

puro

**Reversing
climate change
with Puro
CO₂ removal
marketplace.**

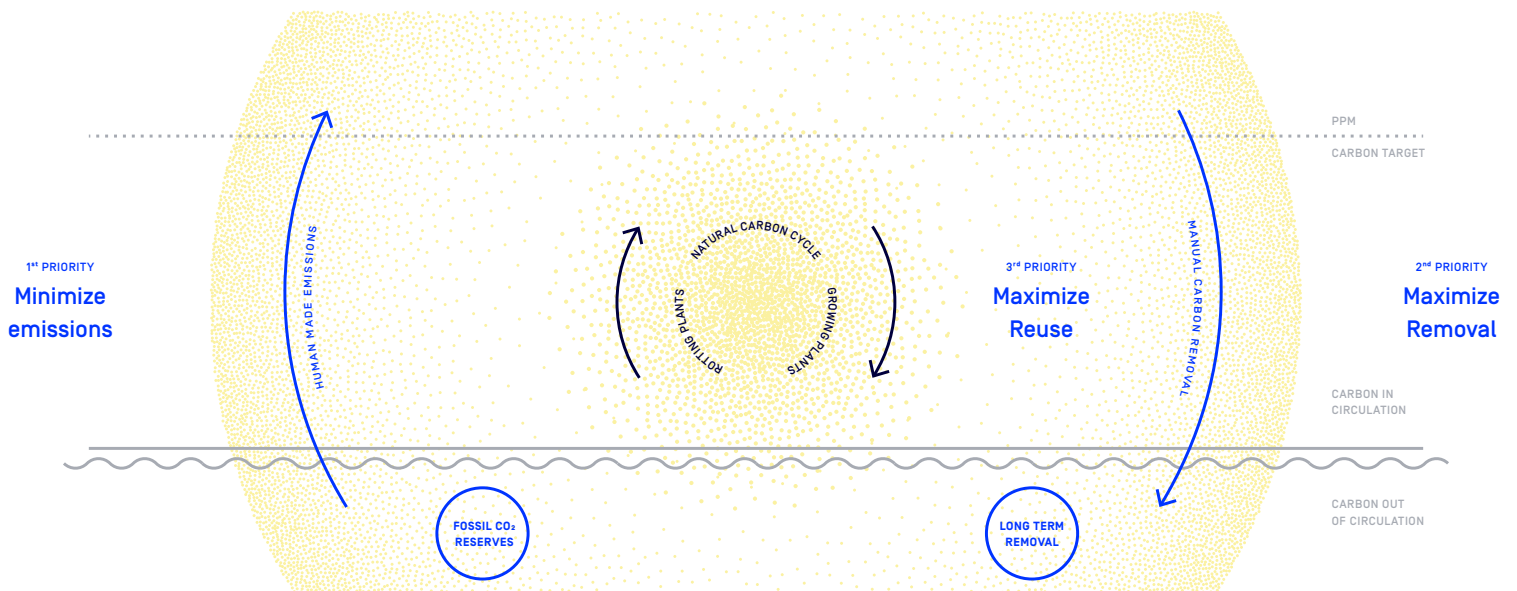
01

The problem we're all facing

Everybody can do something to help reduce greenhouse gas emissions, but nobody can stop causing emissions completely. When we breathe, consume food or use transportation, we emit CO₂. The accumulation of carbon dioxide in the atmosphere has continued for 150 years resulting in 1000 billion tons [=Gt] surplus²

of CO₂ remaining in the air. As the IPCC report states¹, emissions and CO₂ removals need to be in balance by 2050. Currently less than 50% of yearly human caused emissions are sequestered [absorbed away from the atmosphere] by oceans, soils and other natural means. And so to limit global warming to 1.5°C we must both reduce CO₂ emissions and remove CO₂ from the atmosphere.

↓ LET'S LOOK AT THE WAY CARBON CIRCULATES ON THE PLANET.



02

Balancing carbon circulation

As fossil carbon reserves are consumed, the amount of carbon dioxide in the atmosphere increases. Minimizing fossil emissions is the first priority, but unfortunately, emission reductions are not progressing at the required pace. As the second priority, we need to maximize the downward arrow - the CO₂ removals - to balance the emissions and the activities that store carbon away from circulation. In the long run, what goes up, must come down.

Furthermore, to avoid extracting more carbon from fossil sources, utilization of carbon that is already in circulation needs to be maximized.

03

Accelerating carbon removal methods

Creating new ways to remove CO₂ from circulation needs to be accelerated. Identifying new CO₂ removal methods and scaling-up old carbon sinks that can sequester significant quantities is a massive undertaking and it needs to be started today. This essential effort would help balance the 50% of CO₂ emissions - almost 20 billion tons per year - that is not absorbed by natural sinks in oceans, forests and soils. Many potential removal methods are currently overlooked and therefore underdeveloped. The dormant CO₂ removal methods could be activated if there was an economic driver for them.

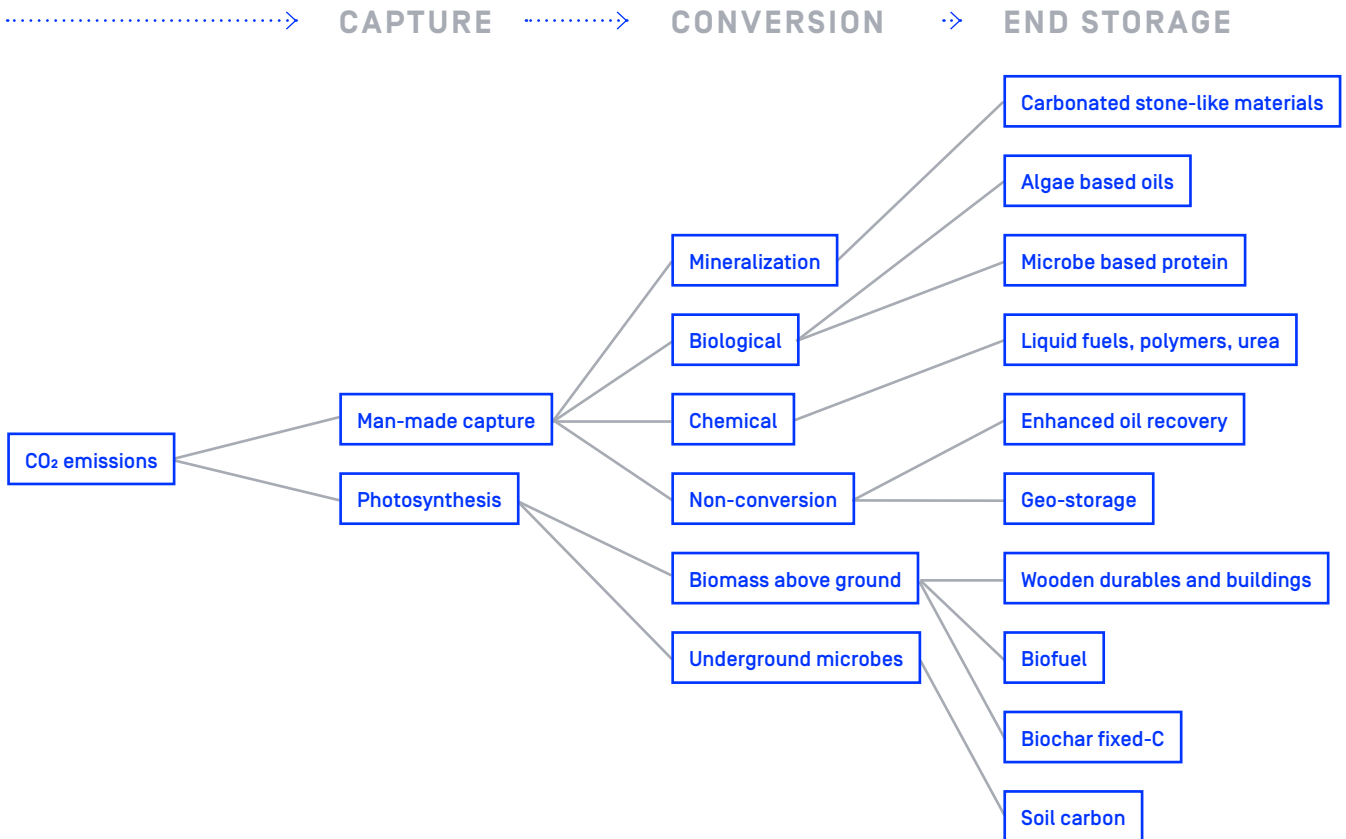
The European Emission Trading Scheme (EU ETS) for emissions excludes the utilization of CO₂ removals. The scheme is locked until 2030, so voluntary mechanisms need to be established as soon as possible. Puro's parallel voluntary mechanism can demonstrate that it is possible to measure and verify CO₂ removals and that they should be included in the toolbox to reverse climate change and return to a balanced CO₂ cycle.

04

Carbon removal methods

It is possible to draw carbon dioxide out from the atmosphere and recycle it in biomass and soil or extract it from circulation by “re-fossilizing”. The diagram below shows some examples of the available CO₂ removal methods. There are large variations in how the CO₂ removal in these methods can be measured and verified. There are also big differences in their current operational scale and future potential as well as stability and life-time of the CO₂ storage.

Examples of the very long-term, stable CO₂ Removal methods are mineralization to carbonates, biochar with high content of fixed carbon, geo-storages and wooden buildings. On the other hand, examples of the dynamic recycling of CO₂ that is already in circulation and can be reused in products are bio-based fuels, foodstuff and other consumable products made of biomass or organic waste streams. Due to the lack of financial incentives, these – and other yet undiscovered – CO₂ Removal methods have not reached their full potential scale yet.



05

Introducing Puro – the world’s first marketplace to offer verified CO₂ removals.

Puro is a pioneering initiative to make CO₂ removals verifiable and tradable. As always with marketplaces, it is about making the interests of various parties meet. On one hand there are organizations that want to become carbon neutral. On the other hand, underutilized CO₂ removal methods would be developed and scaled-up if there was a revenue stream that could be used to finance the investments and operational expenses.

Puro is based on these principles

1. **Voluntary** – since quick action is essential and waiting for regulation would take too much time, we’ve chosen to start operations now together with the voluntary organizations.
2. **CO₂ removals only** – there is an abundance of mechanisms, schemes and marketplaces for pricing and reducing emissions and many of them are contributing to the deceleration of climate change. These mechanisms cover 20% of global GHG emissions³. We aim to complement them by trading with verified CO₂ removal methods, so that carbon sequestration and recycling can be increased.
3. **Geographical area is not limited** unlike e.g. in the Kyoto accord, where actions are meant to take place in the developing countries⁴. CO₂ Removal Certificates [CORC] can be issued to suppliers in any country and purchased by organizations in any country.
4. **Business to business** – buyers are primarily companies, municipalities, states and governments to get sufficient trading volume and liquidity right from the beginning. Consumer movements and B2C-retail are likely to emerge but from the perspective of this marketplace they are considered channel partners for our wholesale operation.
5. **Technology and sector agnostic** – the marketplace encourages the development of all verifiable CO₂ removal methods in any industry. Carbon balancing can take place between unrelated sectors.
6. **Science-based** – certificates must be comparable and represent the real CO₂ removed from the atmosphere. Our verification methodologies require scientific measurement and quantification of the removed CO₂ as the foundation for credibility.
7. **Post-transition regulation** – we are optimistic that in the long-term carbon pricing will cover 100% of both emissions and removals in all sectors so that removals are rewarded, and emitters must pay for cleaning. Governments can also play an important role by using national ETS income on the Puro marketplace and thus actually removing the emissions that were allowed through the ETS mechanism.



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Introducing Puro – the world’s first marketplace to offer verified CO₂ removals.

→ So far, we have identified half a dozen CO₂ removal methods that have significant volume potential and where costs are reasonable. The following are already available in the marketplace:

In addition, soil carbon and geo-storages have large-scale potential as CO₂ removal methods. In the future, Puro will add CO₂ removal methods that meet measurability and verification requirements.

1. Carbonated building elements:

Manufacturing of cement causes 6–8% of greenhouse gas emissions globally. However, it is possible to manufacture concrete-like building elements without cement by utilizing slag from the steel industry. In the hardening process CO₂ is carbonated into the element and is mineralized permanently. The benefits include easy measurability and long duration of the storage.

2. Wooden building elements: When wood that originates from sustainably grown forest is used for buildings, the carbon stays away from the atmosphere for the lifetime of the building and at times also after end-of-life. The carbon balance of using building materials is also possible to measure and verify.

3. Biochar is made from biomass via pyrolysis. It is a stable diamond-like form of carbon that can endure in soil for thousands of years. Waste biomass is increasingly available when bio-based products come to end-of-life.

06

Existing CO₂ removal commerce is complex and time-consuming

There are numerous great examples of sustainable companies that have decided to nullify their emissions totally or be carbon neutral, regarding a certain product or a function. For example, Apple has decided to neutralize the emissions of Apple Maps cars by investing in the restoration of mangrove forests⁵.

However, this has required several people at Apple to identify and rate thousands of projects and finally select this approach

as the optimal means for CO₂ removal. In addition, management and control of the project will consume resources. We don't believe that this cumbersome approach is possible or wise for the majority of organizations. Instead, a marketplace where verified, comparable CO₂ removal certificates are offered from all methods, enables more buyers to become carbon-neutral with less effort, sooner and more effectively.

07

Puro is an ecosystem of pioneering companies and experts

Voluntary action is the fastest way to move forward. Puro is the first marketplace in the world to offer verified CO₂ removals.

Puro is also an ecosystem of pioneering companies that are devoting their time and expertise to scale up the marketplace. Fortum, the biggest electricity retailer in the Nordics, was the initiator and Fortum Innovation and Venturing covered the costs of setting up and operating the marketplace. More than 20 companies and sustainability experts from 6 countries co-created rules for CO₂ removal and storage methodologies and verification during March and April 2019 [document available for download in our website]. These rules form the basis of the CORC Marketplace, define the roles and responsibilities of different actors in the system and facilitate assessment of contractual compliance. The original signatories are in charge of the ongoing governance of the methodologies, registry and auction rules, independently from Fortum.

The marketplace auctions are open to suppliers, companies that build and run carbon net-negative operations, and buyers, ambitious companies who after reducing their emissions want to also remove CO₂ from the atmosphere and explore CORCs as a solution to meet their voluntary climate objectives. The CORCs compliance to the rules is audited by an independent assessor – at the moment DNV GL – which is one of the largest verifiers in the world for ISO 14000 and ISO 9000 certificates.

Other extended ecosystem actors include channel partners, industry associations, researchers, investors and carbon footprint and LCA consultants.

Puro, from an innovation experiment to a growth company

The drive and urgency shared by the signatories and ecosystem actors made possible the fast development of the marketplace. We looked for expertise and the best available resources to develop methodologies, the trading platform and verification. Puro held the first auctions where CO₂ Removal Certificates [CORC] were ever traded in May and June 2019.

The initial phase formed the core of the experiment where we successfully validated our hypothesis and now Puro is on growth mode. Here are the most important learnings:

- We can make CO₂ removal from the atmosphere measurable and verifiable. With our verification scheme we produce certificates that are so trustworthy that organizations are willing to buy them and use them in their business operations to meet their climate objectives.
- Companies are willing to pay for our certificates voluntarily. The price of the CORC is determined entirely based on supply and demand and the Weighted Average Price has been published in our website after each auction. Verified CO₂ removal now has a price.
- We have some evidence that it is possible to stimulate capitalization and growth in the carbon net-negative economy. One of our suppliers has announced a ten-fold volume production expansion.
- We can attract unknown and innovative carbon net-negative methods to join the fight against climate change. More than 100 suppliers have contacted us with CO₂ capture, utilization and long-term storage methods.
- We can harmonize CO₂ removal methods. 1 CORC is a digital tradable asset equal to 1 ton of CO₂ removed from the atmosphere and stored for the long term, no matter how it was captured and stored or in which country. About 80% of CORC bids are technology-neutral, which indicates that CORCs could be made a commodity. The other 20% are for specific CO₂ removal methods or country of origin.
- We can create a marketplace that is so easy and rewarding to use that people recommend it to others.
- We have seen buyers willingly tell their peers and customers about their use of Puro CORCs to neutralize their emissions.



Join the next auction on Puro

If your company is ready to make CO₂ removal part of their climate change actions, contact us to register your interest and join our next CO₂ removal auction:
contact@puro.earth



More information

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Links

1. <https://www.ipcc.ch/sr15/>
2. https://en.wikipedia.org/wiki/Carbon_dioxide_in_Earth%27s_atmosphere
3. <https://openknowledge.worldbank.org/bitstream/handle/10986/29687/9781464812927.pdf?sequence=5&isAllowed=y>
4. <http://www.fao.org/3/a0413e/a0413E05.htm>
5. <https://qz.com/1391782/apple-investing-in-negative-emissions-via-mangrove-restoration/>



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