



1.5°C

BUSINESS
LEADERSHIP

Solutions, strategies, and
mindsets for our only future



Tom Hegen photography

The images throughout this publication not attributed to companies are taken by award-winning German photographer Tom Hegen. His photos explore human impact on Earth, including landscapes shaped by human activity and vulnerable to climate change. His work is a stark reminder about how we interact with the world around us, and what is at risk. We share the story behind each photo throughout the report.

Use your smartphone camera to follow the QR code to read more and explore his portfolio.



Cover photo

©Tom Hegen, The Iceberg Series II. A visual study of shapes, patterns and luminosity of icebergs in the Ilulissat Icefjord. A UNESCO World Heritage Site 250km north of the Arctic Circle, Greenland's Ilulissat Icefjord is the sea mouth of Sermeq Kujalleq, one of the few glaciers through which the Greenland ice cap reaches the sea.

Special Edition Report for the
UN Secretary-General's Climate Action Summit
September 23, 2019

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©Tom Hegen, The River Vein Series. As Icelandic glaciers melt, ice-blue water veins flow across black volcanic sand, creating most peculiar patterns in the landscape. Those scenes have an element of duality. It is hard to tell whether a picture was taken from a macro perspective or from a small airplane around 3000ft in the air.



Contents

| | |
|----|---|
| 07 | Welcome to a new era of business leadership , by Lise Kingo, Remi Eriksen & Rasmus Schjødt Pedersen |
| 08 | Business leaders: Join the movement , by Lise Kingo, CEO & Executive Director, UN Global Compact |
| 13 | Join the 1.5°C campaign Business ambition for 1.5°C — our only future |
| 14 | How to be a 1.5°C transformer , by Erik Rasmussen, Founder, Sustainia |
| 19 | The story of an opportunity mindset |
| 20 | Investing for our only future The UN-convened Net-Zero Asset Owner Alliance |
| 21 | “Science-based targets should become a standard business practice” , with Alberto Carrillo Pineda, Director of Science Based Targets and Renewable Energy at CDP |
| 22 | A world of solutions , Global map |
| 24 | Industrial waste for low-carbon cement production , Dalmia |
| 25 | Pricing carbon drives decarbonisation , Acciona |
| 26 | World’s first wastewater biofactory , Aguas Andinas & SUEZ |
| 28 | Accelerating Japan’s sustainable future , with Yuki Isogai, Partner of Sustainability, PwC Japan |
| 32 | Europe’s largest solar plant , Iberdrola |
| 33 | Circular carbon in the Amazon , Natura |
| 34 | It only takes a decade , with Jakob Askou Bøss, Senior Vice President, Corporate Strategy and Stakeholder Relations, Ørsted |
| 38 | Water-reducing jeans production , Levi Strauss & Co. |
| 39 | Replacing oil with CO₂ in plastics , Covestro |
| 40 | Catalysing change , with Peder Holk Nielsen, CEO, Novozymes |
| 42 | Waste to energy for Indian cities , Mahindra |
| 43 | Native forest conservation programme , Viña Concha y Toro |
| 46 | Academia is a vital bridge , with Inge Jan Henjesand, President, BI Norwegian Business School |
| 48 | Not fast enough , with Remi Eriksen, President & CEO, DNV GL |
| 52 | COP 25: Chile , with Margarita Ducci Budge, Executive Director, UN Global Compact Network Chile |
| 54 | Sources |



Welcome to a new era of business leadership

The Paris Agreement of 2015 saw the world's governments commit to preventing the worst impacts of climate change by limiting global warming to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. However, commitments from governments have so far fallen short of what is needed to achieve this goal. In fact, it is estimated that existing governmental commitments need to be increased five-fold in order to stand a chance of keeping warming below 1.5°C.

The Intergovernmental Panel on Climate Change 2018 Special Report on Global Warming of 1.5°C only reinforced the need for urgent climate action from all sectors and nations, and proved that half a degree can make a world of difference. This is the new market reality for

businesses who must step up and play a leading role in our only future, but it requires a fundamental change in mindset. Existing technology can deliver the future we desire, including meeting the Paris Agreement targets, but only through accelerated scaling on many fronts.

This report shows that those who adopt the opportunity mindset — a fundamental prerequisite to climate leadership — can stand to profit in multiple ways from aligning with a 1.5°C scenario. These climate leaders are showcased on the Global Opportunity Explorer together with strategies and over 1,000 sustainable solutions from across the globe.

As part of the UN Secretary-General's global call to action, we urge you to step up and take action in support of a 1.5°C future now.



Lise Kingo
CEO & Executive Director,
UN Global Compact



Remi Eriksen
President & CEO,
DNV GL



Rasmus Schjødt Pedersen
CEO & Senior Partner,
Sustainia

©Tom Hegen, The Shark Bay Series. The Shark Bay UNESCO World Heritage Site sits at the most westerly point of Australia and covers an area of 23,000km². It is home to precious marine life vulnerable to climate change. The natural and vibrant elements of earth and sea fuse together to create some of the most captivating landscapes in Australia.

By Lise Kingo,
CEO & Executive Director,
UN Global Compact

Business leaders: **Join the movement**

Climate change is finally being recognised as the global crisis that it is. Never before have so many citizens across the world been impacted by climate change, and never before have so many people been raising their voices for action — including many young people across the world.

From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. As the global climate emergency continues to threaten the livelihoods of both people and the planet, we are already seeing business operations and economies disrupted around the world.

Last November's report by the Intergovernmental Panel on Climate Change (IPCC) demonstrated the difference between a 2°C and 1.5°C future, making the clear case that every half degree of global heating makes a world of difference. Ambitious climate action is integral to the successful implementation of all 17 of the Sustainable Development

Goals as well as the Paris Agreement, but we need to act with urgency.

The only future we have depends on our ability to successfully limit the worst impacts of climate change, focusing not only on mitigation, but on resilience and adaptation as well. Fortunately, we collectively have the innovation, tools, and expertise to rise to the challenge — what we need now is courageous leadership.

Recognising a new wave of climate leadership

We know that successfully halting climate change and dealing with its impacts will take unprecedented effort by all stakeholders. As UN Secretary-General António Guterres said in an interview for TIME





magazine, “climate change is not a problem for multilateralism, climate change is a problem for us all. But I think climate change offers an opportunity for multilateralism to prove its value”.

Young people understand the urgency of this crisis better than anyone. While adults negotiate, young people are demanding immediate action. What we need is an intergenerational dialogue — an exchange of ideas and solutions between leaders young and old to bring together the best and brightest across generations, geographies and cultures, united in rising to the climate challenge.

For governments and business, working together to build a prosperous, net-zero carbon economy by 2050 is critical. Companies have an opportunity to step up as leaders at the forefront of the climate movement, reimagining the way they can work together with both governments and the United Nations to shift industries and transform the way we do business.

Taking action for a 1.5°C future

Already, over 2,400 companies and 350 investors have committed to advancing the Paris Agreement through a range of actions including: carbon pricing; setting science-based targets; sourcing 100% renewable energy; and integrating climate-related financial disclosures into the heart of corporate strategy. However, despite this increasing business engagement, the pace of action and investments is far from meeting the 1.5°C goal.

That is why earlier this year, the UN Global Compact, together with a broad coalition of more than 25 other business, civil society and UN leaders, launched a global campaign calling on business

leaders to step up their climate ambitions by setting science-based targets aligned with limiting global temperature rise to 1.5°C above pre-industrial levels. Frontrunners are already proving that a 1.5°C-compliant business model is possible, and there is evidence that these companies will be best-placed to thrive in the economies of tomorrow.

But to send powerful signals to consumers, investors and governments, we need more high-emitting businesses to join the movement. Only then can we reach a positive tipping point where 1.5°C-aligned corporate strategies are the new normal for businesses and their supply chains around the world.

Raising our ambition together

To create this new normal in due time is a must to avoid the worst impacts of climate change. We are running out of time, and I strongly urge companies around the world to join the campaign and take action now. It must become mainstream and easy to see the benefits of being a ‘1.5°C business leader’. But business cannot act alone. Government policies are essential to provide companies and investors with the clarity and confidence they need to drive further investments in climate solutions. This in turn drives growth and job creation, and helps manage risk and ensure competitiveness as part of a just transition.

The coming year is critical in our attempt to address climate change and to get back on track towards a 1.5°C future. The efforts are lagging behind and it takes an unprecedented effort from both business and governments together with civil society to make up for years of inaction. But we can still do it, provided that companies step up and take the lead in setting science-based targets. We cannot afford to miss that opportunity and are fast running out of time and options. So business leaders: join the movement and join it now.

In parallel with corporate climate action, governments can use this opportunity to make clear their economic development pathways and plans to enable companies to invest decisively in a net-zero future. Through this positive ambition loop, private and public partners can drive more meaningful and ambitious climate action, particularly in hard-to-abate sectors.

The bold individuals, countries, and organisations that step up are well positioned to be the leaders of tomorrow. Our only future depends on all of us collectively scaling up our climate actions and ambitions, and business leaders have the opportunity to lead the way. We must show the young generation that we are serious about changing course for a better, more sustainable world.



©Tom Hegen, The River Vein Series. As Icelandic glaciers melt, ice-blue water veins flow across black volcanic sand, creating most peculiar patterns in the landscape. Those scenes have an element of duality. It is hard to tell whether a picture was taken from a macro perspective or from a small airplane around 3000ft in the air.





**“We have
taken action for
a 1.5°C future”**

Anand Mahindra,
Chairman, Mahindra Group

Join the 1.5°C campaign



What does the 1.5°C commitment entail?

The 1.5°C campaign is a commitment that sends a powerful message to business peers, investors, policy makers, customers, suppliers, civil society organisations, and other stakeholders. Those business leaders who sign on confirm that within the next 24 months, their company intends to calibrate decarbonisation plans with the ambition required to limit warming to 1.5°C through one or both of the following options:

- **Option 1: 1.5°C science-based targets**

By aligning greenhouse gas emission reduction targets, across all relevant scopes, with 1.5°C emissions scenarios.

- **Option 2: Net-zero commitment**

By setting a public goal to reach net-zero emissions by no later than 2050 in line with 1.5°C scenarios and interim quantitative targets, consistent with this ambition, and in line with the criteria and recommendations of the Science Based Targets initiative.

Companies joining the campaign are expected to formally commit, if they have not already done so, to set science-based targets through the Science Based Targets initiative (SBTi), and to subsequently submit their targets for validation by the SBTi.

Why should businesses take action for 1.5°C?

The business benefits of science-based climate action are clear. Leading companies are already proving that 1.5°C-compliant business models are possible, and there is evidence that these companies will be best-placed to thrive as the global economy undergoes a just transition to a net-zero future by 2050. The 1.5°C campaign is also an opportunity for businesses to demonstrate leadership in their sector and work with governments to accelerate climate action.

See the full list of business leaders who have joined the 1.5°C campaign by scanning the code below.





By Erik Rasmussen,
Founder, Sustainia

How to be a 1.5°C transformer

The 1.5°C business leader has to rethink and expand what business is all about — and do it fast. The next 1,000 days might decide what it takes to be a transformative leader.

In 2030, when we look back 10 years we might remember this period as the biggest, strongest, and most challenging disrupter of business leadership ever with the disrupting force of climate change as a complete business game changer. If not we may have failed our climate mission and not clearly understood what 1.5°C leadership is all about. Solving climate change needs a fundamental mindset change — rethinking and expanding what it takes to do sustainable business.

Until now we have been through the easiest part of the process: creating awareness of the Sustainable Development Goals and the climate challenges by discussing the challenges and options at numerous conferences and seminars. It has paid off in the business community. According to a 2019 survey conducted by the UN Global Compact, 85% of global CEOs claim that they are personally committed to ensuring that their company is a sustainability leader.

But now follows the difficult part: turning awareness and commitments into business reality. That

seems to be another ball game, according to the UN Global Compact survey.

Only 32% of the CEOs indicate their company has, or plans to set, corporate goals that are sufficiently ambitious, science-based and aligned with the needs of society.

The survey also reveals that while 71% recognise the critical role that business could play in contributing to the delivery of the Sustainable Development Goals, a mere 21% believe that business is actually playing that role.

The 1,000 day transformation

These and other supporting figures confirm why true and credible 1.5°C business leadership calls for new mindsets and new business models. And speed matters. Still more reports with still more alarming conclusions confirm that we are far off the 1.5°C trajectory but are heading for critical tipping points and temperature rises of 3°C and more. So this year is really the last, last call for 1.5°C business leadership.

Given the speed and scale of the challenges, we have to downplay the 2030 deadline. Instead, we must deliver breakthrough results within a much shorter time span: three years. If business at large cannot provide major transformations within 1,000 days, we risk falling further behind and any narrative of 1.5°C business leadership will be more fiction than fact. That is why 1.5°C business leadership should entail more than committing to more ambitious targets. It should commit any company to expand its role and responsibility in developing sustainable societies.

One thing is joining the campaign and committing to setting targets. Another and far more demanding challenge is to integrate this into all business decisions and embed the corporate commitment throughout the company with buy-in from all employees. It is a matter of developing a new corporate identity. The 1.5°C campaign should be seen as a major transformer of a business model — an opportunity to rethink the raison d'être of the company in a new world order. Failing to understand and accept that perspective, the commitment risks being reduced to an instant CEO gimmick. Becoming a 1.5°C business leader should be rated as a fundamental strategic decision with widespread implications for the company.

So far more than 600 companies have committed to setting science-based targets and around 60 of those companies have committed to 1.5°C. That is good news for a start, but what really matters are the first impact reports — how did it work out and how did it change the business models and influence the climate? We need to learn these lessons very fast, and we need a breed of '1.5°C business heroes' who can galvanise business leaders to join the 1.5°C campaign.

That is why '1.5°C business leadership' should be seen as a prerequisite for tomorrow's CEOs — a leadership that must expand its role and responsibility in society. Taking action for 1.5°C means recognising and accepting a new business paradigm that makes private companies entrepreneurs of a new sustainable world order. The 17 Sustainable Development Goals have defined the new role of business, which has

been embraced by companies. But as documented in the UN Global Compact surveys, businesses must now translate commitments into new business models, strategies, and solutions.

It all depends on mindsets and how to approach the turbulent business environment. You must understand that the difference between a risk and an opportunity is how soon you discover it, and why the difference between managing risks and opportunities is a matter of being reactive or proactive. There is no doubt about what kind of leadership is needed to remain within 1.5°C degrees.

Choose your history

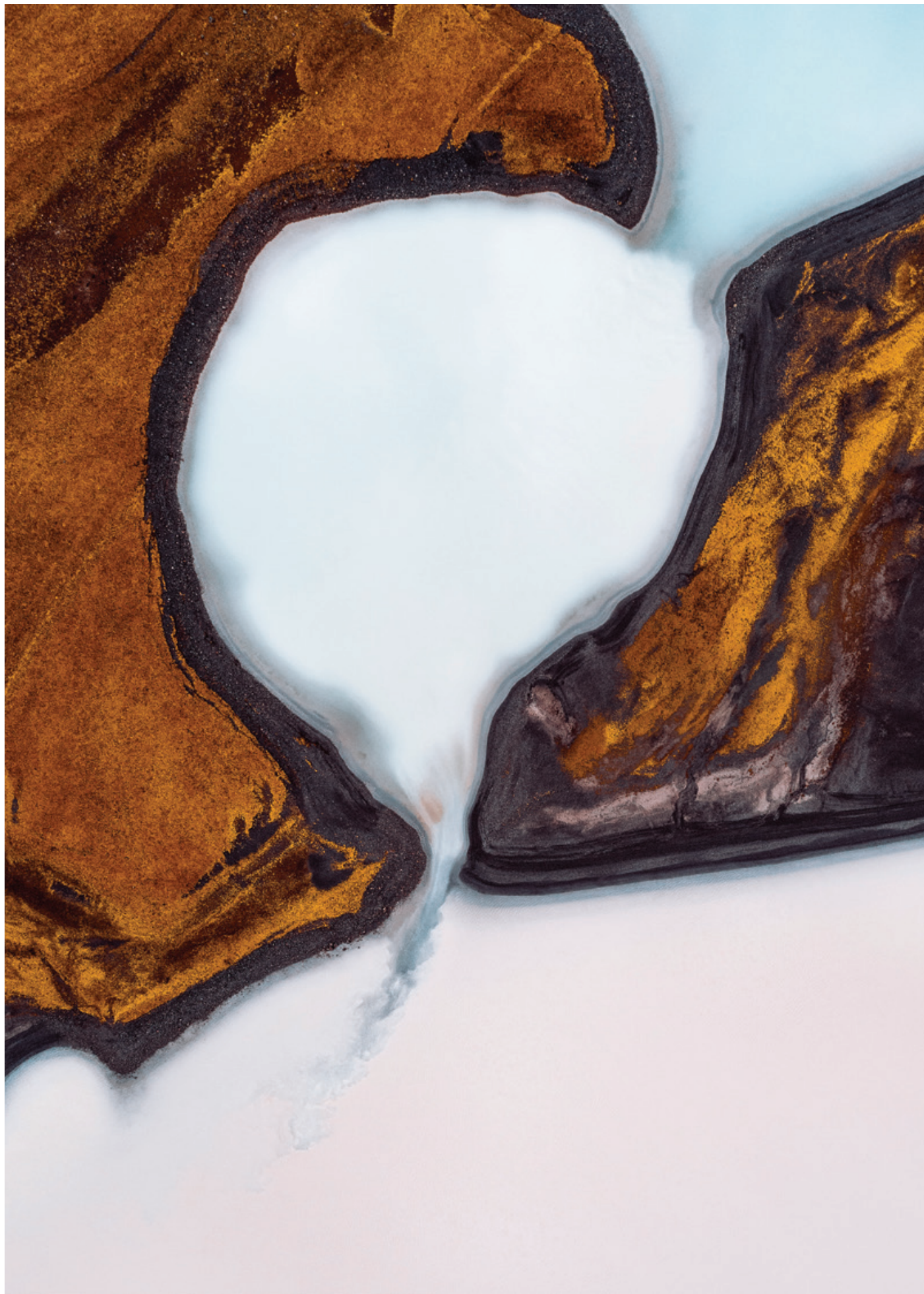
Climate change tops the list of environmental, social, and governance (ESG) concerns for investors in 2019 and consumer perceptions of corporate sustainability performance are having more and more of an impact on purchasing patterns. The accelerating treadmill of corporate leadership combined with growing pressure from stakeholders means that CEOs who do not become 1.5°C leaders will simply be eliminated.

1.5°C business leaders may be considering their position in history. In 2100 we will know if we managed to stay below the 1.5°C scenario. Scientific models will have been played out, and we will have seen the consequences of climate change caused by the human race. The 1.5°C business leaders of 2019 may be those remembered as the minority who tried and failed, or the vanguard who upped their ambition and led the masses. And the CEOs who did nothing will be seen as the villains of the past. 1.5°C business leaders are choosing right now which side of history they wish to fall.

As the global average temperature continues to rise and we increasingly see the effects of climate change in reality, the time for leadership is now. Some are born for this type of leadership, but many will have to transform from just CEOs to become 1.5°C business leaders and join the private sector climate vanguard. Only those with the right mindset will be able to make this transformation, and only they stand a chance of being remembered favourably in 2100.



© Tom Hegen, The Iceberg Series II. A visual study of shapes, patterns and luminosity of icebergs in the Ilulissat Iøefjord. A UNESCO World Heritage Site 250km north of the Arctic Circle, Greenland's Ilulissat Iøefjord is the sea mouth of Sermeq Kujalleq, one of the few glaciers through which the Greenland ice cap reaches the sea.



The story of an opportunity mindset

Turning risk to opportunity is a mindset. It is a mindset that has transformed individuals, businesses, and markets. Now it is clear that only those with this mindset will be able to unlock the opportunities of humanity's greatest risk to date: climate change. It took the combined sustainability strategy of the UN Global Compact, business acumen of DNV GL, and creative communication of Sustainia to conceptualise the mindset in 2015, with the advent of the Global Opportunity Reports.

Global Opportunity Reports

Launching one month after the World Economic Forum's (WEF) Global Risks Report, the first Global Opportunity Report provided an antidote to the traditional risk-centric approach of business. Surveys with more than 17,000 business leaders over the five annual editions since then have revealed 55 global opportunities, regional insights, and scores of business pioneers adopting the opportunity mindset.

The first Global Opportunity Report in 2015 focused on five key risks from the WEF Risks Report. The report identified fifteen market opportunities stemming from these risks and included region and industry-specific analyses.

The 2016 edition expanded the total market opportunity count to 30. The report also showcased eight opportunity leaders, demonstrating a readiness to take on the

responsibility of building a more sustainable future and using the Sustainable Development Goals (SDGs) as a compass for this journey.

The Global Opportunity Report 2017 once more surveyed thousands of business leaders to show the opportunities behind the five key WEF risks, and identified the need for a new leadership paradigm to address the gap between risk and opportunity.

The fourth edition of the Global Opportunity Report in 2018 honed in on the four SDGs that, according to DNV GL's "Future of Spaceship Earth" study, were most likely to miss their 2030 targets.

Having identified hundreds of opportunities and thousands of concrete solutions addressing global risks, the 2019 edition focused in more detail on climate change, 'the biggest market disruptor'.

The 2020 edition will continue the series and will be launched in February 2020 at BI Norwegian Business School in Oslo.

The Global Opportunity Explorer

The founders of the opportunity mindset also created a digital platform to house all of the previous insights, analyses, and solutions. The Global Opportunity Explorer is the first of its kind to vet, verify, and present high-quality solutions that exist in the market, and is now the world's leading

open ecosystem for sustainable solutions. Rooted in five years of research, surveys of 17,000 business leaders and 17 expert panels from the Global Opportunity Reports, the Explorer contains over 1,000 sustainable solutions, market opportunities, and urban climate solutions, all addressing the SDGs. The platform relies on continuous co-creation and crowdsourcing for expansion. Anyone can contribute solutions for free, which are then vetted by Sustainia's experts, and uploaded to the platform if accepted.

The Global Opportunity Explorer has also inspired a daughter site of its own, theexplorer.no is a Norwegian governmental initiative and showcases Norwegian solutions addressing the SDGs.

An opportunity mindset is paramount for 1.5°C leadership

If the 1.5°C target of the Paris Agreement is to be achieved then the opportunity mindset must be adopted at a far greater scale and speed. The Global Opportunity Explorer continues to gather the mindsets, strategies, and solutions from the network of adopters, inspiring corporate sustainability leadership all over the world.



Investing for our only future

1.5°C business leadership from the UN-convened Net-Zero Asset Owner Alliance

An international group of institutional investors representing more than 1.7 trillion USD has committed to transitioning their investment portfolios to net-zero emissions by 2050. The UN-convened initiative, called the Net-Zero Asset Owner Alliance, shows the role investors can play in aligning with a 1.5°C scenario.

With long-term horizons, asset owners are acutely vulnerable to the systemic disruptions that climate change will cause in ecosystems, societies, and economies. They also have a key role to play in today's emerging sustainable finance landscape, fostering economic decarbonisation and climate-resilience. With over 1.7 trillion USD in assets under management, the UN-convened Net-Zero Asset Owner Alliance plans to use its financial influence to drive progressive financial industry practices.

The Alliance is a recently formed international coalition of public and private institutional investors that seeks to leverage emissions reductions in the real economy down to the neutrality needed for

climate stability. Alliance members will advocate for, and engage in, corporate and financial industry action, as well as public policies, to support the low-carbon transition of economic sectors, while considering associated social impacts.

The Alliance will regularly report on progress, including establishing intermediate targets every five years in line with the Paris Agreement.

The UN-convened Net-Zero Asset Owner Alliance is supported by the UN Environment Programme Finance Initiative and the Principles for Responsible Investment in collaboration with the WWF, and is part of the Mission 2020 Campaign.



“Science-based targets should become a standard business practice”

Alberto Carrillo Pineda, Director of Science Based Targets and Renewable Energy at CDP

What are science-based targets?

Science-based targets are those adopted by companies to reduce greenhouse gas emissions in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement — to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.

Alberto believes that by joining the Science Based Targets initiative (SBTi) and publicly committing to science-based targets, companies are able to demonstrate their leadership on climate action. These targets are validated by a panel of industry experts. “As more and more companies join the initiative it will create a critical mass that will drive an increase in science-based target setting throughout the private sector” says Alberto.

Towards a net-zero future

“As well as an important tool for companies aligning with the 1.5°C scenario, science-based targets also help companies take action in the shorter-term, while aligning with the long-term goal of reaching net-zero emissions by mid-century” says Alberto. The combination of shorter-term science-based targets with long-term strategies provides a powerful combination that gives certainty to investors and other stakeholders that the company is mitigating transition risks.



Good for business

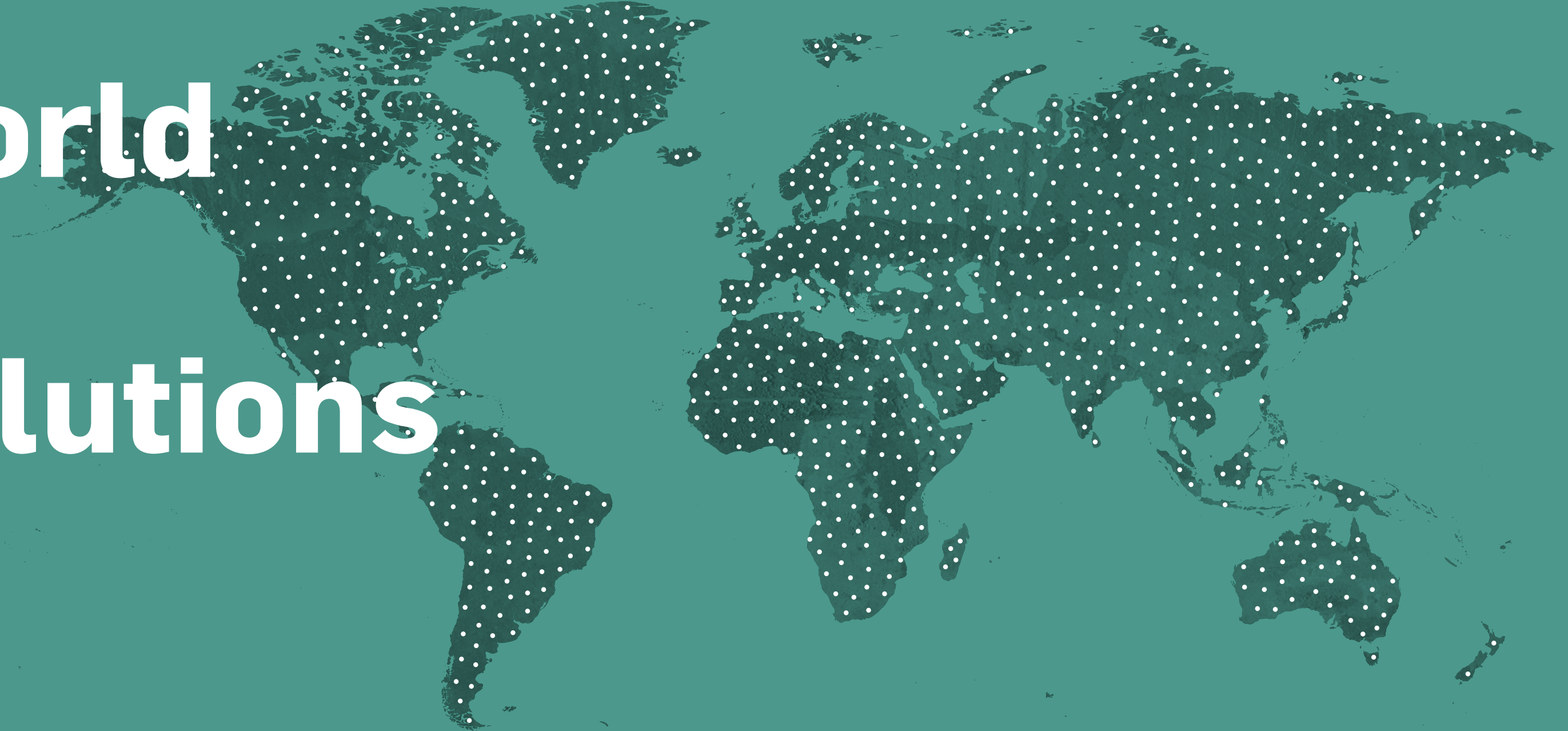
Businesses are seeing benefits from setting science-based targets in six areas of business: increasing innovation; reducing regulatory uncertainty; strengthening investor confidence and credibility; improving profitability and competitiveness; improving brand reputation; and bottom line savings.

The SBTi is a collaboration between CDP, the UN Global Compact, World Resources Institute (WRI), and the WWF, and is one of the We Mean Business Coalition commitments.

600+ companies have committed to setting science-based targets within 24 months.
230+ companies have had their science-based targets validated by the SBTi.



A world of solutions



The Global Opportunity Explorer contains over 1,000 sustainable solutions that address the Sustainable Development Goals. The Global Opportunity Explorer is still growing, and you can contribute for free by submitting your solution online. This report features solutions from UN Global Compact participating companies who have joined the 1.5°C campaign, as well as leaders with mindsets who are demonstrating 1.5°C strategies.





DALMIA | INDIA | RESOURCES

Industrial waste for low-carbon cement production

Dalmia is repurposing industrial waste products, turning industry byproducts and scrap into a cement high on strength and low on environmental impact.

By substituting a percentage of cement ingredients with industry waste products, Dalmia saves natural resources and helps to reduce the environmental impacts of its industrial processes. The blended cements include industrial waste products such as fly ash from coal-based thermal power plants and waste from the steel industry. These additives lead to reductions in limestone mining and improvements in energy efficiency with reduced CO₂ emissions from the actual manufacture of their cement, resulting in an average intensity of 526kg/t compared to the global average of 900kg/t.

Dalmia is part of the Caring for Climate initiative and uses an internal carbon price to generate funds for investing in low-carbon technology. The company continues to innovate, driving up the percentage of waste products incorporated in their

cements to simultaneously drive down their greenhouse gas emissions and sequester carbon from the atmosphere with the clear goal in mind to achieve net negative emissions by 2040. Dalmia was the first heavy industry sector company to make this commitment. The company is currently five times water positive and has pledged to become a 10 times water positive cement group by 2030.

Dalmia's 1.5°C commitment

Dalmia was ranked as the most sustainable cement producer in the world by the Carbon Disclosure Project in 2018. The company was the first in the industry to become a member of RE100 and EP100 projects, and recently announced a commitment to set science-based targets aligned with a 1.5°C scenario.



ACCIONA | GLOBAL | FINANCE

Pricing carbon drives decarbonisation

Acciona has put a price on carbon to affect both internal business decisions as well as external investment decisions, moving the company towards its 1.5°C commitment.

Acciona, a global renewable energy and infrastructure group, introduced an internal carbon pricing accounting system in 2016. This requires every business unit across Acciona's global operations to measure its carbon emissions and pay for offsetting them, typically with carbon credits issued by the UN's Clean Development Mechanism, which helps finance sustainable projects in the developing world. This acts as an internal tax, incentivising each business unit to reduce its carbon emissions as much as possible

without stipulating how it should be done. This suits the diverse range of activities the business units are responsible for.

In addition to the internal carbon price, Acciona also uses a shadow carbon price to assess the climate risk of future projects and investments. This shadow price is based on the estimated cost to society of a future project's carbon emissions and helps to align business growth with Acciona's 1.5°C commitment. Acciona halved its emissions between 2010 and 2015 and publicly advocates for more ambitious climate policy that includes carbon pricing mechanisms.

Acciona's 1.5°C commitment

Acciona was one of the first companies to have committed to more ambitious science-based emission reduction targets aligned with 1.5°C of global warming and have these targets validated. The company is also part of the Caring for Climate initiative.



World's first wastewater biofactory



Aguas Andinas, Chile's largest water utility company, has partnered with SUEZ to process Santiago's wastewater. The biofactories reduce pollution in the Mapocho river and generate bioenergy and fertilisers in the process.

Aguas Andinas and SUEZ are transforming Santiago's three wastewater treatment plants into biofactories that convert wastewater and sewer sludge, a wastewater treatment byproduct, into clean energy, fertiliser, and clean water.

Wastewater from urban and industrial environments is directed to the bio-factories, which harness natural processing techniques in order to minimise energy and chemical usage. Low-energy nitrogen treatment, coupled with the transformation of carbon into biomethane and dry biosolids, have enabled the plant to become energy-positive. The wastewater treatment plant has become a centre that produces resources (water, nutrients, fertiliser) and energy (biomethane, electricity, heat), with minimal environmental impact on noise, odours, and landscaping. Treated wastewater is reused directly or indirectly for agriculture to enhance the resilience of territories and to mitigate water scarcity risks.

In developing and emerging countries, SUEZ identifies the greenhouse gas emissions mitigation imperative as a good entry point to catalyse and accelerate waste management systems. Although many governments have already included references to their waste and water management policies in their current Nationally Determined Contributions, SUEZ welcomes clearer and more specific policies as part of the Caring for Climate initiative.

The three plants produce 49GWh of electricity and 177GWh of natural gas annually, enough for the consumption of 50,000 and 22,500 inhabitants respectively. The biofactories will be zero-waste, energy self-sufficient, and carbon neutral by 2022, a solution that contributes to SUEZ's and Aguas Adinas' water stewardship practices adopted as part of the CEO Water Mandate and helps achieve their emission reduction targets set through the Science Based Targets initiative.

SUEZ's 1.5°C commitment

SUEZ is one of the first companies to have committed to more ambitious science-based emission reduction targets aligned with 1.5°C of global warming and have these targets validated.





Accelerating Japan's

Yuki Isogai,
Partner of Sustainability,
PwC Japan



Consultancies are the mechanics of Japan's sustainable transition: diagnosing the creaks of organisations in need of a sustainable service, and providing the tools necessary for their low-carbon future. That is the message from Yuki Isogai, Partner of Sustainability at PwC Japan.

As the first country to officially incentivise companies to set science-based targets, Japan is amongst the leaders in encouraging corporate action on climate change. The role for consultancies like PwC Japan in helping companies to understand, visualise, and implement changes has therefore never been bigger.

Yuki is certain of one thing, and that is change. Change is coming to the Earth's climate, and the Japanese market. How much change though is the most important question, and as the IPCC Special Report on 1.5°C made clear, half a degree can make a world of difference. Yuki believes "there is always a market for what is valuable to society" and a stable climate is certainly valuable for society - the 1.5°C report puts that beyond doubt.

Japan is uniquely positioned as a highly industrialised island nation in a tectonically active area that also lacks natural resources. It is therefore highly dependent on fuel imports for energy, and in 2016 it imported 96% of its fuel for energy production. Yuki sees this as an industry ripe for transformation in a 1.5°C scenario, with opportunities for business in the creation of more renewable energy, a regional distributed energy production and consumption system, and innovations in efficiency throughout the island nation.

Yuki believes that in today's society, there is no doubt that companies exert much influence on both social and environmental issues, and they must be part of any solution to long-term challenges. At their best, companies can create social movements, behavioural changes, and technological innovation to greatly improve the lives of citizens. At their worst, they can slow progressive change, maintain the status quo, and prolong damaging behaviours. This potential has been recognised by the Japanese government which has placed company actions at the center of Japan's new long-term strategy to reduce greenhouse gas emissions. Yuki believes that PwC Japan is well-positioned to aid companies acting as change-makers in this future sustainable society.

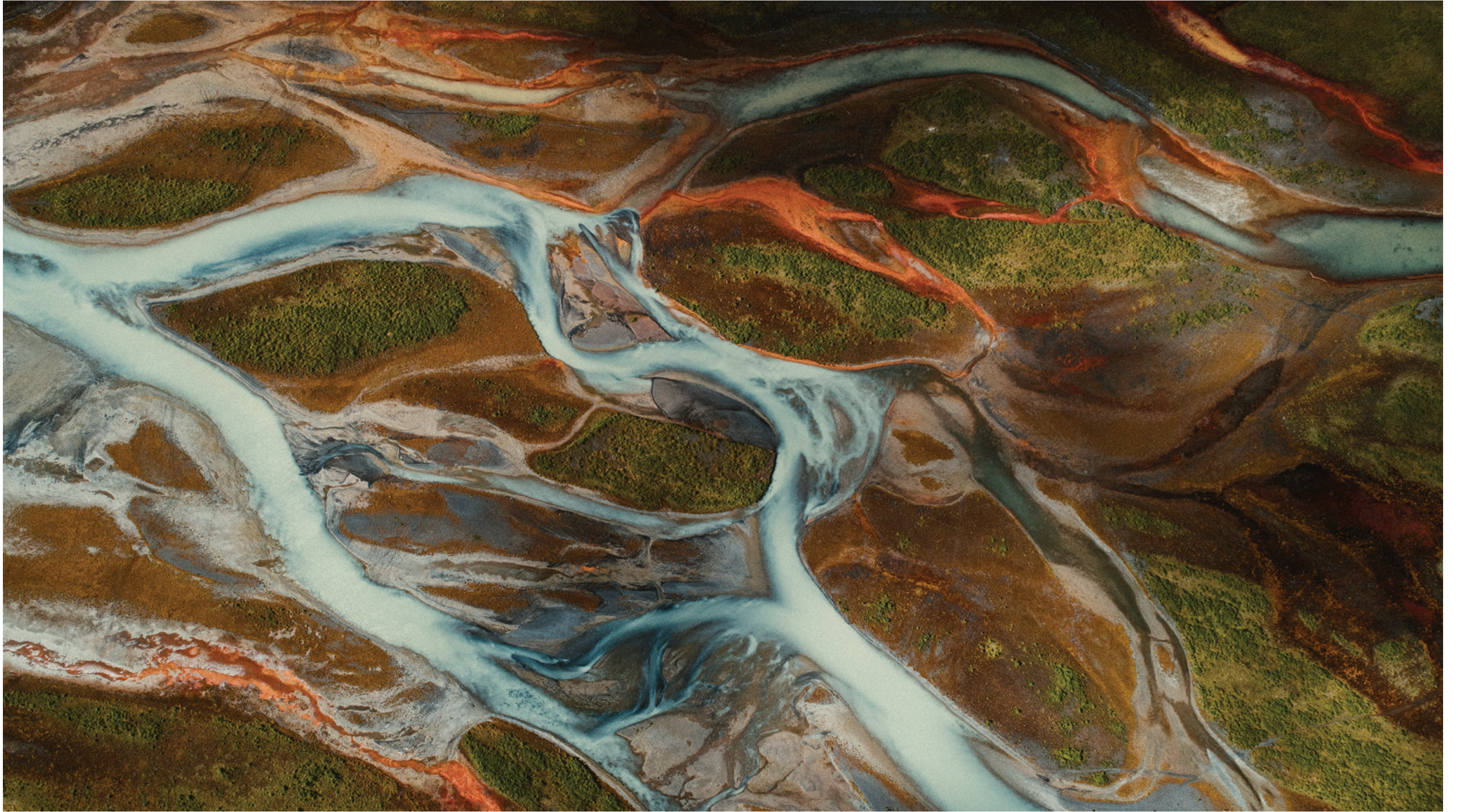
Climate change is a challenge unlike any seen before. With long-term consequences impacting the most vulnerable disproportionately, it can be challenging for businesses to understand the problem, let alone their role in the solutions. Yuki believes that mindset changes are first required at board level, with companies looking further ahead into the future. Fortunately, Japan is no stranger to the long journey. Forty percent of all of the companies that have been in existence for more than 200 years exist in Japan. This culture of thinking long-term contrasts with the short-sightedness seen in other economies.

Changing the mindsets of these companies who are well-equipped to deal with long horizons can take time. However, Yuki has seen plenty of evidence already to suggest that after several rounds of discussions with senior business leaders, it is possible to create an opportunity mindset of sustainable change. Once business leaders understand that this sustainability transition can go hand in hand with strong and enduring business performance, then it is less of a hurdle to overcome.

PwC Japan also works to encourage an environment of change in Japan and to help drive ambition loops with public policy. For example, in June this year as part of the long-term climate and growth strategy, the Japanese government became the first in the world to incentivise companies setting science-based targets. As companies step up and set ambitious science-based targets for mitigation, this creates the precedent and environment for the government to set more ambitious policies and regulations, thus creating positive feedback loops. With a strong understanding and competency in setting and implementing changes to achieve science-based targets, PwC Japan is capable of accelerating the changes, operating within the framework set up by the government.

PwC Japan is involved with helping to create mindset changes needed for companies to commit to setting science-based targets, helping companies understand how to set these targets, and creating strategies for implementing the changes needed to achieve the goals. In this sense Yuki sees the role of PwC Japan as a mechanic, diagnosing the creaks of organisations in need of a tune-up, and providing the tools needed for many more years of clean and efficient running.

sustainable future



©Tom Hegen, The River Vein Series. As Icelandic glaciers melt, ice-blue water veins flow across black volcanic sand, creating most peculiar patterns in the landscape. Those scenes have an element of duality. It is hard to tell whether a picture was taken from a macro perspective or from a small airplane around 3000ft in the air.



IBERDROLA | SPAIN | ENERGY

Europe's largest solar plant

Iberdrola is moving forward with Europe's largest solar photovoltaic plant as a massive step in the company's clean energy strategy.

Iberdrola has initiated the development of Francisco Pizarro, Europe's largest photovoltaic plant, in Extremadura of Spain. Occupying a 1,300 hectare site, the Francisco Pizarro plant will have a capacity of 590MW when the plant comes into operation in 2022. It will provide clean energy to 375,000 people, while reducing an estimated 245,000 tonnes of CO₂ annually. During its construction, the project will employ 1,000 people, contributing to Iberdrola's commitment to ensure a just transition where shifting to a low-carbon economy creates green and decent jobs.

The Francisco Pizarro project has an investment of more than 300 million EUR and is a central part of Iberdrola's 34 billion EUR projected investment for the period 2018–2022. This plan allocates almost 40% of this investment to renewable energy

deployment and 47% to networks, setting solid foundations for sustainable growth in the next decade, fully aligned with the most ambitious climate scenarios.

Iberdrola has set an internal price on carbon and is calling on governments to deliver more robust climate policy frameworks to drive investments in a low-carbon economy. The company is also part of the Caring for Climate and CEO Water Mandate initiatives.

Iberdrola's 1.5°C commitment

Iberdrola was one of the first companies to commit to more ambitious science-based emission reduction targets aligned with 1.5°C of global warming. These targets have also been validated by the SBTi.



NATURA | BRAZIL | RESOURCES

Circular carbon in the Amazon

Circular Carbon is the first carbon 'insetting' project within the Natura production chain. It remunerates communities for environmental conservation, with the goal of combating deforestation in the Amazon region.

To contain deforestation and encourage family agricultural producers to conserve local vegetation, Natura has developed a project that pays for carbon offsetting in its production chain, known as Circular Carbon. This type of carbon 'insetting' remunerates smallholders for environmental conservation services that boost the resilience of the supply chain, providing them with an additional source of income on top of existing revenues from the sourcing of raw materials.

With this, the company is seeking to broaden its relations with the supplier communities in the region and reconcile production with conservation. Natura's Circular Carbon project is

located in one of the regions in Brazil under the greatest pressure from deforestation and the goal is to replicate it in other communities in the Amazon region.

Natura's 1.5°C commitment

Natura's Circular Carbon project is an example of a nature-based solution that integrates natural systems into concrete climate action and helps advance both climate change mitigation and adaptation, contributing to Natura's 1.5°C trajectory. The company has also put an internal price on carbon and committed to engage responsibly in climate policy through the Caring for Climate initiative.



Jakob Askou Bøss,
Senior Vice President, Corporate Strategy
and Stakeholder Relations, Ørsted



It only takes a decade

Other organisations and industries must learn from Ørsted's remarkable ten-year transformation, according to Jakob Askou Bøss, Senior Vice President of Corporate Strategy and Stakeholder Relations at Ørsted.

If someone said to you ten years ago that one of Europe's most fossil fuel intensive energy providers would be producing more than 80% of its energy from green sources in a decade, it would have been difficult to imagine. But that is precisely what Ørsted has done. Ten years, 2020–2030, is also the timeframe the world has in which to halve global carbon emissions and move towards a 1.5°C scenario. Decisions taken today will shape the future

emissions curve, impact the level of future warming, and ultimately determine the scale of impact climate change has on humanity.

"We began our transformation with the 85/15 vision," says Jakob, who is responsible for corporate strategy and stakeholder relations at Ørsted. In 2008, 85% of Ørsted's power and heat production was black and 15% was green. Within a generation, the ambition was to turn that ratio on its

head. But progress has been faster than expected: by mid-2019 82% of the company's energy was generated from renewable sources, including offshore and onshore wind, solar, and bioenergy. By 2025 that figure will rise to 99% based on decisions already made, making Ørsted's energy production virtually emission free. The company's vision is a world that runs entirely on green energy.

The key ingredients

Ørsted's radical vision for change was driven by a determination to help transform global energy systems from fossil fuels to renewables and make the company relevant and competitive in an era of global climate action. That determination, Jakob believes, was supported by three key ingredients that helped to realise Ørsted's decadal transformation: clear policy frameworks; setting ambitious targets; and innovative partnerships. These are all ingredients that he sees potential for replication elsewhere by companies across industries.

Clear policy frameworks

The EU's 2020¹ energy policy goals were decided in 2008 and set a clear direction for energy development in the EU towards 2020. Jakob believes this kind of long-term policy framework was key for Ørsted's decision to embark on its transformation.

Ørsted has also been key in driving down the levelised cost of electricity from offshore wind. The UK government, for instance, wanted to diversify the national energy mix. Ørsted set an ambitious cost reduction target in 2013, promising to deliver new offshore wind energy at 100 EUR per MWh by 2020. This target was achieved more than three years ahead of schedule and helped cut costs by more than 60%. The commitment to cost reduction was important in creating political momentum for large-scale development of offshore wind in the UK, which is the world's largest offshore wind market today.

Ambitious targets

Setting and meeting ambitious targets for sustainable development of the business, often based on the direction set by policy frameworks, has been instrumental to Ørsted's transformation. That

includes the 85/15 vision, the bold cost-reduction targets for offshore wind and, since 2013, incrementally increasing targets for cutting the company's carbon emissions, Jakob says.

Ørsted was one of the first companies to set a science-based target for reducing emissions from power generation. The company has now raised the ambition level again and committed to reduce its greenhouse gas emissions intensity of power generation by 98% by 2025, compared to 2006. It also commits to reduce indirect greenhouse gas emissions from end use of its products and in its supply chain by 50% by 2032, from a 2018 base-year. Ørsted has also recently joined the 1.5°C campaign.

Innovative partnerships

Companies can also work within strong policy frameworks to set ambition loops in play, Jakob says, adding that Ørsted's innovative financing model for offshore wind farms has helped accelerate the growth of offshore wind. Stable and long-term government policy enabled the company to invite investors to acquire 50% ownership of an offshore windfarm which allowed Ørsted to free up capital to continue investing in new offshore wind farms, thus further maturing and scaling the industry. It is now cheaper to develop offshore wind power than build a new coal- or gas-fired power plant.²

From vision to reality

Jakob believes that Ørsted is well on the way to completing its transformation to a sustainable energy company. "If we hadn't embarked on our ambitious transformation from black to green energy, our business model would have been under severe pressure today. Instead, we decided to renew ourselves from within, driven by the vision of creating an energy company based on green energy, and which would have a business model that is fit-for-purpose in the new world of renewable energy. Today, ten years on, we have proven that our vision could be turned into reality," says Jakob, and concludes:

"We want to inspire others on their journey of transformation, because the world desperately needs ambitious climate action to stay below 1.5°C."

1 The EU 2020 climate and energy package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020.

2 Bloomberg New Energy Finance, 2019. New Energy Outlook 2019.



© Tom Hegen, The Salt Series. The production of sea salt is one of the oldest forms of human intervention in natural spaces, created from evaporation of seawater from artificially created ponds. The colour of the water indicates the salinity, created by changing of micro-organisms in the ponds. The salt ponds and marshes are an important habitat for many species like birds, shellfish, and micro-organisms.



LEVI STRAUSS & CO. | GLOBAL | RESOURCES

Water-reducing jeans production

Under their Water<Less® range, Levi Strauss & Co. have saved over three billion litres of water and recycled two billion litres by optimising their use of water and making changes to the production and processing steps in jeans manufacturing.

As part of the company's sustainability focus, Levi Strauss & Co.'s Water<Less® collection focuses on reducing the amount of water needed to produce jeans, right from cotton production to the sales room. The company has performed two life cycle assessments on their products, and estimates to have saved over three billion litres of freshwater through a number of initiatives.

At the manufacturing level, Levi's is committing to reduce the amount of water used in highly stressed areas by 50% by 2025, with the ultimate vision of only using as much water as replenishes naturally wherever they operate. To this end, Levi's will help all of their key suppliers (representing 80% of total product volume) become distinguished Water<Less® facilities by 2025.

The company is part of the CEO Water Mandate and has made these water saving innovations publicly available, encouraging industry-wide participation in water saving.

Today, some 67% of Levi's jeans are made Water<Less®, which will increase to 80% by 2020.

Levi Strauss & Co.'s 1.5°C commitment

Levi Strauss & Co. was one of the first companies to announce a commitment to set science-based targets aligned with a 1.5°C scenario and have these targets validated.



COVESTRO | GLOBAL | RESOURCES

Replacing oil with CO₂ in plastics

Covestro uses waste CO₂ from other industrial processes as a chemical feedstock for manufacturing plastic foams.

Covestro and their partners have developed a chemical process enabling them to convert waste CO₂ into a raw material for the manufacture of plastics and foams. The company has engineered a new catalyst capable of binding CO₂ into polyols, which are the building blocks of polyurethane foam — a flexible plastic foam commonly used in mattresses and upholstery.

The process uses less energy than the conventional petroleum-based production of polyurethane polyols. The CO₂ used in the production process is a waste product from a neighbouring plant directly connected to Covestro's plant.

The company currently manufactures a commercial polyurethane foam with a CO₂-based content of 20%, resulting in a 20% reduction in the petrochemicals used in the production process. Their Dormagen factory in Germany was the first to install the technology to make foams, but they intend to produce rubber and synthetic fibres using a similar process in the future too.

In order to limit global warming to 1.5°C, we must pursue both rapid emissions reductions and carbon removal. Covestro's Carbon Capture and Use (CCU) technology is a strong example that contributes to achieving a net-zero economy.



Peder Holk Nielsen,
CEO, Novozymes

Catalysing change

Much like the enzymes it works with, Peder Holk Nielsen believes that Novozymes can act as an agent of acceleration, catalysing the future of sustainability through its unique position in society.

Enzymes are biological catalysts, uniquely shaped to increase the speed of reactions in the biological world. Continuously adapting to changing conditions around them, they are natural wonders that form a crucial and interconnected component of the microbial landscape. Peder Holk Nielsen, CEO of global biotech firm Novozymes, believes that it too can act as an agent of acceleration, shaping the future of sustainability through the business' unique position in society today.

"We have an important role to play in the climate dialogue at political, business and societal levels, and we want to showcase the power of biology to help solve this global challenge" says Peder, and he truly sees their business as a changemaker in the efforts to remain under 1.5°C of

global warming. With the right mindset, strategies, and solutions, there are several ways that Peder believes Novozymes can support and accelerate change at each of these levels.

The business level

Novozymes has been on a mission since 2005 to decouple growth from emissions, and so far it has made good progress. "In the last eight years absolute emissions from our operations have risen by only 6%, while revenue has increased by 48%" says Peder — "this has been achieved with our engineers, production site teams, and experts helping to shape the best decision making possible for our own investments". The company now aims to halve absolute emissions from operations by 2030 and be carbon neutral by 2050.



Peder singles out these long-term commitments, as well as target setting as two important strategies required for a sustainable transformation, "we were among the first companies to commit to and support efforts aligning with a 1.5°C scenario. Making such a commitment of course puts pressure on us and sets expectations, but it also enables us to make better decisions in the longer-term". He cites science-based targets as a key driver in building momentum for companies to reduce emissions in their operations and across the supply chain.

The societal level

"As a business-to-business company, explaining the wider climate and sustainability benefits of our solutions can be challenging", he continues. To address this, Novozymes has documented and demonstrated the potential of its solutions to enable customers to reduce emissions across multiple industries and geographies from agriculture, food production and processing, to advanced bioenergy and biorefining.

The political level

At a political level, Peder takes inspiration from the UNFCCC and the work of its Secretariat — "this organisation has been led by two outstanding female leaders in recent years. It has made an invaluable effort to support diversity of stakeholder views, including business, into the discussions, helping drive climate action at all levels". In a similar manner to the Nationally Determined Contributions (NDCs), Novozymes will be setting out its climate goals, plans and investments, and milestones that it will report back on. Peder says "we will continue to meet with key decision makers and will further assess our climate advocacy activities later this year, considering the outcomes of the Climate Action Summit and COP 25". These kinds of public-private interactions are important milestones that can help support raising levels of ambition", he noted.

Ultimately, Peder recognises that a company operates within society, and at its best should be a force for good. As Novozymes seeks to create better business with biology, it can also play an important role in reinforcing the positive benefits of climate action.



Waste to energy for Indian cities

Mahindra Waste to Energy Solutions Ltd (MWTESL) converts organic waste to biogas and organic manure. The technology converts more than nine tonnes of organic waste to energy on a daily basis to Chennai, and is operational in multiple Indian regions.

MWTESL has implemented several projects harnessing this scalable technology, with one in the central-west town of Indore that since its initiation in 2018 has processed more than 7,000 tonnes of organic waste, extracted over 180 tonnes of methane and

produced over 300 tonnes of fertiliser. Similar projects have been started in the regions of Maharashtra and Andhra Pradesh, with capacity varying from 18 to 45 tonnes per day.

Biogas provides energy to the cities in different forms, ranging from powering street lamps, to cooking applications, and for bus fuel. Converting organic waste into biogas also helps to reduce the reliance on fossil fuels and reduce the release of methane from waste.

Mahindra's 1.5°C commitment

Anand Mahindra, Chairman of Mahindra Group, was one of the signatories to the open letter urging companies to commit to setting science-based targets aligning with a 1.5°C scenario. The company was one of the first to commit to these ambitious targets and, as part of the Caring for Climate initiative, has put an internal price on carbon to help achieve these targets.



Native forest conservation programme

Viña Concha y Toro has a strong focus on conservation, protecting large areas of native forest around its Chilean vineyards for a range of ecosystem services.

The company protects more than 3,270 hectares of native sclerophyll forest and scrub in its Chilean estates — around one third of the total area of wine plantations. Sclerophyll forests were once more extensive, but now only exist in small patches in the coastal ranges and Andean foothills.

After their registration with the National Forestry Corporation (CONAF), Viña Concha y Toro agreed to work on the conservation and protection of these forests in the regions of O'Higgins and Maule, developing a specific plan for each forest leading to increased biodiversity and higher water quality. The winery also planted native species to restore certain areas previously affected by livestock farming and biomass extraction.

As well as protecting a range of native, endemic, and endangered species, the conservation programme also helps to provide a number of ecosystem services for the vineyard estates including carbon sequestration. The company estimates that each tree in these forests can capture around one tonne of CO₂ over its lifetime.

Viña Concha y Toro's 1.5°C commitment

Acknowledging the risk climate change poses to Viña Concha y Toro's future in terms of availability and quality of grapes, this solution contributes to curbing the effects of climate change and to the winery's commitment to set science-based targets aligned with a 1.5°C scenario. The company has also put an internal price on carbon.





©Tom Hegen, The Shark Bay Series. The Shark Bay UNESCO World Heritage Site sits at the most westerly point of Australia and covers an area of 23,000km². It is home to precious marine life vulnerable to climate change. The natural and vibrant elements of earth and sea fuse together to create some of the most captivating landscapes in Australia.

Inge Jan Henjesand,
President, BI Norwegian
Business School

Academia is a vital bridge

Business schools must act as a bridge between sustainably minded students and businesses in need of changemakers. That is the message from Inge Jan Henjesand, President of BI Norwegian Business School.



Today's generation of students are driven to create positive societal change. Today's generation of businesses are committing to positive change. Universities, and especially business schools, must act as a bridge between them, says Inge Jan Henjesand, President of BI Norwegian Business School.

"We believe that today's students — the future generation of entrepreneurs and business leaders — can be a driving force in the fight against climate change. Today's generation of students have more of a drive to create lasting sustainable impact than any generation before them" says Inge Jan. Sustainable impact is also one of the driving factors in career path choice. BI Norwegian Business School (BI) aims to give their students the understanding of business, the knowledge, and the strategies needed to make enduring sustainable change in business and society.

Equipping graduates with mindset, knowledge, and skills

With increased recognition among governments and businesses for change to align with the 1.5°C scenario, comes an urgent demand for new mindsets and strategies in employees. "We are developing knowledge and skills in students that today's leaders need in order to bring business and society forward" says the President. In order to do this, BI has integrated the Sustainable Development Goals (SDGs) into the learning goals for all programmes and also offers specialised lectures, courses, and study programmes within sustainability.

This inclusion of the SDGs throughout BI aims to equip students with knowledge and skills on how the business school disciplines can be a force for good. BI also integrates concepts from the Principles for Responsible Management Education (PRME), a UN-supported initiative created to equip business students



with the understanding and ability to deliver positive change. Students leave BI not only with a desire to make positive change, but also with the tools to make it happen. "Transforming the approach to traditional business disciplines is key to create the mindsets and strategies in the next generations of graduates from BI", says Inge Jan.

As the second-largest business school in Europe, BI has a significant effect on the next generations of young professionals entering the workplace. Graduates entering businesses not yet aligned with the 1.5°C scenario may provide the force needed to create change from the bottom up. Graduates entering businesses already aligned with the 1.5°C scenario, will be well placed to help business leaders embed their ambitious visions and strategies throughout the organisation.

Addressing operational footprints

In addition to equipping students with mindsets, knowledge and tools, BI has also integrated the SDGs into its

operations. Special attention is on Goal 4: Quality Education, Goal 5: Gender Equality and Goal 13: Climate Action.

BI is working towards reducing emissions by 40-50% by 2030, through increasing use of renewable energy and supporting greener mobility solutions. The largest shares of emissions currently come from business travel, commuting, and food and beverage services.

There are a number of ways that BI is targeting emissions reductions across their Eco Lighthouse-certified campuses. All are located close to public transportation hubs, reducing the need for private transportation options, and are continually assessed in annual climate reports.

BI is targeting both energy demand reductions and renewable energy generation. The Oslo campus has reduced electricity demand by 30% from 2006 to 2018 (2.4 million kWh), and the buildings' heating and cooling is partly powered by geothermal energy.

At the new campuses in Trondheim and Stavanger, the buildings have solar panels on the roofs and receive cooling from seawater. Heating is delivered locally and partly generated from bioenergy. It is expected that BI's campuses during the first full year of operations will have reduced the need for energy from the energy grid by 85%, and the business school is continually looking at how to further increase the use of renewable energy in the years to come.

"BI is also aiming to increase our material-recycling rate to 65% by 2022, and remove unnecessary use of plastic and single-use wrapping. With this focus on strong environmental performance, we hope that the new campuses will be inspiring for students to spend time in, both in and out of the classroom", says the President.

As academic institutions like BI continue to bridge the gap between youthful desire for change and businesses in need of new strategies and mindsets, business can truly become a force for good.



Remi Eriksen,
President & CEO, DNV GL

Not fast enough

Existing technology can deliver the future we desire, including meeting the Paris Agreement targets, but only through considerable acceleration on many fronts. That is the message from Remi Eriksen, President and CEO of DNV GL.

That the world is very far away from limiting global warming to 1.5°C by the end of this century is widely known. "Less commonly understood is exactly how far we are from delivering that future and what needs to be done to close the gap between the current warming trajectory and 1.5°C", says Remi Eriksen, President and CEO of DNV GL. "That is one of the main reasons why I initiated a research effort to study the energy transition and provide answers to these questions. The findings worry me greatly, as, indeed they should all of us".

Recently released in its third edition, the findings in DNV GL's annual *Energy Transition Outlook – a Global and Regional Forecast to 2050* are alarming, precisely because they are not alarmist. Sverre Alvik, Director of DNV GL's Energy Transition research programme, explains how DNV GL has spent the better part of four years designing, expanding, and refining a model of the world's energy system, encompassing demand and supply of energy globally. "We have drawn on the real-world expertise of hundreds of colleagues and dozens of experts around the world in governments and academia."

A fast transition

Sverre characterises DNV GL's forecast as a 'central case' for the energy transition. "There is no wishful thinking in our forecast", he explains. "Policy-wise we expect a heightened focus on decarbonisation, but we conservatively model carbon prices towards 2050 at levels not very much higher than today". Even so, DNV GL predicts a rapid transition to a lower-carbon energy system, with fossil and non-fossil sources split almost evenly in the energy mix by mid-century (as opposed to the present 80% fossil/ 20% non-fossil ratio). Electrification will more than double from today's levels by 2050, with 63% of that electricity supplied by solar PV and wind. Efficiency gains in how energy is both supplied and used will also intensify over the coming decades, such that the world's primary energy use will in fact peak in 2030, despite a growing global economy and population.

But emissions keep coming

Even with these dramatic changes, cumulative emissions associated with DNV GL's forecast indicate a 2.4°C warming of the planet by the end of this century, relative to the preindustrial average — a level considered dangerous by the Intergovernmental Panel on Climate Change and the world's scientific community.

With reference to Figure 1 (p.50), Sverre explains: "We see in our forecast that the 1.5°C carbon budget is exhausted in 2028; and humanity exceeds the 2°C budget in 2049, and from that point continues burning fossil fuels until almost the end of the



century. In the year 2050 alone, the world's energy system will still emit 18 gigatonnes of CO₂ (GtCO₂). The result is surplus emissions above the 1.5°C budget of a staggering 770 GtCO₂ by 2050. The energy future we forecast is thus unequivocally not fast enough".

What can be done?

Sverre and his forecasting team have quantified three main energy-related responses.

"We could, from this day forward, generate all our electricity from renewable sources. Sadly, if this was all we did, we would still fall short of even the 2-degree goal, let alone 1.5°C.

We could start using less energy, reducing energy intensity at a much higher speed than the annual 2.5% we forecast. But annual reductions would need to be 4.8%/yr to achieve 2°C, and we consider this unrealistic. Efficiency gains as the only means to achieve a 1.5°C future are simply unattainable.

We could capture carbon in enormous quantities. But even if all emissions associated with coal-

and gas-fired power were to be captured, that alone would not be enough. And, given the snail-paced development of Carbon Capture and Storage (CCS) worldwide in recent years, it appears to be a particularly slender straw to clutch at."

No silver bullet

If the world is to avoid dangerous warming, policies must be developed to tackle at least three fronts simultaneously: more energy efficiency; more renewables; and industrial-scale CCS. Sverre cautions, "this should not be read as 'a little bit of everything'; per contra, we require a lot of everything, and making sure such efforts together at scale is hugely difficult". For example, large improvements in two of the areas that DNV GL identifies might be enough to deliver a 2°C future, but would not stretch to the target of 1.5°C.

We have the technology, but not the policy

"The technologies to deliver the 1.5°C target exist: if they are deployed rapidly, their costs will fall quickly, setting up a self-reinforcing effect", says Sverre. However, this can only succeed if policies enabling the Nationally Determined Contributions

Figure 1: Carbon emissions and carbon budget

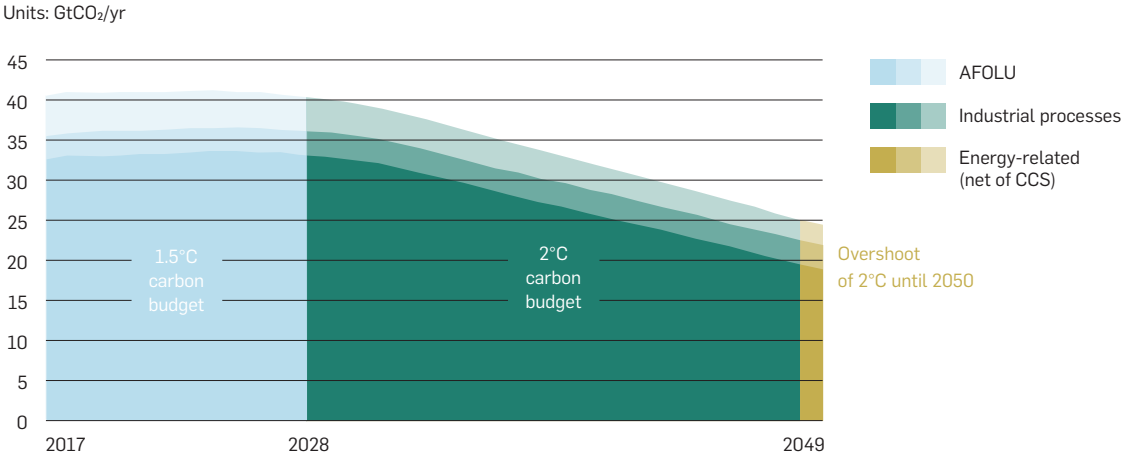
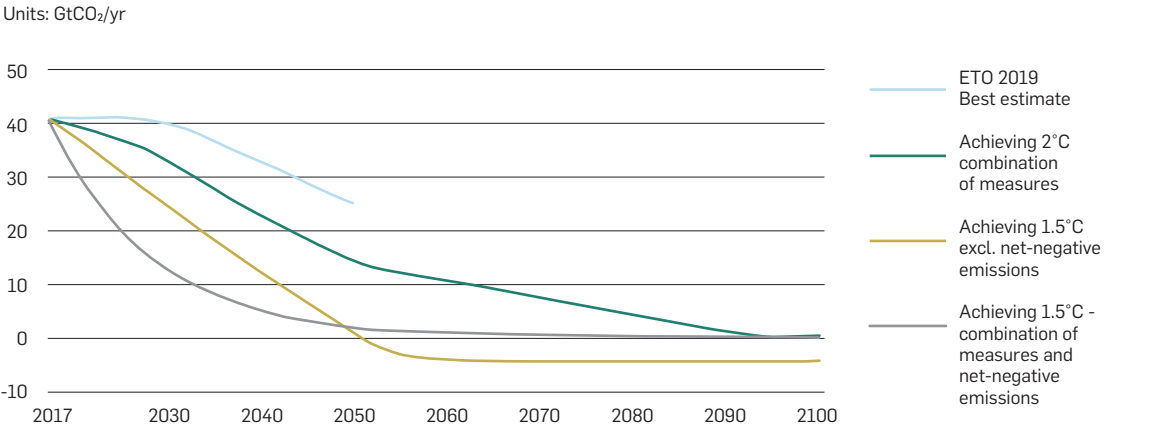


Figure 2: Achieving 2°C or 1.5°C using a combination of measures



(NDCs) under the Paris Agreement — are dramatically strengthened. Figure 2 shows how a combination of measures can lead us to 1.5°C or 2°C. As illustrated, getting emissions down is not only important, but also very urgent.

Take action now

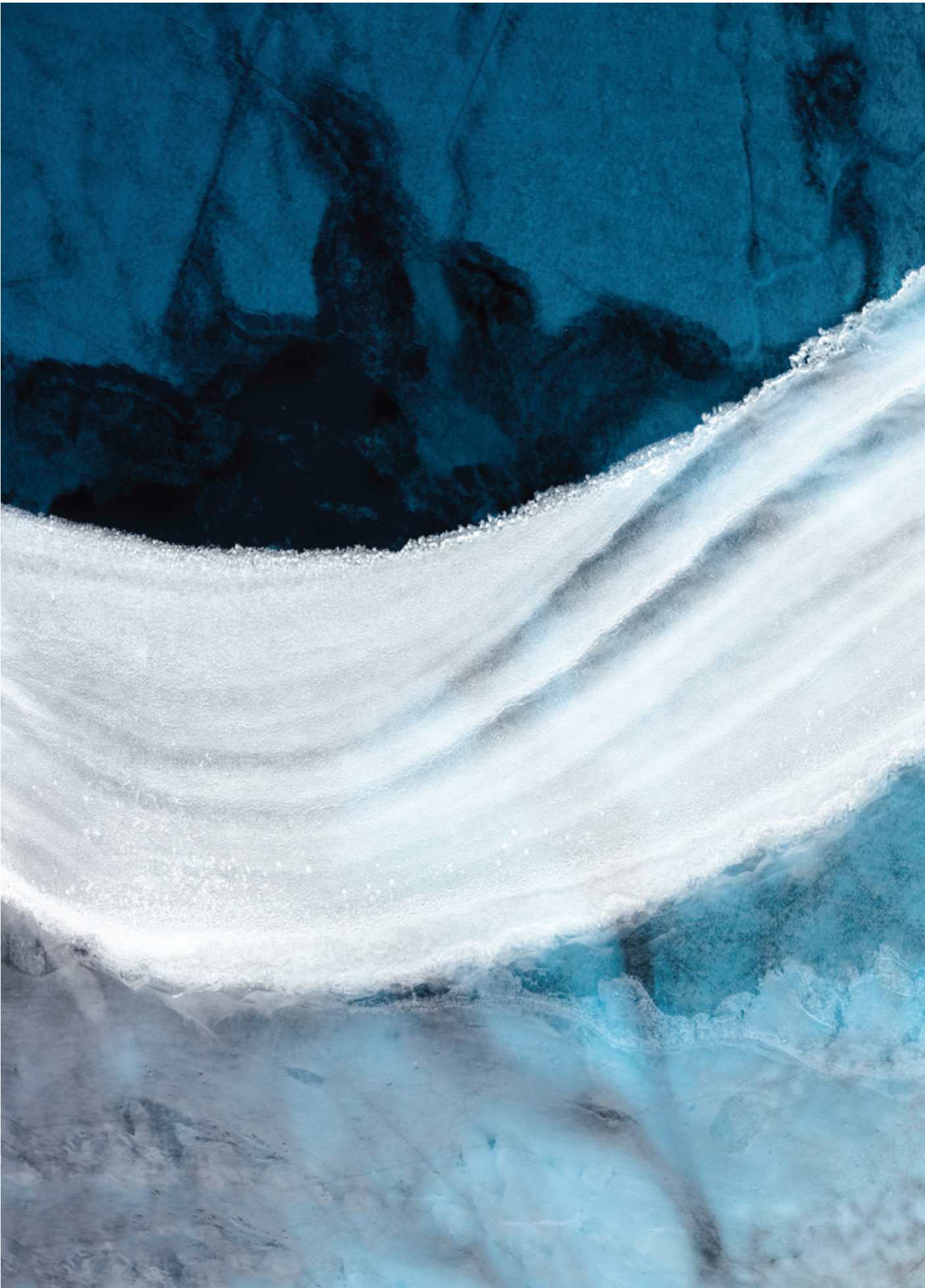
To Sverre's mind, too many policy-makers are setting too much store by net-negative emissions technology — permanently removing CO₂ from the atmosphere by means of, for example, reforestation and afforestation, bioenergy with carbon capture and storage (BECCS) and direct air capture.

"None of these technologies exist at scale today. Yet, so many 1.5°C and 2°C scenarios 'achieve' their target by

imagining that large-scale net-negative emissions programmes will be initiated towards the middle and end of this century."

As a world-leading risk management company, DNV GL views the risk and the consequences of a delayed response by humanity as too high. Allowing anthropogenic emissions to persist risks triggering any number of tipping points, such as the premature melting of permafrost releasing large amounts of methane.

"Our preferred focus is on what can be done today", says Sverre. "Existing technology can deliver the future we desire — including meeting the Paris Agreement target — but only through accelerated scaling on many fronts."



© Tom Hegen, The Two Degrees Series. This series explores the effects of global warming on the Arctic ice sheet. It is one of the fastest warming places on the planet, providing the first indication of how climate change is having an impact. Its melting surface is one of the starkest examples of global climate change.

COP 25: Chile

An urgent anniversary



Margarita Ducci Budge,
Executive Director,
UN Global Compact Network Chile

There will be no fireworks for the silver anniversary of the international climate conference in December 2019 — COP 25 in Chile. In fact, only when the UN's Intergovernmental Panel on Climate Change becomes redundant will there be celebrations. But Executive Director of the UN Global Compact Chile, Margarita Ducci Budge, believes that the 1.5°C business leaders are beginning to create some momentum ahead of the talks that could help to ratchet ambition up at the international level.

Margarita is responsible for advancing corporate sustainability at the grass-roots level in Chile. She is beginning to see change in industries such as energy, transport, and waste, where companies are driving Chile's sustainable transformation. Much work is still needed, and Margarita urges more companies to join the 1.5°C campaign before COP 25 to send the right message to governments.

"When companies step up their ambition levels, they can act faster than governments, and people see real change, inspiring action at the individual and political level", says Margarita. She also realises that the more people are aware of sustainability and climate action, the more businesses stand to gain from taking these positive steps: "The value that companies can generate from taking real, meaningful action is enormous. People can see through greenwashing efforts and false CSR strategies, so only real action will make the impact businesses hope for moving forward".

Margarita believes that the momentum created by the 1.5°C business leaders could be exactly what the international climate talks need in order to ratchet their ambitions, just as the Paris Agreement called for. In order to have any hope of staying below 1.5°C, we need business and governments to move together.

"The 1.5°C business leaders are sending a message to governments around the world. A message of ambition, of belief, of opportunity. Nations must now respond. Time for action is now."



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About the UN Global Compact

As a special initiative of the UN Secretary-General, the United Nations Global Compact is a call to companies everywhere to align their operations and strategies with ten universal principles in the areas of human rights, labour, environment and anti-corruption. Launched in 2000, the mandate of the UN Global Compact is to guide and support the global business community in advancing UN goals and values through responsible corporate practices. With more than 9,500 companies and 3,000 non-business signatories based in over 160 countries, and more than 60 Local Networks, it is the largest corporate sustainability initiative in the world.

For more information, follow @globalcompact on social media and visit our website at unglobalcompact.org.

About DNV GL

DNV GL is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. Operating in more than 100 countries, our professionals are dedicated to helping customers in the maritime, oil & gas, power and renewables and other industries to make the world safer, smarter and greener.

About Sustainia

Sustainia is a global sustainability think-tank and advisory, headquartered in Copenhagen with a presence in Chile and China. Since 2009, the mission of Sustainia has been to change mindsets and narratives around sustainability through impact communication and fact-based storytelling. Armed with mindsets, strategies, and solutions, Sustainia advises organisations large and small on how to create enduring sustainability transformations required in order to stay relevant in an ever-changing world.

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