

Prospects for CCS in Carbon Markets

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South Pole

South Pole: pioneering climate solutions

South Pole enables corporates, capital markets, and the public sector to reduce their impacts on climate change through advisory services and high impact carbon offset projects.

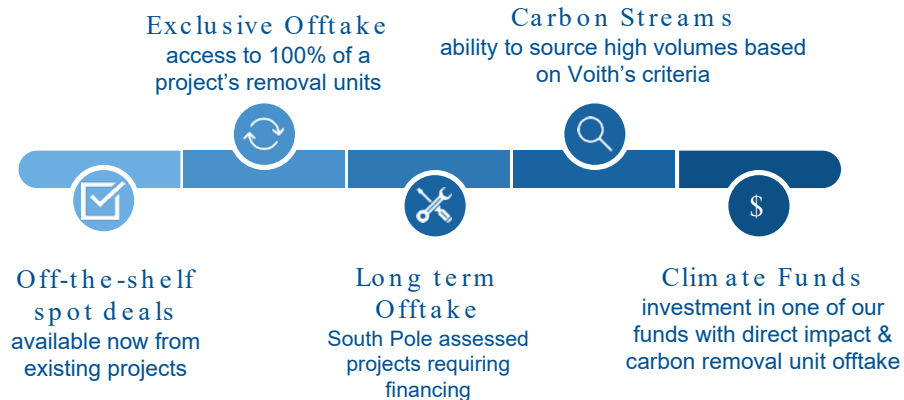


In our 15 year history, our nearly 1,000 projects have reduced, avoided, and sequestered over 60 million tons of CO₂e.

South Pole also advises more than 1,000 clients on their climate strategy and respective implementation.

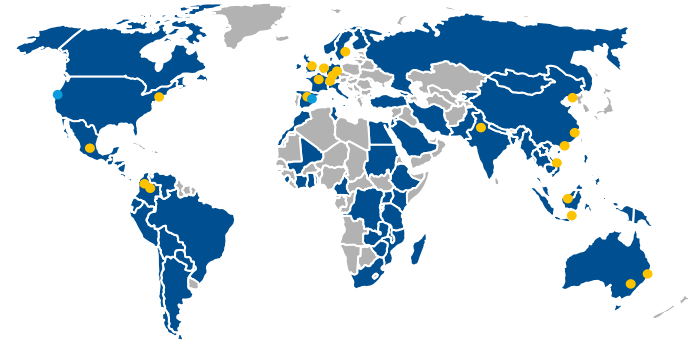
South Pole Climate Projects

World-class climate projects with a variety of financing mechanisms



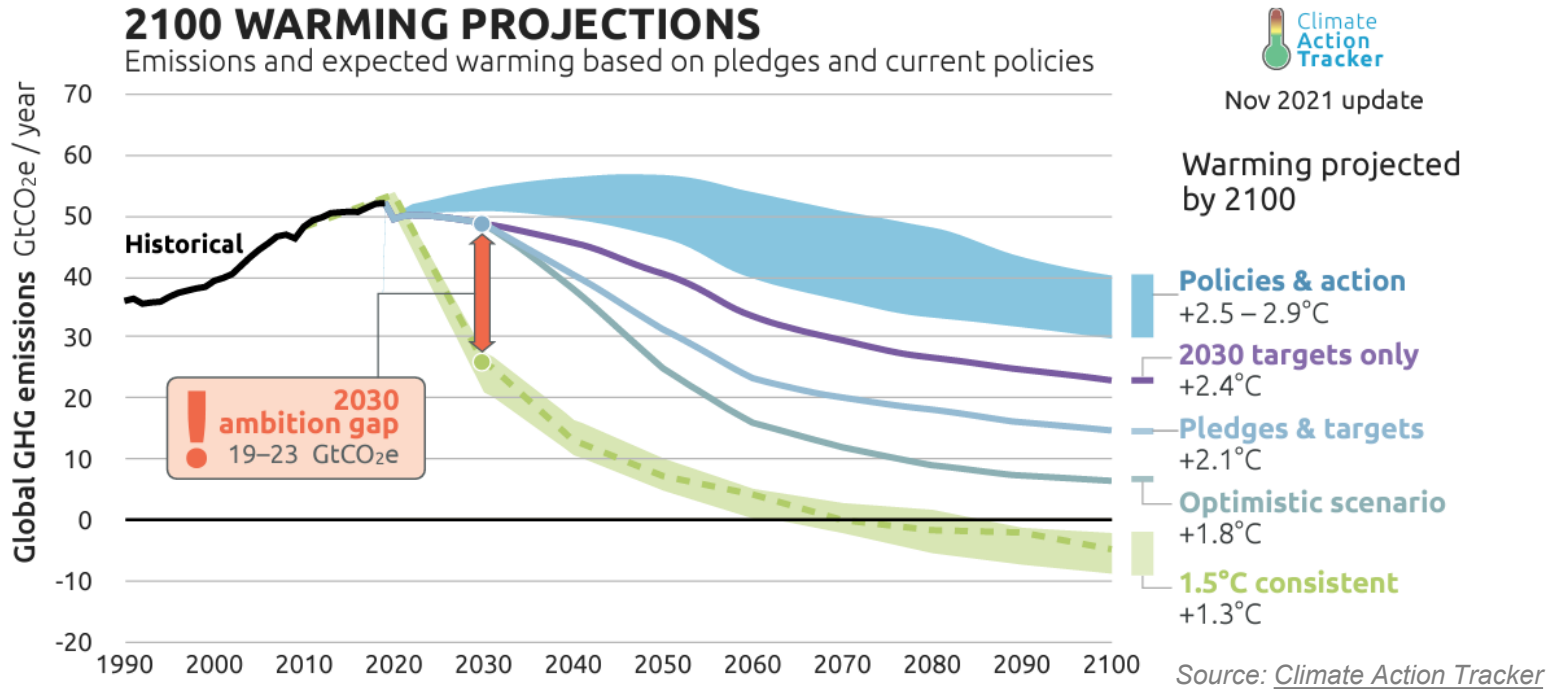
Global Impact - Local Reach

Our staff of 1,200 employees in over 30 offices around the world includes biodiversity experts, consultants, scientists, project developers, investors and reputations managers.



The Big Picture

Net Zero and the global ambition gap

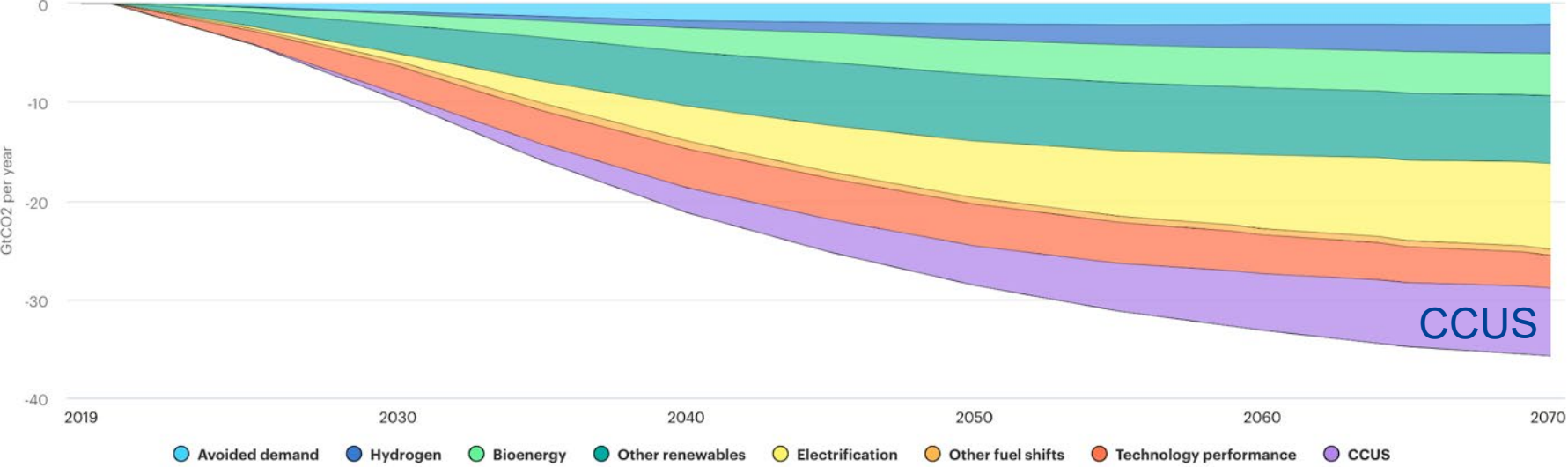


CCUS Policies & regulations 

CCUS Financial incentives 

The role of CCUS in achieving Net Zero

CO2 emissions reductions in the energy sector in the Sustainable Development Scenario relative to the Stated Policies Scenario



Cumulative emissions reductions, 2020-2070

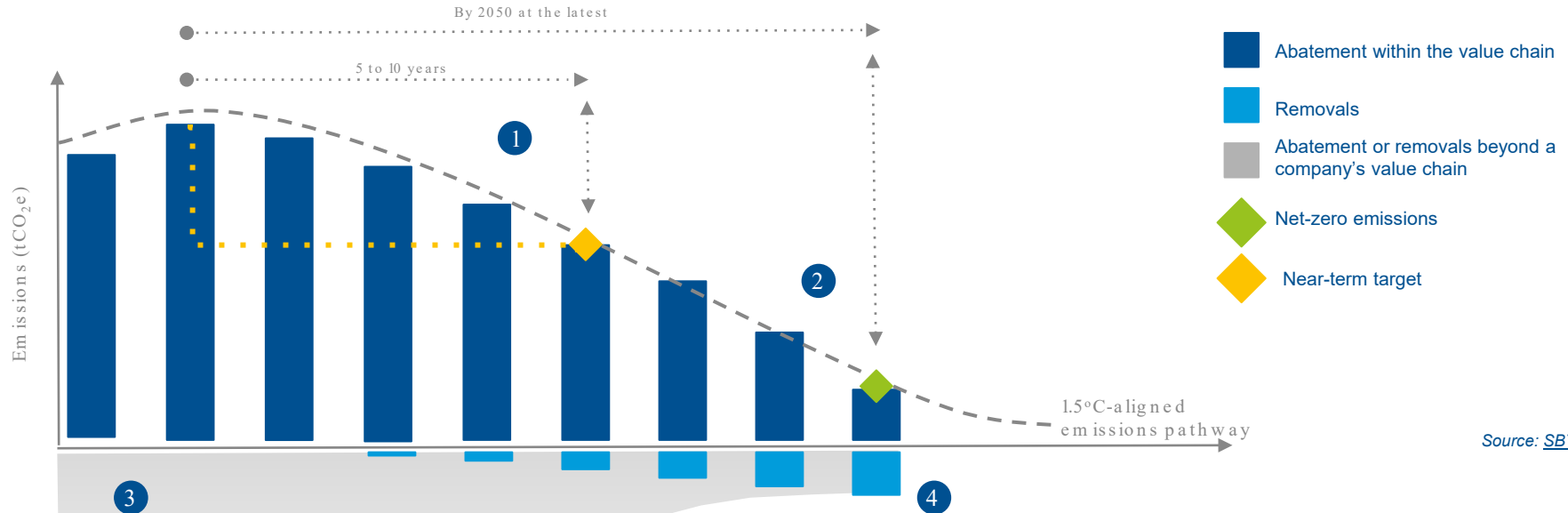
IEA. All rights reserved.

Source: EIA

CCUS vs CDR: Reductions vs Removals



Best practice net-zero strategy as per SBTi



Source: [SBTi](#)

- 1 To set near-term SBTs: 5-10 year emission reduction targets in line with 1.5°C pathways.
- 2 To set long-term SBTs: target to reduce emissions to a residual level in line with 1.5°C scenarios by no later than 2050.
- 3 Beyond value chain mitigation: in the transition to net-zero, companies should take action to mitigate emissions and finance removals beyond their value-chains. For example, purchasing high-quality carbon credits..
- 4 Neutralisation of residual emissions: GHGs released into the atmosphere when the company has achieved their long-term SBT must be counterbalanced through the permanent removal and storage of carbon from the atmosphere.

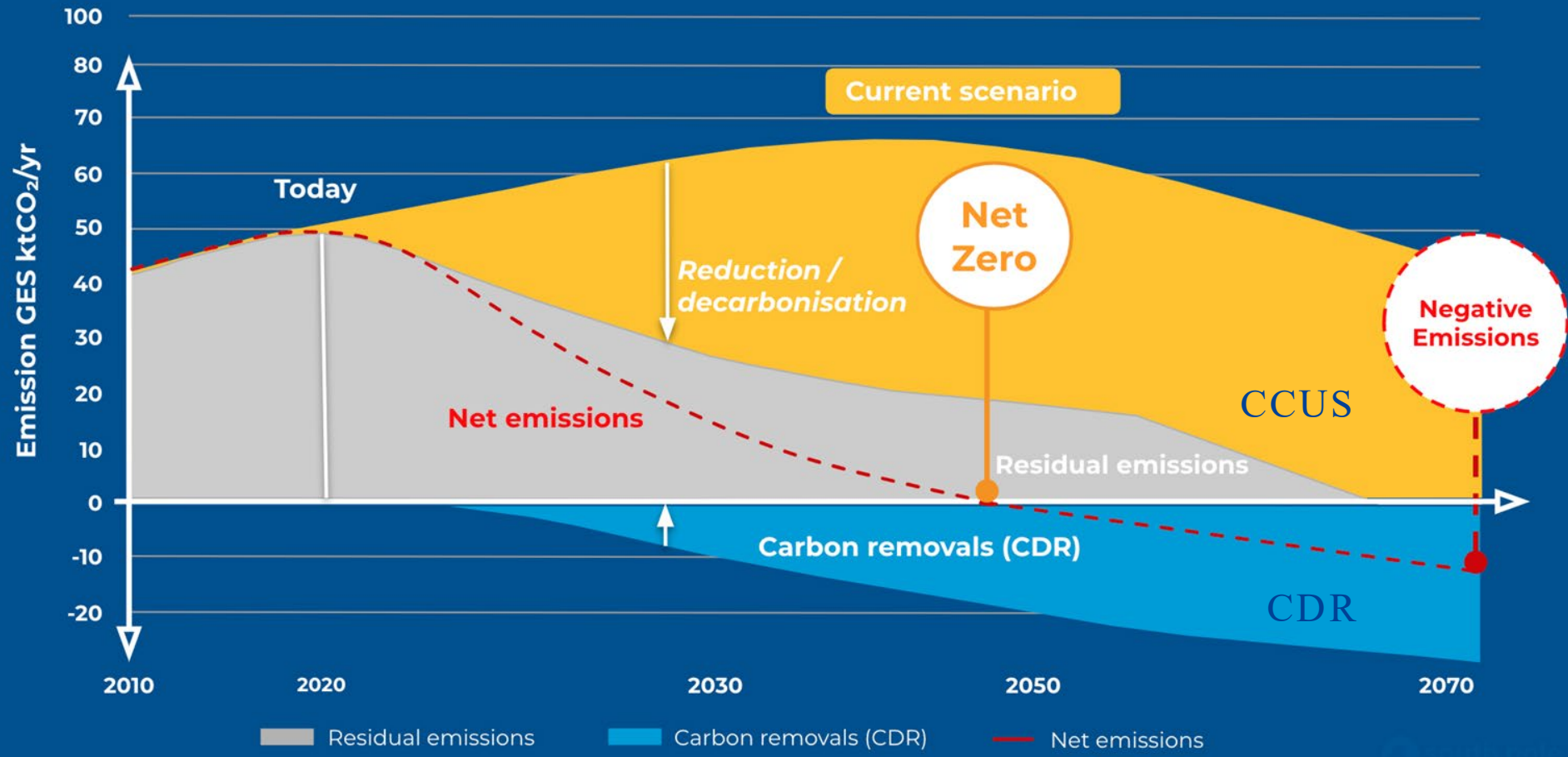
Distinguishing between reductions and removals

CO ₂ -source	Carbon Capture and Storage (CCS)	Carbon Capture and Utilisation (CCU)	
		Materials	Power-to-X
Fossil source			
Biomass			
Atmosphere			

Source: ClimateWorks Foundation.

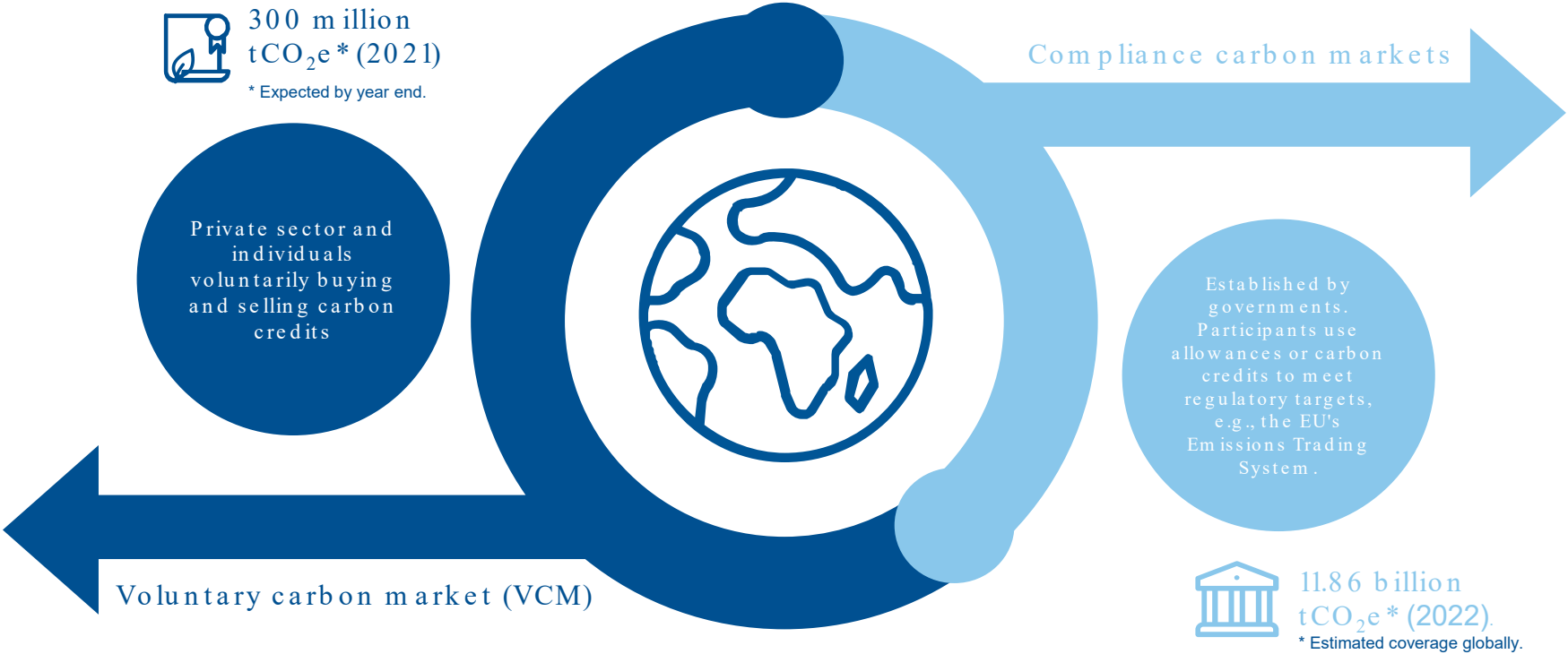
Carbon removals (CDR)

Emission reductions



Voluntary vs Compliance Carbon Markets

Two types of carbon credit markets ...



Compliance carbon pricing schemes worldwide

KEY STATISTICS ON REGIONAL, NATIONAL AND SUBNATIONAL CARBON PRICING INITIATIVE(S)

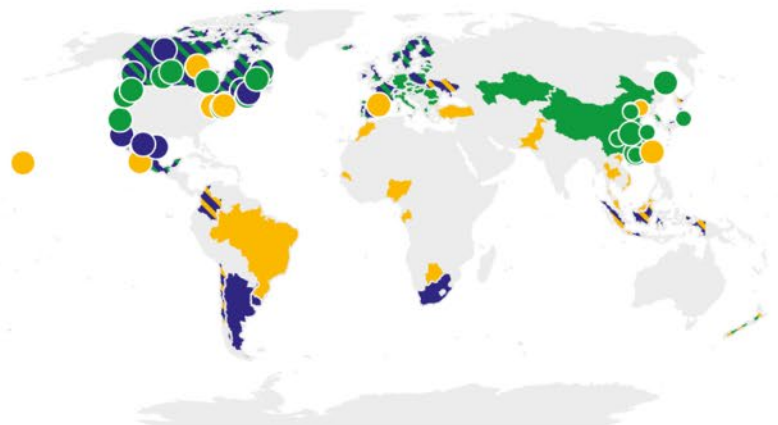
70 Carbon Pricing initiatives implemented

47 National Jurisdictions are covered by the initiatives selected

36 Subnational Jurisdictions are covered by the initiatives selected

In 2022, these initiatives would cover **11.86 GtCO₂e**, representing **23.17%** of global GHG emissions

Summary map of regional, national and subnational carbon pricing initiatives

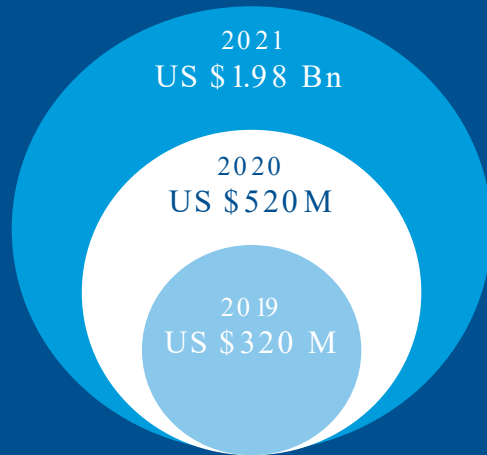


- ETS implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS implemented or scheduled, ETS or carbon tax under c...
- Carbon tax implemented or scheduled for implementation
- ETS and carbon tax implemented or scheduled
- Carbon tax implemented or scheduled, ETS under consider...

Source: [World Bank Carbon Pricing Dashboard](#)

Voluntary Carbon Market Growth

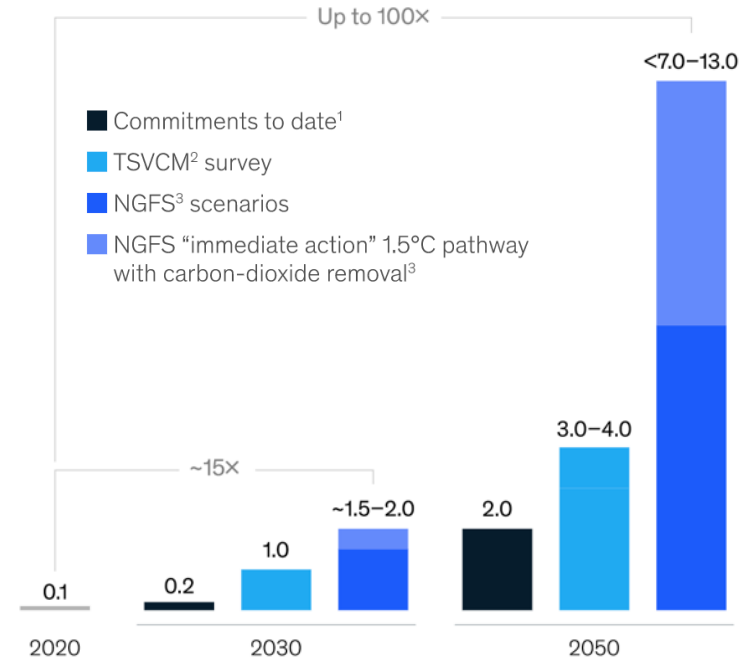
Historic voluntary carbon market growth
Voluntary market has expanded by over 600% since 2019 and almost hit US\$2 billion in value in 2021.



Source: Forest Trends' Ecosystem Marketplace. 2022. *The Art of Integrity: State of Voluntary Carbon Markets, Q3 Insights Briefing*. Washington DC: Forest Trends Association

2030 & 2050 Forecast

Voluntary demand scenarios for carbon credits, gigatons per year



Source: McKinsey "A blueprint for scaling voluntary carbon markets to meet the climate challenge"

Prices in Voluntary Carbon Markets vary significantly by project type...

	2020			2021		
	VOLUME (MtCO2e)	PRICE (USD)	VALUE (USD)	VOLUME (MtCO2e)	PRICE (USD)	VALUE (USD)
FORESTRY AND LAND USE	57.8M	\$5.40	\$315.4M	227.7M	\$5.80	\$1,327.5M
RENEWABLE ENERGY	93.8M	\$1.08	\$101.5M	211.4M	\$2.26	\$479.1M
CHEMICAL PROCESSES / INDUSTRIAL MANUFACTURING	1.8M	\$2.15	\$3.9M	17.3M	\$3.12	\$53.9M
WASTE DISPOSAL	8.5M	\$2.69	\$22.8M	11.4M	\$3.62	\$41.2M
ENERGY EFFICIENCY / FUEL SWITCHING	30.9M	\$0.98	\$30.4M	10.9M	\$1.99	\$21.9M
HOUSEHOLD / COMMUNITY DEVICES	8.3M	\$4.34	\$36.2M	8.0M	\$5.36	\$43.3M
TRANSPORTATION	1.1M	\$0.64	\$0.7M	5.4M	\$1.16	\$6.3M
AGRICULTURE	0.5M	\$10.38	\$4.7M	1.0M	\$8.81	\$8.7M

Projects linked to industry and power sector sell at significantly lower prices (2-3 USD/t in 2021) than nature-based and community projects (5-8 USD/t in 2021)

* Note, these are annualized averages, EM Data can be analyzed more granularly by day, month, quarter, year.

** Note, these are Categories, EM Data can also be analyzed more granularly by Project Type and sub-Type.

Source: Ecosystem Marketplace, a Forest Trends Initiative.

A hiker is silhouetted against a clear blue sky as they stand on the jagged, rocky peak of a mountain. Below the hiker, a vast valley unfolds, featuring a winding river that meanders through a forested landscape. In the distance, layers of mountains are visible, their peaks softened by atmospheric haze. The overall scene is serene and expansive, capturing a moment of solitude in nature.

Prospects for CCS in Carbon Markets

My personal hypothesis no. 1

Voluntary markets will...

... play a marginal role for CCS with a focus on emission reductions (i.e. fossil fuel based power generation, oil & gas industry; cement, steel and chemical industry)

Reasoning

1. The market is not big enough (CCUS industry requires 130 billion USD/year in investments from now until 2050 [McKinsey] whereas the VCM is at 2 billion USD/year today - potentially 100 to 500 billion USD/year by 2050 [Bloomberg New Energy Finance])
2. The prices or the willingness to pay for traditional CCS by buyers in the VCM is not likely to reach the required levels for CCS projects over the next 10 years
3. Buyers have a clear preference for projects with social and environmental co-benefits / SDG contributions
4. Hesitation by buyers to financially support oil & gas or heavy industry - mainly due to limited public acceptance and criticism by NGOs
5. Most likely, sectors relevant for traditional CCS will be covered by compliance instruments in most jurisdictions

Counterargument

Frameworks like SBTi may start to push buyers to buy credits within their own supply chain (e.g. O&G would have to buy CCS credits instead of nature-based credits)

My personal hypothesis no. 1 (continued)

Voluntary markets will...

... play a marginal role for CCS with a focus on emission reductions
(i.e. fossil fuel based power generation, oil & gas industry; cement, steel and chemical industry)

However

- Voluntary markets might be able to support some early (pre-compliance) projects or transactions in the market;
- Voluntary markets will make significant contributions towards the development and evolution of regulatory frameworks for compliance schemes (e.g. transfer of lessons from the CCS+ Initiative under the VERRA framework to the JCM and J-credit schemes)

My personal hypothesis no. 2

Voluntary markets will...

... play an important role for CDR projects
(e.g.. DACS, BECCS, CO2 mineralisation, enhanced weathering)

Reasoning

- Net zero strategies trigger an explicit and significant demand for carbon removals (beyond compliance markets);
- The supply of nature-based removals (e.g. reforestation and soil carbon) is not sufficient to cover the required levels of removals as per IPCC;
- Nature-based removals are perceived as more risky due to non-permanence risks;
- The supply and demand dynamics for carbon removals in the market might sustain price levels that would make CDR projects feasible

However

Voluntary markets will not be sufficient to deliver the required amount of investments to achieve the required volumes of removals by 2030 or 2050

My personal hypothesis no. 3

Compliance markets will...

... key to scale both the CCUS and the CDR industries

Reasoning

1. Compliance markets, including emission trading schemes, carbon taxes, public subsidies and tax incentives as well as carbon credit schemes, can reach the right level of ambition in terms of market size, prices and specific technical, regulatory and financial support to scale CCUS and CDR industries as required by science;
2. Some overarching issues within international frameworks (i.e. Paris Agreement with regards to CDR targets and accounting; or the London Protocol with regards to the treatment of CO₂ storage) still have to be further developed - the same applies to more local policy and regulatory issues such as the regulations for the construction and operation of CO₂ pipelines or CO₂ storage sites for example;
3. Compliance schemes will benefit from the early deployment experience within voluntary markets related to CCUS and CDR (allowing them to build on VCM experiences and incorporate these learnings into their own governance and technical frameworks)
4. There are already some interesting precedents underway in terms of compliance instruments and public subsidies, including the 45Q and Low Carbon Fuel Standard schemes in the US, the EU ETS and the EU Innovation Fund for example

Contacts

Here to help you along your climate leadership journey



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Q&A

VCM growth scenarios

There are different scenarios forecasted by market commentators and analysts. While many are possible, all point to a steady rise in prices compared to today.

Key factors that will influence future prices include:

> Changes in best practices within the VCM

> Macro economic factors

> National climate policy changes

Different VCM scenarios for 2030: price, demand and market size⁶

Scenario	Pricing (USD/Ton)	Demand (GtCO ₂ /Year)	Market Size (USD Billion)
Taskforce on Scaling Voluntary Carbon Markets (TSVCM) Projections			
Prioritization of Low Cost Supply	USD 10-USD 20	1-2	USD 10-USD 40
Preference for Local Supply	USD 50-USD 90	1-2	USD 50-USD 180
Trove Research			
Trove Research	USD 20-USD 30	0.5-1.5	USD 10-USD 40
BloombergNEF Projections			
Maintaining Status Quo (primarily low-quality credits)	USD 11	1	USD 11
SBTI Scenario (removal project credits only)	>USD 200	1	>USD 200
Hybrid Scenario (gradual phase-in to removal only)	USD 48	1.7	USD 80

Source: BloombergNEF, Trove - [Future Size of the Voluntary Carbon Market](#); TSVCM - [Final Report](#), Credit Suisse