

In collaboration with
Boston Consulting Group



Winning the Race to Net Zero: The CEO Guide to Climate Advantage

INSIGHT REPORT
JANUARY 2022

Contents

3	Foreword
4	Executive summary
5	1 Global climate action accelerates (but remains insufficient)
8	2 Change will happen faster than you think
9	2.1 We underestimate technology progress
9	2.2 We underestimate policy
10	2.3 We underestimate when change will hit us
13	3 The early mover advantage
13	3.1 Climate leaders can attract better talent
14	3.2 Climate leaders play in higher-growth segments
15	3.3 Climate leaders save costs
16	3.4 Climate leaders reduce their risk exposure
17	3.5 Climate leaders reinforce their access to cheaper capital
18	3.6 Climate leaders create higher shareholder value
19	4 Individual companies can change the game
19	4.1 Raise the bar
20	4.2 Reshape your context
21	4.3 Disrupt your business model
22	4.4 Save cash while saving carbon
22	4.5 Pioneer a net-zero product
24	5 The CEO Guide to Climate Advantage
32	6 Think bigger, act faster
33	Contributors
35	Endnotes

Disclaimer

This document is published by the World Economic Forum as a contribution to a project, insight area or interaction. The findings, interpretations and conclusions expressed herein are a result of a collaborative process facilitated and endorsed by the World Economic Forum but whose results do not necessarily represent the views of the World Economic Forum, nor the entirety of its Members, Partners or other stakeholders.

© 2022 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system.

Foreword



Antonia Gawel
Head, Climate Action,
World Economic Forum

Climate action has seen several critical milestones in 2021. The latest Intergovernmental Panel on Climate Change (IPCC) report has been called a “code red for humanity” due to human-caused global warming. We need to collectively and urgently step up efforts to “keep 1.5°C alive”. While COP26 in Glasgow achieved meaningful progress in raising national and non-state actor ambitions and in progressing the central provisions of the Paris Agreement, significant gaps remain. National emission-reduction commitments for 2030 and 2050 still fall far short of the required 1.5°C pathway and many business leaders still lack the proof of delivery required.

Companies can help lead the change. Achieving net zero by 2050 will require a full transformation of many aspects of our economy and society – supported by governments, investors, companies and consumers. This World Economic Forum and Boston Consulting Group report explicitly takes a business perspective. Leadership and action by the private sector are critical to accelerate climate action in tandem with bold actions by government leaders. Building on unprecedented private-sector momentum, it explores the ways in which early movers are changing the game for their sectors – and beyond – while securing sources of business advantage. Corporate climate leadership is a means both to do good and to create value.



Patrick Herhold
Managing Director
and Partner, Center for
Climate and Sustainability,
Boston Consulting Group

The findings of this report are based on quantitative and qualitative evidence from across the public and private sectors. We conducted interviews with nearly two dozen CEOs (chief executive officers) and senior executives from leading companies across regions and sectors – from energy to chemicals and industrials to consumer goods and food. We analysed corporate data from CDP, the Science Based Targets Initiative (SBTi) and financial databases. Our analysis was supplemented with additional research from a range of sources, including the International Energy Agency (IEA), Climate Watch, IRENA, the World Bank and Climate Action Tracker, in addition to previous work by Boston Consulting Group.

This year’s World Economic Forum Annual Meeting must continue to raise climate ambitions, but also focus on translating bold commitments into near-term action and delivery by focusing on three key areas. First, engage leaders to close the emissions gap and translate targets into concrete roadmaps. Second, catalyse this transformation to ensure delivery through a just and equitable transition. Third, mobilize all of society to ensure their expectations are met and that leaders fulfil their commitments.

We are in the decade of urgent delivery. With an acceptance of the crisis and surging ambition, leaders must ensure that bold action follows. The benefits of action are clear, and the costs of inaction pose a threat to all of humanity.

Executive summary

The race to net zero will forever change the way in which many companies do business.

The immediacy, pace and extent of change are still widely underestimated, but early movers can seize significant advantages. This report shows how.

Global climate action accelerates. After years of inadequate action to counter the threat of climate change, actors across all sectors are waking up to the challenge. Governments and businesses are setting targets that would have been unthinkable even three to four years ago. In areas where they do not move quickly enough, others, including investors and courts, are stepping in in greater numbers. The dam of inertia is cracking.

Change will happen faster than you think. The net-zero transition will decisively accelerate this decade. It will disrupt many sectors of the world economy. Many companies are still ill-prepared because much of the data they use to inform their decisions about the future is outdated. Disruptive technological progress and policy action are all happening in a non-linear way and occurring much faster than anticipated. Collectively, companies underestimate the change ahead and act too conservatively, risking stranded assets and obsolete business models as a result.

The net-zero transition is an opportunity. An accelerating net-zero transition will challenge heritage business models and create opportunities for early movers. Climate leaders can attract and retain better talent, realize higher growth, save costs, avoid regulatory risk, access cheaper capital and create new sources of value for customers. Done well, this

will translate to higher shareholder returns and a sustainable source of competitive advantage.

Individual companies can change the game.

Solving the climate crisis requires everyone to move. However, the leadership of early movers can have an outsized impact. Often, change has been triggered by a single company boldly moving ahead of its sector – by raising the bar for that industry, by reshaping its context, by disrupting its own business model, by showing that emissions reduction can work economically and by providing customers with a sustainable choice. Now, more than ever, the regulatory context makes it rewarding to be an early mover. Climate leaders are not only creating more value, they are changing the game. They compel others to follow.

The CEO Guide to Climate Advantage. CEOs in all sectors need to navigate an unprecedented global transformation. On the path to net zero, they must successfully transform their strategies, operations, business portfolio and organizations. There is no blueprint for what lies ahead, but we can provide a guide for what to look out for and the moves to consider.

It's time to commit, engage and act. The world is embarking on the biggest peacetime transformation in history. Rarely has a full generation of CEOs faced so big an opportunity – and so great a threat. This is a time like no other for bold, ambitious leadership. It's time to move.



To be early might be challenging, but to be too late will be devastating.

Anna Borg, Chief Executive Officer, Vattenfall

1

Global climate action accelerates (but remains insufficient)

Governments and businesses are making commitments that seemed unthinkable three to four years ago. But more is needed.

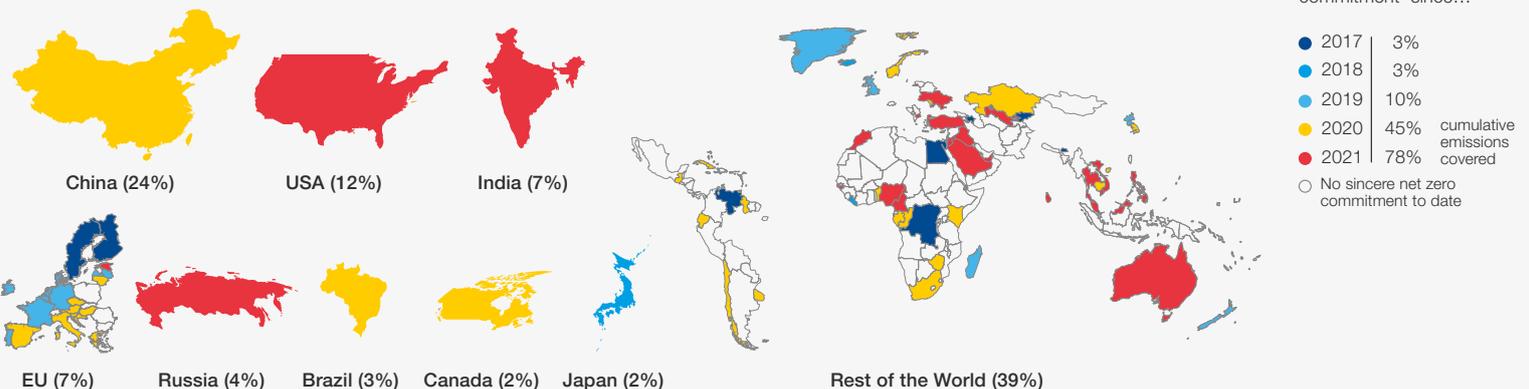
The world is not on track to reach the Paris Accord targets. COP26 did not deliver an updated set of national commitments to limit global warming to well below 2°C – let alone 1.5°C.

Actual policies will likely fall even further short. Similarly, only a minority of companies are currently reducing emissions in line with a 1.5°C path.

Yet things are changing. After years of complacency, the world has woken up to its most existential threat. In 2019, only 10% of global emissions were covered by national pledges (29 countries) to achieve net-zero emissions. Today, 92 countries representing 78% of global emissions have made sincere net-zero commitments on a national level, excluding mere propositions or commitments that are still in discussion.¹ (See Figure 1.)

FIGURE 1 National net-zero commitments are growing rapidly^{2,3}

92 countries responsible for 78% of global emissions now have a sincere net-zero commitment



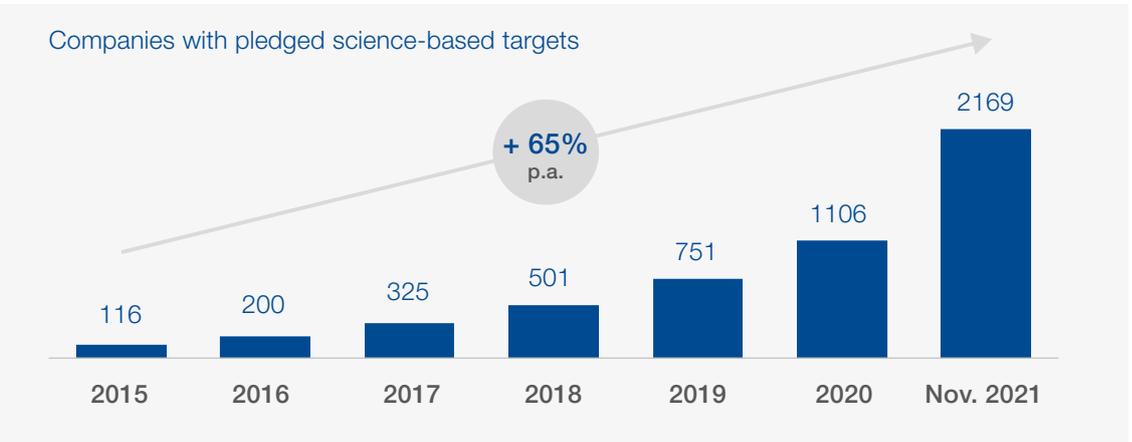
Note: Country sizes scaled according to their share of global greenhouse gas emissions; countries on RoW map kept their usual scale
1. National commitments independent of target date that are considered sincere (either in law, in policy document, officially declared or achieved).

Source: Net Zero Tracker; Climate Watch; BCG analysis

As of 2020's year end, more than 9,600 companies worldwide were disclosing emissions data to the international not-for-profit organization CDP (formerly the Carbon Disclosure Project). Of these, around 3,000 had set emissions-reduction targets, up from fewer than 900 in 2017. More than 2,000 companies had set science-based targets validated by the Science Based Targets initiative (SBTi), up

from only 116 in 2015. (See Figure 2.) Many of these companies have also set ambitious supply-chain targets, which will accelerate the pace of change. In the auto industry, for example, Scope 3 pledges of major original equipment manufacturers (OEMs) have led to a spate of decarbonization pledges by their tier-1 suppliers. (See Figure 3.)

FIGURE 2 Corporate commitments are growing exponentially^{4,5}

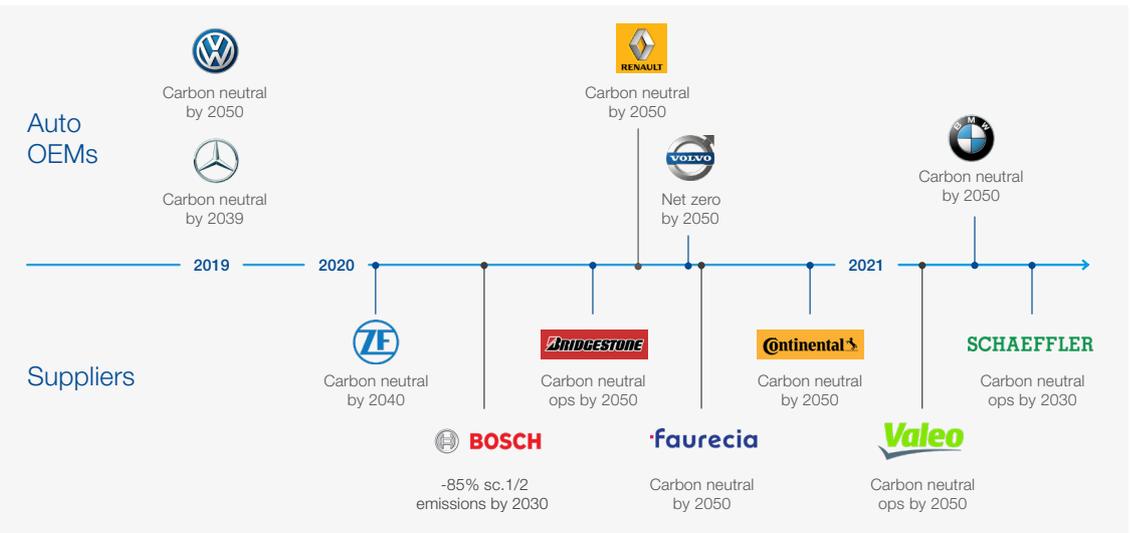


Note: ~\$24T revenues (~30% global GDP) covered with science-based targets

Data as of 19 November 2021; cumulative view, includes companies committed and with targets set.

Source: Net Zero Tracker; Science Based Targets initiative (SBTi)

FIGURE 3 European automotive industry suppliers set targets following OEMs' Scope 3 pledges⁶



Source: SBTi; Companies' press releases; BCG analysis

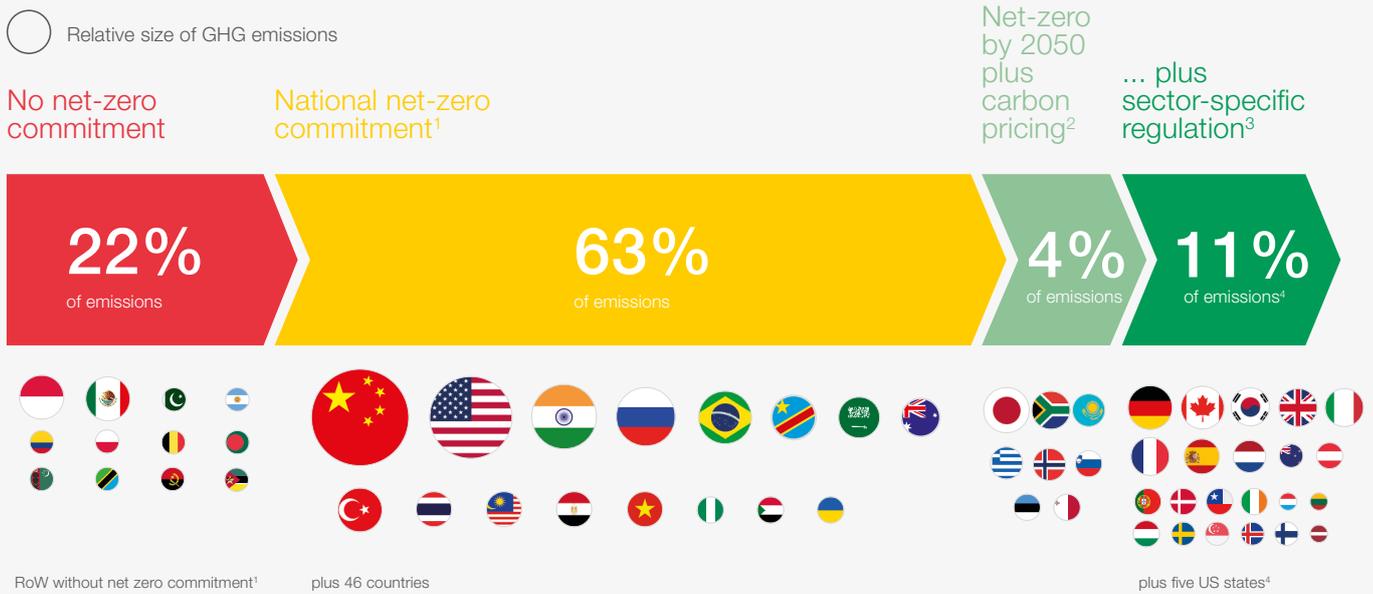
Where governments and companies do not move fast enough, investors and the judiciary are showing a growing willingness to step in and mandate stronger climate action. Between 2009 and 2021, more than 1,400 court cases were filed (1,200 in the US and the remainder in 58 other countries) seeking some form of climate action from companies or governments, a sixfold increase in the number of climate cases over a single decade. In recent cases, courts in the Netherlands required a tightening of corporate emissions-reduction targets, and Germany's federal court forced the government to accelerate and detail its national emissions-reduction plan. The impact of these judicial decisions has gone beyond paper rulings; they lead to real action by companies and, in the case of Germany, unprecedented speed to codify more ambitious targets in law within a matter of months.

Investors are also applying pressure. Activist investors are accelerating climate action through board member elections, while shareholders are successfully demanding greater disclosure on carbon-related issues. A study by international accounting firm EY found record levels of support for proposals on environmental and social topics, such as climate change, among Fortune 100 companies during 2021 annual shareholder meetings. By 30 June 2021, 20% of environmental and social shareholder proposals that went to a vote received more than 50% support, compared with 12% in 2019 and 3% in 2016.⁷

The dam of inertia is cracking. During this decade, the climate transition will accelerate at an unprecedented pace, disrupting many sectors of the world economy.

Global climate action is still insufficient

FIGURE 4 Many countries still have a commitment-regulation gap^{8,9,10,11,12,13,14,15}



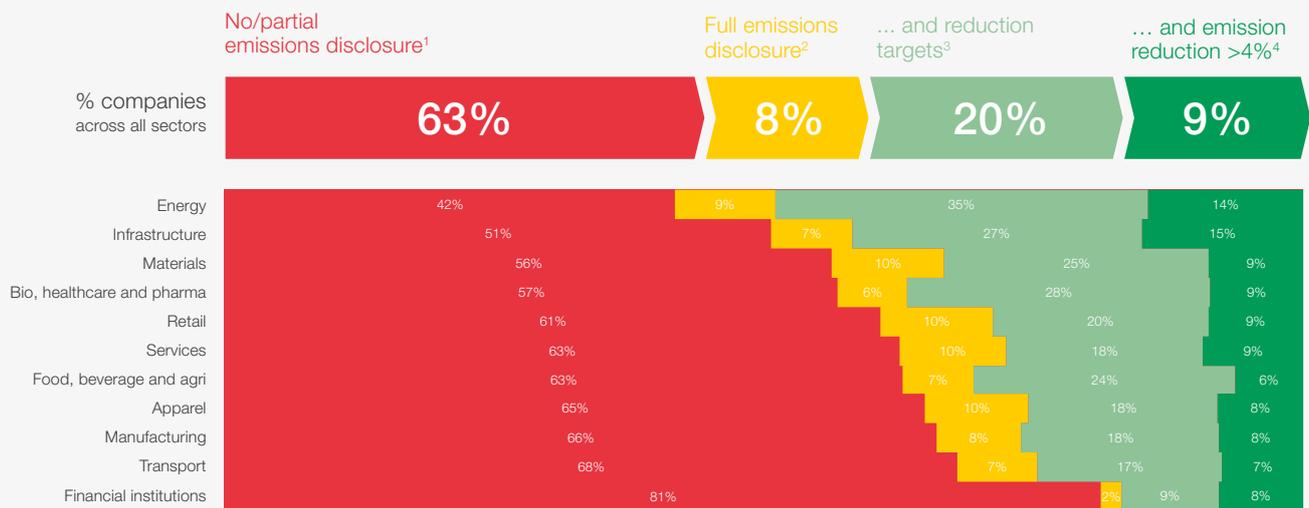
Note: 1. National commitments independent of target that are considered sincere (either in law, in policy document, officially declared or achieved); 2. Emissions trading scheme or carbon tax in place; 3. At least one regulatory instrument per sector: energy, agriculture, transport and industry; 4. Including emissions of five US states (California, Maine, New York, Virginia, Connecticut).

Source: Net Zero Tracker; Climate Watch; ICOS, Ren21, Past Coal Alliance, ICCT, World Bank; Governments' websites; BCG analysis

While 92 countries have made a sincere net-zero commitment, only eight aim to reach the target by 2050 and have implemented a nationwide carbon-pricing scheme. Some 22 countries and five US

states representing 11% of global emissions are leading the way by also having sector-specific regulations in place for the energy, agriculture, transport and industrial sectors.

FIGURE 5 Corporate climate action is accelerating but still insufficient¹⁶



Note: 1. Companies that do not disclose emissions data or disclose only (parts of) Scope 1 and/or 2 emissions; 2. Companies that fully disclose scope 1+2+3 emissions; 3. Companies that fully disclose all emissions AND had an emission reduction target in 2019; 4. Companies that fully disclose all emissions, had an emission reduction target in 2019 AND reduced emissions 2018 vs. 2019 by >4%.

Source: CDP data (2018–2020); Refinitiv data (2018–2020); BCG analysis

While corporate action is accelerating, it is still insufficient. Only 20% of companies both disclose their full-value chain emissions and have emissions-reduction targets in place. Only 9% of companies

achieved an actual emissions reduction of more than 4% last year (the annual linear reduction required to limit temperature rise to 1.5°C).

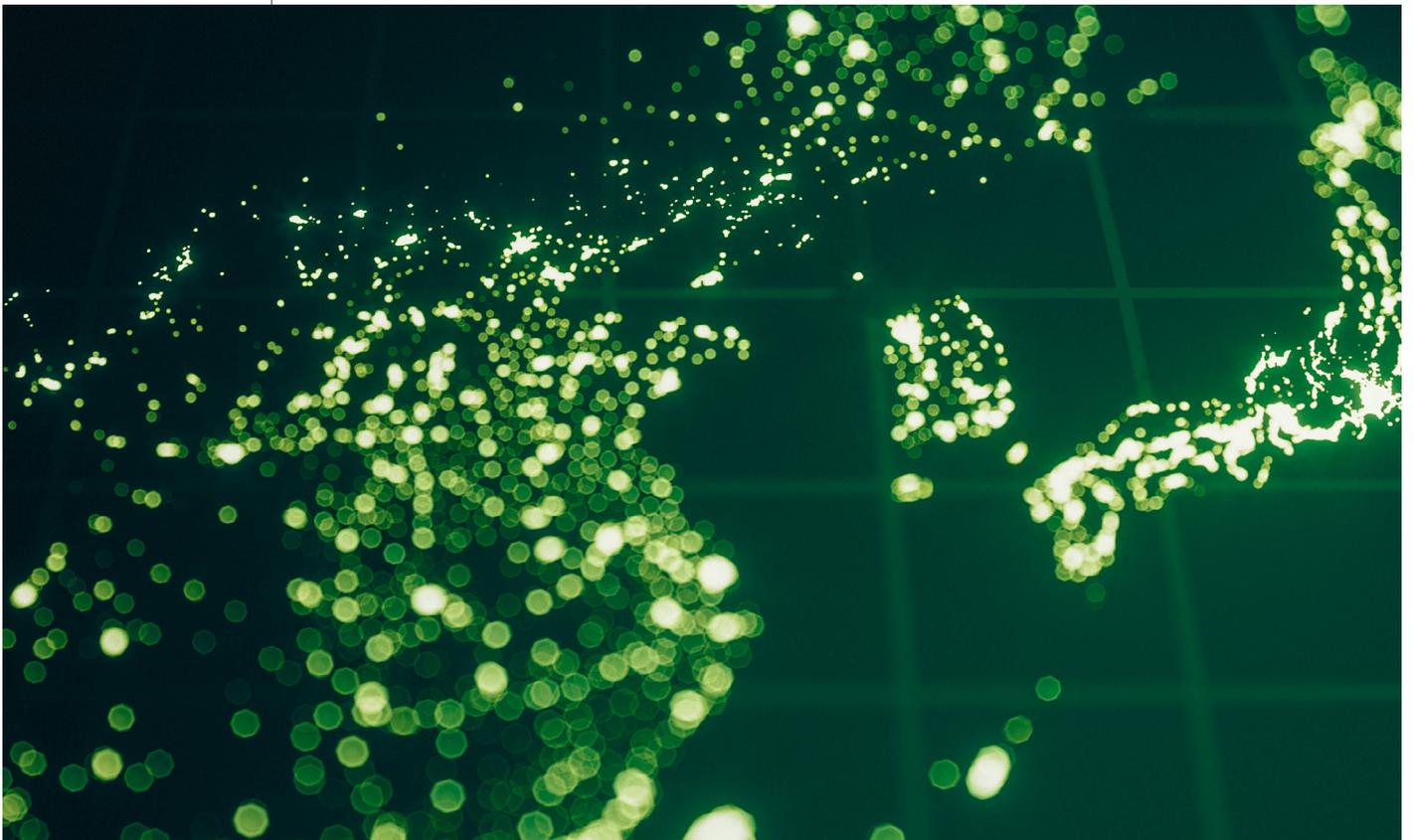
2

Change will happen faster than you think

Many companies are not well-equipped to deal with such disruption. The projections they use to inform their decisions about the future are often outdated or wrong.

As has been the case with previous technological shifts, most companies seem to collectively

underestimate the pace and scope of change ahead – and act too conservatively as a result.

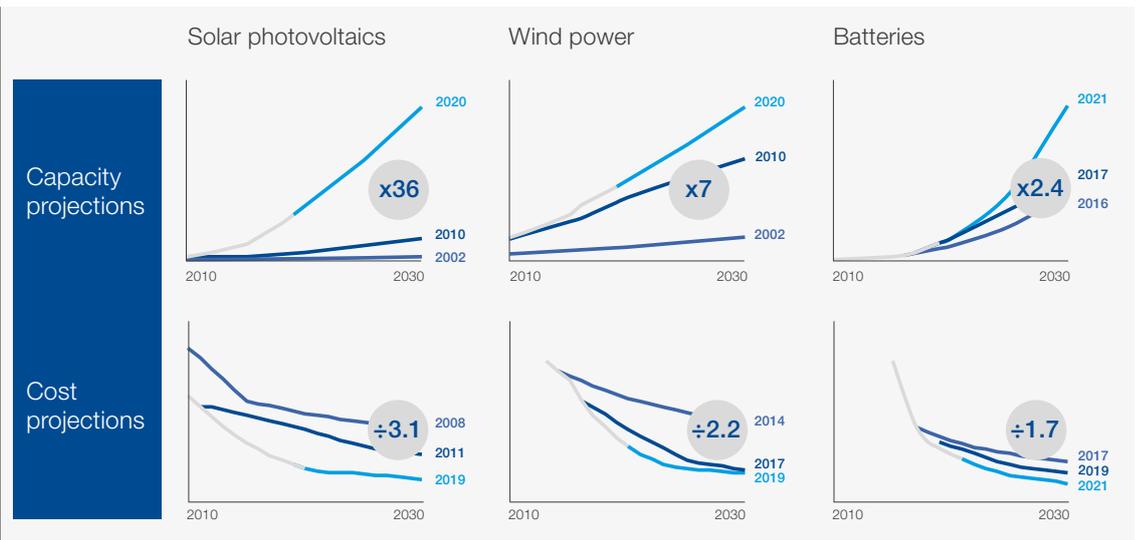


2.1 We underestimate technology progress

To estimate the future progress of disruptive technologies, companies typically use consensus projections (a combination of existing forecasts that are based on different methodologies). But time and time again, projections of key low-carbon technologies have proven far too conservative. For example, forecasts of solar photovoltaic (PV) capacity

in 2030 increased by a factor of 36 between 2002 and 2020, while projected unit costs dropped by a factor of three. This dynamic of mutually reinforcing technological progress and cost decrease, in many jurisdictions driven and supported by regulatory incentives, can be observed for other low-carbon technologies. (See Figure 6.)

FIGURE 6 We underestimate technology progress¹⁷



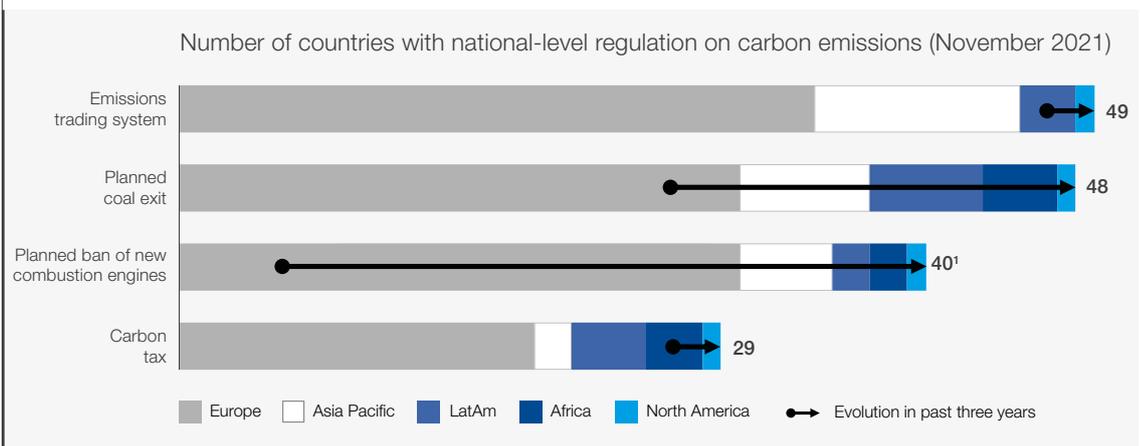
Source: IEA; BNEF; IRENA; BCG

2.2 We underestimate policy

Companies often rely on “current policy” scenarios as if they were projections. Over-reliance on policy stability bears risks: in a time of insufficient response to an escalating crisis, policies play catch-up and become increasingly ambitious. For example, the number of countries planning to ban coal-fired power and internal combustion engines has soared in the past three years, on the back of measures such as the EU’s Fit for 55 regulatory package.¹⁸

COP26 further facilitated meaningful progress on coal, with more than 40 countries committing to end all investment in new coal-power generation domestically and abroad. Forty countries have announced bans of internal combustion engines since 2018, and emissions trading systems and carbon taxes have been implemented in 49 and 29 countries, respectively. (See Figure 7.)

FIGURE 7 A significant carbon regulation pipeline^{19,20,21}



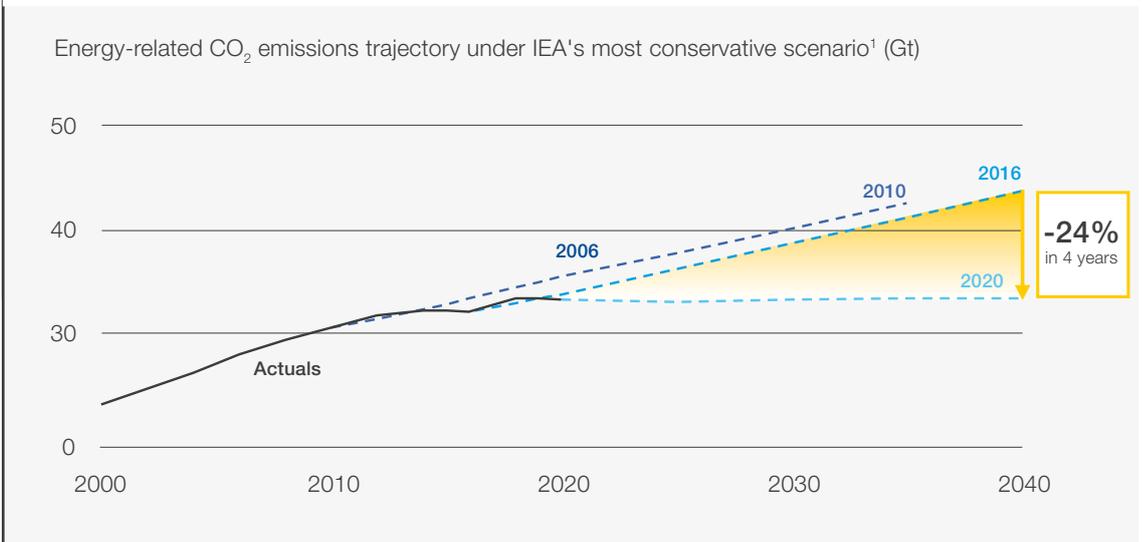
Note: 1. Including 20 countries under EU proposed Fit for 55 package.

Source: Powering Past Coal Alliance; International Council on Clean Transportation; The World Bank; BCG analysis

The International Energy Agency (IEA) publishes policy-driven scenarios on future energy emissions in its annual *World Energy Outlook*. While much attention has focused on its net-zero scenario, it is critical to see that even in its most conservative

prediction, projections for 2040 energy-related CO₂ emissions have dropped by 24% over the past four years.²² (See Figure 8.) There are many reasons to assume this trend will continue.

FIGURE 8 We underestimate policy progress²³



Note: 1. Reference scenario in 2006; current policies scenario in 2010 and 2016; stated policies scenario in 2020.

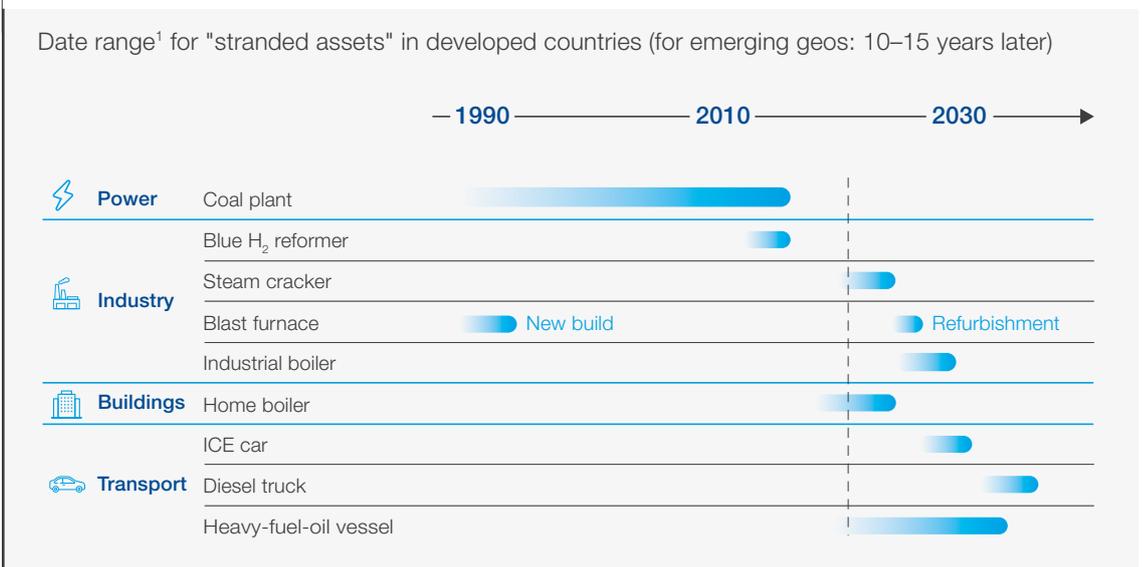
Source: IEA *World Energy Outlook* for 2006, 2010, 2016, 2019, 2020

2.3 We underestimate when change will hit us

Many companies underestimate how quickly long-term changes in their markets can affect their business models and performance. They grossly misjudge the impact that faster climate transformation can have on long-lifetime assets. As restrictions on equipment burning fossil fuels tighten, so the useful lifespan of the equipment shortens. Two recent examples demonstrate this risk. Uniper, a German utility, brought its last new coal power plant online in 2020, shortly after Germany announced its 2038 exit from coal. Given further recent tightening

of German emissions-reduction targets and the new government's ambition to exit coal by 2030, the plant may have to shut down only 10 years into its 45-year lifespan. Similarly, the Nord Stream 2 gas pipeline – a 40-year asset – may go online just as European gas consumption passes its peak and less than 30 years before Europe aims to consume no more natural gas at all. In developed economies that seek to be Paris-aligned, many investments in fossil assets already carry significant risk of becoming stranded – or they will within only a few years. (See Figure 9.)

FIGURE 9 New fossil investments are increasingly at risk of being stranded^{24,25}



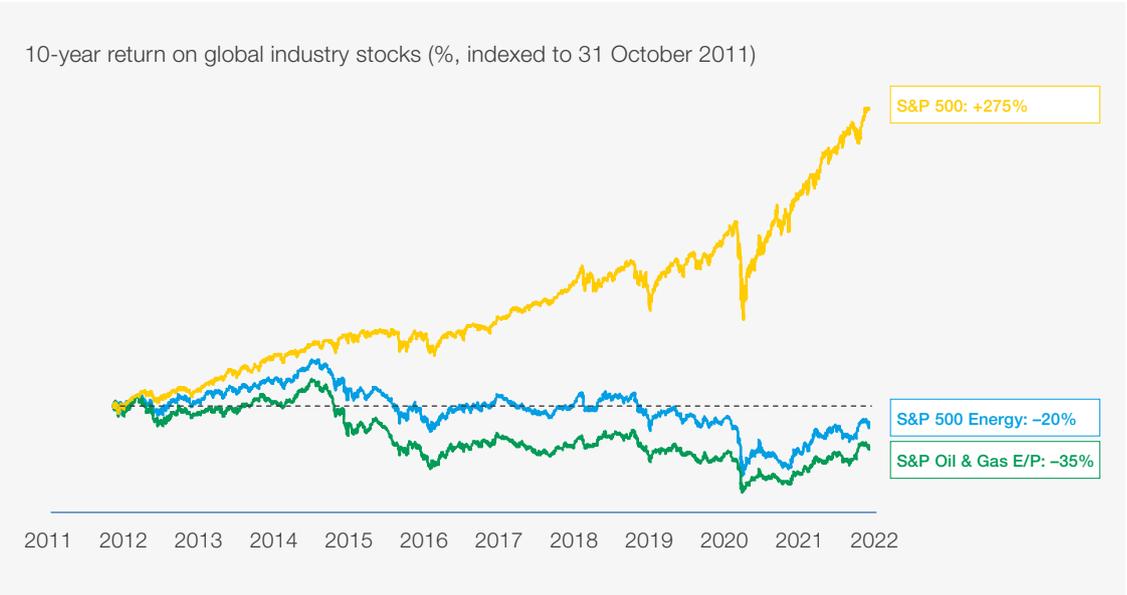
Note: 1. Date based on IEA's net zero 2050 scenario – offset to 2045 for steam crackers, blast furnaces and industrial boilers – and IEA's OECD-specific SDS, both 2050-capped; considers both asset useful life and financial life (where these differ).

Source: IEA; GlobalData; S&P market intelligence; EU JRC; industry experts; Chemcom by BCG; BCG Center for Energy Impact; BCG analysis

Companies also often misjudge how quickly the impact of seemingly distant developments can be felt by capital markets. Investors look forward, and a significant portion of companies' valuations lies in expectations for future performance. When the energy transition started in Europe, incumbent utilities hardly felt the initial impact in their business

results. But once financial markets grasped the longer-term implications of a growing share of renewables and pressure on wholesale power prices, many companies lost significant market value within only a few years. In other sectors with fossil fuel-based business models, increasing investor scepticism can already be observed. (See Figure 10.)

FIGURE 10 **Markets are sceptical of fossil fuel-based business models²⁶**



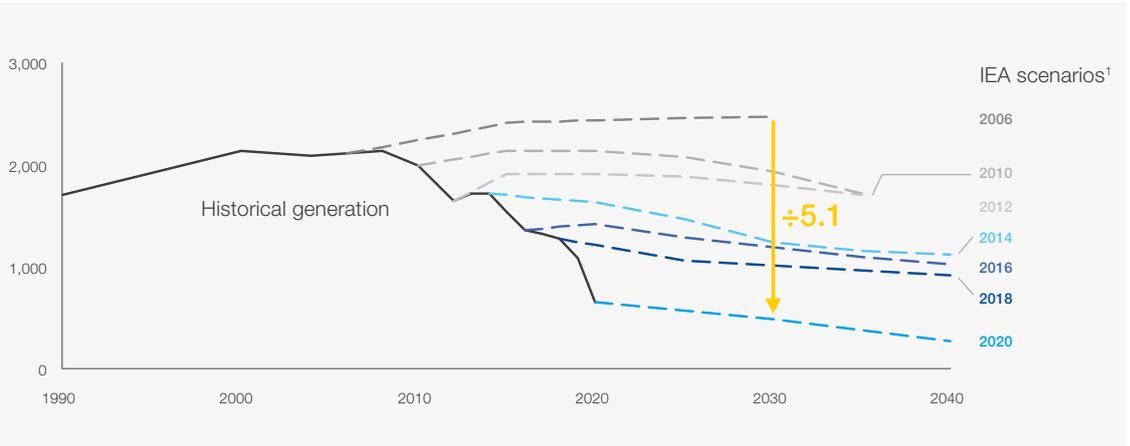
Source: S&P Global, as of 25 November 2021

The realities that fossil energy players are already experiencing are an indicator of the changes ahead for many. We are in the early stages of climate

change-related disruption, and there is little doubt that the pace of change will increase. Companies in all sectors need to prepare for this acceleration.

Wrong every time

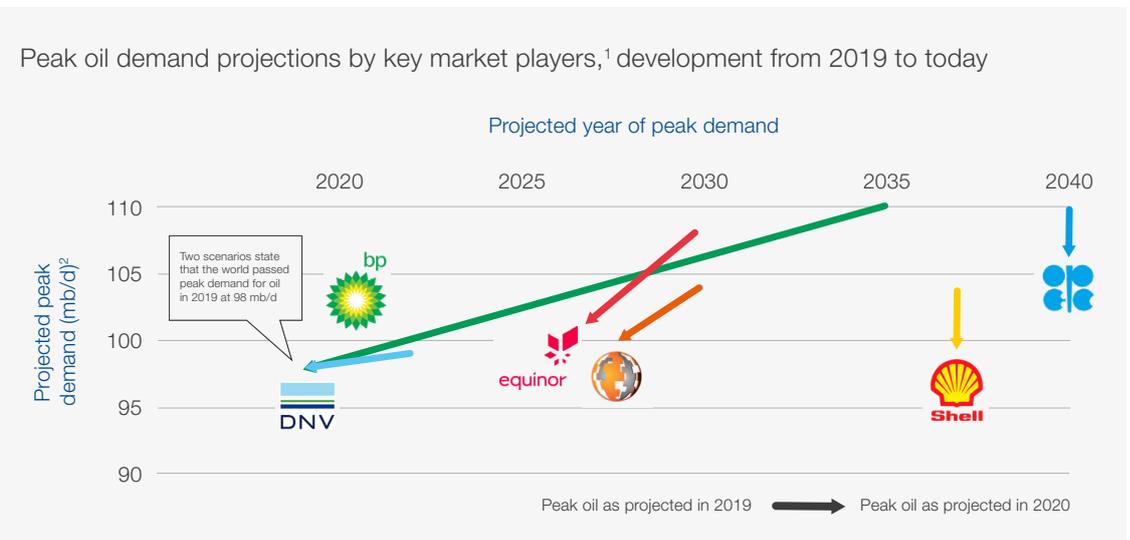
FIGURE 11 US energy generation from coal (TWh): IEA scenarios over time²⁷



Note: 1. Based on IEA's successive "alternative policies", "new policies" and "stated policies" scenarios for 2006, 2010, 2012, 2014, 2016, 2018 and 2020.

Source: IEA; BCG analysis

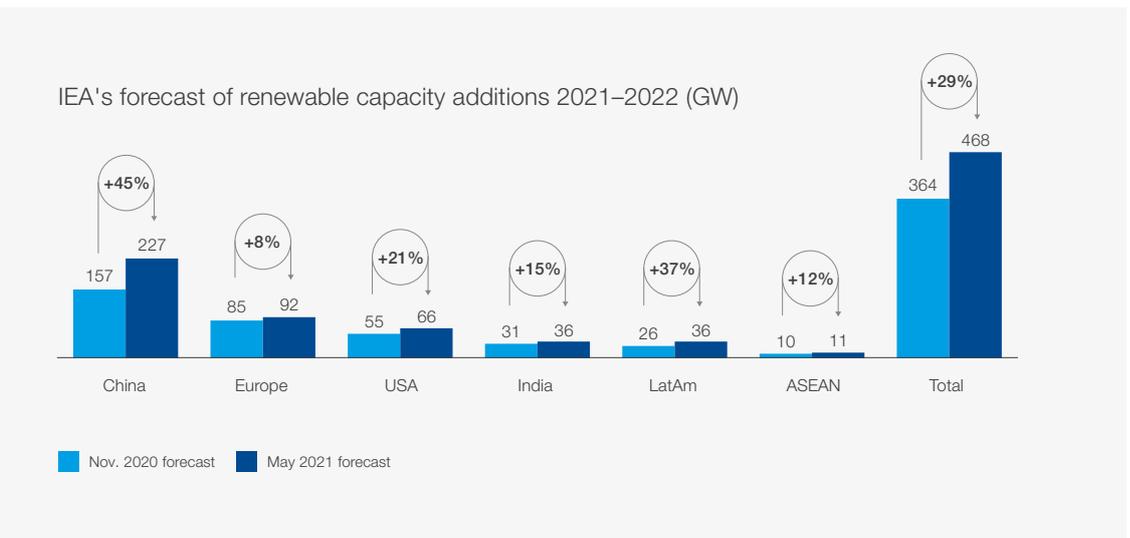
FIGURE 12 Peak oil projections are getting lower and closer^{28,29}



Note: 1. Demand forecast (public reports) in each player's moderate scenario (e.g. Equinor Reform, BP Rapid, Shell Mountains vs. Islands), indexed to match IEA value for oil demand in 2019; 2. Millions of barrels per day.

Source: BP; Equinor; Shell; DNV; Rystad; OPEC; BCG Center for Energy Impact; BCG analysis

FIGURE 13 Subsequent IEA forecasts for global renewable capacity additions in 2021–2022 (GW)³⁰



Source: IEA, *Renewable Energy Market Update 2021*

3

The early mover advantage

As enormous investments are mobilized, consumer preferences recalibrated and regulations progressed, the climate transformation will challenge heritage business models and create

major opportunities in a wide range of sectors. The timing is right for early movers, and they stand to gain competitive advantage in at least six areas. (See Figure 14.)

FIGURE 14 Climate leaders gain competitive advantage

Easier hiring, retention

40%

of talent seek sustainability

Higher revenues

+4–25 pp

CAGR of sales growth for “green” products

Save cash and carbon

~50%

of emission reduction at net zero cost in key sectors

Lower regulatory risks

+2–12 pp

EBIT margin after EU Carbon Border Tax¹ for companies abating 55% of emissions

Cheaper financing

–100 bp

WACC for top quartile environmental performers in Europe

Higher value

+3 pp

TSR for top quartile environmental performers globally

Note: 1. Based on a €75/tCO₂ carbon price assumption for 2030.

Source: EU announcements; BCG analysis

3.1 Climate leaders can attract better talent

Workers and jobseekers are increasingly factoring sustainability into their employment decisions. Companies with bold climate agendas can boost their attractiveness to new employees and improve worker retention. A December 2020 survey by BCG and the Network showed that around half of employees see sustainability as a reason to change,

or not choose, an employer. In 2019, the *Accenture Chemicals Global Consumer Sustainability Survey* found that about 40% of millennials had chosen a job because the company performed better on sustainability than an alternative, and in the region of 30% had left a job because of a company’s lack of a sustainability plan.



The focus on sustainability has taken on a whole new dimension, including in our ability to retain and attract the best talent and drive best-in-class performance.

George Oliver, Chairman and Chief Executive Officer, Johnson Controls



The growing influence of climate change, particularly on the health and viability of our communities, has rallied our employees around the world.

Christophe Weber, President and Chief Executive Officer, Takeda

3.2 Climate leaders play in higher-growth segments

While baselines are still low, sales of green alternatives to traditional products are rapidly gaining momentum in multiple sectors. (See Figure 15.) For example, between 2017 and 2020 in the US, sales of plant-based meat substitutes rose 16 percentage points faster than sales of animal meat. Globally from 2016 to 2019, electric vehicle sales increased by 26% annually, while conventional

car sales dropped by 2% a year. As downstream companies increasingly set ambitious targets for Scope 3 reductions, more and more opportunities for new green products will emerge along entire value chains. Even in carbon-intensive sectors such as cement, steel and fuels, forecasts show that the expected growth of greener alternatives should far outpace stagnating sales of traditional alternatives.

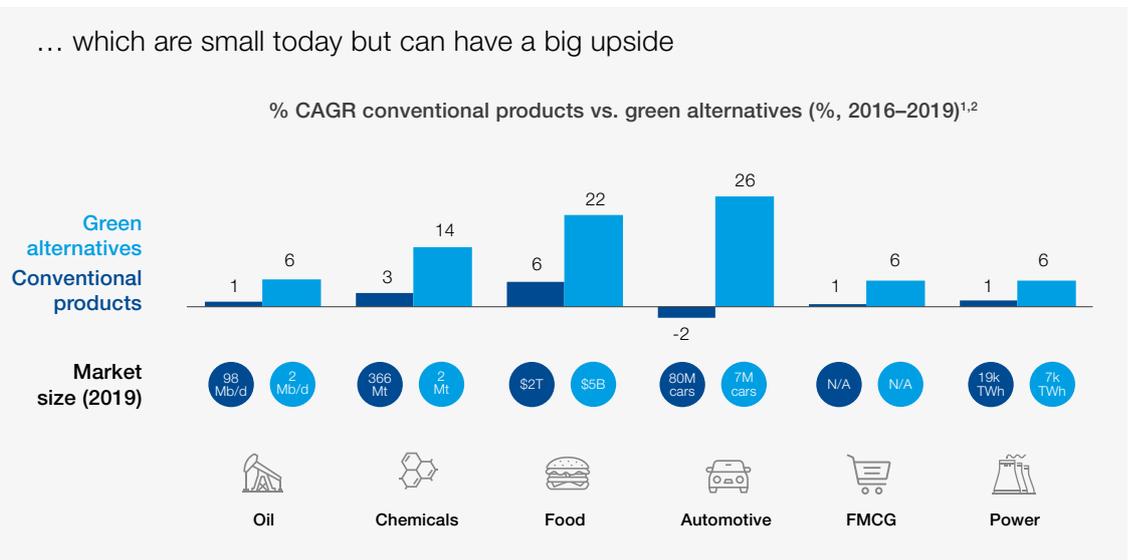


Our board's strategic planning exercise concluded that climate change is the only overarching megatrend to build a growth strategy on. What convinced them was the ability to generate revenue out of sustainability.

Hak Cheol Shin, Chief Executive Officer, LG Chem

FIGURE 15

Climate leaders participate in higher-growth segments^{31, 32, 33, 34, 35}



3.3 Climate leaders save costs

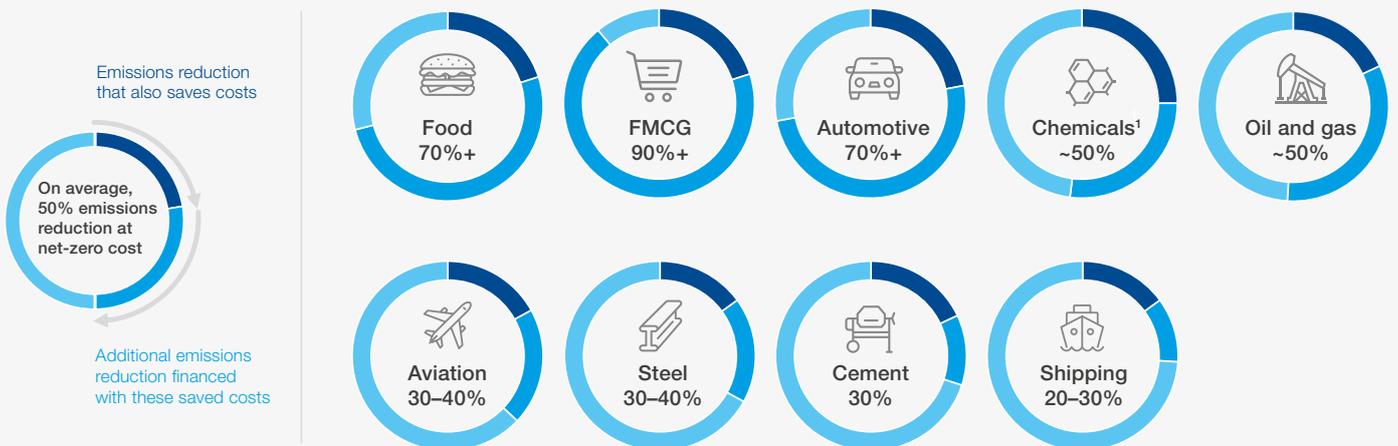
Companies can reduce costs while cutting emissions. By becoming more energy-efficient and switching to lower-cost renewable power, they can realize significant savings. For example:

- Unilever achieved €800 million (\$900 million) in savings by sourcing low-cost renewable electricity, which more than offset the premiums paid to sustainably source plastic and palm oil.
- IKEA realized €130 million (\$147 million) in savings in five years through the roll-out of renewable energy.
- Process improvements and a shift towards lower-emission cement enabled Dalmia Bharat Cement to achieve the lowest CO₂ intensity in the industry. While tripling its capacity between 2011 and 2021, the company reduced its emissions by more than 20% and grew its EBITDA (earnings before interest, taxes, depreciation and amortization) margin sevenfold.

- A 16% reduction in Coca-Cola’s packaging weight ratio led to about \$600 million in cost savings over six years.
- Repsol identified a suite of profitable measures to reduce its industrial emissions by 0.8Mt by 2025, with an estimated internal rate of return of over 20%.

BCG analysis of actual decarbonization projects shows that companies across essentially all major sectors can realize significant cost savings through Scopes 1 and 2 decarbonization. Almost all companies can realize at least one-third of emissions reductions at net-zero costs to their business. And some companies even manage to fully decarbonize at net-zero costs. (See Figure 16.)

FIGURE 16 Companies can reduce significant Scope 1 and 2 emissions at net-zero cost³⁶



Note: 1. Considering petrochemicals and plastics.

Source: World Economic Forum and BCG; BCG Decarbonization Tool; BCG case experience

3.4 Climate leaders reduce their risk exposure

Fast-tracking decarbonization keeps leading companies ahead of tightening carbon regulations. For example, BCG analysis of the outlook for the EU's proposed carbon border adjustment mechanism in five emissions-intensive industries shows that, while the cost of carbon would erode margins in all sectors by 2030, companies that decarbonize early would enjoy EBIT (earnings before interest and taxes) margins that are 2 to 12 percentage points higher than those that delay. (See Figure 17.). Leaders will also be able to secure earlier long-term access to prospectively scarce sustainable

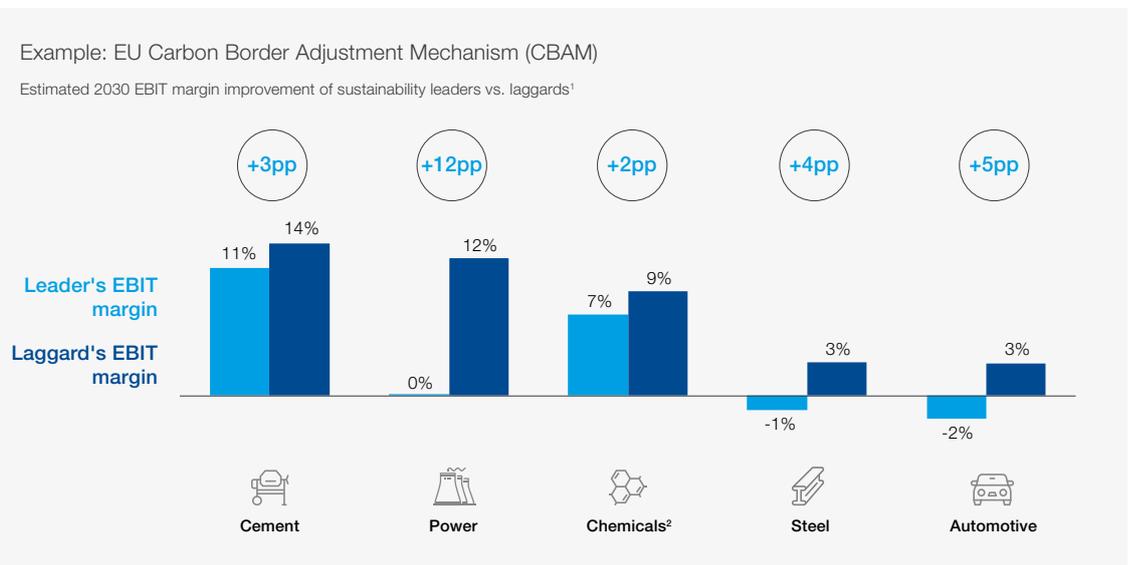
resources, such as renewable power, secondary materials or low-carbon hydrogen.³⁷ Already, early movers such as Apple, Tesla and Volkswagen are moving to ensure access to future supplies of critical metals through long-term contracts with producers. Nestlé and Unilever have invested \$30 million and \$15 million, respectively, in a private equity fund that invests in and supports the development of companies in the plastics recycling value chain.³⁸ LG Chem has formed joint ventures with bioplastic providers to secure supplies.



Pushing environmental values is not about altruism, it is about building a stronger, more resilient business for the future.

Alan Jope, Chief Executive Officer, Unilever

FIGURE 17 New regulation hits laggards harder^{39,40}



Note: 1. Assuming leaders complete a 55% decarbonization by 2030 vs. 0% for laggards and based on a €75/tCO₂ carbon price assumption for 2030; 2. Petrochemicals only.

Pro-forma analysis, keeping all other things equal.

Source: European Commission; Refinitiv; BCG analysis



We expect a significant increase in prices for sustainable aviation fuel (SAF) in the short- to mid-term because there will be more demand than supply. This shortage will drive innovation in new types of SAF, which will unlock further upside for those able to secure capacity for their end customers.

Frank Appel, Chief Executive Officer, Deutsche Post DHL Group

3.5 Climate leaders reinforce their access to cheaper capital

Early movers enjoy better financing terms, including lower weighted average cost of capital (WACC). BCG analysis found a correlation consistent across 10 sectors that sustainability leaders secure lower-cost capital at an average of ~100 basis points less than sector laggards. (See Figure 18.)⁴¹

New debt financing vehicles offer lower-cost financing to companies funding green projects (green bonds) or tie financing costs to the achievement of sustainability targets (sustainability-linked bonds). For example, Italy-based Enel's

latest €3.5 billion (\$4.0 billion) sustainability-linked bond is subject to a 25 basis-point step-up if the company does not meet its emissions-reduction and renewables capacity targets – meaning climate action helps ensure lower interest rates. Spanish utility Iberdrola issued €1.5 billion (\$1.7 billion) in sustainability-linked debt at a discount of 4 basis points compared to a previous loan. Danone's €2 billion (\$2.3 billion) sustainability-linked bond issue carries a discount or premium on the interest rate paid, indexed to the company's ESG score.



The lower risk profile of sustainable companies justifies a lower cost of debt. We have developed a range of sustainability-linked financing mechanisms that not only cover green projects, but the whole company.

Francesco Starace, Chief Executive Officer and General Manager, Enel

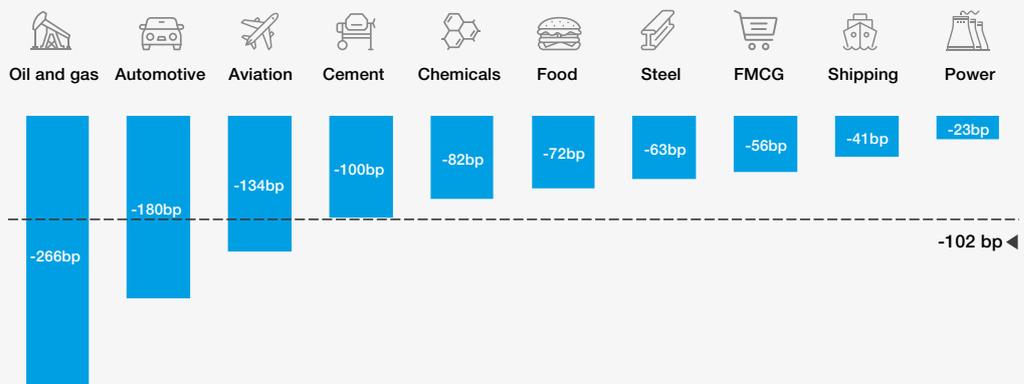
FIGURE 18 Leaders reinforce their access to cheaper capital⁴²

Note: 1. Simple average weighted average cost of capital (WACC) % (leaders – laggards), outliers removed from sample per interquartile range rule.

Sustainability leaders (laggards) defined as top- (bottom-) quartile Refinitiv Environmental Pillar Score; geographical scope limited to control for regional variation in WACC.

Source: Refinitiv data (29 November 2021) for listed companies with >\$500 million market cap (>\$5 billion for automotive due to consolidated nature of industry); BCG analysis

Average WACC discount¹ of Western-European sustainability leaders vs. laggards



More and more, the financial industry is engaging with essential heavy industries to drive climate action. I expect that, in the not-too-distant future, access to financial markets will be reserved for those companies that lead in decarbonization. It will be a key determinant in a company's ability to raise capital.

Fernando A. Gonzalez, Chief Executive Officer, CEMEX

3.6 Climate leaders create higher shareholder value

We increasingly see indications of higher shareholder returns for climate leaders. BCG analysis in early 2021 showed that energy sector climate leaders including Enel, Iberdrola, Neste, NextEra Energy and Ørsted generated annual total shareholder returns of the order of 30% from 2017 to 2020 (a level similar to that of tech firms such as Amazon, Apple, Facebook and Google). But not only a select few benefit. In BCG's [Value Creators Report 2021](#), a financial analysis of valuation multiples of a US industrial sector found emissions intensity to be the second-largest driver of company valuation. Less

carbon-intensive companies saw higher valuations than their more carbon-intensive peers, all else being equal. New analysis shows that climate leaders achieve higher total shareholder return than laggards in the majority of sectors.⁴³ And while correlation does not necessarily prove causality, there is a strong narrative of a link between climate leadership and value creation. (See Figure 19.)

Corporate climate action is a source of competitive advantage – one that will likely grow throughout this decade.

FIGURE 19 Leaders achieve better shareholder returns^{44,45}



Note: Leaders defined as top-quartile Environmental Pillar Score (Refinitiv) in 2016; laggards defined as bottom-quartile of the same. Share prices for each company in the sample are indexed, average difference in TSR calculated based on median index of leaders and laggards in December 2016 and December 2020.

Source: CapitalIQ dividend-adjusted share prices (30 November 2021) for listed companies with >\$500 million market cap; Refinitiv; BCG ValueScience; BCG analysis

4

Individual companies can change the game

One of the most common narratives around corporate climate action is the collective action paradigm “no company can do it alone”. Solving the climate crisis certainly requires everyone to move. Yet major progress in recent years has often come not from collective action but from competitive

action, triggered by one individual company boldly moving ahead of its sector. Early movers can not only create value – they can change the game by prompting the systemic changes across sectors and the regulation needed to achieve the climate imperative. Here are five ways they do it.

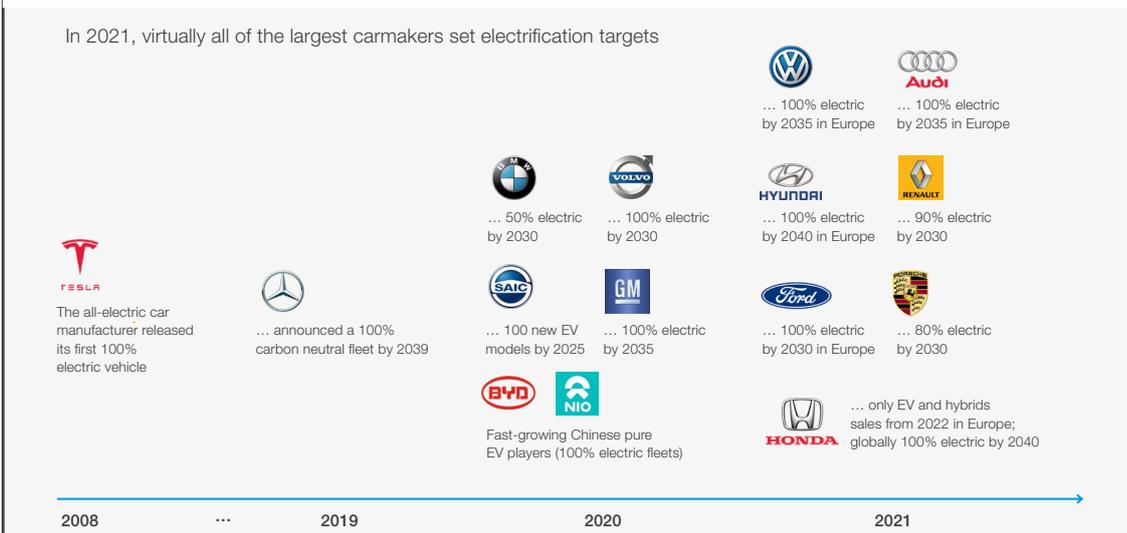
4.1 Raise the bar

Even in the most conservative sectors, sustainability is now a competitive consideration. “What do we have to do to be leading?” has become a question in board-level discussions. At the very least, companies do not want to be seen as lagging, so if one company moves, many others feel pressured to follow – and the goalposts move quickly. A single company with the courage to set ambitious targets can move its entire industry.

Take the example of Tesla. When it introduced the first mass-production fully electric vehicle in 2008, the technology was still widely regarded with scepticism. When Mercedes announced in 2019 that it would aim for a carbon-neutral vehicle

fleet by 2039, eyebrows were raised across the industry. Today, only three years later, virtually all major carmakers have set ambitious electrification targets and new all-electric players have emerged. Many global carmakers plan to exit sales of internal combustion engines (ICE) entirely within the next one or two decades. (See Figure 20.) While the decarbonization of passenger vehicles has been supported by policy at national and regional levels (e.g. EU fleet-wide emissions targets, electric vehicle purchasing incentives and the introduction of ICE bans), the OEMs that were first to move showed to both governments and competitors that electric vehicles are serious alternatives to ICE vehicles.

FIGURE 20 | A single player can raise the bar⁴⁶

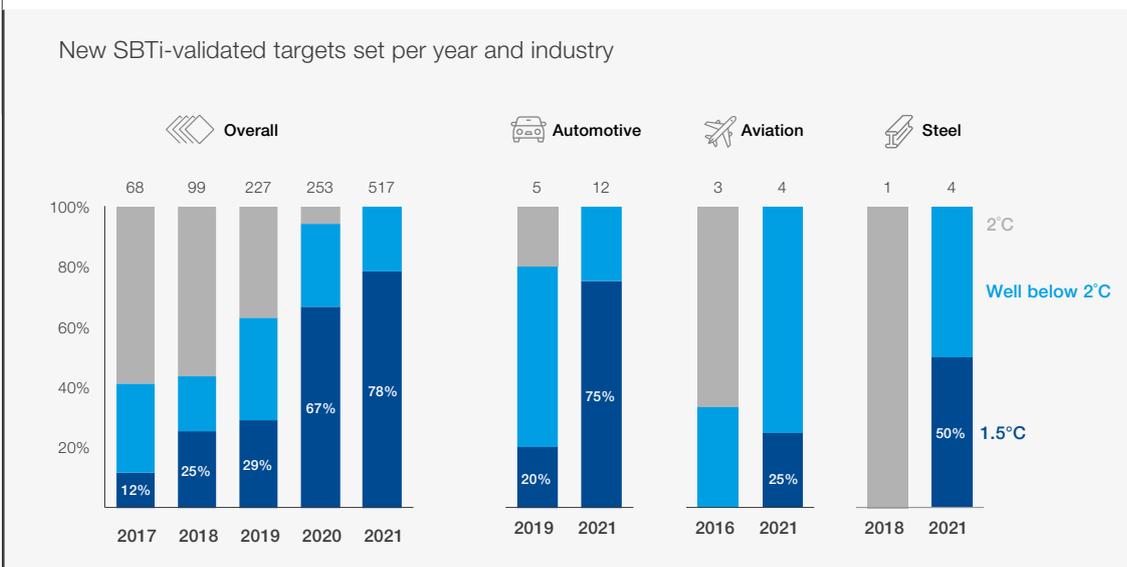


Source: Company reports; Race to Zero

The same phenomenon can be observed in other industries. An analysis of SBTi-validated corporate emissions-reduction targets show that the bar is continuously being raised. (See Figure 21.) Four years ago, it was a commonly held belief in the steel industry that achieving ambitious unilateral climate commitments was not feasible. Today, companies accounting for about 20% of global steel production

have set firm net-zero emissions commitments.⁴⁷ In less emission-intensive sectors, ambitious companies such as Dentsu International, Heineken and H&M are committing to net-zero production emissions (Scopes 1 and 2) within the next 10 years and a fully net-zero supply chain (Scopes 1, 2 and 3) within the next 20 years – both unheard of only three or four years ago.

FIGURE 21 | The bar for “what good looks like” continues to rise⁴⁸



Note: Companies with near-term science-based targets set for 2030.

Source: SBTi; BCG analysis

4.2 Reshape your context

In many cases, market context, such as the high cost of alternative technologies or lack of clear customer demand, can discourage ambitious decarbonization. This has not prevented leading players from acting. Where the context was unhelpful, they reshaped it. Here are three examples.

No market for low-carbon offerings? Create one. One of the largest cost drivers in international shipping is bunker fuel. Moving from fossil to renewable sources can increase fuel cost by a factor of three. It is a classic example of an industry in which moving early creates competitive risk. But does it? In 2019, logistics company Maersk piloted the world’s first “net zero shipping” product. They have also recently invested in eight container vessels that can be fuelled with green

methanol and are backing the plans to build Europe's largest P2X facility⁴⁹ that will produce ammonia with offshore wind power.

Peers need to act collectively to make climate action meaningful? Align your industry. By pushing common ambitions with competitors, companies can move their whole value chain and drive customer behaviour. Fashion is the second-highest polluting industry in the world. In 2019, 200 brands united under the Fashion Pact and collectively committed to sustainability, creating new standards for the sector. And because the production of batteries for electric vehicles poses significant social and environmental risks, the Global Battery Alliance is setting up a Battery Passport to track batteries' footprint and establish a de facto standard for a responsible battery value chain. Similar initiatives are now popping up in other sectors, including food, shipping and aviation, among others.

Climate regulation is insufficient? Advocate to make it tighter. Ørsted decided to move away from coal, oil and gas and towards becoming a renewable energy company in the early 2010s, a time when

renewables were far from cost-competitive. The company engaged with governments on policies that could help "move the needle". Its ambitious cost-reduction target increased governments' support of offshore wind, including through feed-in tariffs introduced in Denmark and the United Kingdom. Today, Ørsted is widely credited with bringing offshore wind technology to market maturity and has installed more offshore wind capacity than any other company globally.

Ørsted's example is a good demonstration of the role that policy-makers can play to help climate leaders lead. Consistent and stable climate policy frameworks will have a critical role in shaping overall market contexts and driving systemic change – through harmonized reporting standards, carbon pricing and border adjustment mechanisms, sector-specific regulation consistent with carbon reduction objectives, enabling speedy deployment of existing technologies, de-risking investments in new technologies and decarbonizing public procurement. This helps create the context for other early movers to successfully lead the way.

4.3 Disrupt your business model

In a net-zero pathway, would your business shrink or grow? If the answer is shrink, consider challenging it yourself, before someone else does. Green growth opportunities exist in all sectors. To seize them, companies need to address societal needs in new ways – by identifying new products, services, markets and business models and pioneering new technologies. Those who go all in may find themselves changing their markets.

Companies can capture new business value from customer preferences shifting away from their traditional offerings. IKEA has introduced circular hubs in almost every market, where furniture can be resold, repaired or recycled and in the last year this marketplace had already repurposed more than 30 million items. Similarly, Bayer is helping farmers to generate carbon credits through more sustainable farming practices, even if this reduces demand for some of its traditional products.

Where the path to net-zero emissions requires new technologies, the first companies to move can become key enablers for the decarbonization of entire sectors. Since SSAB delivered the

world's first fossil-free steel in 2021, other major steelmakers across Europe have been scrambling to offer similar projects. Maersk's pioneering investments in vessels and fuel production projects for alternative fuels such as e-methanol and ammonia are almost certain to attract followers in the industry.

In some cases, the path to net zero provides opportunities to employ existing capabilities in new low-carbon growth markets. In a perfect example of how to turn a challenge into an opportunity, crop nutrition company Yara International is not only investing millions to decarbonize its energy-intensive production processes but is also now commercializing clean ammonia as low-to-zero greenhouse gas emission transport fuel. Rolls-Royce is deploying its engineering and manufacturing expertise to develop new modular nuclear power reactors that will help to decarbonize the power sector as well as transport and industry through clean fuel and green hydrogen production. There are many such examples in other sectors.



The organization needs to mirror what society needs from a company in terms of sustainability and innovation.

Francesco Starace, Chief Executive Officer and General Manager, Enel



The largest innovations are the ones that are aimed towards value chains. We developed a feed additive to reduce cows' methane emissions and created a new market to address a problem no one had tried to solve before.

Dimitri de Vreeze, Co-Chief Executive Officer and Chief Operating Officer, Royal DSM

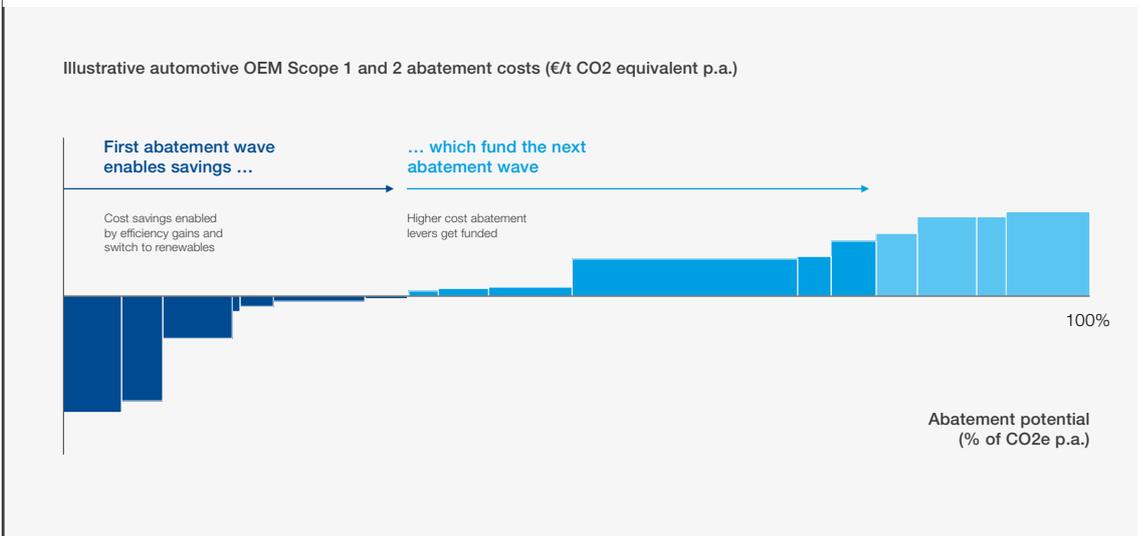
4.4 Save cash while saving carbon

By systematically prioritizing economic levers such as energy efficiency and switching to renewable power, companies can meet quite ambitious decarbonization targets while realizing savings in the process. These savings can help pay for more expensive emissions-reduction levers such as decarbonizing heat generation further down the

road. (See Figure 22.) Some companies can even reach net-zero emissions at net-zero costs.

By proving that decarbonization is economically viable, companies unlock ambitious emissions reductions in their industry. By openly talking about it, they put pressure on others to follow.

FIGURE 22 Many companies can save cash and carbon alike



Carbon is shifting cost curves. Steel producers, especially in the EU, need to factor in the cost of carbon and transition to a green future, both on their capex and opex.

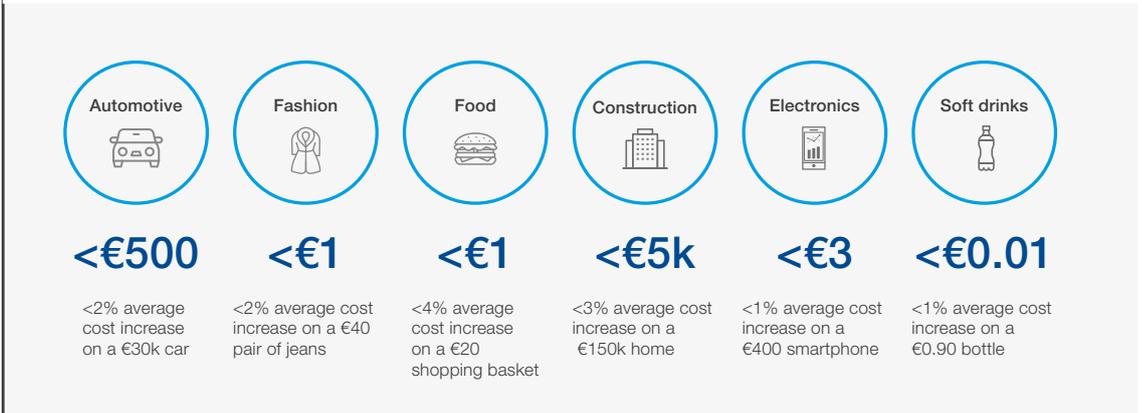
T.V. Narendran, Chief Executive Officer and Managing Director, Tata Steel

4.5 Pioneer a net-zero product

For many downstream sectors, supply-chain emissions far exceed those from a company's own production processes. Last year's report, [Net Zero Challenge: The Supply Chain Opportunity](#), argued that the economic impact of addressing emissions was far lower than most people expected. Since the

share of base material costs makes up only a small portion of most products' end customer prices, even if the entire value chain moved to net-zero emissions, most products would become only 1% to 4% more expensive. (See Figure 23.)

FIGURE 23 | Full decarbonization has a low impact on the end price⁵⁰



Note: Prices are indicative for each product/basket

Companies should not only address their supply-chain emissions, they should fast-track net-zero versions of their products to market, giving customers a truly sustainable choice. There is nascent demand for such products, especially in developed markets, that is currently underserved. The first company to market in each sector will not only yield much of the initial benefit but will also

put significant pressure on peers to follow. The car company Polestar has announced its intention to launch the world's first net-zero car by 2030, through, among other things, switching its entire supply chain to renewables, minimizing raw material needs and reusing metal from scrapped cars. It will not be the last example.

5

The CEO Guide to Climate Advantage

Winning the race to net zero requires a transformation. Here are the steps CEOs need to navigate on the path to getting there. (See Figure 24.)

FIGURE 24 The CEO Guide to Climate Advantage

Net-Zero Strategy					
Estimate your footprint	Understand your climate risk exposure	Define your net zero business model	Shape your offset and removal strategy	Set ambitious targets	
Net-Zero Operations			Net-Zero Business Portfolio		
Decarbonize your operations	Decarbonize your supply chain	Build physical resilience	Decarbonize your downstream portfolio	Unlock green growth and innovation	
Net-Zero Organization					
Be radically transparent	Mobilize your organization	Grow your capabilities	Finance the transformation	Advocate, with citizenship	Engage your ecosystem

Building block 1: Net-Zero Strategy

Net-Zero Strategy					
Estimate your footprint	Understand your climate risk exposure	Define your net zero business model	Shape your offset and removal strategy	Set ambitious targets	
Net-Zero Operations			Net-Zero Business Portfolio		
Decarbonize your operations	Decarbonize your supply chain	Build physical resilience	Decarbonize your downstream portfolio	Unlock green growth and innovation	
Net-Zero Organization					
Be radically transparent	Mobilize your organization	Grow your capabilities	Finance the transformation	Advocate, with citizenship	Engage your ecosystem

As in any transformation, the first step is developing a strategy for how to achieve competitive advantage. There are five key factors to get right when shaping a net-zero strategy.

1a Estimate your footprint

The starting point for any climate strategy is understanding the problem. Companies need to quantify their emissions impact, both in their own operations (Scopes 1 and 2) and across the value chain (Scope 3), including suppliers and customers using their products or services. Because of limited data and visibility, establishing supply-chain transparency is one of the biggest challenges. [A recent survey by BCG GAMMA](#) found that, while 85% of 1,290 surveyed organizations are concerned about reducing their emissions, only 9% feel enabled to measure their emissions “comprehensively”.

Successful companies find ways to overcome this

challenge. They establish upstream transparency about emissions as far as the level of suppliers or even supplier sites, which enables them to track supply-chain initiatives and monitor progress. They are also able to identify product-specific carbon footprints, which enables them to commercialize emissions reductions to a more effective degree.

To overcome the measurement challenge, Unilever developed a repository of carbon intensity that encompasses all processes and materials used in its products. Heineken employs a baselining tool to gather supplier-level emissions and is beginning to track emissions from the farming of the crops that go into its beer at the level of individual farms.

1b Understand your climate risk exposure

Climate change and climate action both affect companies’ business models. The ramifications of a changing climate, such as more violent weather-related events, create physical risks that can disrupt companies’ operations, infrastructure and supply chains. Accelerating climate action triggered by customers, investors, advocacy organizations and regulators creates transition

risks, especially for fossil fuel-based businesses and the companies that serve them. These actions also create new growth opportunities. Successful companies will transparently analyse their financial exposure in a net-zero scenario – and draw the right conclusions. Their less successful counterparts will prove masters of deception – principally deceiving themselves.

1c Define your net-zero business model

Companies need to define their purpose and their business model on the road to net zero. Will you lead your industry on decarbonization? Will you pioneer new technologies? Will you enable others? Will you grow in new low-carbon businesses? Making

any of these ambitions viable requires establishing your business case, through savings, new growth, supportive regulation or exploring other avenues. Many net-zero pathways become much less daunting once the true costs and upsides are understood.

For example, Ørsted discovered that once its future ambition for renewables was set, it was able to accelerate its green transformation much more rapidly than originally envisioned. As a result, the company was able to reach its target of shifting

to 90% renewables 20 years ahead of its initial schedule. Maersk first looked at its net-zero commitment as an almost insurmountable problem to solve. Now they are the first to commercialize green shipping as a business opportunity.

1d Shape your offset and removal strategy

Offsetting carbon emissions (in effect, paying someone else to avoid or remove CO₂) is a controversial topic among some companies and climate activists. Indeed, credible corporate climate strategies follow a clear mitigation hierarchy, starting with rapid, deep emission cuts in line with near- and long-term [science-based targets](#) for a company's own processes (Scope 1), purchased electricity and heat (Scope 2) and those emissions generated by suppliers and end users (Scope 3). Offsets must not detract from this priority. Only after reaching 90–95% of emissions reductions by 2050 can companies use carbon removals to neutralize their remaining emissions and achieve net zero – though they should already begin to invest to support scaling of these critical solutions.⁵¹ (See [this carbon removals guide](#) for further information.⁵²)

While it will not contribute to meeting their own net-zero target, leading companies should also support broader decarbonization efforts outside of their value chains. This is where credible avoidance offsets enter the picture, following [best practice guidance](#) for natural climate solutions credits.⁵³

History is rich with examples of corporate compensation and communication programmes that were at best well-intended and included “carbon neutral” claims at a fraction of the true cost of removing carbon to offset emissions. On the flip side, ambitious companies can have a truly positive impact using well-designed offset programmes that supplement their efforts to reduce emissions in line with a science-based pathway.



Swiss Re is committed to achieving net-zero emissions across our entire assets and liabilities by 2050 and in our operations by 2030, focusing primarily on emissions-reduction measures as part of our strategy to ‘do our best’. A \$100/tCO₂ internal carbon levy supports a 10-year funding scheme to move from carbon offsetting to carbon removal in line with our ‘remove the rest’ strategy.

Christian Mumenthaler, Group Chief Executive Officer, Swiss Re

BOX 1

Shaping your removal strategy

Consider these three sets of questions to shape your removal strategy:

- What should the role of offsets be in the decarbonization journey? Are they a matter of last resort for unavoidable emissions or an instrument to achieve carbon neutrality immediately while addressing physical emissions in the process? Should they play any role at all?
- What cost of removing carbon will be assumed? Early carbon-neutral claims were often centred on paying \$3–\$6 per ton of CO₂ offset, yet best estimates on the true costs of carbon removal are dramatically higher – nature-based solutions (not permanent, but with the potential to store carbon for decades) will likely be in the \$15–\$40 per ton range.

Engineered solutions with more permanent removal are currently in excess of \$200 per ton and likely will stay above \$100 per ton even with technological breakthroughs. A serious net-zero strategy that includes carbon removals must include costs that truly reflect nature and engineered removal solutions to avoid greenwashing exposure.

- What type of projects best fit your decarbonization ambition, reductions or removal offsets? Are these projects related to or independent of your business? Are they projects with a focus on social or environmental co-benefits? Do they support the scale-up of particular technologies (such as soil sequestration, direct air capture or others)?



BCG is committed to being net zero in 2030 across Scopes 1, 2 and 3. We are targeting \$80 per ton to remove any carbon we still emit through a combination of leading-edge nature based and engineered solutions.

Rich Lesser, Global Chair, Boston Consulting Group

1e Set ambitious targets

Companies look at multiple factors when setting corporate emission targets. What does the science demand of them on a 1.5°C pathway? What do they have to do to be in line with – or ahead of – their peers? What are customers and investors looking for? What regulations are in place today or expected to be implemented tomorrow?

To get ahead in the race to net zero and to establish truly sustainable climate leadership, only one question really matters: What is actually the best that your company can do? Ambitions are dynamic. A target that leads the industry today doesn't necessarily lead it tomorrow unless it is truly ambitious and continues to evolve as circumstances change and technologies advance. Companies that understand this can truly change their industry.

“ **Some leaders won't commit until they can see every step, but we don't know all answers yet. Declaration of where you'll get is necessary to trigger action.**

Alan Jope, Chief Executive Officer, Unilever

“ **Realizing that the food sector will experience significant change, we moved swiftly to set a high ambition. It's better for business to be first movers rather than having decisions being taken on our behalf.**

Svein Tore Holsether, Chief Executive Officer, Yara International

Building block 2: Net-Zero Operations

Net-Zero Strategy					
Estimate your footprint	Understand your climate risk exposure	Define your net zero business model	Shape your offset and removal strategy	Set ambitious targets	
Net-Zero Operations			Net-Zero Business Portfolio		
Decarbonize your operations	Decarbonize your supply chain	Build physical resilience	Decarbonize your downstream portfolio	Unlock green growth and innovation	
Net-Zero Organization					
Be radically transparent	Mobilize your organization	Grow your capabilities	Finance the transformation	Advocate, with citizenship	Engage your ecosystem

Companies need to “climate-proof” their full operations. This means addressing emissions in their production and supply chain, but also building resilience to increasing physical risks from climate change.

2a Decarbonize your operations

Decarbonizing a company's own operations is a complex effort. The difference between doing this well or not so well can cost hundreds of millions of dollars. We saw in section 4 that almost all companies have levers that can save cash as well as carbon. Maximizing the yield from these potential savings – often across dozens of facilities around the globe – is one of the key success factors for making decarbonization economic.

The most effective emissions-reduction programmes are not run much differently from a cost-savings

programme. The best companies manage top-down efforts, identifying the lowest-cost pathways by site or facility and steering progress with well-thought-out targets and incentives. They understand how government policies can substantially shape the economics of investing and sequencing moves across locations. They also realize synergies and transfer of knowledge across production sites; for example, through central carbon “swat teams” that support this across the organization.

2b Decarbonize your supply chain

For many sectors, supply-chain emissions far exceed emissions from company operations. While section 4 showed that the economics of addressing these are lower than expected, implementing decarbonization programmes is difficult. Companies need to rethink the design of their products and try to use fewer, alternative or secondary materials. They need to hardwire CO2 emissions into their purchasing decisions and engage much more intensively with suppliers to convince them to accurately measure and then reduce emissions in their own processes and supply chains. Effective initiatives can include partnering on technology development, providing tech support for efficiency

improvements, and investing jointly in carbon-efficient processes and transparent measurement and tracking systems.

Nestlé's Global Head of Operations, Magdi Batato, said, "We have around 100 initial pilots on farms to demonstrate the positive impact of regenerative agriculture, inspiring farmers to follow us on this journey." Schneider Electric is working with its top 1,000 suppliers with the goal of reducing their carbon footprints 50% by 2025, leveraging tools and best practices provided by Schneider. Walmart has partnered with HSBC on a programme that pegs suppliers' financing rates to their sustainability efforts.

2c Build physical resilience

Even as the world mobilizes to reduce emissions, the impact of climate change will only increase in the coming decades, disrupting company facilities, operations and supply chains. In addition to the potentially significant one-off costs of such events, companies face structurally higher costs from increasing insurance premiums. Companies need to build resilience to these sorts of disruptions to ensure business continuity. They must also satisfy increasing scrutiny from investors and insurers, especially as monitoring and disclosure become standard elements of transparency and reporting.

Strengthening resilience involves understanding exposure to physical risks from climate change, as well as investing in early-warning systems to

enable timely action, contingency plans (such as inventory and redundancy in case of supply disruptions), physical resilience (relocation and climate-proofed infrastructure, for example) and risk transfer (insurance). Financial implications can be severe. Norilsk Nickel is currently investing \$5.5 billion in risk management and environmental projects following a major diesel leak caused by melting permafrost in Russia's Arctic north. BASF was forced to cut production in its main plants in Ludwigshafen, Germany, in 2018 because low water levels in the Rhine River disrupted their raw material supply. Oil refineries in Louisiana lost tens of millions of dollars in revenues in 2021 due to a hurricane that disrupted power and water supplies.

Building block 3: Net-Zero Business Portfolio

Net-Zero Strategy					
Estimate your footprint	Understand your climate risk exposure	Define your net zero business model	Shape your offset and removal strategy	Set ambitious targets	
Net-Zero Operations			Net-Zero Business Portfolio		
Decarbonize your operations	Decarbonize your supply chain	Build physical resilience	Decarbonize your downstream portfolio	Unlock green growth and innovation	
Net-Zero Organization					
Be radically transparent	Mobilize your organization	Grow your capabilities	Finance the transformation	Advocate, with citizenship	Engage your ecosystem

Along with building resilient operations, companies need to "climate proof" their business portfolios. Reductions in fossil use may not come with equal

speed in all sectors or geographies, but it will likely come faster than many expect. On the flip side, so will green growth.

3a Decarbonize your downstream portfolio

How will your portfolio perform in a net-zero world? How fast will declining legacy businesses be undermined in a 1.5°C or 2°C scenario? All companies that are exposed to fossil fuel-based business models, however indirectly, need to understand the answers to these questions.

Successful companies adopt a scenario-based approach to create transparency and then take bold decisions to act on what they learn. They seek to limit exposure to (or actively manage the sunset of) declining businesses and invest in those that can contribute to growth in the longer term.

3b Unlock green growth and innovation

From renewables to e-mobility to efficiency solutions to hydrogen to meat alternatives and many, many other innovations, low-carbon solutions will see enormous growth across all sectors. Many of the technologies that will help us reach a net-zero pathway are already known today. Others require [further innovation](#). Companies should gain exposure to new high-growth business areas on the back of the global drive to net zero. They should look for new markets where they can employ current advantages to create new offerings and business models. And they should hurry.

For example, Olam is using its expertise in sustainability and agricultural emissions to launch an enterprise software-as-a-service platform that will support other companies to decarbonize. Their GreenPass platform offers end-to-end carbon management and reporting across sectors.

To develop the world's largest green hydrogen project, ACWA Power is deploying its renewable power generation and storage capabilities in partnership with Air Products and Chemicals (which will transport the hydrogen to customers globally) and NEOM (which is co-investing and will host the project due to its abundant solar and wind resources).

Building block 4: Net-Zero Organization

Net-Zero Strategy					
Estimate your footprint	Understand your climate risk exposure	Define your net zero business model	Shape your offset and removal strategy	Set ambitious targets	
Net-Zero Operations			Net-Zero Business Portfolio		
Decarbonize your operations	Decarbonize your supply chain	Build physical resilience	Decarbonize your downstream portfolio	Unlock green growth and innovation	
Net-Zero Organization					
Be radically transparent	Mobilize your organization	Grow your capabilities	Finance the transformation	Advocate, with citizenship	Engage your ecosystem

Winning the race to net zero requires transformation of the entire organization, often starting with a step change in transparency, mobilization and

capabilities. It also requires new engagement strategies with external stakeholders: investors, regulators and the entire value chain.

4a Be radically transparent

The net-zero transition requires new levels of transparency within and outside the company. Internally, carbon metrics should be made available through decision-making tools at all levels, informing everything from board strategy-setting to procurement and purchasing decisions. Transparency can help mobilize employees and harness their power to act, while clear targets and related incentives will help speed up the shift away from business as usual. Questions to guide the effort include the following:

- Have you established transparency about the carbon footprint of all key products your procurement department purchases?
- Do decision-makers get regular reporting about the carbon emissions they can influence, and how they will evolve with the initiatives that are currently in place?

- Are you able to provide the end-to-end carbon footprint of all of the products you sell?

If the answer to any of these questions is no, there is still work to do.

Externally, climate-related reporting is gaining importance. More and more companies are communicating boldly about their current footprint, progress and unsolved issues. Making progress against standards set by third parties, such as the CDP or the Financial Stability Board's Task Force on Climate-Related Financial Disclosures (TCFD) is increasingly a table stake (a requirement in order to be taken seriously).

4b Mobilize your organization

From operations to procurement, product development and strategy, the climate transformation will involve people throughout the organization making decisions differently from how they have in the past. Just as companies steer profitability and sales, they need to establish a "carbon governance" model that sets the right incentives and makes future-proof investments easier, including a new steering model, processes, KPIs, incentives, systems and more.

Companies steer emissions in very different ways: Some implement internal carbon pricing to translate

their carbon ambitions into financial figures and integrate CO₂ into financial management. Some steer purely by setting and communicating strong targets that the organization is expected to implement. Some are able to activate specific abatement initiatives based on full transparency of their potential impact (measure-based steering). Regardless of the steering method, mobilizing the organization requires setting new responsibilities, aligning internal processes, establishing carbon controlling and reporting at all levels, and developing (financial) incentives in performance management.



Companies need targets that go beyond a CEO's tenure and need to institutionalize these throughout the organization.

Simon Connell, Global Head Sustainability Strategy, Standard Chartered Bank

4c Grow your capabilities

The transformation will almost certainly require the organization to develop or acquire new skills to support the pivot to new businesses or technologies. Especially for companies in industries undergoing fundamental change, staff reskilling could be one of the defining challenges of the coming decade. Companies may also need to adopt a new type of leadership that is

more comfortable with taking bolder decisions in uncertain circumstances. Leaders should be guided by a clear purpose and "north star" ambition, rather than a set of consensus projections about the future. In an era of rapid change, today's typical decision horizon of three to four years simply isn't fit for purpose and must be extended to better anticipate the risks and opportunities ahead.



The net-zero transformation requires a reinvention of leadership. Executives have to overcome the fact that the business they have built is not the one that needs to be there in 10 years.

Nigel Topping, UK High Level Climate Action Champion, COP26



Leaders need to combine an understanding of business and technology with the ability to lead through uncertainty.

Anish Shah, Managing Director and Chief Executive Officer, Mahindra



Sustainability experts need to understand the business. Rather than recruit sustainability experts and train them on steel, I train my best line managers on sustainability.

T.V. Narendran, Chief Executive Officer and Managing Director, Tata Steel

4d Finance the transformation

The transition to net zero will require substantial investment – in decarbonizing operations, building new businesses and strengthening resilience. At the same time, at hardly any other point in history has such a large volume of capital been waiting to fund a single cause. In 2020, more than \$500 billion was invested in the energy transition.⁵⁴ During COP26, a group of banks, insurers and investors managing \$130 trillion pledged to put combating climate change at the heart of their work.⁵⁵ Companies can employ green financing and engage with partners on innovative financing schemes, such as sustainability-linked bonds. Securing the best

terms requires many of the factors described above: an honest and bold ambition; a compelling and distinctive sustainability “story”; and radical transparency that enables investors to see whether companies deliver on their promises. One of the first companies to develop such schemes was Enel. The company’s first-of-its-kind SDG-linked bond aligned financial and sustainability incentives, expanded the horizon of Enel’s climate accountability beyond the typical CEO tenure, and created a much broader marketplace for such instruments. Today, examples of such funding structures abound.

4e Advocate – with citizenship

Corporate advocacy has an image problem, which stems from the fact that too many companies take a very short-sighted approach to lobbying. From utilities that want to continue to burn coal to car OEMs and oil multinationals arguing against e-mobility, recent history is full of attempts to protect business practices that are no longer in line with humanity’s interests.

Instead of trying to prolong the life of a non-sustainable business or process, companies should seek support for developing their future, sustainable endeavours. Sustainability leaders draw advantage from being ahead of the curve when regulations tighten, while competitors need to catch up. A big part of Ørsted’s success today is the result of

favourable regulatory changes that it sought 10 years ago. SSAB pioneered green steel with support from the Swedish government. Maersk is now lobbying the International Maritime Organization to establish more stringent climate regulations for shippers through its member states, knowing that this is not only the right thing to do, but that it will also de-risk Maersk’s own net-zero transformation.

In the US, EU and other regions, new legislation is accelerating incentives for innovation that can reshape investments and accelerate progress. Companies can both help to shape those policies to be most impactful and efficient and provide lighthouse examples that will encourage more and better government support to go further, faster.

4f Engage your ecosystem

Combating climate change is a collective effort, requiring partnerships and collaboration among organizations with common goals. Companies can engage their ecosystems of suppliers and partners to further everyone’s ability to deliver sustainable outcomes more quickly by combining expertise, co-investing, securing scarce material supplies, aggregating demand for breakthrough technologies, sharing best practices and setting industry standards. A number of potentially

powerful global coalitions are taking shape, such as the First Movers Coalition (FMC), the Alliance of CEO Climate Leaders and the Mission Possible Partnership.⁵⁶ Companies in almost all major sectors can also engage in smaller, more specialized initiatives that help overcome roadblocks in their respective industries.

6

Think bigger, act faster

The transition to net zero is on; in fact, one can argue it is a race to net zero. The world is embarking on the biggest peacetime transformation in history, which will fundamentally change the way many companies do business. The immediacy, pace and extent of change are still widely underestimated. Rarely has a full generation of CEOs faced so big an opportunity – and so big a threat. In the past, early movers in big global shifts have managed to secure windfalls for their companies. Those who saw the opportunity are thriving today. Many of those who saw only risks have still not recovered; some have not survived.

The climate crisis will not be overcome by a few early movers, but their leadership can have an outsized impact. CEOs must ensure that they follow ambition with commitment and action, that their purpose aligns with the needs of their customers, the world and the aspirations of their employees, and that they look for opportunities rather than just at the costs. The goal must be true transformation, not just incremental improvements.

It is time to seize the opportunity. It is time to change the game on climate. It is time to move.



Contributors

World Economic Forum

Jonathan Eckart

Lead, Corporate Climate Action

Antonia Gawel

Head, Climate Action and Deputy Head, Centre for Nature and Climate
Member of the Executive Committee

Boston Consulting Group

Jens Burchardt

Partner and Associate Director, Climate Impact

Shane Fagan

Principal, World Economic Forum Fellow

Michel Frédeau

Managing Director and Senior Partner

Patrick Herhold

Managing Director and Partner

Sanni Inovaara

Consultant

Rich Lesser

Global Chair

Cornelius Pieper

Managing Director and Partner

Nicolas Salomon

Consultant

Acknowledgements

Frank Appel

Chief Executive Officer, Deutsche Post DHL Group

Magdi Batato

Executive Vice-President and Head of Operations, Nestlé

Jakob Askou Bøss

Senior Vice-President, Corporate Strategy, Ørsted

Jesper Brodin

Chief Executive Officer, Ingka Group (IKEA)

Mayra Buschle

Consultant, Boston Consulting Group

Priyasha Chakrabarty

Lead Knowledge Analyst, BCG ValueScience Center

Simon Connell

Global Head Sustainability Strategy, Standard Chartered Bank

Elena Corrales

Knowledge Expert, Boston Consulting Group

Ed Daniels

Executive Vice-President Strategy, Royal Dutch Shell

Fernando A. Gonzalez

Chief Executive Officer, CEMEX

Mike Haigh

Chair of the Executive Board, Mott MacDonald

Svein Tore Holsether

Chief Executive Officer and President, Yara International

Alan Jope

Chief Executive Officer, Unilever

Christian Mumenthaler

Group Chief Executive Officer, Swiss Re

T. V. Narendran

Chief Executive Officer and Managing Director, Tata Steel

George Oliver

Chairman and Chief Executive Officer, Johnson Controls

Anish Shah

Managing Director and Chief Executive Officer, Mahindra and Mahindra

Hak Cheol Shin

Chief Executive Officer, LG Chem

Mahendra Singhi

Managing Director and Chief Executive Officer, Dalmia Bharat Cement

Søren Skou

Chief Executive Officer, A.P. Møller-Maersk

Nikki Speklé

Consultant, Boston Consulting Group

Francesco Starace

Chief Executive Officer and General Manager, Enel

Stacey Tank

Chief Transformation and Corporate Affairs Officer, Heineken

Nigel Topping

UK High Level Climate Action Champion, COP26

Jean-Pascal Tricoire

Chairman and Chief Executive Officer, Schneider Electric

Dimitri de Vreeze

Co-Chief Executive Officer and Chief Operating Officer, Royal DSM

Antonia Wanner

Head of ESG, Sustainability Strategy and Deployment, Nestlé

Christophe Weber

President and Chief Executive Officer, Takeda

Endnotes

1. Including these would amount to 88% of global emissions covered by net-zero targets by December 2021.
2. Net Zero Tracker: <https://zerotracker.net/>.
3. Climate Watch Data, *Historical GHG Emissions*: <https://www.climatewatchdata.org/ghg-emissions>.
4. Net Zero Tracker: <https://zerotracker.net/>.
5. SBTi, *Companies Taking Action*: <https://sciencebasedtargets.org/companies-taking-action>.
6. Ibid.
7. EY, *What Boards Should Know About ESG Developments in the 2021 Proxy Season*, August 2021: https://www.ey.com/en_us/board-matters/esg-developments-in-the-2021-proxy-season.
8. Net Zero Tracker: <https://zerotracker.net/Powering>.
9. Climate Watch Data, *Historical GHG Emissions*: <https://www.climatewatchdata.org/ghg-emissions>.
10. ICOS, *Data Supplement to the Global Carbon Budget 2021*: <https://www.icos-cp.eu/science-and-impact/global-carbon-budget/2021>.
11. UN, *Glasgow Leaders' Declaration on Forests and Land Use*: <https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>.
12. REN21, *Renewables 2020: Global Status Report*: https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf.
13. Powering Past Coal Alliance, *PPCA Members*: <https://www.poweringpastcoal.org/members>.
14. International Council on Clean Transportation, *Update on Government Targets for Phasing Out New Sales of Internal Combustion Engine Passenger Cars*: <https://theicct.org/publications/update-govt-targets-ice-phaseouts-jun2021>.
15. World Bank, *Carbon Pricing Dashboard*: <https://carbonpricingdashboard.worldbank.org/>.
16. CDP Data (years 2018–2020); Refinitiv Data (years 2018–2020).
17. International Energy Agency (IEA), *Renewable Energy Market Update*: <https://www.iea.org/reports/renewable-energy-market-update-2021>.
18. European Union, *Fit For 55*: <https://www.consilium.europa.eu/en/policies/green-deal/eu-plan-for-a-green-transition/>.
19. Powering Past Coal Alliance: <https://www.poweringpastcoal.org/about/who-we-are>.
20. International Council on Clean Transportation, *Update on Government Targets for Phasing Out New Sales of Internal Combustion Engine Passenger Cars*: <https://theicct.org/publications/update-govt-targets-ice-phaseouts-jun2021>.
21. World Bank, *Carbon Pricing Dashboard*: <https://carbonpricingdashboard.worldbank.org/>.
22. Part of the reason is that, in 2020, the IEA stopped publishing scenarios based on historic government policies, acknowledging that, "It is difficult to imagine this 'business-as-usual' approach prevailing in today's circumstances."
23. International Energy Agency (IEA), *World Energy Outlook for 2006, 2010, 2016, 2019, 2020*: <https://www.iea.org/topics/world-energy-outlook>.
24. International Energy Agency (IEA), *Net Zero by 2050*: <https://www.iea.org/reports/net-zero-by-2050>.
25. International Energy Agency (IEA), *World Energy Outlook 2020*: <https://www.iea.org/reports/world-energy-outlook-2020>.
26. S&P Global, as of 25 November 2021.
27. International Energy Agency (IEA), *World Energy Outlook for 2006, 2010, 2012, 2014, 2016, 2018, 2020*: <https://www.iea.org/topics/world-energy-outlook>.
28. The figure represents industry players' own changing (publicly available) projections of peak oil as published in equivalent moderate scenarios pre- and post-COVID (Equinor Reform, BP Rapid, Shell Mountains vs. Islands), indexed to match IEA value for oil demand in 2019. Considers oil only.
29. BCG Center for Energy Impact: <https://www.bcg.com/industries/energy/center-for-energy-impact/default>.
30. International Energy Agency (IEA), *Renewable Energy Market Update 2021*: <https://www.iea.org/reports/renewable-energy-market-update-2021>.
31. International Energy Agency (IEA), *World Energy Outlook 2020*: <https://www.iea.org/reports/world-energy-outlook-2020>.
32. Institute for Bioplastics and Biocomposites, *Facts and Statistics*: <https://www.ifbb-hannover.de/en/facts-and-statistics.html>; PlasticsEurope, *Plastics – the Facts 2020*, https://plasticseurope.org/wp-content/uploads/2021/09/Plastics_the_facts-WEB-2020_versionJun21_final.pdf.
33. Statista, *(Plant-Based) Food Market in the US*: <https://www.statista.com/statistics/1070603/plant-based-food-market-size-in-the-us/>; <https://www.statista.com/outlook/cmo/food/united-states>.
34. International Energy Agency (IEA), *Global EV Outlook*: <https://www.iea.org/reports/global-ev-outlook-2020>.
35. Our World in Data, *Electricity Mix*: <https://ourworldindata.org/electricity-mix>.

36. World Economic Forum and Boston Consulting Group, *Net-Zero Challenge: The Supply Chain Opportunity*: <https://www.weforum.org/reports/net-zero-challenge-the-supply-chain-opportunity>. Calculated based on a “full cost” perspective, including cost of capital.
 37. According to a BCG paper, *The Sustainability Scarcity*, about 45% of the demand for recycled polyethylene terephthalate (rPET) will be unmet by 2025, and the supply of raw materials used in battery production is less than a third of what will be required in 2030. Furthermore, even under a conservative scenario, the net supply of carbon credits, on which many companies rely as part of their sustainability strategies, will fall short of demand by 300 million metric tons of carbon dioxide equivalent (MtCO_{2e}) in 2030.
 38. Young, D., Hutchinson, R. and Reeves, M., “The Green Economy Has a Resource-Scarcity Problem”, Harvard Business Review, 8 July 2021: <https://hbr.org/2021/07/the-green-economy-has-a-resource-scarcity-problem?registration=success>.
 39. World Economic Forum and Boston Consulting Group, *Net-Zero Challenge: The Supply Chain Opportunity*: <https://www.weforum.org/reports/net-zero-challenge-the-supply-chain-opportunity>; Refinitiv data.
 40. European Commission, *Carbon Border Adjustment Mechanism*: https://ec.europa.eu/taxation_customs/green-taxation-0/carbon-border-adjustment-mechanism_en.
 41. Sustainability leaders and laggards defined by sector as top- and bottom-quartile Refinitiv Environmental Pillar Score. Analysis considers companies with Western European headquarters to control for regional differences in the cost of capital. Correlation holds for eight out of 10 sectors (excluding automotive and steel) when including US-based companies.
 42. Refinitiv data, as of 29 November 2021.
 43. Sustainability leaders and laggards defined by sector as top- and bottom-quartile Refinitiv Environmental Pillar Score. Analysis considers global peer groups.
 44. Refinitiv data, as of 29 November 2021 and Capital IQ data, as of 30 November 2021.
 45. Oil and gas disregarded due to high volatility in the market in past ~2 years.
 46. Race to Zero Campaign: <https://unfccc.int/climate-action/race-to-zero-campaign>; company press releases.
 47. Reuters, “Investors Call for Urgent Action by Steelmakers on Carbon Emissions”, 4 August 2021: <https://www.reuters.com/business/sustainable-business/investors-call-urgent-action-by-steelmakers-carbon-emissions-2021-08-04/>.
 48. SBTi, *Companies Taking Action*: <https://sciencebasedtargets.org/companies-taking-action>.
 49. P2X stands for “Power to X”, where X stands for different substances the power can be turned into (e.g. green ammonia).
 50. World Economic Forum and Boston Consulting Group, *Net-Zero Challenge: The Supply Chain Opportunity*, <https://www.weforum.org/reports/net-zero-challenge-the-supply-chain-opportunity>.
 51. SBTi, *Net-Zero*: <https://sciencebasedtargets.org/net-zero>.
 52. World Economic Forum, *Net-Zero to Net-Negative: A Guide for Leaders on Carbon Removal*: <https://www.weforum.org/whitepapers/net-zero-to-net-negative-a-guide-for-leaders-on-carbon-removal>.
 53. World Economic Forum, *Natural Climate Solutions for Corporates*: https://www3.weforum.org/docs/WEF_NCSA_NCS_for_Corporates_2021.pdf.
 54. The Economist, “Billions Are Pouring into the Business of Decarbonisation”, 21 August 2021: <https://www.economist.com/business/billions-are-pouring-into-the-business-of-decarbonisation/21803649>.
 55. Reuters, “COP26 Coalition Worth \$130 Trillion Vows to Put Climate at Heart of Finance”, 3 November 2021: <https://www.reuters.com/business/cop/wrapup-politicians-exit-cop26-130tn-worth-financiers-take-stage-2021-11-03/>.
 56. The First Movers Coalition (FMC), launched at COP26, was created through a partnership between the World Economic Forum and the US State Department via the US Special Presidential Envoy for Climate, John Kerry. The FMC uses the collective purchasing power of companies around the world to signal clear demand for scaling up emerging technologies that are critical to the net-zero transition: <https://www.weforum.org/first-movers-coalition>.
- The Alliance of CEO Climate Leaders includes more than 110 chief executive officers from multiple sectors and geographies committed to taking action in their own companies and to spurring broader action. Teams from these companies convene regularly to share lessons and methodologies, and collaborate on joint projects, including scaling renewable power capacity through corporate power purchase agreements and scaling technological carbon removals through early commitments: <https://www.weforum.org/projects/alliance-of-ceo-climate-leaders>.
- The Mission Possible Partnership brings together companies to establish collaborative projects and build demand for green cement, steel, chemicals and transport solutions with the vision that corporate offtake commitments can spur sector-level action: <https://missionpossiblepartnership.org/>.



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org