BeZero

$100 billion

for planet and people

What carbon credits can achieve

About BeZero Carbon

BeZero Carbon is a carbon ratings agency.
We equip world-leading organisations with the
knowledge, tools, and confidence to make better
climate decisions. Our aim is to scale investment
in environmental markets that deliver a
sustainable future.

Our offices are in London, New York, and Singapore. With a 150+ strong
team – made up of climate scientists, geospatial experts, data scientists,
financial analysts and policy specialists – and global partnerships with
local experts and world-leading research institutions, our ratings and risk
tools can help you make risk-informed decisions on carbon projects of any
type, at any stage, anywhere in the world. Our analytical frameworks are
deeply sector-nuanced and bring to the fore our extensive experience in
rating hundreds of projects across dozens of sub-sectors.

Our platform, BeZero Carbon Markets, hosts the most comprehensive
database of rated carbon projects across all major accreditors, sectors,
and regions to help all participants price and manage risk. Ratings are also
available for display on third-party carbon exchanges and marketplaces.
Headline letter ratings and ratings summaries are publicly available on
our website.

Contents

Tommy Ricketts
CEO and Co-founder
of BeZero Carbon

Carbon markets may be facing their own ChatGPT moment.

In July this year, the Science Based Targets initiative will decide whether to allow carbon credits to be used as an instrument to compensate for companies' Scope 3 emissions.

Close to a staggering six gigatonnes of CO_2e in corporate emissions, or a sixth of global emissions, stand to be impacted. If every tonne was compensated for via a carbon credit at a price of just $16.67, the global carbon market would be valued at $100 billion annually.

Most market growth estimates are less extreme, but few are less bullish on the destination. BloombergNEF (BNEF) estimates carbon markets will surpass $100 bn for the first time in the mid-2030s, at which point the total demand for credits will be around 2.5 bn and the average price of a credit around $40.[1]

This is night and day from 2023, when credit retirements from major registries stood at around 170 million, and the average price of a credit was considerably less than $10 with a market value of $2.3 bn.
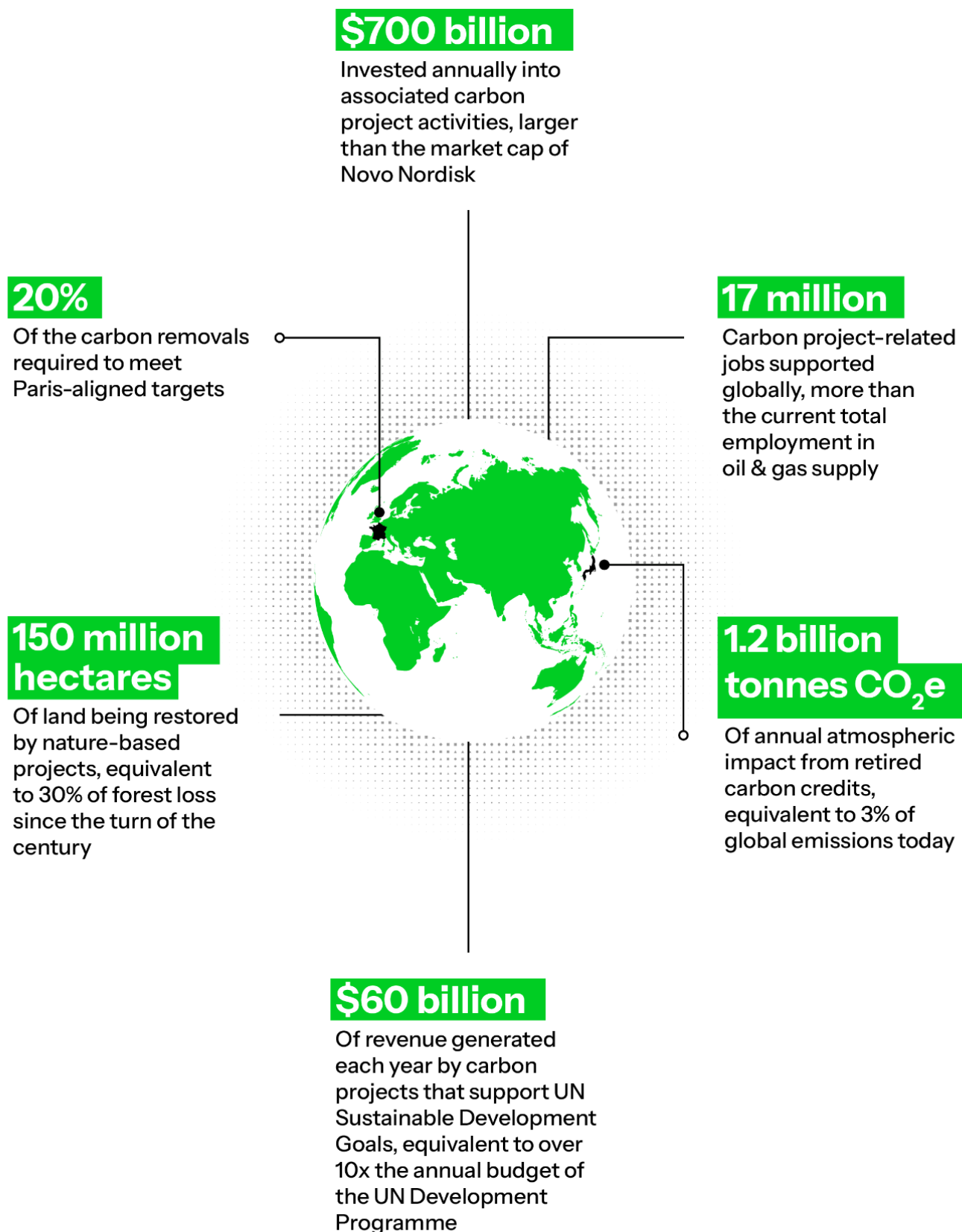
This paper is a thought piece to set out the immense benefits that a $100 bn market would deliver for the planet and its people.

We make recommendations for governments, corporates, and project developers on how to get there – some changes will take more work than others.

Whether the market grows to $10 bn, $100 bn, $1 trillion, or fails entirely depends on the affirmative action from both the public and private sectors, from technological development, through project financing, to regulatory change.

The belief that a successful market can truly contribute to the planet and people is why so many brilliant academics, professionals, and policy-makers are committed to this market's long-term success.

The impact of a $100 bn carbon credit market

$700 billion

Invested annually into associated carbon project activities, larger than the market cap of Novo Nordisk

20%

Of the carbon removals required to meet Paris-aligned targets

17 million

Carbon project-related jobs supported globally, more than the current total employment in oil & gas supply

150 million hectares

Of land being restored by nature-based projects, equivalent to 30% of forest loss since the turn of the century

1.2 billion tonnes CO$_2$e

Of annual atmospheric impact from retired carbon credits, equivalent to 3% of global emissions today

$60 billion

Of revenue generated each year by carbon projects that support UN Sustainable Development Goals, equivalent to over 10x the annual budget of the UN Development Programme

The market for carbon credits today

Carbon markets are a climate action tool. When effective, they allow polluters to compensate for activities that cannot readily be decarbonised.

Project-based carbon credits are generated by activities that reduce or remove greenhouse gas emissions.

Today, there are more than 50 types of activities that can generate carbon credits, from forestry and mangroves to methane capture and soil carbon sequestration, and that number is rising.

Each credit represents one tonne of carbon dioxide or another greenhouse gas equivalent (CO_2e) for a given activity for a given period.

Lifecycle of a carbon credit

To generate carbon credits, a project developer typically adheres to an accredited methodology overseen by a standards body. It may also fulfil industry standards, such as CORSIA or the Integrity Council for Voluntary Carbon Markets Core Carbon Principles.

Project developers usually rely on a mix of outside investment and pre-selling credits via long-term pre-purchase agreements to fund and finance project activities. This is important as it may be years before a project is operational and generating revenue from credit sales.

Issued credits are available via exchange traded contracts, or 'over-the-counter' via marketplaces and brokers. They can only be retired once.

There are four main sources of demand for carbon credits from end buyers:

1. To comply with regulations.
2. To fulfil a corporate net zero transition framework, e.g. Science Based Targets initiative.
3. To make a voluntary climate-related claim, such as carbon neutral.
4. As a form of philanthropy.

Carbon credits can be transacted in a range of markets, including what's commonly referred to as the voluntary carbon market (VCM) as well as domestic compliance markets and as eligible instruments for carbon taxes and cap-and-trade schemes.

The role of carbon ratings

Our analysis shows that BeZero Carbon Ratings have supported the development of a positive correlation between the price and quality of credits for the first time.

This means that ratings are shaping buyer behaviour and more money is being channelled into projects that have better evidenced climate outcomes.

High-quality carbon credits

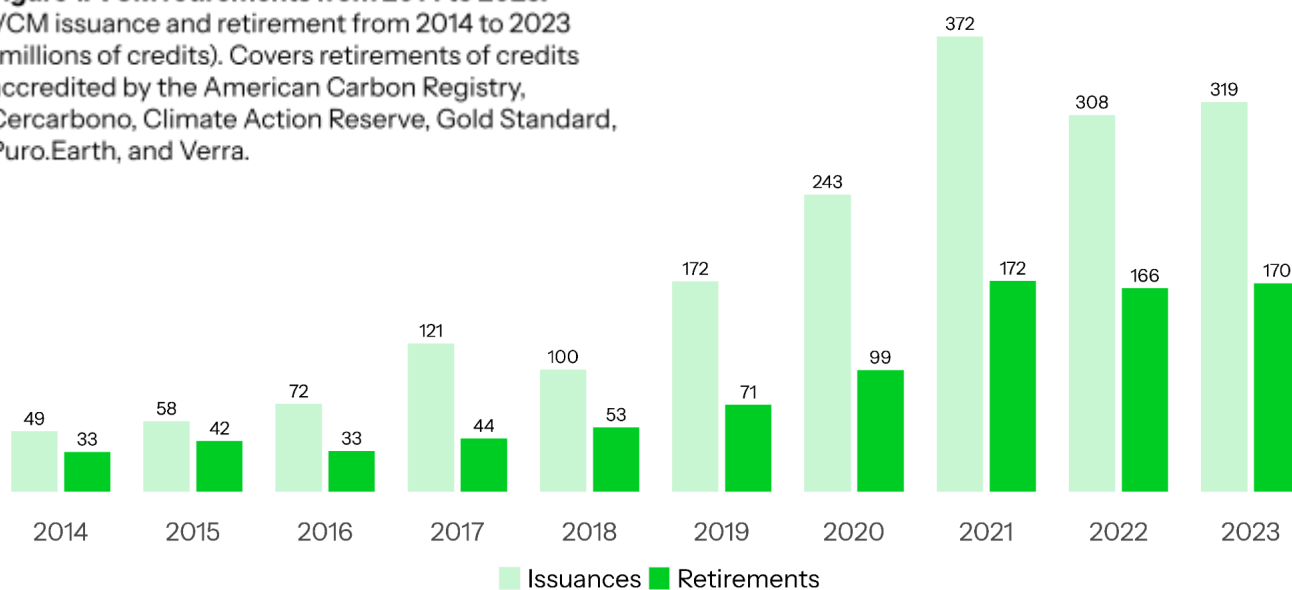Buyers should look for high-quality credits that have three fundamental characteristics:

- Additionality, i.e. the intervention wouldn't have taken place otherwise.
- Carbon accounting, i.e. reliable, accurate data on the project's ongoing atmospheric impact.
- Permanence, i.e. the removal or reduction does not reverse.

Many projects also benefit from an array of valuable co-benefits such as biodiversity, education, or poverty alleviation.

The market for carbon credits today

Figure 1: VCM retirements from 2014 to 2023.
VCM issuance and retirement from 2014 to 2023 (millions of credits). Covers retirements of credits accredited by the American Carbon Registry, Cercarbono, Climate Action Reserve, Gold Standard, Puro.Earth, and Verra.

Legend: Issuances, Retirements

Data values by year (Issuances / Retirements):
- 2014: 49 / 33
- 2015: 58 / 42
- 2016: 72 / 33
- 2017: 121 / 44
- 2018: 100 / 53
- 2019: 172 / 71
- 2020: 243 / 99
- 2021: 372 / 172
- 2022: 308 / 166
- 2023: 319 / 170

Over the last decade, voluntary carbon market (VCM) projects have issued 1.8 billion credits, of which around half have been retired. Annual issuances and retirements have both grown by a factor of 5–6 over this period.[2]

The leading obstacle to scaling carbon markets has been concern over the integrity of carbon credits. This has been fuelled by widespread media scrutiny, notably around issues such as safeguards (protecting wellbeing and human rights), carbon accounting, and additionality.

These concerns can be traced back to an overly simplistic market structure relying on binary accreditation. Either a project passes and is allowed to issue a given number of credits, each equivalent to 1 tonne of carbon dioxide equivalent (tCO_2e), or it does not pass and cannot issue credits.

The problem with this system was that in practice, no two carbon credits are equal and projects face a wide range of risks at issuance and over their lifetime. Simple offsetting whereby $1\ tCO_2e$ emissions is matched to one carbon credit, when that instrument is very likely less than $1\ tCO_2e$, is clearly flawed.

Figure 1 shows that a total of 883 million credits have been retired since 2014. Applying BeZero's risk-adjusted methodology to rated projects, and extrapolating that to all credits retired since 2014, implies that these retirements have had an atmospheric impact of ~300 million tonnes CO_2e, or approximately one-third of the 'offset' claimed using the one credit = one tCO_2e approach.

The market for carbon credits today

Independent carbon rating agencies, such as BeZero Carbon, solve this issue by providing a risk-based analysis of carbon efficacy, and models to understand other key risks.

20% of BeZero rated projects are 'AAA', 'AA', 'A', or 'BBB'-rated, meeting our definition of high or moderate likelihood of delivering on their core climate claim. Meanwhile 80% are rated 'BB', 'B', 'C', or 'D', meaning a low or very low likelihood.

Ultimately, investing in effective carbon projects helps tackle climate change because they:

- Get everyone to set a price on their CO_2e emissions.
- Accelerate net zero.
- Maximise climate impact per $ spent, globally.
- Transfer capital to the global south.
- Create a revenue stream for preservation and restoration of nature.
- Carry wide ranging co-benefits beyond carbon.
- Are an essential tool to fund innovative new technologies.

Carbon credits are never meant to be used as a replacement for decarbonisation activities, but rather as a tool alongside them. A study of over 7,000 businesses showed that companies engaging in the carbon credits market are reducing their own emissions more quickly than their peers. They are 1.8 times more likely to be decarbonizing year-over-year and the median credit buyer is investing 3 times more in emission reduction efforts within their value chain.[3]

In our view, carbon credits should be used as contributory instruments for hard-to-abate Scope 3 emissions, not just Beyond Value Chain Mitigation. Scope 3 emissions are, by definition, someone else's Scope 1 and 2 emissions. Using both means, at the very least, emitters are double-paying for the benefit of the planet and people.

According to BloombergNEF, under the most likely of a range of plausible scenarios, the market for carbon credits is set to surpass a total value of $100 bn per annum for the first time in the mid-2030s.[1] At this point, they project that the total demand for credits (proxied by retirements) will be around 2.5 bn per annum and the average price of a credit around $40. A market of this size will deliver immense benefit for climate and communities.

The impact of a $100 bn carbon credit market

$700 bn
Invested annually into associated carbon project activities

$60 bn
Of revenue generated each year by carbon projects that support UN Sustainable Development Goals

1.2 bn tCO$_2$e
Of annual atmospheric impact from retired carbon credits

150 m hectares
Of land being restored by nature-based projects

17 m
Direct carbon project-related jobs supported globally

20%
Of the carbon removals required to meet Paris Agreement-aligned targets
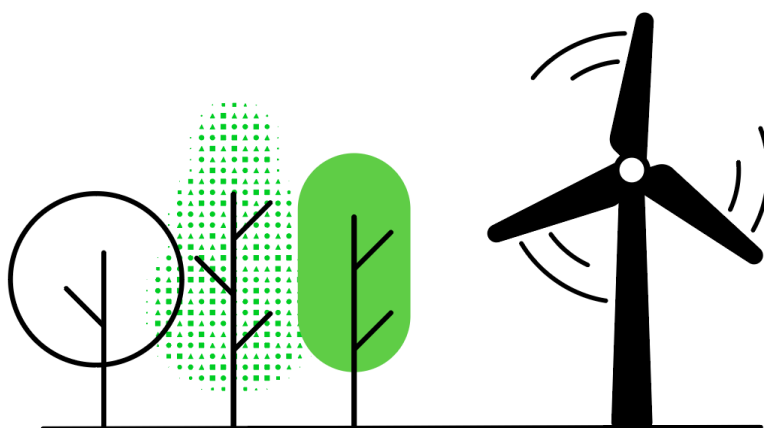
The impact of a $100 bn carbon credit market

The impact of a $100 bn carbon credit market

$700 bn invested annually into associated carbon project activities

Carbon credits drive investment into carbon projects.

We estimate that the total investment per annum into projects supported by a $100 bn traded market would be around $700 bn. This is based on the current ratio of investment to traded market size being around 7:1, and this being maintained going forward.[4] Put into context, $700 bn is larger than the current market capitalisation of Novo Nordisk, Europe's most valuable company.[5]

Without the revenue generated by carbon credits, such projects would not be viable prospects for investment. Credits unlock the much-needed institutional capital required to get carbon reduction and removal projects off the ground. This is particularly critical for technologies like direct air capture (DAC), where plants require substantial upfront investment and significant ongoing operational costs.

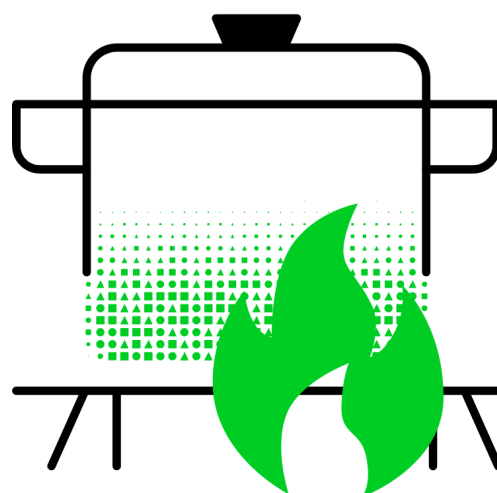**The impact of a $100 bn carbon credit market**

$60 bn of revenue generated each year by carbon projects that support UN Sustainable Development Goals

Carbon credit projects enhance lives and transform communities.

We estimate that, in a $100 bn traded market, carbon credits will generate around $60 bn of revenue per annum for projects that directly deliver against the UN's Sustainable Development Goals (SDGs). This assumes that the current proportion of VCM retirements associated with projects that make one or more SDG claims remains the same in a $100 bn market.[6]

For context, $60 bn is over 10 times the size of the current annual budget of the UN Development Programme, which stood at around $4.8 bn in 2022.[7]

Cookstove projects, for example, deliver cleaner air and improved health outcomes (SDG 3: Good Health and Well-being) by reducing indoor air pollution and decreasing respiratory diseases. Additionally, these projects often provide affordable and clean energy solutions (SDG 7: Affordable and Clean Energy) by using more efficient fuels and technologies. Many forestry projects support indigenous communities by providing sustainable livelihoods (SDG 1: No Poverty) and preserving cultural heritage (SDG 11: Sustainable Cities and Communities). These projects also contribute to life on land (SDG 15: Life on Land) by protecting biodiversity and restoring ecosystems.
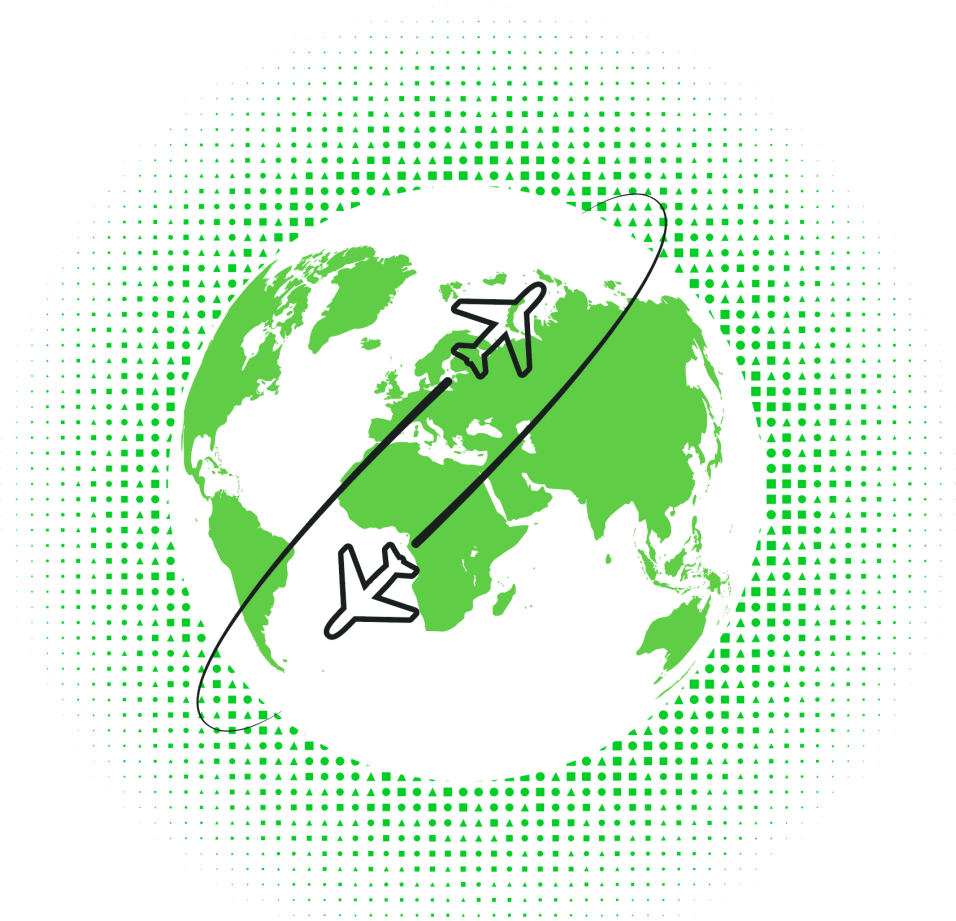
The impact of a $100 bn carbon credit market

An annual atmospheric impact from retired carbon credits of 1.2 bn tonnes of CO_2e

Carbon credits represent real emissions removals and reductions.

We estimate that, in a $100 bn traded market, the total CO_2e emissions removal or reduction from carbon credit retirements would be approximately 1.2 billion tonnes. This takes BNEF's projection of 2.5 billion credits retired per annum in a $100 bn market, then applies a conservative risk-adjustment of over 50%, using BeZero's discounting framework.[8]

This level of emissions removal or reduction is around 3% of total global emissions today, roughly equivalent to the annual emissions of Japan, the 5th biggest emitter in the world.[9] Equivalently it's about one-and-a-half times the annual emissions of the entire global aviation industry today.[10]
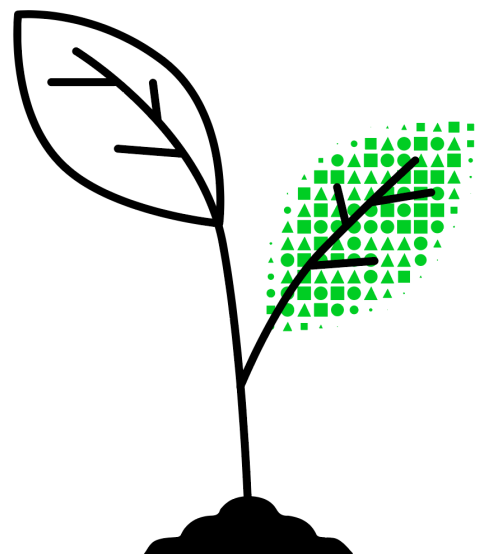
The impact of a $100 bn carbon credit market

150 m hectares of land being restored by nature-based projects

Carbon credits preserve and rebuild diverse ecosystems around the world.

We estimate that, in a $100 bn traded market, nature-based carbon crediting projects could cover around 150 million hectares of the Earth's surface.[11] This is equivalent to 30% of global forest loss since the turn of the century, larger than the land area of Peru.[12]

These projects support some of our most at-risk natural landscapes and biodiversity. Afforestation projects in Brazil restore native forests and provide habitats for endangered species. Blue carbon projects in Indonesia protect coastal areas from erosion and support marine biodiversity. Soil carbon projects in the US improve soil health and increase agricultural productivity.

17 million direct carbon project-related jobs supported

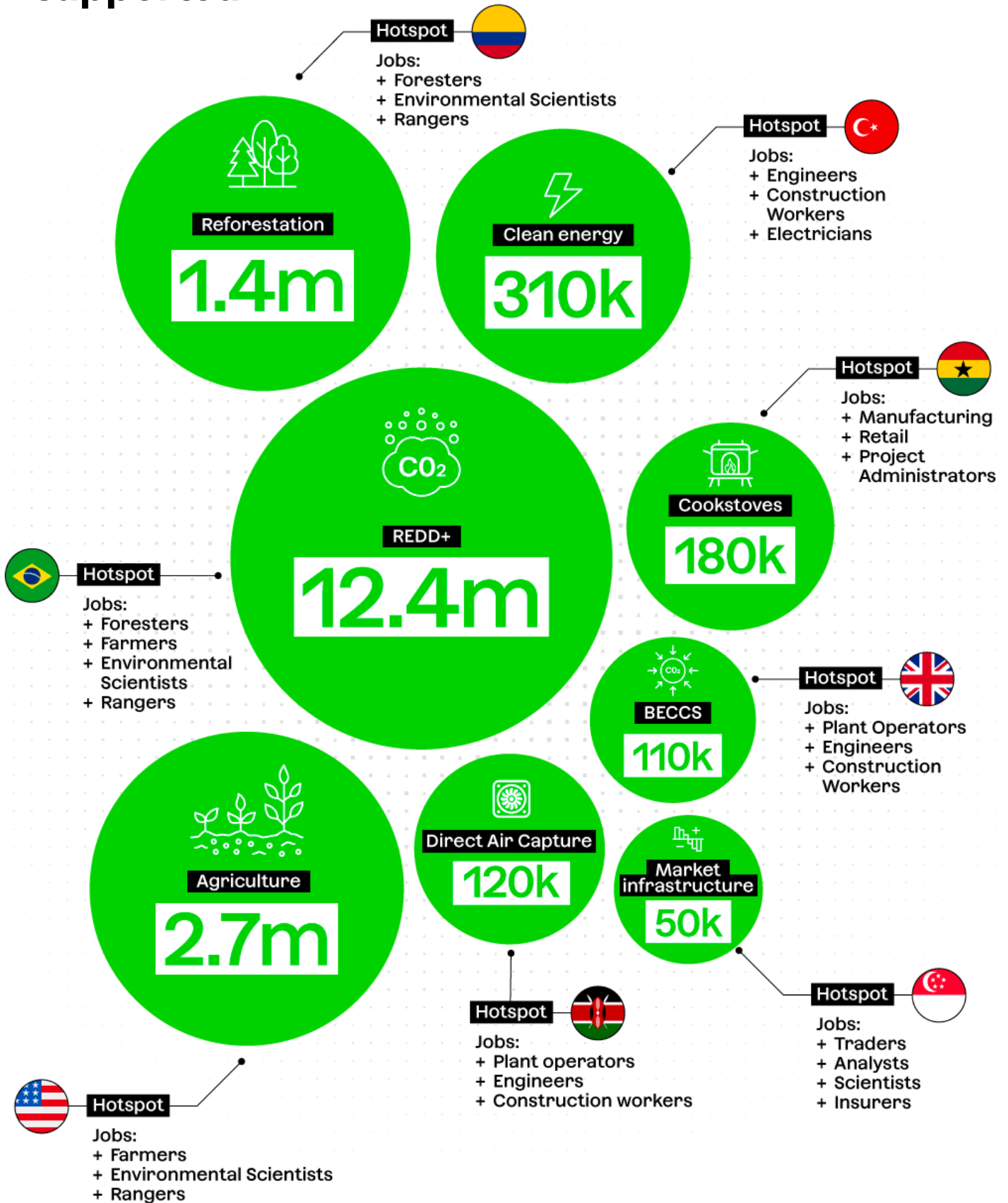## Carbon credit projects and markets deliver jobs and support communities

We estimate that, in a $100 bn traded market, 17 million jobs would be directly supported across all parts of the world in a range of professions. This estimate draws on employment intensity estimates for different project types from a range of sources.[13]

For comparison, this is larger than global employment in oil & gas supply, which stood at an estimated 11.8 million in 2022.[14]

Of this 17 million, we expect around 14 million to be directly working on nature-based projects as ecologists, farmers, foresters, labourers, rangers, and many other role categories. We estimate that around 310,000 will be employed in renewable energy projects: construction workers, electricians, engineers, and others. We expect direct air capture and bioenergy with carbon capture and storage (BECCS) projects to employ around 230,000 in similar professions. Cookstove projects should employ around 180,000 in manufacturing, project administration, and retailing. Finally, we estimate that around 50,000 will be employed in service industries providing the infrastructure for the market to operate effectively: analysts, brokers, data scientists, insurers, lawyers, and traders.

The impact of a $100 bn carbon credit market

17 million jobs supported

Hotspot
Jobs:
+ Foresters
+ Environmental Scientists
+ Rangers

Hotspot
Jobs:
+ Engineers
+ Construction Workers
+ Electricians

Reforestation
1.4m

Clean energy
310k

Hotspot
Jobs:
+ Manufacturing
+ Retail
+ Project Administrators

CO_2

REDD+
12.4m

Cookstoves
180k

Hotspot
Jobs:
+ Foresters
+ Farmers
+ Environmental Scientists
+ Rangers

BECCS
110k

Hotspot
Jobs:
+ Plant Operators
+ Engineers
+ Construction Workers

Agriculture
2.7m

Direct Air Capture
120k

Market infrastructure
50k

Hotspot
Jobs:
+ Plant operators
+ Engineers
+ Construction workers

Hotspot
Jobs:
+ Traders
+ Analysts
+ Scientists
+ Insurers

Hotspot
Jobs:
+ Farmers
+ Environmental Scientists
+ Rangers

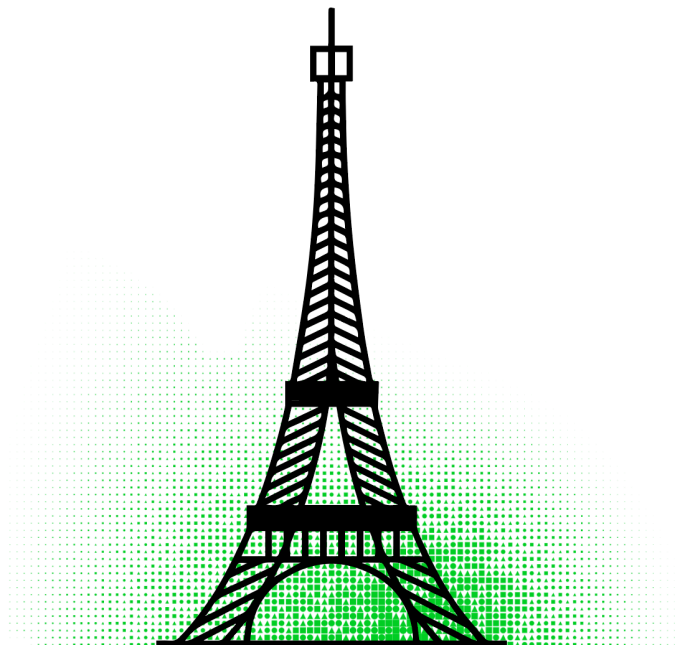## The impact of a $100 bn carbon credit market

Delivering 20% of the carbon removals required to meet Paris Agreement-aligned targets

Carbon credits are climate action

The emissions removals projects financed by a $100 bn market for carbon credits in the mid-2030s would deliver approximately 20% of the removals required to achieve a 1.5 degree-aligned pathway.

This is based on our calculation that around 40% of the total emissions impact of a $100 bn market would result from removals projects, such as reforestation, DAC, BECCS, and McKinsey's projection of the removals required in a 1.5 degree scenario.[15]

As a further illustration of the climate impact of a $100 bn carbon credit market, we estimate that the total emissions reductions and removals delivered by the market would represent around 5% of total global emissions in the mid-2030s, assuming a 1.5 degree-aligned trajectory.[16]

The impact of a $100 bn carbon credit market

We are all responsible for scaling carbon markets, from carbon project developers, to market intermediaries, potential buyers, and governments.

The benefits of a $100 bn market for carbon credits are clear: catalysing progress towards climate targets, global economic opportunity, and finance to drive sustainable development. But scaling up the market to this order of magnitude within the next decade will not be achieved without a change in approach from project developers, corporations, and governments across the world.

Governments have a unique role to play in exercising legislative powers, along with their convening power and diplomatic efforts, to shape a market framework which incentivises private sector actors to participate in the market, purchase high-quality credits and drive innovation.

Demand for carbon credits must be **revived**

Governments should:
- Integrate carbon credits into their compliance carbon markets in a way that mandates or incentivises quality.
- Cooperate to operationalise Article 6 processes and mechanisms.
- Signal their support for initiatives that promote alignment and standardisation across carbon project methodologies and accreditors.

End-buyers should:
- Set an internal price on carbon to account for their own emissions and determine where carbon credits can be used in the immediate term to compensate them.

Project developers should:
- Deliver high-quality projects, and transparently evidence the impact of these projects, using independent assessments such as ratings to substantiate claims that meet strict threshold and methodology standards.

The impact of a $100 bn carbon credit market

The credibility of the market must be **restored**

Governments should:
- Define what a carbon credit is and establish clear regulatory characteristics.
- Increase transparency by enforcing greater disclosure requirements at all levels of the market for carbon credits.
- Give existing regulatory authorities the remit to regulate organisations that set carbon credit methodologies, validate projects, manage credit issuance and intermediate transactions, and provide risk analytics.

End-buyers should:
- Implement higher standards of internal disclosure, publishing not only the number of carbon credits purchased but the projects purchased from, and if possible the rating those credits are assigned.
- Use ratings to select high-quality carbon credits for use in their carbon credit strategies.

Project developers should:
- Improve standards of disclosure, following standardised templates to demonstrate carbon accounting and other technical details.

Incentives to innovate must be **renewed**

Governments should:
- Support R&D in carbon projects and markets, leading by example via their procurement strategies.
- Regulate the market, but leave room to capitalise on innovations to help it scale, including by enabling greater financialisation.

End-buyers should:
- Use their purchasing power to support novel projects and market initiatives that push boundaries and contribute to market credibility.

Project developers should:
- Invest in the development of new technologies and methodologies.
- Collaborate with accreditation bodies to accelerate the go-to-market time for new project methodologies.

Glossary

Article 6 markets

Article 6 is designed to address the key aims of the Paris Agreement: mobilising capital to increase country ambition and accelerating action towards net zero.

Article 6.2 enables bilateral emissions trading between countries in order to achieve their respective emission reduction targets, while Article 6.4 is intended to set up a new UN-mechanism for the trading of carbon credits.

BECCS

Bioenergy with carbon capture and storage

Involves capturing and permanently storing CO_2e from processes where biomass is converted into fuels or directly burned to generate energy.

Carbon credits

Transferable instruments each representing an emission reduction or removal of 1 tonne of CO_2 or CO_2 equivalent.

Carbon ratings

Publicly available, risk-based frameworks for assessing the effectiveness of a given carbon credit, assigning it a score representing how likely it is to avoid or remove a tonne of CO_2e

Compliance carbon markets (CCMs)

The most common types of compliance carbon markets are emissions trading schemes and carbon taxes implemented at a national level.

Created and regulated by mandatory national, regional, or international carbon reduction regimes.

Some compliance carbon markets allow for the retirement of carbon credits to achieve compliance obligations.

CORSIA

Carbon Offsetting and Reduction Scheme for International Aviation

A market-based mechanism developed by the UN's International Civil Aviation Organization, which handles international flights.

The agreement was signed by 192 countries in 2016 and aims to help the aviation industry reach its climate goals by making international flights after 2020 carbon neutral.

DAC

Direct air capture

Technologies which extract CO_2 directly from the atmosphere, for CO_2 storage or utilisation.

Glossary

ICVCM's Core Carbon Principles	The Integrity Council for Voluntary Carbon Markets (ICVCM) is an independent governance body that aims to set and maintain a global standard for quality in the voluntary carbon market. Its Core Carbon Principles are intended to establish fundamental principles for high-quality carbon credit methodologies that create a verifiable climate impact.
Issuance	The process of generating carbon credits from a given project, which will often require verification from standards organisations (e.g. Verra, Gold Standard, ACR, etc.). Once a project is registered and verified, it is issued with carbon credits that represent 1 tonne of CO_2e that has been reduced or removed from the atmosphere.
Retirement	The process of permanently removing a carbon credit from circulation after it has been used to offset emissions so that the credit cannot be reused or claimed by another entity.
Voluntary carbon market (VCM)	The market in which carbon credits are most commonly bought and sold voluntarily. A fast-developing market, projected to be worth billions in the next decade, with 96% of the FTSE350 drawing on some form of carbon credits to reduce or offset their greenhouse gas emissions. [17]

References

1. *BNEF: Long-Term Carbon Offsets Outlook 2024. Note that this is market value in terms of the total monetary value of retired credits.*

2. *From BeZero Carbon's proprietary database.*

3. *Ecosystem Marketplace: All in on climate: The role of carbon credits in corporate climate strategies.*

4. *Estimate of 7:1 ratio of investment to traded market size based on MSCI/Trove research indicating that carbon crediting projects raised around $18bn of investment in the 2.5 years up to 2022, hence around $7bn per annum. Compared with a total traded market of around $1bn, this gives a ratio of 7:1.*

5. *Novo Nordisk market cap from Yahoo Finance.*

6. *Estimate of the proportion of VCM retirements associated with projects that make one or more SDG claims from BeZero proprietary database.*

7. *UNDP: Structured dialogue on financing the results of the UNDP Strategic Plan, 2022-2025.*

8. *This is calculated using BNEF's projection of retirements by carbon credit project sector as a starting point. This is broken down into the following sectors: reforestation, REDD+, agriculture, clean energy, cookstoves, DAC and BECCS. For each sector, we have assumed that the current distribution of retirements by BeZero rating level applies, then calculated risk-tonnes by applying BeZero's discounting factors.*

9. *Total global emissions from Statista. Japan emissions also from Statista.*

10. *Aviation industry emissions from IEA.*

11. *This is calculated using BNEF's projection of credit issuance by nature-based project type (reforestation, REDD+, agriculture) as a starting point. We have then used project data from BeZero's proprietary database to calculate a typical issuance per hectare per annum for each project type, and combined these figures with the issuance projections to calculate total land area.*

12. *Forest loss since the turn of the century from World Resources Institute. Land area of Peru from Our World in Data.*

13. *REDD+, agriculture and reforestation based on estimation of the average annual issuance per hectare of these project types, with an assumption of 0.1 jobs per hectare based on ILO/WWF research. DAC estimate based on Rhodium research which estimates that a 1 megaton per annum DAC plant requires on average 278 workers to operate on an ongoing basis. BECCS estimate based on Stockholm Exergi estimate of 6,700 jobs per 10 million tonnes of CO_2e captured by BECCS. Cookstoves estimate based on research from the Gyapa Cookstoves project, which estimated that 600 jobs were supported by the project, which issued more than 5 million credits over 12 years. Clean energy estimates based on American Clean Power estimate that the solar industry in the US avoided 102 million metric tonnes of CO_2 being emitted and employs 253,000 people. Market infrastructure estimate based on assumption that financial services, professional & technical services, insurance, and data and information services capture around 15% of total market value, then applying assumption of around 3 direct jobs in these sectors per $1m in final demand based on EPI estimates for the US economy.*

14. *International Energy Agency estimate of total oil & gas supply employment.*

15. *The calculation of the total emissions impact of removals projects is drawn from our overarching emissions estimate as explained in footnote 1. The estimate of total removals required by the mid-2030s in a 1.5 degree pathway is sourced from McKinsey.*

16. *Total emissions by the mid-2030s in a 1.5 degree pathway sourced from Carbon Brief.*

17. *Kana Earth research as reported by Carbon Herald.*