JANUARY 2021

# TASKFORCE ON SCALING VOLUNTARY CARBON MARKETS

FINAL REPORT

TSVCM

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# TASKFORCE LEADERSHIP

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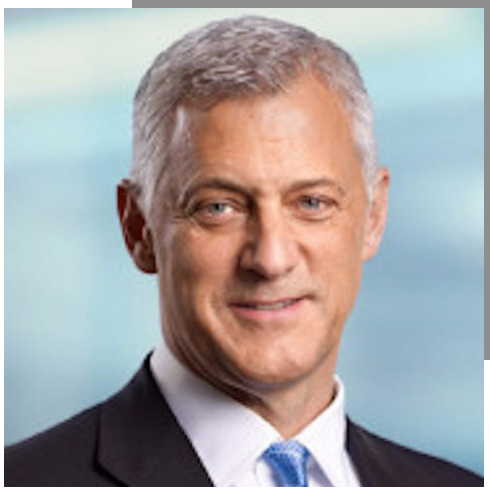

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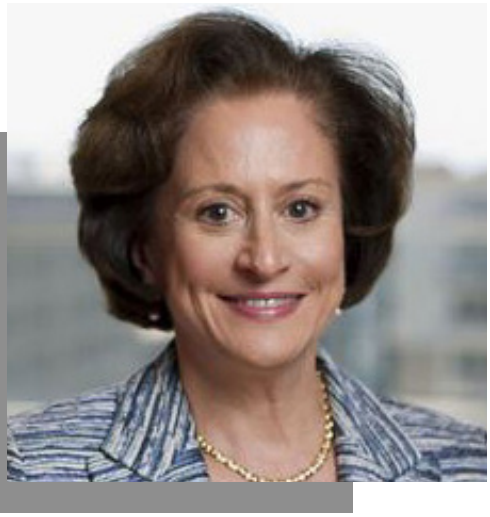

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## ABOUT THE TASKFORCE

The Taskforce on Scaling Voluntary Carbon Markets is a private sector-led initiative working to scale an effective and efficient voluntary carbon market to help meet the goals of the Paris Agreement.

The Taskforce was initiated by Mark Carney, UN Special Envoy for Climate Action and Finance Advisor to UK Prime Minister Boris Johnson for the 26th UN Climate Change Conference of the Parties (COP26); is chaired by Bill Winters, Group Chief Executive, Standard Chartered; and is sponsored by the Institute of International Finance (IIF) under the leadership of IIF President and CEO, Tim Adams. Annette Nazareth, senior counsel at Davis Polk and former Commissioner of the US Securities and Exchange Commission, serves as the Operating Lead for the Taskforce. McKinsey & Company provides knowledge and advisory support.

The Taskforce's more than 50 members represent buyers and sellers of carbon credits, standard setters, the financial sector and market infrastructure providers. The Taskforce's unique value proposition has been to bring all parts of the value chain to work intensively together and to provide recommended actions for the most pressing pain-points facing voluntary carbon markets.

The Taskforce is also supported by a highly engaged Consultation Group, composed of subject-matter experts from approximately 120 institutions, who contribute additional perspective to the recommendations.

## ABOUT THE REPORT

This report was developed by the Taskforce on Scaling Voluntary Carbon Markets, drawing on multiple sources, including a research collaboration with McKinsey & Company, which is providing knowledge and advisory support to the IIF. The Taskforce is responsible for the conclusions and recommendations of the research. Members of the Taskforce on Scaling Voluntary Carbon Markets provided insights across their particular fields of expertise. The findings in this report do not necessarily reflect the views of individual Taskforce members or contributors.

## ACKNOWLEDGEMENTS

We would like to thank all Taskforce members and Consultation Group members that contributed their time, insights and perspectives. We would like to express our special thanks to the philanthropic entities who have supported this project as donors, including the High Tide Foundation, which has served as the lead donor with the Children's In-vestment Fund Foundation and Quadrature serving as supporting donors. We would also like to express our special thanks to Bloomberg Philanthropies and ClimateWorks Foundation for their assistance coordinating our funding. The work of the Taskforce would not have been possible without the generous support and thoughtful engagement of all of these supporting institutions.

PREFACE:

# A WORD FROM THE TASKFORCE LEADERSHIP

The need for climate action, and tools to mobilize finance for the low-carbon and resilient transition, grows more urgent by the day. To achieve the Paris goals to limit global warming to 1.5 degrees Celsius, the global community needs to reach net-zero emissions by no later than 2050. This will require a whole-economy transition—every company, every bank, every insurer and investor will have to adjust their business models, develop credible plans for the transition, and implement them.

Stakeholders across the global economy are stepping up to this challenge. Investors, executives, policymakers, and consumers have realized the role they can play and have promoted or committed to strategies to achieve net-zero or net-negative emissions. To identify the risks and opportunities arising from this transition, investors are demanding transition plans and granular information about how companies plan to reach these targets. Concrete climate action by corporations, including appropriate use of offsetting, cannot wait until 2050, but needs to start now.

Many companies, especially in hard-to-abate sectors, will need to offset emissions as they achieve their decarbonization goals, creating a surge in demand for credible offsets. The credibility of voluntary carbon credits in transition plans will be open to increased scrutiny. To facilitate this global decarbonization there is a need for a large, transparent, verifiable and robust voluntary carbon market, one that promotes genuine action of high environmental integrity. We sincerely want to thank the voluntary market participants for their trailblazing efforts in developing the current well-functioning and credible market, which is now in a position to further improve and scale.

Along with the carbon avoided, reduced, or removed, the scaling up of markets has the further potential to help support financial flows to the Global South, as activities and projects in these countries can provide a cost-effective source of these carbon-emission reductions. Voluntary carbon markets can also play a critical role in scaling down cost curves for emerging climate technologies, bringing these technologies to market earlier, and allowing them to be used in direct decarbonization efforts.

The Taskforce on Scaling Voluntary Carbon Markets was convened in September, bringing together experts from across the carbon markets value-chain, from more than 20 sectors of the economy and six continents, and with experience of the full history of these markets. Supported by a Consultation Group covering an even broader set of experts and observers, it has worked at pace to draw up a blueprint and roadmap to build the market infrastructure needed for a fully functional voluntary market.

The Taskforce's recommendations aim to identify the infrastructure solutions necessary to scale voluntary carbon markets. These are recommendations for the private sector

developed by both current and potential market users to ensure this market can deliver to the needs of its participants without compromising the integrity of decarbonization. The Taskforce has found six key areas where efforts are required to achieve a large, transparent, verifiable, and robust voluntary carbon market; these themes are establishing core carbon principles, core carbon reference contracts, infrastructure, offset legitimacy, market integrity, and demand signaling.

We would like to thank the Taskforce members for their extensive contributions and dedication to this effort, as well as all respondents to the public consultation on the Taskforce's initial findings. We also thank the wide range of public and private institutions participating in the Taskforce's Consultation Group for their continued engagement.

This report is the beginning of a longer process. Going forward, the Taskforce and Consultation Group will continue to move with deliberation, at pace, and with inclusivity to drive real change in the market. While the majority of the required work will be driven by individual market participants, the Taskforce and Consultation Group will support four topics: i) Stakeholder engagement, ii) Governance, iii) Legal principles & contracts, iv) Credit level market integrity.

This is truly an historic opportunity to contribute to getting the world to net-zero, and we encourage continued participation from across the economic value chain to ensure that the blueprint and future initiatives set out a pathway toward real growth of these markets.

# FOREWORD

BY BILL GATES

Every year, the world emits approximately 51 billion tons of greenhouse gases into the atmosphere. To avoid the worst impacts of climate change, we need to reduce that number to zero—and we need to do it in the next 30 years. This will be one of the hardest challenges humanity has ever faced, but we can meet it if we act boldly to reduce emissions worldwide.

The private sector has an essential role to play in this effort. Companies and industries must work to decarbonize their production, distribution, and supply chains. They must make big investments in the innovative new technologies that can accelerate decarbonization across the global economy. And they need to develop and scale markets for carbon that encourage partners and competitors to reduce their emissions, too. We need to think differently about how we finance the physical economy so we can bring reliable, affordable, and carbon-free solutions to the whole world.

A robust voluntary carbon market is one important tool the private sector can use to address climate change and reach net-zero emissions by 2050. While this market is important for a number of reasons, I am most excited because I believe it has the potential to drive early investment in green technologies, especially those that are difficult to commercialize. To take just one example, the third largest contributor to global emissions is manufacturing, so the world needs to find ways to produce carbon-free materials like steel and cement. To do so, we need new technologies such as carbon capture, the electrification of manufacturing processes, and green hydrogen. If carbon credits help make these emerging climate technologies more affordable now, they can eventually be used more widely and cost-effectively to reduce direct emissions. By orders of magnitude, this will enhance the positive impact of the carbon credits themselves.

An increasing number of voluntary carbon market activities and offsetting opportunities available today focus on technologies and projects that are quickly becoming, cost competitive. These include renewables, and energy efficiency projects. The work of the Taskforce is essential to making sure that this market is rigorous, additive, and meaningful. It is impressive how much thought has gone into that endeavour. As more robust offerings come online to deliver climate impact, we need to embrace those programs and allocate critical capital toward developing new technologies like low-carbon fuels for heavy transport, low-carbon steel and cement, and better carbon removal technologies.

If we don't start financing innovation now, it will be impossible to reach our decarbonization goals before we run out of time. So we are working to identify the promising new green technologies that could benefit most from significant investment, and to create more innovative financing programs that can work alongside voluntary carbon markets to generate the levels of investment we need in those technologies. This means taking on more risk and accounting for the likely impacts of climate change in investment decisions. If we can build an investment thesis focused on climate impact, we can create the industries that will replace today's incumbents with productive investment opportunities across sectors. Those who have the courage to take these steps now will not only help the world avoid a climate disaster, they

will position themselves for success by being the best equipped to finance, produce, and buy the clean solutions that will underpin our future economy.

I am very encouraged by the steady stream of companies committing to net-zero emissions by 2050. It's vital that we start turning these commitments into concrete action. I encourage companies to start following the principles laid out in this report: i) reduce, ii) report and iii) offset. And I especially urge them to invest a percentage of corporate offsets in climate technologies relevant to their value chain and Scope 3 emissions footprint, as well as in the emerging climate innovations that can dramatically reduce emissions across the economy.

Finally, I want to thank the Taskforce on Scaling Voluntary Carbon Markets for its work thus far. When brought to scale, this market can create productive avenues to address climate change. Not only will it help reduce emissions, but it will also bring much needed funding to countries in emerging markets, help protect biodiversity, and positively impact communities around the world.


**BILL GATES**

CO-CHAIR OF THE BILL & MELINDA GATES FOUNDATION AND FOUNDER OF BREAKTHROUGH ENERGY


# EXECUTIVE SUMMARY

Limiting global warming to 1.5°C, in line with the Paris Agreement, requires that global annual greenhouse gas (GHG) emissions are cut by 50 percent of current levels by 2030 and reduced to net-zero by 2050. Achieving a global net-zero goal is critical for the health of the planet, the stability of ecosystems, and to ensure safe conditions for future generations. To achieve this goal, deep, broad-ranging, and rapid action to reduce emissions must begin immediately across all sectors of the economy.[1] In support, an increasing number of firms are making commitments to achieve their own net-zero targets, by reducing their own emissions, emissions associated with supply chains, and the use of their products. Firms setting such targets will be expected to demonstrate how net-zero emissions goals will be achieved.

Carbon credits, purchased voluntarily, enable organizations to compensate or neutralize emissions not yet eliminated by financing the avoidance/reduction of emissions from other sources, or the removal of greenhouse gases from the atmosphere and thus meaningfully contribute in the transition to global net-zero.[2] The projects generating these carbon credits can be broadly grouped into two categories: i) GHG avoidance/reduction projects, such as renewable energy or avoided deforestation and ii) GHG removal/sequestration projects, such as reforestation or technology-based removal.[3] In addition to climate mitigation, many projects can also generate broader environmental, social, and economic benefits, ranging from increased biodiversity, job creation, support for local communities, and health benefits from avoided pollution. Similarly, credits supporting emerging climate technologies can help scale down cost curves, bringing these technologies to market earlier and decreasing their "green premiums" against carbon-intensive alternatives. Furthermore, as a significant share of potential projects are located in the Global South[4], carbon credits can generate flows of private capital to these economies.

Concrete climate actions by corporations can be grouped into three main categories: i) Reduction, ii) Reporting and iii) Offsetting of GHG emissions that are hard to abate, due to either technological or cost barriers. Direct emissions reductions by corporates must be the priority, with appropriate offsetting playing an important complementary role to accelerate climate mitigation action. It's fundamental that offsetting is done through

1. The Paris Agreement, unlike the Kyoto Protocol, effectively covers nearly all greenhouse gas emissions and makes them the responsibility of national governments.
2. In this report, we generally follow the convention of using "carbon credit" to describe the verified emissions reduction or removals generated, traded, retired, and "offset" to describe the act of financing other climate change mitigation actions to compensate or neutralize for one's own footprint. Unless specified, when we discuss carbon credits, we refer to credits used for voluntary purposes, as opposed to compliance purposes (e.g., meeting obligations in jurisdictions with regulated carbon market schemes). The majority of credits retired in the voluntary market is issued by independent standards (e.g., VCS, Gold Standard, ACR, CAR, etc.). Some compliance schemes allow the use of independent standard credits, an example being the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).
3. Looking ahead to 2030, around 40-50 percent (>4.0 GtCO2) of carbon credit supply potential will be from avoidance/reduction projects, and around 50-60 percent (3.9-6.4 GtCO2) from removal/sequestration projects.
4. For example, together Indonesia and Brazil make up 30% of Natural Climate Solution potential that is identified in 2030

high-integrity carbon[5] avoidance/reduction and carbon dioxide removal/sequestration projects such that their compensation leads to genuine carbon emissions reductions and environmental benefits. Furthermore, it is critical that corporations report annual emissions (in line with Task Force on Climate-related Financial Disclosures [TCFD] and GHG Protocol recommendations) and that they articulate clear trajectories toward their climate targets, including plans for offsetting. Concrete climate action by corporations, including appropriate use of offsetting cannot wait until 2050, but needs to start now.

A new voluntary carbon market needs to provide a productive forum for companies to support the path toward net-zero emissions – not only through nature based solutions and cost competitive technologies, but also through investment in new, expensive technologies that will address the hardest to decarbonize parts of our economy. Many companies will gravitate toward the most cost-effective options available, so we need institutions to encourage investment in the projects and technologies that are the most difficult to commercialize.

The private sector must identify and support new programs to finance, structure, and deploy these critical solutions now, so that in the future we can continue economic development in countries across the world, including those rapidly industrializing today. For example, heavy emitting industries – like oil & gas, aviation, and manufacturing – could establish effective partnerships that commit their voluntary carbon mitigation activities toward developing these challenging low carbon solutions.

Many of the investments needed to scale emerging breakthrough technologies do not meet the risk and return expectations of today's markets. A range of mechanisms will be needed to ensure capital flows to these technologies. These could include blended financing, access to benefit markets (including voluntary carbon markets), or altering risk, return or time horizon expectations for projects with the highest potential for climate impact. Those who do invest early could position themselves for success in the world to come, by being the best equipped to finance, produce, and buy the clean solutions that will underpin our future economy.

For finance to flow to these GHG emissions avoidance/reduction and removal/sequestration projects, well-functioning voluntary carbon markets will be a critical enabler.[6] A liquid voluntary carbon market at scale could allow billions of dollars of capital to flow from those making commitments, such as carbon neutral or net-zero, into the hands of those with the ability to reduce and remove carbon. Depending on different price scenarios and their underlying drivers, the market size at stake in 2030 could be between $5 billion and $30 billion at the lowest end of the spectrum, and up to over $50 billion at the highest end (both ranges assuming demand of 1-2 Gt CO2).[7] To accelerate the development of a market at this scale, the Institute of International

5. We generally use "carbon" in place of "carbon dioxide equivalent (CO2e)," which includes other GHGs such as methane, nitrous oxide, etc. "Carbon dioxide" is used when we specifically mean CO2.
6. It is important to note that the advancement of regulated markets and regulations would also enable the private sector to play a full part in the transition to a net positive carbon economy.
7. McKinsey analysis. Scenario based rather than forecast. Full details in Chapter 3. $5-30 billion represents a scenario where all historic supply surplus is used first followed by prioritization of low cost supply; over $50 billion represents a scenario where buyers have a preference for local supply.

Finance (IIF) established a private-sector Taskforce on Scaling Voluntary Carbon Markets (Taskforce) in September 2020. The purpose of the Taskforce is to significantly scale up voluntary carbon markets and ensure they are transparent, verifiable, and robust. Hence, as a first step, the Taskforce developed a blueprint for a voluntary carbon market which:

- connects carbon credits supply to demand in a seamless, cost-effective, and transparent way.
- instills confidence and ensures credibility in carbon credits being exchanged/ transacted.
- is scalable to meet the expected increase in demand as more companies pursue efforts to limit thetemperature increase to 1.5 degrees Celsius above pre-industrial levels, as set out by the Paris Agreement.

The work of the Taskforce is guided by four key principles. First, the Taskforce will produce open-source solutions for private sector organizations to take forward. Second, voluntary carbon markets must have high environmental integrity and minimize any risks of negative consequences (such as aligning to do-no-harm principles). Third, recognizing the broad range of important work underway in this space, the Taskforce will amplify existing and ongoing work of parallel initiatives. Fourth, and perhaps most importantly, the Taskforce's work is predicated upon the principle that voluntary carbon markets must not disincentivize companies' own emissions reduction efforts.

A number of scoping considerations have shaped the work of the Taskforce (more in Chapter 1). Wherever possible across all of our recommendations, we leverage existing work and point to the need for relevant expert bodies to take on further work. For example, we chose not to provide a specific recommendation on the appropriate role of offsetting in the context of sector-by-sector decarbonization strategies as these are being addressed by other initiatives involving climate scientists and business experts (see examples in Chapter 4, recommended action 12). We also recognize the development of attribute-based markets (such as EACs, RINs, and potentially credits for green hydrogen, sustainable aviation fuels, green cement in the future), but these are not specifically covered in this report. However, it is our belief that many of the recommendations made here equally apply to adjacent markets; where relevant these have been called out in the report.

Finally, we recognize that regulatory decisions, including international climate policy architecture, may significantly impact outcomes of efforts to scale up voluntary carbon markets, and significantly assist the progress this market can make. We also note the existence of compliance markets (e.g., EU ETS, forthcoming China ETS, California's Cap-and-Trade Program). They are not covered in this report but some of these have clear linkages to the voluntary carbon markets. Considering the core focus of the Taskforce on private-sector solutions, we do not seek to opine on policy priorities. Where the Taskforce has identified challenges to scaling up voluntary markets that rely on addressing political issues, the report notes the interdependency and recognizes that this needs to be dealt with but does not seek to provide recommendations.

As the decarbonization of the global economy accelerates in the coming years, demand for carbon credits will likely increase. That demand is more likely to be met if a large-scale, voluntary carbon market takes shape, which is able to help companies achieve carbon neutral, net-zero and net-negative goals. The scale up will need to be significant—our estimate is that voluntary carbon markets need to grow by more than 15-fold by 2030 in order to support the investment required to deliver the 1.5-degree pathway (see Box, "Key Figures Illustrating the Need to Scale"). This increase in climate finance toward critical nature-based and technological solutions can support not only climate action but also generate additional social and environmental benefits for communities, and help spur innovation.

## KEY FIGURES ILLUSTRATING THE NEED TO SCALE

- In order to reach the 1.5-degree Celsius goal, we must remain within a 570 gigaton (Gt) CO2 cumulative 2018–50 carbon budget.
- This goal requires net GHG emissions to fall by 23 Gt by 2030 (which represents a reduction in emissions equivalent to 1.5 times the total emissions from all oil consumption in 2019).
- To reach the net 23 Gt reduction by 2030, 2 Gt will likely need to come from sequestration and removal. In theory, there is sufficient supply potential to match this need, with approximately 3.0 Gt from nature-based sequestration such as reforestation and 1.0-3.5 Gt from technology-based removal such as bio-energy with carbon capture and storage (BECCS) and direct air capture with carbon capture and storage (DACCS). However, this supply potential is subject to significant mobilization challenges.
- Achieving 2 Gt of emissions sequestration and removal by 2030 requires a 15-fold scale-up of voluntary offsetting in 2030 versus 2019, assuming carbon credits are used to finance all of these actions. This will involve a significant step up in corporate commitments, which are sized at just 0.2 Gt in 2030 based on evidence today.
- As carbon credits can help finance both avoidance/reduction measures as well as removal/sequestration, it is likely that the scale-up will be significantly larger than 15-fold.

Voluntary carbon markets have made significant strides in terms of credit integrity, transparency, and market efficiency since its early days. The Taskforce recognizes and appreciates the pioneers in the market – without their work, there would be no voluntary carbon market to scale. The Taskforce believes significant expansion of the market, through a step-change in the scale of supply and demand of high quality, additional, verifiable, and traceable carbon credits will be critical and can be achieved.

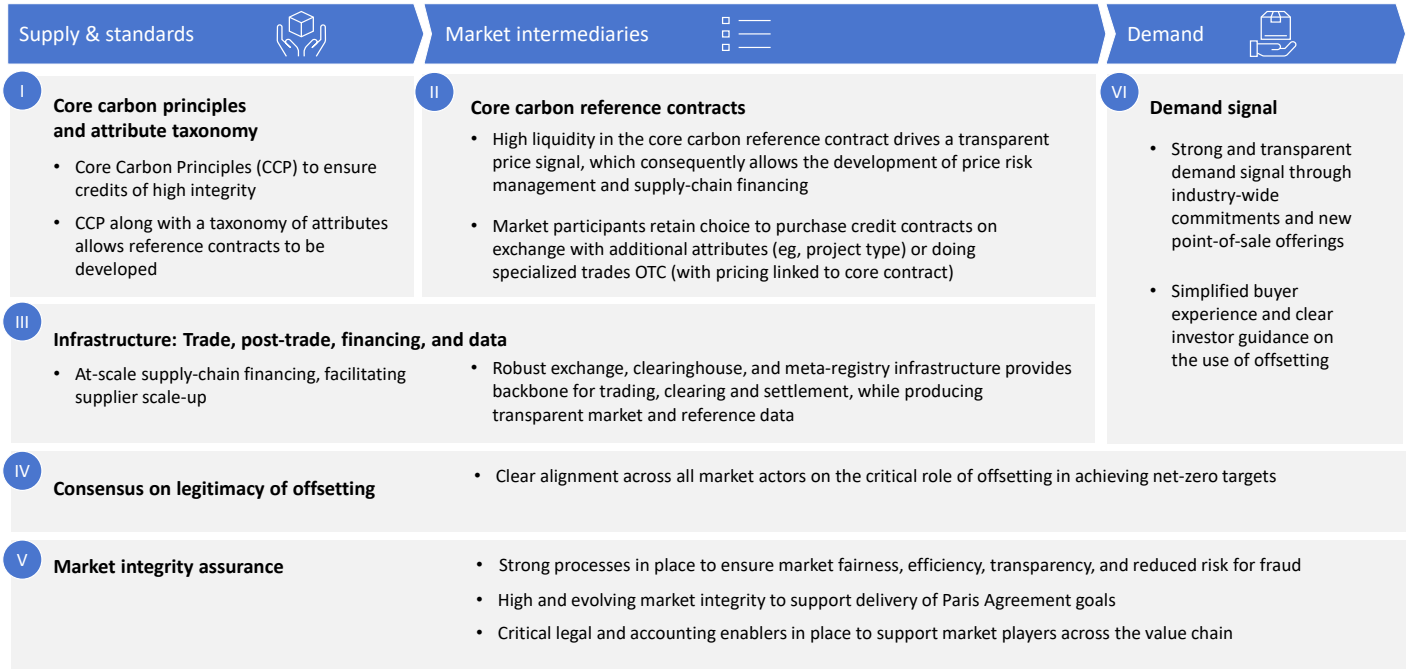
To achieve this step-change in scale, there are some structural challenges that remain to be solved. Today, some buyers struggle to navigate various standards and to find high-quality carbon credits at transparent prices. For a new market participant, it may be difficult to understand what constitutes a high-quality credit, especially as the views on additionality, permanence, and leakage evolve, considering advances in science, technology, and market views on appropriate crediting baselines. Assessing the potential

co-benefits of those credits (benefits beyond carbon emissions reductions), through appropriate measurement, reporting, and verification processes, adds another layer of complexity.[8] On the supply side, sellers face uncertainty in future demand, low prices, limited access to financing, and long lead times to verify credits. As a consequence of these issues, financial intermediaries and data players have not entered the market at scale, leading to a current state of low liquidity and limited data transparency. These are surmountable challenges, but they require innovation while maintaining quality standards and transparency.To support the scale-up of voluntary carbon markets, the Taskforce has identified six key topics for action, spanning the entire value chain. The six topics for action are:

I. CORE CARBON PRINCIPLES AND ATTRIBUTE TAXONOMY
II. CORE CARBON REFERENCE CONTRACTS
III. INFRASTRUCTURE: TRADE, POST-TRADE, FINANCING, AND DATA
IV. CONSENSUS ON THE LEGITIMACY OF OFFSETTING
V. MARKET INTEGRITY ASSURANCE
VI. DEMAND SIGNALS

These six topics for action shape the high-level vision which the Taskforce aspires to reach (Exhibit 1).

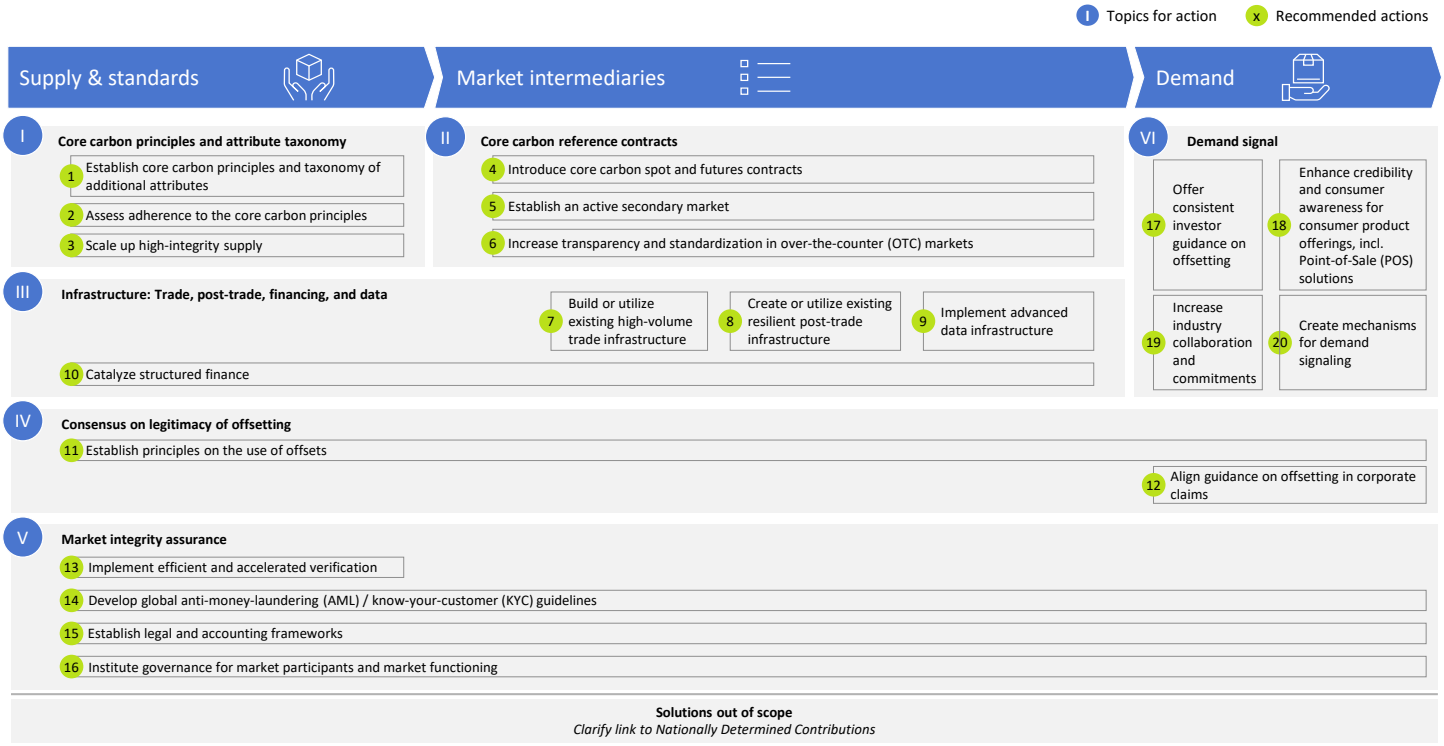
EXHIBIT 1: VISION FOR VOLUNTARY CARBON MARKETS




8. Discussions among Taskforce members have indicated that desire for verifiable evidence of co-benefits is a key driver of buyers' current purchasing decisions.

To deliver the vision, a set of 20 underlying recommended actions has been developed by the Taskforce (Exhibit 2). These recommended actions form the core of the Taskforce blueprint.

## EXHIBIT 2: OVERVIEW OF RECOMMENDED ACTIONS



## EXHIBIT 3: DETAILED OVERVIEW OF RECOMMENDED ACTIONS

| Topic for action | Recommended action | Description |
|---|---|---|
| i **Core carbon principles and attribute taxonomy** | 1. Establish core carbon principles and taxonomy of attributes | CCPs define threshold quality criteria for a carbon credit and additional attributes is a framework for accommodating diverse buyer preferences |
| | 2. Assess adherence to the core carbon principles | Standards and underlying methodologies should be assessed against the CCPs to ensure high integrity |
| | 3. Scale up high-integrity supply | Supply needs to increase by more than 15-fold by 2030, by encouraging entrants, ensuring methodologies are in place and providing financing |
| ii **Core carbon reference contracts** | 4. Introduce core carbon spot and futures contracts | Standardized spot and future contracts allows trading at scale and provision of clear pricing signals |
| | 5. Establish an active secondary market | The secondary market for carbon credits can help buyers manage price risks, increase liquidity and retain flexibility |
| | 6. Increase transparency and standardization in over-the-counter (OTC) markets | OTC markets can build bespoke contracts off of the core carbon reference contract and its price |
| iii **Infrastructure: Trade, post-trade, financing, and data** | 7. Build or utilize existing high-volume trade infrastructure | Exchanges listing CCP-aligned credits would allow for increased liquidity and ease of purchase |
| | 8. Create or utilize existing resilient post-trade infrastructure | Post-trade infrastructure, including the design of a meta-registry, should bolster market integrity and market functioning |
| | 9. Implement advanced data infrastructure | Advanced data infrastructure, with common or shared data fields/protocols that are widely accessible, will increase market transparency |
| | 10. Catalyze structured finance | Financing for carbon credit projects should increase, especially as the market becomes more liquid; interim blended finance is required to support some supply scale up |
| iv **Consensus on legitimacy of offsetting** | 11. Establish principles on the use of offsets | Use of offsetting principles (reduce; report; offset) & the use of offsetting at point-of-sale principles provide guidance on how corporates should use carbon credits |
| | 12. Align guidance on offsetting in corporate claims | Overview of the types of corporate claims that companies are allowed to make with offsetting today, and a call for future alignment |
| v **Market integrity assurance** | 13. Implement efficient and accelerated verification | Data protocol for a digital project cycle can help the verification process become more efficient, effective, and secure |
| | 14. Develop global anti-money-laundering (AML) / know-your-customer (KYC) guidelines | AML/KYC guidelines should take best-practices from the financial services industry and tailor to the VCM context |
| | 15. Establish legal and accounting frameworks | Key enablers (e.g. standardized documentation, financial accounting frameworks, carbon disclosures/reporting mechanisms) are necessary for the market to scale |
| | 16. Institute governance for market participants and market functioning | Both credit-level governance (CCPs) and market-level governance are needed going forward |
| vi **Demand signal** | 17. Offer consistent investor guidance on offsetting | Investors should provide clear, ambitious guidance on climate action and the use of offsetting to companies |
| | 18. Enhance credibility and consumer awareness for consumer produce offerings, incl. Point-of-Sale (POS) solutions | Clear and credible consumer product labelling, PoS infrastructure, and consumer carbon literacy can help expand PoS offerings |
| | 19. Increase industry collaboration and commitments | Industry consortium and commitments can be highly effective in generating demand |
| | 20. Create mechanisms for demand signaling | Demand signaling is crucial to help suppliers scale up supply and support structured finance G |

## AVOIDANCE/REDUCTION VS. REMOVAL/SEQUESTRATION AND PERMANENCE OF STORAGE

Carbon credits can broadly be grouped in two main categories: (i) avoidance/reduction credits and (ii) removal/sequestration credits. Avoidance/reduction projects reduce emissions from current sources, such as by funding the implementation of lower-carbon technologies such as renewable energy, and avoiding practices that cause emissions such as by reducing deforestation. Removal/sequestration projects take out and use/store CO2 from the atmosphere, including through nature-based sequestration such as reforestation, peatland restoration, and technology-based removal such as bio-energy with carbon capture and storage (BECCS) and direct air capture with carbon capture and storage (DACCS). Within these two credit categories are four sub-categories of credits, which each have different characteristics:

### I. AVOIDANCE/REDUCTION

- Avoided nature loss: Limits the loss of nature such as forests and peatlands that store and sequester carbon. Avoided nature loss is part of natural climate solutions (NCS). Projects often have high co-benefits for nature and society, such as positive impact on surrounding biodiversity, water quality, soil quality and livelihoods. They can help reduce the amount of future removal required to stay within the target carbon budget.
- Technology-based avoidance/reduction: Reduces emissions from current sources, which do not have the financial incentive or regulatory requirement to decarbonize. Common projects include setting up clean cookstoves, capturing methane, changing industrial processes to emit less GHGs, and funding the transition to renewable energy in areas where it is not yet competitive or mandated. Projects often have co-benefits such as improving livelihoods. They can help reduce the amount of future removal required to stay within the target carbon budget. Newer technologies could include green hydrogen, sustainable aviation fuels and green cement. Industry partnerships are critical enablers to help develop such solutions within the value chain.

### II. REMOVAL/SEQUESTRATION

- Nature-based sequestration: Uses nature to sequester more carbon in the biosphere, including reforestation and restoring soil, mangroves, and peatlands. Nature-based sequestration is also part of NCS. Projects often have high co-benefits for nature and society such as positive impact on surrounding biodiversity, water quality, soil quality, and livelihoods.
- Technology-based removal: Removes and uses/stores CO2 from the atmosphere with the help of modern technology that uses or stores it in the geosphere or through other secure methods such as in concrete. Solutions include BECCS and DACCS. This is the most permanent storage solution.

The Taskforce recommends that all project types (both avoidance/reduction and removal/sequestration including scaling down cost curves and bringing emerging technologies earlier to market) need financing now in order to meet the carbon budget associated with 1.5-degree Celsius warming. To achieve the goals of the Paris Agreement and to reach global net-zero emissions, a shift to increase the proportion of removals/permanent sequestration will be necessary. In the short term avoidance/reduction projects can and should be used; in the longer term, flows will have to shift toward removals including technology-based removal with

permanent storage, while continuing to significantly invest in and maintain existing nature loss projects will still be required for decades to come.

Across our recommended actions, we address the balance between avoidance/reduction versus removal/sequestration projects in two ways:

- In topics for action I and II, we emphasize the ability to distinguish between avoidance/reduction and removal/sequestration. Additionally, buyers will have the opportunity to further delineate removal credits between geological carbon storage and biological carbon storage. These distinctions are captured as additional attributes. In the longer term, it may be considered whether a separate core carbon contract for removals is needed. We recommend the establishment of a governance body which can oversee and adapt these decisions over time.
- In topics for action IV and VI, we again note that in the short term, all project types are needed to maximize climate change mitigation. We strongly recommend a shift toward removal/sequestration in the medium to long term while ensuring continued investment in avoided nature loss in existing and new projects. The future governance architecture can be responsible for ensuring this. We ask stakeholders to acknowledge the different roles and benefits of each project type across corporate claims and recommend that investors issue clear guidance to corporates accordingly.

## SCALING UP CRITICAL CLIMATE TECHNOLOGIES

Companies turn to voluntary carbon markets to compensate or neutralize emissions not yet eliminated because it is either not possible or prohibitively expensive to directly reduce emissions from all activities across their value chains, such as from business travel, shipping, or cement production for construction. The projects in the market today include renewables, energy efficiency, and natural climate solutions—all critical tools in reducing greenhouse gases and reaching net-zero emissions. In addition to deploying these tools, to achieve carbon reduction goals, it will be critical to accelerate and support the development of emerging technologies which can transform our economy—technologies such as low-carbon fuels for heavy transport, low-carbon steel and cement, and improved carbon removal technologies. These technologies address the root sources of emissions that lead to 'offsets' in the first place but are currently too expensive to adopt at scale.

Going forward, voluntary carbon markets can play a significant role driving investments into new climate technologies that are the most difficult to commercialize. These technologies address two critical elements outlined in IPCC's mitigation pathways i) drastic reduction in emissions, including from hard-to-abate sectors and ii) durable removal at scale.

Emerging breakthrough technologies are necessary to reach our goals for net-zero emissions by 2050. New innovation in technologies such as clean steel (e.g., using electrification or low-carbon hydrogen heating) and low-carbon fuels (e.g., sustainable aviation fuel or sustainable marine fuel) will reduce reliance on fossil products and achieve major emissions reductions down the line. Promoting emerging technology through voluntary carbon markets is critical to help bring these solutions to scale and reduce costs. We can learn from the journey of successful climate technologies – like wind and solar – where these early interventions had an outsized impact in bringing down cost and reducing the green premium relative to fossil fuel-based incumbents. The challenge is that we need to make these investments even more

quickly than those into wind and solar, in order to drive the cost-effective adoption of these technologies in the corporate value chain before 2050. We know that investment today can catalyze climate impact beyond the initial reduction from the carbon credits themselves. Voluntary carbon markets can support the commercialization of emerging climate technologies by giving companies the opportunity to support the path to decarbonization.

New technologies like BECCS and DACCS can also offer durable solutions to remove carbon from the atmosphere, without the permanence constraints faced by nature-based solutions. These technologies are critical for providing the removal required to reach global net-zero, however are currently too expensive today and will remain above $100 per ton until we make sufficient investment to drive down cost. We expect most supply from BECCS and from liquid-sorbent DACCS to sit between $100 to $200 per ton of CO2 in 2030. Voluntary carbon markets can help drive the cost down faster in the same way as it can for new reduction technologies.

The report addresses the topic of breakthrough climate technologies in the following way:

RECOMMENDED ACTION 1:

The additional attribute taxonomy should allow buyers to i) select projects with co-benefits of contributing to technological innovation in the form of cost-curve declines ii) select carbon credits that have removal attributes with geological storage.

RECOMMENDED ACTION 3:

The Taskforce calls for the rapid development of new carbon credit methodologies, both for reduction climate technologies and for technology-based removals. As we move into phase two of the Taskforce, work can begin on what is needed.

RECOMMENDED ACTION 11:

The Taskforce asks corporates to consider buying carbon credits within their own value chain, to abate for their Scope 3 emissions. This may help promote early investment in the projects and technologies that are the most difficult to commercialize within their own value chain to scale down the cost curve, promoting a long-term reduction in that industry's Scope 3 emissions. For example, heavy-emitting industries – like oil & gas, aviation, and manufacturing – could establish effective partnerships that commit their voluntary carbon mitigation activities toward developing these challenging low carbon solutions.

Other ideas could include providing support to new technologies through the development of a central fund. The precise mechanisms to channel funding to breakthrough emerging technologies will be explored as part of the Governance Working Group during the next phase of the Taskforce's work.

## CORE CARBON PRINCIPLES AND ATTRIBUTE TAXONOMY

The success of scaling voluntary carbon markets rests on building a market with both high-integrity and sufficient liquidity. This can be achieved via a set of "Core Carbon Principles" (CCPs) and a taxonomy of additional attributes.

To enable contracts that assure buyers and the wider ecosystem that genuine emissions reductions are made with high environmental integrity, without any negative social or environmental side-effects, we believe that the market needs to align on a set of CCPs. These principles set out threshold quality criteria to which a carbon credit and the supporting standards and methodologies should adhere. This is a foundational step that would enable other recommended actions to work toward high-integrity market scaling and achieving Paris Agreement emissions goals.

Currently, liquidity in voluntary carbon markets is fragmented.[9] Projects have a range of attributes (project type or geography, for example) that can influence their value, and buyers have different attribute preferences. In today's market, matching each individual buyer with a corresponding supplier is a time-consuming and inefficient process, transacted over-the-counter.

Reference contracts can bundle suppliers' products and buyers' preferences to allow for significantly more efficient matching of buyers and suppliers. Buyers could benefit from a simplified buyer journey, increased price transparency and more effective price risk management. Suppliers benefit from improved access to financing and a clear price signal to inform their investment decisions as well as enable price risk management. The planet benefits due to increased climate action, financed by a scaled-up voluntary carbon market. The CCPs are a critical enabler, as they can serve as the basis for a core carbon reference contract. To accommodate buyers' diverse preferences, a few variations of the core reference contract that offer additional attributes should be made available. To enable these, a taxonomy of additional attributes has to be defined.

9. Fragmentation is due in part to low carbon prices, caused by a lack of demand over the last decade. The introduction and aggregation of new demand can drive prices above the cost of abatement.

RECOMMENDED ACTION 1:

## ESTABLISH CORE CARBON PRINCIPLES AND TAXONOMY OF ADDITIONAL ATTRIBUTES.

CCPs will set the threshold quality criteria for a verified ton of carbon (or carbon equivalent[10]) avoided/reduced or removed/sequestered. These quality thresholds will ensure CCP-aligned credits[11] adhere to the highest level of environmental and market integrity. The CCPs should be hosted and updated[12] by an independent third-party organization.[13] The organizational setup for this governance body is further discussed in the executive summary sidebar (Need for End-to-End Market Governance). Further work on establishing the CCP governance will be conducted in implementation (see Chapter 5 Roadmap for Implementation). This entity should define a taxonomy of additional attributes that can be used to classify all projects and credits. These additional attributes could include vintage,[14] project type (i.e., avoidance, reduction, nature-based removal, technology-based removal), co-benefits (e.g. impact on sustainable development goals (SDGs) or technology innovation), location, and inclusion of corresponding adjustments.[15] These attributes will allow buyers additional choices in contracts built based on them. In particular, some buyers may want to only buy CCP credits with removal attributes, as these credits may be necessary for certain types of claims in the future (e.g., net-zero). In the longer term it may therefore be considered whether a separate core contract for removals is needed. Initially, the Taskforce recommends keeping only one core contract to avoid splitting liquidity as the majority of projects are likely to remain avoidance/reduction in the short term.

10. If needed, the governance body ought to facilitate consensus on the conversion factor of other GHGs like methane in offsetting or corporate claims accounting.
11. The label "CCP credits" describes credits issued in accordance with a CCP-approved standard and methodology, and does not imply a new credit issuance process.
12. These updates will need to reflect decisions made on new types of offset projects/methodologies (e.g., forms of soil sequestration, technology-based removals) and updates to existing methodologies (e.g., size of buffers necessary for each project type).
13. Organizations selected to host and curate the CCPs will need to have a deep understanding of the sector, including buyer needs, track record in carbon methodology and project development, and how private finance can work to mitigate climate change. They will also need to be aware of parallel regulatory initiatives (e.g., EU taxonomy for sustainable activities) and manage relevant areas of alignment or coordination.
14. There are three key dates pertaining to each project that are relevant: project start, year of credit issuance, and year the actual emission reduction took place. In this report, when vintage is discussed, we generally refer to the last definition: the year the actual emission reduction took place.
15. Corresponding adjustments are described in further detail in Chapter 1.

RECOMMENDED ACTION 2:

## ASSESS ADHERENCE TO THE CORE CARBON PRINCIPLES.

There is a need for an independent third-party organization to assess standards and methodologies against the CCPs and the set of additional attributes.[16] While it is possible for this work to be conducted by the same body as the one who hosts the CCPs, the Taskforce recommends this task to be carried out by separate validation/verification bodies (VVBs) accredited by the International Accreditation Forum (IAF). The taxonomy would ideally be adopted by all relevant carbon-market standards entities, which should in turn clarify which of their methodologies have received certification for adhering to the CCPs and the additional attributes. While we recognize assessment at the methodology level would be significantly more burdensome than at the level of standards, it is key to addressing significant quality concerns from across the value chain. It will be critical to minimize the administrative burden to the degree possible without compromising integrity. Further work is needed to identify the right level of detail necessary for methodology assessments, balancing between the administrative burden and the need to ensure quality, and understand how the verification agencies will interact with the CCP governance.

RECOMMENDED ACTION 3:

## SCALE UP HIGH-INTEGRITY SUPPLY.

In line with the ambition of scaling the market with high-quality credits by more than 15-fold by 2030, supply of carbon credits will need to scale rapidly without sacrificing integrity or the underlying projects impact on local communities. This scale-up will need to come from both nature and technology projects. Although 8 to 12 GtCO2 per year of potential carbon credits have been identified by 2030, there are a number of significant mobilization challenges to bring this potential to market. Of this 8 to 12 GtCO2 per year, 65 to 85 percent comes from Natural Climate Solutions, in particular avoided deforestation and avoided peatland impact (3.6 GtCO2 per year). Scaling NCS requires efforts from both smaller-scale project developers and large multinational firms. Removals credits will need to come from emerging technology such as BECCS, DACCS, and others, as well as existing large multinational firms who are well placed to further industrialize these technologies.

To support small-scale suppliers, the Taskforce recommends a supplier/financer matching platform, where suppliers can upload proposed projects. The platform should ideally include a supplier risk registry allowing upload of previous project development history and credit score, and be subject to the same standards and controls that would apply to any other voluntary carbon market infrastructure. For negative emissions technology (e.g., DACCS, BECCS)

16. CORSIA demonstrates this is possible to achieve.

and other maturing climate technologies (e.g., green hydrogen, sustainable aviation fuel), the Taskforce encourages the development of new methodologies in a timely and robust manner. Across all supply categories, we emphasize the need for credits to come from projects that are validated and verified under approved CCP-aligned methodologies. All quality criteria need to be met and the guardrails discussed for different project types need to be in place. We also encourage the market to be forward looking and seek to maximize both short-term climate mitigation and long-term mitigation potential (e.g., through continued innovation[17]).

## CORE CARBON REFERENCE CONTRACTS

As mentioned above, one of the key issues in today's voluntary carbon markets is that there are no "liquid" reference contracts (e.g., spot and futures) with a daily, reliable price signal. This makes price risk management almost impossible and serves as an impediment to the growth of supplier financing. In order to concentrate liquidity and unlock the benefits that come with it, there is a need for core carbon reference contracts that can be traded on exchanges.

For buyers, the spot and futures markets can be complementary and fulfill different needs. A spot contract may fit a buyer who wants to year-by-year purchase the necessary quantity of carbon credits at market price to compensate for the current/prior year's emissions. The forward market, may in particular suit buyers who have a multi-year emissions outlook along with a clear offset trajectory, to manage future price risks.

After these reference contracts are developed, there will still be a significant number of parties that prefer and continue to make trades over-the-counter (OTC). These OTC contracts can also benefit from the reference contracts as they could use the price of the core carbon contract as a starting point and then negotiate pricing for additional attributes. This ensures that the relevance of the core carbon contract will further increase, while at the same time still allowing for OTC arrangements for those who desire them (e.g. for particular needs). Some OTC contracts in the future may continue to be fully bespoke. Contracts for difference could be negotiated for high cost projects using core carbon as a reference. For all OTC contracts, we note the need for standard contracts to enable more efficient trading on the primary market.

RECOMMENDED ACTION 4:

### INTRODUCE CORE CARBON SPOT AND FUTURES CONTRACTS.

Development and listing of a standardized spot and futures core carbon contract (based on the CCPs) with physical delivery (delivery of certificates) will allow development of a transparent, daily market price. Exchanges could also develop reference contracts which combine the core carbon contract with additional attributes that are separately priced (e.g., project type or location).[18] These futures contracts should have suitable maturities (e.g., one year), be cleared at clearinghouses, and potentially offer the

17. Industry partnerships to galvanize support around developing these challenging low-carbon solutions within their core value chain will be a critical enabler.

18. Listing a contract on exchanges would mean making use of existing financial market infrastructure for pooling liquidity, which can involve the additional benefits of a regulated trading environment (e.g., market surveillance of trading activity, mandatory anti–money laundering/know-your-customer checks of participants).

option to financially settle (no actual delivery of certificates), and be fungible across all markets/trading platforms. A core carbon contract should also be set up to allow more flexible purchase sizes for buyers, with different underlying projects amalgamated to deliver the size required. For this to take off, key buyers need to become active in these contracts.

The Taskforce encourages large buyers to purchase a share of their voluntary credits on exchange, through reference contracts, to encourage the development of liquidity.

RECOMMENDED ACTION 5:

## ESTABLISH AN ACTIVE SECONDARY MARKET.

An active secondary market allows investors, buyers and sellers to manage and hedge their risk exposures. In particular, these liquid markets will support longer-term financing for project developers and allow buyers to manage risks that arise from carbon reduction commitments. Market makers and risk takers should be involved in these markets to provide additional liquidity. It will be important to create access to the markets for participants who traditionally were not present in the financial markets and may have faced barriers navigating the complexity involved in onboarding to an exchange or clearinghouse (e.g., not have the capital to engage). Access could be improved through existing bank intermediaries, brokers/retailers, or via a specific carbon development bank. It will also be important to drive awareness among buyers and sellers about these access points.

RECOMMENDED ACTION 6:

## INCREASE TRANSPARENCY AND STANDARDIZATION IN OVER-THE-COUNTER (OTC) MARKETS.

OTC markets will continue to exist after the development of reference contracts, but will be tightly linked to them. OTC markets will benefit from the development of reference contracts. When negotiating OTC contracts, both parties can use the price of the liquid core carbon contract as well as the price signal for standardized additional attributes as a starting point. Approaches to other, non-standardized project attributes (e.g., unique combinations of project type, location, vintage, SDG-impact and other co-benefits, etc.) can then be negotiated.

It is recommended that master agreements be improved based on currently existing agreements, such as the International Swaps and Derivatives Association (ISDA) emissions trading annex (further detailed in recommendation 15). This would enable more efficient trading of credits, for both primary and secondary OTC markets. In addition, the OTC market would greatly benefit from increased transparency; one way to achieve this could be the entry of price reporting agencies such as Platts, OPIS[19], Argus, or Heren.

19. Platts and OPIS have launched daily price reports for a subset of voluntary carbon markets.

# INFRASTRUCTURE:
# TRADE, POST-TRADE, FINANCING, AND DATA

A core set of infrastructure components needs to be in place to make a market work. The components must work together in a way that is resilient, flexible, and able to handle large-scale trade volumes.

RECOMMENDED ACTION 7:

## BUILD OR UTILIZE EXISTING HIGH-VOLUME TRADE INFRASTRUCTURE.

Robust trade infrastructure is a vital precondition for the listing and high-volume trading of core carbon reference contracts (spot and futures), as well as contracts reflecting a limited set of additional attributes. Exchanges should provide access to market data, for example through APIs. They should also adhere to suitable cybersecurity standards. OTC infrastructure should continue to exist in parallel to exchange infrastructure, and OTC brokers are encouraged to provide increased transparency on market data.

RECOMMENDED ACTION 8:

## CREATE OR UTILIZE EXISTING RESILIENT POST-TRADE INFRASTRUCTURE.

Clearinghouses are needed to enable a futures market and provide counterparty default protection. They should offer access to relevant data (e.g., open interest), for example through APIs. Meta-registries should provide custodian-like services for buyers and suppliers and enable the creation of standardized issuance numbers for individual projects across existing registries (similar to the concept of International Securities Identification Number (ISINs) in capital markets). Meta-registries along with the underlying registries of the standards providers should apply suitable cybersecurity standards to prevent hacking.

RECOMMENDED ACTION 9:

## IMPLEMENT ADVANCED DATA INFRASTRUCTURE.

Sophisticated and timely data is essential for all environmental and capital markets. In particular, data providers should offer transparent reference and market data, which is not readily available today, due to limited registry data access and an OTC market with limited transparency. For example, the Taskforce encourages that statements detailing the retirement of credits, including the names of entities in which credits are retired, should be made public. Data providers should also collect and offer historical project and project developer performance and risk data to facilitate structured finance and the formulation of OTC contracts. New reporting and analytics services (spanning across registries) need to be developed for buyers and suppliers.

Implementation could be supported by meta-registries, which collect and structure all openly accessible reference data. A critical enabler is that all registries offer reference data through open APIs, including an offset product markup language (OpML) to ensure consistent data parameters. Furthermore, intermediaries (e.g., exchanges and clearinghouses) should include trading information in their existing data flows.

RECOMMENDED ACTION 10:

## CATALYZE STRUCTURED FINANCE.

Banks and other supply chain financiers should provide lending facilities for project developers (both capital expenditures and working capital) collateralized by the right to generate carbon credits, subject to successful validation and verification. In the medium to long term, a liquid spot and futures contracts market for carbon credits would provide a great foundation for structured finance offerings because it would provide clarity on pricing and facilitate risk transfer, improving the overall bankability of these projects. As per a standard structured finance approach, financing should be provided based on expected cashflows from offtake agreements. This is an important way of bridging the gap between immediate investment/capital needs and expected future cashflows. However, since futures contracts will not materialize in the short term, additional structured finance solutions are required to provide a comprehensive suite of solutions for developers. This is particularly relevant for developers of projects that are currently not bankable, due to a lack of credit history or previous project development experience.

The Taskforce recommends the following steps to catalyze financing:

- Develop data transparency on risk, including previous project/supplier performance.[20]
- Develop matching platforms for suppliers and financiers (see recommended action 3).
- Equip and train financiers across the ecosystem to rapidly assess execution risk.
- Provide recognition for banks that finance offset projects (e.g., develop "offset financier" label or extend existing labels).
- Encourage existing development banks and green investment banks to commit to increase lending facilities for suppliers, in particular for the smallest suppliers (over the long term, the Taskforce's aim is to create a market that can generate standalone funding for emissions reductions; use of public finance should only be a bridge solution).
- Uphold transparency and continued high standards on anti–money laundering/know-your-customer (AML/KYC).

20. This could be done by data providers in the market.

# CONSENSUS ON THE LEGITIMACY OF OFFSETTING

A key problem facing the development of voluntary carbon markets arises from the lack of a shared vision for, and understanding of, the role of offsetting in supporting the achievement of net-zero goals.

RECOMMENDED ACTION 11:

## ESTABLISH PRINCIPLES ON THE USE OF OFFSETS.

Establishing principles on the use of offsets can help ensure that offsetting does not in any way disincentivize companies' internal climate change mitigation efforts to reduce Scope 1, 2 and 3 emissions. The Taskforce recommends two sets of principles for companies. The first, Principles for Net-Zero Aligned Corporate Claims and Use of Offsets, sets out guidelines on the use of offsets for corporate buyers. These are:

- **REDUCE:** Companies should publicly disclose commitments, detailed transition plans, and annual progress against these plans to decarbonize operations and value chains in line with science to limit warming to 1.5 degrees Celsius as per the Paris Agreement, using best available data, and prioritize fully implementing these commitments and plans.[21] This includes making public (or subjecting to external audit) the basis on which claims are made.
- **REPORT:** They should measure and report Scope 1, Scope 2, and, wherever possible, Scope 3 greenhouse gas emissions[22] on an annual basis using accepted third-party standards for corporate greenhouse gas accounting and reporting.
- **OFFSET:** Companies are strongly encouraged to compensate a share of unabated emissions annually during the transition to net-zero through the purchase and retirement of carbon credits generated under credible third-party standards.[23] However, offsets do not replace the need to reduce value chain emissions in line with science.[24]

The second, Principles for Credible Use of Offsets in Products or at Point of Sale, sets out high-level principles for the design of offset product or point-of-sale (POS) offerings to customers. Details are found in Chapter 4. We recommend that these principles should be further developed, hosted, and curated by an independent body. An independent High Ambition Demand Accelerator for the Voluntary Carbon Market (HADA-VCM)[25] will take on this role.

21. To be refined to include guidance on who may make the determination of "best available climate science" and guidance on grace periods as corporates adapt to changes.
22. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain.
23. Corporates do not have to commit to offsetting all emissions as long as offsets are part of a credible transition plan to net-zero; these can be avoidance/reduction or removal/sequestration offsets.
24. SBTi
25. Working title

RECOMMENDED ACTION 12:

## ALIGN GUIDANCE ON OFFSETTING IN CORPORATE CLAIMS.

Alignment will need to be reached regarding the use of offsetting in corporate claims across ongoing initiatives. These initiatives include HADA-VCM and the Science Based Targets Initiative's (SBTi) process, among others, to define the role of offsetting in supporting net-zero claims (in particular, see approach as set out by SBTi's strategy 5[26]) as well as efforts by investors, via organizations such as Climate Action 100+ and the Net-Zero Asset Owner Alliance (NZAOA), to offer guidance to corporates on climate action. Furthermore, the Taskforce calls for the alignment of carbon accounting and corporate claims standards (other ongoing efforts are described in Chapter 4).

# MARKET INTEGRITY ASSURANCE

Integrity of voluntary carbon markets should be further improved. Today the market lacks a strong governance body to decide on participant eligibility, strengthen validation and verification processes,[27] and combat fraud or money laundering. As an example, the highly fragmented nature of supply creates potential for errors as well as for fraud (e.g., potential conflicts of interest between the auditor and the project developer, issues in baseline modeling, double counting under multiple standards). There is also potential for money laundering, in particular due to lack of price transparency and regulatory oversight. And finally, there may be duplication in AML/KYC efforts, as various market participants independently screen complex counterparties. To promote market integrity, the Taskforce recommends three actions.

26. See SBTi's paper "Foundations for science-based net-zero target setting in the corporate sector"
27. Many of these instances are associated with historic accreditation processes. In particular, we note anecdotal evidence of cases where the verifiers allegedly did not have competence and/or resources to fully conduct the validation or verification, and cases where conflicts of interest were not managed between the developer and the auditors.

RECOMMENDED ACTION 13:

## INSTITUTE EFFICIENT AND ACCELERATED VERIFICATION.

The Taskforce encourages continued development toward a digitized project cycle, where appropriate, with the aim to reduce lead times and costs and improve integrity. As a first step the Taskforce recommends the development of a shared digital data protocol across standards. This data protocol should be tailored to specific project types by defining necessary project data fields and procedures to protect the integrity of the verification process. Furthermore, technology is rapidly evolving. The Taskforce recommends that the shared digital data protocol explore the use of satellite imaging, digital sensors, and distributed-ledger technologies (DLT), to further improve speed, accuracy, and integrity. Implementation of the digital data protocol could be a first step toward broader end-to-end life-cycle and value-chain tracking of all carbon credit data. The Taskforce acknowledges that monitoring, reporting, and verification (MRV) involves a global community of assurance providers with overlaps between the compliance and voluntary markets. The verification process should be consistent across both markets.

RECOMMENDED ACTION 14:

## DEVELOP AML/KYC GUIDELINES.

Anti–money laundering and know-your-customer guidelines consistent with existing regulations in trading and banking should be developed. This is especially important where regulation does not currently exist. The work needed goes beyond the scope of the Taskforce. This would include AML/KYC guidelines for specific groups of market participants (e.g., suppliers, buyers, and intermediaries) as well as guidelines for which market participants are responsible for the AML/KYC screening. A governance body would need to host these, and ensure they are coordinated with other existing regulatory regimes at the international level (e.g., the Financial Action Task Force (FATF)).

RECOMMENDED ACTION 15:

## ESTABLISH LEGAL AND ACCOUNTING FRAMEWORKS.

A number of legal and accounting enablers will support the legitimacy and efficacy of voluntary carbon markets. The Taskforce notes a number of ongoing efforts to address voluntary carbon markets' legal and accounting needs, but they are relatively nascent and can benefit from increased coordination and support. These needs include standardized contracts, financial accounting methods, and carbon credit disclosure/accounting. To have robust exchange and OTC trades, standardized documentation for primary and secondary markets are needed. Securitization-like contracts are also necessary to provide an effective vehicle for bundling credits sold. Any documentation should be underpinned by appropriate legal opinions. Regarding

financial accounting, credits purchased in the voluntary markets are currently lacking clear guidance on how to treat them (e.g., as an asset or expense). The Taskforce encourages further clarity from international accounting agencies (e.g., International Financial Reporting Standard (IFRS) or Generally Accepted Accounting Principles (GAAP)). Finally, reporting/disclosure associated with the use of offsets is an important enabler to demand signaling and market legitimacy. Finally, reporting/disclosure associated with the use of offsets is an important enabler to demand signaling and market legitimacy. Companies should report direct emissions and offset purchases separately with as much transparency on project types as possible. The Taskforce encourages clarity from organizations such as the Greenhouse Gas Protocol on how removals credits may or may not be counted against a company's footprint (Scope 1, 2, and 3). The Taskforce recognizes that appropriate governance is required to host and curate standard contracts, financial accounting guidance and carbon accounting guidance (see sidebar, "Need for End-to-End Governance").

RECOMMENDED ACTION 16:

## INSTITUTE GOVERNANCE FOR MARKET PARTICIPANTS AND MARKET FUNCTIONING.

In order to ensure the integrity and functioning of the market, strong governance is required across three dimensions: i) participant eligibility, ii) participant oversight, and iii) market functioning. First, participant eligibility may include setting the principles that buyers, suppliers, and intermediaries must adhere to in order to participate in voluntary carbon markets. Second, on participant oversight, the Taskforce recommends minimizing conflicts of interest in the MRV process and providing accreditation, audit, and spot checks for the conduct of the VVBs.[28] Finally, the third dimension concerns overseeing market functioning. This may include developing principles to prevent fraud across the value chain, including ensuring good AML practices per recommended action 14. It would also include establishing, hosting, and curating principles for the use of offsetting set out in recommended action 11 and any consideration on how long buyers/investors can hold onto carbon credits (see sidebar, "Need for End-to-End Governance").

28. An existing system for accreditation already exists with national accreditation bodies (ABs) accrediting VVBs to ISO 14065. This process is reinforced by a system of peer assessment undertaken by ABs to evaluate the effectiveness of other ABs acting within their geographic regions. The International Accreditation Forum (IAF) exists to provide guidance on the application of ISO standards used in accreditation. This process may be sufficient in its current form or may require further evaluation.

## NEED FOR END-TO-END MARKET GOVERNANCE

Comprehensive governance is critical to ensure high integrity across the voluntary carbon market value chain. The taskforce considers that governance structures will be needed in three key areas: i) overseeing the hosting, curation and assessment of the CCPs, ii) the market principles, iii) legal and accounting rules. Underlying these three key governance needs, there are a range of more detailed governance considerations across the value chain (Exhibit 4). Specific examples of governance needs have been outlined in recommended actions 1, 2, 14, and 16.

To ensure comprehensive governance, the Taskforce recommends that a blend of existing and newly established governance bodies interact. For needs such as accreditation of validation and verification bodies, the IAF provides a ready model for oversight. For marketplaces and financial instruments, there are local regulators such as the CFTC; IFRS and GAAP are international standards for financial accounting. However, some needs are not covered today, such as the hosting and curating of CCPs. The Taskforce recognizes that further work is needed to map out the governance needs, setting out roles and responsibilities and the governance architecture needed to minimize conflicts of interest. In order to provide clarification in this complex governance landscape, the Taskforce recommends that the implementation road map include a specific deliverable undertaking this further work. This could include the development of an umbrella governance body which could also carry out required governance needs (e.g., hosting and curating the CCPs).

New governance bodies will need substantial expertise and resourcing, and further work is needed to set out financing models for these functions. Appropriate governance around the process for the identification, appointment, and monitoring of various parties to take on the roles identified is necessary. Across these governance bodies, care should be taken to ensure basic due process/procedural fairness requirements. These elements include independence, freedom from bias and conflicts of interest, and the rights for proponents to be heard, make submissions, receive notice of pending decisions that affect them, get written reasons for decisions, and have a limited right of challenge for the most serious decisions. Great care should be taken to consider diversity and balanced representation in the body's ranks, especially in relation to representation of the Global South, where many projects are hosted, and whose views should be central to these discussions. Finally, given the global nature of voluntary carbon markets, it will be important for international regulators and governance bodies to communicate and coordinate to promote safe and transparent markets across jurisdictions.

Chapter 5 on the implementation road map goes into further detail on a potential path forward for defining future governance bodies.

EXHIBIT 4: GOVERNANCE BODIES

| Governance roles | | | Supply: Project design & development | Supply: Validation | Supply: Verification/ issuance | Market intermediaries: Supply side financing | Market intermediaries: Trading (pricing, execution) | Market intermediaries: Risk manage-ment | Market intermediaries: Settlement & retirement | Market intermediaries: Market & reference data | Demand: Voluntary |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Umbrella oversight | CCPs: Core carbon principles | CCPs and definition of additional attributes | Establish, host, and curate the Core Carbon Principles and additional attributes<br>Develop guidance for any required guardrails or exclusions of project types | | | | | | | | |
| | | Adherence to CCPs | | Assess validity of methodologies against the CCPs | | | | | | | |
| | Market integrity principles | Participant eligibility | Set principles for what suppliers, market intermediaries, and buyers must adhere to in order to participate in voluntary carbon markets | | | | | | | | |
| | | Participant oversight | Set guidelines on supply commitments (i.e. template for suppliers' pledge) | Provide accreditation, guidance, and oversight over the VVBs (incl. spot checks)<br>Increase VVB capacity if needed | | Establish principles for commodity trading regulation (e.g. derivatives / futures regulation), combatting money laundering, fraudulent transactions and excessive speculation | | | | Meta-registry oversight body | Set guidelines on buyer commitments (i.e. template for buyers' pledge)<br>Provide guidance on offsetting in corporate claims |
| | | Market functioning | Develop mechanisms against supply-side fraud (e.g. double counting, misrepresent-tation)<br>Develop necessary principles for an accelerated and digital MRV project cycle | | | | | | | | Establish, host, and curate the use of offsets principles |
| | Legal and accounting rules | Legal | Host / refine standardized contracts for OTC and exchanges and for securitization (with appropriate legal underpinnings) | | | | | | | | |
| | | Accounting | Provide financial accounting guidance for offsets<br>Provide carbon accounting guidance relevant to offsetting | | | | | | | | |

# DEMAND SIGNALS

The Taskforce believes that a clear demand signal could be one of the most important factors for market scaling, as it would provide the impetus to drive the development of liquid markets and scaled-up supply. To that end, the Taskforce proposes the following recommendations.

RECOMMENDED ACTION 17:

## OFFER CONSISTENT INVESTOR GUIDANCE ON OFFSETTING.

Aligned investor guidance on the role of voluntary offsetting can be a powerful lever to help grow demand. The Taskforce recommends that investor alliances, such as the Institutional Investors Group on Climate Change (IIGCC), Climate Action 100+, and the Net-Zero Asset Owner Alliance, acknowledge that while emissions reduction remains the priority for corporates, offsetting plays a limited but vital role in achieving the Paris Agreement ambition. This could be enacted by developing clear guidance to corporates, including on the appropriate use of offsetting, consistent with the principles laid out by the Taskforce.

RECOMMENDED ACTION 18:

## ENHANCE CREDIBILITY AND CONSUMER AWARENESS FOR CONSUMER OFFERINGS, INCLUDING POINT-OF-SALE (POS) SOLUTIONS.

Implementing consumer solutions across sectors could rapidly scale demand for voluntary credits. This includes both B2C and B2B sales (e.g., carbon-neutral milk for B2C, and carbon-neutral LNG cargo for B2B). The Taskforce recommends implementing the CCPs for consumer products. This would improve legitimacy and consistency of

claims. To enhance credibility and consumer awareness for these offerings, improvements in quality, credibility, transparency, and consumer education are required. The Taskforce recommends requiring clear and consistent carbon claims, using clear carbon labeling, and expanding existing POS offerings. Existing POS carbon credit offerings (e.g., purchase of an offset airline ticket) could be enhanced through the use of digital technology, for example enabling carbon credit registries to interface with software that would allow microtransactions involving voluntary credits. It will be essential to support efforts to increase carbon literacy of all consumers.

RECOMMENDED ACTION 19:

## INCREASE INDUSTRY COLLABORATION AND COMMITMENTS.

Identifying and supporting priority sectors where industry-wide collaboration, through consortia, commitments and/or industry-wide POS programs, could support the growth of offset demand. The need is likely to be greatest among hard-to-abate industries such as oil & gas, steel, and cement; companies should lead the way by setting ambitious goals ahead of regulation, given the immediate need for change.

RECOMMENDED ACTION 20:

## CREATE MECHANISMS FOR DEMAND SIGNALING.

Establishing effective ways for end buyers to signal future demand would improve market transparency and facilitate scaling of credit supply. The Taskforce encourages companies to send long-term demand signals (via, for example, long-term offtake agreements or reduction commitments). Companies could create more transparency on "intermediate demand" for the interim period prior to reaching net-zero and the likely demand when they reach their target date, for example through a buyer commitment registry, which could either be hosted by a standard setter (e.g., SBTi or CDP) or a data provider.

# ROADMAP FOR IMPLEMENTATION

Going forward, the Taskforce will continue its work to scale an effective and efficient voluntary carbon market to help meet the goals of the Paris Agreement. The Taskforce has developed a Roadmap for Implementation, laying out eight areas of work building on the recommended actions (Exhibit 5). These areas of work are:

A. STAKEHOLDER ENGAGEMENT
B. GOVERNANCE
C. LEGAL & ACCOUNTING PRINCIPLES
D. CREDIT LEVEL INTEGRITY
E. PARTICIPANT LEVEL INTEGRITY
F. DEMAND & SUPPLY COMMITMENT ENGINE
G. TRADED VOLUME & MARKET INFRASTRUCTURE
H. CORRESPONDING ADJUSTMENTS

EXHIBIT 5: AREAS OF WORK FOR 2021

| Areas of work | Blueprint recommended actions |
|---|---|
| A Stakeholder engagement | *Cross-cutting across all recommended actions* |
| B Governance | 2 Assess adherence to the core carbon principles; 16 Institute governance for market participants and market functioning; 13 Implement efficient and accelerated verification; 14 Develop global anti-money-laundering (AML) / know-your-customer (KYC) guidelines |
| C Legal principles & contracts | 4 Introduce core carbon spot and futures contracts; 15 Establish legal and accounting frameworks |
| D Credit level integrity | 1 Establish core carbon principles and taxonomy of additional attributes |
| E Participant level integrity | 11 Align guidance on offsetting in corporate claims; 12 Establish principles on the use of offsets |
| F Demand & supply engines | 3 Scale up high-integrity supply; 17 Offer consistent investor guidance on offsetting; 18 Enhance credibility and consumer awareness for consumer product offerings, incl. Point-of-Sale (POS) solutions; 19 Increase industry collab-oration and commitments; 20 Create mechanisms for demand signaling |
| G Traded volume & market infrastructure | 5 Establish an active secondary market; 6 Increase transparency and standardization in over-the-counter (OTC) markets; 7 Build or utilize existing high-volume trade infrastructure; 8 Create or utilize existing resilient post-trade infrastructure; 9 Implement advanced data infrastructure; 10 Catalyze structured finance |
| H Corresponding Adjustments | *Not in scope of blueprint* |

In the coming months, the Taskforce will focus on the first areas of work (A through D) by establishing a series of Working Groups. Areas of work E through I will be driven by other independent efforts (see chapter 5 for further detail).

We look forward to engaging with a broad range of public and private stakeholders to catalyze further momentum, and convert Blueprint to action, to help voluntary carbon markets scale in support of net-zero goals.

# THE CRUCIAL IMPORTANCE OF CARBON MARKETS

Meeting the long-term temperature goal of the Paris Agreement of limiting warming to 1.5°C will require a global decarbonization of all aspects of the economy.[29] In 2018, the Intergovernmental Panel on Climate Change (IPCC) clarified that achieving a 1.5°C goal will require an approximately 50 percent reduction of emissions by 2030 (-23 gigatons of carbon-dioxide [GtCO2])[30], leading to achievement of net-zero emissions by 2050, when emissions are balanced by removal of carbon dioxide from the atmosphere.[31] This Taskforce is aligned behind the ambition of achieving that 1.5°C goal.

As organizations in every sector decarbonize their operations and value chains, some will find that emissions from certain sources can only be eliminated at a prohibitive expense with existing technologies, and that emissions from other sources cannot be eliminated at all. Carbon credits, purchased voluntarily, enable organizations to compensate for these residual emissions by financing the reduction of emissions from other sources, or the removal of greenhouse gases from the atmosphere.[32] In certain sectors, some firms are seeking to not only reduce current emissions, but also compensate for past contributions to climate change. In this broad context, voluntary carbon markets, where carbon credits can be traded, are set to play an increasingly significant role in ambitious strategies, including net-zero targets, through both the removal/sequestration and the avoidance or reduction of emissions. This is alongside the role of compliance carbon markets in achieving net-zero.

Recognizing the importance of voluntary carbon markets in achieving net-zero carbon emissions, the Institute of International Finance has established a Taskforce on Scaling Voluntary Carbon Markets, with a mandate of creating a blueprint for voluntary carbon markets that could meet much greater demand for carbon credits.

This chapter provides a closer look at the need for carbon credits and at the Taskforce's effort to build consensus on how to scale up voluntary markets and define solutions to the challenges they now face.

29. The Paris Agreement, unlike the Kyoto Protocol, effectively covers most greenhouse gas emissions and makes them the responsibility of national governments. *Paris Agreement*, United Nations Framework Convention on Climate Change, Dec. 12, 2015, unfccc.int.

30. Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments, Intergovernmental Panel on Climate Change, Oct. 8, 2018, ipcc.ch.

31. We recognize that there is uncertainty due to climate sensitivity and modeling assumptions; however, any further commentary is out of the scope of this report. We base our case on the IPCC guidance on the 1.5-degree Celsius pathway.

32. As countries move toward legislated net-zero targets and these targets are enforced by governments, any company in a hard-to-abate sector with residual emissions reductions may also need to demonstrate on a compliance basis that they are either (i) reducing those emission to zero; or (ii) offsetting them. If they are offsetting them, these offsets may no longer be purely "voluntary" as the company may start to face legal obligations to report on their use of carbon credits.

Should current emissions trends continue, global average temperatures would likely rise 3.5°C above preindustrial levels by 2100.[33] A temperature rise of this magnitude will push critical natural carbon sinks (including permafrost, or the Amazon rainforest) beyond dangerous tipping points, initiating harmful feedback loops in the climate system (such as ice loss, rapid release of methane, and changes in ocean circulation). This will amplify the impacts of anthropogenic emissions releases. Physical impacts such as fires, flooding, and storms, will continue to increase in frequency and intensity, leading to vast ecosystem and human impacts. From a socioeconomic perspective, five systems are directly affected by climate change: livability and workability, food, physical assets, infrastructure, and natural capital.[34] Billions of lives are affected, with significant knock-on effects for financial markets and the economy.

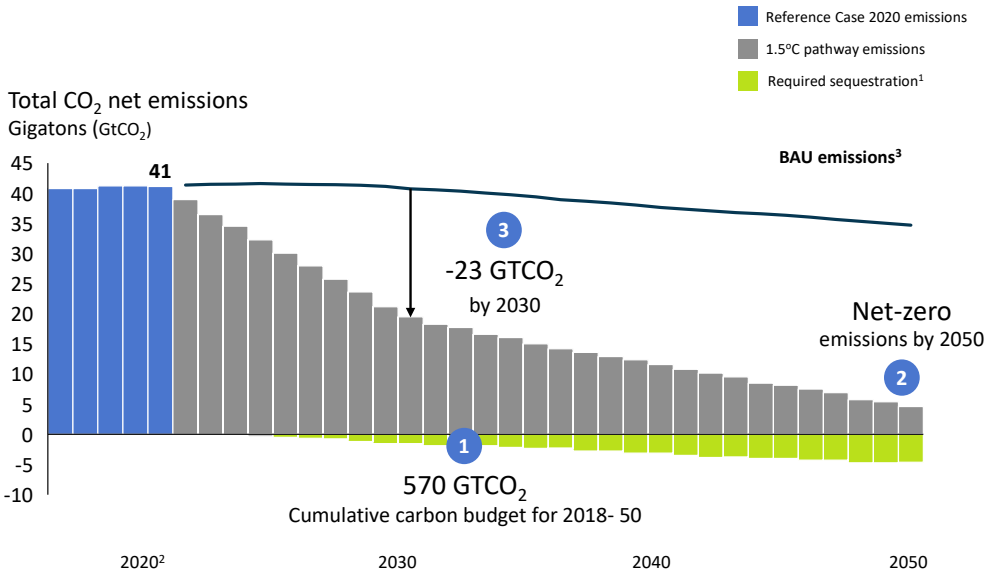
The impacts of climate change are already being felt, and are set to worsen. Averting the worst of potential climate futures requires a global effort to limit global warming to 1.5°C. As noted above, achieving the 2050 net-zero pathway necessary for the 1.5°C goal requires deep, rapid reductions, beginning now, across all sectors of the economy.

However, there are material limits to the decarbonization of economic and industrial processes which the world is likely to continue to rely on, not least to deliver other mitigation and adaptation measures. For example, making cement traditionally involves a chemical process, calcination, that accounts for most of the cement industry's carbon emissions. While there are emerging "green" cement technologies that may produce low emissions or negative emissions cement, the technology is unlikely to achieve necessary scale in the short-term. Therefore, to achieve net-zero, residual emissions will have to be neutralized by the removal of carbon dioxide from the atmosphere, using so-called negative emissions technologies such as bio-energy with carbon capture and storage (BECCS), direct air capture with carbon storage (DACCS), as well as the use of natural climate solutions (NCS) such as reforestation (Exhibit 6).

33. The IPCC's Representative Concentration Pathways (RCP) scenario 8.5 notes that the mean warming increase is 3.7°C, with the likely range being 2.6° to 4.8°.

34. Jonathan Woetzel, Dickon Pinner, Hamid Samandari, Hauke Engel, Mekala Krishnan, Brodie Boland, and Carter Powis, Climate risk and response: Physical hazards and socioeconomic impacts, McKinsey Global Institute, Jan. 16, 2020, McKinsey.com.

## EXHIBIT 6: 1.5°C PATHWAY EMISSIONS




1. In order to reach the **1.5°C** goal we must remain within the **570 $GTCO_2$ carbon budget**
2. By 2050 **all remaining emissions need to be fully offset** by sequestration (net zero)
3. To set us on this path we must reduce net emissions by **23 $GTCO_2$ by 2030**

1. 570GT of cumulative CO2 emissions from 2018 for a 66% chance of a 1.5°C increase in global mean surface temperature (GMST)
2. While emissions fell by a quarter at the peak of COVID-related lock-down, daily emission have rebounded to be only 5% lower than 2019 levels. Scenarios to 2050 still remain the same. From Nature: Current and future global climate impacts resulting from COVID-19
3. Business-as-usual emissions

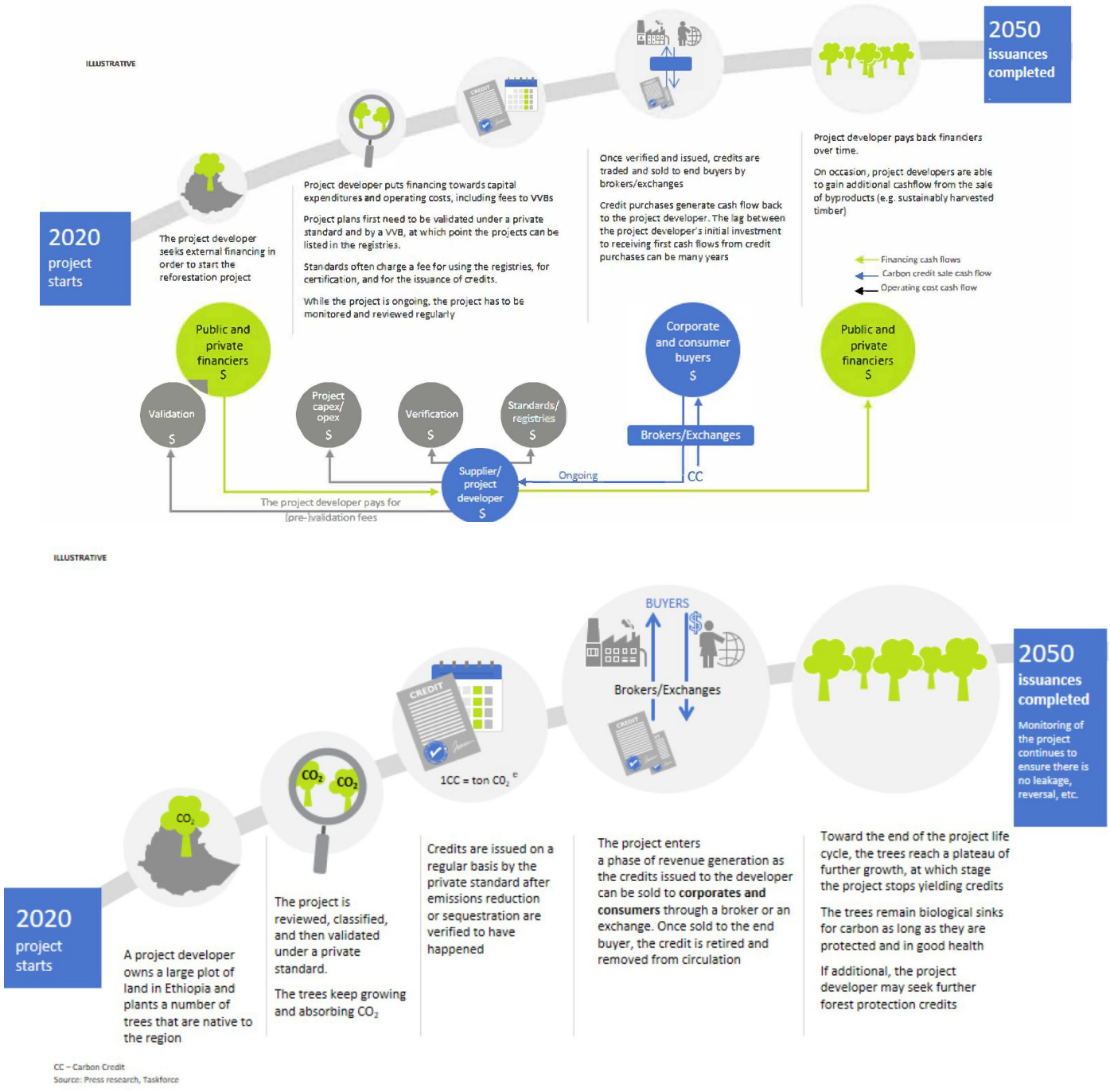
Source: McKinsey 1.5oC Scenario Analysis; IPCC; Le Quéré et al. 2018

Robust and efficient voluntary carbon markets can enable private sector actors to take ambitious steps toward compensating for their contribution to climate risk through the purchase and retirement of carbon credits as offsets. A carbon credit is a verifiable quantity of climate mitigation for which the buyer can claim an offset as a result of financing either:

Reduction or avoidance of carbon emissions, by funding the implementation of technologies or practices that avert potential future carbon emissions when they otherwise would not have taken place (e.g., implementation of renewable energy projects instead of fossil-fuel energy, energy efficiency, clean cookstoves, capture and destruction of industrial greenhouse gases (GHGs), and emissions reductions from reduced deforestation; or

Removal or sequestration (storage) of carbon dioxide from the atmosphere, by funding the implementation of negative-emissions technologies and the use of specific NCS (e.g., afforestation or blue carbon). In this report, we generally follow the convention of using "carbon credit" to describe the verified GHG emissions reduction or removals generated, traded, and retired and "offset" to describe the act of financing other climate mitigation actions to compensate or neutralize for one's own footprint.

## EXHIBIT 7: ILLUSTRATIVE LIFECYCLE OF A CARBON CREDIT AND CORRESPONDING PROJECT CASH FLOW







CC – Carbon Credit
Source: Press research, Taskforce

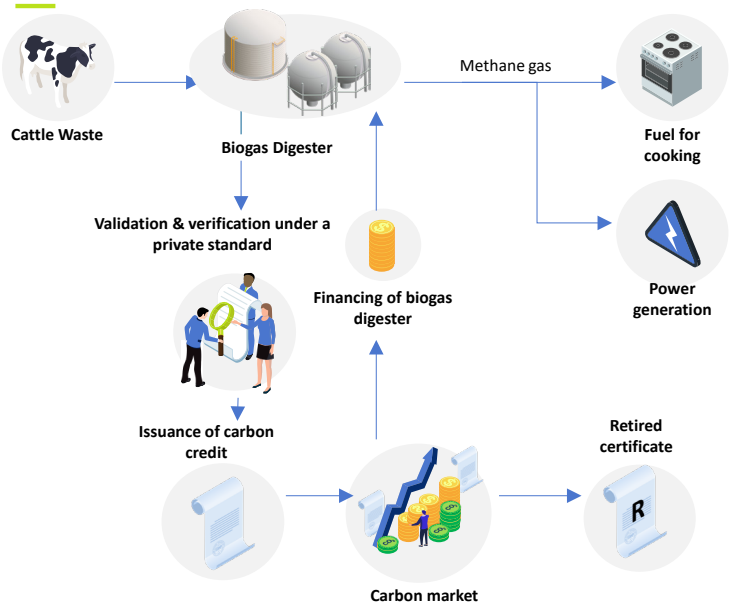
# EXHIBIT 8: SAMPLE PROJECTS

## Project context

A biogas digester can collect waste to produce methane gas used for cooking or power generation

However, the high capex and the technical complexity associated with biogas digesters can make it prohibitive for farmers to install them on their farms. Carbon credits can help finance the project

## Illustrative project setup




## Potential co-benefits

- Production of organic fertilizer to enhance crop production
- Local employment and job training for project construction and maintenance
- Reduced waste odors with reduced cases of acute lower respiratory infection
- Decreases reliance on wood for fuel
- Improved quality of life for farmers impacted, incl. redistribution of household labor

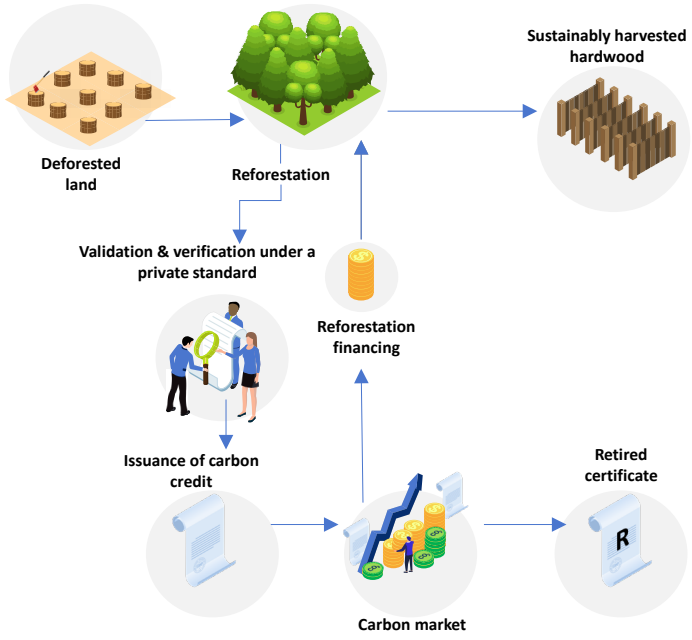
## Project context

The deforested land was previously used for cattle ranching

The remoteness of deforested land, lack of investment and a lack of know-how prevented reforestation activities

The project developer identified this opportunity for reforestation after the previous owner put the land up for sale

The project developer made sure to plant native species to do no harm to the ecological system in place




## Potential co-benefits

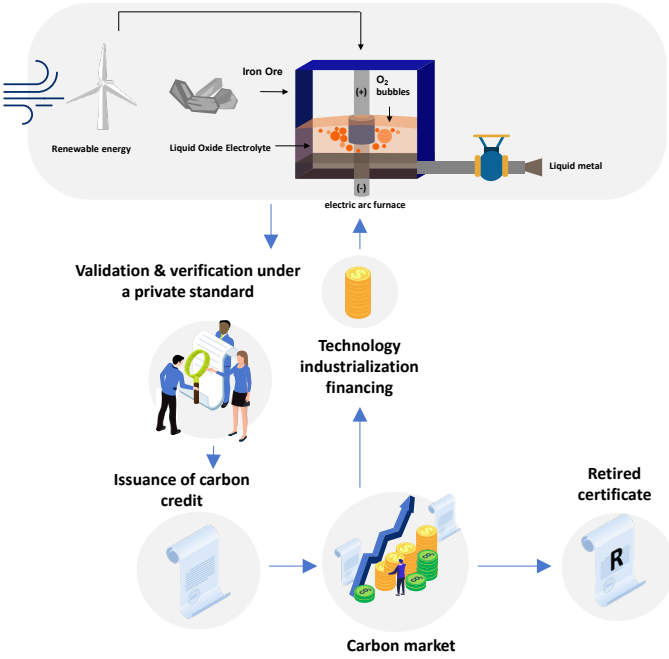
- Better synergy between natural resources in the area (e.g., water retention, soil health)
- Ecosystem corridors for wildlife
- Poverty alleviation and local job creation
- Capability building on the importance of sustainable activities

## Project context

For steel, the current industrial standard, using a basic oxygen furnace, is carbon intensive due to the nature of the reaction between iron oxide and carbon (in the form of coke), which produces CO2 as a by-product

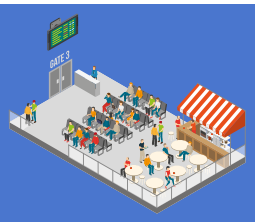
Using low carbon hydrogen instead of natural gas can reduce the energy intensity of making direct reduced iron, as water rather than CO2 will be the by-product. Another path forward, to potentially even lower emissions, could be to use an "electric arc furnace" running on fully renewable electricity

Voluntary carbon market methodologies for green steel projects are still to be developed




## Potential co-benefits

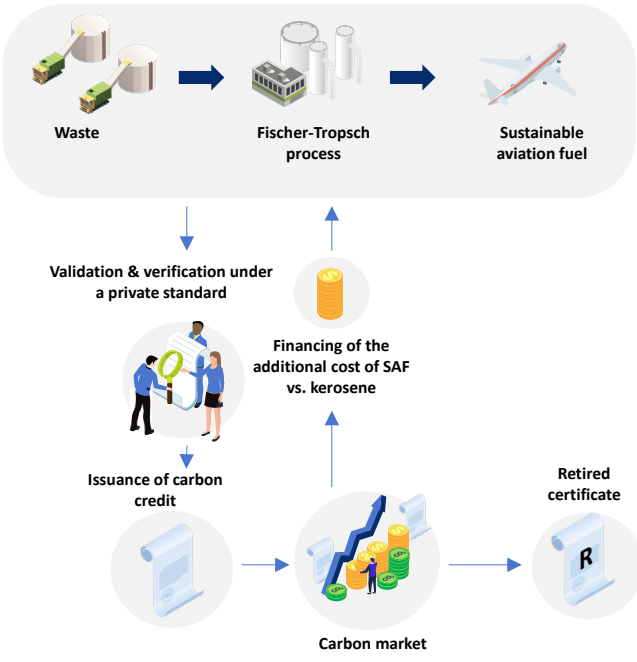
- Commercial industrialization of these new techniques is expected to take over a decade
- To accelerate the process, voluntary carbon markets can play a role, by making the investments in these technologies viable for more firms, and reducing the time until the technology is commercially viable without offsets or subsidies, replicating the journey of photovoltaic solar
- Buyers whose value chains are tied to steel production – including manufacturers, the auto industry, and companies who build and own office space – could support projects that help create early markets for green steel, leading to its eventual cost competitive use in the value chain

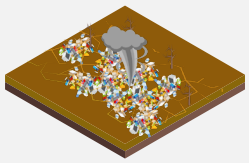


## Project context

Aviation currently accounts for 2-3% of GHG emissions, but some projections indicate it could be up to ~25% by 2050. Electrification of aviation is challenging for many applications, due to the weight of batteries and the difficulty of recharging them mid-flight. Thus Sustainable aviation fuel (SAF) will likely be the key to reducing emissions. SAF is commercially available today, but it is two-to-three times more expensive than the kerosene used to fuel most flights. This 'green premium' on SAF is a major barrier to getting the technology to scale

Voluntary carbon market methodologies for SAF projects are still to be developed



## Potential co-benefits

- Uses waste that may otherwise have ended-up in landfills, slowly emitting polluting gases
- Funds obtained could also go to research and development of new ways to produce low carbon aviation fuel
- Lessons learned may also contribute to sustainable fuel development for other industries such as marine
- Buyers whose value chains are tied to aviation emissions-including airlines and companies with large business travel footprints – could support projects that help create early markets for SAF, leading to its eventual cost competitive use in the value chain

# A BLUEPRINT FOR SCALING VOLUNTARY CARBON MARKETS:

## THE WORK OF THE TASKFORCE

The pressing need for a step change in the generation and trading of high-quality and robust carbon credits inspired the Institute of International Finance to establish a private sector Taskforce, bringing together experts from across the voluntary carbon markets supply chain. The Taskforce will aid the development of a scalable, liquid, transparent, high-integrity, and reliable voluntary carbon market and is chartered to draw on best practices to date and lessons learned from all existing carbon markets. Exhibit 9 shows the structure of the Taskforce, building on the approach used for the Task Force on Climate-related Financial Disclosures (TCFD).

EXHIBIT 9: TASKFORCE STRUCTURE

**Sponsor organization**

Timothy Adams, CEO, Institute of International Finance (IIF)

**Taskforce**

| Chair | Operating Lead | Members | Observers | Donors |
|---|---|---|---|---|
| Bill Winters, CEO, Standard Chartered | Annette Nazareth, Partner, DavisPolk; former SEC Comm-issioner | ~50 subject matter experts across the carbon market value chain (eg, buyers, suppliers, financial intermediaries) | World Economic Forum, ICC, IETA | Philanthropic foundations dedicated to making a positive difference by contributing to initiatives that help the world reach net zero |

**Consultation Group: Companies, NGOs & development banks**

~120 subject matter experts from companies or institutions with large emissions, significant supply or key expertise

**Consultation: IIF member orgs**

IIF member firms including banks, asset managers, and other financial services providers

**Operating team**

IIF, Standard Chartered, Private Finance Hub (observer), McKinsey & Company

## MANDATE

The Taskforce on Scaling Voluntary Carbon Markets has a mandate to harness the expertise in the private sector to develop a blueprint for a voluntary carbon market which:

- connects carbon credit supply to demand in a seamless, cost-effective, and transparent way,
- instills confidence and ensures credibility in carbon credits being exchanged/transacted, and
- is scalable to meet the expected increase in demand as more companies commit to achieving the 1.5°C ambition set out by the Paris Agreement.

Now is the moment to establish the infrastructure for effective carbon markets. New rules are expected to be agreed by the Twenty-Six Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow in late 2021. There, parties are due to submit plans with increased ambition for national emissions reductions, and to agree on international accounting and transfer rules for mitigation outcomes under Article 6 of the Paris Agreement. One of the last components of the "Paris rulebook," these rules will determine how emissions reductions achieved in one country and transferred to another will be captured in each country's emissions balance to prevent the same emission reduction from being counted toward more than one Nationally Determined Contribution. These are known as the Article 6 negotiations (see sidebar, "Addressing the Challenges of Corresponding Adjustments"), and these rules will influence companies' use of carbon credits.

In line with the scope of its mandate, the Taskforce chose not to take up the issue of the appropriate and specific role of offsetting in the context of sector-by-sector decarbonization strategies in this phase of work. Companies in "harder-to-abate" sectors, in which technological constraints limit their ability to decarbonize operations and supply-chains, might offset to achieve greater emissions reductions than they might otherwise. Various other initiatives, involving climate scientists and business experts, are working to clarify the proper role of offsetting in decarbonization strategies (see discussion calling for alignment and future work in Chapter 4, recommended action 12). The Taskforce defers to those experts on how companies can best achieve emissions reductions. We also recognize the development of attribute-based markets (e.g., EACs, RINs, and potentially credits for green hydrogen, sustainable aviation fuels, green cement, etc. in the future), but these have not been specifically covered by this report. However, it is our belief that many of the recommendations made here equally apply to adjacent markets. Where relevant these have been called out in the report.

Similarly, the Taskforce has not provided recommendations on policy issues that could affect demand for and supply of carbon credits, or the functioning of regulated compliance markets (e.g., emissions-trading schemes). For the current market, the Taskforce acknowledges that the carbon market is in a period of transition from a regulatory perspective, especially in relation to the Article 6 negotiations. There are other regulatory interlinkages to the voluntary carbon market—everything from land use and property laws to regional carbon pricing or compliance schemes. Changes in these myriad rules will impact the scaling of the voluntary carbon markets.

For example, airlines will begin to implement the voluntary pilot phase of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), increasing carbon credit demand. California's emissions-trading scheme will lower the volume of carbon credits that companies can purchase to comply with regulations, capped at 4 to 6 percent of emissions covered by compliance credits between 2021 and 2030. We acknowledge the permitted use of credits from independent standards in compliance markets drives a portion of demand for these credits.

Where the Taskforce has identified challenges to scaling up voluntary markets that rely on unblocking political issues, the report notes the interdependency, recognizes that this needs to be dealt with, but does not comment on the political dynamics or seek to provide solutions. In particular, the Taskforce understands that there are interactions between the voluntary carbon market and the frameworks governing carbon markets under the Paris Agreement, including Article 6. Voluntary carbon market scale-up would benefit from regulatory clarity. However, a full examination of these issues is beyond the scope of the Taskforce which focuses on building the market infrastructure needed to scale the market.

Instead, the Taskforce is actively engaging with parallel initiatives examining these issues. For example, a consortium led by Trove Research and University College London is working closely with a sub-group of Taskforce members to conduct analysis on the interactions between the voluntary carbon market and the Paris Agreement. Relevant insights from this work could inform the Taskforce's work. (Further information on this initiative can be found at globalcarbonoffsets.com.)

By helping scale up carbon markets, implementation of the recommendations in the Taskforce's blueprint for the voluntary carbon market will help the private sector mobilize capital to finance the low-carbon transition. Carbon markets are not the only way to do this: many of the institutions represented by Taskforce members, as well as governments, international organizations, and development banks, are deploying a variety of other tools to mobilize finance for the low- carbon transition. This wider work is a core component of national and regional policy making, and while the IIF participates in some of those efforts, these other tools are outside the scope of the Taskforce's work.

## ADDRESSING THE CHALLENGE OF CORRESPONDING ADJUSTMENTS

What is a corresponding adjustment: A corresponding adjustment (CA) is an accounting tool currently being discussed within negotiations on Article 6 of the Paris Agreement as the way of ensuring that double counting of greenhouse gas emissions mitigations transferred internationally between countries' Nationally Determined Contributions (NDCs) is avoided.

Even though the specific rules around corresponding adjustments have yet to be finalized, they represent a new concept and there are still differing opinions as to whether and how these adjustments should apply to the voluntary carbon market. The Taskforce recognizes that the outcome of the negotiations of Article 6 of the Paris Agreement, in particular in relation to rules around CAs, may influence the voluntary carbon market. In particular, there are concerns about the workability of requiring CAs for all voluntary transactions given how many countries may not be willing or able to commit to such adjustments, at least in the near term, when voluntary finance may be critical to drive climate action.

Some buyers have told the Taskforce that they would like to secure CAs for voluntary market activities to protect against regulatory, reputational and other risks. They may be concerned that their emissions reduction claim, represented by retiring credits, may not be valid if it is also being claimed by the host country (i.e., country in which the reduction took place). The reason cited for this line of thought is that the carbon credit would finance a reduction which the host country in any case committed to make, which would make the credit non-additional.

On the other hand, not all buyers may require corresponding adjustments: corporate and

national emissions accounting can exist separately. It is environmentally sound for a firm, so long as it fulfills the criteria for the use of offsets as part of a decarbonization strategy in recommended action 11, to make claims such as carbon neutrality on the back of emissions reductions they financed, provided that any claims also clearly indicate that those reductions remain part of the national balance of the host country for the purposes of accounting under the Paris Agreement. In addition, some buyers may prefer to contribute to a host country's emissions target. Separately, since the transfer of CAs will need to be reported at the intergovernmental level, there may be a time- lag between the transfer of a carbon credit and the proof of an associated CA. This risks extending the verification process for credits with associated CAs. There may be potential solutions, such as obtaining letters of intent or commitment from host countries, in parallel with additional buffers set by the standards setters. The Taskforce cannot deliver policy guidance on CAs, and this is subject to ongoing international negotiations. The perspective of market players above is provided to recognize these interdependencies and inform this broader conversation. Once rules are negotiated, the voluntary market should comply with the rules of the Paris Agreement and Article 6. Further work will need to be done to determine how to proceed as the outcomes of the Article 6 negotiations become clearer. Failure to clarify and align the CA rules may be an impediment for scaling the voluntary carbon markets and only a clearly articulated, workable and credible resolution will provide assurance to the full range of voluntary carbon credit buyers.

In the meantime, buyers will need assurance that their carbon credits are unique—the core carbon principles described in recommended action 1 in Chapter 4 will in this regard be crucial to ensuring integrity. The Taskforce also hopes to support buyers who want to purchase credits including CAs by reflecting these in the defined taxonomy of additional attributes, as detailed in recommended action 1.

## KEY GUIDING PRINCIPLES

**Carbon markets can provide a way of increasing emissions reductions by uncovering economically efficient ways of driving change that can reduce costs and increase ambition. Carbon markets are unusual in that they create financial value for something that is hard to verify (reduced or avoided emissions) and which can be non-permanent (enhanced carbon sinks). Therefore, the rules of the game are important to maintaining trust. It is imperative that carbon credits lead to emissions reductions or removals in addition to what would have happened anyway.The Taskforce has developed this draft blueprint according to four key principles.**

- The first is that the Taskforce will produce open-source solutions for private-sector organizations to take forward.35 These solutions are not meant to compete with other initiatives, but to work alongside them to scale up voluntary carbon markets globally for the benefit of all participants.
- The second principle is that voluntary carbon markets must have high environmental integrity and minimize any risks of negative consequences (i.e., seek to do no harm). The design of some carbon markets has occasionally allowed projects that generate carbon credits to cause harm to local communities and ecosystems. Carbon markets should be designed to ensure that emissions-reduction projects benefit local communities, preserve or strengthen

35. Where relevant, the Taskforce believes that it is important to work with existing standards authorities (e.g., ISO) to ensure that market players continue to operate in accordance with international standards.

ecosystems, and do no harm.

- Recognizing the broad range of important work underway in this space, a third principle is to amplify existing and ongoing work of parallel initiatives. The Taskforce aims to bring together players across the value chain and across the globe, and has mapped out a detailed landscape of ongoing initiatives (Exhibit 10).36 These ongoing initiatives all inform the blueprint for scaling voluntary carbon markets. Many are members of the Taskforce or Consultation Group, and lessons from these initiatives are incorporated into this report. Going forward, the road map and related efforts arising from this report will need to work alongside these organizations and projects to ensure we learn from and support one another's efforts.
- Lastly, and perhaps most importantly, the Taskforce's work is predicated upon the principle that voluntary carbon markets must not undermine incentives for emissions mitigation. To reach the goals of the Paris Agreement in line with climate science, all sectors must reduce their absolute emissions, and globally we will need to compensate for historic emissions. Carbon markets should therefore be designed in a way that does not lessen incentives for businesses to reduce their own emissions. They should also enable companies to become carbon negative (e.g., removing more GHG emissions than they produce), to achieve the even more ambitious goals that are necessary for achieving the Paris Agreement targets.

**The next chapter sets out important considerations for the design of the voluntary carbon markets, based on the Taskforce's research.**

## SOCIAL IMPACT OF CARBON MARKET PROJECTS

An important but sometimes overlooked aspect of the voluntary carbon market is the social impact of climate mitigation projects. At a minimum, each project avoids, reduces, or removes GHGs from the atmosphere. Beyond the minimum, projects can produce a range of co-benefits encompassing a much broader range of improved social or environ-mental outcomes. These co-benefits are most often evaluated via the lens of the UN Sustainable Development Goals (SDGs). Some impacts are inherently embedded in the design of a climate mitigation project. For example, a cookstove project inherently supports better health for the family using it. Other impacts are intentionally added. For example, a renewable energy project may seek to employ as many women employees as possible to provide increases opportunity for income. These are examples of positive social impact that can come with each project.

The Taskforce is also very conscious of the potential negative social impact that can arise in the process of developing and implementing a climate-mitigation project. In many cases the consequences may be unintended. In others, like any other undertaking, there may be malpractice that results in negative social impact. Regardless of cause, the Taskforce is committed to the principle that climate mitigation projects should do no harm and go the distance to ensure all facets of social and environmental impacts are considered. This involves rigorous project validation and verification steps around do-no-harm, along with continued monitoring and local engagement. This report addresses the social impact of carbon market projects in the following ways:

IN RECOMMENDED ACTION 1, "Establish core carbon principles and taxonomy of additional attributes," one of the core criteria of the core carbon principles is to do no harm. Standards are required to set a robust process to ensure this outcome. Safeguards should be aligned, at a minimum, to ensure no harm to human rights and minimize environmental risks.

36. Details can be found in the appendix.

IN RECOMMENDED ACTION 1, "Establish core carbon principles and taxonomy of additional attributes," the designation of co-benefits as additional attributes in the taxonomy we outline helps delineate projects that go above and beyond on their social impact. We hope this mechanism can elevate projects with high social impact and effectively match those credits to interested buyers at higher volumes. SDG impact should be independently verified alongside carbon impact.

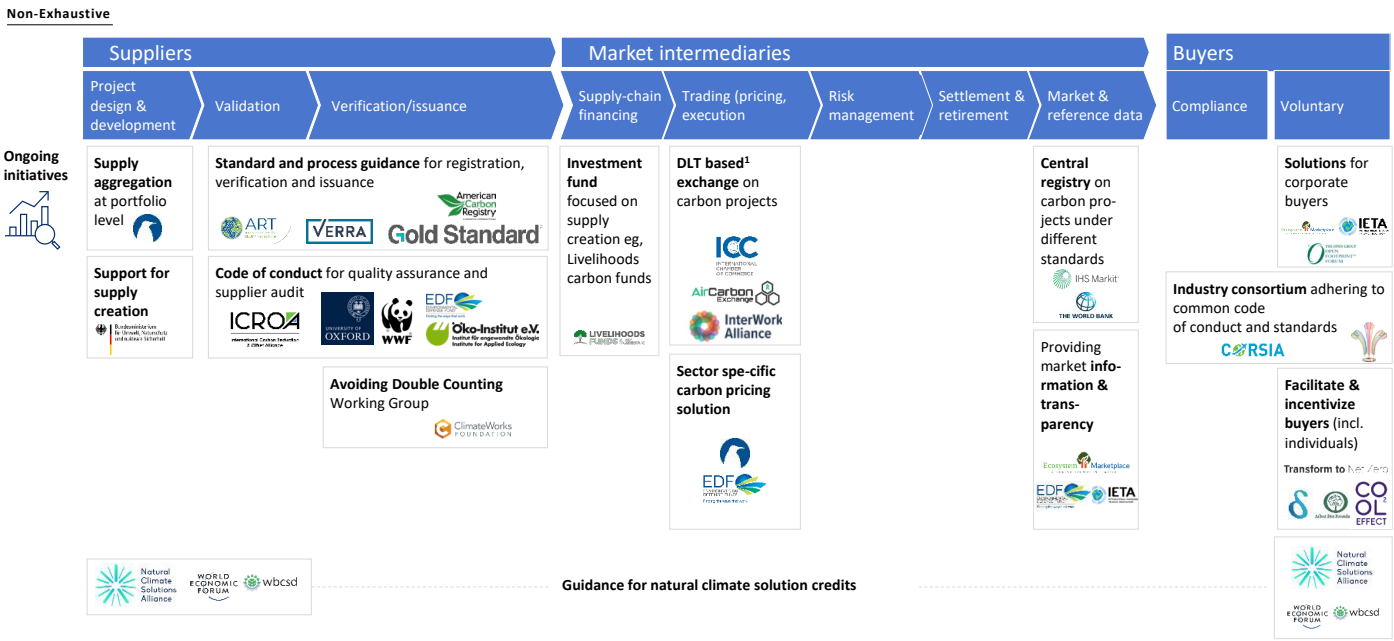
IN RECOMMENDED ACTION 10, "Catalyze structured finance," we recognize the need to bridge supplier financing in the interim until commercial financing can fully standalone. This will be especially important for players in markets that have difficulty accessing capital or smaller suppliers. It is important to address the social dimension of bridge financing.

IN RECOMMENDED ACTION 13, "Institute efficient and accelerated verification," we recognize the introduction of new technology could impose limitations on certain suppliers or auditors. However, it could also help reduce costs for smaller suppliers and decrease the lead time built in for developers to get paid back after credits are purchased. The accelerated project cycle should be designed with all these social considerations in mind.

Finally, the do-no-harm principle applies across our 20 recommended actions. The social impact and equity implications of climate change mitigation projects should always be evaluated.

Ultimately, the overarching impact of the voluntary carbon market is increased financing toward climate change mitigation projects, most often involving large cash flows from developed to the Global South. At the core of this context is the ability to support economic progress in conjunction with climate change mitigation in the host countries of these climate change mitigation projects.

## EXHIBIT 10: ONGOING CARBON MARKET INITIATIVES




1. Distributed-ledger technology

# REQUIREMENTS FOR SCALING UP VOLUNTARY CARBON MARKETS

To understand what is required to scale the voluntary carbon market, it is important to draw lessons from experience in recent decades. This chapter takes a brief look at the past before addressing the current state and exploring the preconditions for future growth. We explore the need for strong demand signals, assured supply, and for adequate and robust market infrastructure.

## A BRIEF HISTORY OF VOLUNTARY CARBON MARKETS

Voluntary carbon trading began in 1989, before the first Conference of the Parties (COP) to the UNFCCC. Early transactions mostly related to projects aiming at preventing deforestation (Exhibit 11).

Several developments brought the use of carbon credits closer to mainstream practice. First, the adoption in 1997 of the Kyoto Protocol[37] established several elements of a carbon-market infrastructure—in particular, the Clean Development Mechanism (CDM), which set standards for carbon-offsetting methodologies and laid the foundation for an official central registry of credits.

In 2003 came the launch of the first centralized cap-and-trade system, the voluntary but legally binding Chicago Climate Exchange (CCX), that also permitted the application of a limited percentage of verified credits to comply with the emissions reduction schedule. CCX was a self-regulated exchange, with oversight provided by the Commodity Futures Trading Commission and member baseline and reduction compliance audited annually by NASD/FINRA. CCX provided price discovery for emissions trading globally, and provided its 450 members, including major companies, universities, cities and states, a platform for making commitments to reduce emissions via standardized, legally binding contracts.

The tradeable instrument on CCX was the fungible CCX carbon financial instrument (CFI), equivalent to one ton of CO2.[38] Members of CCX committed to directly reduce Scope 1 emissions from all North American operations on a specified reduction schedule, and could apply credits on a limited basis to meet their compliance requirement.[39] As in a classic cap-and-trade system, members who achieved their reduction targets beyond their compliance requirements had surplus CFI allowances to sell or bank; those who did not meet the targets complied by purchasing additional CFIs from those with a surplus. Associate Members were Scope 2 emitters only, and committed to reduce or offset their entire annual North American

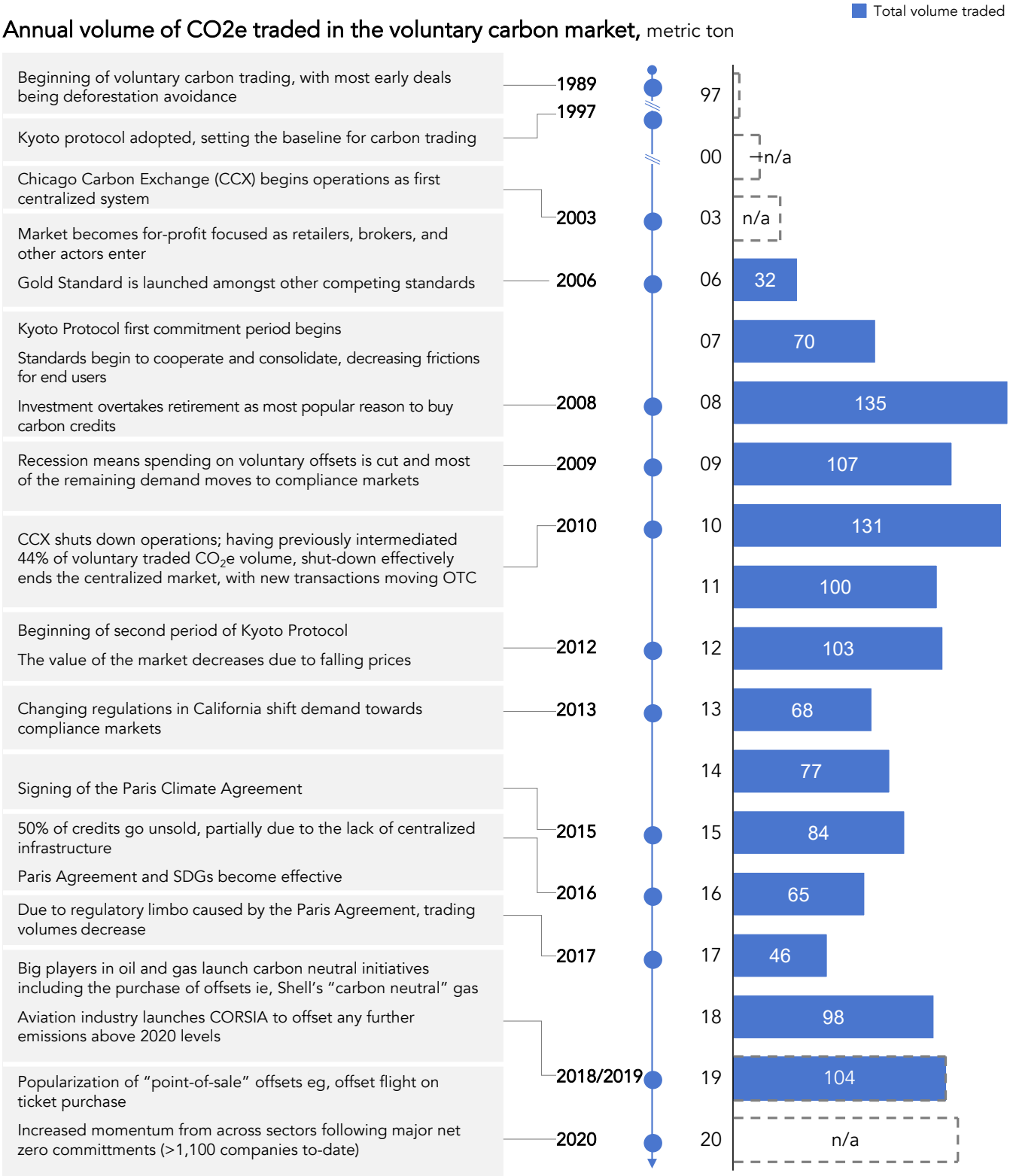
37. The Kyoto Protocol commits industrialized countries and economies in transition to a greener future to limit and reduce greenhouse gases emissions in accordance with agreed individual targets.
38. CCX covered all six greenhouse gases and pioneered some offset protocols. Offset projects could only be eligible for CFI credit issuance if verified by bona fide verifier systems, such as DNV.
39. When CCX ceased its Phase II operations in 2010, only 10 percent of the compliance requirements of emitting members had been met by offsetting.

emissions by the purchase of CFIs from CCX members. By enabling members to achieve emissions reductions of 700 million tons of carbon-dioxide equivalent (MtCO2e) over seven years, the CCX demonstrated that an exchange and trading platform could improve the transparency and liquidity of carbon markets, including integration of carbon credits.[40] CCX also launched and co-owned China's first carbon market, and had affiliates worldwide, serving as a template for an eventual global market.[41] The CCX ceased operations in 2010. This decline was partially triggered by unmet regulatory expectations, including the failure of the Waxman-Markey bill in the US for a national cap-and-trade system to pass, as well as the breakdown in negotiations at Copenhagen in 2009, dashing hopes for global carbon markets taking off.

The history of compliance and voluntary carbon markets have been interlinked since their inception. One can observe correlated movements between compliance market, Certified Emissions Reductions (CERs) volumes, and voluntary credit volumes traded (e.g., both had a significant drop-off in 2013). A critical development in compliance markets worth highlighting, was the linking of the CDM to the EU Emissions Trading System (EU ETS) in 2005. This allowed companies to use CERs, which are carbon credits generated from CDM projects, to comply with EU emissions regulations. Between 2008 and 2016, the EU ETS reduced more than 1 billion tons of CO.[42] The connection between the CDM and the EU ETS also brought new attention to voluntary markets. Seeing that large industrial companies had to pay for the right to emit greenhouse gases, service providers like PR, consulting and law firms anticipated that they might eventually face similar requirements and began purchasing voluntary credits. CER trading volumes dropped heavily after 2012, by which time covered entities of EU ETS had purchased much of their allowed credits for the 2012 to 2020 phase. They are still being traded but at much reduced levels (see appendix: CDM/CERs analysis).[43] We note that if compliance schemes (e.g., EU ETS, the California Cap-and-Trade program, the piloted China ETS) update decisions on accepting independent standard credits going forward, it may significantly impact overall demand for independent standard credits and drive further fungibility and liquidity across carbon markets. Compliance and voluntary markets can continue to be mutually reinforcing in the future.

40. *Building Bridges: State of the Voluntary Carbon Markets 2010*, Forest Trends, June 14, 2010, forest-trends.org.
41. Paula DiPerna, "Pricing Carbon: Integrating Promise, Practice and Lessons Learned from the Chicago Climate Exchange," In: Walker et al (eds), Designing a Sustainable Financial System, Palgrave, Macmillan, Cham, 2018.
42. Patrick Bayer and Michael Aklin, "The European Union Emissions Trading System reduced CO2 emissions despite low prices," in *PNAS* 2020.
43. This was driven by the supply of large volumes from HFC projects and large hydroprojects from certain countries, both of which had raised concerns with the EU around additionality (and thus eligibility), and so entities purchased before eligibility could be removed. In the next (fourth) phase of the EU-ETS, offsets are not permitted.

EXHIBIT 11: HISTORICAL VOLUNTARY CARBON, MARKET EVOLUTION AND TIMELINE




Source: McKinsey, Ecosystem Marketplace, ICROA

From the history of voluntary carbon markets, we take away the significance of offset demand, carbon credit supply, and market infrastructure for the proper functioning of the marketplace.

## DEMAND.

Signals are critical to the success of carbon markets. Although corporate climate strategies and targets can motivate companies to purchase carbon credits, tight budgets can limit their buying during economic downturns. The annual trading volume in voluntary markets dropped by half after the global financial crisis, between 2008 and 2013. With sufficient industry pressure and a clear narrative on the legitimacy of the market, demand can rise. Ambitious and transparent corporate claims are essential to signaling longer-term demand and thereby attracting sellers to the market. Today, we have a much stronger demand signal through companies setting net-zero goals between 2030 and 2050. There will be a significant increase in demand going forward.

Demand can also be affected by regulation. In 2008, market observers speculated that new regulations in the compliance market would strengthen demand for carbon credits. But the failure of the Copenhagen climate summit in 2009 dashed hopes that carbon markets would take off in the short term, which meant participants lost confidence and prices and volume collapsed. Similarly, linking the CDM to the EU ETS increased offset demand—and breaking the link caused demand to plummet.

## SUPPLY.

The defining point in the history of carbon credit supply has been quality. This has been discussed in two ways: i) quality of individual projects as measured against independent standards and ii) perceptions of offsetting in catalyzing progress toward decarbonization.

Verification of credits is overseen by standards to ensure an adequate supply of verifiable, high-quality carbon credits. Early developers of projects that produced voluntary carbon credits used their own standards for measuring the amount of carbon emissions a project would counterbalance. In a few instances, these standards turned out to be unreliable. When they came to light, the industry lost credibility. Project developers must demonstrate, beyond any doubt, that the project and associated credits compensate for the quantity of emissions that they are supposed to. However, verification can be costly, especially for smaller-scale project developers.

Beyond verification of the carbon credit, quality points to a broader set of beliefs in legitimacy of offsetting. Debate continues today on the role of offsetting in corporate claims and in contributing to a global net-zero goal. Effective governance of offsetting is essential to the success of voluntary carbon credit supply in catalyzing progress on decarbonization.

## MARKET INFRASTRUCTURE.

Finally, intermediaries and market infrastructure are essential to facilitating a functioning marketplace. From 2006 to 2008, the quantity of carbon credits traded in voluntary markets more than tripled. This period of growth, however, was brought to an abrupt halt by the financial crisis of 2007– 2008 and unsuccessful Copenhagen climate summit in 2009. The CCX, which had handled the trading of nearly half the world's

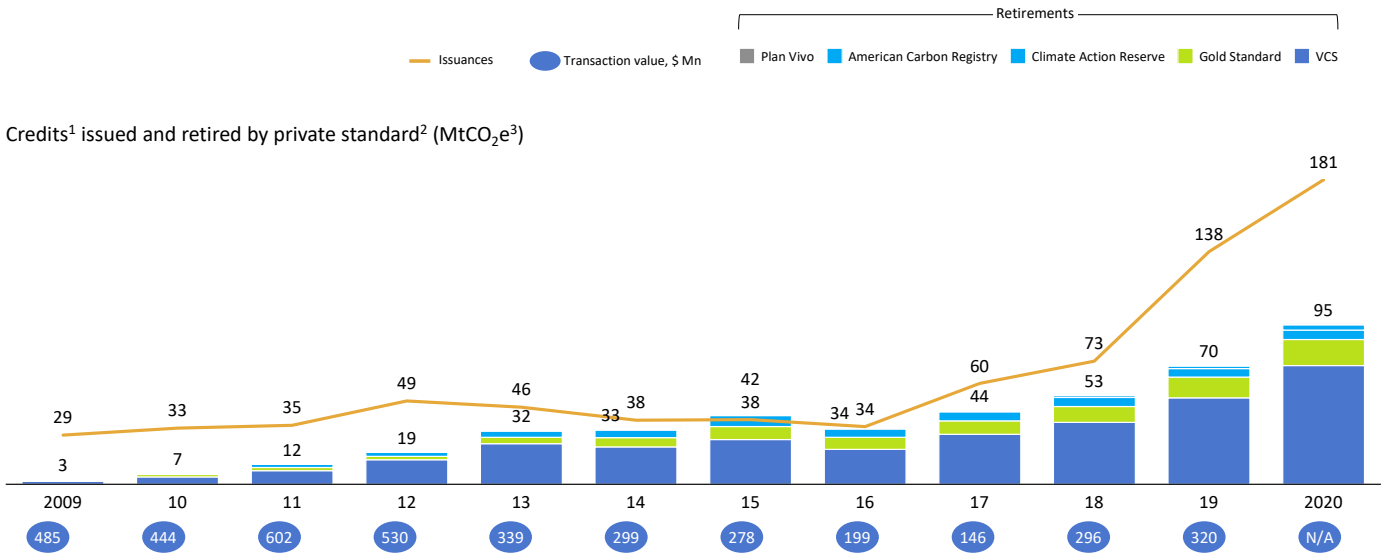
voluntary emissions credits, ceased operating in 2010,[44] and companies resorted to trading carbon credits over the counter.The resulting over-the-counter market which persists to today, has led to a marketplace that lacks liquidity and transparency.

# THE PRESENT:

## RISING DEMAND FOR VOLUNTARY OFFSETTING

In the past two years, voluntary markets for carbon credits have grown substantially.[45] In 2017, some 44 MtCO2e worth of carbon credits were retired, allowing the purchaser of these carbon credits to claim to have compensated emissions by financing emission reductions elsewhere. Over twice as much volume of credits, 95 MtCO2e, have been retired in 2020 (Exhibit 12).

### EXHIBIT 12: RECENT GROWTH IN VOLUNTARY CARBON MARKETS




1. One carbon credit represents one ton of carbon dioxide equivalent (CO2e) avoided or sequestered.
2. Issuances and retirements based on registry data and McKinsey analysis; transaction value based on Ecosystem Marketplace 2019 report.
3. $MtCO_2e$ = million metric tons of carbon dioxide equivalent.

Source: Ecosystem Marketplace; press search; data from VCS, GS, CAR, ACR and Plan Vivo market registries; McKinsey analysis

Pressure from investors appears to be a potent driver of demand. Many large asset owners have called on companies to commit to achieving net-zero emissions: for example, BlackRock CEO Larry Fink [46] wrote to chief executives saying his company would now avoid investments in companies that "present a high sustainability-related risk." In September 2020, the Climate Action Steering Committee, involving more than 500 global investors with over $47 trillion in assets, sent a letter to CEOs and chairs of the board at 161 global companies calling on firms

44. This decline was partially triggered by regulatory expectations that were never met (including the failure of the Waxman-Markey bill in the US for a national cap-and-trade system to pass, as well as the breakdown in negotiations at Copenhagen in 2009), dashing hopes for carbon markets taking off.
45. Outside of CERs, units under the Clean Development Mechanism.
46. Larry Fink, "A Fundamental Reshaping of Finance," BlackRock, January 2020, blackrock.com.

to commit to net-zero business strategies. Signals like these have prompted companies to focus on addressing their GHG footprints— a shift that is visible across several sectors.

## OBSTACLES ON THE ROAD TO MATURITY

Despite these promising signs, it would be premature to suggest that voluntary carbon markets are on a secure growth trajectory. There remain significant obstacles to be overcome before voluntary carbon markets can achieve similar maturity to other advanced markets, such as corn, metals, and power (Exhibit 13).

EXHIBIT 13: CURRENT VOLUNTARY CARBON MARKET MATURITY ASSESSMENT


1. eg, Livelihoods funds
2. For capex, working capital and maturities

Source: Taskforce, McKinsey analysis

Key maturity elements that need to be addressed are:

- Volume of supply: A mismatch between issuance and retirement of credits has resulted in more supply than demand of credits for nearly every year on record. As of December 2020, there were 321 Mt credits in inventory.[47] As a result, there is unlikely to be a shortage of supply in the immediate term (approximately the next 3 to 5 years) as demand commitments ramp up.[48] However, an expected acceleration in demand toward 2030 (up to approximately 1.5 to 2 Gt, see chapter 3) will make it difficult for supply to keep up. The challenge to supply high volumes of high-quality credits will only increase as demand continues to grow toward 2050 and beyond.
- Quality assurance of supply: Quality of carbon credits remains an issue of concern. Supplies of carbon credits grew by a third from 2019 (138 MtCO2e) to 2020 (181 MtCO2e). Most voluntary carbon credits are issued by reputable players, and more than 90 percent of credits adhere to the most common standards for verification: Verra's VCS Program, the Gold Standard, American Carbon Registry, and the Climate Action Reserve.[49] Nevertheless, buyers remain uncertain about the quality of credits being supplied. Many are especially concerned about permanence — the question of whether projects maintain GHG reductions or removals on a permanent basis, in which case they must have specific requirements stretching over multiple decades and a comprehensive risk mitigation and compensation mechanism in place, with a means to replace any units lost. Other concerns include leakage (where a project results in an increase in emissions outside of the project boundary), and additionality (the question of whether projects genuinely yield emission abatement that would not otherwise occur). These concerns apply especially to two large categories of projects: large-scale renewable energy, and forestry and land use. Projects sequestering carbon in (agricultural) soil are an emerging project category, and methodologies are still evolving to answer similar quality concerns of measurability, permanence, and additionality.
- A central market infrastructure for conducting and financing transactions: The market for voluntary carbon credits remains mainly over the counter, with a highly fragmented landscape of retailers and wholesalers. No participant acts as a market maker. Resilient, secure, scalable trade and post-trade infrastructure does not exist. A few risk management tools exist, such as insurance products and carbon buffers, but there is limited price risk management or counterparty default protection. Supply-chain financing or structured finance only exists in partnerships between individual suppliers and certain large buyers, whereas in mature commodity markets, banks and wholesale traders provide supply-chain finance. Although there are a number of established registries, price, volume, and transaction data are limited. Open access data is further limited.

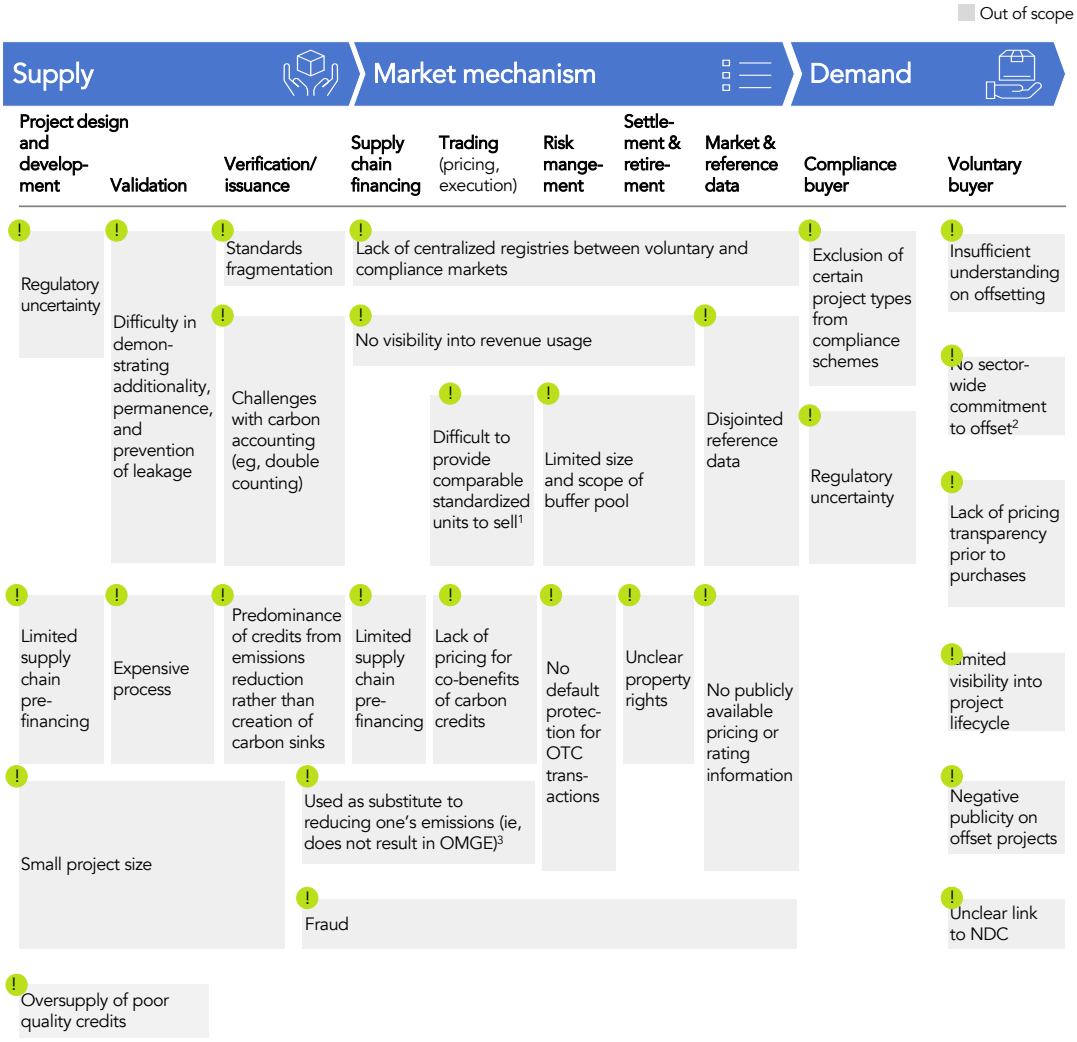
47. McKinsey analysis of ACR, CAR, GS, Plan Vivo, Verra; around two thirds of total inventory is made up by renewable-energy and REDD+ projects. See appendix for detailed breakdown.
48. Although there is unlikely to be an overall shortage of supply in the immediate term, there may be shortages in specific segments e.g., deforestation.
49. These four standards are approved by International Carbon Reduction and Offset Alliance (ICROA), have been approved by ICAO for the CORSIA, and work in a number of compliance carbon markets.

# THE FUTURE:

## CHALLENGES IN SCALING THE MARKET

While demand for voluntary carbon credits exceeded 90 MtCO2e this year, it is still notably short of what is needed to support net-zero, estimated to be at least 2 GtCO2 per year by 2030. Taskforce members also identified key pain points which are impeding market development across the voluntary carbon market value chain (Exhibit 14). These pain points go one step further than the current market maturity assessment, as they synthesize key challenges along the value chain and point us in the direction of key topics for action, discussed in the next chapter.

### EXHIBIT 14: VOLUNTARY CARBON MARKET MAJOR PAIN POINTS



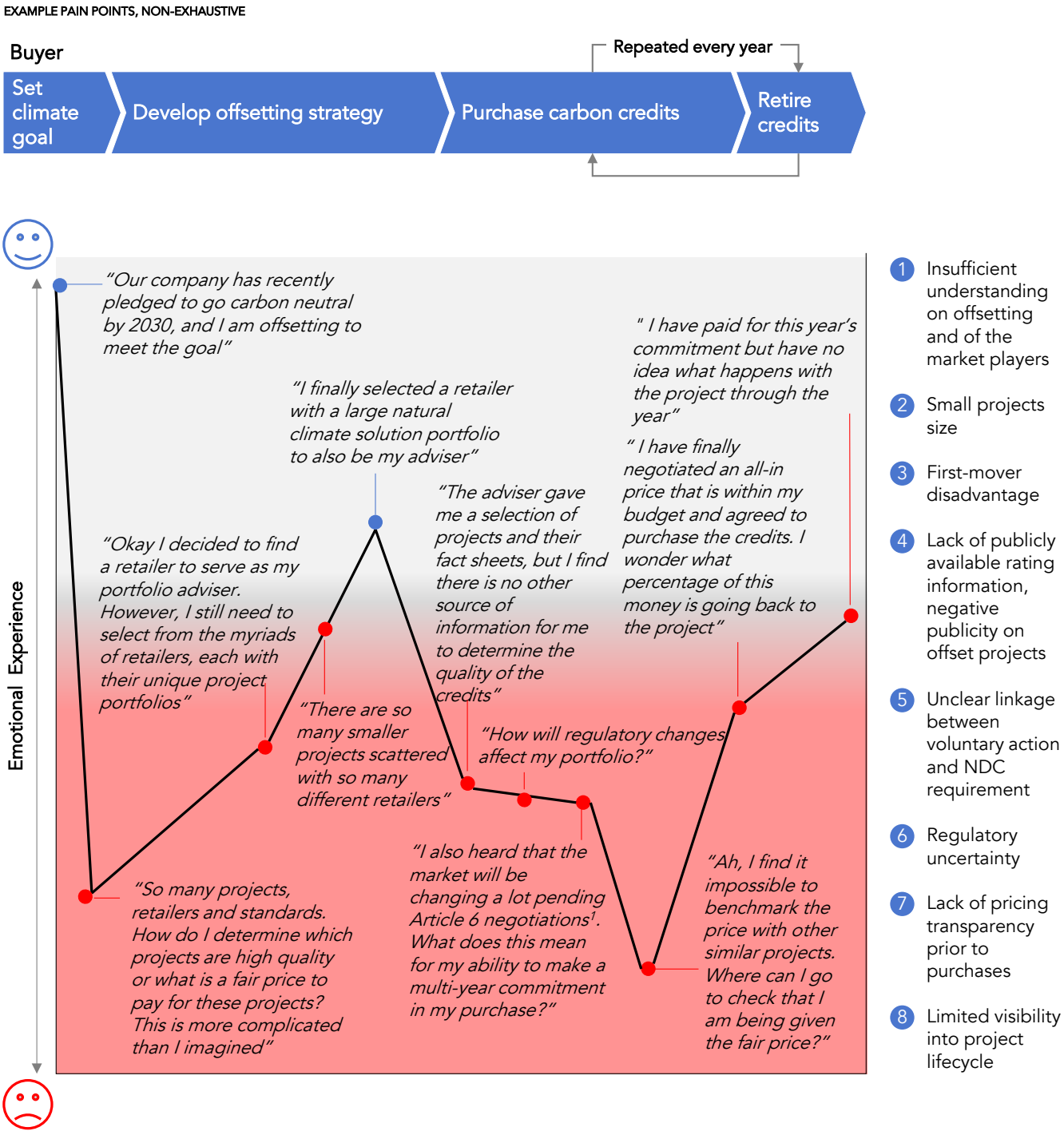

1. Due to additionality or level of protection.
2. Potential to create a competitive disadvantage for those companies who offset.
3. Offsetting fund the equivalent emissions reductions as that emitted, and so does not result in an Overall Mitigation in Global Emissions (OMGE), relevant for Paris Agreement's Article 6.4.
4. While resolving the oversupply of CDM credits from Kyoto is critical to address for Article 6 negotiations, it cannot be resolved through market based solutions.

Source: Taskforce, McKinsey analysis, Expert interviews, Press reports, Carbon market watch: Carbon Markets 1012019, World bank: State and Trends of Carbon Pricing 2019, Ecosystem Marketplace (EM); Overview and Comparison of existing carbon schemes

## BUYER AND SUPPLIER PERSPECTIVES

Fragmented and complex markets mean that the typical buyer's journey involves a number of difficulties: insufficient understanding of offsetting, negative publicity on associated projects, difficulty finding sufficiently large project sizes, lack of commonly agreed principles to ensure the quality of credits, regulatory uncertainty, lack of pricing transparency, and limited visibility into project life cycle (Exhibit 15).

### EXHIBIT 15: AN ILLUSTRATIVE BUYER JOURNEY




1. Article 6 allows the trade of carbon credits to be used for Nationally Determined Contributions; however, the link between NDCs and voluntary offsets still needs to be clarified

## A BUYER'S PERSPECTIVE:

### VOLKER HESSEL FROM SIEMENS, SUSTAINABILITY MANAGER

"There are three main areas of concern for us as a buyer: By far the most important is credibility, followed by linkage of offset projects to our core business, and price transparency.

Credibility is crucial and of the foremost concern to us as corporate buyers. We're not so worried about price or brokering the cheapest deal because our reputation is tied to the quality of the credits we purchase.

As a technology-driven company, we focus on the linkage of offsets to our business. This ability to customize the type of credits we purchase helps us make our action more compelling to our employees and key stakeholders. And this can have multiple implications. Offsets that compensate for land-use by our offices might be equally relevant for us as technology-driven offsets which are close to our core business. The ability for us to customize the type and co-benefits of voluntary credits would be welcome.

Finally, transparency in market pricing is currently lacking. It is very hard to understand what drives the price differential across offset projects, nor is there clarity on what the purchase price is helping to buy. This is especially important given the large pricing differences we observe in the marketplace. Transparency will help us make the best decisions on offsetting."

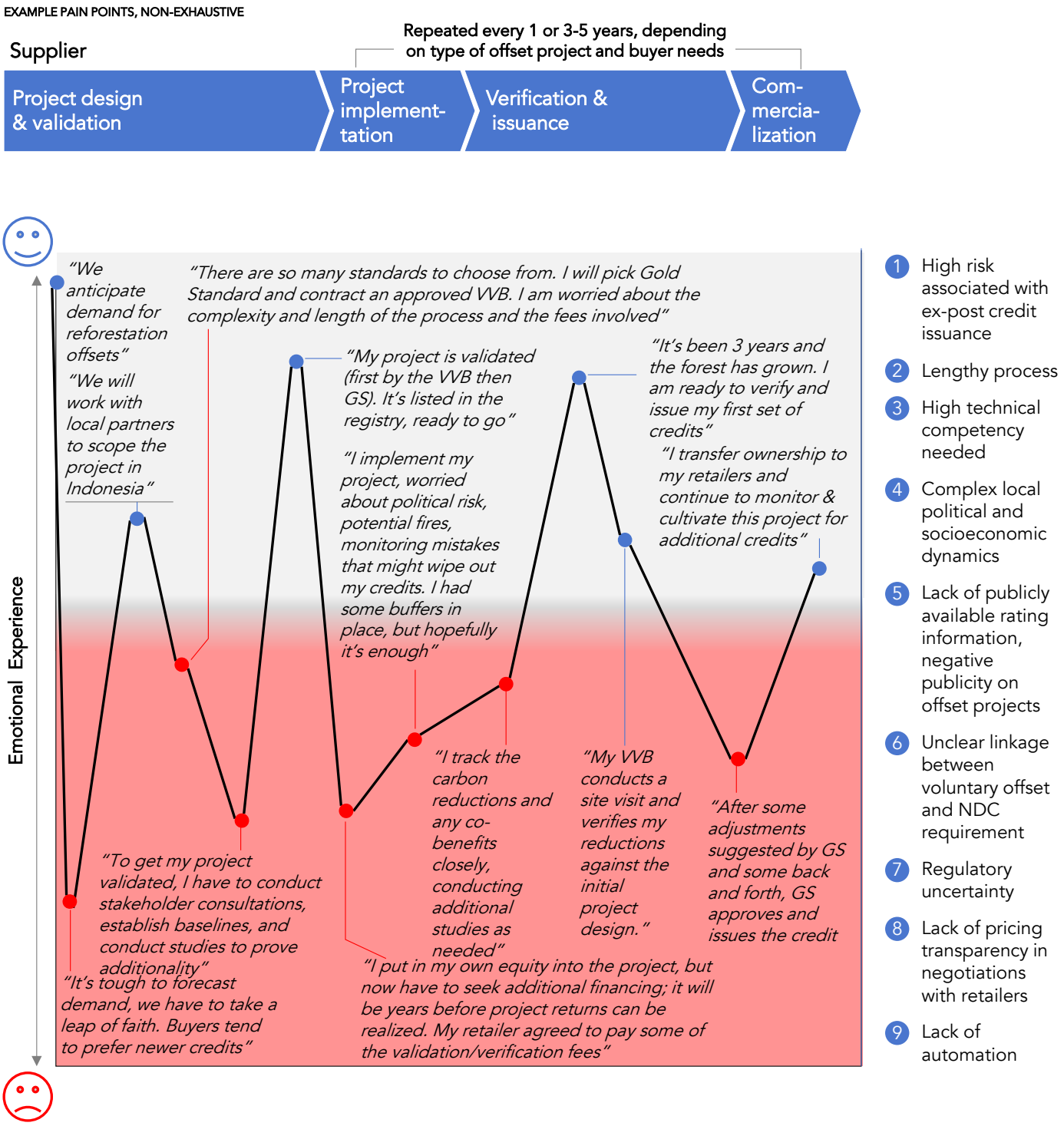
### AMY BANN FROM BOEING, STRATEGY DIRECTOR FOR ENVIRONMENT & MATERIALS

"The aviation sector set decarbonization goals over a decade ago to catalyze our long-term emissions reductions strategy of technology innovation, operational efficiency and sustainable fuels.

As we weighed how to incorporate offsetting as a 'gap filling' component of our strategy to address emissions that cannot be directly abated in sector, we saw a need for global standards to enable large scale purchasing with high quality assurance. Together with world governments and environmental non-governmental organizations, we crafted the CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) program hosted at the United Nation's International Civil Aviation Organization. It shifts the functions of verification and criteria selection from buyers to a centrally managed and approved process. We benchmarked best practices from existing schemes and deliberated over complex issues for several years resulting in a robust, one-of-its-kind program announced just before the Paris agreement was forged.

We are pleased that CORSIA is serving as inspiration to scale up the voluntary market, drawing from valuable lessons learned and updating elements as conditions evolve. With the rise in demand for offsets as timelines to decarbonize accelerate, it's key for compliance and voluntary markets to work in tandem to foster widely accepted, stringent standards. This Taskforce has a critical role in charting the course ahead as we move forward to link together UN mechanisms with private sector markets at this pivotal moment in carbon market growth."

EXHIBIT 16: AN ILLUSTRATIVE SUPPLIER JOURNEY



## A SUPPLIER'S PERSPECTIVE:

### JOCHEN GASSNER FROM FIRST CLI-MATE, CEO

"A few key observations from the supplier side include: 1) rapid transitions in the market, 2) ability to match supply to buyer needs, and 3) financing.

The market as it stands today is in a period of transition. First, the transition from Kyoto to Paris raises questions about how voluntary offsets are accounted on the corporate and host country levels. Under the Paris Agreement and its implementation in national policies, voluntary markets will compete with nations and international compliance trading schemes over the supply and use of emission reductions. This may lead to undersupply of carbon credits for the voluntary market.

Second, corporates are transitioning from purchasing credits each year to using voluntary offsetting as an instrument in their long-term climate/net zero strategies. This means that offset purchases are linked to long-term emission reduction trajectories. Sourcing and delivery of credits need to be planned with a five- to ten- year demand profile in mind. Voluntary markets are largely spot markets today; purchases will be done under long-term forward contracts in the future.

Offset projects are contracted for their specific characteristics by many buyers. Heterogeneous specifications (such as location, project type) across buyers and limitations on project supply make it sometimes very difficult to match supply and demand in the spot market, let alone plan supply that matches demand in the future.

Third, the willingness of buyers or intermediaries to provide up-front financing is limited. However, financing is essential, especially with a long lag time between project development, issuance, and retirement. Whereas forward contracts can be a solution, given the lack of reference points for prices, buyers cannot agree on prices years down the line for a project.

Finally, there is always policy risk if standards change their rules halfway through a project's life cycle."

In chapter 3, we explore the projected outlook for supply and demand, and in chapter 4 we make recommendations to address the pain points and obstacles to market scaling identified so far.

OUTLOOK:

# DEMAND, SUPPLY AND PRICE SCENARIOS FOR VOLUNTARY CARBON MARKETS IN 2030 AND 2050

**Following review of the requirements to scale voluntary carbon markets, the next step is to develop an understanding of potential future carbon offsetting demand, supply and price in order to extract relevant implications for the blueprint recommendations. In this section, we analyze scenarios for demand, supply and price in turn.**

## KEY FINDINGS

1. Voluntary carbon offset markets could grow at maximum by approximately 15-fold to 1.5 to 2 GtCO2 of carbon credits per year in 2030 from today, and at maximum by 100-fold to 7 to 13 GtCO2 per year by 2050 from today. These are maximum bounds, not forecasts, as they represent total removal/sequestration requirements from climate modelling 1.5 and 2 degree pathways, and do not account for shares of the total that will flow through compliance markets or alternative financing mechanisms to offsets such as grants.
2. The total 'practical' potential[50] of carbon credits is 8-12 GtCO2 per year by 2030. Included in this total is: (i) avoided nature loss (3.8 GtCO2) (ii) nature-based sequestration (2.9 GtCO2) (iii) emissions avoidance/reduction (more than 0.2 GtCO2), and (iv) technology- based removal (1.0 to 3.5 GtCO2) such as bio-energy with carbon capture and storage (BECCS) and direct air carbon capture and storage (DACCS).
3. Although there is sufficient 'practical' supply to meet demand in 2030, the challenge will be to mobilize it. Supply that enters the market could be as little as 1 to 5 Gt CO2 per year by 2030 due to four significant mobilisation challenges that impact all offset categories:

   A. Rate and complexity of scale-up: Unprecedented rate of scale-up would be required to reach 8-12 GtCO2 per year. If supply scales at the same rate it has done over the last 10 years in the next 10, we would reach approximately 1 GtCO2 per year by 2030

   B. Geographical concentration: 90 percent of the 'practical' NCS potential sits in the Global South while 90 percent of offset commitments today originate from companies with HQ's in the Global North. This means (i) a need for complex international purchase agreements and (ii) high dependency on a handful of countries where it is typically less easy to

50. The 'practical' potential applies an economic feasibility filter to the total potential to reflect that some land is more difficult to address

operate in. If buyers opt to buy credits solely from their respective Global North/ South hemisphere we would reach 2 to 4 GtCO2 per year by 2030.

C. Risks: All project types carry different types and magnitudes of risk. For example, there is a risk that avoided nature loss is not sustained on a permanent basis due to threats such as fire or forest clearance. Similarly, an over-reliance on BECCS may mean competition with food production for land, pushing up food prices if managed in an unsustainable way. These risks may stand in the way of action and ultimately reduce supply that enters the market.

D. Lack of financial attractiveness: Although offset project types are generally profitable, some are not financially attractive due to (i) long lag times between investment and return (average of seven and five years from project start date to first retirement for reforestation and avoided deforestation respectively), and (ii) risks such as permanence that require buffers. If NCS projects with a first retirement period of five years or more are excluded, we would reach 1 to 3 GtCO2 per year by 2030.

4. By 2050, we will need a shift toward removals including technology based removal with highly permanent storage, while a significant amount of avoided nature loss projects will still be required.

5. The price of carbon credits in 2030 will depend on the supply portfolio that has been mobilized- in part as a result of buyer preferences. We test five different scenarios that build on drivers in the market today. Depending on different price scenarios and their underlying drivers, the market size at stake in 2030 could be between $5 billion and $30 billion at the lowest end of the spectrum, and up to over $50 billion at the highest end (both ranges assuming demand of 1 to 2 GtCO2).[51]

6. Overall, we find four key implications for scaling up voluntary carbon markets:

E. On the demand side, carbon dioxide removal/sequestration cannot replace the need for urgent and immediate emissions avoidance/reduction, but is required even in the most ambitious decarbonization scenarios

F. A diverse portfolio of offset types is needed, from avoidance/reduction to removal/sequestration

G. Buyers and sellers will need to trade credits across the world to ensure sufficient supply and allow everyone to benefit

H. Rapid supply scale-up action across all offset categories is required from today

51. McKinsey analysis. Scenario based rather than forecast. $5-30 billion represents a scenario where all historic supply surplus is used first followed by prioritization of low cost supply; over $50 billion represents a scenario where buyers have a preference for local supply.

Because of uncertainty surrounding emissions trajectories, regulation and how corporate commitments translate to demand for voluntary offsets, there are very few published scenarios on voluntary demand for carbon offsets.[52] However, we do know that the momentum for climate action is building as more organizations understand the case for addressing climate change. Currently 30 percent of Fortune 500 companies have made climate commitments to 2030, a five-fold increase from 2016.[53]

To frame future demand for carbon offsets, this report shows three distinct scenarios based on:

i) **Commitments to date: Offset demand that has been established by climate commitments of more than 700 of the world's largest companies, whose Scope 1 and 2 emissions alone account for around 20 percent of global emissions.54 This is our lower bound, and does not account for likely growth in climate commitments.**

ii) **Taskforce survey: Projected offset demand envisioned by subject matter experts within the Taskforce.**

iii) **Decarbonization scenarios: Removal/sequestration required in 1.5-degree and 2-degree climate scenarios in 2050. This is our upper bound for potential market size in 2050 because it assumes that all removal/sequestration is supported by voluntary offsets (rather than compliance markets or other financing mechanisms).**

Here we lay out the approach for each scenario:

## COMMITMENTS TO DATE:

We analyzed offset demand using commitment data from more than 700 of the world's largest companies. First, we identified companies that have publicly made net-zero or carbon neutral commitments beyond any regulatory requirement. To calculate each company's offset demand, we estimated residual emissions[55] (Scope 1 and Scope 2) by the target date of net-zero emissions or carbon neutrality. Residual emissions are emissions that remain after gross emissions are avoided/reduced. We then assumed that all of these residual emissions will be offset in voluntary carbon markets. Of these commitments, financial and technology companies make up the bulk by number of companies (60 percent), but aviation and O&G lead in volume of emissions committed to offsets (80 percent).[56] To be conservative, this estimate

52. Literature on future demand typically focuses on compliance markets and the implications of Article 6; for example, International Emissions Trading Association (IETA) finds approximately 5Gt $CO_2$e per year in offset potential with facilitation from Article 6; "The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges," IETA, September 2019. Recent Trove Research paper, 2020 conducts high-level top-down estimate and finds 1.1Gt in 2030 and 1 to 3Gt in 2050, Trove Research, 2020, trove-research.com).

53. "Climate commitments" include RE100, SBTi, Carbon Neutral; "Response required: How the Fortune 500 is delivering climate action and the urgent need for more of it," Natural Capital Partners, October 2020.

54. Measured by revenue; average revenue of dataset is $55 billion

55. Residual emissions were calculated using commitment data where possible (e.g., if a company has committed to a certain percent emissions reduction by 2030, we assume that this will be delivered). Where data was not available, we made sector specific assumptions for the emissions reduction pathway of the relevant company.

56. McKinsey analysis of public company data for over 700 large global companies; n= 36 companies with net-zero commitments to 2030.

does not account for (i) offsetting of scope three emissions[57] or (ii) likely new corporate climate commitments and increases in ambition of current commitments. This approach therefore represents our lower bound—an absolute minimum for voluntary carbon offset demand.

## TASKFORCE SURVEY:

We used results from a survey of 65 subject matter experts within the Taskforce that captures their projections of voluntary offsetting demand in 2030 and 2050. These experts have deep applied expertise in the field and include representatives of corporations, offset originators, standard-setters, civil-society organizations, NGOs, financial institutions, and exchanges.

## DECARBONIZATION SCENARIOS:

Decarbonization scenarios reach 1.5-degree or 2-degree pathways through (i) cross-sector avoidance/reduction of greenhouse gas (GHG) emissions, and (ii) removal/sequestration of carbon dioxide from the atmosphere. In the short term, there is a focus on avoidance/reduction and over time the volume of removal/sequestration required increases. Most scenarios in line with the Paris Agreement reduce emissions by at least half by 2030 and reach net-zero emissions by 2050, often with a sizeable role for removal/sequestration of carbon dioxide.[58]

Removal/sequestration is needed for two purposes. The first is to offset annual emissions to reach net-zero (that is, to compensate for residual emissions by removing an equivalent amount of carbon dioxide). The second purpose is to correct for historic emissions (that is, to reach net-negative emissions, with annual carbon dioxide removal in excess of emissions). This explains the negative emissions 'overshoot' in many climate models which assume that the carbon budget is breached before mid-century and that negative emissions post 2050 are used to reduce atmospheric $CO^2$. To illustrate the degree of reductions and removal typically seen in these scenarios, Exhibit 17 shows three climate scenarios published by the Network for Greening the Financial System (NGFS). For more information, see sidebar, "About the NGFS Climate Scenarios"). These three scenarios include both a 1.5-degree and 2-degree scenario and reflect the "marker" scenarios as identified by NGFS as closely as possible.[59]

57. Despite it being best practice to include all three scopes of emissions for carbon neutral and net-zero commitments, as prescribed by several standards.

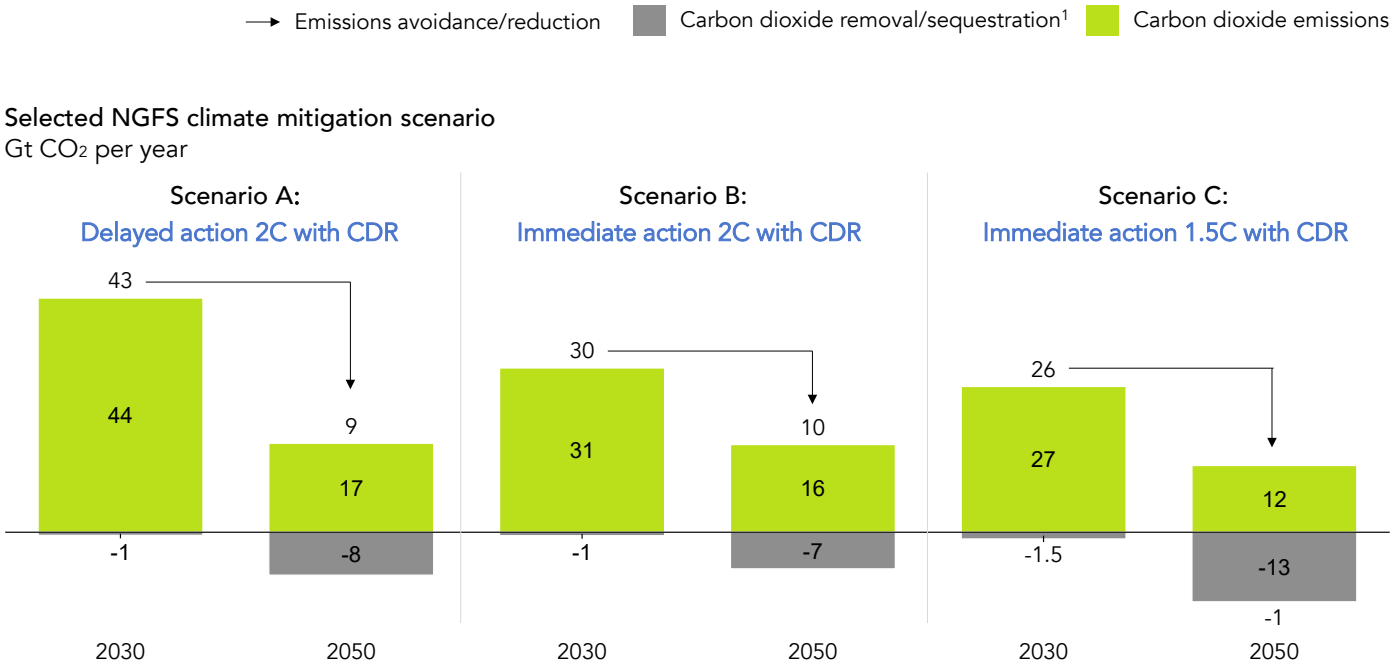
58. Henderson, Pinner and Rogers, April 2020, "Climate Math: What a 1.5-degree pathway would take", McKinsey.com

59. Delayed 2-degree Celsius scenario limited with CDR with REMIND-MAgPIE 1.7-3.0 represents an "actual" NGFS marker scenario. Immediate 2-degree Celsius scenario with CDR is a second marker scenario when used by the GCAM 5.2 model. For the purpose of consistency, we use this same Immediate 2-degree Celsius scenario with CDR, but we use the REMIND-MAgPIE model instead. (REMIND-MAgPIE stands for Regional Model of Investments and Development Model of Agricultural Production and its Impacts).

## ABOUT THE NGFS CLIMATE SCENARIOS

The Network for Greening the Financial System (NGFS) is a group of 66 "central banks and supervisors" committed to sharing best practices, contributing to the development of climate and environment-related risk management in the financial sector, and mobilizing mainstream finance to support the transition toward a sustainable economy. The NGFS has selected eight climate scenarios to explore the impacts of climate change and climate policy with the aim of providing a common reference framework. These climate scenarios are generated by well-established integrated assessment models (IAMs): GGCAM, MESSAGEix-GLOBIOM and REMIND-MAgPIE. IAMs are useful for scenario analysis because they provide internally consistent estimates across economic, energy, land-use and climate systems metrics. However, they are also subject to some limitations and simplifications, for example, their ability to capture big changes that could arise from sudden policy shifts.

EXHIBIT 17: THREE SELECTED NGFS CLIMATE SCENARIOS




In order to translate these climate scenarios into a demand scenario, there are two important dynamics to call out. The first is that while voluntary markets are likely to be a major driver of demand for removal/sequestration of carbon dioxide, they will not be the only one (compliance markets and financing mechanisms other than offsets such as grants will complement them). In other words, voluntary markets will not make up all of the total removal/sequestration across climate scenarios. The second dynamic is that by 2050 the market should have shifted to removal/sequestration offsets, and away from avoidance/reduction offsets that are common today.

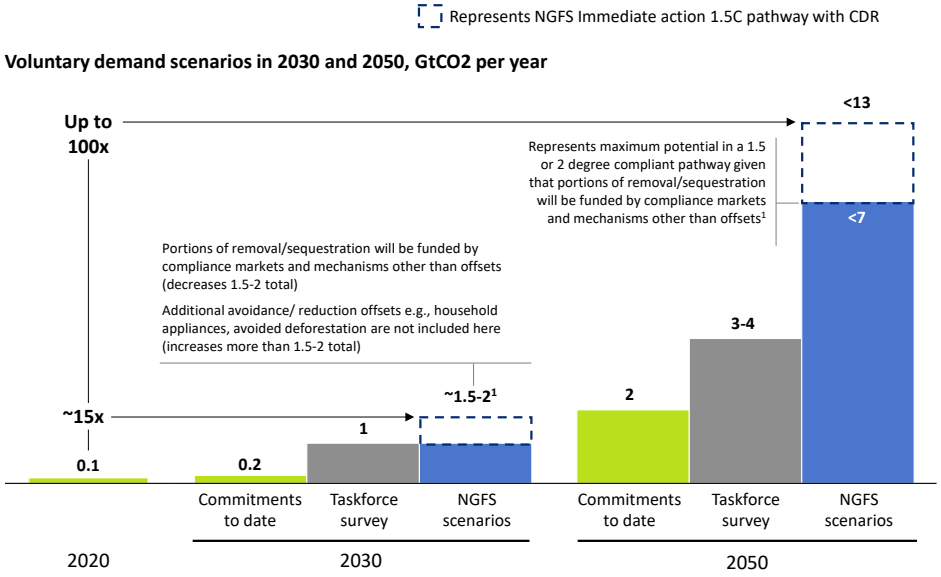
In 2030, NGFS scenarios show that around 1.5 GtCO2 of removal/sequestration may be needed each year to achieve a 1.5°C pathway (Exhibit 17). Offset demand may be lower than that due to the dynamic of voluntary markets being just one driver of removal/sequestration as outlined above. However, this dynamic may be balanced out as avoidance/reduction offsets will continue to play an important role in 2030.

By 2050, the NGFS scenarios show that 7 to 13 GtCO2 of removal/sequestration would be needed each year to achieve net-zero emissions (Exhibit 17). This represents the upper bound of our demand scenarios. It is an upper bound because (i) it does not account for the share of demand that will flow through compliance markets or that will be financed by mechanisms other than offsets such as grants, (ii) we do not expect any avoidance/reduction to be supported by offsets in 2050 as we should have shifted to removal/sequestration, and (iii) ideally, and as reflected in other climate pathways (see executive summary), avoidance/reduction happens at a quicker rate than NGFS lays out so there may be less need for removal/sequestration by 2050. And even if demand were to reach this upper bound it may be implausible, or at least an unprecedented challenge, to satisfy.

Overall, we find that in an emissions scenario consistent with a 1.5C pathway, carbon markets could grow to around 15-fold to from 0.1 to 1.5-2 GtCO2 of carbon credits per year in 2030, and up to a maximum of 100-fold by 2050 to 7-13 GtCO2 of carbon credits per year by 2050 (Exhibit 18), assuming no constraints on supply. In comparison, the Taskforce survey projects 1 GtCO2 of demand by 2030 and 3-4 Gt by 2050 and the lower bound of commitments to date is 0.2 GtCO2 by 2030 and 2 GtCO2 by 2050.

Delivering this magnitude of removal/sequestration in 2050 would pose a very significant challenge. Supply constraints and mobilization challenges could make meeting this demand at best difficult, and at worst implausible. This underlines the need for emissions reduction to be implemented as urgently as possible, and likely at a faster pace than identified in the NGFS scenarios.[60]

## EXHIBIT 18: VOLUNTARY DEMAND SCENARIOS




**Commitments to date:**

Demand that has been established by climate commitments of more than 700 large companies. This is a lower bound as it does not account for likely growth in commitments

**Taskforce survey:**

Projected offset demand envisioned by subject matter experts within the Taskforce on Scaling Voluntary Carbon markets (i.e., sits between upper and lower bound)

**NGFS scenarios:**

Removal/ sequestration required in 1.5-degree and 2-degree NGFS climate scenarios in 2030 and 2050.

This is an upper bound in 2050 as it assumes that all removal/ sequestration is supported by voluntary offsets whereas in reality it will be made up by a mix of voluntary and compliance markets as well as mechanisms other than offsets

Note: This analysis (i) does not take into account the split of credits that will be traded in compliance vs. voluntary markets; (ii) is built on a starting assumption that the world is compliant with a 1.5 or 2 degree pathway

Source: Network for Greening the Financial System (NGFS)

60. For a more ambitious decarbonization scenario, see Kimberly Henderson, Dickon Pinner, Matt Rogers, Bram Smeets, Christer Tryggestad, and Daniela Vargas, "Climate math: What a 1.5-degree pathway would take," *McKinsey Quarterly*, April 20, 2020, McKinsey.com.

## WHAT THIS ANALYSIS IS AND IS NOT:

| WHAT IT IS | WHAT IT IS NOT |
|---|---|
| • A way of framing upper and lower bounds of potential demand for voluntary offsets<br>• A range of scenarios based on three distinct analytical approaches | • A forecast<br>• A supply-side view<br>• A feasibility assessment of NGFS scenarios |

SUPPLY SCENARIOS

# APPROACH TO SIZE THE POTENTIAL SUPPLY OF CARBON CREDITS TO 2030:

Sizing the potential supply of offsets requires assessment of four project types, all of which are required with some urgency to help meet the world's decarbonisation goals and all of which face significant challenges:

- Avoided nature loss: Limits the loss of nature such as forests and peatland, which currently sequester large amounts of carbon. Avoided nature loss is part of NCS.
- Nature-based sequestration: Uses natural landscapes to sequester more carbon in the biosphere, including reforestation and restoring soil, mangroves, seagrass and peatlands. Nature-based sequestration is also part of NCS.
- 'Additional' emissions avoidance/reduction: Reduces emissions from current sources, which do not have the financial incentive or regulatory requirement to decarbonize. Common project types include setting up clean cookstoves, changing industrial processes to emit less GHGs, and funding the transition to renewable energy in areas where it is not yet competitive.
- Technology-based removal: Removes CO2 from the atmosphere with the help of modern technology and stores it in the geosphere; solutions include BECCS and DACCS.

Each offset category has different advantages and disadvantages that make them best matched to different buyers, as well as different roles to play over time. For example, avoided nature loss projects can be mobilized at low cost and have high environmental co-benefits such as positive impact on surrounding biodiversity, water quality and soil quality. Yet, these projects can be difficult to sustain on a permanent basis, as there is always a risk the forest or peatland will be threatened during or after a crediting period. Strategies such as buffers can be used here to mitigate these risks. Nature-based sequestration can also have high co-benefits, yet faces challenges related to mobilization such as competition for land. Emissions avoidance/reduction projects are essential for decarbonization in the next decade and are a large share of available supply today. Technology-based removal is critical to delivering carbon removal and permanent storage at scale, yet it is sub-scale today and developing new capacity often involves long lead times and high capital costs.

To draw implications for the blueprint, we have developed a supply scenario that is focused on the potential supply of credits in 2030. The year 2030 was chosen to reflect

both the criticality of the next 10 years in addressing climate change and the ambition of the Taskforce to mobilize action at pace. Beyond 2030, there will be inevitable shifts in supply: for example, the potential of DACCS is likely to grow as the technology is deployed and costs come down with scale.

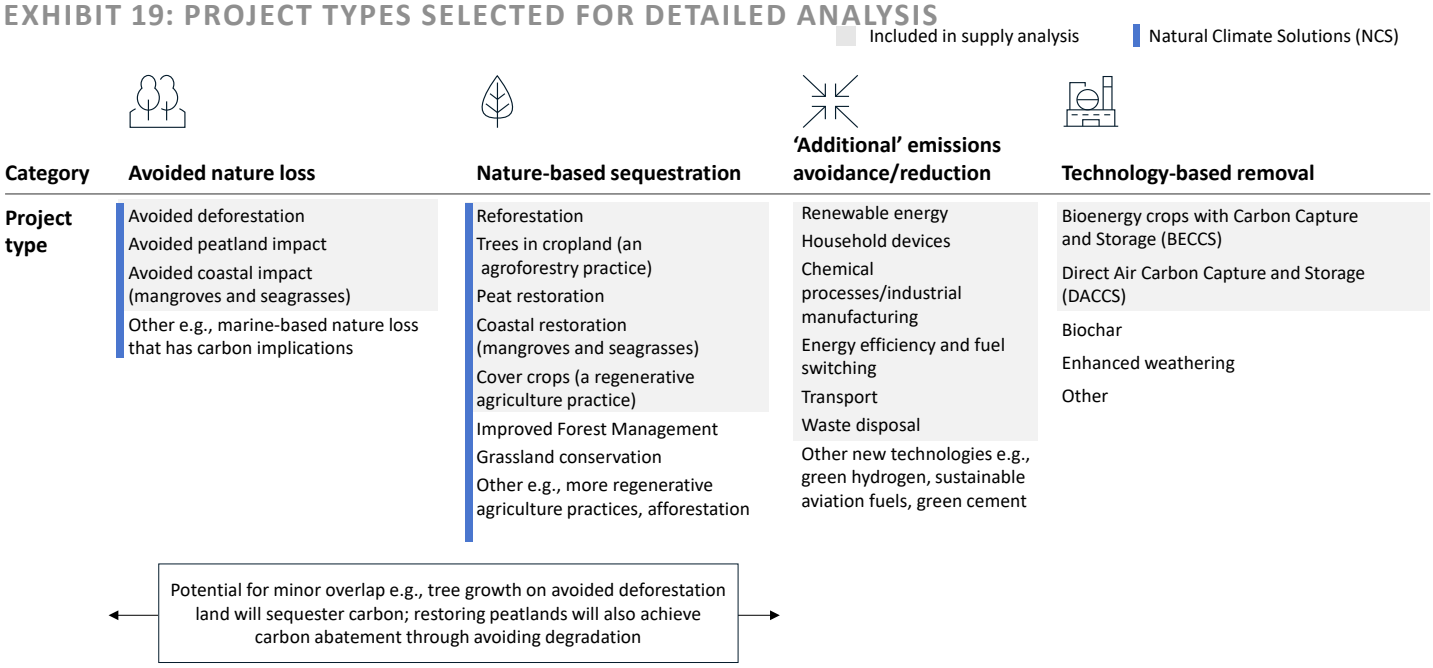
## WHAT THIS ANALYSIS IS AND IS NOT:

| WHAT IT IS | WHAT IT IS NOT |
|---|---|
| • A way of framing potential volume of supply<br>• A scenario based on analysis for select high scale potential carbon-offset project types | • A forecast<br>• A full assessment of all carbon credits potential<br>• A complete assessment of constraints (e.g., carbon storage capacity and accessibility) |

This supply scenario focuses on project types with relatively high scale potential that have already been deployed (Exhibit 19). For example, the scenario uses existing literature[61] to identify high-priority NCS, and sources such as the Global CCS Institute to evaluate options for technology-based removal. Triangulation with academic literature shows this is likely to account for about three-quarters of potential supply.[62] This is not to say that project types not included are unimportant: as research in this field continues, it will be possible to include additional project types such as improved forest management (IFM). IFM could be a good place to start given its high issuance volumes on registries today, along with regenerative agriculture practices[63] and biochar as a promising emerging technology.

61. Sources include natural climate solutions, Griscom et al., 2017.
62. For example, 2. Griscom et al., 2017 Table S4. Cost-effective NCS mitigation levels contributing to holding global warming below 2 degrees Celsius. Total mitigation potential is estimated at 11.3 $GtCO_2$ per year; NCS that we cover are 8.3 $GtCO_2$ peryear.
63. Initial sizing from literature review suggests around 0.2 to 1.0 $GtCO_2$ per year potential from regenerative agricultural practices such as legumes in pasture, optimized grazing, and low/no till.

## EXHIBIT 19: PROJECT TYPES SELECTED FOR DETAILED ANALYSIS




Source: McKinsey analysis; McKinsey Nature Analytics

# METHODS TO SIZE THE POTENTIAL SUPPLY OF CARBON CREDITS TO 2030:

This scenario uses a specific method to estimate the potential supply of offsets in each category.

- **AVOIDED NATURE LOSS:** We baselined historical cover, current cover and projected future cover using recent scientific literature to find expected nature loss. In the case of avoided deforestation for example, we replicated analysis used in Busch et al., 2019[64], which estimates the geospatially distributed potential for avoiding deforestation to 2050 based on a forecast of the rate of gross deforestation, on agricultural revenue, and on scenarios for carbon price incentives (Exhibit 20).
- **NATURE-BASED SEQUESTRATION:** We used different approaches for each project type, using a mix of scientific literature and detailed geospatial mapping to identify total biophysical potential. In the case of reforestation for example, we identified total biophysical potential and then adjusted down to correct for (i) biomes (biological communities) where NCS could have a negative climatic effect, such as reforestation in non-forest biomes and boreal forests due to absorbing heat and accelerating warming (albedo effect); (ii) water stress; (iii) human footprint (that is, we excluded cropland and urban areas, as well as areas where urban expansion is projected); and (iv) land with high economic returns from other uses. Exhibit 20 shows how these filters work in practice, using Indonesia and Brazil as examples (see methodological appendix for detail per each NCS).
- **'ADDITIONAL' EMISSIONS**

64. Busch et al., 2019, Nat. Comm. 9, 436-466; McKinsey Nature Analytics analysis

**AVOIDANCE/REDUCTION:** We used a highly conservative methodology for this category by sizing additional emissions avoidance/reductions that are inventory today. [65] This excludes pipeline projects and/or forecasts for new projects, and therefore represents a highly conservative lower bound.

- **TECHNOLOGY-BASED REMOVAL:** BECCS potential was determined by sizing global sustainable biomass availability from forestry and agricultural residues. What makes it 'sustainable' biomass is stringent environmental, social and economic filters that are applied. For example, we limit the amount of residue taken to allow for soil quality maintenance, and consider opportunity costs. Here, the availability of biomass material is the constraint to scale, as carbon storage potential[66] is abundant, as are brownfield (typically coal plants) and greenfield sites to build BECCS facilities from or on. For DACCS, we made outside-in assumptions on the potential scale-up of commercial plants, using pipeline projects as a starting point and extrapolating out.

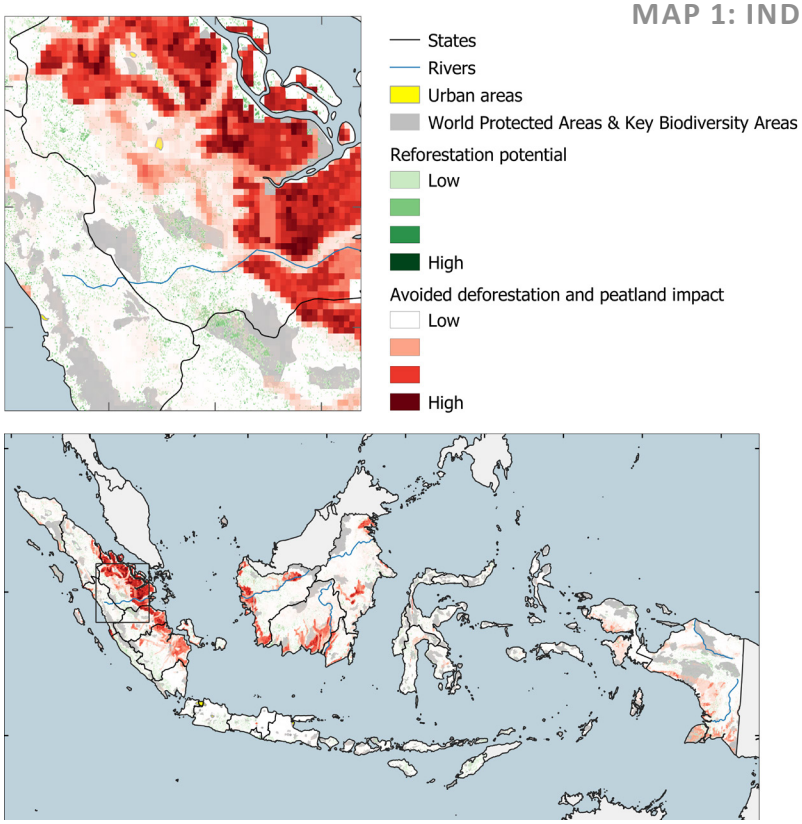
65. McKinsey analysis of public registries data including ACR, CAR, GS, Plan Vivo, VCS
66. Global Status of CCS Report, 2020, Global CCS Institute

## EXHIBIT 20: EXAMPLE OUTPUT FOR INDONESIA AND BRAZIL USING GEOSPATIAL FILTERS

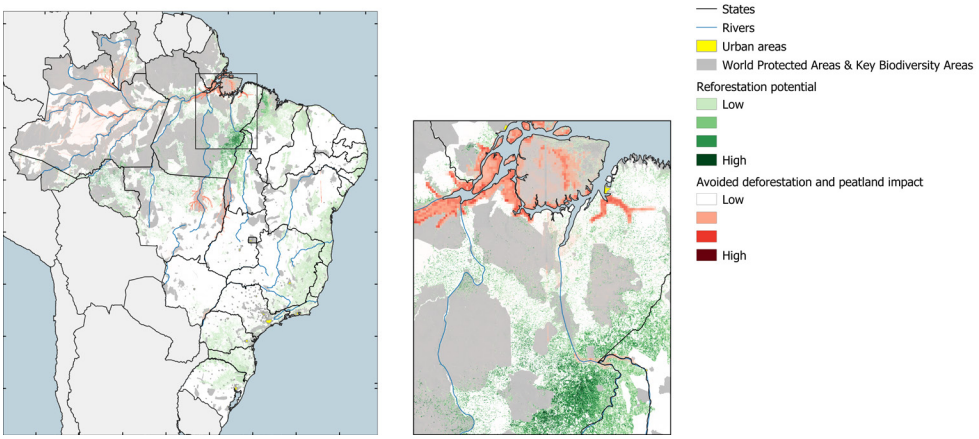
These snapshots below of Indonesia and Brazil bring our geospatial methodology to life for reforestation, and avoided deforestation and peatland impact. The red areas on the maps represent areas of forest and peatland that are at risk of deforestation. These areas are therefore identified as potential sources of carbon credits. The 'low' to 'high' score represents emissions abatement rates, which are driven by factors such as rates of deforestation and forest density.

The green areas represent potential land for reforestation. Land plots are more dispersed and therefore more difficult to see compared to the heavily concentrated red areas. As shown by the maps, there are no overlaps in land area available for reforestation or avoided deforestation and peatland impact i.e., no double counts of potential. In addition, the map shows that urban areas (in yellow) are left untouched, which is a reflection of the human footprint filter applied to the potential of reforestation.

### MAP 1: INDONESIA




### MAP 2: BRAZIL



## SIZE OF THE 'PRACTICAL' POTENTIAL OF CARBON CREDITS SUPPLY

Overall, we find the 'practical' potential of carbon credits supply is 8 to 12 GtCO2 per year by 2030 (Exhibit 21). The 'practical' potential is a portion of the total potential of NCS credits, in recognition that it becomes progressively more difficult to secure carbon credits as the total potential of each source is approached. It filters out 'low-feasibility' lands, which are more likely to be accessed by mechanisms other than voluntary carbon markets, such as philanthropic or governmental grants. For example, the 'practical' potential of reforestation is sized at 1.0 GtCO2 per year by 2030, which excludes an additional 1.1 GtCO2 per year that is 'low' feasibility according to our filter.[67] There are many economic, political, and social lenses that can be used to determine feasibility, and in reality, these lenses would not draw a neat boundary between lands that are 'practical' or not for voluntary carbon markets; however, this analysis classifies low-feasibility lands assessing their agricultural rent as an economic barrier and proxy for feasibility.[68] Agricultural rent is defined as the economic return from agricultural land, which represents a key decision factor in land use choices relevant to NCS and is accounted for in the majority of academic literature on NCS costs.

Crucially, although this 8 to 12 GtCO2 'practical' potential is conservative compared to previous sizings given methodological choices such as an economic feasibility filter, supply that enters the market could be as little as 1 to 5 GtCO2 per year by 2030 due to four significant mobilization challenges that impact all carbon credit categories (Exhibit 21).

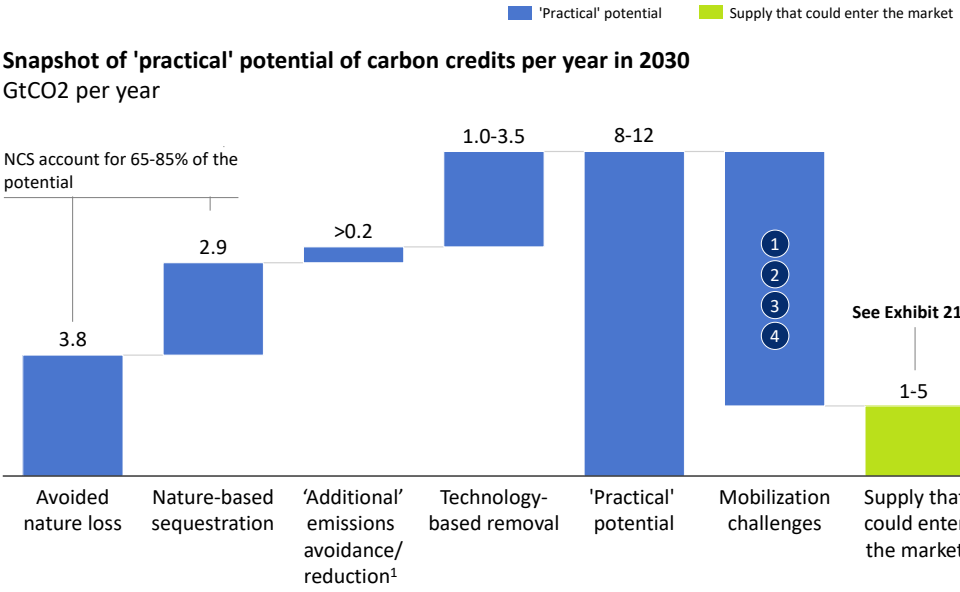
67. For all avoided nature loss and nature-based sequestration (i.e., all Natural Climate Solutions), we find a total potential of 10.2 $GtCO_2$ per year by 2030. The 'practical' portion of this is filtered down to 6.7 $GtCO_2$ per year (3.8 $GtCO_2$ from avoided nature loss and 2.9 $GtCO_2$ from nature-based sequestration)

68. Used statistical thresholds of $10 and $45 per hectare per year to differentiate between respectively high and medium, and medium and low feasibility, corresponding to the 33rd and 66th percentiles of the ecoregion median values. When testing this methodology in Brazil for example, approximately 75 percent of Brazil's voluntary carbon credits today originate in high or medium feasibility areas.

EXHIBIT 21: ILLUSTRATIVE MOBILIZATION CHALLENGE SCENARIOS

## The 'practical' potential of carbon credits is 8-10 GtCO2 per year in 2030

Supply that could enter the market is more likely between 1-5 Gt per year




**To reach 8-12 Gt by 2030, you would need to believe that 100% of the potential would enter the market. This is not likely due to key mobilization challenges:**

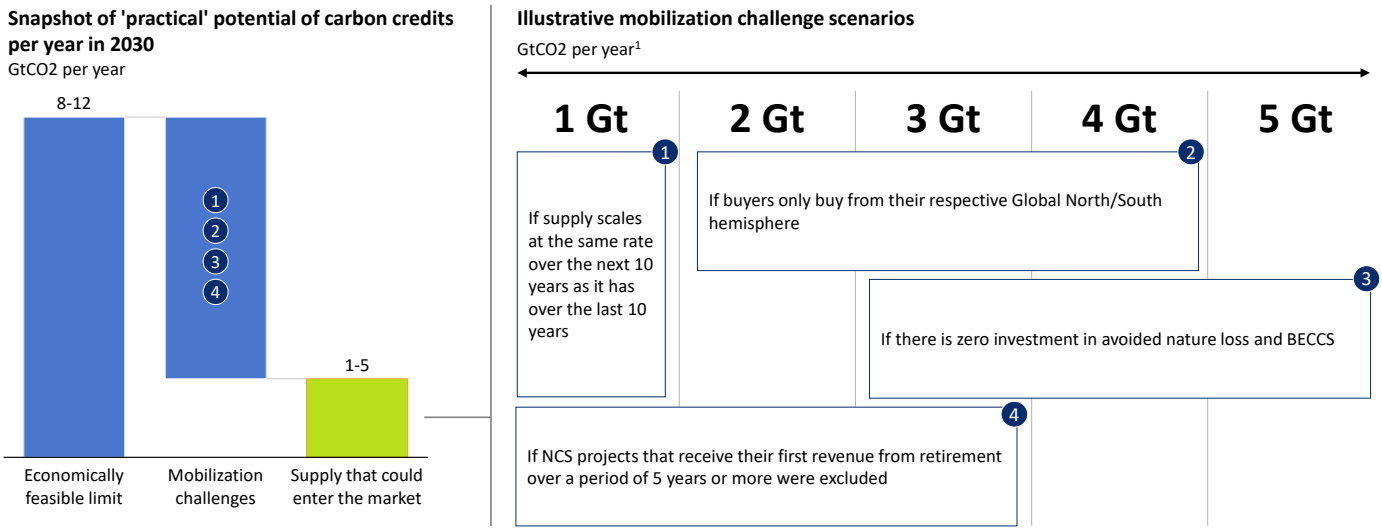
1. **Rate and complexity of scale-up**
2. **Geographic concentration**
3. **Risks**
4. **Lack of financial attractiveness**

EXHIBIT 21 (CONT'D): 'PRACTICAL' POTENTIAL OF CARBON CREDITS PER YEAR IN 2030

## Supply that could enter the market by 2030 is more likely between 1 to 5 Gt per year when testing mobilization challenge scenarios

Scenarios intended as illustrative to show how the magnitude of impact of mobilization challenges

x Mobilization challenge number [deep-dives to follow]



Together, NCS account for 65 to 85 percent (6.7 GtCO2 per year by 2030) of the 'practical' potential of carbon credits supply in 2030. Due to stringent biophysical, human and economic filters described above, this is a conservative estimate compared to previous sizings, such as Griscom et al.'s landmark report in 2017[69] that found over 10 GtCO2 per year by 2030 of 'cost-effective' potential. The largest NCS by potential are avoided deforestation and peatland impact, peatland restoration and reforestation. Given their large potential, environmental co-benefits and immediacy of emissions avoidance/reduction in the case of avoided nature loss, initiatives such as the World Economic Forum's Natural Climate Solutions Alliance are underway to accelerate action to scale.

## SIGNIFICANT CHALLENGES IN MOBILIZING AND SCALING PROJECTS:

Each project type will face mobilization challenges:

### CHALLENGE 1.

#### RATE AND COMPLEXITY OF SCALE-UP:

The rate of scale-up required is unprecedented for all carbon credit categories and would take fundamental shifts in the way that land is used in the case of NCS. If supply scales at the same rate in the next decade as it has in the last, we would reach only about 1 GtCO2 per year of supply. For example, to reach our 'practical' potential, approximately 100 coal plants would have to be converted to BECCS facilities to remove 1 GtCO2 per year, compared to a current pipeline of less than five.[70] For reforestation, it would take a land area over twice the size of California to keep sequestering just 1 GtCO2 per year.[71] What makes this scale-up complex from the outside is the inherent heterogeneity - specifically of NCS - and technical hurdles such as measurement and verification. In addition, given the time lag between action and carbon sequestration impact for project types such as reforestation (e.g., approximately 3 to 5 years for boreal or coniferous forests[72]), action would have to take place years in advance of 2030 in order to reach the potential by 2030.

### CHALLENGE 2.

#### GEOGRAPHIC CONCENTRATION:

Our analysis shows that the bulk of low cost NCS potential is located in the Global South. Together, for example, Indonesia and Brazil make up 30 percent of this total. This regional and national concentration has two implications. The first is that given 90 percent of offset

69. Natural Climate Solutions, Griscom et al., 2017 ; 'cost-effective' potential defined as less than $100/tCO2
70. McKinsey analysis of WRI 2019 Global Power Plant Database, assumes average coal plant capacity of approximately 10Mt$CO_2$ capture/yr; Global Status of CCS Report 2020
71. Uses global average reforestation sequestration rate of 9.6t$CO_2$/ha/yr
72. McKinsey climate commitment database used in commitments to date demand modeling; includes only companies with commitments to net-zero/carbon neutrality rather than other commitments such as SBTs, RE100 etc.

commitments to date originate from companies with HQ's in the Global North[73], international purchase agreements will be a pre-requisite for successful scale-up of NCS. These can be complex arrangements, for example in respect of assessing and building in risk considerations. If buyers only buy credits from their respective hemisphere we would reach 2 to 4 GtCO2 of supply per year by 2030.

The second implication is that due to high concentrations of NCS, a handful of countries will be crucial in determining the volume of supply that is mobilized. Here, political willingness, policy on jurisdictional projects and ease of operation are three significant factors that could impact the mobilization of supply. As one proxy for 'ease of operation', the World Bank's World Governance Indicators (2019) show that typically, countries with high concentrations of NCS have low governance scores. Overall, high concentrations mean high national dependencies in countries that may not be most suited for action. Therefore, there may be considerable risks that may prevent the 'practical' NCS potential from being reached.

## CHALLENGE 3.

### RISKS:

All projects carry different types and magnitudes of risk. For example, there is a risk of permanence and leakage for avoided nature loss, and a risk to food security if sourcing biomass for BECCS is done in an unsustainable way. These risks may stand in the way of action and ultimately reduce supply that enters the market. These risks may stand in the way of action and ultimately reduce supply to the market. If there is zero investment in avoided nature loss and BECCS, we would reach 3 to 5 GtCO2 per year by 2030.

## CHALLENGE 4.

### LACK OF FINANCIAL ATTRACTIVENESS:

For many NCS projects, development is not financially attractive due to the time lag between investment and retirement of credits (i.e., revenue). For example, it takes an average of six to seven years for a reforestation project to issue its first credits, and five years in the case of avoided deforestation.[74] On top of this, factors such as high financial risk disincentivize investment. If NCS projects that receive their first revenue from retirement over a period of five years or more were excluded, we would reach 1 to 3 GtCO2 per year by 2030. In addition, risks to the permanence of avoidance/reduction or removal/sequestration of emissions means that 'buffers' may be required, further eroding profits. The result is that typically, and even when operating at economies of scale, NCS are not financially attractive for investors seeking returns. While innovative funding models are emerging today such as Livelihoods Funds where buyers pool funds to front investment, there is a long way to go before they become widely accessible.

The Taskforce recommends that all project types need financing now in order to meet the

73. McKinsey climate commitment database used in commitments to date demand modeling; includes only companies with commitments to net-zero/carbon neutrality rather than other commitments such as SBTs, RE100 etc.

74. McKinsey analysis of registries: Plan Vivo, VCS, GS, ACR, CAR

carbon budget associated with 1.5°C warming: Both avoidance/reduction and removal/sequestration (including scaling down cost curves and bringing emerging technologies earlier to market). In the longer term, flows will have to shift toward removals including technology based removal with highly permanent storage, while continuing to significantly invest in and maintain existing nature loss projects will still be required for decades to come. This is for two reasons:

- First, a shift from avoidance/reduction to removal/sequestration: As 'net-zero' is the ambition, residual emissions will need to be removed/sequestered rather than avoided/reduced.
- Second, within removal/sequestration, there is a need to shift to technology-based removal while maintaining historical nature-based carbon sinks: Nature-based sequestration (biologic storage) has a ceiling on potential (see Chapter 3), so there is a need for additional tech-based removal (geologic storage), the potential of which is abundant. At the same time, nature-based carbon sinks must be maintained. In addition, biologic storage typically has higher risk of being reversed. Although biologic storage can theoretically store carbon for millennia, it is at greater risk than geologic storage from real-world conditions such as political priorities, economic pressures, fire and disease. To minimize this risk, geological storage i.e., tech-based removal projects can gradually make up a larger portion of the mix due to lower risk of reversal.

## PRICE SCENARIOS

## APPROACH

Today, the average price of a carbon credit in voluntary carbon markets ranges between approximately $2-10 per ton. There is high variability between different project types, locations and credit attributes such as vintage and co-benefits. For example, the average price of a renewable energy credit is $1.4, compared to $4.3 for a forestry and land use credit.[75]

In the coming years, price will depend on the evolution of overall demand, buyer preferences and supply side availability. In this analysis we test two cases for overall demand: i) GtCO2 per year and ii) GtCO2 per year in 2030. We test these two demand cases against four scenarios for buyer preferences. The output is then mapped to the supply cost curves we have developed, to determine a (weighted) average price. In addition, we include one triangulation point that takes the price estimates from Network For Greening the Financial System (NGFS) climate modelling to match the upper bound methodology in demand scenarios at the beginning of this chapter (Exhibit 22). These scenarios are illustrative rather than forecasts.

75. Forest Trends' Ecosystem Marketplace, *Voluntary Carbon and the Post-Pandemic Recovery. State of Voluntary Carbon Markets Report, Special Climate Week NYC 2020 Installment*. Washington DC: Forest Trends Association, 21 September 2020

## EXHIBIT 22: WE TEST FIVE PRICE SCENARIOS IN 2030 AND 2050

| Supply scenarios | Description |
|---|---|
| A **Start with historic supply surplus** | Assumes that buyers will use existing supply of credits first and then opt for cheapest available new supply |
| B **Prioritization of low cost supply** | Assumes that buyers use the cheapest available new supply at the time of purchase (in effect, includes Natural Climate Solutions only) |
| C **Early investment in technology-based solutions** | Assumes that buyers use the cheapest available supply at the time of purchase but also invest in enough technology-based solutions to bring them down the cost curve in 2030 |
| D **Preference for local supply** | Assumes that buyers will buy locally (by Global North/Global South) |
| E **NGFS price of carbon** | Takes the price of carbon from NGFS decarbonization scenarios used in this report's demand scenarios |

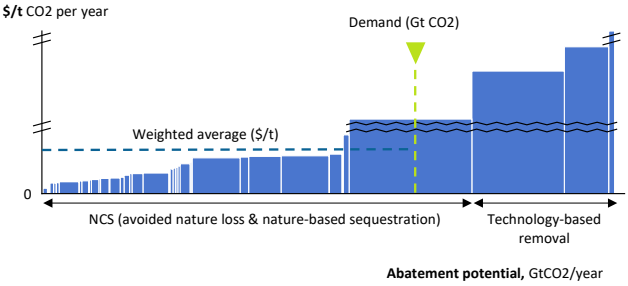
**Methodology to find price in each scenario**

**I. Built cost curve for the 'practical' potential of carbon credits**: 8-12 GtCO2 per year (see below)

**II. Used cost curve to inform which project types would be included in each price scenario** e.g., for Scenario B: "Prioritization of low cost supply" we include all credits on the left hand side of low and high demand signal volumes used for 2030. The components of the cost curve included varies across scenarios and time horizons.

**III. Found weighted average** for project types that are included in each scenario for both time horizons

**'Practical' potential of carbon credits supply per year in 2030**




Typically, avoided nature-loss and nature-based sequestration is at the low end of the price scale and costs between $10 to 50 per ton of CO2, with variations between geographies and project types. At the high end of the scale is technology-based removal, where we expect most supply from BECCS and from liquid-sorbent DACCS to sit between $100 to 200 per ton of CO2 in 2030.[76] As with NCS, costs will vary by geography due to factors such as biomass type (forestry residues are typically cheaper than agricultural residues), proximity to biomass source, and proximity to carbon storage and cost of renewable energy. Given the need to scale technology-based removal, investment from a diverse set of investors (such as philanthropic, financial, public sector investors) may prove critical to shoring up credit volumes at affordable prices.

Behind scenarios A, B, C and D sit a set of assumptions that drive price calculations (see table below). As scenario E lifts prices directly from NGFS climate modelling, we do not include assumptions here.

76. McKinsey literature review incl. UK Energy Research Centre, IPCC; McKinsey analysis suggests cumulative CAPEX investment of $10-30 billion could be required to decrease DAC cost to approximately $150 per t of $CO_2$

| SCENARIO | ASSUMPTIONS IN 2030 | ASSUMPTIONS IN 2050 |
|---|---|---|
| A. Start with historical supply surplus | All existing supply surplus (inventory from registries) is used before 'new' supply. This supply surplus is sized at approximately 0.3 GtCO2 as of year-end 2020.<br>'New' supply takes the lowest cost portion available to meet demand<br>Demand will include a 50 percent buffer to account for mobilization challenges (i.e., if demand is 1 GtCO2, we include price range for lowest 1.5 GtCO2) | There is no remaining historical supply surplus as it has been used up<br>Supply of avoidance/ reduction project types will be unavailable<br>Demand will include a 50 percent demand buffer as before<br>Technology-based solutions will be available at a starting cost of $250 per t CO2 reduced to $150 per t after 0.15 Gt of credits are retired (i.e., sufficient investment to bring down cost curve) |
| B. Prioritization of low cost supply | Takes the lowest cost portion available to meet demand<br>Demand will include a 50 percent demand buffer as above | Supply of avoidance/ reduction project types will be unavailable<br>Demand will include a 50 percent demand buffer as before<br>Technology-based solutions will be available at a starting cost of $250 per t CO2 reduced to $150/t after 0.15Gt of credits are retired (i.e., sufficient investment to bring down cost curve) |

| | | |
|---|---|---|
| C. Early investment in technology-based solutions | Demand will include a 50 percent demand buffer as above<br>0.15Gt of technology-based removal credits are retired at starting cost of $250 per t CO2 (i.e., sufficient investment to bring down cost curve) | Supply of avoidance/ reduction project types will be unavailable<br>Demand will include a 50 percent demand buffer as before<br>Technology-based solutions will be available at cost of $150 per t CO2 (cost already been brought down cost curve) |
| D. Preference for local supply | **Assumes 60-80 percent of demand is from Global North**<br>**For demand that is unable to be met by local supply, technology-based solutions will be used to meet demand** at starting cost of $250 per t $CO_2$ reduced to $150 per t after 0.15Gt of credits are retired (i.e., sufficient investment to bring down cost curve) | **Supply of avoidance/reduction project types will be unavailable**<br>**Technology-based solutions can plug excess demand requirements at cost of $150 per t $CO_2$** (cost already been brought down cost curve) |

The assumption to remove avoidance/reduction project types in 2050 was developed on the basis that although there will be a continued need to protect against nature loss, offsetting is unlikely to be the right mechanism given increases in national net-zero claims that will require greater governmental action.

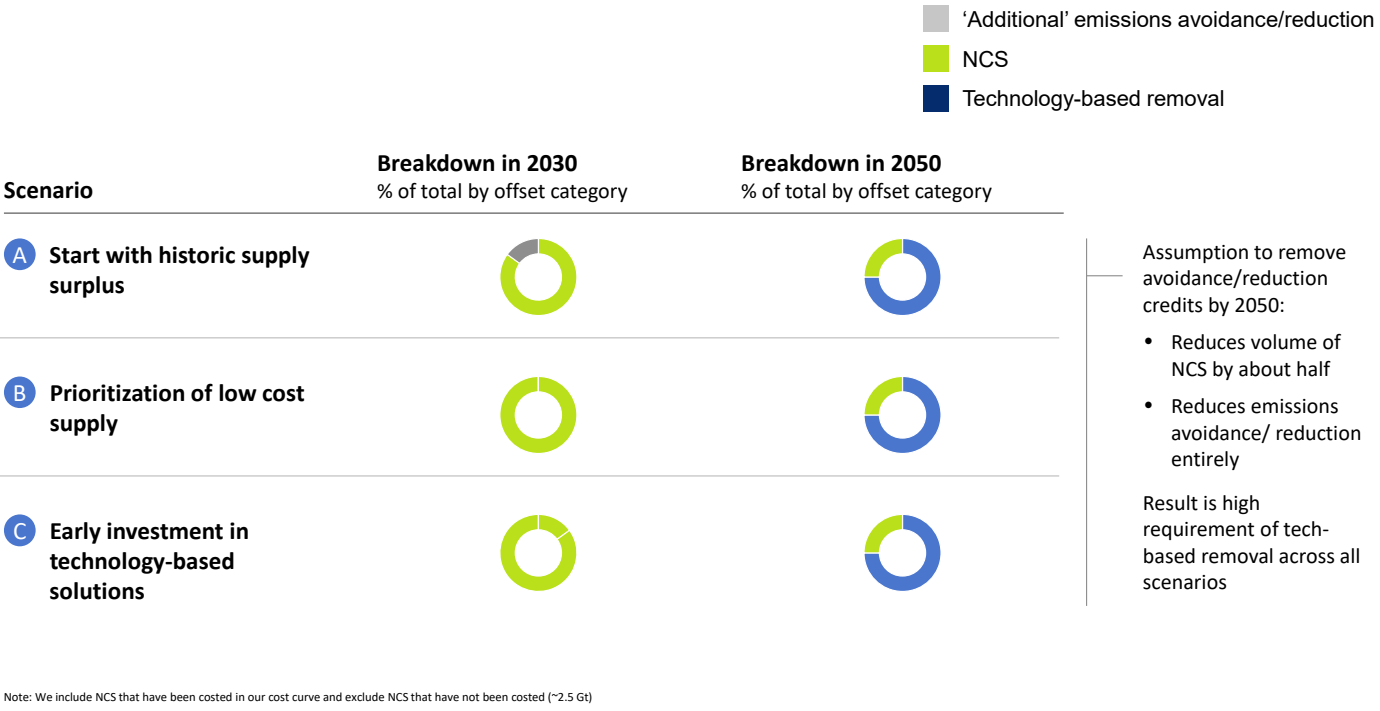
Across all scenarios, we use consistent demand estimates to reach a market size. For 2030, we use 1-2 GtCO2 which represents the Taskforce survey as a lower bound and the NGFS scenario as an upper bound. We do not use 'committed demand' as the lower bound as it will grow.

## RESULTS

Overall, we arrive at a range of prices in 2030, spanning from $5 to 15 per tCO2 in Scenario A and $50-90 in Scenario D (Exhibit 23). These ranges translate to market sizes of $5 to 30 billion and over $50 billion in 2030 respectively.

Scenarios A, B and C arrive at the same price range in 2050 due to convergence in the type of supply that is mobilized (Exhibit 24). In these scenarios, low-cost NCS makes up a smaller proportion in 2050 than in 2030 due to the removal of avoidance/reduction credits e.g., avoided deforestation from the total potential. In turn, significant quantities of higher cost technology-based removal are required to fulfil demand.

EXHIBIT 24: BREAKDOWN OF CARBON CREDIT CATEGORIES INCLUDED IN PRICE RANGES FOR SCENARIOS A, B AND C IN 2030 AND 2050




Note: We include NCS that have been costed in our cost curve and exclude NCS that have not been costed (~2.5 Gt)

## FOUR KEY IMPLICATIONS FOR OUR BLUEPRINT

This final section presents four key insights from our demand, supply and price scenarios, along with their implications for the blueprint for scaling up carbon markets.

### ON THE DEMAND SIDE, CARBON DIOXIDE REMOVAL/SEQUESTRATION CANNOT REPLACE THE NEED FOR URGENT AND IMMEDIATE EMISSIONS AVOIDANCE/REDUCTION, BUT IS REQUIRED EVEN IN THE MOST AMBITIOUS DECARBONIZATION SCENARIOS

The Taskforce's recommendations emphasize that large-scale emissions avoidance/reduction should be a priority and should start now, with offsets playing a vital yet complementary role. This point is reflected in several recommendations:

RECOMMENDED ACTION 11:

Establish principles on the use of offsets—This will help ensure that offsets do not crowd out other climate action.

RECOMMENDED ACTION 13:

Align guidance on offsetting in corporate claims—This will clearly distinguish between the roles of avoidance/reduction and removal/sequestration.

RECOMMENDED ACTION 17:

Offer consistent investor guidance on offsets—This will support investors as they think through their options for climate action.

### A DIVERSE PORTFOLIO OF PROJECT TYPES IS NEEDED, FROM AVOIDANCE/REDUCTION TO REMOVAL/SEQUESTRATION

In the face of mobilization challenges involved in expanding the supply of carbon credits, achieving scale will be difficult unless supplies increase from all project types. Additionally, the advantages and disadvantages of different project types mean that decision makers will require a range of options. Lastly, project types are expected to perform different roles over time. In the long term, for example, the importance of technology-based removals is likely to increase.

The Taskforce recommends that stakeholders acknowledge the role that each type of carbon credit can play in meeting corporate claims, and that investors issue clear guidance to corporates accordingly. The need for a diverse portfolio of project types is reflected in one recommendation:

RECOMMENDED ACTION 16:

Institute governance for market participants and market functioning—this governance would develop guidance on the appropriate use or exclusion of project types over time, thereby supporting the use of a variety of carbon credits.

### BUYERS AND SELLERS WILL NEED TO TRADE CREDITS ACROSS THE WORLD TO ENSURE SUFFICIENT SUPPLY AND ALLOW EVERYONE TO BENEFIT

There is a geographical mismatch between sources of offset demand and sources of credits. The opportunity to scale up voluntary carbon markets therefore depends on efficient, high-integrity international exchanges for offsets to enable funding to flow across borders. All market participants, including regulators, need to encourage international allocation of capital for credits. This necessity is reflected in several recommendations:

RECOMMENDED ACTION 1-20:

These aim to facilitate efficient matching of buyers and suppliers at scale.

### RAPID-SUPPLY SCALE-UP ACTION ACROSS ALL OFFSET CATEGORIES IS REQUIRED FROM TODAY

Early action at pace is required to overcome mobilization challenges and long lead times to ensure that demand can be met in the run up to 2050 and beyond. This includes early investment in technology-based removals to ensure sufficient scale at accessible costs in 2050, and innovative action to overcome mobilization barriers for NCS such as de-risking investment in projects to improve financial attractiveness for investors. By 2050, we will need to shift toward technology-based removals. This urgency of action is reflected in:

RECOMMENDED ACTION 3:

SCALE UP HIGH-INTEGRITY SUPPLY

The next chapter presents the Taskforce's blueprint and recommendations for scaling up voluntary carbon markets.

# BLUEPRINT RECOMMENDATIONS

To support the scaling-up of voluntary carbon markets, the Taskforce has identified six major topics requiring action, spanning the entire value chain (Exhibit 25). The six topics for action are:

I. CORE CARBON PRINCIPLES AND ATTRIBUTE TAXONOMY
II. CORE CARBON REFERENCE CONTRACTS
III. INFRASTRUCTURE: TRADE, POST-TRADE, FINANCING, AND DATA
IV. CONSENSUS ON THE LEGITIMACY OF OFFSETTING
V. MARKET INTEGRITY ASSURANCE
VI. DEMAND SIGNALS

To address these six topics, we propose a set of 20 recommended actions (Exhibit 25). These recommended actions form the core of the Taskforce blueprint and are outlined below.

## EXHIBIT 25: KEY RECOMMENDED ACTIONS ALONG THE VALUE CHAIN

I Topics for action

x Recommended actions

| Supply & standards | Market intermediaries | Demand |
|---|---|---|

### I Core carbon principles and attribute taxonomy

- 1 Establish core carbon principles and taxonomy of additional attributes
- 2 Assess adherence to the core carbon principles
- 3 Scale up high-integrity supply

### II Core carbon reference contracts

- 4 Introduce core carbon spot and futures contracts
- 5 Establish an active secondary market
- 6 Increase transparency and standardization in over-the-counter (OTC) markets

### III Infrastructure: Trade, post-trade, financing, and data

- 7 Build or utilize existing high-volume trade infrastructure
- 8 Create or utilize existing resilient post-trade infrastructure
- 9 Implement advanced data infrastructure
- 10 Catalyze structured finance

### IV Consensus on legitimacy of offsetting

- 11 Establish principles on the use of offsets
- 12 Align guidance on offsetting in corporate claims

### V Market integrity assurance

- 13 Implement efficient and accelerated verification
- 14 Develop global anti-money-laundering (AML) / know-your-customer (KYC) guidelines
- 15 Establish legal and accounting frameworks
- 16 Institute governance for market participants and market functioning

### VI Demand signal

- 17 Offer consistent investor guidance on offsetting
- 18 Enhance credibility and consumer awareness for consumer offerings, incl. Point-of-Sale (POS) solutions
- 19 Increase industry collaboration and commitments
- 20 Create mechanisms for demand signaling

**Solutions out of scope**

*Clarify link to Nationally Determined Contributions*

## CORE CARBON PRINCIPLES AND ATTRIBUTE TAXONOMY

Successful development of voluntary carbon markets depends on building credibility and transparency. This is why it's crucial to ensure the market has confidence in any new reference contracts being launched. To enable high-integrity contracts, a set of core carbon principles is required, against which carbon credits and their underlying standard and methodology can be assessed.

RECOMMENDED ACTION 1:

### ESTABLISH CORE CARBON PRINCIPLES AND TAXONOMY

The Taskforce recommends the establishment of "Core Carbon Principles" (CCPs) for a ton of verified carbon (or carbon equivalent), avoided, reduced or removed. These CCPs set out threshold quality criteria to which a credit and the supporting standard and methodology[77] should adhere (Exhibit 26). The Taskforce argues for adopting the broadest possible definition of the CCPs, while ensuring high integrity and quality are maintained.

Detailed definitions for the recommended quality criteria shown in Exhibit 27 can be found in the appendix.

An important note on the criteria "Permanent" (Exhibit 27) is that it includes buffer provisions. These buffers act as an insurance policy, for cases where, for example forest fires release previously offset carbon dioxide into the atmosphere, as all other projects would have contributed sufficient additional carbon dioxide to cover these losses. This would mean that a credit retired by a buyer would remain valid, in the unfortunate event of damage to the underlying project. Separately on the criteria addressing leakage, the project will be required to measure, and discount emissions reductions/removals achieved to account for leakage.

An important decision is whether credits need to be of a certain "vintage" or project age to quality for the CCPs, thus excluding projects with emissions reductions prior to a certain date.[78] It should be noted that independently of this decision, any vintage credit would have to prove that its methodology adheres to the CCPs. The Taskforce defers any decision on excluding credits of a certain vintage to the future governance body. This governance body may choose to exclude all projects from earlier vintages, or only certain methodologies and/or project types. It is important to note that some project types have longer verification cycles (e.g., afforestation projects may only verify every five years to allow for sufficient carbon capture to happen to justify the cost). A number of "vulnerable" projects (e.g., community projects in the Global South) started prior to 2016. As a result, vintage restrictions should not unintentionally direct capital away from activities that we do want to encourage. Finally, the Taskforce

77. We use standards to refer to the GHG crediting program (e.g., Gold Standard, Verra, ACR, CAR, etc.) and methodology to refer to the specific documentation a standard provides to assess a project against.

78. There are three key dates pertaining to each project that are relevant: project start, year of credit issuance, and year the actual emission reduction took place. In this report, when vintage is discussed, we generally refer to the last definition: the year the actual emission reduction took place.

has also discussed a potential model where corporates may use older credits to claim historical emissions. Such a suggestion may help promote demand for offsetting historical emissions.

Buyers who participated in the Taskforce expressed a desire to continue to tailor their offset purchases. Examples include buyers who want to support a certain location, aid in financing new technologies (e.g., BECCS, DACCS), a specific value chain, or support other SDG goals. To accommodate the need for standardization as well as customization, the Taskforce developed a recommended framework that combines the CCPs with separate additional attributes (Exhibit 27). The rationale behind separating additional attributes from the core carbon product is to drive liquidity into the core carbon reference contracts (which will be based on the CCPs). If a buyer purchases an additional attribute contract, they will receive a carbon credit that adheres to the CCPs and meets the specific additional attribute they have selected, at a premium to the price of the core contract. The taxonomy of additional attributes includes vintage, project type, co-benefits such as contribution to the SDGs or contribution to technological innovation in the form of cost-curve declines, location, and corresponding adjustments.

In particular some buyers may want to buy only CCP-aligned credits with removal attributes, as these may be necessary for certain types of claims in the future (e.g., net-zero). These should be further delineated between geological carbon storage and biological carbon storage. In the longer term, it may therefore be considered whether separate core contract for removals is needed. Initially the Taskforce recommends keeping only one core contract to avoid splitting liquidity, as the majority of credits are likely to remain avoidance and reduction in the short-term. At the same time, there be nothing to stop an organization launching removals only contracts, consistent with the CCPs. Liquidity would move to removal contracts if that is what the market wants. Further additional attributes which could be considered over time include the ability to choose specific standards as well as select CORSIA eligibility.

To facilitate development of the CCPs, the Taskforce recommends that an independent third-party organization should host and curate the CCPs.[79] The governance structure needs to minimize conflicts of interest and ensure that, over time and based on the best available data, concepts such as additionality, permanence and what constitutes sufficient buffers are kept up to date to maintain confidence of all participants. This organization will be tasked with governing the CCPs in so far as certain standards or methodologies do not meet specific key criteria for a carbon credit.

This governance body will in the future need to decide which project types do not meet the quality thresholds or would only meet them with additional guardrails.[80] One example may be renewable energy projects, which may eventually be phased out as renewables become so economically efficient that they no longer satisfy the additionality principle. This transition has already started: the VCS program no longer accepts grid-

79. To clarify, the Taskforce is not the entity that will set the CCPs, the independent body should set and continually update them. This is what is meant by "curate."

80. These are meant to serve as minimum guardrails. Independent standards themselves can set additional guardrails on top of these minimum guardrails as they see fit.

connected renewable energy projects in countries other than the Least-Developed Countries (LDCs), and Gold Standard has set up a similar guardrail.

The future governance body will also have to opine upon inclusion of CDM credits (CERs), the bulk of which are renewable energy-related projects and generally are not seen as part of the voluntary market. There is a potential case to query the additionality of some CERs. An analysis of CERs from 2013 TO 2020 show that 70 percent or more of the credits were non-additional.[81] The review of CERs would need to include credits that were later converted to credits offered by independent standards.

Another example of a project type which may require the governance body to implement guardrails is REDD+.[82] In the past, there have been concerns about baselining, permanence, and leakage. For example a forestry project could experience a loss of trees through a fire or illegal loggers could simply move to another location. In response, the voluntary carbon standards bodies have implemented a number of guardrail measures (e.g., improved project design, full accounting of potential leakage, establishment of buffer pools to manage reversal risk, and other frameworks to evaluate effectiveness). As part of the discussion on how to ensure these REDD+ projects are effective, there is a debate as to whether standalone project-based REDD+[83] should be allowed in the medium to longer term. Furthermore as many governments have begun to account for deforestation and forest degradation at the jurisdictional level, there is a need to ensure national accounting adds up, and thus for individual project based REDD+ projects to "nest" into the jurisdictional program, if possible.[84]

Given this debate, the governance organization may consider implementing additional guardrails and regularly updating these based on latest available science, through structured processes and protocols. For example, such guardrails with respect to REDD+ could include: i) Where REDD+ activities or pools are accounted for by the country at the jurisdictional scale, all such project activities must be nested within that program; ii) For activities not accounted for at the jurisdictional scale, projects can operate on a standalone basis (i.e., not required to be nested within a jurisdictional program); iii) Where previous activities are subsequently included in a jurisdictional program, credits from standalone activities would no longer be eligible (after a reasonable grace period). Additional guardrails should be implemented to ensure the existence of adequate measures to address both non-permanence and leakage. Rigorous and transparent monitoring (e.g., applying satellite imagery and in-person verification) should be carried out. Finally, it is worth noting that buyers will have the choice to select either jurisdictional or project REDD+ credits through the

81. Cames, et al., *How additional is the Clean Development Mechanism?* Oeko Institut & SEI, March, 2016, infra.ch.

82. REDD+ stands for Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks. We recognize REDD+ frameworks as acknowledged in Article 5 of the Paris Agreement. In this document, REDD+ does not refer specifically to the UN-REDD+ frameworks, but rather to those voluntary carbon methodologies that have used the UN framworks as a base

83. Project-based REDD+ generally support forest owners or local communities who receive credits to protect their forest from deforestation, while jurisdictional or nested REDD+ generally support government programs to protect forests from deforestation, potentially with private land owners "nesting" into the broader government programs.

84. It is important to note that outside of REDD+, typically other natural climate solutions such as soil and agricultural carbon, grasslands, and blue carbon do not need to be nested given that they are outside of jurisdictional accounting.

additional attribute structure.

As the governance body evolves in its guidance on the CCPs, it should be forward looking (and not act retrospectively). It will not increase confidence in the market if suppliers and financers invest in something that meets the criteria at the time but where remaining credits are no longer monetizable if or when standards change.

To ensure impartiality and control for the risk of conflicts of interest arising, the Taskforce believes the governance body should not be tied to any unique sectoral or political interests. The Taskforce acknowledges the existing ICAO/ CORSIA principles and reference contracts built on them, for example Global Emissions Offset (GEO) on CBL Markets. See Exhibit 27 for a comparison between ICAO/CORSIA principles, ICROA principles, and the CCP-proposed principles. In addition to the different treatment of REDD+ credits, CDM credits, and vintage, the main difference between ICAO/CORSIA principles and the ICROA principles is the granularity of assessment level. ICROA approves programs on the standard level (e.g., does not assess individual methodologies), while CORSIA has used a mixed approach, in some cases assessing standards and in some cases assessing individual methodologies. Ideally the governance body should work to incorporate useful lessons from ICAO/CORSIA in order to streamline the assessment of standards.

EXHIBIT 26: DEFINITION OF CORE CARBON PRINCIPLES AND ADDITIONAL ATTRIBUTES

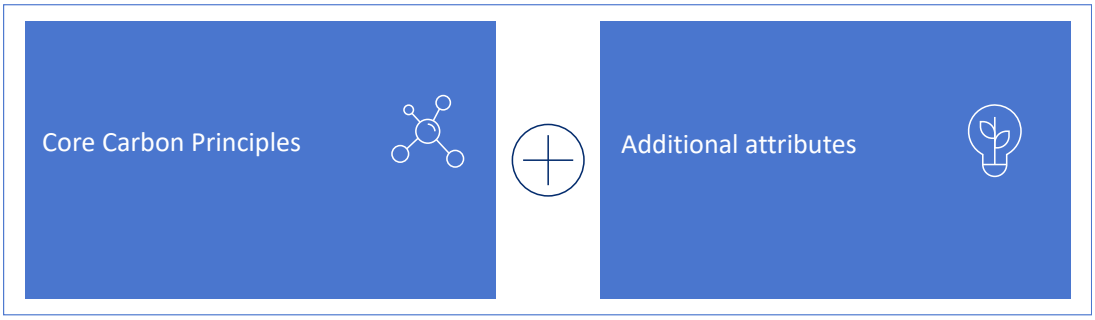
| Carbon credit components |  | |
|---|---|---|
| Description | A ton of verified carbon or carbon equivalent removed, avoided, or reduced<br>Adhering to a set of threshold quality criteria for the credit and the supporting standard / methodology | Other product attributes described in a taxonomy (eg, project type, co-benefits, region, location, vintage ) that buyers find helpful in addition to the “pure” carbon |

EXHIBIT 28: DEFINITION OF CORE CARBON PRINCIPLES AND ADDITIONAL ATTRIBUTES

| | CRITERIA | DESCRIPTION |
|---|---|---|
| Minimum quality standards for the offset product | I. Clear and Transparent Accounting Standards and Methodologies | The independent standard must publish accounting standards and methodologies that ensure that emission reductions and/or removals are:<br>• **REAL:** Measured, monitored and verified ex-post to have actually occurred.<br>• **ADDITIONAL:** Beyond GHG reductions or removals that would otherwise occur. Projects demonstrate a conservative business-as-usual scenario and must be surplus to regulatory requirements. Jurisdictional programs demonstrate additional reductions below the historical reference level.<br>• **BASED ON REALISTIC AND CREDIBLE BASELINES:** Credited only beyond performance against a defensible, conservative baseline estimate of emissions that assumes the BAU trajectory in the absence of the activity. Baselines should be recalculated on a regular, conservative timeframe.<br>• **MONITORED, REPORTED, AND VERIFIED:** Calculated in a conservative and transparent manner, based on accurate measurements and quantification methods. Must be verified by an accredited, third-party entity. MRV should be conducted at specified intervals.<br>• **PERMANENT :** Only issued for GHG reductions or removals that are permanent or, if they have a reversal risk, must have requirements for a multi-decadal term and a comprehensive risk mitigation and compensation mechanism in place, with a means to replace any units lost.<br>• **LEAKAGE ACCOUNTED FOR AND MINIMIZED:** Assessed, mitigated, and calculated considering any potential increase in emissions outside of the boundary, including taking appropriate deductions.<br>• **ONLY COUNTED ONCE :** Not double-issued or sold. |
| | II. Do No Net Harm | The independent standard must have requirements to ensure that all projects and programs consider related environmental and social risks and take actions to mitigate associated harm. |

| | CRITERIA | DESCRIPTION |
|---|---|---|
| Minimum quality standards for the supporting independent standard | III. Program Governance | The independent standard must be managed by a government or non-profit organization that sets out in a transparent manner the governance of the program, including:<br>• Roles and responsibilities of the organization, management and staff that are responsible for the program, as well as the board that oversees the organization<br>• Enforcement of rules to guard against conflict of interest by the board, management, and staff<br>• Published grievance and redress mechanisms |
| | IV. Program Transparency and Public Participation Provisions | The independent standard must have in place provisions for public stakeholder consultation on:<br>• Development of program rules and procedures<br>• Accounting methodologies<br>• Projects and governmental programs (in the case of jurisdictional crediting)<br><br>Stakeholder comments should be transparently addressed. |

| | CRITERIA | DESCRIPTION |
|---|---|---|
| Minimum quality standards for the supporting independent standard | V. Clear and Transparent Requirements for Independent Third-Party Verification | The independent standard must publish requirements for independent third-party verification and auditing, including provisions to assess and avoid conflicts of interest, and for accreditation and oversight of validation and verification bodies.<br>Further, the independent standard should require validation and verification bodies to be accredited to ISO 14065 by an accreditation body that is a member of the International Accreditation Forum. |
| | VI. Legal Underpinning | The independent standard has requirements to ensure that there is a robust legal framework underpinning the creation and ownership of all units issued, including:<br>• Requirements that project and program developers submit legal representations to accept legal responsibility for the documentation being submitted<br>• A clear definition of the legal nature of the units issued, underpinned by appropriate legal opinions<br>• Registry Terms of Use that set out further requirements in respect of interactions with the program's registry |
| | VII. Publicly Accessible Registry | The independent standard must have a publicly available registry that tracks the units issued and with the basic functionality to:<br>• Provide access to all underlying project/program information, including program documentation, verification statements, and legal representations<br>• Transparently issue, retire, and cancel units<br>• Individually identify units through unique serial numbers that contain sufficient information to avoid double counting (type, geography, vintage)<br>• Identify unit status (issued, retired, canceled)<br>• Track chain of custody, from creation to retirement |

| | CRITERIA | DESCRIPTION |
|---|---|---|
| | VIII. Registry Operation | The independent standard must have rules and procedures in place to ensure that:<br>**- ALL ACCOUNT HOLDERS:**<br>• Pass "know your customer" checks<br>• Agree to the legal requirements regarding the use of the registry, as set out in Terms of Use<br>**- THE REGISTRY:**<br>• Guards against Registry Service Provider conflicts of interest<br>• Has robust registry security and provisions for regular security audits |

RECOMMENDED ACTION 2:

## ASSESS ADHERENCE TO THE CORE CARBON PRINCIPLES

There is a need for an independent third-party organization to assess standards, methodologies, and validation against the CCPs and the set of additional attributes.[85] While it is possible for this work to be conducted by the same body as the one who hosts the CCPs, the Taskforce recommends this task to be carried out by separate expert verification agencies. These verification agencies (VVBs) should be accredited by the IAF. Verification bodies should audit, and conduct spot checks including document review and unannounced site visits.

The taxonomy should be adopted across standard setters, including the largest ones: VCS, GS, ACR, CAR, Plan-Vivo, and ART.[86] The standard setters should clarify which of their methodologies have received certification for adhering to the CCPs. While we recognize assessment at the methodology level would be significantly more burdensome than at the level of standards, it is key to address significant quality concerns from across the value chain. It will be critical as a design principle to minimize the administrative burden to the degree possible without compromising integrity.

Further work is needed to i) identify the right level of detail necessary for methodology assessments, balancing between the administrative burden and the need to ensure quality, and ii) understand how the verification agencies will interact with the CCP governance. Mechanisms should be adopted to ensure CCP oversight does not stifle innovation at the standards level.

85. CORSIA demonstrates this is possible to achieve.
86. Defined in the appendix – acronyms

RECOMMENDED ACTION 3:

## SCALE UP HIGH-INTEGRITY SUPPLY

In line with the ambition of scaling the market with high quality credits by more than 15-fold by 2030, supply of carbon credits will need to scale rapidly without sacrificing integrity or the underlying projects impact on local communities. This scale up will need to come from both nature and technology. Although 8 to 12 GtCO2 per year of potential carbon credits have been identified by 2030, there are a number of significant mobilization challenges to bring this potential to market. Of this 8 to 12 GtCO2 per year, 65 to 85 percent comes from NCS- particularly avoided deforestation and avoided peatland impact (3.6 GtCO2 per year). Scaling NCS requires efforts from both smaller-scale project developers and large multinational firms. Removals credits will need to come from emerging technology such as BECCS, DACCS, and others, as well as existing large multinational firms that are well placed to further industrialize these technologies.

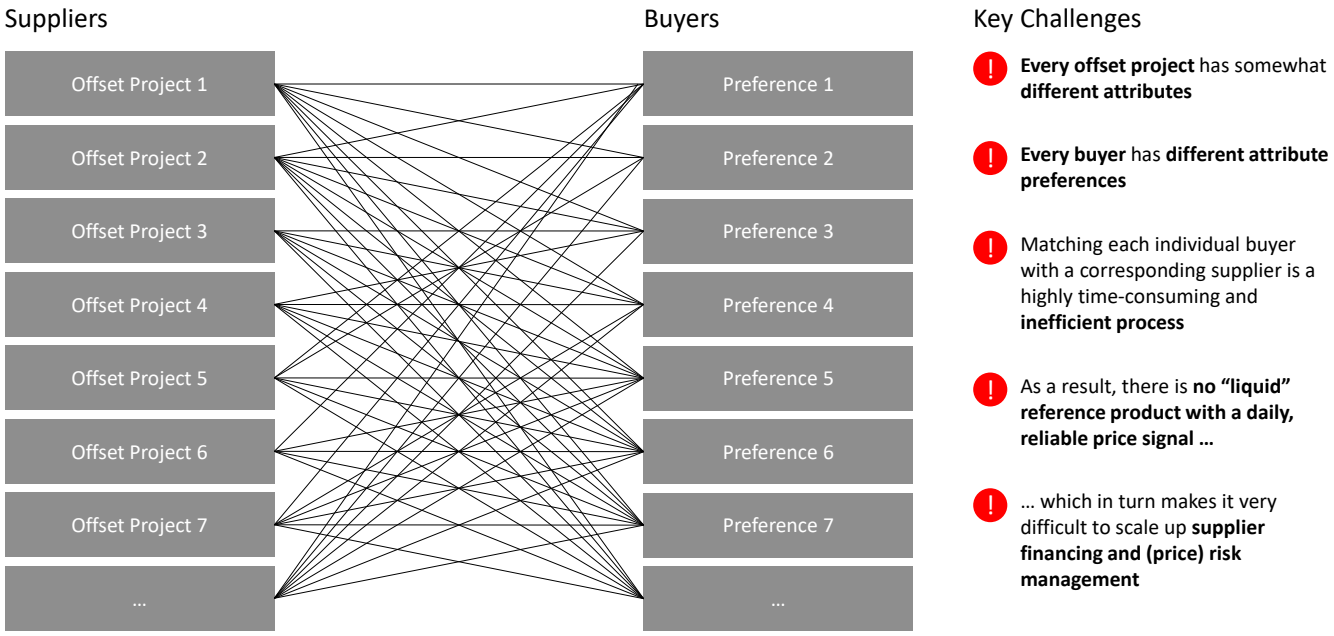
To support small-scale suppliers, the Taskforce recommends a supplier/financer matching platform, where suppliers can upload proposed projects. The platform should ideally include a supplier risk registry, for example allowing upload of previous project development history and credit score, and be subject to the same standards and controls that would apply to any other voluntary carbon markets infrastructure. For negative emissions technology (e.g. DACCS, BECCS) and other maturing climate technologies (e.g. green hydrogen, sustainable aviation fuel), the Taskforce encourages the development of new methodologies in a timely and robust manner.[87] Industry partnerships to galvanize support around developing these challenging low carbon solutions within their core value chain will be a critical enabler. Across all supply categories, we emphasize the need for credits to be validated and verified under approved CCP-aligned methodologies. All quality criteria need to be met and the guardrails discussed for different project types need to be in place.

For large players who seek to support project development for voluntary carbon markets, there are a number of ways in which companies can be helpful in leveraging their existing capabilities toward climate mitigation projects. For nature, this could mean partnering with organizations to tackle challenges associated with major project development or, in the case of REDD+, convincing key stakeholders (e.g., government) that there is long-term demand for the credits and a desire for nesting. For example, an oil-and-gas developer may be effective in leveraging its skills in clarifying carbon rights, nesting regulation, benefit sharing to increase the social, environmental, and economic benefit for the project site. For technology-based credits, companies can invest in innovation and consider retrofitting relevant assets. Across all project types, developers will need to ensure CCP-compliance on environmental and project integrity, including ensuring that all guardrails are in place and potentially creating positive social impact above and beyond the CCPs.

87.

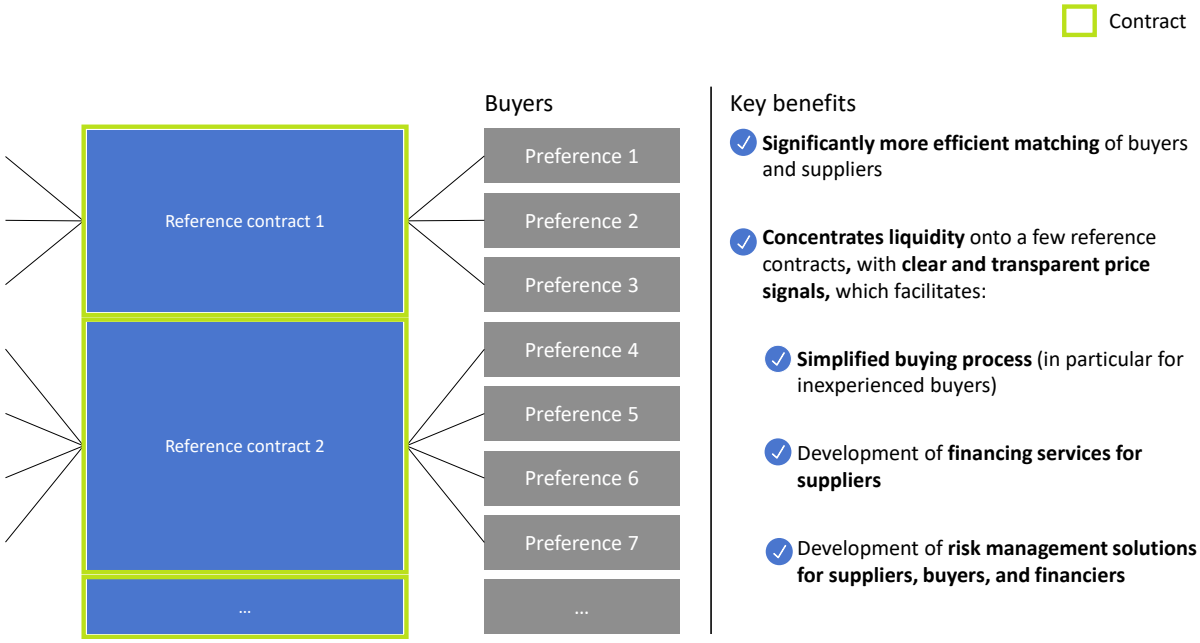
Every project has somewhat different attributes (e.g., carbon removal versus avoidance, geography, vintage, project type) and every buyer has different attribute preferences. For example, some buyers look to purchase credits linked to their geography or supply-chain or credits which offer particular SDG-impacts or co-benefits. Matching each individual buyer with a corresponding supplier is a time-consuming and inefficient process (Exhibit 29). As a result, there are no liquid reference contracts (e.g., spot and futures) with a daily, reliable price signal, which in turn makes it very difficult to scale up supplier financing and (price) risk management.

EXHIBIT 29: THE CHALLENGE IN A NUTSHELL (SIMPLIFIED)



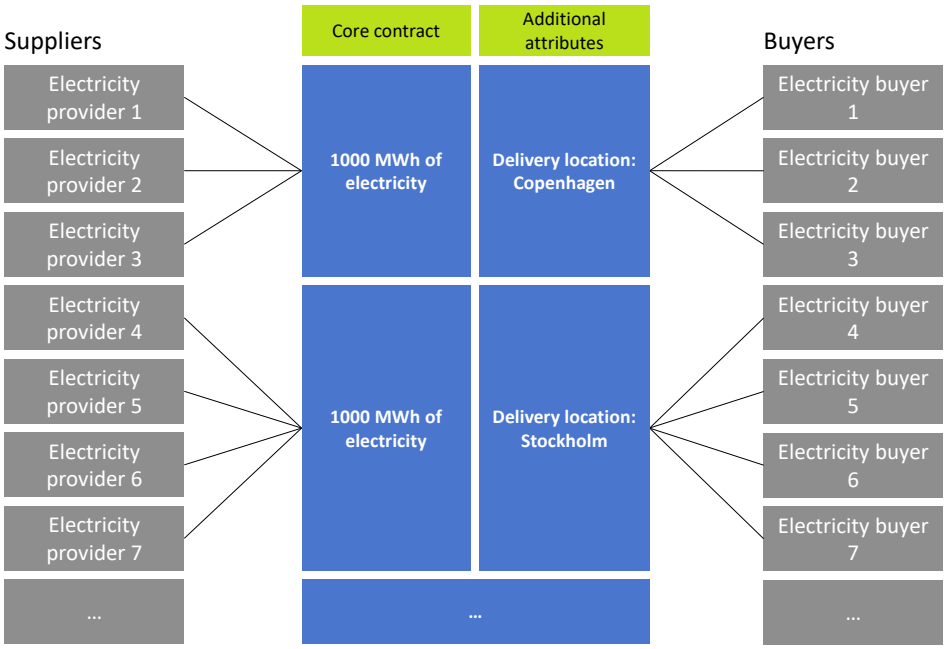

Reference contracts can bundle suppliers' products and buyers' preferences to allow for significantly more efficient matching of buyers and suppliers (Exhibit 30). Buyers benefit from a simplified buyer journey and increased. price transparency. Suppliers benefit from price risk management and improved access to financing, as well as a clear price signal to inform their investment decisions.

## EXHIBIT 30: THE SOLUTION IN A NUTSHELL (SIMPLIFIED)




Several other markets with non-standardized products (e.g., corn, oil and other commodities) have successfully implemented reference contracts in the past. The Nordic power markets (Exhibit 31) have the Nordic System Price as the core contract, and attributes (in this case the location of delivery) are traded as an add-on to the core contract. Many other commodity markets work according to similar principles and have succeeded in standardizing and scaling contracts despite the vast complexity of the underlying physical substance, without compromising on integrity and quality.

## EXHIBIT 31: REFERENCE CONTRACT IN THE NORDIC POWER MARKET




**Nordic System Price** *(Nasdaq)*

- Standard quantity
- Delivered at standard time
- Traded daily, highly liquid
- Enables risk management and supplier financing

**Very limited number of add-on contracts to account for different delivery locations** (eg, Copenhagen vs. Stockholm)

RECOMMENDED ACTION 4:

## INTRODUCE CORE CARBON SPOT AND FUTURES CONTRACTS

The Taskforce recommends the introduction of a spot and futures reference contract, based on the CCPs, with physical delivery. This contract bundles credits that satisfy the CCPs from several suppliers into one contract. A buyer receives any of the eligible carbon credits traded in the "Core Carbon Contract" and, at delivery, a certificate for the particular underlying credit.

One potential way these contracts could emerge is that exchange traded spot market contracts with transparent price signals will enable a forward curve to develop. As that curve develops, it will enable futures markets to develop contracts based on the reference contract. Futures contracts serve the longer-dated needs of the market. The core futures contracts should have suitable maturities (e.g., one year), be cleared at clearinghouses, and offer the option to financially settle (no actual delivery of certificates). Futures contract should be fungible to allow for trading across all markets and not only on a single platform, potentially enhancing market liquidity. The futures market will be the basis for industrialized financing. Banks and financiers will be able to finance against a futures price. Financing can also be linked to offtake agreements (allowing banks to finance project development based on the existence of a contract with a future buyer already in place).

In addition to the core carbon spot and futures contracts, which are based on the CCPs, additional attributes demanded by buyers (such as the distinction between removal and reduction credits) can be woven into additional reference contracts (see contract option 2 in Exhibit 32) that can either be priced and traded as a "basis" (difference to) the core contracts, or as standalone contracts. The Taskforce recommends these contracts be traded as a basis to core contracts. A buyer will receive any carbon credit that qualifies for the "core carbon contract" and in addition fulfils the desired additional attributes. At delivery, a certificate for the underlying credit, related to that specific additional attribute, will be presented to buyers. Crucially, the number of permutations of these additional reference contracts should be kept to a minimum. The goal is to concentrate as much liquidity in as few contracts as possible. Therefore, the additional reference contracts should represent the most prevalent buyer preferences[88]

These core carbon contracts should also be set up to allow more flexible purchase sizes for buyers, with different underlying projects amalgamated together to deliver the size required.

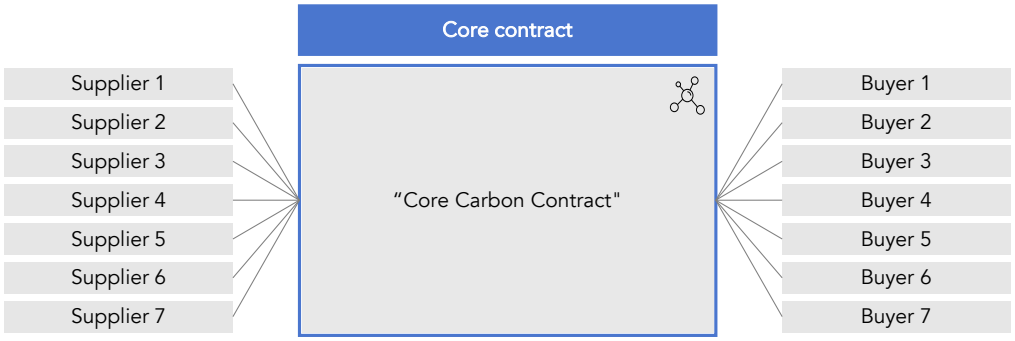
88. For co-benefits, we encourage recognition and further development of existing programs (e.g., the Blue Carbon Initiative for marine-based co-benefits, and Gold Standard's Black Carbon Quantification Methodology for co-benefits of addressing pollutants, the Verra's Sustainable Development Verified Impact Standard (SD Vista) and Gold Standard for the Global Goals for SDG outcomes, and Verra's Climate, Community & Biodiversity (CCB) Standards for benefits to community and biodiversity).

## EXHIBIT 32: CONTRACT OPTIONS FOR THE VOLUNTARY CARBON MARKET

Contract

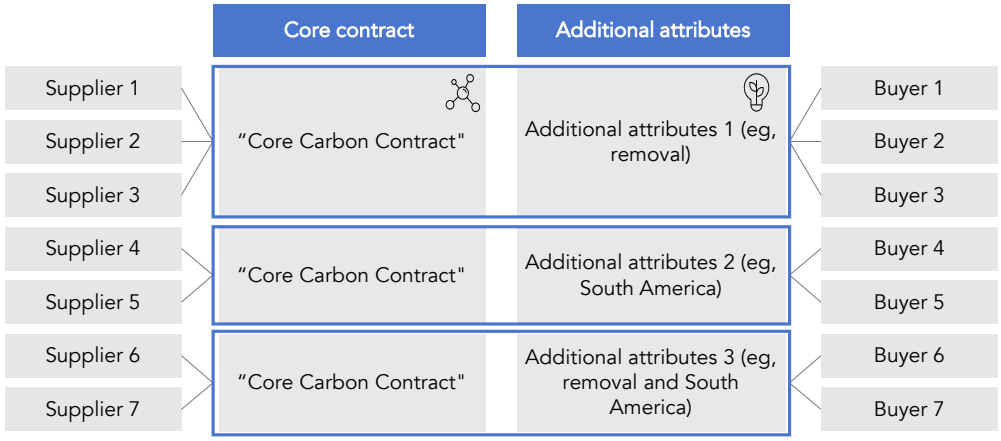
### Exchange-traded reference contracts

**1 Core reference contract which fulfills the "Core Carbon Principles"**




A buyer will **receive any carbon credit that qualifies** for the "Core Carbon Contract". At delivery the buyer receives the certificate for the underlying credit

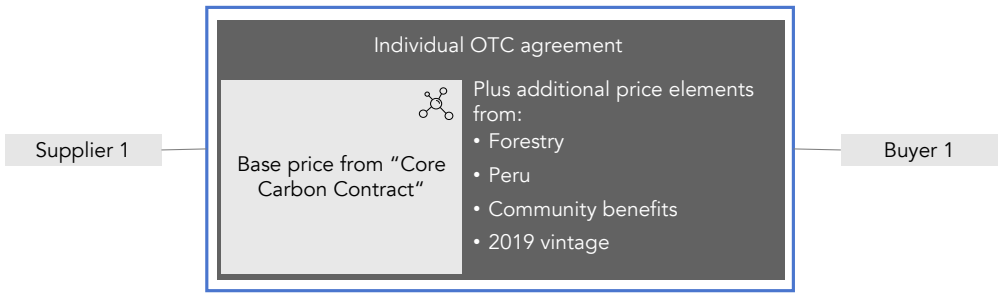
**2 Reference contracts which combines the "Core Carbon Contract" with select additional attributes[1]**




A buyer will **receive any carbon credit that qualifies** for the "Core Carbon Contract" and fulfills the requirements of the additional attribute(s) specified. At delivery the buyer receives the certificate for an underlying credit which fulfils the Core Carbon Contract and the additional attributes

### OTC contracts

**3 OTC contracts leveraging reference contracts as benchmarks for pricing**

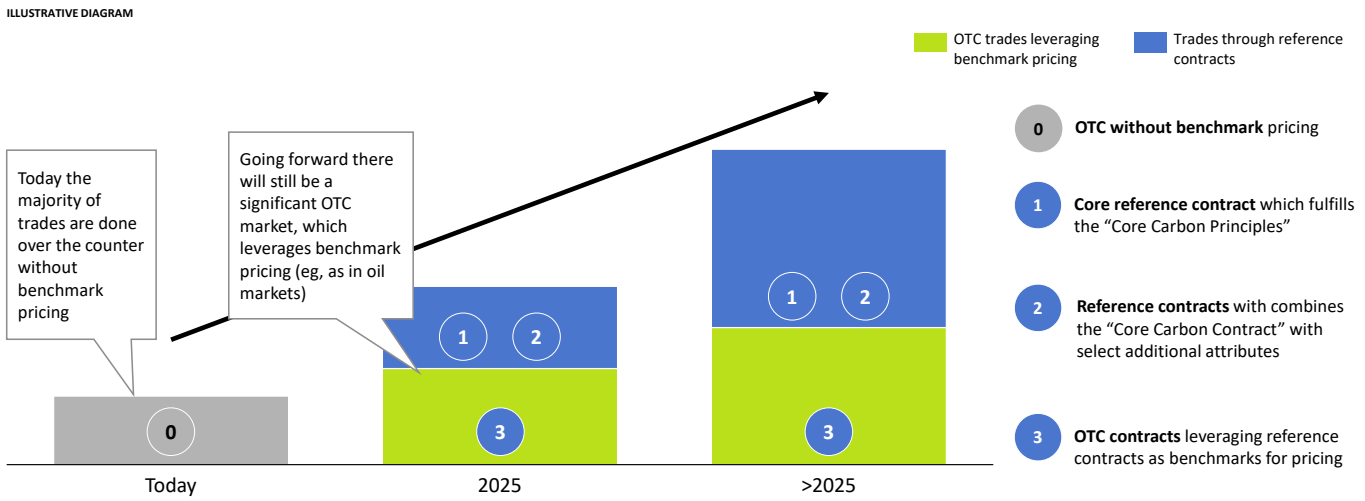



A buyer will **receive a carbon credit certificate from a pre-specified project** with particular attributes that the buyer wants (eg, location, project type)

1. Two sub-options exist: i) Core Carbon Contract and additional attributes traded within one contract ii) Core Carbon Contract and additional attributes traded as two fully separate contracts

For reference contracts to develop into a pricing benchmark and enable the associated benefits, a substantial proportion of buyers must switch their purchasing away from OTC and toward reference contracts (spot and futures). We therefore recommend that large buyers make this transition in their carbon credit portfolio over the coming years (Exhibit 33). The more that contracts in general can be referenced to the core carbon contract, the more the liquidity will grow.

## EXHIBIT 33: BROAD ADOPTION IS KEY TO SUCCESS




Concentration of liquidity and associated benefits **only materialize if reference contracts are widely adopted**. This will require buyers to adapt purchasing behavior. We would recommend buyers to transition a part of their carbon credit portfolio to reference contracts.

## RECOMMENDED ACTION 5:

## ESTABLISH AN ACTIVE SECONDARY MARKET

A secondary market is where investors buy and sell securities they already own. The creation of a functioning, liquid, transparent secondary market is core to the success of any mainstream market. Its presence provides many benefits for participants across the value chain, from suppliers through to buyers (including both corporates that intend to retire as well as investors). This can equally be true in the market for voluntary carbon credits and will need to be a core part of market scaling. For voluntary carbon markets, a secondary market is where credits can be traded beyond a first transaction between a buyer and seller[89], provided that the credit has not been retired. The EU ETS is an example of a carbon market with an active and liquid secondary market.

There are a number of benefits associated with a secondary market, especially when transacted on an exchange. These benefits include increased transparency of pricing, development of better risk management of carbon exposure and reduction, ability to change strategy to support an organization's change in carbon credit focus, lower volatility in pricing, introduction of investors, and more efficient trading through a tighter bid-ask spread. These benefits matter to investors, buyers, and sellers, who can all participate in the secondary market.

A functioning secondary market, especially one in a public market where existing data distribution mechanisms are in place, provides transparency of the prices arrived from both quoting (pre-trade) and transactions (post-trade). By its nature a secondary market will consist of trading of instruments multiple times prior to the ultimate retirement of a credit as an offset. Thus the price information from a functioning secondary market can exceed by many times the information coming from a primary market. This transparency provides essential

89. First seller would typically be the developer.

information on which participants in the market can base their decision.

As a market develops its participants would want and need to manage risk to that particular sector. In the case of the carbon markets, this will include managing the differences between emission reduction projects and their timelines and the commitments made by the firm around reduction of emissions. Secondary markets allow participants to manage those risks through the ability to easily buy or sell credits which address that management. In addition a secondary futures market provides ability to manage that risk through future commitments rather than needing to purchase outright credits.

- Third, a secondary market and the liquidity it provides allows firms to change their strategy more efficiently. This is likely to result in firms making commitments in voluntary carbon markets if they know that they have the ability to change that strategy or commitment if their circumstances change. If a firm were unable to make changes to their carbon reduction strategy due to an inability to exit a carbon credit position they are less likely to enter the position in the first place, thus reducing demand for the market.
- The more liquid a market is the lower the volatility the prices in that market are (see work by Amihud (2002) amongst others). As such, while there is a view that financial markets bring volatility and price variation due to the introduction of speculation the empirical evidence is otherwise. A more liquid market with a variety of participants reduces price volatility and provides a more stable basis for entering and exiting positions. This is likely to be equally true in secondary carbon credit markets.
- Finally, as has been seen in the compliance carbon markets (such as the EU ETS) a liquid secondary market with more certain pricing and the known ability to enter and exit positions creates attraction for investors. The introduction of investors into a market helps further increase the liquidity within it, further supporting the existing players. In addition, specifically within the carbon markets, the introduction of investors in the creation of credits which (assuming other aspects of the report are acted upon) will further support increased projects thus further supporting the achievement of the market's carbon-reduction goals. It is also likely (as has been seen in the compliance markets) to lead to an increase in prices as demand grows and investors see the value in carbon credits as an asset which will increase in value. This can therefore have the desired effect of creating an increase in prices for carbon, further driving value into carbon emissions reduction projects.

All in all, a secondary market brings more efficient trading. A liquid transparent secondary market provides a smaller difference between the price a seller would sell at and the price a buyer would buy at (the bid-ask spread). This reduces trading friction and the implicit cost of trading for end participants in the market. Buyers and sellers who have an insight into the pricing will be able to transact more readily and more frequently, creating a virtuous circle of liquidity if the cost of those trades comes down.

Additional services may arise in the secondary market—one example could be the development of indices. An index would track the price of multiple underlying carbon credits. This would allow buyers an easy-to-use tool to hedge price risks against long-term commitments, and would allow

financial investors easy access. This would help generate further liquidity in the market. Any index would ideally also be constructed to change over time, initially being primarily constructed of avoidance/reduction credits, but over time shifting to removals.

It will be important to create access to the markets for participants who traditionally were not present in the financial markets and may have faced barriers navigating the complexity involved in onboarding to an exchange or clearing house (e.g., not have the capital to engage). Access could be improved through existing bank intermediaries, brokers, or via a specific carbon development bank. It will also be important to drive awareness for buyers and sellers about these access point.

RECOMMENDED ACTION 6:

## INCREASE TRANSPARENCY AND STANDARDIZATION IN OVER-THE-COUNTER (OTC) MARKETS

Over-the-counter (OTC) markets will continue to exist after the development of reference contracts, but will be tightly linked to them. There are various reasons why buyers may not wish to trade on an exchange, such as the need for highly bespoke contracts (e.g., specific co-benefit needs in particular locations) or the complexity involved in onboarding to an exchange or clearinghouse. However, OTC markets will benefit from the development of reference contracts. When negotiating OTC contracts, both parties can use the price of the liquid core carbon contract as a starting point, negotiating only the pricing for the additional attributes, however complex they might be (e.g., unique combinations of project type, location, vintage, SDG-impact and other co-benefits, etc.).

To facilitate the continued growth of OTC markets, standardized contracts are needed to facilitate negotiations (these contracts are further discussed in recommended action 15 on legal and accounting enablers). Further digitization of voice-brokered OTC services can also drive efficiencies. There can also be high value in providing post-trade risk reduction services (e.g. compression services[90]) to provide further efficiencies in the OTC market. Finally the OTC market would greatly benefit from increased transparency, one way to achieve this could be the entry of price reporting agencies such as Platts, OPIS[91], Argus, or Heren.

90. Compression is a process of replacing multiple offsetting derivatives contracts with fewer deals of the same net risk to reduce the notional value of the portfolio. It can be carried out between two or more counterparties (bilateral and multilateral compression respectively).

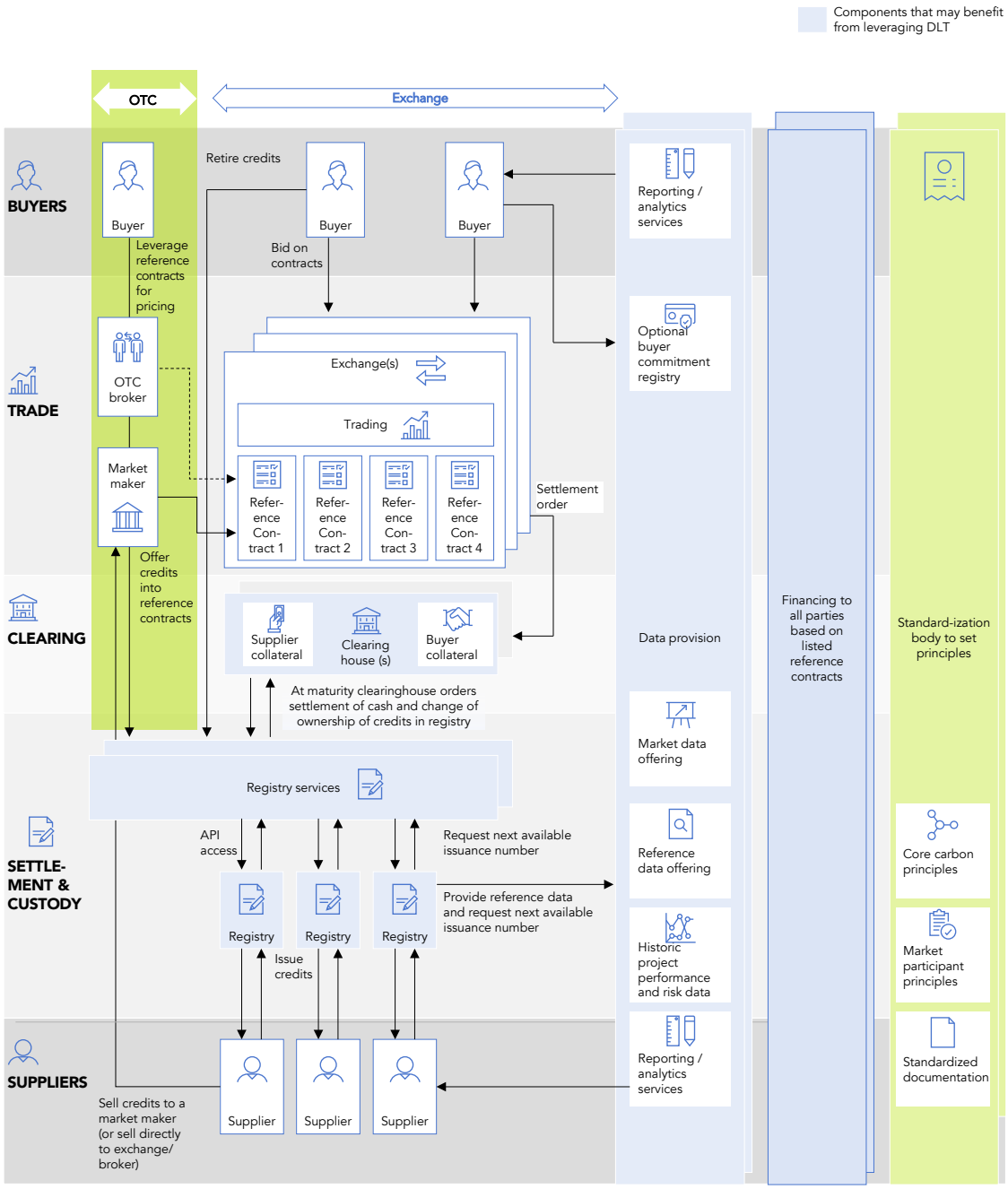
91. Platts and OPIS have launched daily price reports for a subset of voluntary carbon markets.

# INFRASTRUCTURE:

## TRADE, POST-TRADE, FINANCING, AND DATA INFRASTRUCTURE

For a market to function, a core set of infrastructure components needs to be in place. These components must work together in a way that is resilient, flexible, and able to handle large-scale trade volumes. The required components of the future architecture can be found in Exhibit 34.

### EXHIBIT 34: TRADE INFRASTRUCTURE DESIGN




Source: McKinsey analysis

The critical recommended actions to develop the target infrastructure are outlined below.

RECOMMENDED ACTION 7:

## BUILD OR UTILIZE EXISTING HIGH-VOLUME TRADE INFRASTRUCTURE

Robust trade infrastructure is a vital precondition for the listing and high-volume trading of core carbon reference contracts (spot and futures), as well as contracts reflecting a limited set of additional attributes. Exchanges should provide access to market data, for example through APIs. They should also adhere to suitable cybersecurity standards. OTC infrastructure should continue to exist in parallel to exchange infrastructure, and OTC brokers are encouraged to provide increased transparency on market data.

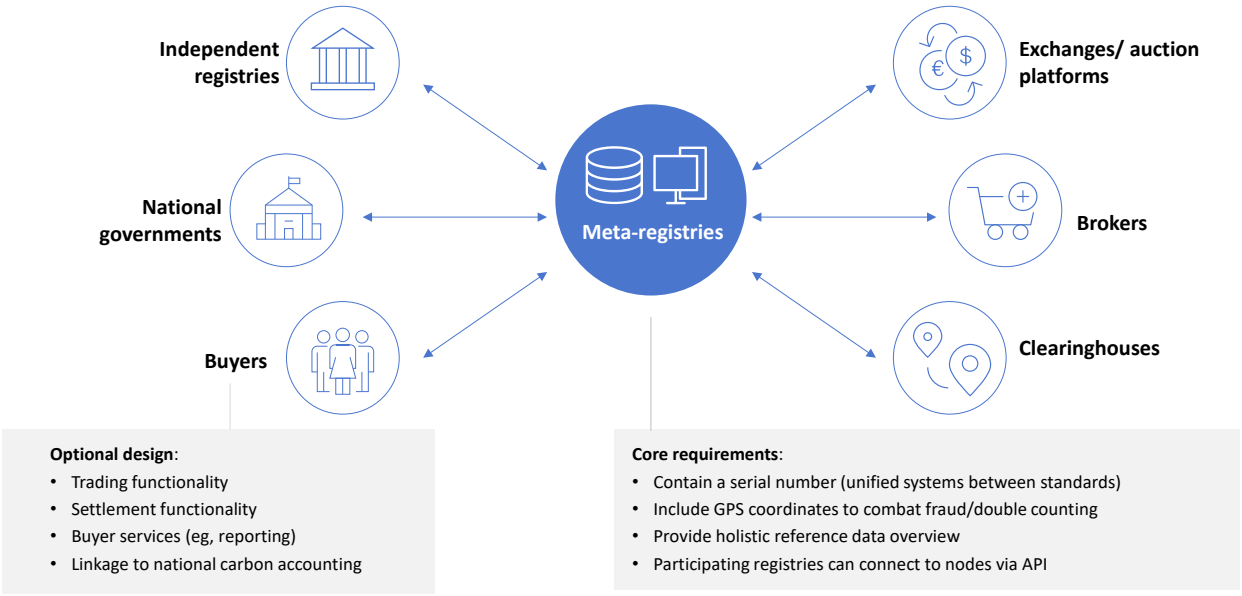
RECOMMENDED ACTION 8:

## CREATE OR UTILIZE EXISTING RESILIENT POST-TRADE INFRASTRUCTURE

Clearinghouses are needed to enable a futures market and provide counterparty default protection. They should offer access to relevant data (e.g., open interest), for example through APIs. Meta-registries should provide custodian-like services for buyers and suppliers and enable the creation of standardized issuance numbers for projects across existing registries (similar to the concept of ISINs in capital markets) (Exhibit 35). Meta-registries along with the underlying registries of the standards providers should apply suitable cybersecurity standards to prevent risk of hacking. A meta-registry could potentially be set-up through a multiple step process. First, a common information model could be developed so that registries' information can be matched. Then, a web-services-based interchange between registries could be created, with the information being available read-only to all users. This allows for project and user transparency and enables due diligence about the users. Finally, a DLT-based database can be created to hold the information about projects, validation, verification, issuance, retirements, beneficiary and purpose of retirement. Infrastructure should be aligned to the Committee on Payment and Settlement Systems– International Organization of Securities Commissions (CPSS-IOSCO) Principles for Financial Market Infrastructures. If possible, the meta-registry should connect to the national registries as well as the voluntary independent registries to maximize data interoperability.[92]

92. See World Bank Data Warehouse concept.

EXHIBIT 35: RECOMMENDED ARCHITECTURE FOR A META-REGISTRY




Source: McKinsey analysis, IHS Markit

RECOMMENDED ACTION 9:

## IMPLEMENT ADVANCED DATA INFRASTRUCTURE

Sophisticated and timely data is essential to all environmental and capital markets. In particular, data providers should offer transparent reference and market data, which is not readily available today, due to limited registry data access and an OTC market with limited transparency. Taskforce encourages that statements of retirement of credits and in which entity's name the credits were retired. Data providers should also collect and offer historic project or project developer performance and risk data to facilitate structured finance and the formulation of OTC contracts. New reporting. and analytics services (spanning across registries) need to be developed for buyers and suppliers. Implementation could be supported by meta-registries, which collect and structure all openly accessible reference data. A critical enabler is that all registries offer reference data through open APIs, including an offset product markup language (OpML) to ensure consistent data parameters. Furthermore intermediaries (e.g., exchanges and clearinghouses) should include trading information in their existing data flows.

RECOMMENDED ACTION 10:

## CATALYZE STRUCTURED FINANCE

Banks and other supply chain financiers should provide lending facilities for project developers (both capital expenditures and working capital) collateralized by the right to generate carbon credits, subject to successful validation and verification. In the medium to long term, a liquid spot and futures contracts market for carbon credits would provide a great foundation for structured finance offerings because it would provide clarity on pricing and facilitate risk transfer, improving the overall bankability of these projects. In particular, per standard structured finance approach, financing should be provided based on expected cashflows from offtake agreements. This is an important way of bridging the gap between immediate investment/capital needs and expected future cashflows. However, since futures contracts will not materialize in the short term, additional structured finance solutions are required to provide a comprehensive suite of solutions for developers, for example to finance natural climate solutions in the short- to medium-term. This is particularly relevant for developers of projects that are currently not bankable, due to a lack of credit history or previous project development experience. Whether in the interim or after a fuller set of structure finance offerings is developed, the market should focus on improving the bankability of projects, including developing approaches that can support the verification of Core Carbon Principles in the projects seeking financing.

The Taskforce recommends the following steps to catalyze financing:

- Develop data transparency on risk, including previous project/supplier performance.[93]
- Develop matching platform for suppliers and financiers in the interim (see recommended action 3)
- Equip and train financiers across the ecosystem to rapidly assess execution risk.
- Provide recognition for banks that finance offset projects (e.g., develop "green financier" label or extend existing labels).
- Encourage existing development banks and green investment banks to commit to increase lending facilities for suppliers, in particular for the smallest suppliers.
- Uphold transparency and continued high standards on AML/KYC.

The Taskforce's aim over the long term is to create a market that can generate standalone funding for emissions reductions. Use of public finance should only be a bridge solution. Furthermore, the Taskforce recommends that banks check to ensure that projects meet or are on a path to meeting the CCPs before providing financing and/or claiming recognition.

93. This could be done by data providers in the market.

## CONSENSUS ON THE LEGITIMACY OF OFFSETTING

There are potential misconceptions on the role of offsetting in supporting a 1.5-degree Celsius degree pathway. A key issue facing development of voluntary carbon markets arises from a lack of shared vision of the role of offsetting in supporting achievement of net-zero goals and the legitimacy of carbon offsetting as a corporate practice, especially when considered in comparison to other decarbonization activities (e.g., reduction of a company's own emissions). There are valid concerns regarding the robustness of carbon credits, stemming from past controversies, market failures, and the potential for offsetting to be misused. Some of these concerns pertain to the structure of carbon credits themselves, including the additionality of certain types of projects. Other concerns relate to the use of offsetting, and whether or not offsetting may create unintended disincentives for corporate action to reduce emissions internally.

In its desire to shift public perceptions, the Taskforce has focused on principles to ensure that offsets are used credibly and on clarifying the claims that companies make about their use of them.

RECOMMENDED ACTION 11:

## ESTABLISH PRINCIPLES ON THE USE OF OFFSETS

Offsetting can raise climate ambitions if pursued in conjunction with a company's efforts to reduce its own emissions. Establishing clear principles on the use of offsets is critical.

The taskforce proposes the following set of Principles for net-zero-aligned corporate claims and use of offsets

1. Reduce: Companies should publicly disclose commitments, plans, and annual progress to decarbonize operations and value chains in line with science to limit warming to 1.5-degree Celsius as per the Paris Agreement, using best available data, and prioritize fully implementing these commitments and plans.[94] This includes making public (or subjecting to external audit) the basis on which claims are made.
2. Report: They should measure and report Scope 1, Scope 2, and, wherever possible, Scope 3 greenhouse gas emissions [95] on an annual basis using accepted third-party standards for corporate greenhouse gas accounting and reporting.

- Offset: Where unabated emissions remain on that transition pathway, companies are strongly encouraged to compensate a share of unabated emissions annually during the transition to net-zero through the purchase and retirement of carbon credits generated under credible third-party standards.[96]

These principles are meant to guide action and encourage "best practice." For example,

94. To be refined to include guidance on who may make the determination of "best available climate science" and guidance on grace periods as corporates adapt to changes.
95. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain..
96. Corporates do not have to commit to offsetting all emissions as long as offsets are part of a credible transition plan to net-zero; these can be avoidance/reduction or removal/sequestration offsets.

Scope 3 coverage varies by sector and its accounting methodologies will continue to evolve. Companies should increase their Scope 3 coverage over time and follow the best available guidance for the sector (see sidebar, "Scope 3 Accounting in the Context of Offsetting").

## A NOTE ON CARBON VERSUS FINANCIAL ACCOUNTING

When accounting is discussed in the context of voluntary carbon markets, it may be referring to carbon accounting or financial accounting. Carbon accounting can occur at different levels and for different entities. A country can account for its carbon in its national GHG inventory. A corporate could use the system of Scope 1, 2, 3 accounting laid out by the GHG Protocol. And an individual can tally their carbon footprint. Financial accounting, on the other hand, dictates how carbon credits are regarded within a company's financial statements. As of right now, voluntarily purchased carbon credits are frequently regarded as expenditures rather than assets. More on financial accounting is discussed in recommended action 15.

Accounting is closely associated with reporting and disclosures. There are a number of disclosures investors and the public may be interested in. The TCFD is the most recent guidance issued for best corporate practices in disclosing climate-related financial risk. Across ESG dimensions, SASB and a number of other standards provide guidance on the variables/categories that are insightful to understand a company's performance along each of the environment, social, and governance dimensions. Finally, disclosure of a company's climate targets and how it plans to meet them is core to voluntary carbon markets. While there are some guidelines (e.g., from SBTi on science-based targets), there is no uniform disclosure requirement for how companies plan to meet their net-zero targets on a "glidepath" (see recommended action 12 for discussion of initiatives that is working on further guidance here). Companies are currently not required to disclose any details on their offset purchases used to meet their claims.

### III. SCOPE 3 ACCOUNTING IN THE CONTEXT OF OFFSETTING

The Taskforce recommends the measurement and reporting of Scope 1, Scope 2, and wherever possible, Scope 3 greenhouse gas emissions on an annual basis. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain. Broad Scope 3 guidelines are detailed in the GHG Protocol for all corporates, and it is the Taskforce's position that companies should complete Scope 3 inventory to the fullest extent.

### IV. CONSULTATION ACROSS THE TASKFORCE REVEALED A FEW KEY POINTS:

First, Scope 3 measurement is a powerful lever for companies to measure their decarbonization progress. For example, a consumer product company with products that when used create emissions would have significant Scope 3 implications. Measuring it allows companies to make more Paris-aligned decisions, including identifying residual emissions necessary to be offset. Similarly, for financial services, the measurement of Scope 3 would redirect fund flow from carbon-intensive assets to low-carbon assets, creating incentive for financiers to provide structured finance products for offset projects.

Second, guidance on measuring Scope 3 is evolving. The existing GHG Protocol provides broad coverage on Scope 3 accounting across sectors, and sector-specific Scope 3 guidance is emerging for industries where Scope 3 is difficult to measure. One such example is the

Partnership for Carbon Accounting Financials (PCAF), which provides some guidance on how financial institutions can assess and disclose greenhouse gas emissions of loans and investments. Despite some progress, the Taskforce recognizes the complexity involved in Scope 3 measurement, the limitations on data availability, and the added accounting burden. Companies are encouraged to make their best effort on Scope 3 measurement as they adhere to the Principles for Net-zero-Aligned Corporate Claims and Use of Offsets.

Offsetting can also be offered by corporates as products or at the point of sale (POS). Offset products can include a range of offerings (e.g., for a commercial flight, as part of a credit card that offsets every purchase). Innovation and market evolution make it impossible and undesirable to anticipate every use case, but principles for the credible use of offsetting in products or at POS can help guide responsible action.

The Taskforce proposes the following Principles for Credible Use of Offsets in Products or at POS:

1. Companies should follow the Principles for Net Zero-Aligned Corporate Claims and Use of Offsets. Offsetting in products or at POS similarly should not disincentivize their own emissions reduction.
2. Scope 3 emissions cover the use of products and services sold by the reporting company. Companies should be explicit about how they account for the offsets in products and at POS in their Scope 3 reporting and with the consumer on the consumer product label.[97]
3. Companies should ensure minimum pricing and product transparency for their customers. Elements of such transparency could potentially include:
   a. Being clear about profits, if any, that companies are making from their offset products on the premise that consumers should have a choice of offsetting through a different channel if pricing is distorted from the market price[98]
   b. Informing consumers whether the credit or the offset product they purchase has any additional benefits (i.e., co-benefits) beyond emissions reductions
   c. Allowing end-consumers to access data that validates the retirement of their purchased credits (e.g., a gasoline customer's app tracks when the customer bought offset gasoline and provides the unique identifier of the credit tied to the purchase), or they seek third- party validation and auditing of POS products to demonstrate the use of funds against traded spot or future contracts and the delivery of the requisite credits

97. For example, if a customer uses a credit card that offsets every purchase, both the bank and the merchant may claim credit for the offset. This double counting, implicit in the way Scope 3 works (pending changes to this accounting framework), should be made clear to consumers.
98. Similar to the Seller's Pledge put forth by Richard and Dee Lawrence, the founders of the Cool Effects crowdfunding platform.

RECOMMENDED ACTION 12:

## ALIGN GUIDANCE ON OFFSETTING IN CORPORATE CLAIMS

An increasing number of corporates are making commitments to align business models with decarbonization goals, including in the form of time-bound decarbonization targets (e.g., targets for achieving net zero emissions for internal operations and supply-chains by a certain date). Corporate commitments on climate action range from science-based targets via the Science-Based Targets Initiative (SBTi), to net-zero, carbon neutral, and carbon negative (Exhibit 36). Frameworks for such commitments and claims are being put forward by multi-stakeholder coalitions and initiatives, including the SBTi, which is in the process of developing standards for how net-zero and climate positive claims should be set and monitored (Exhibit 37).[99] For example, while offsetting is not counted toward science-based (emissions reduction) targets, SBTi does recognize the role of offsetting toward net-zero claims. ISO similarly has significant development underway for a new International Standard on Carbon Neutrality (ISO14068)[100], with over 20 countries participating. The Taskforce highlights Strategy 5 from the SBTi report as an example of an ambitious net-zero targeting setting, where offsets can play a significant complementary role after emissions minimization and abatement options are exhausted. Furthermore, the strategy also highlights the importance of making a difference through annual climate mitigation action rather than postponing action to the target year.

99. *Foundations for Science-Based Net-Zero Target Setting in the Corporate Sector,* SBTi and CDP, September 2020, science-basedtargets.org.

100. See ISO website for ISO14068 information alongside other initiatives: https://www.iso.org/standard/43279.html.

## EXHIBIT 36: DIFFERENCES BETWEEN CORPORATE CLAIMS

NOT MUTUALLY EXHAUSTIVE

| | | Description | Treatment of offsetting | Offsets used | Reporting protocols/ standard setters |
|---|---|---|---|---|---|
| Increasing use of offsetting | Science-Based Target (SBT) | Target **consistent with the level of decarbonization required** to limit global temperature increase to less than 1.5 to 2°C above preindustrial levels | Offsetting is not counted towards SBTs; however, SBTi recognizes the use of offsets for net-zero claims | None | SCIENCE BASED TARGETS DRIVING AMBITIOUS CORPORATE CLIMATE ACTION |
| | net-zero | Target to achieve a scale of **value-chain reductions over time** and to **neutralize the impact of any residual emissions** (not mutually exclusive with SBT) | Offsets used for the residual emissions at net-zero or to compensate for emissions during the transition process | TBD (SBTi guidance on net-zero claims pending[1]) | None right now, SBTi in consultation process to set a net-zero protocol, incl. guidance on use of offsetting in net-zero claims |
| | Carbon neutral | Target for the company to **compensate all emissions produced** in a **set period**, usually evaluated on an annual basis | Offsets are used to balance against unabated emissions | All types | Climate Neutral Company; CLIMATE NEUTRAL; CERTIFIED CARBON NEUTRAL company; Carbon Neutral PAS 2060 |
| | Carbon negative | Target where the company **goes beyond achieving net-zero emissions** to create an environmental benefit by removing additional emissions | Offsets are required to achieve this target | TBD (Primarily removal for some[2]) | None right now |
| | Carbon free | Target to use 100% clean energy or materials to **directly power company operations** (can be used as a bolt-on target to any previous claims) | n/a – offsetting does not apply here, primarily applied to energy currently | n/a | None right now |

1. Subject to change in the SBTi consultation process; Under the preliminary report, all offset types are allowed as long as they are high-quality during the transition to net-zero and only removals are allowed for residual emissions at net-zero
2. Eg, Microsoft

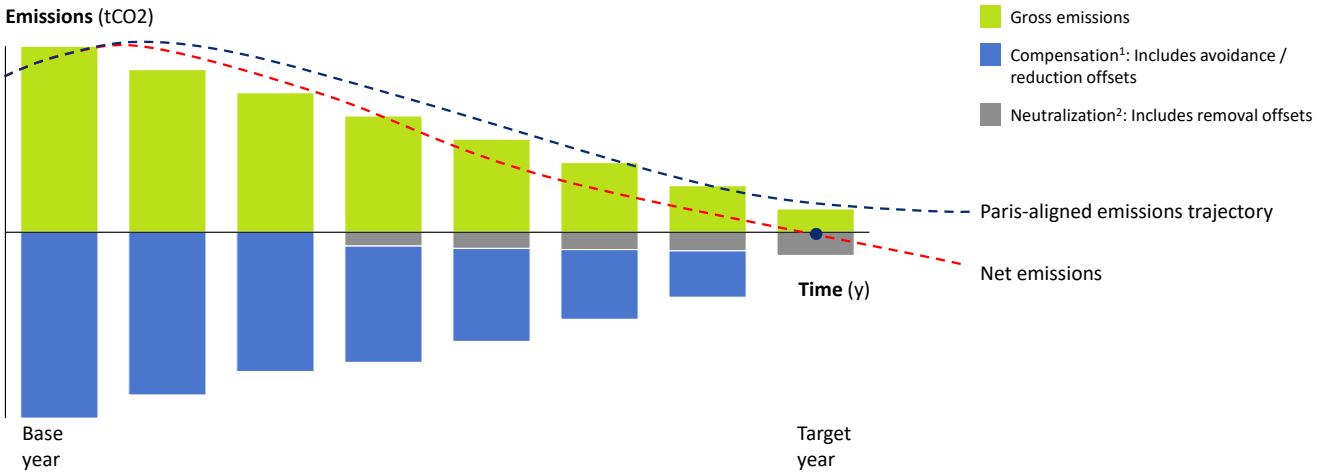
Source: McKinsey analysis, SBTi, press search

Achieving greater alignment on the proper use of offsets in different types of corporate claims can help clarify and de-risk the target-setting and purchasing process for buyers. This applies to ongoing initiatives as well as the development of additional guidance. The following are some examples of ongoing initiatives (more details in the appendix) in broad thematic categories. Organizations like the SBTi, ISO[101], Client Earth[102], and others are seeking to define the role of offsetting in net-zero claims. Climate Action 100+, the UN PRI, and NZAOA's guidance from investors to corporates on climate action can also shape the role of offsetting in corporate claims. For corporates, organizations such as the UNFCCC-led Race to Zero campaign and the WBCSD both have minimum criteria required for participation[103]. The Taskforce notes the recent publication of the Oxford Principles for Net-Zero Aligned Carbon Offsetting. The Oxford Offsetting Principles go one step beyond the Taskforce's recommended action 11 in calling for a shift over time to carbon removal projects with long-term storage. It is the Taskforce's strong wish that guidance and principles put forward by key stakeholders will be aligned.

EXHIBIT 37: SBTI ROLE OF OFFSETTING IN NET-ZERO, STRATEGY 5.

**D: SBTi has outlines five corporate strategies of which the most ambitious encourages in the short term avoidance / reduction offsets and in the long term removal offsets**

**SBTi Strategy 5: Climate positive approach**




1. Compensation: While reaching a balance between emissions and removals is the end goal of a net zero journey, companies should consider undertaking efforts to compensate unabated emissions in the transition to net-zero as a way to contribute to the global transition to net zero
2. Neutralization: Reaching net-zero emissions requires neutralizing a company's residual GHG emissions with an equivalent amount of carbon removals. An effective neutralization strategy involves removing carbon from the atmosphere and storing it for a long-enough period to fully neutralize the impact of any GHG that continues to be released into the atmosphere.

Source: Foundations for science-based net-zero target setting in the corporate sector, Version 1.0 September 2020

101. ISO Technical Committee 207 Subcommittee 7, Greenhouse gas management and related activities, Working Group 15, is currently developing a new standard with the current title of Carbon neutrality. This document is anticipated to address the use of offsets in claims made by organizations. Existing ISO standards under TC207, SC3 – Environmental Labelling are also of relevance

102. Client Earth Principles for Net-Zero Claims (https://www.clientearth.org/press/clientearth-publishes-key-principles-for-paris-aligned-strategies/).

103. WBCSD (https://www.wbcsd.org/Overview/News-Insights/General/News/New-membership-criteria).

As noted, development of additional guidance may also be needed. Specifically, the Taskforce notes the need for more sectoral decarbonization pathways, especially for hard-to-abate sectors. The lack of corporate claim standards can deter hard-to abate sectors from offsetting while delivering emissions reduction. The Taskforce also recommends the incorporation of aligned guidance on the use of offsets in corporate claims within national or international guidance on green finance (e.g., under the EU Taxonomy as part of the Action Plan on Financing Sustainable Growth).[104] Given companies' climate targets and varying offsetting strategies, it is imperative to develop standardized offsetting reporting frameworks for corporates (e.g. tons of project types, vintage, standard, price paid, etc.), ideally in line with broader frameworks like the EU Taxonomy.

Thus, the Taskforce recommends the adoption of a common narrative on the role of offsetting in corporate claims that balances the need to offset with the urgency in reducing a company's own emissions. This is critical to the legitimacy of offsetting.

The legitimacy of offsetting can be further bolstered by the rich and complex landscape of stakeholders in voluntary carbon markets. In addition to initiatives on the use of offsets, there are efforts led by WRI on carbon accounting. On the supply side, there are organizations defining minimum quality standards (e.g., ICROA, CORSIA/ICAO, WWF/ EDF/Oeko-Institut) and treatment of natural climate solutions (e.g., ART[105], NCS Alliance). There are also ongoing efforts to clarify guidance on negative emissions technologies and land use from the UN PRI and the GHG Protocol[106], NCS Alliance). These are all influential in shaping the overall consensus on the legitimacy of offsetting.

Finally, there is a conceptual connection between corporate use of offsetting to corporate deforestation targets. The Taskforce encourages key stakeholder groups to find a way of bringing the two together. The logic is similar to that of "reduction first": companies should reduce their deforestation activities first before offsetting

All in all, the Taskforce does not opine on the respective validity of these initiatives but notes that the growth of voluntary carbon markets relies on their clear and timely guidance. The Taskforce recommends that these initiatives work to achieve aligned guidance at pace, as this is crucial to the successful adoption and scaling of voluntary carbon markets.

104. The Taskforce has also received suggestions to include offsetting as part of both fiscal and monetary "green" stimulus. We simply note this suggestion and refrain from engaging in regulatory/policy discussions.

105. Also a standard for jurisdictional REDD+ projects.

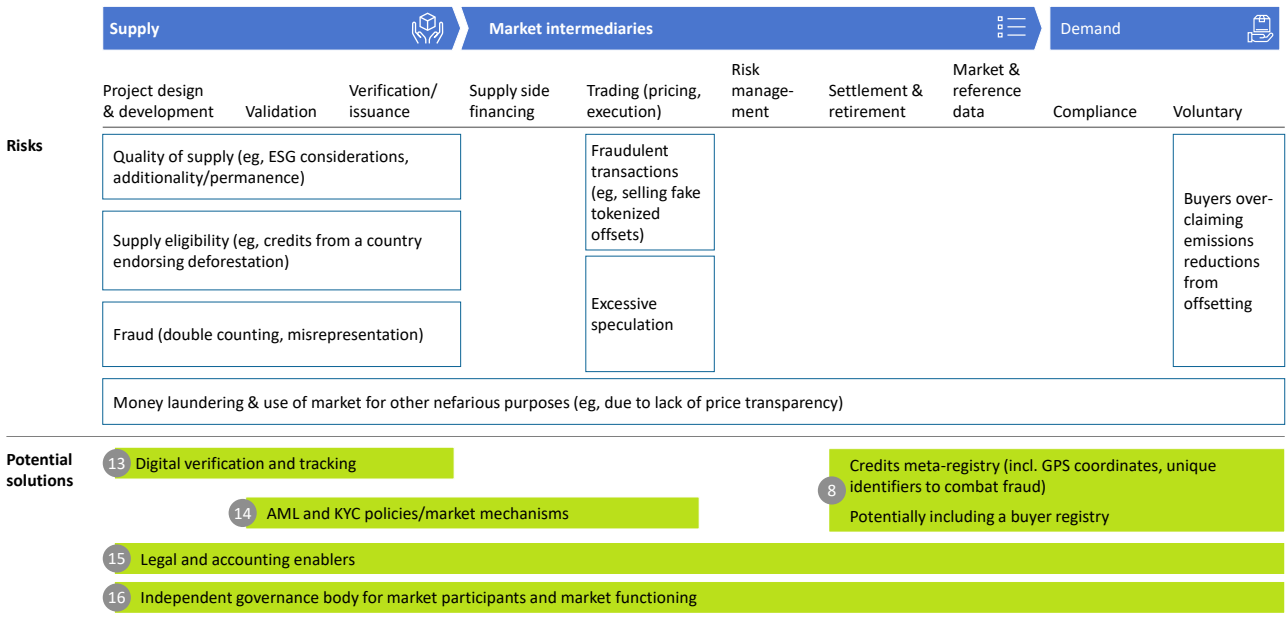
106. We note that the GHG Protocol will be releasing updated guidance in 2022 on carbon removals, land, and bio-energy, which can have additional implications of how corporates account for land use impacts in their Scope 3 emissions. The guidance released can also have implications on other ways of financing removals projects and clarify how corporates can account for insetting in their GHG inventory.

Market integrity challenges affect the growth of voluntary carbon markets in a number of respects:

- The heterogeneous nature of supply creates potential for errors as well as fraud. Possible recommended actions include revamped verification procedures and development of meta-registries (which would use GPS coordinates or DLT to verify that credits are not being sold or counted twice). A system of unique identifiers for each carbon credit, no matter what standard it is developed under, would create further transparency and would lend itself to a DLT solution.
- There is potential for money laundering due to a lack of price transparency, leading to duplication of effort as various market participants independently screen counterparties. It would be beneficial if this could be done by one group, in the same way that banks conduct AML/KYC checks in other financial markets. The potential for fraud here is significant as well, as voluntary carbon markets have seen scandals with credits sold off-registry multiple times as investments to individuals who do not understand the market.

The spectrum of market integrity concerns across the value chain is visualized in Exhibit 38.

EXHIBIT 38: MARKET INTEGRITY CONCERNS ACROSS THE VALUE CHAINCHAIN




The Taskforce has three recommended actions, in addition to the meta-registry with fraud protection features discussed in recommended action 8. The Taskforce recommends a central, well-protocolized meta-registry that provides clear, effective accounting and seamless connectivity among governments, NGOs, and market participants.

RECOMMENDED ACTION 13:

## INSTITUTE EFFICIENT AND ACCELERATED VERIFICATION

To speed up the verification process and to improve supply integrity, the Taskforce encourages further development toward a digital project cycle where appropriate. This requires a shared data protocol to be developed across standards and registries that captures necessary project data and protects its integrity during processing and transfer. It will be important to collectively define foundational requirements to ensure interoperability across standards. This would enable verification entities to monitor and validate integrity on higher frequency basis, rather than at the end of long reporting periods.[107]

The aim would be to reduce the currently 15-month periods to approximately six weeks. New digital project cycles should drive cost reductions for project developers and more frequent credit issuances. It could in the longer-term be the foundation for end-to-end digital tracking across the value chain, leading to data traceability and thus improved claim credibility integrity.

This recommended action is subject to the constraint of technology maturity and readiness. Because the technology in this realm is rapidly evolving, the Taskforce does not recommend specific solutions, but rather encourages rapid innovation and continued testing and evolution. For example, the data protocol could explore the use of satellite imaging, digital sensors, artificial intelligence, open data marketplaces, and DLT,[108] to further improve speed, accuracy, and integrity.[109] The appendix includes a set of key questions to consider when evaluating MRV solutions. While significant strides have been made in these areas and there are several promising start-ups in this space, further work is needed to develop open-source, accessible, and science-based MRV tools and systems.

In addition, critical in-person assessments by validation and verification bodies will still need to occur at a certain frequency. There will also invariably be constraints on how data protocols can be designed across different project types. MRV involves a global community of assurance providers with high overlaps between the compliance and voluntary markets. Any new verification process should ideally be consistent across the markets for all carbon credits issued.[110] Similar technology will also likely play a major role in attribute-based markets to enable secure and efficient verification and end-to-end tracking of products in those markets.

It may also be helpful to tap into the broader network of organizations and forums mobilizing digital solutions for climate and sustainability (e.g., Climate Chain Coalition, InterWork Alliance). These groups may tackle broader governance and social-related issues

107. This assumes activities that may no longer need regular in-person visits if monitoring technologies can be deployed and that the accelerated verification can lower overall cost of verification. However, this would not apply to all project types. It's possible that real-time monitoring in some instances can be counterproductive if it increases overall project cost and verification burden. This is not the goal of this recommended action.

108. Digital ledger technology solution could be centralized, mixed, or fully decentralized.

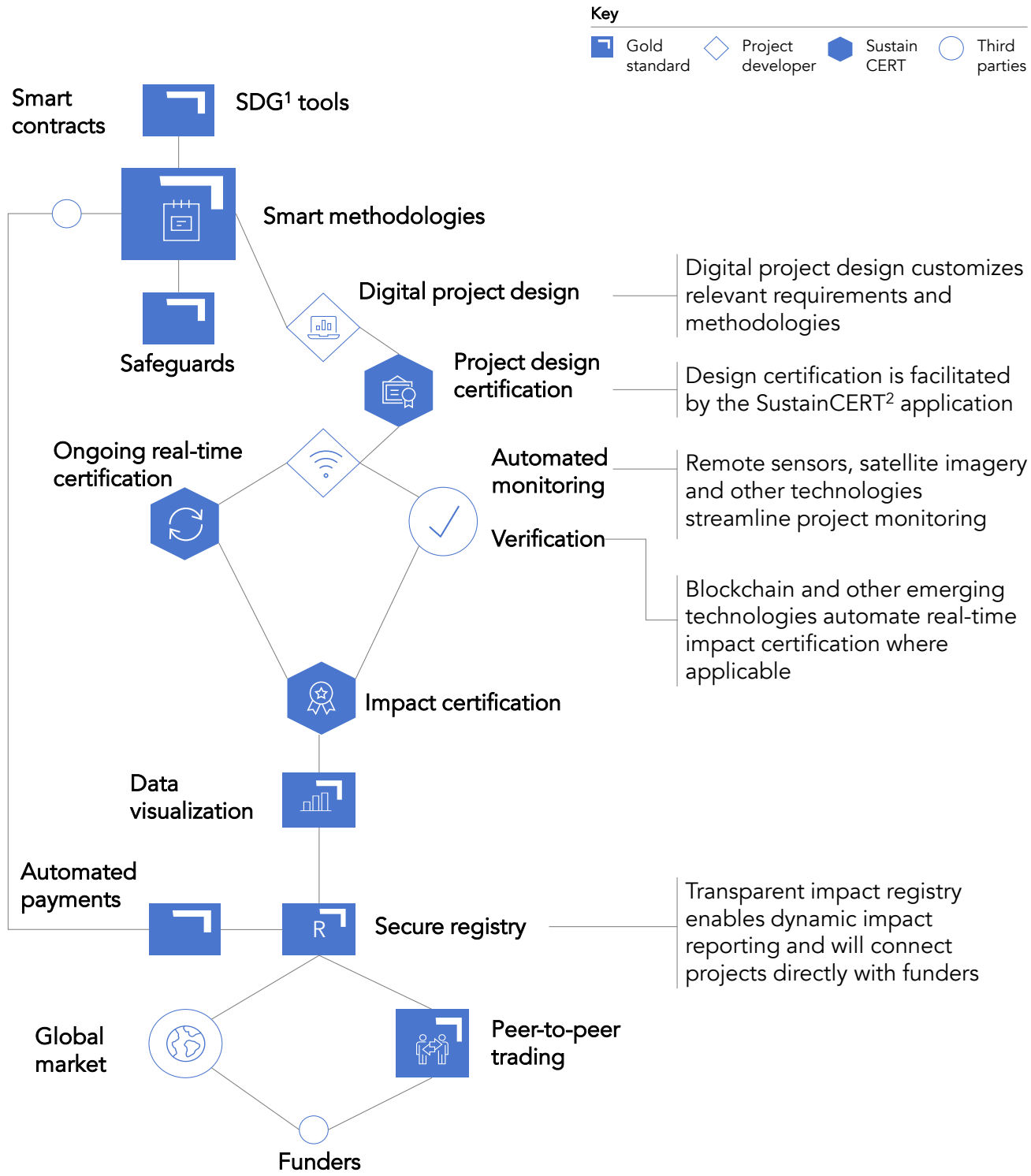
109. For a good survey of available digital technologies, see "Blockchain and Emerging Digital Technologies for Enhancing Post-2020 Climate Markets," World Bank Group, 2018, openknowledge.worldbank.org.

110. See forthcoming EBRD publication, "A Protocol for Digital MRV," to inform further digitalization of the MRV process. ISO also has a series of foundational conformity assessment standards. See more details in the appendix.

regarding the use of certain types of digital technologies that would apply to the carbon-market MRV process.

An example of an accelerated project cycle can be seen in Exhibit 43. A number of existing initiatives are already implementing many of these suggestions, and the Taskforce encourages, where necessary, development of interoperable systems.

EXHIBIT 39: EXAMPLE DIGITAL PROJECT CYCLE FROM GOLD STANDARD




[1]Sustainable Development Goals.
[2]SustainCERT is the official certification body for Gold Standard.

Source: Gold Standard

RECOMMENDED ACTION 14:

## IMPLEMENT AML/KYC GUIDELINES

Implementation of AML and KYC guidelines and processes used within regulated markets should be extended to voluntary carbon markets to check against fraudulent actors who may take advantage of the maturing market. A review, which is beyond the scope of the Taskforce, should take place to assess what specific AML/KYC guidelines for the sector need to be developed and implemented. This would include standards for applying AML/KYC to specific groups of market participants (e.g., suppliers, buyers, and intermediaries) as well as guidelines for which market participants are responsible for the AML/KYC screening. A governance body would need to host these, and keep them coordinated with other existing regulatory regimes at the international level (e.g., the Financial Action Task Force [FATF]). Today's validation and verification protocols mandated by the IAF do not specifically address AML/KYC issues.

RECOMMENDED ACTION 15:

## ESTABLISH LEGAL AND ACCOUNTING FRAMEWORKS

A number of legal and accounting enablers will support the legitimacy and efficacy of voluntary carbon markets. The Taskforce notes a number of ongoing efforts to address the voluntary carbon market's legal and accounting needs, but they are relatively nascent and can benefit from increased coordination and support. These needs include standardized contracts, financial accounting, and carbon accounting.

To have robust exchange and OTC trades, standardized documentation for primary and secondary markets is needed. Trades require appropriate legal underpinnings and it may be necessary to further clarify carbon rights. Contracts similar to those used for securitization are also necessary to provide an effective vehicle for bundling credits sold.. Within the contracts, terms should be clear, especially given the potential complexity involved in trading carbon credits in primary and secondary markets. The range of questions that would need to be answered to establish these contracts include how terms deal with durability, reversal risk, and recourse, what margin collateral and reserve requirement are necessary for cleared and uncleared contracts, and so on. The Taskforce recommends further work in the implementation. Any documentation should be underpinned by appropriate legal opinions.

The second need is for financial accounting enablers. While the IFRS and other accounting bodies have defined compliance credits under the EU ETS and other cap-and-trade programs as intangible assets, it is our understanding that credits purchased in the voluntary markets are currently primarily regarded as expenses/cash outflow. This has potential implications for the tax treatment of credits and how credits are evaluated in bankruptcy proceedings. The Taskforce recommends further engagement with the IFRS consultation process, along with other accounting bodies, on whether credits can be treated as assets. The implications of this change will need to be further fleshed out

and evaluated. Across these topics, lessons learned from the EU ETS and other markets could be applied.

On carbon accounting, reporting/disclosure associated with the use of offsets is an important enabler to demand signaling and market legitimacy. In relation to recommended action 12, there will need to be guidance on how removals offsets may or may not be counted against a company's footprint (Scope 1, 2, and 3). Further—and crucially—no commonly agreed-upon framework yet exists to report corporate offsetting (both past activities and future plans). The framework should have sufficient details, such as volumes purchased and retired by project types, vintage, standard, and potentially price paid. It should include guidance for companies to report direct emissions and offset purchases separately, rather than as a net figure. Setting a framework in place with high legitimacy and adoption rates will be a significant step forward. It will also be a crucial enable of systems such as a buyer registry. The Taskforce further recommends companies follow the TCFD guidance for general climate risk disclosure.

RECOMMENDED ACTION 16:

## INSTITUTE GOVERNANCE FOR MARKET PARTICIPANTS AND MARKET FUNCTIONING

An independent body is likely needed to provide guidance and perform key functions to ensure the high level of environmental and market integrity required for the success of voluntary carbon markets. It could be the same or a different organization as the one hosting and curating the CCPs.

This body will need to both make key decisions and perform necessary functions to ensure market integrity along three dimensions. The first dimension is on participant eligibility. This may include setting the principles for what buyers, suppliers, and intermediaries must adhere to in order to participate in voluntary carbon markets; establishing, hosting, and curating principles for the use of offsetting set out in recommended action 11; and developing and maintaining KYC guidelines as recommended by recommended action 14. If offsetting is (or is perceived to be) providing a disincentive for other climate action (e.g., companies reducing their own emissions to the extent possible), the governance body may consider, stipulating rules to mitigate this. Types of guidance on eligibility could include asking corporate buyers to show a valid claim before purchasing credits by registering their claims in the buyers' meta-registry,[111] ensuring a minimum level of supplier transparency, and so on.

The second dimension is on participant oversight. In particular, the Taskforce recommends developing principles to minimize conflicts of interest in the MRV process and providing accreditation, audit, and spot checks for the conduct of the validation and verification bodies (VVBs).[112]

111. Through a careful analysis of unintended or disproportionate burden on certain buyers rather than all buyers.

112. A system for accreditation already exists with national accreditation bodies (ABs) accrediting VVBs to ISO 14065. This process is reinforced by a system of peer assessment undertaken by ABs to evaluate the effectiveness of other ABs acting within their geographic regions. The International Accreditation Forum (IAF) exists to provide guidance on the application of ISO standards used in accreditation. This process may be sufficient in its current form or may require further evaluation.

For example, potential conflicts of interest between suppliers and the entities doing the validation or verification of individual projects and their credits should be minimized. This can be done through rotation requirements that begin after the first verification, which is typically combined with the validation, to provide sufficient safeguards to ensure that newly registered projects are scrutinized by two separate bodies early on in the credit issuing process.[113] This body is also encouraged, under participant oversight, to consider elements missing from the ecosystem. For example, a crucial challenge is the limited availability and capacity of local auditors, a challenge that will only magnify with market scaling.

The third dimension is on overseeing market functioning. This may include developing principles to prevent fraud across the value chain, including ensuring good AML practices per recommended action 14. For registries, the principles may stipulate further transparency on project/methodological documentation (e.g., relevant shapefiles for land-based projects). Market functioning principles should also include oversight on other forms of market dysfunction, such as market manipulation, spoofing and non-intentional disruption or circumvention of pre-trade and post-trade risk controls by algorithmic/automated trading systems. This governance scope may also consider the question of how long buyers/investors can hold onto purchased carbon credits.

## CREATING A DEMAND SIGNAL

The growth of demand in voluntary carbon markets faces a number of challenges:

- Investor confidence is varied and at best limited: there is a need for education on the role of offsetting and need for standardized approaches that investors can adopt.
- Companies have been hesitant in developing POS offerings and are inconsistent in the types of claims they make about their products (e.g., carbon-neutral product).
- Industry collaboration has been piecemeal: consortia need to be established across sectors, especially for the hard-to-abate sectors, to set ambitious net-zero goals, with the appropriate use of offsets identified.
- There is a distinct lack of transparent forward demand planning, leading to issues with supplier financing and limited data transparency
- Having considered how other markets developed, we believe that a clear demand signal from buyers could be one of the most important drivers for the development of liquid markets and scaled-up supply. The demand signal should be sustained over time.

RECOMMENDED ACTION 17:

## OFFER CONSISTENT INVESTOR GUIDANCE ON OFFSETTING

There is a need to align investors behind the use of voluntary carbon offsets in meeting climate targets. The Taskforce recommends that investors acknowledge that while internal emission reductions remain the priority for corporates, offsetting will play a

113. These are examples only; substantive guidance to be issued by appropriate governance bodies.

limited but still vital role in achieving the Paris Agreement ambition. The recommended actions set out above in topics for action IV-V aim to address skepticism concerning the role of offsetting by clarifying their legitimacy in meeting certain goals. Consequently, the Taskforce recommends that key investor alliances, such as the NZAOA, Climate Action 100+, and the IIGCC connect with the necessary reporting protocol bodies, e.g., SBTi, ISO,[114] and others, to ensure consistent guidance on net-zero and carbon offsetting. One example of a high-ambition goal for investors to encourage companies to pursue would be with the SBTi recommended strategy 5 (Exhibit 41). A desired aim of this work is to align investor alliances to produce clear and consistent guidance on the role and use of offsets, in conjunction with the reporting protocols and standard setters.

RECOMMENDED ACTION 18:

## ENHANCE CREDIBILITY AND CONSUMER AWARENESS FOR CONSUMER OFFERINGS, INCLUDING POINT-OF-SALE SOLUTIONS

There are a number of emerging consumer product offerings that present consumers with the ability to offset a purchase. Implementing consumer solutions across sectors could rapidly scale demand for voluntary credits, by improving the day-to-day ability for consumers to purchase voluntary credits: and make more informed choices. This includes both B2C and B2B sales (e.g., carbon neutral LNG cargo for B2C). Having reviewed the current claims landscape, the Taskforce recommends implementing, the following steps (in order of priority):

- **REQUIRING CLEAR AND CONSISTENT CARBON CLAIMS.** Product-level carbon-neutrality claims need to be linked to accepted standards (e.g., ISO 14067:2018 on carbon footprint of products, ISO 14026:2017 on footprint communication, PAS 2060 standard for carbon neutral products, PAS 2050 for calculating lifecycle emissions from a product, and the GHG Protocol Product Standard for reporting on such footprint). The Taskforce recommends further work by claims bodies to ensure consistency in the use of carbon credits, following the Taskforce principles on legitimacy in recommended action 11. There should be clarity on the exact reduction pathway the company and the POS offering are undertaking. This will reinforce the credibility of the use of offsets by companies without confusing or misleading consumers, establish a level playing field for competition, and potentially encourage more companies to make carbon claim products.
- **ENCOURAGING CLEAR CARBON LABELING.** Carbon labeling could be a follow-on step to good claims. This could be developed in a similar way to Fairtrade International or traffic-light labeling on food. Private-sector organizations that lead carbon labeling include food and beverage companies such as Oatly, Just Salad, and Quorn and application developers like the

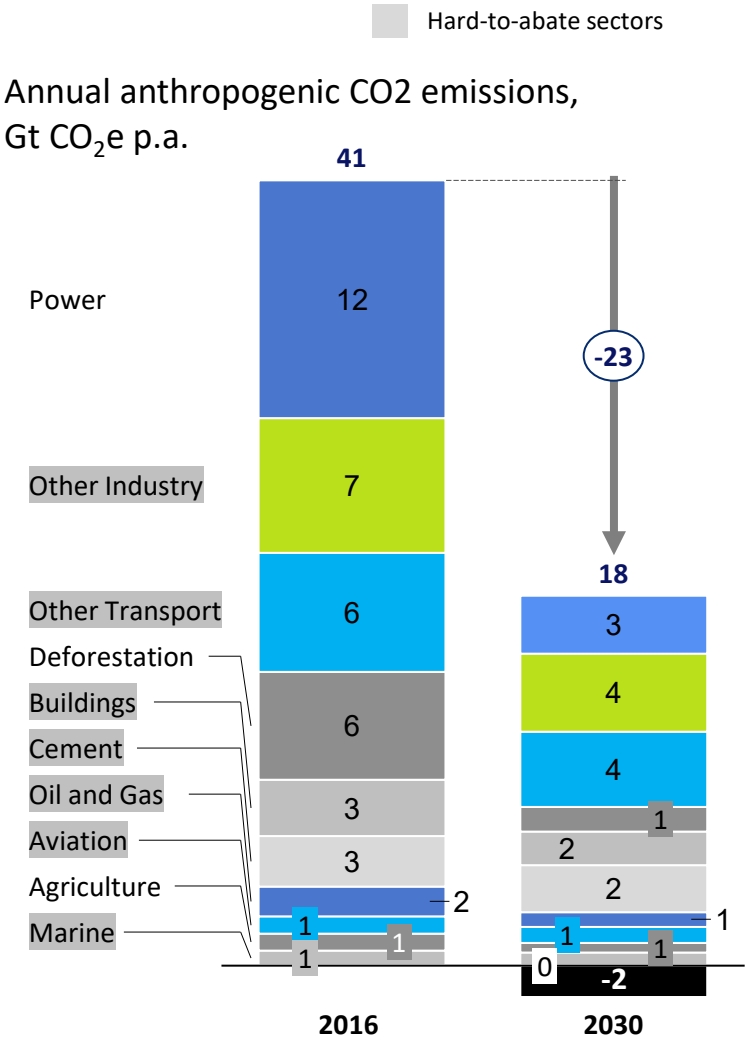
114. ISO Technical Committee 207 Subcommittee 7, Greenhouse gas management and related activities, Working Group 15, is currently developing a new standard with the current title of Carbon neutrality. This document is anticipated to address the use of offsets in claims made by organizations.

Giki Badges in the UK.[115] The Taskforce welcomes the sustainable markets initiative (SMI) that is analyzing how companies might use such an approach to influence purchasing behavior. Work in this space should seek to build on existing standards defining best practices for communicating environmental claims (e.g., PAS 2050, ISO 14020:2000 and ISO 14021:2016) and adhere to local advertising laws.

- **EXPANDING EXISTING POS CARBON OFFSET OFFERINGS.** Working with industry associations, major retailers, and any other organization that may be interested in supporting the development of offset offerings will provide consumers with more options without forcing them to adopt new habits and, if furthered through work with e-commerce platforms, could help scale offset demand without creating a complex supply-chain. In the future, as the market for offset products or credits establishes itself and consumer preferences change, the market should explore the possibility of offering POS offerings as the default choice for consumers (i.e., putting the onus on consumers to decide not to purchase offsets, as opposed to choosing to add them to their purchase).
- **CREATING DIGITAL FUNCTIONALITY TO ENABLE POS OFFSET PURCHASES.** Linking carbon credit registries to software that would allow micro-transactions of voluntary credits is a technical barrier to overcome. An example would be an app linked to credit card purchases that aggregates offsets into a balance for consumers. This will provide consumers with an easy way to offset but is likely to need significant investment and education to be a useful tool. Increasing consumers' awareness of their footprint can encourage a longer-term shift in consumer habits: this awareness can raise accountability as consumers reward those companies that have made progress on their decarbonization strategies.
- **FINALLY, THE TASKFORCE RECOMMENDS STRONGER AND INCREASED CONSUMER EDUCATION EFFORTS TO IMPROVE CARBON LITERACY.** While carbon labeling is an important first step, market players should continuously strive to help consumers understand the science and economics behind their carbon footprint and behind offsetting.

115. Giki Badges have created gamified ways of engaging consumers in low-carbon purchasing behaviors.

EXHIBIT 40: DECARBONIZATIONREQUIREMENTS BY SECTOR




NB: Emissions from waste (0.02 Gt CO2 annually) not shown and assumed to remain constant through 2050

Source: EDGAR 2015; FAOSTAT 2015; IEA 2015; McKinsey 1.5C Scenario Analysis; Global Energy Perspective – Reference Case 2019

RECOMMENDED ACTION 19:

## INCREASE INDUSTRY COLLABORATION AND COMMITMENTS

Based on McKinsey analysis, the Taskforce has identified priority sectors where industry-wide collaboration (via consortia or sector coalitions) could support scaling of offset demand (Exhibit 40).

For three of the hard-to-abate sectors, cement, marine and aviation, industry-wide programs have been established to jointly commit to a number of net-zero or emissions reductions goals. In other sectors, smaller company alliances, such as the Oil & Gas Climate Initiative (OGCI), have also formed in order to pursue sustainable goals, but the Taskforce thinks these efforts can go further.

Establishing industry-wide programs can significantly scale the demand for offsetting, as hard-to-abate sectors (illustrated by the gray shading in Exhibit 40) are likely to require offsetting not only during the transition to net-zero, but also beyond it for any residual emissions within their value chain. The Taskforce therefore welcomes

these initiatives and strongly encourages similar sectors to do the same

When considering the remaining hard-to-abate sectors, the Taskforce believes heavy industries such as oil & gas provide the next-best potential for bolstering emissions reduction activity and wider sustainability goals via greater industry collaboration. The hope is to further this ambition and create industry-wide programs with ambitious targets that meet the requirements set out in this Blueprint. The Taskforce also believes that, beyond "buyer coalitions" (coalitions of companies committing to net zero and/or buying credits), such collaborations can also play a role in establishing joint POS offerings which could further scale demand.

The Taskforce believes it is necessary for private-sector participants to collaborate ahead of regulation, i.e., on a voluntary basis, because the case for change in carbon markets is immediate, and delays risk serious consequences for the environment.

In addition to establishing industry-wide programs for select sectors, the Taskforce believes tailored sector wide standards on the use of offsets, that build on the Taskforce's recommended criteria of CCPs, can improve industry best practices and aid the buyers' journey as they decarbonize. Such standards should help improve the legitimacy of offsetting, as well as the financial support necessary for product development.

## Overview of needed work in VCMs and who will lead

| | | Objectives | Who (Subject to change) |
|---|---|---|---|
| Fully Taskforce driven | A Stakeholder engagement | **Builds support for the Taskforce blueprint and recommendations**, provides critical feedback from stakeholders (e.g. CEOs) to the other Working Groups, and drives the narrative on offsets, in particular through a CEO letter | **Taskforce Working Group** |
| | B Governance | **Publishes a governance report** detailing key needs for governance in the voluntary carbon market, roles and responsibilities, governance structure, etc. and identifies potential ways this governance body could be established<br>**Develops eligibility principles** for suppliers, auditors/VVBs, intermediaries and buyers.[1]<br>**Establishes blueprint** for high-level **digital project cycle** | **Taskforce Working Group** |
| | C Legal principles & contracts | **Creates standardized documentation for OTC and exchange on both the primary and secondary markets and for securitization** | **Taskforce Working Group** |
| | D Credit level integrity | **Defines the CCPs and Additional Attributes,** and develops the necessary assessment frameworks | **Taskforce Working Group** |
| Independent effort, with input from the Taskforce | E Participant level integrity | **Aligns guidance on corporate claims,** including reporting/disclosure requirements. Close coordination with ongoing initiatives required (e.g. SBTI, Oxford principles, GHG protocol, ISO). This includes guidance on what types of offsets (e.g. CCP approved, with removal attributes and specific vintage) that are required for making specific claims. | **HADA-VCM[2] (independent effort)** |
| Information sharing with Taskforce | F Demand & supply engines | Scale up demand for offsetting and commitments to develop high-quality credits | WBCSD, NCSA, Coalition for Negative Emissions, SMI |
| | G Traded volume & market infrastructure | Market players to develop the infrastructure and services required to scale up trading | Private market players |
| | H Corresponding Adjustments | Evaluates the implications of Article 6 negotiations on the voluntary carbon market | Trove research |

1. AML / KYC principles form part of these, but would not be covered in Phase 2
2. Working Title: High Ambition Demand Accelerator for the Voluntary Carbon Market

Lastly, it is important to create solutions that can effectively signal demand from end buyers to enable better transparency and scaling of credit supply. This cannot be done prescriptively. Rather, the Taskforce encourages companies to send long-term demand signals (through long-term offtake agreements or reduction commitments, for example) and find ways to create more transparency on intermediate demand for the interim period before reaching net zero and the likely long-term demand (i.e., residual emissions) once this target date is reached. These demand signals could be aggregated through a buyer commitment registry, which could either be hosted by reporting protocols/standard setters (e.g., SBTi/CDP) or a data provider. Suppliers can facilitate this by being more transparent on their profit margins for projects to enhance the fairness of the markets. More refinement is needed on any additional mechanisms that would be required to make this a longer-term proposition.

# ROADMAP TO IMPLEMENTATION

Looking ahead, the Taskforce is committed to catalyzing and driving real change required to scale effective and efficient voluntary carbon markets to help meet the goals of the Paris Agreement. Ensuring the environmental integrity of the scaled-up market remains at the core of the Taskforce's effort, and further work is needed to guarantee this: including designing robust CCPs and market integrity principles, and a governance structure fit to oversee their fulfilment. To achieve this change, the Taskforce has developed a roadmap to move from blueprint to action.

This roadmap to implementation builds directly on the recommended actions in the blueprint. It is centered on eight areas of work that capture the recommended actions (Exhibit 41). These areas are:

A. STAKEHOLDER ENGAGEMENT
B. GOVERNANCE
C. LEGAL & ACCOUNTING PRINCIPLES
D. CREDIT LEVEL INTEGRITY
E. PARTICIPANT LEVEL INTEGRITY
F. DEMAND & SUPPLY COMMITMENT ENGINE
G. TRADED VOLUME & MARKET INFRASTRUCTURE
H. CORRESPONDING ADJUSTMENTS

## EXHIBIT 41: OVERVIEW OF THE AREAS OF WORK IN THE ROADMAP

| Areas of work | Blueprint recommended actions |
|---|---|
| A Stakeholder engagement | *Cross-cutting across all recommended actions* |
| B Governance | 2 Assess adherence to the core carbon principles; 16 Institute governance for market participants and market functioning; 13 Implement efficient and accelerated verification; 14 Develop global anti-money-laundering (AML) / know-your-customer (KYC) guidelines |
| C Legal principles & contracts | 4 Introduce core carbon spot and futures contracts; 15 Establish legal and accounting frameworks |
| D Credit level integrity | 1 Establish core carbon principles and taxonomy of additional attributes |
| E Participant level integrity | 11 Align guidance on offsetting in corporate claims; 12 Establish principles on the use of offsets |
| F Demand & supply engines | 3 Scale up high-integrity supply; 17 Offer consistent investor guidance on offsetting; 18 Enhance credibility and consumer awareness for consumer product offerings, incl. Point-of-Sale (POS) solutions; 19 Increase industry collab-oration and commitments; 20 Create mechanisms for demand signaling |
| G Traded volume & market infrastructure | 5 Establish an active secondary market; 6 Increase transparency and standardization in over-the-counter (OTC) markets; 7 Build or utilize existing high-volume trade infrastructure; 8 Create or utilize existing resilient post-trade infrastructure; 9 Implement advanced data infrastructure; 10 Catalyze structured finance |
| H Corresponding Adjustments | *Not in scope of blueprint* |

The Taskforce's vision is that each of these eight areas will deliver critical components over time to jointly scale the market. The high-level objectives of the areas of work is laid out in Exhibit 42.

## EXHIBIT 42: ROADMAP OBJECTIVES AND RESPONSIBLE WORKING

### Overview of needed work in VCMs and who will lead

| | | Objectives | Who (Subject to change) |
|---|---|---|---|
| Fully Taskforce driven | A Stakeholder engagement | **Builds support for the Taskforce blueprint and recommendations**, provides critical feedback from stakeholders (e.g. CEOs) to the other Working Groups, and drives the narrative on offsets, in particular through a CEO letter | **Taskforce Working Group** |
| | B Governance | **Publishes a governance report** detailing key needs for governance in the voluntary carbon market, roles and responsibilities, governance structure, etc. and identifies potential ways this governance body could be established<br>**Develops eligibility principles** for suppliers, auditors/VVBs, intermediaries and buyers.[1]<br>**Establishes blueprint** for high-level **digital project cycle** | **Taskforce Working Group** |
| | C Legal principles & contracts | **Creates standardized documentation for OTC and exchange on both the primary and secondary markets and for securitization** | **Taskforce Working Group** |
| | D Credit level integrity | **Defines the CCPs and Additional Attributes,** and develops the necessary assessment frameworks | **Taskforce Working Group** |
| Independent effort, with input from the Taskforce | E Participant level integrity | **Aligns guidance on corporate claims,** including reporting/disclosure requirements. Close coordination with ongoing initiatives required (e.g. SBTI, Oxford principles, GHG protocol, ISO). This includes guidance on what types of offsets (e.g. CCP approved, with removal attributes and specific vintage) that are required for making specific claims. | **HADA-VCM[2] (independent effort)** |
| Information sharing with Taskforce | F Demand & supply engines | Scale up demand for offsetting and commitments to develop high-quality credits | WBCSD, NCSA, Coalition for Negative Emissions, SMI |
| | G Traded volume & market infrastructure | Market players to develop the infrastructure and services required to scale up trading | Private market players |
| | H Corresponding Adjustments | Evaluates the implications of Article 6 negotiations on the voluntary carbon market | Trove research |

1. AML / KYC principles form part of these, but would not be covered in Phase 2
2. Working Title: High Ambition Demand Accelerator for the Voluntary Carbon Market

Working Groups A through D will work be made up of committed experts chain from the Taskforce and Consultation Group, and will have balanced representation across the value-chain.

## AREA OF WORK E:

Participant level integrity. To drive the topic of participant market integrity forward, the TSVCM will draw from and feed in to a fully independent initiative in the process of being established: The High Ambition Demand Accelerator for the Voluntary Carbon Market (HADA-VCM)[116]. This group will use the Taskforce Plenary sessions to gather input.

## AREA OF WORK F:

The Taskforce appreciates the efforts of leading institutions such as the Natural Climate Solutions Alliance (a multi-stakeholder initiative convened jointly by the World Business Council for Sustainable Development (WBCSD) and World Economic Forum (WEF)), and others in pushing for high-integrity supply and demand commitments. The Taskforce also appreciates the efforts of the Coalition for Negative Emissions and others focused on scaling supply of credible and verifiable carbon removals, including with permanent storage. We hope that this list continues to grow and we'll be happy to support more initiatives.

## AREA OF WORK G:

Traded volume and infrastructure, the Taskforce appreciates the numerous private-sector initiatives that are either ongoing or announced in areas ranging from, development of new exchanges, meta-registries, standard contracts, price risk services, new verification tools, and many more. While avoiding supporting any particular solution or player in a competitive market, the Taskforce is highly encouraged by the current market momentum.

## AREA OF WORK H:

A fully independent effort led by Trove research is underway to determine interlinkages for the voluntary carbon markets with Article 6, and the use of corresponding adjustments. This effort and the Taskforce will continue to exchange relevant information going forward. Taskforce Working Groups will operate at an intensive pace and participate in weekly meetings from February to May 2021. May-June 2021 will be a period for public consultation on the deliverables of Working Groups A-D. Final deliverables for Phase 2 will be published by end-of-June. Throughout, the Taskforce will ensure cross-Working Group collaboration to avoid silos.

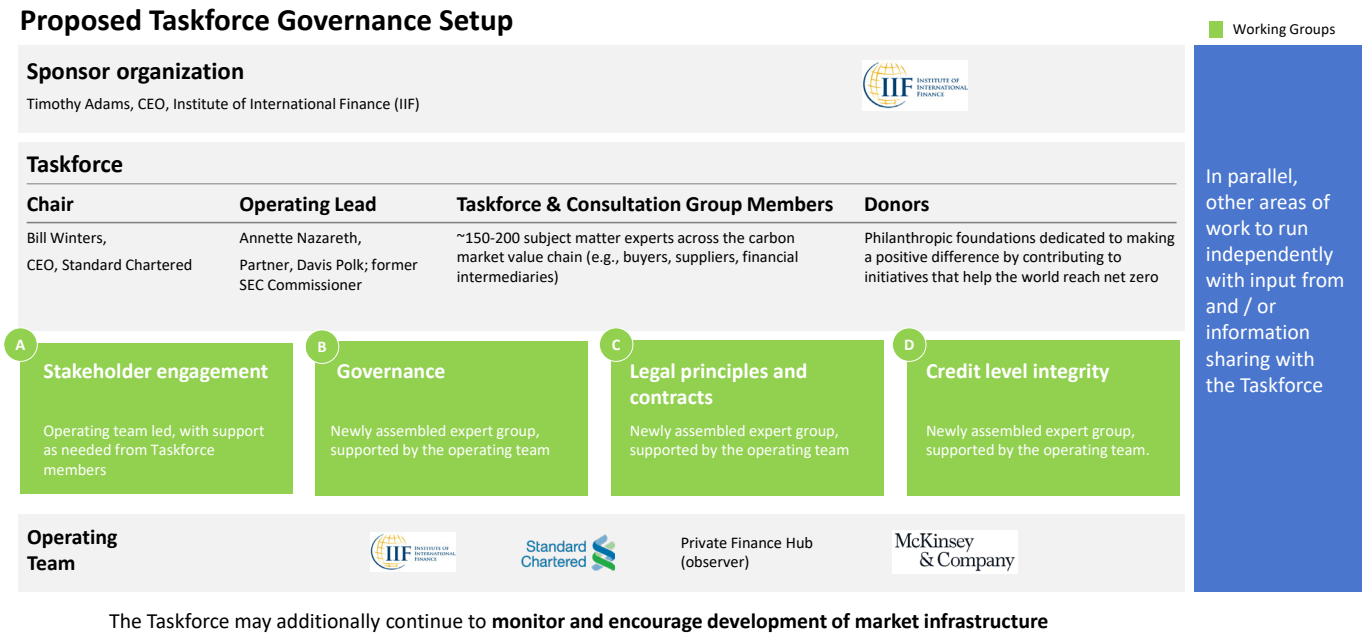
Further details regarding the roadmap will be released to the public separately as more detailed information becomes available.

Finally, the Taskforce notes that Governance will remain similar to today: chaired by Bill Winters, Group Chief Executive, Standard Chartered; and sponsored by the Institute of International Finance (IIF) under the leadership of IIF President and CEO, Tim Adams. Annette

116. Working title

Nazareth, senior counsel at Davis Polk and former Commissioner of the US Securities and Exchange Commission, serves as the Operating Lead for the Taskforce. McKinsey & Company provides knowledge and advisory support (Exhibit 43).

## EXHIBIT 43: ORGANIZATIONAL SETUP




We look forward to continuing our deep commitment to scale environmentally robust voluntary carbon markets in the months to come, by converting blueprint to action.

# ACKNOWLEDGMENTS

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# APPENDIX

## ACRONYMS

| | |
|---|---|
| **IIF** | Institute of International Finance |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **ISDA** | International Swaps and Derivatives Association |
| **ISIN** | International Securities Identification Number |
| **KYC** | Know-your-customer |
| **LDC** | Least-developed countries |
| **MRV** | Monitoring, reporting, and verification |
| **NBS** | Nature-based solution |
| **NCS** | Natural climate solutions |
| **NDCS** | Nationally Determined Contributions |
| **NGFS** | The Network of Central Banks and Supervisors for Greening the Financial System |
| **NGOS** | Non-governmental organizations |
| **NZAOA** | Net Zero Asset Owner Alliance |
| **OTC** | Over-the-counter |
| **PAS** | Publicly Available Specification |
| **PCAF** | Partnership for Carbon Accounting |
| **POS** | Point of sale |
| **PRI** | Principles for Responsible Investment |
| **R2Z** | Race to Zero campaign |
| **REDD** | Reducing emissions from deforestation and forest degradation |
| **REDD+** | Reducing emissions from deforestation and forest degradation, conservation of existing forest carbon stocks, sustainable forest management and enhancement of forest carbon stocks |
| **SBTI** | Science Based Targets Initiative |
| **SDG** | Sustainable Development Goals |
| **SMES** | Subject matter experts |
| **SMI** | Sustainable Markets Initiative |

| | |
|---|---|
| **TCFD** | Task Force on Climate-related Financial Disclosures |
| **TSVCM** | Taskforce on Scaling Voluntary Carbon Markets |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **VCM** | Voluntary carbon market |
| **VCS** | Verified Carbon Standard |
| **VVB** | Verification and validation body |
| **WEF** | World Economic Forum |
| **WRI** | World Resources Institute |
| **WWF** | World Wildlife Fund |

## GLOSSARY OF TERMINOLOGY

| TERMINOLOGY | DEFINITION |
|---|---|
| Additionality | The principle that carbon credits should represent emission reductions or carbon dioxide removals that would not have been realized if the project had not been carried out, and the project itself would not have been undertaken without the proceeds from the sale of carbon credits |
| Afforestation | The process of establishing and growing forests on bare or cultivated land, which has not been forested in recent history |
| Article 6 | Article 6 of the Paris agreement defines an accounting framework for international cooperation. It establishes rules on which countries get to claim reductions in emissions from carbon credits retired |
| Baseline scenario | A scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed project activity |
| Carbon credit | Verifiable quantity of climate mitigation for which the buyer can claim an offset as a result of financing either reduction or avoidance of carbon emissions or the removal or sequestration of $CO_2$ in the atmosphere |
| Carbon negative | Target where the company goes beyond achieving net-zero emissions to create an environmental benefit by removing additional emissions (also known as climate positive) |
| Carbon neutral | Target for the company to compensate all emissions produced in a set period, usually evaluated on an annual basis |

| TERMINOLOGY | DEFINITION |
|---|---|
| Certified Emissions Reductions (CERs) | Tradable units issued by the UN through the Clean Development Mechanism for emission reduction projects in developing countries; each CER represents one metric ton of carbon emissions reduction; CERs can be used by countries to meet their emissions goals under the Kyoto Protocol |
| Clearinghouse | Financial institution standing between two firms to facilitate the exchange of payments, securities or derivatives transactions; Its aim is to reduce the risk of one participant of a trade not honoring their settlement obligations |
| Clean Development Mechanism (CDM) | A provision of the Kyoto Protocol that allows developed countries (Annex 1) to offset their emissions by funding emissions-reduction projects in developing countries (non-Annex 1) |
| Double counting | Double counting occurs when a carbon emissions reduction is counted toward multiple offsetting goals or targets (voluntary or regulated); an example would be if two companies claimed the same credit toward their footprint |
| Ex-ante | In terms of carbon offsets, ex-ante refers to reductions that are planned or forecasted but have not yet been achieved; the exact quantities of the reductions are therefore uncertain |
| Ex-post | As opposed to ex-ante offsets, ex-post reductions have already been realized and their quantities can be audited |
| Futures trade | A trade wherein the participants agree on a sale at a predetermined price with delivery happening in a specified time in the future |
| Issuances | Total volume of offsets generated that are issued following project verification by a standard body (e.g., VCS); each offset receives a unique serial number and is listed in a registry to avoid double-counting |
| Jurisdictional REDD+ | An integrated, jurisdiction-wide accounting framework that enhances environmental integrity by ensuring all project and other reducing emissions from deforestation and degradation activities in a given jurisdiction are developed using consistent baselines and crediting approaches. The ultimate goal is to ensure emission reductions "add up" at the jurisdictional level, whether national or sub-national, with each participant receiving proper credit for their contribution. |

| TERMINOLOGY | DEFINITION |
|---|---|
| Leakage | Leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases (GHG) which occurs outside the project boundary, and which is measurable and attributable to the project activity |
| Nested REDD+ | A hybrid approach to REDD accounting that includes elements of both sub-national and national approaches to REDD. Under this approach, countries can adopt two unique features: firstly, the capacity to scale up from a sub-national to a national approach over time. Secondly, countries have the option to account for and receive international offsets at sub-national and national levels simultaneously. |
| Net-zero | Target to become carbon neutral by a certain date in the future (not mutually exclusive with SBTi) |
| Offtake agreement | An arrangement between a producer and a buyer to purchase or sell portions of the producer's upcoming goods |
| Permanence | The principle that carbon offsets must permanently remove the carbon dioxide or equivalent emissions from the atmosphere or oceans; for forest carbon, a reversal of carbon storage can happen from human activity (e.g., logging) or unforeseen natural events (e.g., forest fires, pest outbreaks) |
| Reduced Emissions from Deforestation and Forest Degradation (REDD+) | REDD+ projects are project types in areas where existing forests are at risk of land-use change or reduced carbon storage; the projects focus on conserving these forests before they are degraded or deforested, resulting in the avoidance of a business-as-usual scenario that would have produced higher emissions; emissions reductions occur primarily through avoided emissions; the + indicates the enhancement of forest carbon stocks, and under jurisdictional REDD+, there is a requirement to reduce emissions below the baseline |
| Reforestation | This process increases the capacity of the land to sequester carbon by replanting forest biomass in areas where forests have been previously harvested |
| Retirements | Total volume of offsets for which the impact has been claimed by the end buyer; once an offset has been retired it can no longer be traded |

| TERMINOLOGY | DEFINITION |
|---|---|
| Science-Based Target | Target consistent with the level of decarbonization required to keep global temperature increase within 1.5 to 2°C compared to preindustrial levels; offsets are not allowed for counting toward SBTi targets; however, SBTi recognizes the use of offsets for net-zero claims |
| Sequestration | The process of removing CO2 from the atmosphere either by natural or artificial means |
| Spot trade | A trade in which commodities are traded for immediate delivery; Settlement usually happens within two working days |
| Task Force on Climate-related Financial Disclosure (TCFD) | Taskforce established by Mark Carney in 2015 to increase and improve the relevance of climate-related information disclosed voluntarily by corporations, to enable financial market players and the authorities to better understand and manage the risks they represent |
| Transaction value | Value of transacted volume of offsets traded between project developers, intermediaries, and end buyers; offsets can be traded indefinitely until they are retired |
| Vintage | The vintage of a carbon credit describes the year in which emissions reduction takes place; A project can generate credits of multiple vintages |

## DISCLAIMER:

Methodology was developed by McKinsey & Company's Nature Analytics solution, which builds on peer-reviewed methodologies and existing data points or spatial data layers. Although our geospatial analytics can provide useful directional guidance at global scale, drawing any local conclusions will require additional detailed, local studies, notably to include precise local geographic contexts or recent local developments (political or otherwise). In particular, analysis of costs of CO2 abatement are country-level estimates primarily based on expert interviews aiming at providing directional information on costs. Any project-specific assessment should require additional, site-specific research.

## SIZING THE SHORT-TERM 'PRACTICAL' CARBON ABATEMENT POTENTIAL

In this report we estimate the potential of eight Natural Climate Solutions (NCS): reforestation, avoided deforestation, coastal restoration, avoided coastal degradation, peatland restoration, avoided peatland degradation, trees in cropland and cover crops.

For each NCS, the total solution potential is assessed via NCS-specific modeling, the granularity of which depends on the available data. Where available, geospatial data on the extent of targeted ecosystems (such as tropical forests and wetlands) and their degradation status allows assessment of where each NCS can be implemented by avoiding further degradation or restoring ecosystems. This is then combined with an estimate (geospatial or not) of the CO2 sequestration potential of the NCS (or avoided emissions). For the reforestation NCS, the technical potential is further reduced into a "realistic" potential, taking biophysical exclusion filters (such as water availability) into account.

Furthermore, the short-term 'practical' abatement potential is then estimated for each NCS based on agricultural rent: areas with low (less than or equal to $10 per hectare) to medium (greater than $10 per hectare and less than or equal to $45 per hectare) agricultural rent. Agricultural rent is defined here as the economic return from agricultural land. The agricultural rent represents a key decision factor in land-use choices relevant to NCS and it is accounted for in most studies on NCS costs. It has been calculated as follows:

a. We took granular crop yield and distribution for more than 40 main crops (source: The UN Food and Agriculture Organization (FAO)/MapSPAM) and livestock weight and density for eight major livestock categories (source: FAO Global Gridded Livestock of the World).

b. We derived granular gross agricultural revenue by matching yields with farm-gate prices of these crops and livestock.

c. We used the ecoregion gross agricultural revenue median as the relevant ecoregion agricultural rent, to filter out extreme values and fill areas where no cropland is currently present, effectively assigning a hypothetical agricultural rent to land uses that are not (yet) converted to agriculture such as forests.

d. We assumed 30 years of agricultural revenues discounted at 10 percent annually; a rate that is typically used by development banks for evaluating public investments in developing countries.

e. We applied revenue to each area selected for NCS based on highest-revenue yielding crop in that area.

f. We used statistical thresholds of $10 and $45 per hectare per year to differentiate between high and medium, and medium and low feasibility, corresponding to the 33rd and 66th percentiles of the ecoregion median values.

## DETERMINING THE COSTS OF SHORT-TERM NCS PROJECTS

Country-level cost curves were built for each NCS focusing on high potential countries. NCS project costs were determined via expert interview and literature review, and discounted using a 10 percent discount rate on 30-year projects (in line with the academic literature) to account for the different time horizons of expenses.

### FOUR TYPES OF COST ARE CONSIDERED IN OUR ASSESSMENT:

i) **Land costs: The cost of acquiring or renting the area of land on which the NCS is developed plus any other land-related cost (such as land taxes)1. For each country assessed, two cost estimates were provided: one for high feasibility (low cost) areas and one for medium feasibility (medium cost) areas. We assumed that cost differences in these areas were driven by land cost difference, which is highly correlated with the agricultural rent. For high feasibility areas, we therefore used the land cost provided by local expert (triangulated with local/official data sources) assuming that existing projects (on which experts base their information) were implemented in such high feasibility areas. For medium feasibility areas, we derived estimates of land value from a World Bank analysis2. One simplifying assumption taken was that project developers would be leasing land directly and paying land costs in full, rather than with the help of governments and non-profits, meaning at low to no cost.**

ii) **Initial project costs: The initial costs and investments needed to start a NCS project, including project and site preparation, site set-up, administration, and legal costs.**

iii) **Recurring project costs: The payments for labor, materials and overhead necessary to operate a NCS-project throughout its duration, such as maintenance, administration, security, and community payment.3**

iv) **Carbon credit monetization costs: The cost of converting realized NCS impact into actual carbon credits. Detailed cost components included are: initial validation costs, annual verification costs,4 and issuance fees. This does not include marketing costs.**

1 Land ownership structures (e.g., communal land) mean that land used for an NCS might not be effectively acquired or rented at a market price. We still include the land value in our costs in those cases, as a proxy for the land opportunity costs.

2 "The changing wealth of nations 2018: Building a sustainable future," World Bank, 2018. When World Bank values were either below or one order of magnitude larger than the prices for high-feasibility locations, we replaced them using a price correlation equation.

3 Using a standardized $ per hectare rate for countries outside Europe, North America and Australia, based on expert inputs and a review of the academic literature

4 This can be every other year or up to every 5-years depending on the certification organism

## REFORESTATION

We started by creating a map of global reforestation potential, following Bastin et al.5 To do so, we first predicted tree coverage globally under natural conditions, independently of land-use. Based on Bastin et al. data set on observed tree coverage within protected areas (78,774 photo-interpreted measurements), we trained a Random Forest model6 using a set of spatial predictors at a resolution of one square kilometre grouped in four categories:

**Climate variables7: Mean annual temperature, mean temperature in the wettest quarter, annual precipitation, precipitation seasonality, and precipitation in the driest quarter**

I. Topographic variables8: Slope, elevation, and hill shade

II. Soil variables9: Bedrock depth, sand content, and World Reference Base soil classes

III. Biogeographic variables10: Biomes and continent

Hyperparameter tuning was made using R's caret package11 and repeated cross-validation with 40 folds and setting the number of trees at 500.

After transforming tree cover to forest cover, according to the definition of the FAO of the United Nations,12 we calculated the technical reforestation potential as the difference between the predicted forest cover and the current forest cover.13

The 'realistic' reforestation potential is then calculated by filtering the technical abatement potential using three biophysical exclusion filters:

I. Biome filter: For each NCS, we excluded biomes where the solution is non-natural or could have negative effects on ecosystems and climate, i.e. boreal forests/taiga; grasslands, tropical savannas, and shrublands; and deserts and xeric shrublands biomes.14

II. Water stress filter: Based on data from the World Resource Institute, we excluded areas where water stress is projected to be extremely high (greater than 80 percent) or to be arid

5 Jean-Francois Bastin et al., "The global tree restoration potential," Science, 2019, Volume 365, Issue 6448, pp. 76–79.

6 Leo Breiman, "Random forests," Machine Learning, October 2001, Volume 45, pp. 5–32.

7 Stephen E. Fick and Robert J. Hijmans, "WorldClim 2: New 1-kilometre spatial resolution climate surfaces for global land areas," International Journal of Climatology, May 15, 2017, Volume 37, Issue 12, pp. 4302–15.

8 Derived from Shuttle Radar Topography Mission (SRTM) 1 Arc-Second Global, US Geological Survey, usgs.gov.

9 T. Hengl et al., "SoilGrids250m: Global gridded soil information based on machine learning," PLoS ONE, 2017, Volume 12.

10 D. M. Olson et al., "Terrestrial ecoregions of the world: A new map of life on Earth," BioScience, 2001, Volume 51, pp. 933–38.

11 M. Kuhn, "Building predictive models in R using the caret package," Journal of Statistical Software, Volume 28, Number 5, pp. 1–26.

12 Land of at least 0.5 hectares with at least 10 percent tree cover.

13 Derived from Marcel Buchhorn et al, "Fractional forest cover layer," 2019, Copernicus Global Land Service, Land Cover 100M: Epoch 2015, Globe (version 2.0.2).

14 Following J. W. Veldman et al., "Comment on 'The global tree restoration potential,'" Science, October 18, 2019, Vol. 10, we excluded trees planted in boreal forests, tundra, and montane grasslands and shrublands, which can have a negative net warming effect due to a decrease of albedo. Similarly, we excluded savannas and grasslands biomes, as tree planting in these regions will likely threaten biodiversity, through habitat replacement and increased fire risk, and reduce food security for locals relying on them for livestock forage, hunting, or water supply.

in 2040, based on the RCP 8.5 scenario.

III. Human footprint filter: We excluded current cropland and urban areas15, as well as areas where urban expansion is projected with a probability greater than 50 percent by 2050.16

- Finally, we combined the reforestation map with state-of-the art geospatial data on CO2 sequestration rates following natural regrowth (Cook-Patton et al., 2020) to compute the total potential CO2 abated through reforestation for the next 30 years.
- Our underlying assumption here is that reforestation follows a "plant and leave it" approach, rather than a plantation approach. As such, our sequestration rates and costs assume that any hectare of land will only be planted once.

To calculate reforestation project costs, we assumed reforestation projects aimed at replicating natural forests rather than purely commercial plantations. As such, all forestry management costs17 (and revenues) typically associated with commercial plantations are excluded. This simplifying assumption was made to: (i) build a cost estimate of on "higher quality" reforestation carbon credits, meaning those with the most co-benefits in terms of biodiversity; (ii) be consistent across countries by having one archetype of reforestation approach; and (iii) step away from the ongoing debate on whether commercial plantations are less "legitimate" as a result of commercial uses. For simplification, we assumed all planting takes place in year one.

## AVOIDED TROPICAL DEFORESTATION AND PEATLAND DEGRADATION

We relied on Busch et al.18 to estimate areas that are likely to be deforested and associated CO2 emissions in the tropics by 2050.19 Their approach is based on a gridded land-cover change model accounting for site characteristics such as slope, elevation, protected status, initial forest cover, and agriculture revenue potential. We reproduced their results using provided codes and input layers20. Busch et al. project 541.5 million hectares (Mha) of deforestation between 2020 and 2050 under business as usual (BAU) (18 Mha per year), corresponding to 256.9 GtCO2. These estimates include deforestation of peat swamp forests and the resulted emissions from peatland loss. They exclude deforestation of mangrove forests and deserts.

- Contrary to other NCS types, we used the work of Busch et al. to define the achievable potential using their Marginal Abatement Curves (MAC)21, using thresholds of $10 per tCO2, $45 per tCO2 and $100 per tCO2 to differentiate between respectively high and medium,

15 Land cover classes 10, 20, and 190, from Marcel Buchhorn, Bruno Smets, Luc Bertels, Myroslava Lesiv, Nandin-Erdene Tsendbazar, Martin Herold, & Steffen Fritz. (2019). Copernicus Global Land Service: Land Cover 100m: collection 2: epoch 2015: Globe (Version V2.0.2) [Data set]. Zenodo. http://doi.org/10.5281/zenodo.3243509

16 Chen et al., 2020

17 E.g., fertilization, pruning and thinning of trees, etc.

18 J. Busch et al., "Potential for low-cost carbon dioxide removal through tropical reforestation," Nature Climate Change, June 2019, Volume 9, Issue 6, pp. 463–6.

19 This includes emissions from living biomass, soils and peatland. The potential from avoiding peatland degradation in temperate regions is not included in this analysis. Based on Griscom et al., 2017, it represents approximately 10 percent of total peatland avoided degradation potential.

20 J. Engelmann and J. Busch, "Replication data for potential for low-cost carbon dioxide removal through tropical reforestation", Harvard Database 2019, volume 5. dataverse.harvard.edu

21 MAC are developed by reducing the potential agricultural revenue (the main driver of forest loss) with a carbon price incentive ($/tCO2), all other variables remaining constant.

and medium and low feasibility. At 100$ per tCO2, replication data shows a total potential of 5.3 GtCO2 per year, while at $45 per tCO2 and $10 per tCO2, the potential is reduced respectively to 3.36 and 1 GtCO2 per year.22

- To calculate avoided deforestation and peatland degradation project costs, we used our standard cost methodology using the same land value as for reforestation projects.

## COASTAL RESTORATION AND AVOIDED DEGRADATION

We calculated the carbon abatement potential associated with the restoration and avoided degradation of coastal wetlands (focusing on mangroves and seagrass beds, which jointly represent at least 70 percent of global coastal wetlands23). The extent of avoided coastal impact is a combination of the extent of coastal ecosystems with restoration and with avoided degradation potential (mangroves24 and seagrasses), both of which were calculated by comparing a baseline cover to a current cover (the difference allowing to define a restoration potential and to make projections at the 2050 horizon to calculate avoided loss). For avoided loss of coastal ecosystems, we also set a threshold for the maximum avoided loss extent, based on the conservative assumption that 30 percent of the ecosystem surface is/will be protected by 2050 and thus should not be included in the avoided loss extent. The restoration/avoided loss extent was then multiplied by carbon sequestration values.25

- Contrary to the generic approach outlined above, we used the agricultural rent from cropland only as livestock farming is probably less representative of the feasibility of coastal NCS.
- To calculate avoided coastal impact project costs, only costs for mangrove restoration/avoided degradation were investigated (seagrass restoration/avoided degradation projects are less widespread and hence less data is available for them), making the simplifying assumption (in line with expert recommendations) that the cost of restoration was equal to the cost of avoiding degradation plus the cost of planting trees.26

## PEATLAND RESTORATION

We combined four main sources to obtain the extent and emission reductions from peatland restoration: (i) a spatial database of the extent of global peatlands (PEATMAP), (ii) a land cover map at 300m resolution27, (iii) a country database of the extent of degrading peatland in 1990

22 According to Busch et al, a carbon price of $20/tCO2 would incentivize land users to reduce deforestation by 2.36 Mha/year, corresponding to 1.83GtCO$_2$/year (55.1 GtCO$_2$ and 70.9 Mha over the 2020-2050 period), while a carbon price of $50/tCO$_2$ would reduce deforestation by five Mha/year or 3.61 GtCO$_2$/year (149.7 Mha or 108.3 GtCO$_2$ over the 2020-2050 period)

23 Hopkinson et al., "Chapter 1 - Coastal Wetlands: A Synthesis", Coastal Wetlands, pp. 1-75, 2019.

24 Extent mangrove data were obtained from Global Mangrove Watch (1996-2016) while those of seagrass habitats were obtained from Ocean Health Index Science showing the global distribution of seagrass meadows in 2012 (annual loss rates were obtained from literature review).

25 Different carbon sequestration values were used for restoration of the coastal ecosystem versus the avoided loss of the coastal ecosystem. For mangroves, we applied a constant carbon sequestration rate of 6.4 tCO$_2$ per hectare per year (Griscom, 2020) across the globe for restoration and of 11.7 tCO2 year hectare per year for avoided loss. For seagrasses, we applied a constant carbon storage value of 3.4 tCO2 year hectare per year for seagrass restoration (Griscom et al., 2017) across the globe and 4.7 tCO2 year hectare per year for the avoided loss of seagrass meadows (Pendelton et al., 2012).

26 Note: Land cost provided by experts for avoided coastal impact sometimes differ than those use for reforestation/avoided deforestation projects

27 ESA CCI-LC

and 200828 and (iv) emissions factors.

Following Leifeld and Menichetti (2018), we first overlaid the peatland area with the land cover map. When covered by cropland, the peat area was considered to be degraded. We then summed the degrading area by country and compared it with the degrading extent reported in the country database for 2008. In case the calculated extent was higher than the one reported in the database, we considered the calculated extent to be the more accurate. In the other case, w e distributed the remaining degraded extent over all others non-degrading area of the peatland map, proportionally to its area.

We then multiplied the degraded areas by their respective emission factors, depending on their biome and land cover.29

We considered the total area for restoration to be equal to the current degrading area (51 Mha).

We used our standard cost methodology to calculate peatland restoration project costs.30

## TREES IN CROPLAND

We used the results of Chapman et al. 2020 to estimate the potential that can be achieved by adding trees to crop systems. First, they estimated current carbon stocks in cropland based on a global map of above- and below-ground biomass. Furthermore, using a threshold of five tCO2 per ha to distinguish croplands lacking woody biomass (less than or equal to five tCO2 per ha) from those containing woody biomass (greater than five tCO2 per ha), they calculated the median carbon stocks in the latter category for each land unit (biome or country) and assigned this value as the sequestration potential that can be achieved by planting trees in cropland in a given unit. Finally, they multiplied the cropland area with the sequestration rate, assuming an adoption rate between one and 10 percent. We retained the scenario of a five percent adoption rate (i.e., five percent of cropland area currently below five tCO2 per ha is planted with trees).

To calculate trees in cropland project costs, we assumed similar costs structures as for reforestation, with 2 main differences: (i) site set up costs (especially the planting of trees) were factored down as planting density will be much lower and (ii) recurring maintenance costs were also considered as lower as these tasks cannot easily be differentiated from other cropland maintenance tasks carried out by the main land-user. Land costs were not included since the implementation of this NCS has no opportunity cost given full overlap with cropland.

## COVER CROPS

To estimate the theoretical extent of cover crops, we started from a global cropland area of 1571 Mha (FAOSTAT, 2018) from which we removed cropland already planted with a perennial or winter crop (Poeplau & Don, 2014; Griscom et al., 2017) or where climatic factors & cropping systems require a fallow period. To do this at the granular level, we first computed the Crop Duration ratio (CD), representing the percentage of the year a field is cropped. Following Sieberth et al. 2010, CD was calculated at five min degree pixel resolution as the

28 Joosten et al. 2008

29 See Leifeld and Menichetti (2018), table 1

30 Note: Land cost provided by experts for peatland restoration sometimes differ than those use for reforestation/avoided deforestation projects

mean growing area31 divided by the cropland extent32. Conservatively, we considered that areas with CD less than or equal to 60 percent (corresponding to approximately five months of off-season) to be suitable for cover cropping. We further filtered out areas under high water stress33. Finally, we computed the percentage of cropland suitable for cover crop per country and applied this number to the current cropland area34 to estimate the total current cropland area suitable for cover cropping.

In most countries, we assumed an adoption rate of 50 percent by 2050 (Poeplau & Don, 2014), but based on expert insights we adjusted this to 60 percent or 80 percent in some geographies. We also excluded three percent of the remaining surface to accommodate the surface area required to produce the necessary seeds (Runck et al., 2020), as well as croplands on which cover crops are already being used. We applied a carbon sequestration rate of 1.17 tCO2 per ha per year based on a recent global meta-analysis on the impact of cover crops on soil organic carbon (Popleau & Don, 2015).

Our cost calculations for cover crop differ from those of other NCS as we included an estimate of the direct economic benefits accruing to farm operators of using cover crops. As such, we present both gross and net costs of CO2 with cover crops. Key cost components are: (i) seeds, (ii) planting and (iii) terminating the cover crops, which recur every year. We include three types of economic benefits: (i) reduced input costs, starting in the second year after adopting cover crops, (ii) increased revenue from higher yield of the main crop (starting in year three) and, in some countries, (iii) revenue from the sale of the cover crop harvest (starting in year one). Land costs were not included since the implementation of this NCS has no opportunity cost. Contrary to other NCS, we assume annual carbon certification costs to be fixed per project and equal across countries.

## CLEAN DEVELOPMENT MECHANISM / CERS ANALYSIS

The CDM allows emission-reduction projects in the Global South to earn certified emission reduction (CER) credits, each equivalent to one metric ton of CO2. These CERs can be traded and sold, and were used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol.

There are two types of CER, issued depending on the type of project. Long-term certified emission reduction (lCER) credits, and temporary certified emission reduction (tCER) credits. tCER expire at the end of the Kyoto protocol commitment period after the period they were issued in. The tCERs issued in the first commitment period expired at the end of 2020. lCER expire at the end of their crediting period of the respective project, which depends heavily on project type.

In addition to expiring, CERs can also be voluntarily cancelled prior to their expiration. This allows for a transparent way to use them as an offset mechanism, as cancelled certificates can

31 Average of the 12 monthly growing areas per grid cell. Data from MIRCA2000, Portmann et al., 2010

32 Ramankutty et al. 2008

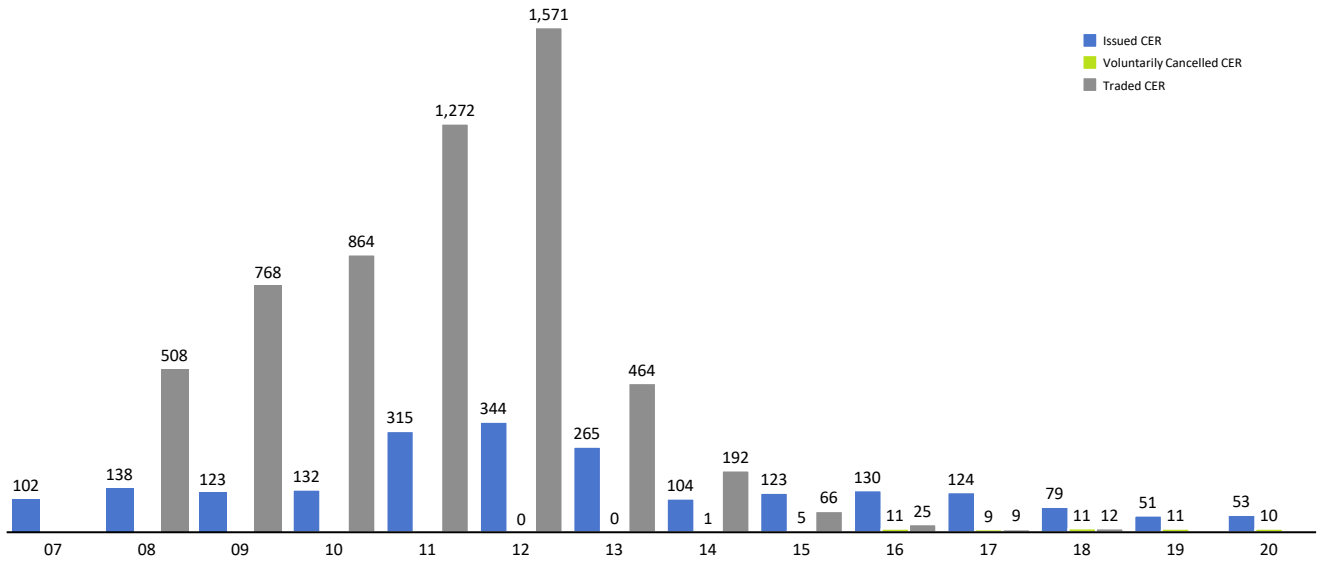
33 We exclude areas where water stress is projected to be extremely high (greater than 80 percent) or to be arid in 2040, based on scenario RCP 8.5 (WRI Aqueduct)

34 FAOSTAT, Land Use 2018

no longer be used for regulatory purposes. Although use as offset via voluntary cancellation was not the original intended purpose, the roughly 10,000,000 CERs retired in 2019 equal 14% of the volume of retirements in the voluntary carbon market (Exhibit 44).

EXHIBIT 44: CLEAN DEVELOPMENT MECHANISM CREDITS BODIES

Annual volume of CERs issued/cancelled, $MtCO_2e$




Source: https://cdm.unfccc.int/Registry/index.html

## DETAILS ON CURRENT CARBON CREDIT INVENTORY IN THE VOLUNTARY MARKET

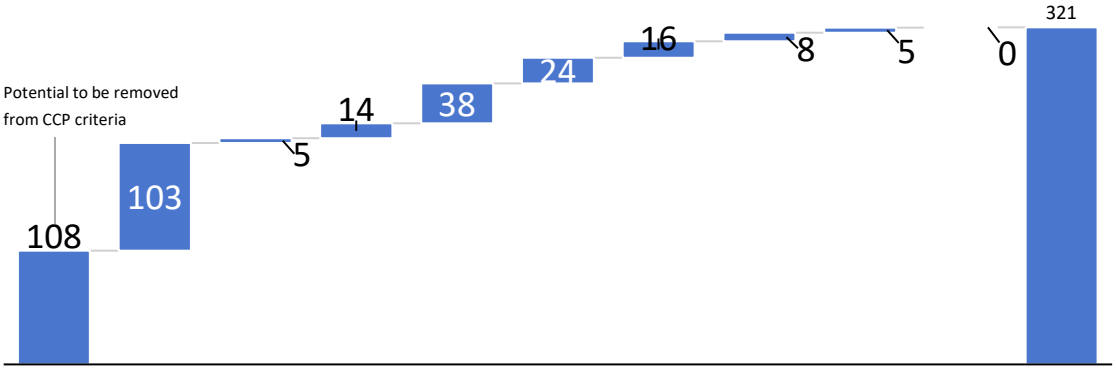
Exhibit 45 shows that renewable energy and REDD+ make up around two thirds of total inventory as of December 2020.

EXHIBIT 44: CLEAN DEVELOPMENT MECHANISM CREDITS BODIES

Vintage analysis

**Renewable energy and REDD+ make up around two thirds of total inventory as of December 2020**

**Inventory by project type,** Mt




| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **% contribution** | 34% | 32% | 1% | 4% | 12% | 8% | 5% | 2% | 2% | 0% | 100% |

| RELEVANT ISO INTERNATIONAL STANDARDS FOR VCM | | |
|---|---|---|
| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
| ISO/IEC Guide 60:2004<br>Conformity assessment<br>— Code of good practice | ISO/IEC Guide 60:2004 recommends good practices for all elements of conformity assessment, including normative documents, bodies, systems, schemes, and results.<br><br>It is intended for use by individuals and bodies who wish to provide, promote, or use ethical and reliable conformity assessment services. These include, as appropriate, regulators, trade officials, calibration laboratories, testing laboratories, inspection bodies, product certification bodies, management system certification/registration bodies, personnel certification bodies, accreditation bodies, organizations providing declarations of conformity, and designers and administrators of conformity assessment systems and schemes, and users of conformity assessment.<br><br>ISO/IEC Guide 60:2004 is designed to facilitate trade at the international, regional, national, and sub-national level. | This standard sets out the generality of the conformity assessment challenges that are identified in the report and what good practice should include. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO/IEC 17011:2017<br>Conformity assessment<br>— Requirements for accreditation bodies accrediting conformity assessment bodies | ISO/IEC 17011:2017 specifies requirements for the competence, consistent operation and impartiality of accreditation bodies assessing and accrediting conformity assessment bodies. | This standard is a framework that can be used to achieve the actions set out under governance bodies to ensure integrity of market participants and market functioning. It provides the requirements for the competence, consistent operation and impartiality of accreditation bodies assessing and accrediting conformity assessment bodies.<br><br>Accreditation bodies perform part of the oversight task set out in recommendation 13 Institute governance for market participants and market functioning in relation to oversight by:<br>reviewing conformity with conflicts of interest principles as set out in standards such as ISO/IEC 17029 or ISO 14065.<br>accrediting validation and verification bodies based on agreed standards such as ISO /IEC 17029 or ISO 14065 including surveillance (spot checks) of the verification and validation bodies. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO/IEC 17029:2019<br>Conformity assessment<br>— General principles and requirements for validation and verification bodies | This document contains general principles and requirements for the competence, consistent operation and impartiality of bodies performing validation/verification as conformity assessment activities.<br>Bodies operating according to this document can provide validation/verification as a first-party, second-party or third-party activity. Bodies can be validation bodies only, verification bodies only, or provide both activities.<br>This document is applicable to validation/verification bodies in any sector, providing confirmation that claims are either plausible with regards to the intended future use (validation) or truthfully stated (verification). However, results of other conformity assessment activities (e.g. testing, inspection and certification) are not considered to be subject to validation/verification according to this document. Neither are situations where validation/verification activities are performed as steps within another conformity assessment process.<br>This document is applicable to any sector, in conjunction with sector specific programs that contain requirements for validation/verification processes and procedures.<br>This document can be used as a basis for accreditation by accreditation bodies, peer assessment within peer assessment groups, or other forms of recognition of validation/verification bodies by international or regional organizations, | This standard supports Recommended action 2 assess adherence to the core carbon principles as follows:<br>• set out how validation and verification bodies shall, as a minimum, operate including matters such as conflict of interest, dealing with complaints, etc.<br>• sets out how the validation and verification process shall be carried out including 'The four eyes principles' i.e. that the review of the outcome and process of the validation or verification shall be carried out by an individual who is independent of the team that carried out the work.<br>Oversight of the validation and verification process is carried out by accreditation bodies see ISO/IEC 17011 above<br>For environmental information ISO 14065 would be used as that provides additional information specific to that type of assessment. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO 14065:2020<br>General principles and requirements for bodies validating and verifying environmental information | This document specifies principles and requirements for bodies performing validation and verification of environmental information statements.<br>Any program requirements related to bodies are additional to the requirements of this document.<br>This document is a sector application of ISO/IEC 17029:2019, which contains general principles and requirements for the competence, consistent operation and impartiality of bodies performing validation/verification as conformity assessment activities.<br>This document includes sector-specific requirements in addition to the requirements of ISO/IEC 17029:2019. | This standard adds details to requirements in ISO/IEC 17029. In addition to links with the report recommendations identified under ISO/IEC 17029 addresses the following recommendations/actions:<br>• Recommended action 13 institute efficient and accelerated verification - The verification process should be consistent across the markets for all carbon credits issued. ISO 14065 has been available since 2007 and is used extensively as the basis for both regulated and voluntary carbon markets. It has demonstrated its efficiency in achieving consistency across those markets.<br>• ISO 14065 as a standard can be used in a program where the program owner specifies additional requirements that shall be met by the validation and verification bodies. This flexibility addresses recommendation 13 institute efficient and accelerated verification's recommendation that the shared data protocol explore the inclusive use of satellite imaging, digital sensors, and distributed-ledger technologies (DLT), to further improve speed, accuracy, and integrity. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO 14064-3:2019 Greenhouse gases — Part 3: Specification with guidance for the verification and validation of greenhouse gas statements | This document specifies principles and requirements and provides guidance for verifying and validating greenhouse gas (GHG) statements.<br>It is applicable to organization, project, and product GHG statements.<br>The ISO 14060 family of standards is GHG program neutral. If a GHG program is applicable, requirements of that GHG program are additional to the requirements of the ISO 14060 family of standards. | This standard adds additional detail to the validation and verification process as set out in ISO 14065. Hence it provides additional detail to the need identified in:<br>• Recommended action 2 assess adherence to the core carbon principles<br>• Recommended action 13 institute efficient and accelerated verification - The verification process should be consistent across the markets for all carbon credits issued. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO/IEC 17040:2005 Conformity assessment — General requirements for peer assessment of conformity assessment bodies and accreditation bodies | ISO/IEC 17040:2005 specifies the general requirements for the peer assessment process to be carried out by agreement groups of accreditation bodies or conformity assessment bodies. It addresses the structure and operation of the agreement group only insofar as they relate to the peer assessment process.<br><br>ISO/IEC 17040:2005 is not concerned with the wider issues of the arrangements for the formation, organization and management of the agreement group, and does not cover how the group will use peer assessment in deciding membership of the group. Such matters, which could for example include a procedure for applicants to appeal against decisions of the agreement group, are outside the scope of ISO/IEC 17040:2005.<br><br>More than one type of activity can be included in a peer assessment process. This can be considered particularly appropriate when the body under assessment conducts combined assessments of multiple conformity assessment activities.<br><br>ISO/IEC 17040:2005 is also applicable to peer assessment amongst accreditation bodies, which is also known as peer | In addition to oversight of validation and verification bodies, see ISO/IEC 17029 above, there is also a case for oversight of the national accreditation bodies to ensure consistency, known as peer evaluation. This standard provides the requirements for how such a peer evaluation is to be carried out, reported etc. |

| STANDARD REFERENCE | AIM OF THE DOCUMENT | RELEVANCE TO VCM |
|---|---|---|
| ISO/IEC 17000:2020 Conformity assessment — Vocabulary and general principles | This document specifies general terms and definitions relating to conformity assessment (including the accreditation of conformity assessment bodies) and to the use of conformity assessment to facilitate trade.<br><br>The general principles of conformity assessment and a description of the functional approach to conformity assessment are provided in Annex A.<br><br>Conformity assessment interacts with other fields such as management systems, metrology, standardization, and statistics. The boundaries of conformity assessment are not defined in this document. | This standard sets out the terminology and definitions used in conformity assessment and is a reference document for the standards discussed above.<br><br>It also sets out the Functional Approach to conformity assessment. Which is summarized as follows: "Conformity assessment is a series of three functions that satisfy a need or demand for demonstration that specified requirements are fulfilled:<br><br>• selection.<br>• determination; and<br>• review, decision and attestation" |

| KEY QUESTIONS FOR DIGITAL MRV PROJECT CYCLE DESIGN | |
|---|---|
| CRITERIA | DIGITAL MRV SOLUTION EVALUATION DESCRIPTION |
| Scope of Use Case Applications | What types of use cases does the digital MRV solution serve? What are the system boundaries and value chains included in those applications? Which sectors does the digital MRV solution serve? |
| Scope of MRV Activities | What MRV activities have been digitized and incorporated into the solution? For example, data collection and ingestion using digital technologies from more sources and with bigger volumes of data. Data analytics and calculations are automated to assess data and compute results. Data and information are incorporated into standardized reporting templates. What data QA/QC activities and verification/assurance activities are performed by the digital MRV solution? Furthermore, to what extent have MRV activities been digitized, and what MRV activities still performed manually with human involvement? What MRV standards, protocols, guidelines, etc. does the digital MRV solution enable? |
| Scope of Digital Technologies | How have MRV activities been digitized and automated? What digital technologies are part of the digital MRV solution, whether directly part of the solution or integrated with the solution? For example, digital sensors, IoT devices, digital twins, remote sensing, real-time data, DLT (Blockchain), smart contracts, AI, ML, data analytics. At what level of maturity/sophistication? |
| Transparency | To what degree is the solution a "black box" (overall and for each component)? How does the digital MRV solution enable auditors and programs to certify the solution meets or exceeds required MRV performance? |
| Sustainability | How "green" is the IT, especially the DLT, in the digital MRV solution? Does the digital MRV solution provide evidence for the energy it saves relative to conventional MRV (e.g., avoided travel emissions) and also relative to other MRV solutions? If the digital MRV solution has a worse environmental footprint, how is that compensated to ensure the integrity of the net environmental benefit? |
| Solution Ecosystem | Who are the partners and stakeholders involved in the design and implementation of the digital MRV solution? For example, is the solution mainly by "tech experts" without significant track record in the climate and SDG space? Can the digital MRV solution easily partner and connect with other solutions for to enable both end-to-end and broad participation? What links are there throughout the relevant value chains can the digital MRV solution bring to add value for users? |

| CRITERIA | DIGITAL MRV SOLUTION EVALUATION DESCRIPTION |
|---|---|
| Professional Services and Resources | Does the digital MRV solution provider also offer professional services to deliver complete deliverables and results? For example, digital MRV readiness assessments, methodological development (transform conventional standards into "smart standards"), project design and conventional MRV activities? What resources, for example, expertise (technical, climate and sustainability), IP, financial, infrastructure, does the digital MRV solution provider have to expand and mature along with customers and stakeholders? |
| Vision and Values | How well do the digital MRV solution provider's vision and values align with market and stakeholder needs and expectations? How does the digital MRV solution provider's vision, and action plan, of the climate and SDG space differ from others? For example, considering both technical (e.g., hardware, software, content, open data, open source) and non-technical issues (e.g., governance, markets, equity, empowerment) are digital innovations aligned with governance innovations, social innovations, financial innovations, etc. |

## RESULTS FROM PUBLIC CONSULTATION

A Public Consultation was held during Nov-Dec 2020 to gather feedback. We received over 160+ responses via the Public Consultation Survey and 25+ letters written directly to the Taskforce. We have read through every comment and given them all due consideration. This final report includes our best attempt at reflecting these comments, while fully recognizing not every comment could be included. More details can be found in the appendix on what we learned.

The questions for consultation included the following:

- Do you agree that the implementation of these six topics for action would significantly help to scale voluntary carbon markets?
- Is there anything not covered by these topics for action that we should consider?
- How could we be more ambitious / forward leaning?
- Do you agree with each of the recommended actions described in the blueprint?
- Should the "Core Carbon Principles" include a position on excluding projects of a certain vintage? If, yes should all projects beyond a certain vintage be excluded, or only certain methodologies or project types?
- Should any project types be excluded, or only be allowed with additional safeguards?
- For reference contracts, should we move toward more standardized or more customized contracts versus the Taskforce recommendation?
- To implement the transition to a more liquid marketplace, would you commit to purchasing credits via reference contracts?
- Of the principles for the credible use of offsets outlined, which ones would you be
- willing to adopt?
- Do you agree with the need for a governance body to ensure integrity of carbon credits? Do you

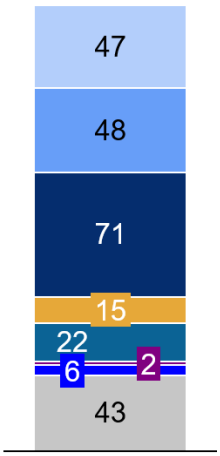
have a suggestion for which body could be a good fit?

- Do you agree with the need for a governance body to ensure integrity of market participants and market functioning? Do you have a suggestion for which body could be a good fit?
- Are there any parallel initiatives you are aware of that the report does not mention? Please describe the initiative.
- Is there anything else in the report you would like to comment on (e.g. second- and third-order effects that we may not have anticipated in market scaling)?
- Would you endorse the blueprint report?

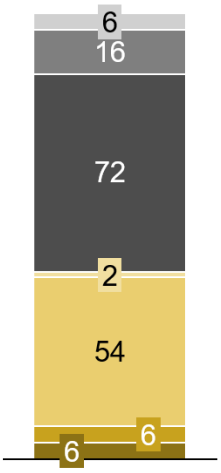
More granular questions related to each of the topics here were included in the Consultation Survey.

# Respondents demographics

**By value chain group**[1]



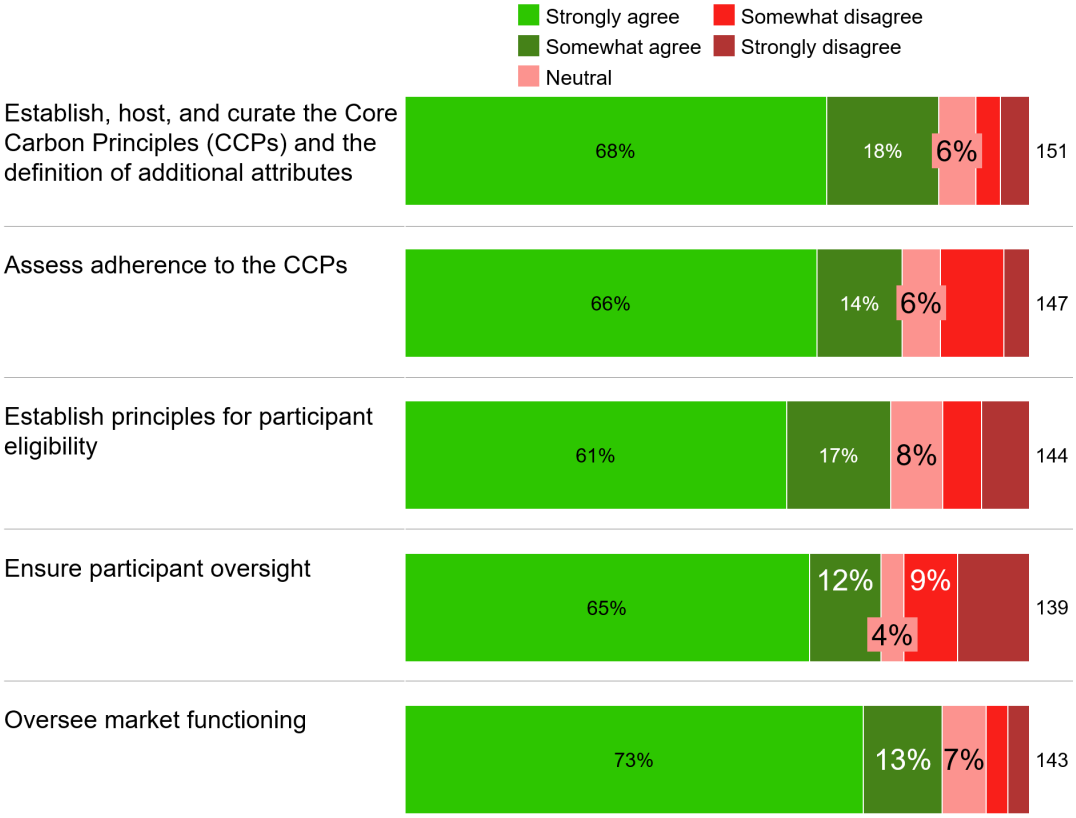

**By geography**



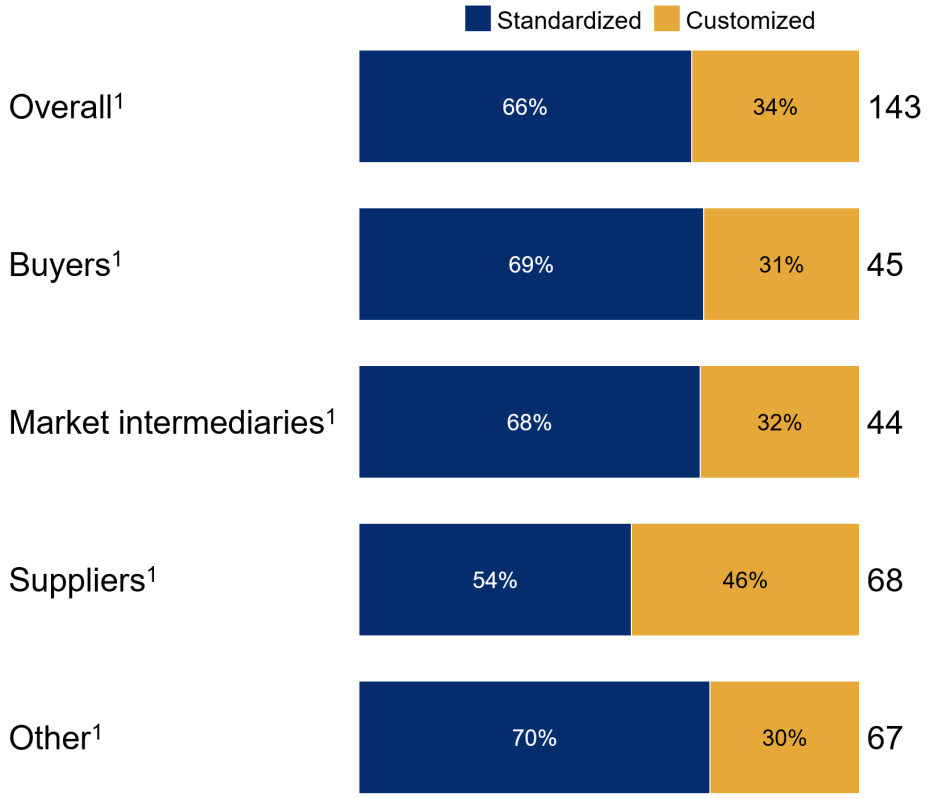

- Buyer
- Market intermediary
- Supplier
- Standard Setter
- NGO
- Regulator/Government
- VVB
- Other
- Africa
- Asia
- Europe
- Middle East
- North America
- Latin America
- Pacific

1. Multiple answers possible
Source: Survey, n=162

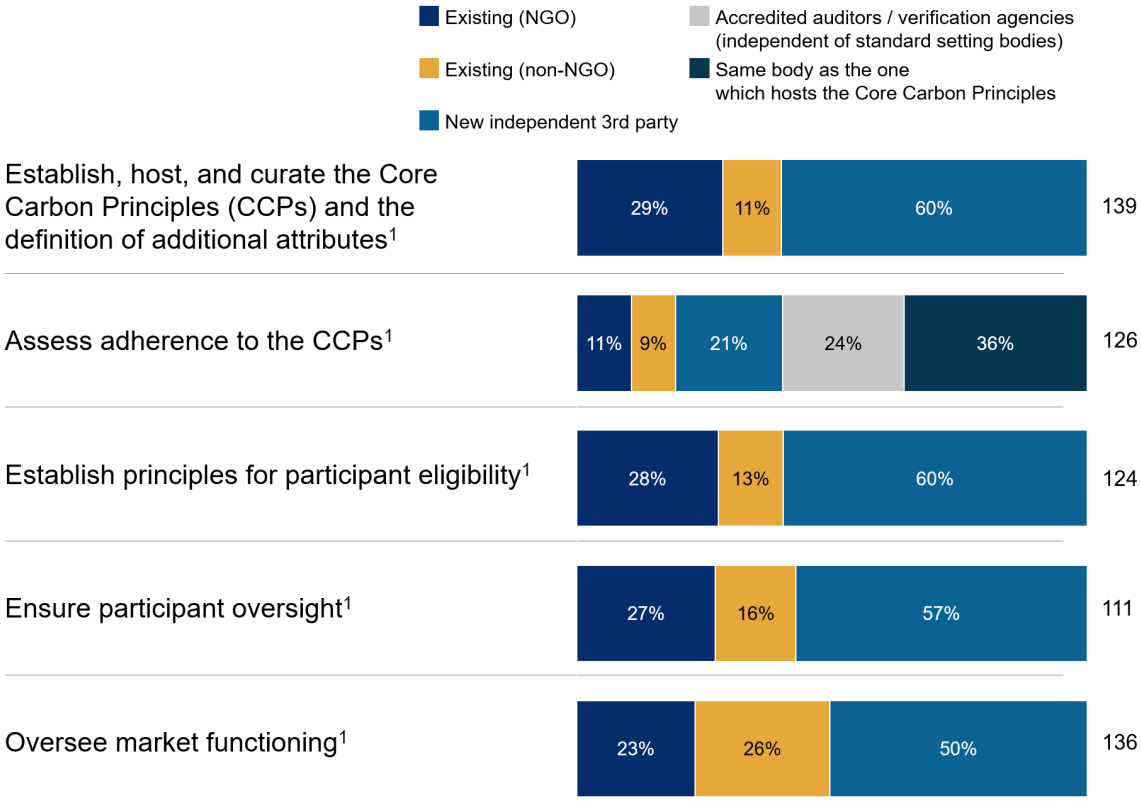
## Do you agree with the need for a governance body to…



## Would you prefer to move towards more standardized or more customized contracts versus Taskforce recommendation?




## What type of organization would you like to see as a governing body?




1. Multiple answers possible to all questions

## AVAILABLE ACADEMIC LITERATURE AND ANALYSES

We have done a literature review across voluntary carbon markets supply, demand, and market architecture. For each, when relevant, we've gathered research on current value and trends, vision of future markets, interventions, and governance.

| TOPIC | PUBLICATION |
|---|---|
| Supply: Current value and trends | IPBES report (2019) |
| | TEEB report (2010) |
| | WWF Global Futures Report (2020) |
| | Changes in the global value of ecosystem services (2014) |
| | The Climate and Biodiversity Nexus (forthcoming) |
| | UN "Meeting the 1.5°C Ambition" |
| | N4C Mapper (forthcoming update Spring 2020) |
| | ENCORE database by UNEP |
| Supply: Interventions | Natural climate solutions, PNAS (2017) |
| | Beyond the Source (2017) |
| | The Wealth of Nature (2017) |
| | CPI Global Landscape of Climate Finance (2019) |
| | Credit Suisse "Conservation Finance from Niche to Mainstream" |
| | WWF (2020) What makes a high quality carbon credit |
| | Campaign for Nature, Anthony Waldron (2017) |
| | IUCN Global Standard for nature-based solutions |
| | Goldstein et al 2020 |
| Supply: Governance | NCS Alliance (ongoing) |
| | GCF's Results Management Framework (RMF) |
| Demand: Current value and trends | Natural Capital Partners |
| | IPCC 2018 |
| | Green Climate Fund |
| | Country specific small case studies |
| | Mission Possible |
| | IT.org |
| | IETA Markets for Natural Climate Solutions |
| | SystemIQ |
| | Conservation International |
| | CORSIA |
| Demand: Interventions | World Bank's Climate Change Fund |
| Demand: Governance | NCS Alliance |
| | Oxford Offsetting Principles |

| TOPIC | PUBLICATION |
|---|---|
| Market infrastructure: Current value and trends | Goldman Sachs (2020)<br>Ecosystem Marketplace (2019)<br>Michaelowa et al. (2019)<br>Carbon market watch (2019)<br>NCS Alliance Knowledge Bank (under development spring 2021) |
| Market infrastructure: Vision of future markets | NCS Alliance<br>New Vision for Agriculture<br>Architecture for REDD+ Transactions (ART)<br>Verra's Jurisdictional and Nested REDD+ framework<br>Natural Capital Market Design, Teytelboym, 2019<br>World Bank (through the Forest Carbon Partnership Facility- FCPF) standard and registry (under development)<br>Gold standard/ German Ministry for the Environment (2019)<br>Natural Climate Solutions Report, WBCSD, 2019<br>IETA/EDF Carbon Pricing: The Paris Agreements Key Ingredient<br>Oxford Offsetting Principles |

## PARALLEL INITIATIVES

| ORGANIZATION | SOLUTIONS DEVELOPED | NAMED PARTNERS |
|---|---|---|
| ICC Carbon Council | DLT-based AirCarbon exchange to provide access to best-in-class carbon projects worldwide | Perlin, AirCarbon Exchange |
| Air Carbon Exchange | | ICC |
| NCS Alliance | Recommendations on Natural Climate Solutions to be released in early 2021 focusing on supply integrity, demand integrity and national & sub-national climate strategies | WEF, WBCSD |

| ORGANIZATION | SOLUTIONS DEVELOPED | NAMED PARTNERS |
|---|---|---|
| Sustainable markets initiative and council. Lead by Prince Charles | Facilitation of industry-wide consortia building through roundtables and council, no concrete consortia built yet | The council has members from: Pact, Meridiam, DNB, Rockefeller Capital, JP Morgan Chase, Roche, Heathrow Airport<br>Established with the support of the World Economic Forum |
| Gold Standard | Solutions on target setting, claims, and financing through guidance suite | VERRA, ICROA, WWF, CDP, WRI, The Nature Conservancy, Carbon Market Watch, World Bank |
| Environmental Defense Fund | Solutions on carbon pricing in sectors not yet covered by the EU ETS trading program | IETA |
| Verra | Options for avoiding double counting, reporting on sustainable development contributions, forest conservation at scale (by governments), others (forthcoming) | Participants in Verra- convened working groups; project developers across geographies and sectors |
| Oxford | Set out the Principles for Net Zero– Aligned Carbon Offsetting | N/A |
| International Emissions Trading Association (IETA) | Reports on carbon pricing and (country) policy developments<br>Training suite on emission trading tools for businesses | N/A |
| International Carbon Reduction and Offset Alliance | Code of conduct for quality assurance and supplier audit<br>Research papers on offset project development within supply-chain | 18 members, among which are ACT, Arbor Day Foundation, BP Target Neutral, Climatecare, Vertis |
| CORSIA | Industry consortium adhering to common code of conduct<br>Central registry for information, data, and implementation | ICAO |

| ORGANIZATION | SOLUTIONS DEVELOPED | NAMED PARTNERS |
|---|---|---|
| Ecosystem Market Trends | Information platform on carbon market developments<br>Attempt to demonstrate innovative public–private financing solutions | N/A |
| Arbor Day Foundation | Facilitation and incentivization of the private sector and consumers for afforestation | N/A |
| InterWork Alliance | No specific solution focused on the carbon market so far<br>DLT token taxonomy framework<br>DLT interwork framework for contracts | Exchanges, banks, tech companies, other consortiums |
| German Ministry of the Environment | Support to promote and create supply in collaboration with Gold Standard, i.e., guidance suite, and training tools | Gold Standard, CDM Watch, UN Environment Programme, KfW development bank, etc. |
| Architecture for REDD+ Transactions (ART) | Standard and process guidance for registration, verification, and issuance of REDD+ credits<br>ART registry associated | Rockfeller Foundation, Norwegian International Climate and Forest Initiative, Environmental Defense Fund, Climate and Land Use Alliance |
| Livelihoods Funds | Livelihoods carbon fund to finance large- scale implementation projects in return of carbon credits | Investors (e.g., Danone, SAP, Michelin) |
| The World Bank | DLT-based meta-registry system connecting country, regional and institutional databases to ensure tracking across different systems | Broad group of member governments and NGOs |
| Transform to Net Zero | TBD | Founding members incl. Microsoft, Maersk, Danone, Mercedes-<br>Benz, Nike, Natura &Co, Starbucks, Unilever,<br>Wipro, EDF |

| ORGANIZATION | SOLUTIONS DEVELOPED | NAMED PARTNERS |
|---|---|---|
| Avoiding Double Counting Working Group | Guidelines toward avoidance of double counting | Meridian Institute, Stockholm Environment Institute, EDF, ACR, Carbon Market Watch, CAR, IETA, Verra, Gold Standard, WWF |
| Dubai Carbon Centre of Excellence (DCCE) | Regional data-centric repository of economically viable sustainability business practices | Dubai Supreme Council of Energy (DSCE), United Nations Development Programme (UNDP), Dubai Electricity and Water Authority (DEWA) |
| Open Footprint Forum | No solution developed to date, although solutions for measuring and managing environmental footprint are planned | The Open Group members, plus 15 organizations from multiple industries (Accenture, BP, Chevron, Cognite, DNV GL, Emisoft, Equinor, Halliburton, Infosys, Intel, Microsoft, Schlumberger, Shell, University of Oslo, Wipro) |