“Reduce, reduce, reduce ... and remove the rest”

On the critical role of carbon removal and how companies can use it smartly

An educational slide deck from CEOs to CEOs, November 2021

Preread version - fully annotated, no speaker notes

Developed by the Alliance of CEO Climate Leaders’ Carbon Removal Action Group with contributions of members of the Forum’s Global Future Council on Net-Zero Transition
“Reduce, reduce, reduce … and remove the rest”

On the critical role of carbon removal and how corporates can use it smartly

To limit global warming to safe levels in line with the Paris Agreement, science calls for three things:

1. Halve emissions by 2030:
   Reduce! … and in parallel start the timely scale-up of carbon removal

2. Net-zero emissions by 2050:
   Reduce! … and balance any residual emissions with carbon removal

3. Net-negative emissions after 2050:
   Reduce! … and remove up to 5-20bn tonnes of CO₂ every year

The carbon removal landscape spans across nature-based, hybrid, and technological solutions

Nature-based removals are ready now, but quality is key. and they won’t do the job alone: Technological solutions are needed over the long-run.

How can companies use carbon removal credibly? “Net-zero” means focus on reductions and ramp up removals. On top, help others to reduce as well.

How can companies use removals smartly? Concerted action and a balanced mix today prevent high price in the future

The Group worked to facilitate access to impactful removals:
- Best-practice Procurement Guide for high-quality nature-based removals
- Tech-removals buyers club “NextGen Carbon Removal Purchase Facility”
To achieve Paris Agreement goals, we need three things:

1) halve emissions by 2030 - equivalent to COVID-19-level reduction of 7% every year

Note: As of Mar 31, 2021. These figures exclude land use, land-use change, and forestry
1. Assumes GHG emissions rebound and grow from 2020 at the same rate as the current policies scenario in UNEP 2019 Gap report to 2050 (1.1% CAGR). 2. Assumes countries decarbonize further at the same annual rate required to achieve their INDCs between 2020 and 2030. 3. Assumes 25% reduction by 2030 and net-zero by 2070. 4. Assumes 45% reduction by 2030 and net-zero by 2050. 5. Paris Agreement goals are to limit global warming to 2.0°C, preferably 1.5°C, while Paris commitments are emission reductions commitments from individual countries.

Source: EDGAR 5.0; FAO; PRIMAP hist v2.1; Global Carbon Project; IPCC; UNEP Emissions Gap Report, WRI; Climate Interactive; BCG analysis
2) net-zero emissions by 2050
3) net-negative emissions after 2050 with up to 5-20bn tonnes CO₂ removed per year

Global CO₂ emissions Billions tonnes per year

Business-as-usual emissions

Massive emission reductions

Residual gross-emissions that cannot be reduced yet

Negative emissions required to:
- balance hard-to-reduce emissions
- reverse the build-up of historic emissions
- balance Earth’s own emissions (e.g. forest fires)

Today: 20bn tonnes of CO₂/yr from Oil & gas use causes

2010 2020 2030 2040 2050 2060 2070

After 2050: up to 20bn tonnes/yr to be removed and stored
Carbon removal = next trillion$ industry (like oil & gas today)!
The carbon removal landscape spans across nature-based, hybrid, and technological solutions.

Nature-based solutions
- **Forestation**: Restore or plant trees on previously woodless land or apply practices that improve forest health.
- **Soil sequestration**: Increase the soil carbon content through changes in land mgmt. (e.g., no-till, cover crops).
- **Blue carbon**: Better manage the carbon content of wetland and marine ecosystems (e.g., mangroves, kelp).

Hybrid solutions
- **Biochar**: Produce charcoal from biomass and use e.g., as soil amendment or chemical additive.
- **Bioenergy with Carbon Capture and Storage (BECCS)**: Burn biofuels, strip the CO₂ from the flue gas, store it permanently (e.g., in depleted oil fields).

Technological solutions
- **Enhanced weathering** of natural minerals to react with and thereby fix atmospheric CO₂.
- **Direct Air Capture and Storage (DACS)**: Filter CO₂ directly from air and store it geologically or in long-lived products.
Nature-based removals are ready to use, but quality is key

“High-quality removals”

- high durability
- high scalability
- high co-benefit and overall
- no harm
- high integrity (standardized, verified)

Source: Swiss Re Institute, 2021
Nature-based solutions are ready to use but will not do the job alone: we need to invest in technological and hybrid solutions now to scale for later.

Note: Nature-based solutions include reforestation, soil sequestration and blue carbon; technological solutions include BECCS, DACCS, biochar and enhanced weathering.

Source: IPCC; Blue Carbon Initiative (2021); Hanna et al. (2021); Beerling et al. (2021); Systemiq (2021); Zeng et al. (2021); Austin et al. (2020); Project Drawdown (2020); van Vuuren (2020); Rhodium Group (2019); Tisserant, Cherubini (2019); Roe et al. (2019); Keith et al. (2018); Bui et al. (2018); Fuss et al. (2018); Stöfler et al. (2018); Wolosin (2017); The Royal Society (2017); Smith (2016); Teichmann (2016); Swiss Re and BCG analysis.

Understanding removals

Pre-read
How can companies use removals credibly?
“Net-zero” means focus on reductions and ramp up removals. On top, they can support others to reduce their emissions as well.

1. Set a science-based/Paris-aligned reduction path with interim targets

2. Set a separate removal path and balance all residual emissions in the net-zero target year, e.g. via carbon removal certificates

3. Compensate beyond own value chain by funding solutions that benefit climate, people, and nature, e.g. via carbon avoidance certificates

![Diagram showing the net-zero target with removals and reductions]

Claim: Net-zero

Usually claimed as: “Climate neutral”
How can companies use removals smartly?
Concerted action and a balanced mix today prevent high price in the future

**Illustrative removal mix in 2021**
- Bulk removal need from NBS at $0-30/t
- plus small share of techn. solutions $100-800/t

This mix can keep average removal price well below $100/t

**Illustrative removal mix after 2050**
- Bulk need from techn. removals at $50-200/t
- NBS $10-75/t

If we act together today,...
...we prevent a price rise and keep average removal price to ca. $100/t

If we don’t act now, NBS will deplete faster and tech removals remain costly → higher average removal cost for all!

How to source NBS of high-quality?

Angle of attack for the Carbon Removal Climate Action Group

How to access techn. removals?
The Group worked to facilitate access to impactful carbon removal for the Alliance

To limit global warming to safe levels, we shall...

1. ...reduce, reduce, reduce - and
2. ...remove the rest to tackle the unavoided, overshoot, and Earth’s own emissions.

Use nature-based solutions in its own right, observing strict quality criteria, and ... use a part of your removal budget for technological solutions already now.

Let’s act now

The Action Group prepared a short Procurement Guide for high-quality NBS based on current best-practice\(^1\)

Let’s act together

The Action Group recommends technological removals via a carbon removals purchase facility

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1) In collaboration with WEF Natural Climate Solutions Alliance and WBCSD
Contributors

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