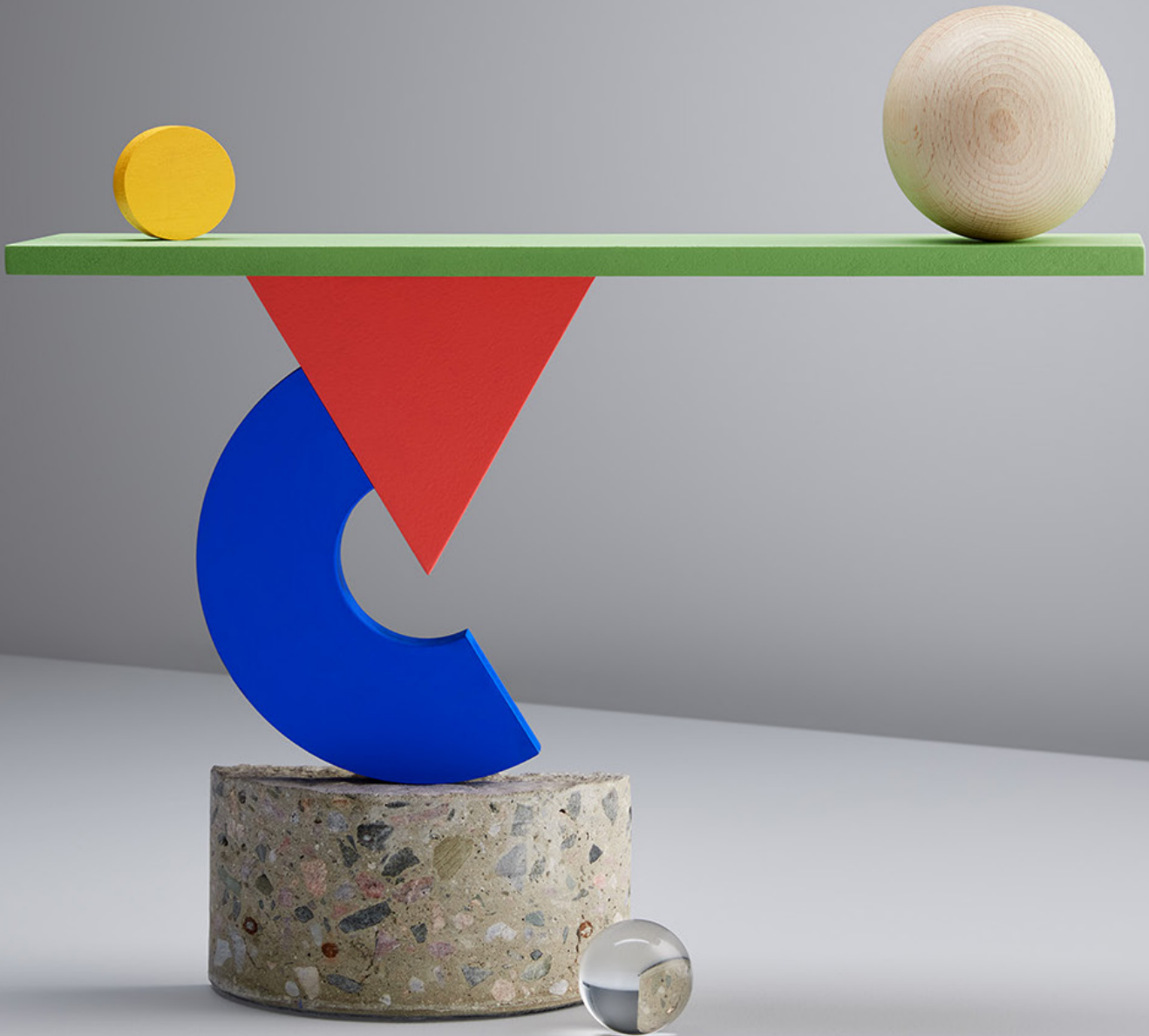


Report of the
Task Force on
**Net Zero Goals
& Carbon Pricing**



CARBON PRICING
LEADERSHIP COALITION

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Objectives

The Carbon Pricing Leadership Coalition (CPLC) Task Force on Net Zero Goals and Carbon Pricing was formed to contribute to the common understanding of net zero and to explore the role of carbon pricing in supporting the transition to net zero over the next 10 to 15 years. A central focus of the Task Force's work was the nexus between global ambition and the commitments and strategies of both national governments and the private sector, including finance.

This report represents the collective views of the Task Force, whose members were serving in their personal capacity. The contents do not necessarily reflect the views or stated policies of the World Bank Group nor the organizations the specific members are affiliated to.

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Foreword

LORD BARKER OF BATTLE
CPLC HIGH-LEVEL ASSEMBLY CO-CHAIR
EXECUTIVE CHAIRMAN
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Never before has humanity faced a common challenge quite like climate change. From national governments to local communities, global corporates to small businesses, as individuals, the choices we make in the coming decades will determine the life chances and security of future generations.

Securing a safe and sustainable future hinges on whether we can move toward a net zero world. At present, 63 countries, 733 cities, and 3,067 businesses have committed to becoming net zero by around 2050. That aspiration must turn into action—and fast. At current levels of annual emissions, the world has less than 20 years remaining on its carbon budget.

The good news is that there is much more we can do to stave off a planetary disaster. Carbon pricing, a key tool in our policy toolkit, has barely begun to deliver its full potential to drive emission reductions. This is an opportunity we must grab. Putting a price on emissions can help direct capital to the most efficient tools for decarbonization as our response evolves and technologies develop.

This report provides us with a good basis to strengthen our understanding of what net zero really means. It outlines the potential of carbon pricing and how, when it is integrated into a broader package of climate action measures, it can incentivize sectoral transformations, align investments to decarbonize the global economy, scale up carbon removals, and spur innovation in greenhouse gas mitigation technologies and practices. The revenues it generates can be used to support a just transition or fund research into breakthrough green technologies.

Carbon pricing can provide drivers for positive change even in hard-to-abate sectors where rapid emission reductions will be more challenging, mitigation technologies are not yet commercially available, electrification or fuel switching is not feasible, or emissions are diffuse.

Importantly, carbon pricing needs to be used as a carrot, not just as a stick. Economies everywhere need to take their public with them and, as with any new policy initiative, be alive to unintended consequences that can manifest themselves in different ways in different markets. Carbon pricing needs to be employed in ways that secure public trust and acceptance as well as supporting global ambition and a just transition to net zero.

The potential is impressive. Currently 45 countries are covered by carbon pricing programs, with another three anticipated to introduce programs within the next few years. Meanwhile, in the private sector, nearly half of the world's largest 500 companies use an internal carbon price. However, carbon pricing schemes still cover just 21.5 percent of global greenhouse gas emissions. When compared to this patchwork implementation, a globally linked carbon pricing system could double emission abatement at no additional cost.

There is also a growing imperative to ensure carbon pricing translates into real impact. Current carbon prices remain far too low to drive the transformative change needed. In fact, less than 4 percent of global emissions are covered by prices aligned with the Paris Agreement. It is also essential that governments and businesses can buy credits and offsets with confidence that they are contributing to meaningful and lasting decarbonization—not just moving numbers around a spreadsheet. Rigor, transparency, and accountability have never been more important when introducing a new financial measure.

Huge challenges demand a commensurate response. We won't defeat climate change by tinkering with the status quo. It's time to press the reset button and put in place credible and effective strategies that will enable economies and companies around the world to get to net zero by mid-century. For this, we will need to bring effective carbon pricing out of the textbook and on to the statute book. **This report points the way. Around the world we have an unexpected opportunity at a global reset—let's not waste it.** ●

Key Messages

- 1 Global net zero will be achieved when human-caused GHG emissions have been reduced to the absolute minimum levels feasible; and any remaining “residual emissions” are balanced by an equivalent quantity of human-caused removals** that are permanently stored so that emissions cannot be released into the atmosphere.
- 2 The scale and urgency of emission reductions needed by both countries and the private sector mean that we can no longer take action only where emissions reductions are low cost or in a piecemeal fashion.** Instead, we must reduce all emissions comprehensively and as quickly and efficiently as possible.
- 3 Carbon pricing, including international cooperation through carbon markets, should be included in the arsenal of measures to enable the achievement to net zero targets. Carbon prices must also be high enough to provide effective signals to society,** to drive the level of investment and technological changes necessary to reach net zero and **be taken in conjunction with complementary policy actions to make carbon pricing relevant across company value chains.** This can be achieved by expanding pricing mechanisms and coordination across countries to cover a higher proportion of global emissions.
- 4 International carbon markets must increase ambition and leverage investment, rather than being used solely to reduce costs.**
- 5 As countries work towards net zero and emissions are aggressively abated, the use of emission reduction credits must necessarily decrease.** Only high-quality removal credits should be used to balance residual emissions at net zero and beyond. **However, high-quality emission reduction credits can provide an important flow of capital to accelerate action on the path to net zero and progress towards emission reductions now.**
- 6 Corporate achievement of net-zero occurs when value chain emissions have been abated to the maximum extent possible and the remaining residual emissions neutralized by an equivalent quantity of removals.**
- 7 Net zero criteria should be integrated into all investment decisions, including those by development finance institutions, to support rapid decarbonization across all economic sectors,** taking into account the national circumstance of individual countries.

- 8 Whether implemented by countries or by the private sector, net zero strategies should support socially fair and just transitions across all regions to be successful.** Governments and companies should respect human rights and pay attention to the impacts of these strategies on people, especially vulnerable and indigenous populations, align with development objectives, and promote jobs and the distribution of costs and benefits.
- 9 The credibility of ambition and stakeholder engagement in net zero development and implementation processes depend on transparent net zero targets.** Moreover, it will foster sectoral mainstreaming and identify opportunities for gains from alignment and collaboration needed to achieve truly systemic change at the pace and scale required.
- 10 Transparency in efforts and separate targets for emission reductions and removals along the trajectory to net zero at all levels, rather than solely net emission targets, would promote accountability and may help prioritize emission abatement.**
- 11 To be credible and to gain and maintain public acceptance all carbon market instruments need to operate within a clear trajectory to net zero, and apply robust accounting rules to ensure the avoidance of double counting.** Companies must robustly account for credits and mitigation contributions and, where possible, track and disclose where credits are sourced.
- 12 If a company uses international credits for compliance purposes, it must ensure that the reductions or removals are not double counted.** Companies should not use international credits without a corresponding adjustment in the host country if that credit is accounted toward the NDC of another country.
- 13 All countries, sectors and companies need to participate in this “race to zero” but not all countries will achieve net zero at the same time.** Due to their capabilities and historic emission levels, advanced countries, in particular, must reach net zero as quickly as possible. Developing and emerging countries may need to take a slower pace due to institutional or capacity limitations or development needs. Still, they should also strive to achieve net zero as quickly as possible.

Introduction

Despite international efforts to limit global warming over the past two decades, atmospheric concentrations of greenhouse gases (GHGs) have risen as global emissions of these gases have increased year after year. The likely increase in human-caused global surface temperature since pre-industrial times is around 1.07°C, and the Intergovernmental Panel on Climate Change (IPCC) expects it will continue to increase until at least the mid-century.¹ The world is already experiencing the effects of a changing climate in the form of, for example, more high-heat days, longer droughts and wildfire seasons, more frequent and intense storms, and rising sea levels. The record-breaking heatwaves and catastrophic flooding around the world in 2020 are only the most recent examples. Some extreme weather events have also intensified and occur more frequently, damaging natural ecosystems and hurting human populations. The impacts will worsen until atmospheric GHG concentrations are stabilized and, even then, they will continue for some time afterwards; the extent of the impacts will depend on the level at which global average temperature peaks.

According to the IPCC,² to avoid the most damaging effects of climate change, the global average temperature must be limited to 1.5°C above pre-industrial levels. The latest evidence suggests that global warming of 1.5°C and even 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO₂) and other GHG emissions urgently occur. Higher temperatures will result in greater impacts from climate change, and an increase above 2°C could result in irreversible damage, such as species losses in some land and ocean ecosystems. Staying within the 1.5°C limit will require immediate and deep emission reductions and for that global net anthropogenic CO₂ emissions need to decrease by half by 2030 relative to 2010 levels and become “net zero” by 2050—a state where any remaining emissions are balanced by CO₂ removals from the atmosphere. Strong, rapid, and sustained reductions in methane emissions and other GHGs will also be needed to limit the warming effect. If the

world does not reach net zero emissions by mid-century, the likelihood of global temperatures rising above 1.5°C increases significantly.

The scale of reductions required to achieve the 2050 net zero target can be illustrated by the global “carbon budget”—the cumulative CO₂ emissions permitted to limit warming to 1.5°C. Global anthropogenic CO₂ emissions over the almost 170-year period (1850–2019) between the start of the industrial era and 2019 was in the range of 2,150 to 2,630 gigatons of carbon dioxide (GtCO₂). In comparison, the remaining estimated carbon budget, from the beginning of 2020, with a two-thirds (67%) likelihood of limiting global warming to a temperature limit of 1.5°C was 400 GtCO₂ and 500 GtCO₂ for an even chance (50%).³ At current levels of annual emissions, with no additional removals, the world will deplete the estimated remaining carbon budget within the next 20 years.

INTRODUCTION

Recognizing the urgency for climate action, many countries are submitting enhanced 2030 national climate plans (Nationally Determined Contributions, NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC) ahead of COP26 in Glasgow in November 2021. In support of the long-term temperature goal of the Paris Agreement, 63 countries have now pledged to reach net zero carbon emissions by around 2050,⁴ and many of these are stepping up their 2030 plans to align with this target. In addition, as of August 2021, 31 subnational regions, 733 cities, 3,067 businesses, 661 organizations, and 173 investors have announced their own net zero commitments.⁵

While this momentum is welcome and needed, a significant gap remains between the current pledges and the aggressive emission reductions needed to achieve net zero globally by mid-century: if fulfilled, mitigation targets to the UNFCCC and other government-announced pledges as of April 2021 would miss the amount of emission reductions needed by 2030 to be on track to reach net zero by mid-century by a wide margin—about 20-23 GtCO₂e.⁶

Companies are also increasingly committing to decarbonizing their own operations and value chains in line with Science-Based Targets. Further, some companies are committing to neutralizing emissions that cannot be abated through permanent carbon removals to reach net zero by 2050 or earlier. This is not enough. To ensure these commitments are robust and do not overshoot emission limits in earlier years, they should be backed up with a clear trajectory to reach net zero by 2050 and intermediate targets (for example, for 2030) that can be monitored. Furthermore, to keep the total stock of GHGs in the atmosphere below a critical threshold, and therefore limit global warming to 1.5C, companies should not only aim for “net zero” as an endpoint but also compensate for their unavoidable emissions along the path to reaching net zero. To encourage companies to commit to this higher ambition level, they should be recognized for it, through a clearer and more ambitious definition of what it means to be “on the path to net zero.”

The lack of a common understanding of what net zero means and what a credible transition to net zero looks like is hampering climate action ambition.⁷ A key question is the appropriate role of carbon pricing, in all its various forms, in supporting the global transition to net zero. Reaching the levels of emission reductions and removals needed to reach net zero will require a fundamental transformation in global energy and industrial systems, cities, and infrastructure (including transport and buildings), as well as in agricultural production, forestry, and other land-use practices.

Carbon pricing can be a powerful tool in a broader toolkit to incentivize sectoral transformations and align investments to decarbonize the global economy, scale up carbon removals, and spur innovation in GHG mitigation technologies and practices, but it must be employed in a way that supports global ambition and a just transition to net zero.

Securing public trust and acceptance for stronger and broader carbon pricing will require addressing perceptions that carbon pricing perpetuates social inequities or impairs industrial competitiveness, and that international markets lock in expectations of low-ambition pathways, or lower incentives for countries or companies to take abatement action at home.

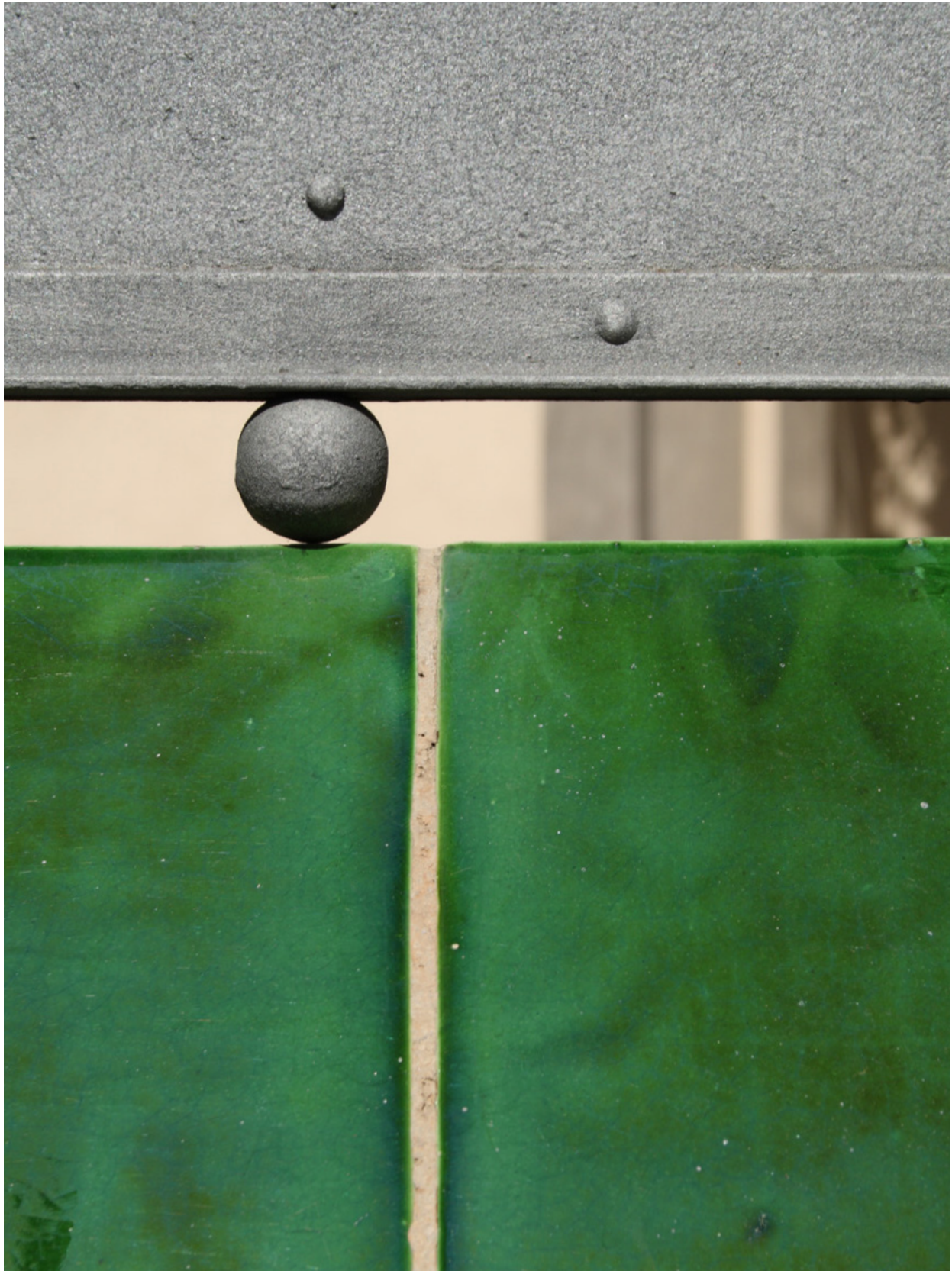
The Carbon Pricing Leadership Coalition (CPLC) Task Force on Net Zero Goals and Carbon Pricing was formed to contribute to the common understanding of net zero and to explore the role of carbon pricing in supporting the transition to net zero over the next 10 to 15 years. A central focus of the Task Force’s work is the nexus between global ambition and the commitments and strategies of both national governments and the private sector, including finance.

This Task Force report builds on previous CPLC work, notably the reports of the High-Level Commission on Carbon Prices⁸ in 2017 and the High-Level Commission on Carbon Pricing and Competitiveness⁹ in 2019, in helping governments, the private sector, and other stakeholders navigate carbon pricing.

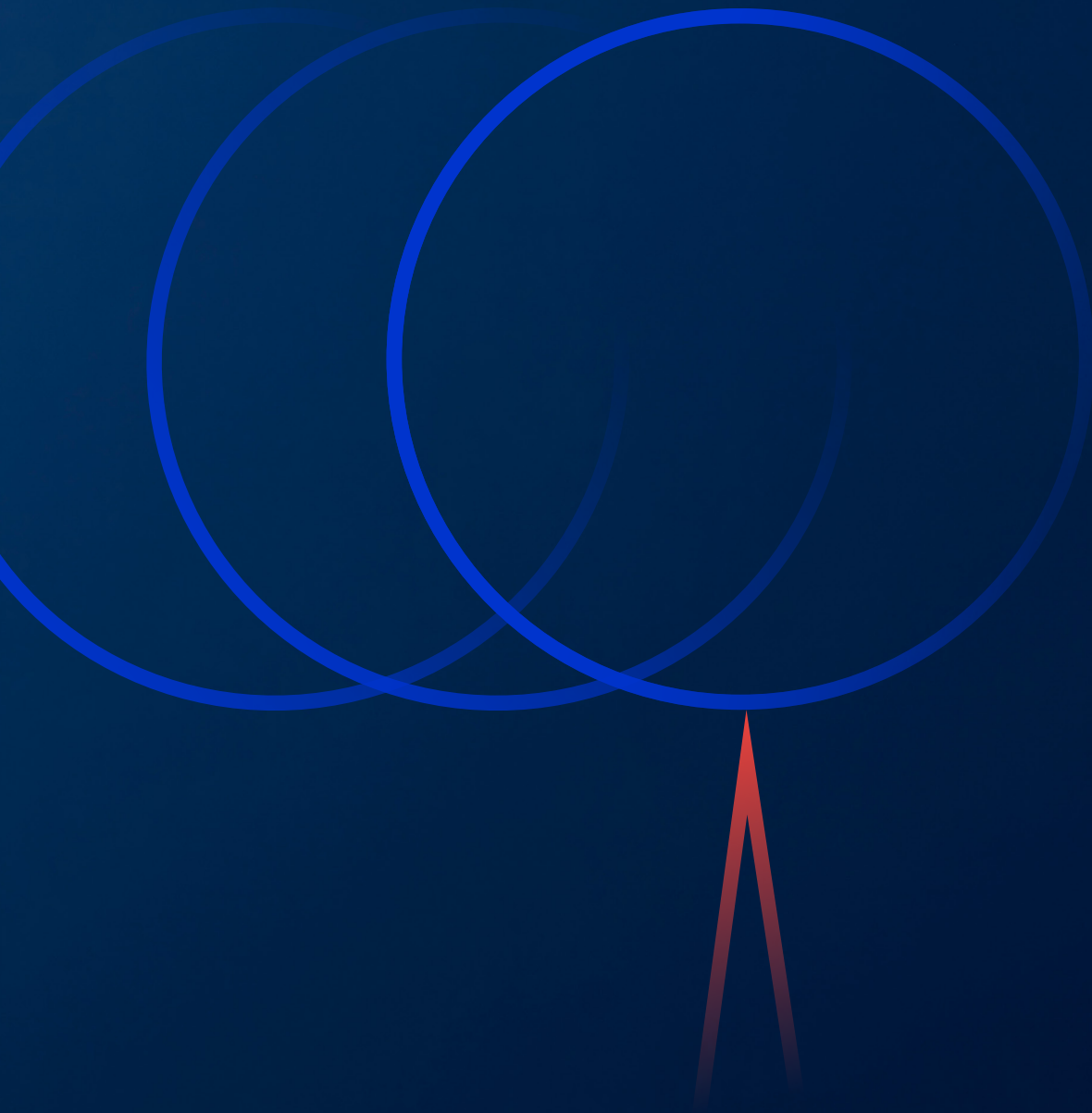
INTRODUCTION

It also benefits from, and complements, ongoing work by other initiatives to advance understanding of net zero and raise climate ambition, including the Glasgow Financial Alliance for Net Zero (encompassing the Net-Zero Asset Owners Alliance, the Net-Zero Banking Alliance, the Net-Zero Asset Managers Initiative, and the Net-Zero Insurance Alliance), the Science Based Targets initiative, the Mission Possible Platform, the Natural Climate Solutions Alliance, the Voluntary Carbon Markets Integrity Initiative, the Taskforce on Scaling Voluntary Carbon Markets, the World Economic Forum's Net Zero Challenge, and the Race to Zero Campaign.¹⁰

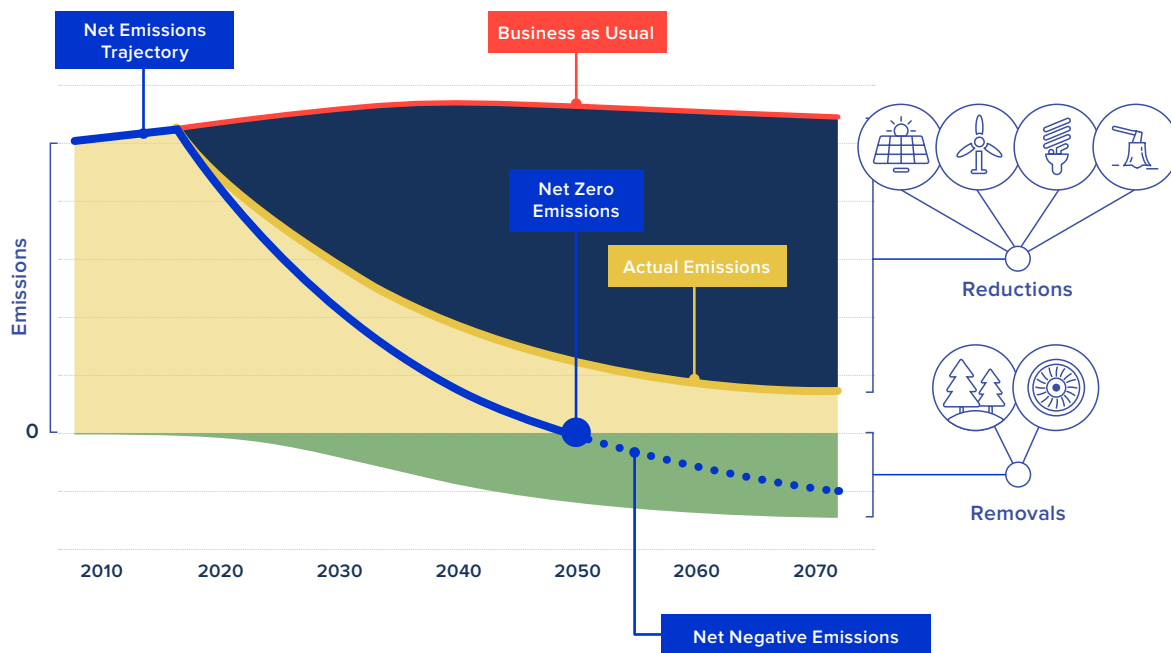
The CPLC Task Force believes that recovering from the global impact of COVID-19 presents a rare opportunity to accelerate climate action. Our collective experience over the past year has demonstrated how closely the economy, public health, and the environment are interlinked. The world can build back better from the pandemic in a way that not only rapidly transforms and decarbonizes the global economy, but also promotes economic prosperity, resiliency, and equity. We hope that this report will contribute to that outcome. ●



The Global Transition to Net Zero



GLOBAL TRANSITION TO NET ZERO AND THE ROLE OF REMOVALS



GLOBAL TRANSITION to NET ZERO

Global net zero will be achieved when human-caused GHG emissions have been reduced to the absolute minimum levels feasible, and any remaining “residual emissions” are balanced by an equivalent quantity of human-caused removals that are permanently stored so that emissions cannot be released into the atmosphere. After net zero has been achieved, the world will likely need to move into a state of negative emissions, where emissions continue to be reduced and removals exceed levels of remaining emissions, to stabilize global temperatures at 1.5°C above pre-industrial levels.

The next 10 to 15 years will be critical to rapidly decarbonize the global economy in the transition to net zero. Global carbon emissions must decline by 50 percent by 2030 for the world to be on a path to avoid warming greater than 1.5°C.¹¹ The timing of efforts is vitally important: earlier emission reductions and neutralization of remaining emissions by removals will result in lower atmospheric concentrations, and thus impacts, than later reductions and removals. Early action is also a hedge against the possibility that new scientific findings may require even more rapid action in the future.

The scale and urgency of emission reductions needed by both countries and the private sector means that we can no longer take action only where emission reductions are low cost or in a piecemeal fashion, but instead must reduce all emissions comprehensively and as quickly and efficiently as possible. All countries, sectors, and companies need to participate in this “race to zero.”

Fundamental transformations in global energy, urban, industrial, and food systems are required for aggressive decarbonization. These include decarbonizing electricity generation; electrifying energy services, especially transportation; and switching to clean fuels. Sectors where mature mitigation technologies are available, such as electricity generation, must reduce emissions rapidly to minimum levels. Even within these sectors, significant investments are needed to scale already available technologies, such as renewable generation and modern electricity grid infrastructure. For hard-to-abate sectors, financing for researching and developing mitigation technologies will be critical to reduce costs and make new technological solutions available.

Investment in sustainable agriculture and land-use practices and incentives for forest protection are urgently needed to end deforestation, maintain existing natural carbon stocks, and address other land-use-related emissions.¹² Mature standing forests and natural landscapes contain carbon stores that, once released, cannot be recaptured within a timeframe to limit warming to 1.5°C.

Carbon removals must be increased to balance out emissions during the transition to and at net zero. The quantity of removals needed will depend on the trajectory of emission reductions (in other words, how much delay there is in reducing emissions to minimum levels) and the level of any residual emissions. The greater the quantity of emissions above the technically feasible minimum in 2050, the greater the quantity of removals needed.

Given their existing availability, relatively low cost, and potential to provide other environmental and socioeconomic benefits, nature-based removals have a central role to play in achieving net zero. However, the potential scale of nature-based removals, particularly land-based ones, is limited due to competing uses for land and water. In

addition, nature-based removals are at risk of reversal, which must be prevented. For these reasons, engineered removals must augment nature-based removals, but these technologies are not yet commercially available or their energy requirements and economic cost are quite high.

The International Energy Agency estimates that, even with aggressive abatement across all sectors, over 7 Gt of removals from carbon capture, utilization, and storage will be needed yearly by 2050 to balance residual emissions associated with energy production and consumption alone.¹³ Large carbon removal projects, like any energy or infrastructure project, require reliable revenue streams. Policies and incentives are needed to align markets and investments to drive innovation and enable rapid scale-up of permanent carbon capture, utilization and storage technologies. Governments and the private sector must take care to ensure that investments in both natural and engineered removals complement, rather than replace, aggressive emission abatement.

What Do We Mean by a Just Transition?

For net zero strategies to be successful, countries and the private sector should consider carefully how strategies will affect people and jobs and the distribution of costs and benefits. A just transition ensures that benefits and costs are distributed fairly, that low-income and vulnerable communities are at least as well off in the transition as they would otherwise be, and that no one is left behind. Although the term was originally used narrowly to refer to job and income opportunities and labor protections, it has since come to be used more broadly to refer to the full range of socioeconomic costs and benefits, including environmental justice and human rights.



“Net zero means a different global economy, one where we balance climate change mitigation, adaptation, and social welfare for all people. It also means an opportunity for building a new system creating jobs in renewable energy, green hydrogen, new technologies. Having a sustainable food and land management system and a new endorsed trans circular economy. Net zero means opportunity, it also means a great challenge.”

Claudia Octaviano Villasana - General Coordinator of Climate Change Mitigation,
National Institute of Ecology and Climate Change, Mexico

Achieving net zero globally by mid-century means that delays by some countries will necessitate more aggressive abatement by other countries, for example, continuing positive emissions in one country will need to be balanced out by either earlier achievement of national net zero targets or net negative emissions in other countries. All countries should act immediately, but not all will achieve net zero at the same time. Due to their capabilities and historical emission levels, developed countries in particular must reach net zero as quickly as possible. Developing countries may need to take a slower pace due to institutional or capacity limitations, or development needs, but should also strive to achieve net zero as quickly as possible.

All forms of international cooperation, including through carbon markets, must be enhanced to support developing countries in transitioning to net zero. Developed countries have a responsibility to provide financing to support emission reductions or removals in other countries as part of their climate finance commitments. Strategies to achieve net zero globally must also recognize and respond to the specific local and regional barriers to decarbonization in developing countries.

Transparency in efforts will be critical for demonstrating ambition and assessing progress toward global net zero. Separate targets for emission reductions and removals along the trajectory to net zero at all levels, rather than solely net emission targets, would promote accountability and may help prioritize emission abatement. Common and rigorous accounting of emission reductions and removals by all actors will ensure that there is only one set of emission “books” for the planet.

CASE STUDY

Trinidad and Tobago Considers Proposals to Use Carbon Pricing to Support a Just Transition

Trinidad and Tobago, as both a petroleum producer and small island developing state, is particularly vulnerable to climate change impacts. A just transition to net zero for the country must both promote climate resilience while protecting the economy and jobs, including the petrochemical industry. Given Trinidad and Tobago’s historic implementation of a domestic Green Fund, an innovative way to use carbon pricing in support of a just transition is being proposed. The fund is financed through a 0.3 percent tax on corporate profits across economic sectors. The revenue collected is distributed to non-governmental organizations, statutory bodies, and subnational governments for environmental projects.

To boost the country’s climate resilience, the government is considering modifying the management of the Green Fund to better incentivize emission reductions, while also actively supporting investments in green technologies. Two proposals have been made. The first is to convert a proportion of the tax on profits to a carbon tax on corporate emissions. A fixed portion of the tax revenue would be returned to companies for investment in emission abatement measures and technologies. The second is to designate the remainder of the fixed portion of the tax for a climate line item in the national budget, where it could be used to fund climate adaptation and emission abatement, and help leverage climate investment.

The Role of Carbon Pricing



THE ROLE of CARBON PRICING

Economic theory is clear that carbon pricing is a powerful and efficient instrument, able to incentivize least-cost emission reductions and removals and drive behavioral change, technological innovation, and investment decisions—particularly for the private sector.

- Government-imposed carbon pricing, in the form of an emissions trading system (ETS) or carbon tax, can be an economically efficient means to reduce emissions, as it provides flexibility for entities subject to the price to find the least expensive emission reductions.
- Carbon credits can provide an avenue for companies to contribute to climate solutions, in addition to pursuing their own science-aligned emission reductions, by compensating for the emissions they cannot immediately mitigate in the short term.
- Carbon pricing can raise government revenue to finance emission abatement and removals in sectors not covered by carbon pricing systems. Revenue can also be used to support a just transition, by channeling investment to populations affected by climate change or emission abatement measures.
- Carbon pricing that predictably and credibly increases over time incentivizes long-term investments in mitigation technologies and practices that are expected to be less expensive than the carbon price in the future.
- Within companies, carbon pricing can drive innovation and efficiency improvements. The use of an internally applied carbon fee can generate funds for investment in further abatement or research and development.
- International carbon credit markets and results-based financing help drive financial flows to climate solutions in developing countries, including to protect carbon stocks and enhance removals, for low-carbon development and to support commercialization of emerging technologies. These could also provide new markets and revenue sources for nations with geological storage capacity and zero-carbon energy resources that could support scale-up and commercialization of carbon removal services.

Given its many benefits, carbon pricing should be included in a broader arsenal of tools to achieve net zero, but it is not a silver bullet. Carbon pricing must be implemented in a way that addresses deficiencies that have to date prevented it from achieving its full potential in helping to mitigate climate change, including weak emissions caps or low carbon tax levels, limited sectoral coverage, and unclear long-term carbon price signals. Use of international markets will need to reflect and protect global and national trajectories to net zero, in rules on allocation and avoidance of double counting. As current NDCs fall well short of what is needed to achieve net zero by 2050, and the quantity of final emissions and removals remains uncertain, countries and companies participating in carbon markets will need to do so on the basis of long-term low-emissions strategies.

Carbon prices in most countries must be much higher than they are today to drive the level of investment and technological changes needed to reach net zero. Tightening ETS caps to levels consistent with net zero emission trajectories will likely result in significantly higher prices under these programs. Similarly, levels of carbon tax will need to be increased over time to assure delivery of the necessary emission reductions. Continued strengthening of methodologies and standards for quantifying and ensuring quality of international credits will also likely increase prices of credits over time. Programs will need to credit at levels consistent with net zero emissions trajectories, and methodologies and standards will need to adjust to take these trajectories into account.

Carbon pricing should be expanded to cover a greater proportion of global emissions, and ideally better coordinated across countries. Such coordination could include supporting the implementation of national and regional carbon pricing programs, moving toward minimum carbon prices in government-mandated programs, removing fossil fuel subsidies, shifting from crediting to trading-based

approaches, as well as linking ETSs across jurisdictions to harmonize the price that trade-exposed industries face.

Government-imposed carbon pricing (an ETS or tax) will be most effective for price-responsive sectors and sectors where emission abatement or removal technologies are commercially available. However, even within these sectors, the effectiveness of carbon pricing will be influenced by the policies and incentives adopted. For instance, the ability of carbon pricing to deliver emission reductions in the transportation sector will depend on the availability of alternatives to traditional GHG-emitting forms of mobility. Other complementary policy actions are needed in addition to or as an alternative to carbon pricing to deliver emission reductions in some sectors:

- In sectors that are not responsive to carbon price signals, or where emissions sources are difficult to monitor or impose a pricing obligation, sector-level regulations (such as codes and standards) may be more effective in reducing emissions. Information-based instruments, such as energy efficiency standards, can complement and enhance the impact of carbon prices.
- Time-limited public support in the form of industry subsidies for emission abatement or public investment in infrastructure and research and development to support technological innovation may be needed to bring about economic transformations for decarbonization in hard-to-abate sectors, and those that have received relatively little investment, such as industrial manufacturing, aviation, agriculture, and CO₂ removal.
- Regulations that were built around incumbent technologies and business models but now hamper the uptake of zero-carbon solutions¹⁴ should be updated to enable profitable business models for clean technology.



“The pathway towards decarbonization is critical if we are to reach the destination of a 1.5 degree world. We can’t keep emitting carbon at a business-as-usual rate or even slowly reduce our emissions and think we can offset these emissions by easily removing carbon out of the atmosphere. We don’t have the land to plant enough trees or the technology today to mechanically remove carbon from the atmosphere in the magnitude needed to displace the emissions we’re producing. Countries and companies must first deliver deep emission cuts in line with science and only after that should they consider purchasing the removal of carbon from others.

At WWF we say this must be the decade of action for reducing our emissions and the decade of readiness for investing in technologies to store and remove carbon. To achieve this, we must set a price on carbon that is ambitious and powerful—meaning high enough to incentivize a shift in economic behavior. But most importantly, we must implement carbon pricing in an inclusive and equitable way that does not create an added burden to those who can afford it least.”

Marcene Mitchell - Senior Vice President, Climate Change, WWF-US

State and Trends in Carbon Pricing

Currently 45 countries are covered by carbon pricing programs, with another three anticipated to introduce programs within the next few years. As of April 1, 2021, 21.5 percent of global GHG emissions are covered by carbon pricing programs, representing a significant increase from 15.1 percent in 2020. The expansion is largely due to the launch of China’s national ETS. In 2020, carbon pricing programs generated \$53 billion in revenue—an increase of around \$8 billion from 2019, which is mostly due to the rise in the European Union’s (EU’s) allowance price.

Most carbon prices today remain far below the \$40-80/tCO₂e range needed to help meet the 2°C temperature goal of the Paris Agreement. As of April 2021, only 3.76 percent of global emissions are covered by a carbon price in this range. Even higher prices will be needed to reach the 1.5°C target. Many of the 63 countries that have adopted net zero targets already have carbon pricing programs in place. A number of jurisdictions are in the process of defining the role of carbon pricing in achieving the net zero strategies, including Canada, China, the EU, individual EU member states, and New Zealand. For instance, to facilitate its updated GHG mitigation target, Canada announced in December 2020 that

it will increase the price of its federal carbon tax by Can\$15/tCO₂e (US\$11.94/tCO₂e) annually to reach Can\$170/tCO₂e (US\$135.30/tCO₂e) by 2030. In the EU, allowance prices have hit all-time highs as the bloc steps up both long- and short-term climate ambition.

Within the private sector, nearly half of the world’s largest 500 companies by market value report using an internal carbon price, or the intention to use one within the next two years. In 2020, 853 companies disclosed using an internal carbon price, with a further 1,159 noting an intention to adopt one over the next two years. This represents a 20 percent increase from 2019.

Ecosystem Marketplace reports volumes of transactions in the voluntary market of more than 104 MtCO₂e in 2019, an increase of 6 percent from 2018. While volumes of renewable energy credit transactions increased, those for agriculture, forestry, and land use decreased, despite the market value of this latter category being more than twice that of renewable energy. Demand for forest credits from developing countries remains especially strong.

International carbon markets must increase ambition and leverage investment, rather than being used solely to reduce costs. To reduce the risk of falling short of net zero targets, use of credits should supplement aggressive emission abatement in acquiring countries and companies. Sales of credits should support low-carbon development and an increase in ambition in selling countries. To this end, carbon credit investments should be targeted at sectors, technologies, and practices that are needed to transform economies toward a net zero future.

Sales of credits must also support socioeconomic development and a just transition in developing countries. Evaluating the impact of the potential transfer of credits on selling countries' achievement of current and future NDC targets, and of the local socioeconomic and environmental impacts of these credit activities on communities and within sectors, would help ensure that the credits are appropriately priced and benefits fairly distributed.

Adherence to a single set of global emission "books" means that there can be no double counting of reductions and removals by countries.

Only high-quality carbon credits with measurable impact have a role to play in mitigating climate change. The availability and use of emission reduction credits must necessarily decrease over time as emissions are aggressively abated and all countries approach net zero. Ultimately, only high-quality removal credits should be used to balance residual emissions at net zero and beyond, and their availability will be limited by global removal capacity. However, given that we need as many emission reductions as possible now, the flow of capital that emission reduction credits can provide is important to accelerate action and progress during the transition to net zero, including providing an avenue for companies to go further than they would without this type of credit. Wise channeling of the investment from credit sales can put seller countries in a position to make more ambitious targets in future NDCs.

Choices regarding investments in emission reduction and removal credits over time must align with long-term strategies and the transition to net zero globally. Reliance on land-based emission reduction and removal credits in the near term should not detract from investments in emission reductions and technological removals that will be essential in the long term.

Article 6 and Corresponding Adjustments

Article 6 of the Paris Agreement provides a framework for global cooperation to strengthen climate ambition through the international transfer of carbon credits or internationally transferred mitigation outcomes (ITMOs) between countries. To prevent double counting of the emission reductions or removals by two different countries, Parties to the Paris Agreement have agreed to apply "corresponding adjustments" where the transactions are authorized by the countries involved. The country that transfers an ITMO would add the emission reduction or removal to its NDC accounting, so that its effective emissions for purposes of accounting for progress toward its national commitment are higher than they would have been without the transfer. The acquiring country subtracts the emission reductions or removals associated with the ITMO from its NDC accounting, so that effective emissions are lower than they would have been without the acquisition. Although the concept of corresponding adjustment has been agreed, negotiations on implementation rules, including how corresponding adjustments will be applied and tracked, are ongoing.

CASE STUDY

California's Experience in Driving Equitable and Effective Climate Action

Ensuring a just transition has been integral to California's climate strategy since the passing of the state's Global Warming Solutions Act in 2006. The Act directed the California Air Resources Board (CARB) to develop and periodically update an overall strategy (the AB 32 Scoping Plan) to achieve the state's GHG limits in a way that minimizes economic costs and maximizes benefits to the state. It also directs the Board to ensure that GHG investment (private and public) is directed toward the state's most disadvantaged communities and that a market-based mechanism is designed to prevent an increase in the emissions of toxic air contaminants or criteria air pollutants. The Act mandates the appointment of an Environmental Justice Committee to advise CARB on these issues.

In response to recommendations of the Environmental Justice Committee during development of the initial Scoping Plan, CARB developed and continues to use a three-pronged approach to achieving the state's GHG goals: two carbon pricing programs—an ETS and a Low Carbon Fuel Standard—are central components of the state strategy. These are complemented by direct emission regulations and incentive programs to drive emission reductions and removals across all sectors. For instance, GHG emission standards for vehicles and rebates for buying zero-emission vehicles help to drive down transportation emissions.

CARB has also taken several steps to ensure that the ETS's benefits are distributed equitably, and economic costs are not unfairly borne by vulnerable communities or specific economic sectors. A Climate Investments program directs revenue from the auction of allowances to projects that reduce GHG emissions and deliver economic and local environmental and public health benefits. Half of the funding to date has gone to projects that benefit priority communities. In addition, state utilities are required to use the allowance value to limit the impact of price increases to consumers, particularly low-income consumers, through bill rebates that are not directly tied to the volume of electricity or natural gas consumed. Free allocation of allowances to energy-intensive, trade-exposed industries helps maintain jobs within those sectors. While there is no evidence that the ETS has exacerbated local air pollution, CARB actively monitors air quality and has strengthened existing programs to reduce toxic and air pollutants. The agency has also introduced new programs¹⁵ that involve local communities in strategies to address air pollution and to direct investment to vulnerable and marginalized communities. A short-lived climate pollutant strategy aims to maximize both climate and health benefits.

As CARB moves forward with the next Scoping Plan to achieve California's 2045 net zero target, climate equity will continue to be a fundamental principle. The agency has signaled that the assessment of local environmental impacts and distribution of the costs and benefits of climate action will be fully integrated into its modeling. In addition, affected communities will be actively engaged in the Scoping Plan development.



“Net zero targets in Australia have transformed the debate from the vagaries of low-carbon economic goals to a focus on the transition strategies required to achieve that clear target. There are four Ts in transition strategies.

Timeliness, we have a focus on 2050 for net zero, but it’s also important to think about 2030 and the Paris Agreement ratchet mechanism, which will then drive our focus every five years thereafter. **Transparency**, not only governments have to communicate their transition strategies, but corporations as well.

Terminology, in the last 12 months we’ve seen incredible focus and accountability for corporations on greenwashing and the like, around carbon neutrality and net zero pathways, corporations are realizing that they’ve got to get it right.

Technology, Australia is a high-carbon political economy, but one where we’ve got significant opportunities, in clean energy, green hydrogen, and negative emissions drawdown technologies such as carbon farming and sequestration.

For that we need proper carbon markets, independent review, and proper carbon pricing signals to guide the further increased investments.

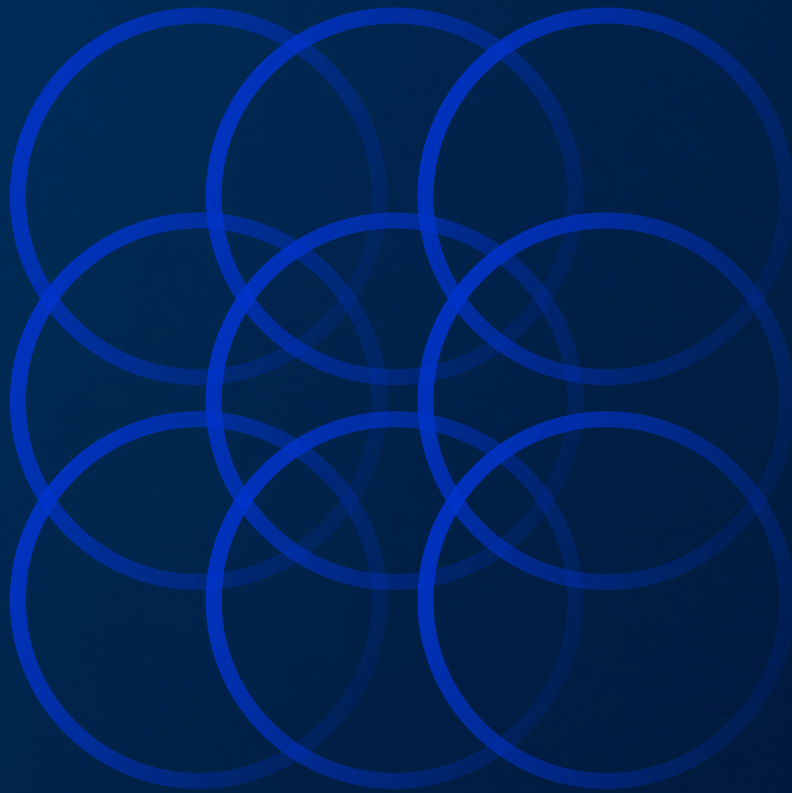
You can say what you like about Australia’s policy ambition, but it has a policy architecture, and indeed carbon markets and pricing that can evolve into one that is fit for purpose. Australia has a small compliance market under the Safeguard

Mechanism where emission intensity baselines could become a driver for decarbonization investments. We also have sovereign-backed emission reduction and carbon sequestration measurement, reporting and valuation systems with governments and corporations active in voluntary carbon markets. Australia’s assurance system is internationally respected and now also backed by the Carbon Market Institute’s world first Carbon Industry Code of Conduct. Finally, we have a Climate Change Authority that could be charged with a greater role in the establishment of short-term targets and policies to match world’s best practice in UK, NZ, and elsewhere.”

John Connor - CEO, Carbon Market Institute



National Transitions to Net Zero



NATIONAL TRANSITIONS to NET ZERO

Countries will pursue different low-carbon development pathways tailored to their national circumstances (such as levels of economic development needed, historical emissions, financial capacity, and removal potential). They should develop national long-term emission trajectories, including short- and medium-term targets, and separate targets for emission reductions and removals to identify and prioritize sectoral transformations required to achieve net zero. Because of the disproportionate impact of short-lived GHGs (such as methane and hydrofluorocarbons) on climate in the short and medium term, countries may also wish to develop separate targets for these gases.

Sectoral targets based on technology roadmaps and milestones can help guide the timely pursuit of cost-effective measures in key sectors. Aggressive emission reductions in hard-to-abate sectors (for example, cement, chemicals, metal manufacturing, transportation, and agriculture) will be more difficult and likely to lead to higher short-term economic costs than in other sectors because mitigation technologies are not yet commercially available, the sectors are not conducive to electrification or fuel switching, or emissions are diffuse (come from multiple small sources). Sectoral characteristics and the availability of abatement technologies should therefore be considered when defining sectoral emission pathways and to identify policy levers to drive transformations. Countries should also encourage the private sector to set their own net zero targets and develop plans aligned with the national strategies and sectoral pathways to attract international financing to support emission abatement transformations.

Internal carbon pricing (such as, shadow pricing) can be an important part of a wider planning toolkit to help develop national pathways and strategies. To be most effective, the price used must be sufficiently high (and increase over time) to help drive timely emission reductions in line with the trajectory to reach net zero. Due to differing marginal abatement cost curves and the comparative commercial availability of abatement technologies, carbon prices will have different impacts on emission trajectories in different sectors.

National and sectoral net zero strategies must support and balance multiple policy goals—economic growth, jobs, access to energy, poverty eradication, protection of vulnerable communities and ecosystems, and economic and environmental resilience. While the transition to net zero is an opportunity to create economic growth and jobs, it must be aligned with the broader sustainable development agenda unique to each region and country.¹⁶ Understanding the potential benefits of the transition to a net zero economy is important, and governments should work

with all sectors to ensure they materialize.¹⁷ Policy makers should also identify the potential negative impacts of decarbonization transformations on different sectors or communities, allowing them to address any inequities in the distribution of benefits and ease costs as appropriate.

Investing in nature-based emission reductions (such as conserving forests and wetlands) and removals (such as reforestation and restorative agriculture) can yield ecological benefits in many countries, but should also support biodiversity, and economic and climate resilience in local and indigenous communities, and respect human rights in line with international principles. Decisions regarding the role of these nature-based

solutions in the transition to net zero, or as a revenue source through selling credits in international carbon markets, should be grounded in the broader policy context and follow the principle of informed consent to enable appropriate consideration of the benefits and trade-offs, including the impacts on local and indigenous communities. Countries should consider competing demands for limited land and the trade-offs or synergies between different potential land uses, such as carbon sequestration, biodiversity, food production, rural livelihoods, renewable electricity, and protecting indigenous heritage. Processes should inform and engage communities in decisions on nature-based solutions and ensure that the benefits of investments are shared equitably.

CASE STUDY

Gabon's Experience Illustrates Need for Higher Valuation of Nature-Based Solutions

Gabon has long recognized the importance of preserving its forests for local economies, carbon absorption, and other ecosystem services. By focusing on sustainable management over the past decade, the country has reduced emissions from deforestation and increased employment in the forest economy. Gabon hopes to use international carbon credit financing to go further, but notes that current credit prices are still too low.

The agreement with Norway under the Central African Forest Initiative (CAFI) proposes a maximum price of \$10 per ton on the condition that Gabon meets all UNFCCC REDD+ criteria and certifies the carbon credits through ART-TREES. However, while \$10 is higher than the current average market price, it is still below the \$18 per ton that Gabon believes is needed to accurately reflect the cost of sustainable forest management and the value of maintaining forests for carbon removal and ecosystem services, as well as provide a return on the investments it has already made in forest conservation. Even at \$18 per ton, there is a wide disparity between the prices of credits from natural solutions and the prices charged under the EU ETS and other government-mandated schemes.

A substantial increase in the price of credits for natural alternatives would create much stronger incentives for conservation and sustainable forest management.



For countries that have capacity to implement such an approach, an ETS or carbon tax can be an important policy instrument for achieving national net zero targets. The level of the cap or price levels under the tax should be sufficient to help drive emission reductions in covered sectors in line with what is needed for the trajectory to reach net zero nationally. Countries should aim to expand coverage of carbon pricing policies over time and adopt complementary abatement policies for sectors outside the carbon pricing regime. Countries should also ensure that cap levels under an ETS do not create a structural surplus of allowances that may lock in low ambition in covered sectors.

“Achieving net zero emissions not only contributes to the objectives of the Paris Agreement but also fulfils our national priorities and these national priorities are part of our development strategy as stated in our Vision 2030 plan, whereby we have committed to placing the environment at the center of all national development. Placing a price on carbon as well as participation in the carbon market can provide opportunities for Trinidad and Tobago to accelerate the net zero transition.

In our case this is particularly relevant as we are currently developing a just transition of the work force policy to guide potential challenges that may arise in this transition to net zero emissions. We’re of the firm view that any carbon pricing scheme must be designed and administered in such a way so as to be able to maximize the benefits and impacts, including through the engagement of stakeholders, and in alignment with the just transition policy.”

Camille Robinson-Regis
- Minister of Planning and Development,
Trinidad and Tobago

Emerging Efforts to Ensure High-Quality Nature-Based Emissions Reduction and Removal Credits

The Architecture for REDD+ Transactions (ART) is a standards body formed to promote the environmental and social integrity and ambition of credits from the forest sector. ART’s REDD+ Environmental Excellence Standard (TREES), first published in February 2020, established technical requirements to ensure the environmental integrity of forest-based emission reduction credits. TREES also requires conformity with the “Cancun Safeguards,” which were adopted under the UNFCCC to ensure that forest carbon initiatives avoid negative social and environmental impacts. Version 2.0 of TREES, expected in 2021, will include a method to credit removals. The TREES standard requires jurisdictional-scale accounting, and eligibility is restricted to national and subnational governments. If credits are to be transferred internationally, TREES requires approval from the host country, and the ART registry will reflect attestation by the government if a corresponding adjustment will be made and reported to the UNFCCC.

The non-profit Emergent was formed to mobilize private sector financing to prevent tropical deforestation, and aggregates buyers and sellers of jurisdictional-scale REDD+ credits. Emergent transacts only TREES-certified credits to ensure that credits are of high integrity. With support from a bilateral donor, Emergent also ensures a minimum price for credits to the jurisdictional sellers—currently \$10 per ton, which is significantly higher than current prices for forest-based credits in voluntary markets.

Supported by Emergent, the Lowering Emissions by Accelerating Forest finance (LEAF) Coalition of several governments and leading corporations, launched in April 2021, has selected ART/TREES as its quality standard. The LEAF Coalition requires government sellers to invest proceeds from credit sales in reducing deforestation and the investments to conform with robust financial, social, and environmental safeguards.

Any use of credits sourced from domestic sectors outside the carbon pricing regime should be limited and reduced over time, as climate targets and abatement measures are extended to cover those sectors. The use of offset credits should be coupled with other policies to ensure that the use of the credits does not lead to negative impacts such as increased local air pollution. Countries should ensure that both generation and use of international credits (generation by hosts, and use by buyers) does not hinder achievement of their national emissions reduction trajectories consistent with net zero.

A carbon tax or an ETS should be designed to limit negative economic impacts on vulnerable groups and ensure that benefits are equitably distributed. These distributional effects will differ across countries and may be more pronounced in developing economies than in developed ones. Tax or allowance auction revenue can be used for multiple purposes, including for investments in vulnerable communities, job training, or cash transfers to blunt inequitable impacts of increased prices on households. However, the amount of this revenue will decrease over time as emissions are reduced. Complementary policies may be necessary to mitigate negative impacts on certain sectors or to ensure benefits accrue to specific populations. For instance, additional investments may be needed to address concerns about other air pollutants, or to ensure that clean technologies are used in specific geographic areas.

CASE STUDY

China Launches the World's Largest ETS

China aims for its national carbon emissions to peak by 2030 and reach net zero by 2060. In an important step toward achieving these goals, in 2021 China launched a national emission trading program for the electricity sector, which is dominated by coal and gas generation and accounts for about 40 percent of national emissions. This program builds on experiences gained in regional pilot programs over the past decade. At its launch, the new ETS created the world's largest carbon market, covering 2,225 companies and over 4,000 MtCO₂ annually. By 2025, China intends to expand to cover petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper and pulp, and civil aviation.

China's program is unusual in that it is based on carbon intensity (tCO₂e/megawatt-hour) rather than an absolute emissions cap. China freely allocates allowances to electric companies based on their actual electrical and thermal output in the compliance year. Companies with relatively high emission intensity may purchase permits from companies with lower emission intensity to comply with the emission intensity target.

Allocating permits to generators for free is critical for political acceptance of the ETS, as it will prevent sharp increases in electricity generation costs, while still providing a price signal for investment in emission abatement. Prices under the ETS are low, around \$8/ton shortly after the launch, but are widely expected to increase over time as the emission intensity target is made more stringent or an absolute cap is introduced in line with China's emission goals, additional sectors are added, and distribution of allowances transitions to auction.



“It is important that every jurisdiction recognizes that carbon pricing is an efficient and effective way to reduce emissions. In British Columbia, we have worked to create a carbon pricing system that ensures low- and moderate-income people are supported through our B.C. Climate Action Tax Credit. A thoughtful, well designed carbon pricing system will be critically important as we move to net zero while ensuring equity for all.

We also return a portion of carbon tax paid by industry to incentivize and support initiatives and technological innovations that reduce their GHG emissions and help fill the demand for low-carbon commodities and products.”

George Heyman - Minister of Environment and Climate Change Strategy, British Columbia

Direct, free allocation of allowances or the ability to use more offsets in early years can mitigate short-term transition costs and potential competitiveness impacts for hard-to-abate sectors. These approaches should decline over time as more jurisdictions adopt carbon pricing programs and competitive distortions decline. Border tax adjustments are another tool to address emission leakage that would arise from the potential competitiveness impacts on energy-intensive, internationally trade-exposed sectors, but need careful consideration to ensure compliance with World Trade Organization rules.

When implemented effectively, linking ETSs between countries can reduce the overall cost of emission abatement in those countries, and thus enable more aggressive abatement in the linked program than if countries had continued with separate systems. For instance, studies suggest that a globally linked carbon pricing system could almost double emission abatement relative to countries acting alone, at no additional cost.¹⁸ Expanding and linking national compliance markets would also harmonize the carbon price that trade-exposed industries face in those countries and reduce the risk of emission leakage. Such linkage should be restricted to countries with similar levels of ambition so as not to dilute allowance prices. Both programs must also have equivalent reporting and enforcement provisions to ensure environmental integrity.

CASE STUDY

European Union Proposal for a Carbon Border Adjustment Mechanism

The ETS has been the central pillar of the EU’s climate strategy since 2005. With the advent of the Green New Deal, adopted in 2019, the cap under the ETS will be progressively tightened to drive emission reductions in covered sectors in line with the trajectory needed to achieve net zero targets by 2050. This tightening of the annual caps is expected to significantly increase allowance prices over the next decade.

If other countries do not adopt equivalent carbon prices, domestic production in hard-to-abate sectors in the EU risks being relocated to other countries as allowance prices rise, resulting in emission leakage. To prevent this risk of leakage, the European Commission has proposed a Carbon Border Adjustment Mechanism (CBAM). The mechanism would require importers of designated high-emission sectors from jurisdictions with lower or no carbon pricing to purchase CBAM certificates as a condition of import. The price of the certificates will be linked to current allowance prices under the ETS, and will vary depending on the embedded carbon in the product being imported and the level, if any, of carbon pricing in the originating country.

By addressing the risk of emission leakage, the CBAM will enable the EU to allow hard-to-abate sectors covered by the ETS to bear higher allowance prices and remain on a level playing field with importers. Free allocation of allowances to sectors covered by the CBAM will be progressively phased out between 2026 and 2035.

Participation in international carbon markets can help countries leverage new streams of capital and bring emerging emission reduction and removal technologies to market. To maximize these opportunities, both acquiring and transferring countries should understand the implications of participating in these markets and must have the capacity to monitor, approve, and track credit transfers, so that they can ensure such participation supports the domestic transition to net zero. Both acquiring and transferring countries and companies have responsibilities in this regard.

Acquiring countries should ensure that any purchase of credits, either directly or by the private sector, complements aggressive domestic emission reductions at the sectoral and company levels. Options include limiting the total quantity of credits that can be acquired,



“Norway introduced carbon pricing nearly 30 years ago. Today over 80 percent of Norway’s emissions are covered. Our low carbon development, sustainable policies, and new technologies are good for almost everyone, but they can also lead to changes in employment and in social transactions. Accounting for such structural elements is very important because we need to build broad support and need to enable a green shift through that support. But we will get there, because the solutions we need get cheaper and more accessible every day. There isn’t a one-size-fits-all solution, strategies can differ, tools can differ from country to country around the world. But it still remains my firm belief that at the center of all these tools we need to have a price on carbon.”

Sveinung Rotevatn
- Minister for Climate and Environment, Norway

CASE STUDY

Indonesia’s Example on Article 6

Indonesia recently submitted an updated NDC to the UNFCCC. The NDC reflects the country’s first Long-Term Strategy on Low Carbon and Climate Resilience 2050, which aims for GHG emissions to peak in 2030 and reach net zero by 2060 or sooner.

Article 6 of the Paris Agreement can be an important resource for Indonesia to meet its NDC because the country can both buy and sell credits. The revenue from selling credits can finance and expedite technology development and use in the country, while buying credits where abatement costs are lower in other countries in the region, such as the Lao People’s Democratic Republic, can help reduce the costs of achieving the NDC.

Participating in the Article 6 mechanism can also support multiple policy objectives in Indonesia. The land-use and forestry and renewable energy sectors, especially micro-hydro projects and technologies, have huge potential to support a just transition because the revenue from selling credits will be directed to local communities. In addition to reducing GHG emissions, projects enabled by Article 6 can create a trickle-down effect and bring co-benefits in energy access, health, and education to people.

As Indonesia’s Finance Minister Sri Mulyani Indrawati observed, “To achieve our climate change goals, we definitely need to address carbon price and carbon price can only work if there is a global mechanism to create a carbon market.”

voluntarily canceling ITMOs rather than applying a corresponding adjustment, discounting corresponding adjustments, or limiting the acquisition of credits to sectors where emission abatement costs are particularly high.

Acquiring countries should also consider ways that credit purchases can encourage transferring countries to increase their ambition, such as helping transferring countries design and implement net zero strategies or requiring that credits meet specific characteristics or are sourced from countries with conditional “stretch goals” in their NDCs. Credit sales can put transferring countries in a position to reach those stretch goals, thanks to the early investment they can attract for low-carbon development strategies.

Transferring countries should ensure that transferred credits are not double counted and not needed to achieve their own NDCs and net zero trajectories. If countries are able to capture lower-cost solutions in their own NDCs, they should consider ways to steer international carbon market investment to high-impact abatement or removals (for example, immature or high-cost emission technologies) to enable an increase in their national ambition. Countries should also ensure that they receive appropriate value for readily available abatement and removal potential. Establishing approval processes and requirements for all international credit transfer, including for voluntary markets, would support these objectives. Involvement of affected communities and interested organizations in monitoring and approval processes would help provide accountability and ensure that credit transfers support national ambition.

Procedures for approving investments and transfers should ensure that the impacts of land-use emission reduction and removal credit activities on local communities have been considered; that the credit

prices appropriately reflect the full opportunity costs of different land uses, including ecosystem services; and that emissions leakage is avoided. Jurisdictional, rather than project-based, crediting approaches are more effective at avoiding leakage and double counting and incentivizing the government actions necessary to address the root causes of forest loss. The process of transitioning projects into jurisdictional-scale accounting systems and programs must address any gaps in government capacity in areas such as forest monitoring, and institutions and processes to ensure the revenues from jurisdictional-scale accounting are equitably shared.



“To harness the power of nature we invest in our forest, wetlands and surrounds, implementing a border-to-border restoration program. We are also addressing energy and transport emissions by phasing out biomass fuel for cooking and introducing aggressive e-mobility incentives. We have also faced difficulties in financing our ambitious plan to become a carbon neutral and climate resilient economy by the middle of the century. That’s why we established the Rwanda Green Fund to act as the engine of green growth and facilitate investment in climate resilience. Initiatives taken by Rwanda would be enhanced by a strong carbon market, one that is working to develop a carbon trading hub for mitigation project, at the national and regional level. The hub will unlock climate finance and investment for green projects in Rwanda and across the continent.

Any carbon pricing system has social economic implications and needs to be carefully designed. Policies must consider people in the planning to ensure an inclusive and equitable transition to net zero.”

Jeanne Mujawamariya
- Minister of Environment, Rwanda

Private Sector Transitions to Net Zero



PRIVATE SECTOR TRANSITIONS to NET ZERO

Voluntary action by companies is important to the global mitigation effort, particularly in the absence of national ambition. Corporate net zero targets and mitigation claims must align with global net zero ambition and should support an increase in national ambition wherever a company does business.

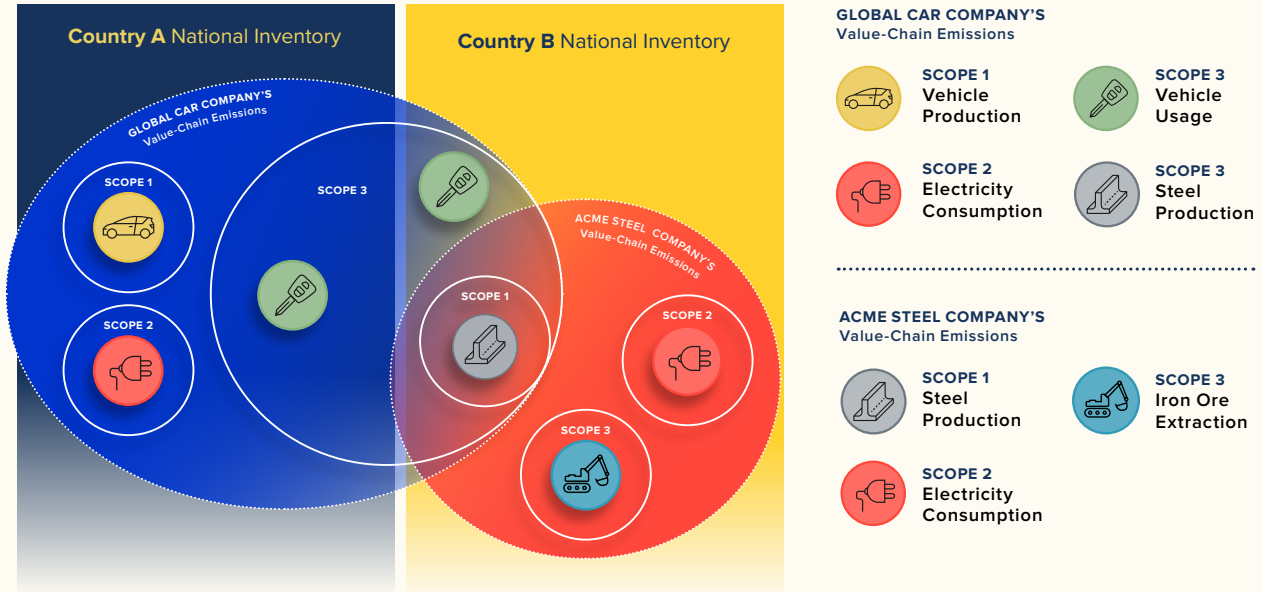
For the private sector, a credible trajectory to net zero means aggressively reducing emissions in their own operations and within their value chains (that is, emissions they induce) in line with the 1.5-degree pathway for their sector over the next 10 to 15 years. By taking responsibility for the emissions of their full value chains, companies can contribute to a transition to net zero, and accelerate results. Companies should plan to address unabated value-chain emissions through investments in emission reductions outside their value chain (compensation). As the world moves closer to net zero, they should neutralize any remaining emissions through investments in removals.

Ambitious leadership from companies requires interim targets (five and 10 years) along the transition pathway to guide planning and to immediately begin reducing emissions within the value chain. Differences in the type and nature of the NDCs in countries where a company operates should not undermine the ambition of the company's emission reduction trajectory.

The Science Based Targets initiative

The SBTi is a partnership between CDP, the United Nations Global Compact, the World Resources Institute (WRI), and the World Wide Fund for Nature (WWF) that aims to define and promote best practice in corporate action on emission reductions and net zero targets in line with climate science. To date, over 1,600 companies have committed, through SBTi, to adopt science-based emission reduction targets. The SBTi's most recent work has focused on corporate science-based net zero targets. Over 600 companies, including Microsoft, IKEA, ENEL, and Rolls Royce, have already made or are committed to science-based net zero pledges through the Business Ambition for 1.5°C campaign.

CORPORATE GHG EMISSION SCOPES



The widely used **WRI/WBCSD Corporate Greenhouse Gas Protocol** categorizes the emissions associated with a company's business activities into three scopes. Scope 1 covers the direct emissions of the company itself, such as emissions due to fuel combustion by company boilers or industrial production. Scope 2 covers the emissions associated with electricity or heat that a company consumes. Emissions associated with all other business activities of a company are included in Scope 3. Scope 3 includes emissions embedded in products that the company uses, including to make its own products (for example, the emissions embedded in steel used to produce cars), as well as emissions caused by use of products sold by a company (such as emissions from customers driving the cars). Scope 3 also covers emissions from activities such as business travel, or a company's investments.

Categorizing emissions by scope facilitates planning and accounting for GHGs at a corporate level, but creates complexity when overlaid with national and global GHG targets. Consider a hypothetical vehicle manufacturer, Global Car Company, that produces automobiles in Country A and purchases steel from a supplier, Acme Steel Company, that operates and sources iron ore in Country B. Global Car Company sells vehicles in countries A and B.

- Global Car Company has Scope 1 (vehicle production) and Scope 2 (electricity consumption) emissions in country A. It has Scope 3 emissions associated with steel production in country B, and Scope 3 emissions associated with vehicle usage in both countries A and B.
- Global Car Company's Scope 3 emissions for steel production are considered Acme Steel's Scope 1 emissions. Emissions associated with iron ore extraction are considered part of Acme Steel's Scope 3 emissions.
- Global Car Company's Scope 1 and 2 emissions will also be reflected in the national inventory of country A; its Scope 3 emissions from steel production will be included in the inventory of country B; its Scope 3 emissions from vehicle usage will be included in the national inventories of both countries A and B.
- Acme Steel's Scope 1 emissions from steel production and Scope 3 emissions from iron ore extraction are reflected in Country B's inventory.

This example provides an extremely simplified illustration of accounting for value-chain emissions across countries. In reality, emission accounting is much more complicated due to the complexity of companies' business operations, production inputs and outputs, and the multinational nature of global supply chains. Accounting in land-use sectors, such as forestry and agriculture, are additionally complicated by the fact that these activities can both emit and sequester carbon.

The use of internal carbon pricing can help companies make decisions about emission reduction strategies and investments to achieve their targets along the net zero trajectory. Internal carbon pricing may be particularly important in the absence of formal regulations or pricing signals from governments. If a company uses this tool, it should first develop an overall long-term abatement strategy, then focus on the right price to drive change in line with the strategy.¹⁹ The company should determine which value-chain activities the price will apply to and, most critically, which decisions will be made based on the carbon price. If internal carbon pricing is central to the company's emission reduction strategy, the price must ultimately cover all emission scopes (where these emissions are not covered by an equivalent carbon pricing commitment of a supplier) and have

the highest degree of influence (pass/fail) over investment decisions.

Investment in high-quality emission reductions or removal credits can complement a company's efforts to reduce emissions outside its value chain. Use of credits, whether domestic or international, should not undermine a company's efforts to aggressively reduce emissions within its value chain. Companies should ideally use credits along the net zero pathway only for reductions or removals in complement to value-chain emission abatement in line with their science-based net zero transition trajectory. Because companies in hard-to-abate sectors have limited abatement options in the short term compared with companies in other sectors, they may wish to invest in credits to contribute to global ambition.

CASE STUDY

How Shell is Using Internal Carbon Pricing

In February 2021, Shell announced its updated Powering Progress strategy to become net zero by 2050. Shell assesses its portfolio decisions, including investments and divestments, against the potential impacts of the energy transition to the use of lower-carbon energy. These include higher regulatory costs linked to carbon emissions and lower demand for oil and gas. Shell's annual carbon cost exposure is expected to increase over the next decade because of evolving carbon regulations.

To assess the resilience of new projects, Shell considers the potential costs associated with operational GHG emissions. Shell develops its carbon cost estimates using short-term policy outlooks and long-term scenario forecasts, both of which reflect current NDCs and evolving national policy developments. Real-term carbon cost estimates range from \$5 to \$110 per ton of GHG emissions in 2030. Shell's real-term carbon cost estimates for all countries are expected to increase to at least \$100 per ton of GHG emissions by 2050 as countries tighten their NDCs. In response, Shell will update its carbon cost estimates each year.

As Shell works to transform its business for a lower-carbon future, it supports carbon pricing as a key policy tool that governments can use to help increase global ambition and encourage investment in lower-carbon technology and infrastructure. Shell's investments in carbon capture and storage (CCS) in Canada have shown how government-mandated carbon pricing mechanism can incentivize uptake of these technologies. Quest, financially supported by the governments of Canada and Alberta, is the world's first commercial-scale CCS facility applied to oil sands operations,²⁰ and has captured over 6 million tons since it launched in 2015. Following the success of Quest, Shell recently announced a proposal to build a large-scale CCS project at its Scotford Complex. Shell is developing the first phase of this proposed project, incorporating the lessons learned from Quest, the current/projected price of carbon, and a proposed Canadian Clean Fuel Standard.

Net zero for companies is appropriately used only to describe the end state in which value-chain emissions have been abated to the maximum extent possible and the remaining residual emissions neutralized by an equivalent quantity of removals. Companies should not claim to have attained net zero by netting emission reduction or removal credits against value-chain emissions when those emissions have not been aggressively abated in line with a science-based pathway. Additional emission reductions and removals can be pursued beyond net zero to help the world become net negative as abatement technologies further evolve.

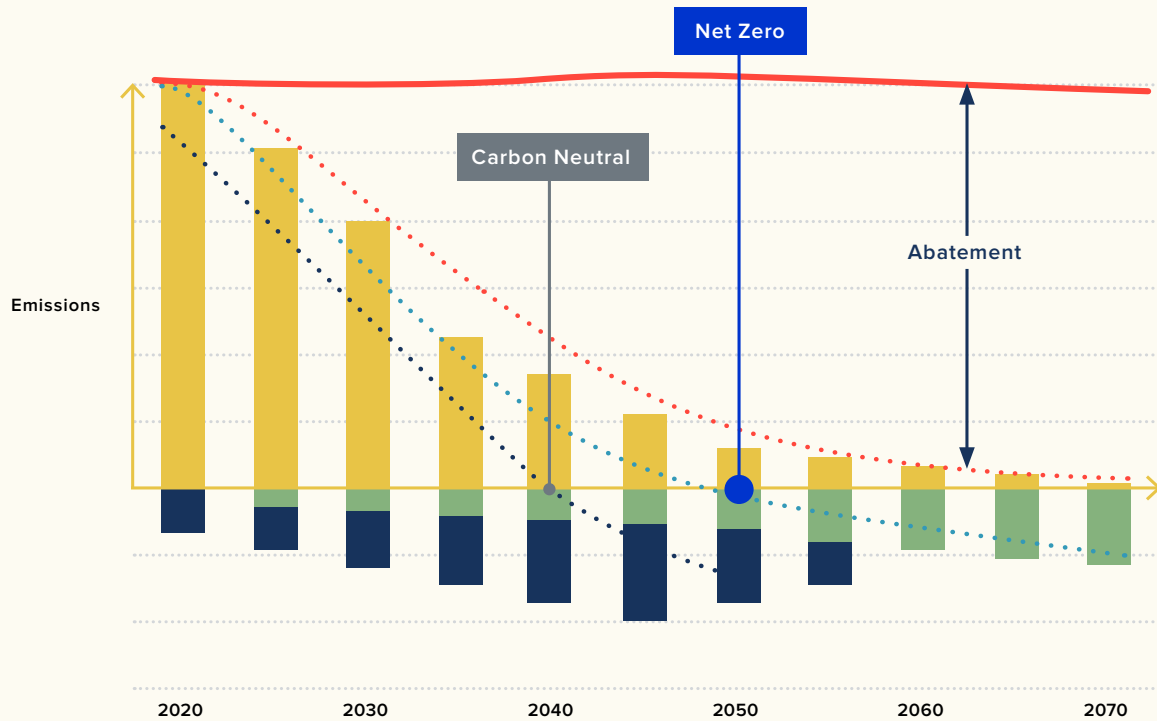
CASE STUDY

Microsoft Commits \$1 Billion to Decarbonize

In January 2020, Microsoft made a commitment to operate carbon negative across its value chain by 2030. As part of this commitment, and in recognition of the urgent need for decarbonization technologies, Microsoft will commit \$1 billion in investments over four years through a new Climate Innovation Fund (CIF). The CIF supports the development of new and emerging climate technologies and the scale-up of existing technologies across the world. In keeping with Microsoft's sustainability commitments, the CIF invests in technology and carbon reduction and removal solutions across a range of economic sectors to reduce emissions and improve water and waste management. Potential investments are prioritized based on their ability to provide measurable climate benefits, bring capital for decarbonization solutions into underfunded markets, benefit developing economies and underserved communities, and align with Microsoft's core business and those of its customers. CIF investment decisions do not explicitly use a carbon price. However, carbon pricing scenarios are included in the evaluation of future growth prospects for potential project investees.

Through its separate carbon removal program, Microsoft procures removal credits to apply to its corporate inventory. Microsoft does not receive carbon credits via CIF investments, although it does procure credits from some of those projects separately. In the future, as technologies evolve and standards improve for verifying reductions and removals, Microsoft may apply certified credits from its CIF investments toward its formal corporate commitments.

INDICATIVE CORPORATE CARBON NEUTRAL AND NET ZERO TRAJECTORIES



The terms carbon neutral and net zero are often used interchangeably but mean different things. This paper is primarily focused on net zero, which we identify as the state where a company has reduced its current value chain emissions to near zero in line with science and any remaining emissions have been neutralized by removals (which may be from within the value chain or credits from outside the value chain).

This paper does not delve into the concept of carbon neutral, which is sometimes used to describe the state where a company's current value chain emissions are completely offset by carbon credits from outside the company's value chain, (which may represent removals, emission reductions, or avoided emissions) and/or removals from inside the value chain. Carbon neutral claims do not necessarily imply anything about the reductions of a company's value-chain emission. This example shows a carbon neutral emission reduction trajectory that is aligned with a 1.5 degree pathway, but not all are. As carbon neutrality is further explored, it will be crucial that carbon neutral emission trajectories are designed to be consistent with the global achievement of net zero emissions.

- Value-Chain Emissions
- Compensation (Emission Reduction / Avoidance)
- Neutralization (Removals)
- Business as Usual
- ⋯ Emissions Aligned with 1.5°C Pathway
- ⋯ Carbon Neutral Emission Trajectory
- ⋯ Net Zero Emission Trajectory

If a company uses international credits for compliance purposes, it must ensure that the reductions or removals are not double counted. Accounting must result in corresponding adjustments according to rules under Article 6 of the Paris Agreement, including the broader set once adopted, and the national requirements of the transferring and acquiring countries. Companies should not use international credits without a corresponding adjustment in the host country if that credit will be counted toward the NDC of another country.

The emerging concept of “mitigation contributions,” as an alternative to using credits to offset emissions, could help align private sector efforts with global ambition. A mitigation contribution would represent an investment in emission reductions or removals outside a company’s value chain but would not be used to offset a company’s value-chain emissions. Similarly, in the case of an international investment, the mitigation contribution would not offset an ITMO that would result in a corresponding adjustment. Because the emission reductions or removals underpinning the mitigation contribution credit are not used by the company for its own internal abatement, but instead to go beyond what it does internally, mitigation contributions would not affect the company’s overall abatement goal, nor result in a decrease in national abatement in the country where the company claims mitigation contributions. Thus, mitigation contributions would avoid the risk of double counting. They can also be a vehicle for results-based capital flows to support ambition in developing countries, provided that investments are made in high-value and high-integrity emission reductions or removals and are consistent with the host country’s long-term strategy. Certification and registration mechanisms would be needed to track the mitigation contribution to provide transparency and accountability but could use much of the existing credit infrastructure.

Why Do Companies Voluntarily Invest in GHG Reductions or Removals?

While companies that operate within an ETS may invest in emission reductions or removal offset credits to reduce the costs of complying with the program, many that operate outside of an ETS invest voluntarily out of a desire to be environmentally responsible or to limit the risk of future regulation. A company may need to be responsive to a stakeholder board that demands the company reduce its carbon footprint, or to make its products or services more attractive to environmentally conscious consumers, or to attract and retain staff. Often, it’s some combination of the three.

For companies that invest in emission reductions or removals to be environmentally responsible, mitigation contributions may be as (or more) attractive as (than) using credits to offset value-chain emissions. Communicating to customers what a mitigation contribution represents may be more challenging than communicating about offsetting emissions, but may be viewed more credibly, particularly if grounded in a science-based net zero target.

CASE STUDY

How Holcim is Building a Net Zero Future

Holcim, one of the world's leading manufacturers of building products, joined the UN Global Compact's "Business Ambition for 1.5°C" pledge with intermediate targets approved by the SBTi in alignment with a net zero pathway. It is now partnering with the SBTi to look beyond 2030, to support the development of the first climate targets for a 1.5°C future in the cement sector.

As part of their endeavor, in 2020 Holcim began offering its ECOPlanet and ECOPact lines of low-carbon cement and concrete, respectively. These low-carbon products represent a reduction in carbon intensity ranging from 30 percent to 70 percent compared to standard cement and concrete. With the addition of the new ECOPlanet Zero and ECOPact Zero lines, Holcim now offers its customers with the possibility to reach a 100 percent reduction in carbon intensity through local compensation.

For these "Zero" product lines, emissions associated with manufacturing and distribution are reduced to the maximum extent currently technologically feasible. Holcim then uses certified removal credits to compensate for residual emissions that are unavoidable with today's technologies. To ensure that the removal credits provide local environmental benefits, the credits are sourced locally. The removal credits are not reflected in Holcim's corporate inventory nor claimed as progress toward the company's net zero commitment. Only its customers benefit from it by purchasing a certified product that has an emission intensity reduced by 100 percent.

While demand for low-carbon products is in its infancy, the company is keen to offer solutions today to collaborate with its value chain and accelerate the transition toward net zero carbon construction. Bringing these products to the market today also facilitates engagement with policy makers to support decarbonization in this essential-to-abate sector and aims to drive customer demand for low-carbon alternatives.

VOICES

"For South Africa it is critically important that we reduce emissions while addressing our key strategic priorities for job creation, poverty alleviation, and inclusive economic growth. It is within this context that Sasol is also transitioning our coal to liquids operations. Against this backdrop, Sasol firmly believes that carbon pricing is a critical part of the suite of policy interventions required to achieve the transition to a low-carbon future and the Paris Agreement goals.

A stable and predictable carbon pricing mechanism that recognizes the need for flexibility to incentives and subsidies is required to deliver on any climate goals.

In this regard a coordinated national vision is a prerequisite that gives clarity to all stake-holders and allows for spheres of the government to work in harmony towards this vision."

Fleetwood Grobler - CEO, Sasol

Companies that invest in mitigation contributions could claim to have contributed to national and global net zero efforts through financing the emission reductions or removals, but could not net the emission reductions or removals against unabated emissions in their value chains. To date, companies have shown little demand for mitigation contributions. More discussion of what mitigation contributions represent and how they may fit into net zero concepts—to companies, stakeholders, and their customers—would be useful.

CASE STUDY

Stripe Accelerates New Carbon Removal Solutions as an Early Customer

Stripe, which processes internet payments for businesses, is acting as an early purchaser to help promising new carbon removal technologies reduce costs and increase production. Recognizing the critical role of carbon removal in reaching net zero but how far behind it is in scaling, Stripe decided to focus on helping to fill that gap.

To select projects, Stripe uses project criteria that characterize the gap in the portfolio of carbon removal solutions that exists today. Specifically, it looks for solutions that are permanent (>1,000 years), scalable (>0.5 gigatons per year by 2040), low cost (<\$100 per ton by 2040), and, importantly, do not compete with agricultural land uses. Examples of technologies are direct air capture, enhanced mineralization, and ocean-based removals. While Stripe is paying \$100–\$2,000 per ton of carbon removed from its current project portfolio, it expects prices to decrease substantially over time. Stripe's job is to be the first-choice buyer: the “demand-side signal” that a market exists for carbon removal.

Stripe's portfolio is made up of promising nascent technologies, for which verification and certification standards do not yet exist. Stripe works with a team of science and governance experts to ensure that selected projects meet its target criteria, which consider permanence, cost, scalability, safety, as well as social and environmental responsibility.

The Stripe Climate program arose out of one of the company's corporate climate initiatives. After the company's initial purchase of \$1 million in carbon removal from four innovative projects, positive feedback from Stripe's customers prompted the company to expand the program to allow its customers to direct a fraction of their revenue toward carbon removal. This became Stripe Climate, which is now made up of over 5,000 businesses from all over the world that are collectively accelerating the development of next-generation carbon removal through a large-scale, voluntary market.

VOICES

“It is critical that a global net zero pathway is inclusive, with non-prescriptive approaches that allow nations to play a prominent role in decarbonization efforts and to find solutions that are compatible with their economic and social make up.

The announcements of the net zero producers forum by major oil producers representing 40 percent of global oil demand in April 2021 was a major leap in leadership. One that focuses on commonalities and enhances cooperation.

The circular carbon economy framework proposed during the Saudi G20 Presidency is another approach that is inclusive and responsive to the social and economic realities facing nations wanting to play a role in fighting climate change, and is now a national framework guiding the Kingdom’s commitment to neutrality.

The ambitious level of cooperation, necessary in the form of joint funding, technology transfer, and mobilization of private capital, will require a set of guidelines to ensure credibility and avoid greenwashing activities that hinder progress and suppress serious ongoing and future efforts to limit emissions. This would include standardized accounting and monitoring systems, cross border policy harmonization, and aligned taxonomies for sustainable finance.”

HRH Princess Noura Al Saud - Founder, AEON Strategy



Sustainable Finance and Carbon Pricing



SUSTAINABLE FINANCE and CARBON PRICING

Because of their important role in supporting low-carbon development, development finance institutions should make net zero a central principle of their portfolios. Net zero criteria should be integrated into all investment decisions to support rapid decarbonization across all economic sectors, taking into account the national circumstance of individual countries. Internal carbon pricing at a price level that would align investments with net zero trajectories can also be used for scenario analyses to assess risks and opportunities of investment decisions.

Individual investments should be aligned with regional, national, and sectoral net zero strategies where they exist. Transformative emission reduction and removal technologies and business models should be prioritized, particularly in hard-to-abate sectors. Investments in forest product and agricultural companies should prioritize companies that move to less carbon-intensive and more sustainable practices, and take aggressive action to halt tropical deforestation and conversion of other natural ecosystems.

Finance institutions can also use carbon pricing to implement a strategy to achieve net zero across their own value chains.

CASE STUDY

How Carbon Pricing Can Support Sustainable Agriculture and Supply Chain Decarbonization

The food chain already represents more than a quarter of global GHG emissions and global demand for food is projected to double in the next two decades. Rabobank is working to reduce emissions and enhance removals across the supply chain of the agri-food sector. Central to this effort is the Rabo Carbon Bank, which supports farmers to transition to “carbon farming” and food corporations on their way to net zero. In 2020, the Rabo Carbon Bank began developing climate-smart propositions. Carbon farming offers farmers a one-stop shop to adopt new land-management practices. These practices generate high-quality removal credits, while also protecting biodiversity, reducing land degradation, and increasing agriculture yields. The Carbon Bank works closely with agronomic advisors and standard-setting organizations to help farmers monetize the value of these practices by verifying removals and certifying and aggregating credits for sale.

Under its “Supply Chain Decarbonization” proposition, the Carbon Bank packages carbon reduction and removal credits generated in the agricultural supply chain. With its large food and agribusiness clients the Carbon Bank achieves, monitors, and verifies carbon reductions and offers financial structures and incentive models that enable farmers and suppliers to implement low-carbon practices, such as methane digesters. Because the credits generated remain within the clients’ own supply chains, this approach enables those clients to reduce their Scope 3 emissions.

Through these and other efforts, Rabobank aims to reduce emissions and enhance removals in the agri-food sector by 1 gigaton by 2030.

Finance Sector Initiatives to Support Net Zero Ambition

The support of the finance sector is critical to achieving a net zero future. A CDP report²¹ concludes that portfolio emissions are over 700 times larger than financial institutions' direct operational emissions. Financial institutions are also lagging in aligning their portfolios with a net zero economy. A diverse group of 332 financial institutions—representing \$109 trillion in assets—disclosed to CDP that fewer than half of banks (45 percent), asset owners (48 percent), and asset managers (46 percent) are taking action to align investments with a well-below 2°C goal, and only 27 percent of insurers are doing so for underwriting portfolios.

Multiple initiatives have sprung up to encourage and coordinate ambitious finance sector action toward net zero. Several of these are convened within the UN system:

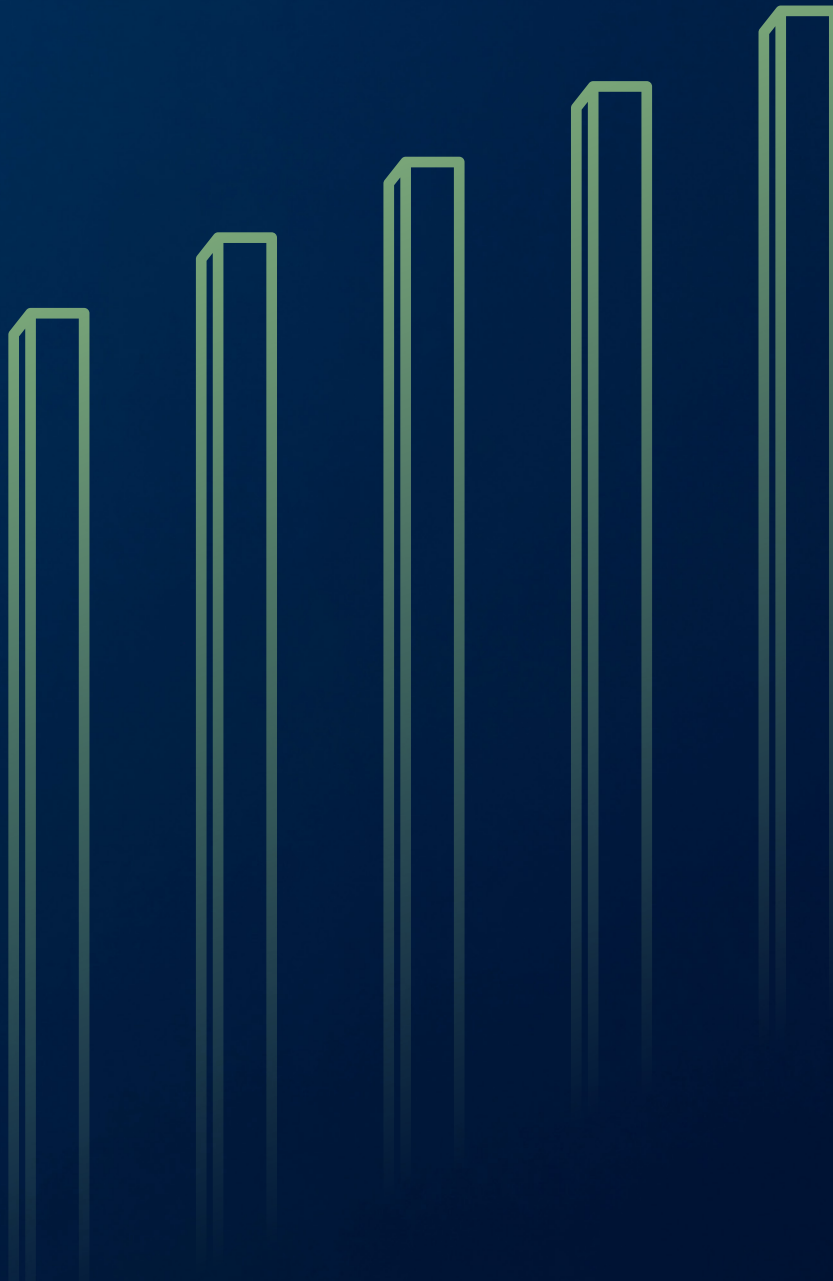
- The Net-Zero Banking Alliance brings together 43 banks from 23 countries with \$28.5 trillion in combined assets that are committed to aligning their lending and investment portfolios with net zero emissions by 2050.
- Both the Net-Zero Asset Owner Alliance (937 institutional investors representing \$5.7 trillion in managed assets) and the Net Zero Asset Managers Initiative (87 signatories with \$37 trillion in assets) support the transition of investment portfolios to align with 2050 net zero emissions targets.
- The soon-to-be-launched Net-Zero Insurance Alliance brings together seven of the world's largest insurers and re-insurers to accelerate the transition to a net zero global economy in their role as risk managers.

Outside the UN, the Net Zero Investment Framework for asset owners and managers provides guidance to a broad range of investors to define strategies, measure alignment of portfolios with emission targets, and transition portfolios toward net zero. The Paris Aligned Investment Initiative has similar objectives. The Net Zero Endowments Initiative brings together top university endowment managers and socially responsible investment experts to build support for climate-friendly portfolio commitments.

The Glasgow Financial Alliance for Net Zero (GFANZ), representing over 250 firms that are responsible for over \$70 trillion in assets, brings together the four initiatives in the UN system into one sector-wide strategic forum. Participating firms agree to establish science-aligned 2030 interim and 2050 net zero targets covering all scopes, and to transparently account and disclose progress in line with the UN Race to Zero criteria. GFANZ is also helping to coordinate efforts across the financial system by developing analytical tools and market infrastructure to promote accountability of these efforts, such as credit rating agencies, auditors, and stock exchanges.



Measuring and Communicating Progress



MEASURING and COMMUNICATING PROGRESS

Full transparency around net zero targets and the strategy for achieving them is essential for credibility of ambition, to encourage stakeholder engagement in net zero development, accountability, and implementation processes. Transparency will also help various actors better understand the plans of others in their sector. This in turn can build confidence and help identify opportunities for gains from alignment and collaboration needed to achieve truly systemic change at the pace and scale required.

Countries and companies should disclose:

- Net zero commitments, including separate emission reduction and removal targets, interim targets, and the trajectory to net zero.
- Any use of internal carbon pricing policies in the net zero strategy.
- Detailed transition plans to decarbonize operations and value chains.
- Planned trajectories (short, medium, and long term) of emissions and removals in the country or within a company's value chain, and assumptions and data used.
- Any planned reliance on domestic or international credits or investment in mitigation contributions and whether these represent emission reductions and avoidance or removals.
- Annual progress toward targets, including on use of offset credits or contribution claims.

Countries and companies should transparently review progress toward net zero targets periodically and revise their net zero strategy based on the review. Independent, third-party auditing of net zero strategies and their results would improve credibility and effectiveness of these strategies. Companies should disclose where emissions, emission reductions, and removals within their value chain occur to provide transparency around where these are reflected in national inventories.

Credible accounting of carbon market transactions is necessary to avoid double counting and to create a social license for carbon pricing. Credits and mitigation contributions must be accounted both where issued and where used. To the extent possible, companies should also track and disclose where credits are sourced.

All credits used by countries or companies must meet quality criteria established by standard-setting bodies and key initiatives. In particular, credits should represent real, measurable, and additional emission reductions or removals; be verified and subject to measures to address material risks of non-permanence and leakage; and avoid double counting.

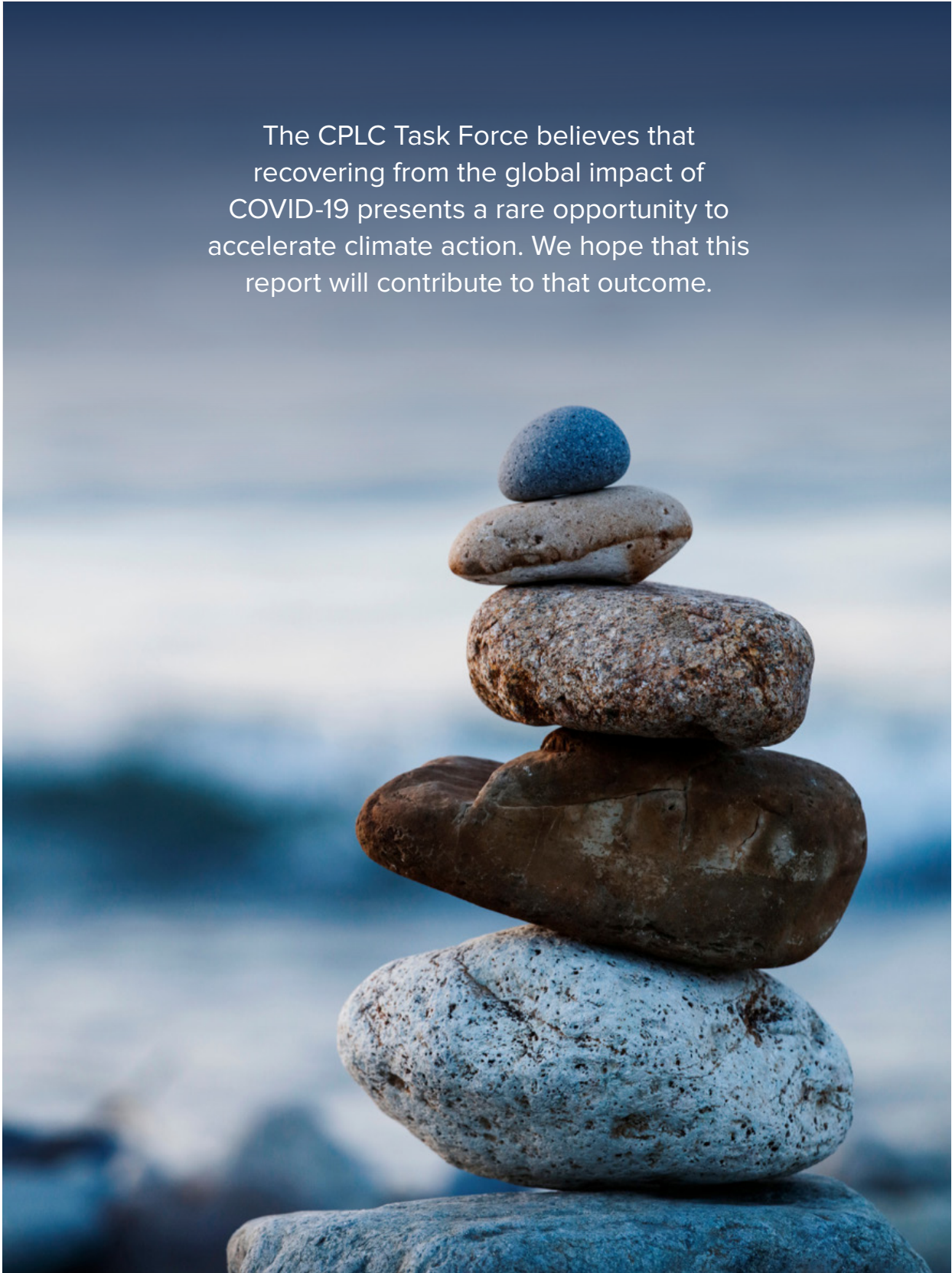
Further work is needed to align the efforts of the private sector in the short to medium term with the level of ambition required to reach net zero globally and to enable transparent comparison of claims. This includes the following:

- Clarify the relationship between corporate and country-level accounting and improve harmonization and oversight of crediting standards.
- Resolve core knowledge gaps, particularly around the limitations of removal capacity and the technical opportunities and costs for emission reductions and removals.
- Reach consensus on safeguards for natural removals to ensure additionality and reduce

the risk of non-permanence and leakage, and promote equity (for example, buffer pools, discounting, valuation of other attributes, high co-benefits, and jurisdictional approaches for aggregating investment).

- Develop approaches to ensure investment in high-value emission reduction and removal credits or mitigation contributions while discouraging overreliance on these credits.
- Reach consensus around comparable metrics and transparency standards around net zero targets and trajectories for governments and the private sector.
- Develop governance structures for and standardize voluntary carbon markets and ensure compatibility with increasingly important compliance markets.
- Nationally track and publish information on international investment in offset projects or mitigation contributions.
- Engage in processes of planning and defining national net zero targets and strategies.

The CPLC Task Force believes that recovering from the global impact of COVID-19 presents a rare opportunity to accelerate climate action. We hope that this report will contribute to that outcome.



Annex: SOME RELEVANT NET ZERO INITIATIVES

Race to Zero Campaign

Race To Zero is a global campaign to rally leadership and support from businesses, cities, regions, investors for a healthy, resilient, zero-carbon recovery that prevents future threats, creates decent jobs, and unlocks inclusive, sustainable growth. The objective is to build momentum around the shift to a decarbonized economy ahead of COP26, where governments must strengthen their contributions to the Paris Agreement. This will send governments a resounding signal that business, cities, regions, and investors are united in meeting the Paris goals and creating a more inclusive and resilient economy.

The Science Based Targets initiative (SBTi)

Launched in 2015, the SBTi is a partnership between the CDP, the UN Global Compact, the World Resources Institute, and WWF. The SBTi has kickstarted a process to develop the “first science-based global standard” specifically for net zero targets.

United Nations-Convened Net-Zero Asset Owner Alliance

As a coalition of institutional investors with over \$6.6 trillion assets under management, the Net-Zero Asset Owner Alliance has committed to transition its portfolios to net zero emissions by 2050. Members include some of the largest insurers and pension funds in the world, building critical scale to support longer-term decarbonization investments and the development of low-carbon business models.

Climate Ambition Alliance: Net Zero 2050

The Climate Ambition Alliance brings together countries, businesses, investors, cities, and regions who are working towards achieving net zero CO₂ emissions by 2050. Country engagement in this Alliance is led by the governments of Chile and the United Kingdom, with support from UN Climate Change and UNDP; while mobilization of a non-government actors is led by the High-Level Climate Champions for Climate Action – Nigel Topping and Gonzalo Muñoz – under the ‘Race to Zero’ campaign.

The 2050 Pathways Platform

The 2050 Pathways Platform is a multi-stakeholder initiative launched at COP22 by High-Level Climate Champions Laurence Tubiana and Hakima El Haite to support countries seeking to develop long-term, net zero GHG, climate-resilient, and sustainable development pathways.

Energy Transitions Commission

The Energy Transitions Commission (ETC) is a global coalition of leaders from across the energy landscape committed to achieving net zero emissions by mid-century. It urges governments, investors, corporates, and civil society to work together to accelerate the deployment of zero-carbon solutions before 2030 to put mid-century targets within reach.

Climate Neutrality Coalition

The Carbon Neutrality Coalition brings together a group of pioneering countries that have agreed to develop ambitious climate strategies to meet the long-term objectives of the Paris Agreement.

**The Leadership Group
for Industry Transition (LeadIT)**

The Leadership Group for Industry Transition (LeadIT) gathers countries and companies that are committed to action to achieve the Paris Agreement. It is supported by the World Economic Forum. LeadIT members subscribe to the notion that energy-intensive industry can and must progress on low-carbon pathways, aiming to achieve net zero carbon emissions by 2050.

The Management Board is made up of representatives from Sweden, India, and the World Economic Forum. A Technical and Expert Committee, made up of LeadIT member representatives, advises the Board. The Management Board approves new company members and decides on the workplan of the Secretariat. The Secretariat is responsible for managing the work of the Leadership Group and is hosted by Stockholm Environment Institute (SEI).

**World Economic Forum
– Net-Zero Challenge**

The Net-Zero Challenge is a voluntary initiative and a prerequisite only for those who are or wish to be members of the WEF's Alliance of CEO Climate Leaders.

**Voluntary Carbon Markets
Integrity Initiative (VCMI)**

VCMI is a multi-stakeholder platform to drive credible, net zero aligned participation in voluntary carbon markets. VCMI coalesces stakeholders around a shared vision for voluntary carbon markets to make a meaningful contribution to climate action and limit global temperature from rising to 1.5°C above pre-industrial levels, while also supporting the achievement of the UN Sustainable Development Goals.

**Deep Decarbonization
Pathways Initiative**

The Deep Decarbonization Pathways initiative is a collaboration of leading research teams currently covering 36 countries. Their aim is to help governments and non-state actors make choices that put economies and societies on track to reach a carbon neutral world by the second half of the century.

**Global Commission on
the Economy & Climate
| New Climate Economy**

The Global Commission on the Economy and Climate is a major international initiative to examine how countries can achieve economic growth while dealing with the risks posed by climate change. The Commission comprises former heads of government and finance ministers and leaders in the fields of economics and business, and was commissioned by seven countries — Colombia, Ethiopia, Indonesia, Norway, South Korea, Sweden, and the United Kingdom—as an independent initiative to report to the international community.

The New Climate Economy (NCE) is the Commission's flagship project. It provides independent and authoritative evidence on the relationship between actions which can strengthen economic performance and those which reduce the risk of dangerous climate change.

**Climate Transparency
Partnership**

Climate Transparency is a global partnership with a shared mission to stimulate a “race to the top” in climate action in G20 countries through enhanced transparency.

**Low Emission Development
Strategies Global Partnership
(LEDS GP)**

The Low Emission Development Strategies Global Partnership (LEDS GP) is a global accelerator of knowledge and solutions that lead the way to climate resilient and low-carbon development. It is a platform driven by climate leaders in Africa, Asia, and Latin America and the Caribbean that enables collaborative and ambitious climate action, peer learning, and innovation. The LEDS GP fosters country leadership and regional communities that enable the transformational changes needed for low-carbon and climate-resilient development.

Oxford Net Zero

Oxford Net Zero is an interdisciplinary research initiative based on the University of Oxford’s 15 years of research on climate neutrality. It is a growing network and collaboration of leading researchers from partner institutions from around the world are working to track progress, align standards, and inform effective solutions in climate science, law, policy, economics, clean energy, transport, land and food systems, and greenhouse gas removal and storage.

Glossary

Allowances: A permit to emit greenhouse gases (GHGs) under an emission trading system (ETS). The total quantity of allowances issued yearly under an ETS is equal to the emission cap for that year. Allowances may be freely allocated by the agency administering the ETS program, or auctioned. Entities that are covered by the ETS must acquire and surrender allowances equal to their emissions. Supply and demand for allowances creates the carbon price signal.

Ambition: The scale and pace of an actor's pledges to reduce cumulative emissions and increase removals toward net zero.

Anthropogenic: Human-caused. The international efforts to address climate change distinguish between anthropogenic GHG emissions and removals, and naturally occurring emissions and removals.

Avoided emissions: Emissions that have been prevented from entering the atmosphere. For instance, investments in energy efficiency result in less emissions being released into the atmosphere than would occur without increased energy efficiency.

Carbon budget: A measure of the cumulative emissions that can enter the atmosphere if the world

is to successfully limit global warming to any given level, such as 1.5°C, within a specific confidence range. The concept is based on the fact that the amount of warming that will occur can be approximated by total carbon dioxide (CO₂) equivalent emissions.

Carbon capture and storage: A process in which a relatively pure stream of CO₂ from industrial and energy-related sources is separated (captured), conditioned, compressed, and transported to a storage location for long-term isolation from the atmosphere.

Carbon credit or credit: A transferrable instrument certified by governments or independent certification bodies that represents emission reductions or removals measured against a counterfactual baseline. Carbon credits are commonly used to "offset" emissions.

Carbon dioxide equivalent (CO₂e): A metric used to quantify the climate impact of different GHGs.

Carbon dioxide removals or removals: Activities that remove CO₂ from the atmosphere and store it in some durable way. The tons of CO₂ that are removed are often referred to as removals or negative emissions. Removal activities may be nature-based, such as reforestation or adding carbon to soils, or technological, such as direct air carbon capture

combined with geological storage. Removal activities are also referred to as sequestration or carbon storage, although these are somewhat different terms.

Carbon market: A market for trading allowances or carbon credits in response to carbon pricing, including an ETS. Carbon markets are characterized as mandatory or voluntary depending on how demand is created.

- A mandatory or compliance market is created by a government carbon reduction program under which private sector actors subject to the program must acquire and surrender allowances or carbon credits equivalent to their emissions to comply with the program.
- Voluntary carbon markets operate outside of a compliance framework and demand is driven by the desire of actors, mostly the private sector, to be environmentally responsible or to try to stave off government regulation.
- Voluntary and compliance carbon markets overlap in that the supply of credits can serve both market types. However, compliance markets, such as a national emission trading program, typically impose restrictions on the type, source, quality, and quantity of credits that may

GLOSSARY

be used. Tracking credits is important in both voluntary and compliance markets to ensure that the emission reductions or removals they represent are not double counted.

Carbon neutrality: Balancing emissions attributable to an actor by a corresponding quantity of emission reduction, avoidance, or removal credits. Carbon neutral differs from net zero, in that net zero allows only for removal credits to balance residual emissions when these emissions have been reduced as aggressively as possible.

Carbon pricing: An approach that imposes a price per ton of CO₂e emissions to incentivize investment in emission reductions or removals. Emission trading systems and carbon taxes are both types of carbon pricing. Carbon pricing can also be used as an internal decision-making tool for companies, governments, investors, or other actors. This is commonly referred to as carbon shadow pricing.

Decarbonization: The process by which countries, the private sector, or other entities aim to reduce or remove GHG emissions across the economy.

Direct emissions: Emissions that are directly physically released into the atmosphere by an activity or process under an actor's ownership or control.

Direct removals: The physical removal of CO₂ from the atmosphere from processes under an actor's ownership or control.

Emission leakage: An increase in GHG emissions elsewhere when an activity is moved to a different location in response to an action to reduce or avoid emissions or increase removals in a specific location. For example, emission leakage occurs if protecting a forest leads to deforestation elsewhere.

Emission scopes: GHG emissions are categorized into three groups or "scopes" for GHG accounting and reporting purposes by corporations and other subnational actors under the most widely used international accounting tool, the Greenhouse Gas Protocol Corporate and Accounting Standard. Scope 1 covers direct emissions from entity-owned or -controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the entity. Scope 3 includes all other indirect emissions that occur upstream or downstream in a company's value chain, such as materials purchased and used in the production of goods, emissions caused by customers using or disposing of goods, and employee travel.

Emission trading system (ETS):

A type of carbon pricing whereby a government imposes an aggregate limit or "cap," which decreases over time, on emissions from specific sectors and sources. Companies covered by the cap comply with the program by acquiring and surrendering allowances, and/or credits where permitted, which may be traded in a carbon market. The market price of allowances at any given time is what is commonly called the carbon price.

Engineered removal: Removal of CO₂ from the atmosphere through technological means, such as direct carbon capture, combined with storage in a geological formation.

Hard-to-abate sectors: Economic sectors where emission abatement costs are significantly higher than in other sectors or where abatement technologies are not yet commercially available. Steel, chemical, and cement production are classic examples. Heavy-duty transportation (such as trucks, ships, and planes) and agriculture (such as application of fertilizer to land) are sometimes considered hard-to-abate because of the diffuse nature of emission sources in these sectors and/or the lack of cost-effective viable alternatives.

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Indirect emissions: Emissions resulting from an actor's activities, such as the production or consumption of goods, but that occur at sources that the actor does not own or control. For instance, emissions from fossil fuel generation are considered indirect emissions of an electricity consumer.

Internal carbon pricing: The establishment of a price per ton of emissions to be used as a planning tool for investment in mitigation activities by governments, the private sector, or other actors. An internal carbon price is sometimes referred to as a carbon shadow price.

Mitigation: Actions to limit climate change and its effects by reducing GHG emissions or enhancing removals.

Mitigation contribution: Quantified emission reductions or removals achieved outside a country or company's value chain as a result of an intervention by that country or company, such as a financial investment, but which are not used to offset the country or company's own emissions. Instead, the actor may claim to have contributed to global or national efforts to reach net zero.

Mitigation hierarchy: A sequential framework of action originally developed to manage biodiversity risk. In the context of net zero targets, it refers to prioritizing abatement of emissions over compensation and neutralization.

Mitigation practices:

- **Abatement:** The avoidance, reduction, or elimination of GHG emissions within a country or within a company's value chain, including reduction in land-use-change emissions.

- **Compensation:** The avoidance, reduction, or elimination of emissions outside a country or outside a company's value chain during the transition to net zero.

- **Neutralization:** CO₂ removals from the atmosphere to counterbalance residual emissions. Such removals may occur inside or outside a country or a company value chain.

Nationally Determined Contribution (NDC): The national level of climate ambition pledged by a country pursuant to the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC).

Nature-based removal: Removal of CO₂ from the atmosphere or oceans through additional transfer of carbon into durable biomass. Also called natural or biogenic removals.

Nature-based solutions: A collective term referring to both nature-based emission reductions, such as conservation of forests and wetlands, and nature-based removals, such as reforestation and restorative agriculture.

Negative emissions: The state beyond net zero at which removals exceed emissions.

Net zero emissions: A state where anthropogenic residual GHG emissions are balanced by permanent anthropogenic removals.

Net zero target: Timeframe for when an actor aims to achieve and maintain net zero emissions.

Offsetting: The use of carbon credits generated from mitigation activities outside a country, jurisdiction, or company supply chain for which emissions are measured and accounted, toward a compliance obligation or voluntary pledge of a country, jurisdiction, or company.

Permanence/non-permanence: Characterization of the risk that CO₂ removed from the atmosphere and stored will be re-released into the atmosphere. Only removals that have extremely low risk of reversal over indefinite timescales are considered permanent.

REDD+: An acronym for a framework adopted under the UNFCCC for reducing emissions from deforestation and forest degradation in developing countries.

Residual emissions: The GHG emissions that remain after aggressive abatement to the lowest technically feasible levels.

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Reversal: The release of CO₂ from carbon storage back into the atmosphere.

Shadow pricing: Assigning a hypothetical or estimated price to carbon to facilitate planning and investment decisions.

Science-based target: Emission abatement targets (not net zero targets) that are in line with emission trajectories that the latest climate science deems 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 by mid-century.

Science-based net zero target: Emission abatement targets that are aligned with the ambition of the Paris Agreement and consistent with the depth of abatement in pathways that limit warming to 1.5°C with no or low overshoot and that neutralize the impact of any residual emissions by permanently removing an equivalent volume of atmospheric CO₂.

United Nations Framework Convention on Climate Change (UNFCCC): The international treaty established to prevent dangerous anthropogenic climate change. The Paris Accord is an agreement adopted under the UNFCCC.

Value-chain emissions: All emissions from activities associated with a company's operations, including inputs to products or services sold by the company, and the use and disposal by consumers of products sold by the company. Value-chain emissions include the direct emissions associated with the company's operations (Scope 1), as well as the indirect emissions associated with electricity and heat consumption (Scope 2), and upstream and downstream activities (Scope 3).

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