplace energy, suggestions included banning personal mobile devices, or old-fashioned solutions like foil to cover walls or spaces near heaters/radiators, mandatory screen savers and sleep mode on all laptops, tablets and phones.

This gap between corporate ambition and action is leading to a high percentage of employees confused over what they need to do to help reduce

57% of junior employees surveyed said employers aren't doing enough to involve them in cutting their carbon footprint at work

greenhouse gases at work. There is also declining trust among employees towards their organisation's capability to deliver on sustainability commitments. More ambitious science-based climate action is needed, and employees must be involved in the journey.

According to Carbon Credentials' research, 60% of respondents, including heads and managers of sustainability, said that a lack of leadership support, insufficient funding and competing inter-departmental budgets and resources were the biggest barriers preventing organisations from rolling out successful sustainability programmes. On the other hand, employees are engaged and willing to help, but aren't always given the incentives, tools and support to do so.

RAWPIXEL.COM/SHUTTERSTOCK

Putting environmental issues on the employee agenda can encourage leaders to act

By incorporating employee engagement into their plans, businesses have the potential to overcome internal budgeting and leadership challenges. Placing environmental issues firmly on the employee agenda can help sustainability managers leverage their support to convince leadership to act. Capitalising on support from willing and passionate colleagues offers a cost-effective way to create change and deliver impact.

Our client, P&O Ferries, found that embedding sustainability into day-to-day employee activities enabled significant savings and more effective company-wide change. A mixture of employee sustainability campaigns and communication materials such as infographics and posters enabled P&O Ferries to share the work being undertaken to minimise its environmental impact.

The results were impressive: carbon savings in one quarter were equivalent to driving 137,000 miles. More than 90% of sites are now supplied with renewable energy, and importantly, P&O now has a trusting, motivated workforce with a renewed sense of ownership in the overall sustainability programme.

For there to be any chance in meeting the IPCC warming recommendations, businesses must play their part by setting ambitious science-based emission reduction targets. Engaging employees in the process is key and will help businesses drive action and ultimately achieve success. Setting targets not only sends out a clear message on the organisations' commitment to climate change but reduces energy costs and spend; which benefits the planet, your people, your business reputation, and your bottom line. ■

Richard Tarboton is director of client services, and Annabell James is sustainability consultant at energy performance and carbon management company Carbon Credentials.

ARTFULLY PHOTOGRAPHER/ SHUTTERSTOCK

‘We can only achieve a 1.5C world if science and business work together’

CDP’s Alberto Carrillo Pineda explains why the Science Based Targets initiative is releasing new technical assistance to help signatories decarbonise further and faster

The warning given by Sir David Attenborough at COP 24 in Katowice pulled no punches. Not only is climate change our greatest threat in thousands of years, the transition to a zero-carbon economy is “nowhere near where it needs to be”. His call echoed the findings of the Intergovernmental Panel on Climate Change’s Special Report that holding global temperature rise below 1.5C will require “rapid, far-reaching and unprecedented changes in all aspects of society”.

As key actors in society, companies must take on the challenge to rapidly decarbonise the global economy. With operations and supply chains that stretch across the world, companies face myriad risks from a changing climate. Even 0.5C of warming could make all the difference, while holding warming to below 1.5C will mean a workforce less exposed to extreme weather, supply chains less at risk from flooding and a global economy that is more resilient. Climate science is a vital tool for companies looking to navigate those challenges and emerge on the front foot.

Over 500 businesses are already seizing the opportunity to get ahead in the zero-carbon transition by committing to the Science Based Targets initiative (SBTi). Those companies are developing innovative new busi-

‘Holding warming to below 1.5C will mean a workforce less exposed to extreme weather and supply chains less at risk from flooding’

ness strategies that are aligned with the Paris Agreement's goal of limiting temperature rise to below 2C. These are ambitious and far-reaching targets requiring, for example, companies to reduce emissions not only from their own operations, but also across their entire value chain.

Science-based targets are a bold move, but companies choosing to set them are already reaping a plethora of business benefits, including bottom-line savings, innovation, strengthened brand reputation, improved investor confidence and resilience against regulation.

HADRIAN/SHUTTERSTOCK

Sony has developed a new plastic, SORPLAS, made up of 99% recycled material

Business benefits

The old adage that greening business models come at the expense of profits is quickly proving to be a false narrative. A YouGov survey last year of global corporations committed to the SBTi found that almost a third (29%) of firms are already seeing bottom-line savings, especially from increased use of clean energy.

And not only is SBTi helping companies save money; it is also driving innovation, according to almost two-thirds (63%) of respondents to the same survey.

Take Kellogg's. The company now has fuel-cell technology at a facility in San Jose, which generates electricity while making waffles, and Sony has developed a new plastic, SORPLAS, made up of 99% recycled material, which reduces CO_2 emissions by nearly 80% during manufacture.

Companies that have committed to the SBTi also report a positive impact on both customer loyalty and investor confidence in their business.

And as more national governments begin to take action on the Paris Agreement by passing new regulations to lower emissions, firms with science-based targets will have future-proofed their business models against disruption.

Kellogg's has fuel cell technology at one facility, allowing it to generate electricity while making waffles

Stepping up to a 1.5C world

It is not only regulation that science-based targets are protecting companies from. In today's world, there is no hiding from the impacts of climate change, which are already bringing untold costs for the global economy.

From a Europe-wide heatwave, to record droughts in Cape Town, hurricanes in the Americas and wildfires in the Arctic, extreme weather cost businesses billions of dollars in 2018.

All of these impacts are occurring at just 1C of warming. Clearly, it's in the interests of businesses to step up and prevent some of the devastating climate impacts we would see in a 2C world.

LUMPPINI/SHUTTERSTOCK

Wildfires across the globe in 2018 cost businesses billions of dollars

As the IPCC special report warned, hitting the 2C threshold would see a doubling in the length of droughts, and cause global sea-levels to rise about 10 centimetres higher compared with 1.5C. This would put another 10 million people at risk of flooding, all the while reducing the ability to grow key crops.

With this urgent need to push towards a 1.5C world, this spring the SBTi will be releasing new technical resources – based on the emissions scenarios presented in the IPCC report – to enable companies to set targets in line with a 1.5C pathway.

We are also introducing important updates to our criteria, devised in consultation with a Scientific Advisory Group consisting of leading climate scientists from around the world, which are aimed at spurring greater ambition and keeping companies on a pathway towards net-zero.

The emergence of a new normal

According to the IPCC, holding global warming below 1.5C will mean global CO_2 emissions reaching net-zero by 2050, and renewables will need to provide at least 85% of global electricity by the same year.

It is an enormous challenge, but the corporations using climate science in their emissions reduction plans are not only reaping the business benefits, they are also signalling a "new normal" in the way business are developing their strategies for the future.

Companies now have the opportunity to aim higher than ever before by setting targets in line with a 1.5C world. We invite them to raise the bar and set the pace of change that the science tells us is needed. By ramping up efforts, these companies will help close the gap between where we are and where we need to be, while sending a clear signal to other companies, governments and institutions across the globe, that they too should be matching this ambition. ■

Alberto Carrillo Pineda is director of science-based targets and renewable energy at CDP, one of the Science Based Targets initiative partners.

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Innovate and lead:
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Transparent ESG disclosures:
Disclose accurate data to showcase risks, demonstrate long-term value and deliver transparent ESG disclosures fit for Investors

Transparent holistic communications:
Deliver purpose-driven communications fit for all stakeholders

Move future risks to opportunities:
Transform business risks into future opportunities through new systems, Board oversight and ambitious leadership

Be part of the change

James F. Kenny
Mayor, City of Philadelphia

City of Philadelphia

Jay Gould
CEO

Interface

Satya Tripathi
Assistant Secretary-General

UN environment

Marilyn Ceci
Managing Director, Head of Green Bonds

J.P.Morgan

Jostein Solheim
Executive Vice President, Foods and Refreshments

Unilever

Lise Kingo
CEO & Executive Director

UN GLOBAL COMPACT

Carol Surface
Chief Human Resources Officer

Medtronic

Tom Szaky
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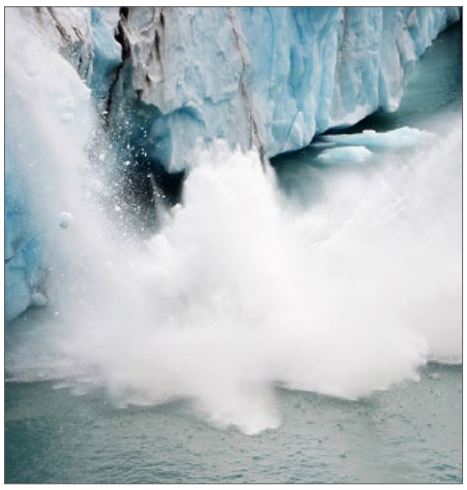
WHAT'S ON THE WEB

The disruptors

How Mindy Lubber is leading the green business fight in Trump's America

Analysis

Vale suspended from Corporate Human Rights Benchmark over dam disaster



Analysis

Major funds launch toolkit to help investors measure SDG impact

Comment

Why NGOs love Allianz, Axa and Swiss Re and are sharply divided on Nestlé