



XPRIZE CARBON REMOVAL

MUSK FOUNDATION

TEAM BOOK 2023

MILESTONE ROUND TOP 60



FOREWORD

Launched in 2021, the [XPRIZE Carbon Removal](#) is a four-year, \$100M global incentive prize competition supported by the Musk Foundation to increase the number of viable, high-quality carbon dioxide removal projects. Teams competing to win the prize must produce a working demonstration that removes at least 1,000 net tonnes of carbon dioxide (CO₂) per year and present a plan for scaling up to gigatonnes of removal annually. Response to the prize has been strong, with over 1,180 groups from around the world currently registered to compete.

In February 2022, XPRIZE solicited proposals for the Milestone Round of the competition. Over 450 proposals were submitted and reviewed by 70 expert reviewers, making this not only the largest XPRIZE to date but also the world's largest technical review of carbon dioxide removal projects. In addition to awarding \$15M in Milestone Awards to the top 15 teams, XPRIZE also announced the “Top 60” ranked teams from the Milestone Review. Most of these teams are included in this book, and represent many of the best and brightest minds in the carbon dioxide removal industry today. The teams are organized by the four main CDR pathways: Air, Land, Ocean, Rocks. Any carbon-negative solution is eligible to win the remaining \$80M in Grand Prizes, whether related to air, ocean, land, or rocks, or any other method that can durably and reliably remove and sequester CO₂. The Grand Prizes will be awarded in April 2025.

The “Top 60” Teams represented in this book are seeking funding and support for their demonstration projects and beyond. Investors and prospective partners are encouraged to contact the companies directly for additional information. To get in touch with XPRIZE, please email carbonremoval@xprize.org.

About XPRIZE

This work is supported by the broader XPRIZE Foundation, a 501(c)3 non-profit whose mission is to help inspire solutions to problems that can have maximum benefit for all humanity. Other active and recently awarded competitions include the \$11M XPRIZE Wildfire, the \$15M XPRIZE Feed the Next Billion, the \$10M XPRIZE Rainforest, the \$10M ANA Avatar XPRIZE, the \$5M XPRIZE Rapid Reskilling and the \$20M NRG COSIA Carbon XPRIZE.

TABLE OF OF CONTENTS



AIR

8 Rivers Capital LLC	5	E-quester	12	Sustaera	19
AIR COMPANY	6	Earth RepAIR	13	TerraFixing	20
Aspiring Materials	7	EPFL Carbon Team	14	Verdox	21
Carbofex	8	Heirloom	15	x/44	22
Carbon Cantonne Inc	9	Parallel Carbon	16	Zero Carbon Production	23
Carbyon	10	RepAir	17	ZS2 Technologies	24
Direct Air Capture LLC	11	SkyRenu Technologies	18		



LAND

AgroCapture	26	Global Algae Innovations	33	Rizome	40
BamCore	27	Mercurius Biorefining	34	Seawater Greenhouse Ltd	41
Bioeconomy Institute	28	NetZero	35	Takachar	42
C2 Tech LLC	29	Perpetual Next	36	The Nature Conservancy	43
Carbon Lockdown	30	PyroCCS GmbH	37	Thermaquatica Inc	44
Carbon4Good	31	RCM Solutions GmbH	38		
Charm Industrial	32	Reverion	39		



OCEANS

Captura	46	Kelp Farm Career	49	SeaForestation.co	52
Ebb Carbon	47	Ocean Nourishment	50	SeaO2	53
Equatic	48	Planetary Technologies	51	TROFX	54



ROCKS

44.01	56	Carbonaught	59	Mission Zero	62
Arca	57	CarbonCure	60	Silicate	63
Carbfix	58	CarStorCon Technologies	61	Yuanchu	64



PS

AIR

COMPANY OVERVIEW

XPRIZE TEAM NAME

Calcite

LOCATION

Durham, NC, USA

FOUNDED 2008

TRL 5

NUMBER OF EMPLOYEES

51-100

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Other

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Prefer not to say

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

>\$100M raised to date

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

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8 RIVERS CAPITAL LLC

COMPANY DESCRIPTION

8 Rivers Capital, LLC is a Durham, NC-based firm founded in 2008 which is leading the invention and commercialization of sustainable, infrastructure-scale technologies as the premier net zero solutions company for industrial decarbonization. 8 Rivers is developing and deploying technologies for clean hydrogen and ammonia (8RH2), transformative zero-emissions power cycles (NET Power and the Allam-Fetvedt Cycle) direct air capture (Calcite), retrofit carbon capture (KC8), sour gas sweetening (TarT), and other advanced clean energy systems.

CORE INNOVATION

The Calcite process passes ordinary air with approximately ≈ 415 PPM CO_2 across calcium hydroxide in a large warehouse, absorbing CO_2 from the air into calcium carbonate crystals, similar to how concrete sidewalks dry and absorb carbon in the process. Warehouse fans then return to the atmosphere CO_2 -depleted air with < 315 PPM CO_2 . The calcium carbonate that's created is cycled into a kiln to regenerate calcium hydroxide and capture the generated CO_2 . The CO_2 is then injected underground for permanent storage, while the calcium is recycled to absorb more CO_2 from the air. The innovative Calcite process enables rapid carbon uptake at large scale and low cost, through the use of simple equipment, abundant feedstocks, and optimized chemistry.

CO_2 CAPTURE

CO_2 is captured by a chemical reaction with exposed calcium hydroxide, forming calcium carbonate. The CO_2 in that calcium carbonate is captured in a kiln, pressurized, and then injected for permanent storage.

CO_2 SEQUESTRATION

CO_2 is injected into permanent underground storage, such as saline aquifers.

CO-BENEFITS OR PRODUCTS

N/A

LEADERSHIP TEAM

8 Rivers has a world class leadership team: <https://8rivers.com/team/>

COMPANY OVERVIEW

LOCATION

Brooklyn, NY, USA

FOUNDED 2019

TRL 7

NUMBER OF EMPLOYEES

51-100

CURRENT OPERATING SCALE

137 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial chemicals, Liquid fuels, Other consumer goods

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Liquid sorbent direct air capture, Solid sorbent direct air capture, Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series B

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

\$40M

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

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AIR COMPANY

COMPANY DESCRIPTION

AIR COMPANY is the world's leading carbon utilization company creating consumer and industrial products from carbon dioxide. Using only renewable energy, their systems convert captured CO₂ into decarbonized alcohols and fuels—with just oxygen and water as byproducts.

CORE INNOVATION

AIR COMPANY developed a more efficient power-to-liquids conversion process as an alternative to the legacy Fischer-Tropsch systems by simplifying a two-step conversion process into a single step of CO₂ hydrogenation-to-fuel-grade paraffins that can be used as drop-in sustainable aviation fuel (SAF).

CO₂ CAPTURE

AIR COMPANY's technology is source-agnostic and capable of utilizing any CO₂ source; so far, it has been demonstrated using point-source capture and biogenic CO₂ sources. Currently, the CO₂ used in their process is captured from traditional fermentation and industrial alcohol plants prior to it being emitted into the atmosphere. For XPRIZE, AIR COMPANY is proposing CO₂ capture via solid solvent direct air capture.

CO₂ SEQUESTRATION

Durable CO₂ sequestration is achieved by converting CO₂ into methanol, which is then converted into plastics and fibers with long lifespans. AIR COMPANY's primary market is sustainable aviation fuel (SAF), which does not durably sequester CO₂ but instead addresses a hard-to-decarbonize market (aviation). The company's AIRMADE™ SAF is 100% drop-in, meaning it does not have to be blended with conventional jet fuel, allowing for significant fossil fuel reductions.

CO-BENEFITS OR PRODUCTS

AIR COMPANY's process creates decarbonized alcohols (including MeOH, EtOH) and fuels (e.g., SAF), allowing the company to quantifiably mitigate CO₂ levels and disrupt existing supply chains across various industries. To date, AIR COMPANY has brought multiple consumer innovations to market including AIR Vodka and AIR Eau de Parfum and is now focusing on achieving world-scale impact with its latest achievement, AIRMADE™ SAF.

The CO₂-based alcohols can be converted into CO₂-based plastics to achieve durable CO₂ storage. The only byproducts are water and oxygen, and optimal use of these co-products is being explored.

LEADERSHIP TEAM

CTO Dr. Stafford Sheehan and CEO Gregory Constantine met as recipients of the Forbes 30 Under 30 awards in Energy and Marketing, respectively. Dr. Sheehan has also been recognized by Chemical & Engineering News' Talented 12 in 2017 and Boston College's 40 Under 40 alumni list in 2020 for his catalyst and CO₂ conversion research. Constantine has a background in entrepreneurship, marketing and strategy and has worked with the world's largest spirits distributor in the world. Additionally, in 2019 he was named the Young Achiever of the Year from Spirits Business.

COMPANY OVERVIEW

LOCATION

Christchurch, New Zealand

FOUNDED 2019

TRL 6

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

10 kgs CO₂/day

PHYSICAL PRODUCT(S)

Industrial gasses/pure CO₂, Soil additives, Building materials, Industrial chemicals

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent DAC, Biomass combustion CO₂ capture, Agriculture, Soils, Grasslands, Coastal lands restoration, Mangroves, Blue carbon, Ocean alkalinity enhancement

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$6.5M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$1M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, VC

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ASPIRING MATERIALS

COMPANY DESCRIPTION

Aspiring Materials is a sustainable industrial technology company developing globally scalable processes to reduce emissions from heavy industry and sequester CO₂. Our diverse team of engineers, scientists and geologists has a wealth of industrial knowledge, experience, and research expertise. From our initial idea of manufacturing concrete on Mars, we have shifted our focus to solving the more immediate climate problems here on Earth. We have a range of IP focused on delivering low-carbon products and solutions needed to achieve net zero by 2050.

CORE INNOVATION

Our technology takes ultramafic rocks and separates out the Mg(OH)₂ used to rapidly remove CO₂ by enhancing carbonate formation in any scenario (i.e., DAC, CCS or seawater alkalinity adjustment). Given a clean energy source, no CO₂ is generated from this process. With multiple, viable products for readymade markets the overall cost of carbon capture is <\$50/t at the commercial scale.

CO₂ CAPTURE

Aspiring's digestion, separation, and regeneration process breaks down magnesium silicate rocks into their component parts, producing reactive silica, iron oxide and magnesium hydroxide (Mg(OH)₂). Mg(OH)₂ rapidly captures CO₂ at both high and low CO₂ concentrations (e.g. biomass combustion flue gas to atmospheric) to produce a stable/usable solid: magnesium carbonate. Transformation of CO₂ into a solid carbonate is possible using a range of standard gas/solid contactors and equipment.

CO₂ SEQUESTRATION

The chemically stable solid magnesium carbonate can be used in a range of industrial products (like cement - up to 10% permissible; fire retardant; building materials, etc.) to durably lock carbon away. In these building product systems the carbonate is locked permanently into geologically stable compounds that won't break down.

CO-BENEFITS OR PRODUCTS

Our process uses Mg-rich minerals to produce a highly reactive silica that can replace up to 30% of Portland cement in concrete (at scale this could abate over 1bt CO₂). Mg(OH)₂ can be used in water-treatment and converts to MgO, where it displaces MgO made from Magnesite (abating up to 3.5t CO₂/tonne MgO). Iron hydroxide (Fe²⁺) provides a low-energy pathway to steel manufacture. Containing up to 2% recoverable Ni for batteries/nickel products. Commercial quantities of H₂ gas are produced during the electrolysis step. The combined emissions abatement from this product mix is up to 1.9t CO₂/tonne of olivine processed.

LEADERSHIP TEAM

Allan Scott (Associate Prof, Civil Engineering): extensive experience in low-carbon cement binder concrete systems. Chris Oze (Prof, Geology): global expert on magnesium-rich rocks and subterranean geological processes, 2+ decades experience assessing how these systems mineralize CO₂. Mark Chadderton (BEng, MBA): 30yrs of engineering, industry, and management experience including design, construction, commissioning the \$36B Wheatstone LNG facility. Matt Watson (Prof, Chemical Engineering): 15yrs industrial experience, 17yrs academia.

COMPANY OVERVIEW

LOCATION

Nokia, Finland

FOUNDED 2017

TRL 9

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

7000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Biochar

SELLING CREDITS

Yes

XPRIZE TRACK

Air (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A, Merger/Acquisition, Corporate

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Project Debt, Corporate Debt, Strategic Partnership, Government

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Govt, Private Equity, Project Finance, VC

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CARBOFEX

COMPANY DESCRIPTION

Carbofex builds, owns, and operates carbon dioxide removal factories and delivers technology to customers globally. Carbofex's CDR technology is based on an advanced, proprietary biochar production process which is both proven and scalable. Carbofex biochar production technology has been in operation since 2017, and now the company aims to scale to be one of the biggest CDR technology providers.

CORE INNOVATION

Carbofex's technology converts waste biomass to biochar via pyrolysis. The pyrolysis process changes the chemical structure of the biomass, releasing energy-rich gas for green heat energy generation and outputting carbon as biochar and bio-oil. Biochar can be permanently stored into soil, thus binding the CO₂ permanently. Carbofex has innovated and developed pyrolysis process equipment, producing the highest quality biochar on the market (over 94% carbon content), valuable pyrolysis oil, and green energy from various biowaste feedstocks. The high carbon content allows maximal CO₂ capture from the feedstock, enabling high-value use cases for the biochar (like safe agricultural use) where carbon is returned into soil permanently.

CO₂ CAPTURE

Each produced ton of biochar stores over 3 tonnes of CO₂ permanently. Carbofex technology can scale up to tens of thousands of tonnes of biochar production per production line annually. With globally distributed installations of the production lines the technology provides unlimited CO₂ capturing capacity.

CO₂ SEQUESTRATION

Biochar as a soil improvement material stores CO₂ permanently.

CO-BENEFITS OR PRODUCTS

Scaling biochar manufacturing and enabling biochar as water management and growth platform in dry environments is a potential solution to desertification and will play a role in solving geographical inequality. Biochar addition to soil is a proven method for reversing the damage of the climate change impacts in the areas suffering the most. Biochar manufacturing provides green energy without releasing CO₂, so it offers an alternative for power plants currently using fossil fuels.

LEADERSHIP TEAM

Jussi Lemilainen (CEO) is a seasoned executive with over 25 years of experience from international business and start-ups. Kim Lehiö (CMO and co-founder) is long term biochar process expert and co-creator of Carbofex's pyrolysis technology. Veikko Kantero (CoB and co-founder) is a serial entrepreneur and executive in green tech.

COMPANY OVERVIEW

LOCATION

Calgary, Canada

FOUNDED 2021

TRL 4

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

8.5 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial chemicals

SELLING CREDITS

Plan to sell in the future

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Pre-seed, Seed, Grant, Angel, Joint Venture

AMOUNT OF CAPITAL SOUGHT

\$650,000

COMMERCIAL STAGE

R&D

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$100,000

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Project Debt, Corporate Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Government, Philanthropic, Private Equity, Project Finance, Venture Capital

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CARBON CANTONNE INC

COMPANY DESCRIPTION

Carbon Cantonne is a Calgary-based carbon capture and utilization company that uses a sustainable process to capture CO₂ from air and convert it into a highly durable, solid product with market potential.

CORE INNOVATION

Carbon Cantonne provides a net-negative carbon solution through a dual-function processing plant that includes (1) direct air capture and (2) conversion of CO₂, or DACX. Our process can take up the low concentration of CO₂ in air with great stability over multiple cycles and without any adverse effects due to humidity. After the CO₂ is up-concentrated through our proprietary adsorber, it is fed into the second part of our process that converts the CO₂ into value-added products—primarily graphite—that can be used in lithium battery production or reinforced concrete. The large amount of heat generated by combustion of CO₂ reduces the total energy requirements of the whole process, leading to a net-negative carbon footprint.

CO₂ CAPTURE

Carbon capture from air occurs through a proprietary adsorbent which has been developed and tested for its higher performance and lower cycle time. The air is sucked using fans into the air contactor where it comes in contact with the adsorbent. The desorption is performed at a relatively higher temperature of 120°C. The cycle time for adsorption-desorption is 6 times less than other conventionally proven technologies in the DAC area.

CO₂ SEQUESTRATION

The CO₂ captured is converted to graphite using a chemical looping process wherein the captured CO₂ is converted using a reagent to graphite and the used reagent is regenerated using an electrochemical process. The energy generated in the conversion process is so high that it can support regeneration and DAC's electrical and thermal demands. If the plant is built at a megatonne-scale, then it is capable of supplying grid electricity.

CO-BENEFITS OR PRODUCTS

LEADERSHIP TEAM

The leadership team at Carbon Cantonne Inc includes Prof. Nader Mahinpey, who is chair of carbon capture technologies at the University of Calgary. He has extensive experience in developing materials for carbon capture processes. Dr. Azhar Uddin is CEO of Carbon Cantonne Inc. He has been in a leadership role since the conception of Carbon Cantonne and has more than a decade experience working in oil and gas.

COMPANY OVERVIEW

LOCATION

Eindhoven, the Netherlands

FOUNDED 2019

TRL 4

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$25M

COMMERCIAL STAGE

R&D

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$10M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Government Funding, Philanthropic Funding, Other

TYPE OF INVESTORS SOUGHT

Family Office, Government, Philanthropic, Venture Capital

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CARBYON

COMPANY DESCRIPTION

Carbyon aims to mitigate climate change by providing a technological solution that captures carbon dioxide directly out of ambient air. Our solution aims to restore the atmospheric carbon balance for the benefit of society and the environment.

CORE INNOVATION

Carbyon builds on state-of-the-art semiconductor technology that enables a unique, fast-swing CO₂ capture process which decimates energy consumption and, by extension, costs per tonne of CO₂ captured. Our modular machine design enables mass manufacturing economies of scale and impact at a gigatonne level.

CO₂ CAPTURE

CO₂ is captured through direct air capture machines that take in ambient air. This air is blown through a specially functionalized membrane that effectively and quickly adsorbs CO₂. The CO₂ is released again by adding energy to the membrane. The captured CO₂ can be processed in a myriad of applications (usage and storage) anywhere on the globe.

CO₂ SEQUESTRATION

CO₂ can be durably sequestered in various ways: by storing it in empty oil or gas fields; in underground rock formations (e.g. basalt); or in materials like concrete. Studies show that all of these sequestration possibilities are widely available and ensure a secure and durable (> 100 years) way to keep CO₂ out of the atmosphere.

CO-BENEFITS OR PRODUCTS

Pure water can be captured alongside CO₂ as a side product. Especially in arid areas this can be a co-benefit as pure water can be used to further process CO₂.

LEADERSHIP TEAM

The leadership team of Carbyon consists of seasoned industry professionals with a shared passion to tackle climate change. Our backgrounds are in technology research, product development, business, finance and operations.

COMPANY OVERVIEW

XPRIZE TEAM NAME

Carbon Corp

LOCATION

Calgary, Canada

FOUNDED 2018

TRL 7

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

10 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Polymers, Building materials, Industrial chemicals, Other

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series C

AMOUNT OF CAPITAL SOUGHT

\$50M

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Government Funding, Other

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Government, Private Equity, Venture Capital

Kyle Hofstetter

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DIRECT AIR CAPTURE LLC

COMPANY DESCRIPTION

"Carbon" a consortium of Direct Air Capture LLC and Carbon Corp, couples Carbon Corp's XPRIZE award-winning technology with its direct air capture partner. "Carbon" selectively removes CO₂ from ambient air and converts it into highly stable carbon nanomaterials. These materials have immense applications as both stand-alone products and as additives to existing products. By applying carbon nanomaterials to existing products like construction materials, the material's compressive and flexural strengths are increased, reducing material needs and ultimately further reducing the carbon footprint.

CORE INNOVATION

Carbon brings value to carbon capture. Not only does Carbon have the ability to permanently remove CO₂ from the air by converting a gas into a solid, it also generates a sought-after material: carbon nanomaterials. Having a value-added end product means Carbon does not rely on carbon credits (a financial burden associated with many carbon removal technologies). Carbon's materials have a value proposition on the order of tens to hundreds of thousands per tonne.

CO₂ CAPTURE

Carbon leverages its patented C2CNT™ technology to selectively absorb CO₂ from ambient air using its electrolytic Genesis Device™. During the electrolytic process, CO₂ is stripped of its oxygen and solid carbon is deposited onto the cathode surface in the form of nanomaterials. This makes carbon dioxide the only feedstock material. Rather than viewing carbon dioxide as an environmental burden, Carbon views it as a free resource.

CO₂ SEQUESTRATION

Carbon takes a gas and converts it into a solid: graphitic nanomaterials. These materials exist on a geological stability time frame, thus the carbon dioxide is removed from the atmosphere and stored in a usable solid material form. Graphitic materials have structure stabilities on the order of millions of years with no environmental implications.

CO-BENEFITS OR PRODUCTS

By generating solid nanomaterials, nanocarbons can be used in existing materials like polymers and construction materials to enhance their properties. This allows for existing products to lower their own carbon footprints. For example, it is calculated that for every 1 tonne of carbon nanomaterials added to cement, 840 tonnes CO₂ is avoided – increasing the compressive strength of concrete reduces the amount of material needed to obtain the same metrics. This allows Carbon to not only directly remove CO₂ but also avoid CO₂ emissions.

LEADERSHIP TEAM

Stuart Licht, founder of our 'Diamonds from the Sky' technology, has spent over 35 years researching cleantech. Kyle Hofstetter, MSc. Chemistry has been the lead in scaling Carbon's technology from benchtop to demonstration plants and now commercialized facilities. Licht and Hofstetter participated in the prior Carbon XPRIZE where they were awarded an X-FACTOR award as a finalist.

COMPANY OVERVIEW

LOCATION

Toronto, Canada

FOUNDED 2020

TRL 3

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

0 tonnes CO₂/year

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Liquid sorbent DAC, Electrolytic direct air capture, Electrochemical CO₂ separation from seawater and/or water splitting)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Pre-seed

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

R&D

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Government Funding

TYPE OF INVESTORS SOUGHT

Prefer not to say

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E-QUESTER

COMPANY DESCRIPTION

E-quester developed a patent-pending, renewable energy-powered, electrochemical direct air capture technology that produces pure CO₂ for sequestration and storage. The CO₂ captured by E-quester will be permanently stored in partnership with mature utilization or sequestration technologies.

CORE INNOVATION

E-quester's core technology will advance the electrocatalytic production of capture liquid and regeneration liquid, with the goal of capturing 400ppm CO₂ in the atmosphere and producing a highly concentrated stream of >99wt% CO₂. We will develop and optimize electrochemical regeneration systems as a replacement for natural gas-powered direct air capture units, thereby achieving a sustainable direct air capture process. Our technology uses chemicals, water, and electricity as inputs in a closed-loop process, resulting in the generation of strong alkali hydroxides and acidic hydrogen halides.

CO₂ CAPTURE

Atmospheric CO₂ is captured with an alkaline hydroxide solution to form a carbonate solution. The carbonate solution is mixed with an acidic hydrogen halide, which liberates CO₂ and produces an electrolyte via pH-swing mechanism. The electrolyte is used to generate capture solution and regeneration solution at a closed-loop operation system.

CO₂ SEQUESTRATION

CO₂ will be sequestered geologically in southeast Saskatchewan, Canada, at the Aquistore site. Dried and compressed CO₂ will be tied into Aquistore's existing CO₂ pipeline and injected 3400 meters underground in supercritical form. It is expected that CO₂ will dissolve in the underground water, mostly in aqueous CO₂ form and partially as carbonate and bicarbonate ions.

CO-BENEFITS OR PRODUCTS

Our technology's primary environmental benefits will be derived from the ability to capture atmospheric CO₂ and mitigate CO₂ emissions. The first notable contribution is in the DAC energy reduction and eliminating conventional natural gas feedstocks that are carbon intensive. The second significant contribution is the increase in land efficiency and compactness due to the compact nature of electrochemical systems.

LEADERSHIP TEAM

The principal investigator and project lead is David Sinton, Canada Research Chair (Tier 1) in Energy and Fluids. The project also benefits from group members of co-PI Edward Sargent's group at the University of Toronto. The team combines systems and materials experts in novel material development, managing large-scale, interdisciplinary projects, and translating technologies from academia to industry. Our team won the XPRIZE Carbon Removal Student Award. We aim to further optimize the capture regeneration process by focusing on low system energy, low process emission, and a stable and low-cost route to achieve the best performance.

COMPANY OVERVIEW

LOCATION

Madison, WI, USA

FOUNDED 2022

TRL 5

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

Building materials

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Liquid sorbent direct air capture, Mining rocks for CDR)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Pre-seed

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

TYPE OF CAPITAL SOUGHT

Corporate Equity

TYPE OF INVESTORS SOUGHT

Venture Capital

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EARTH REPAIR

COMPANY DESCRIPTION

Earth RepAIR is a carbon mineralization company. We manufacture a cement replacement (an SCM) by carbonating a variety of feedstocks, such as fly ash, slag, and natural minerals. CO₂ used to carbonate the feedstock comes from the atmosphere. As a result, our impact on climate change is twofold: removing CO₂ from the atmosphere, and displacing cement (the production of which is responsible for 7% of global CO₂ emissions). Our main advantage is the low energy intensity of the process (less than 200 kWh/tonne CO₂ permanently sequestered).

CORE INNOVATION

Earth RepAIR's technology couples DAC with carbon mineralization. It uses thermodynamically favorable mineralization reactions to circumvent the need for energy-intensive temperature/pressure/pH swing, substantially reducing the cost, footprint, and indirect carbon emissions. Mineralization produces a carbon-negative SCM that can be used as a drop-in replacement for traditional SCM during concrete construction.

CO₂ CAPTURE

Earth RepAIR uses hydroxide liquid CO₂ sorbents for DAC. The capture step is efficient and compatible with existing air contactor designs. Compared to other DAC technologies, Earth RepAIR does not require energy intensive sorbent regeneration. Hydroxide sorbent is regenerated through thermodynamically favorable mineralization reactions under ambient conditions, which eliminates major energy needs associated with DAC and substantially reduces the costs and process carbon footprint.

CO₂ SEQUESTRATION

CO₂ is sequestered via carbon mineralization. Mineralization converts the captured CO₂ into calcium carbonate, a known and proven stable mineral, while simultaneously regenerating hydroxide CO₂ sorbent. The carbonated residue can be used as an SCM.

CO-BENEFITS OR PRODUCTS

Earth RepAIR's SCM can be blended with cement to enhance concrete's mechanical performance and durability. Cement production contributes to 7% of global CO₂ emissions. Replacing cement with Earth RepAIR's cementitious materials can reduce embodied carbon emissions in concrete without changes to current concrete construction practices.

LEADERSHIP TEAM

Earth RepAIR is led by Quentin Phillippe, Robert Anex, and Bu Wang. Quentin spent his career in the energy and environment mid-market private equity and start-ups, where he led the fundraise of a €40m Series B and a €10m seed round for deeptech environmental companies. Rob and Bu are UW-Madison faculty members and inventors of Earth RepAIR's technology. They led a student team that demonstrated the technology at 0.75 kg CO₂/day scale. Their ongoing research is supported by the NSF and DOE's ARPA-E.

COMPANY OVERVIEW

LOCATION

Sion, Switzerland

FOUNDED 2022

TRL 4

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

Validation in relevant environment

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Membrane based direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed

AMOUNT OF CAPITAL SOUGHT

\$1M-\$5M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Project Debt, Corporate Debt, Strategic Partnership, Govt, Philanthropic, Other

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Govt, Philanthropic, Private Equity, Project Finance, VC, Other

Karl Khalil

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EPFL CARBON TEAM

COMPANY DESCRIPTION

We are developing a new system based on graphene membranes to capture CO₂ at point sources and by direct air capture. This technology has been in development in EPFL laboratories since 2017 and we are looking to create a spinoff in the coming months to scale-up and manufacture these graphene membranes at an industrial scale.

CORE INNOVATION

Our technology is based on exclusively developed nano-porous graphene membranes. By using single-layer graphene (the material that won the Nobel Prize in 2010) we can push the physical limit of what is possible with membrane separation. This leads to an unprecedented energy efficiency for CO₂ capture which in turn brings the cost of capture drastically down. We have been developing new methods of synthesis and discovering the fundamental science behind these membranes to make them work. One of the most important of our findings is a new method to create pores and control precisely their sizes in graphene, which act as a physical barrier and only permits CO₂ to pass through while consuming minimal energy.

CO₂ CAPTURE

We can't use membranes alone for direct air capture, but we can leverage their performance and combine them in a special hybrid system that we developed. This system results in an energy optimum for capturing CO₂ directly from the atmosphere and thus minimizes the associated cost. DAC is known as the most energy intensive carbon removal process, but we can prove that innovation in this area can provide affordable large-scale solutions. Atmospheric air will be pushed into large collectors and its CO₂ content will be removed by our system, which then will be used or stored permanently.

CO₂ SEQUESTRATION

We focus mainly on synthesizing and integrating graphene membranes so will collaborate with industrial partners for the durable sequestration or utilization of CO₂. Since our process is highly flexible, the CO₂ purity can be optimized and different storage methods could be used.

CO-BENEFITS OR PRODUCTS

The graphene membranes could be used as a post-combustion solution and installed at industrial facilities like cement, steel, waste, chemicals, etc. This would help to decarbonize the industrial sector whose emissions are harder to replace by other methods and help generate sufficient revenues to build DAC plants. These membranes could also potentially be used to capture CO₂ from seawater.

LEADERSHIP TEAM

Our team is based at the heart of EPFL, one the biggest research hubs and most prestigious universities of Europe. Our group of highly qualified and motivated scientists has been pushing constantly the limits of the science behind our technology under the supervision of Prof. Kumar Agrawal, the world's leader in graphene-based gas separation. This technology will be scaled-up and taken to market under the leadership of Karl Khalil, an aspiring entrepreneur, and Dr. Mojtaba Rezaei, who has extensive expertise around graphene membranes.

COMPANY OVERVIEW

LOCATION

San Francisco, CA, USA

FOUNDED 2020

TRL 9

NUMBER OF EMPLOYEES

51-100

CURRENT OPERATING SCALE

100 tonnes CO₂/year

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Yes

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series B

AMOUNT OF CAPITAL SOUGHT

\$200M

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

\$5M-\$10M

CAPITAL RAISED TO DATE

\$80M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Capital (Debt, Equity and Tax Equity), Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Private Equity, Project/Infrastructure Finance, VC

Shashank Samala
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HEIRLOOM

COMPANY DESCRIPTION

Heirloom is a direct air capture company with a goal of removing 1B tonnes of CO₂ per year by 2035.

CORE INNOVATION

Heirloom leverages limestone, an abundant and inexpensive (\$10-\$50/tonne) mineral to capture CO₂ from air. Heirloom's technology rapidly accelerates the natural ability of minerals to absorb CO₂ from the air from a timespan of years to days.

CO₂ CAPTURE

Limestone (CaCO₃) is thermally decomposed in a kiln to produce calcium oxide (CaO) and CO₂. The CO₂ is removed and stored permanently underground, while CaO is hydrated to form calcium hydroxide (Ca(OH)₂). The Ca(OH)₂ is spread on trays that are vertically stacked and exposed to ambient air. CO₂ from the atmosphere binds with Ca(OH)₂, producing CaCO₃. This CaCO₃ is then recycled back into the kiln, where the looping process begins again.

CO₂ SEQUESTRATION

CO₂ is geologically stored in sedimentary reservoirs, basalts where CO₂ is mineralized, or saline aquifers.

CO-BENEFITS OR PRODUCTS

Direct-air capture produces an enormous number of jobs in manufacturing, construction, and deployments. Heirloom intends to deploy these facilities where the worst impacts of climate change are experienced, or where jobs from the oil & gas industry are displaced. Heirloom also intends to co-locate with net new renewables, and any excess renewable energy generated could help stabilize the grid.

LEADERSHIP TEAM

Shashank Samala, CEO (Tempo, Square (now Block, Inc.)); Any Dubel, Head of Engineering (Tesla, built the Model X&3 factories); Max Scholten, Head of Commercialization (Nuro, Circle); Noah McQueen, Head of Research (UPenn, inventor of technology); Albert Luu, Head of Finance (raised \$B's at SolarCity).

COMPANY OVERVIEW

LOCATION

Ingatestone, UK

FOUNDED 2021

TRL 4

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂, Industrial chemicals

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed, Series A, Grant

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

R&D

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

~\$175k

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Private Equity, Venture Capital

Ryan Anderson
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PARALLEL CARBON

COMPANY DESCRIPTION

Parallel Carbon is developing a hardware platform that is fundamental to a post-fossil fuel society. We are building technology that removes carbon dioxide from the air while producing hydrogen to eliminate emissions. Our mission is to deliver the world's most scalable solution to reverse climate change. Our innovation is a unique direct air capture system. We've found a way to combine ancient geochemistry with modern electrochemistry to perform direct air capture and water electrolysis simultaneously. Our process generates high-quality carbon removal credits and green hydrogen.

CORE INNOVATION

Parallel Carbon is delivering the world's most capital-efficient climate hardware. We've designed a solution that 1) deploys anywhere with wind or solar power; 2) is built with equipment from existing supply chains; and 3) generates green hydrogen to further drive industrial decarbonization. Because our direct air capture process uses ultra-low cost equipment, we operate affordably with clean, intermittent wind and solar power. By using existing equipment and supply chains, we can deploy into the market rapidly. Our process is designed to integrate into the carbontech ecosystem to reduce costs for partners, driving growth potential.

CO₂ CAPTURE

We place hyper-reactive minerals on inexpensive racks to passively capture CO₂ from the air. We then extract CO₂ from the minerals using an innovative pH-swing water treatment process that regenerates the minerals' reactivity. We've developed a new kind of water electrolyzer that drives the pH-swing chemistry while running efficiently and with high durability. The process produces high concentrations of CO₂ and hydrogen.

CO₂ SEQUESTRATION

The CO₂ we capture from the air is used to create infrastructure materials from highly alkaline materials, by-products, and wastes. This includes concrete curing, recycling, and aggregate production. We will also durably store CO₂ via underground injection.

CO-BENEFITS OR PRODUCTS

Our direct air capture technology is special: our electrolyzer also produces green hydrogen, which is an important tool for decarbonizing industries. By designing a product that integrates carbon dioxide removal with hydrogen production, we can double our climate impact.

LEADERSHIP TEAM

Our current team is 2 passionate PhDs with expertise in mineral geochemistry, carbon capture, electrochemistry, process engineering, and decarbonization economics. We have spent years analyzing techno-economics, sustainable manufacturing, regulatory affairs, and leading manufacturing startups, all with an eye to successful commercialization and technology deployment.

COMPANY OVERVIEW

LOCATION

Mevo Carmel, Israel

FOUNDED 2020

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

< 1 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂

SELLING CREDITS

Yes

XPRIZE TRACK

Air (Membrane based direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$50M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$11M

TYPE OF CAPITAL SOUGHT

Strategic Partnership

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Venture Capital

Amir Shiner
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REPAIR

COMPANY DESCRIPTION

RepAir is developing a sustainable gigatonne-scale DAC solution based on a highly efficient and modular electrochemical technology. Our lean, clean technology is powered solely by renewable electricity at ambient temperature for lowest capture cost and minimal carbon footprint.

CORE INNOVATION

A novel electrochemical CO₂ separation process based on a technology inspired by fuel cell and batteries that selectively separates CO₂ from the air having very low energy demand.

CO₂ CAPTURE

RepAir's electrochemical cell includes two symmetrically composed electrodes and a selective separator in-between. Streaming humidified air into the cell while applying electrical current triggers an electrochemical reaction that selectively separates the CO₂ molecules from the air. Highly modular, our solution allows for stacking large numbers of identical electrochemical cells to form "building block" modules with large CO₂ separation capacity. These modules will be mass-produced to drive down capital costs and significantly improve the flexibility of project deployment.

CO₂ SEQUESTRATION

RepAir collaborates with sequestration partners to provide a comprehensive carbon dioxide removal solution. Our facilities will be located adjacent to the CO₂ storage site and will seamlessly stream CO₂ gas for storage directly to the facility of the sequestration partners (e.g., Carbfix).

CO-BENEFITS OR PRODUCTS

We will deploy our DAC facilities in remote locations close to storage sites. Local communities will benefit from countless job opportunities in an emerging negative emissions industry that will gradually replace fossil fuel industry jobs. Our plants are designed to perfectly blend with their surroundings for minimal impact on nature. Our CO₂ may also be used for products like building materials, synthetic aviation fuels and net negative plastics.

LEADERSHIP TEAM

Yehuda Borenstein (Chairman) is a serial entrepreneur and venture builder who strategizes and leads climatech companies. Amir Shiner (CEO) is a seasoned entrepreneur and executive with over 25 years of management experience in leading growing technology companies and taking innovative products to market. Dr. Ben Achrai (CTO) is an excellent scientist and manager with diverse industry experience in R&D of electrochemical systems. Prof. Yushan Yan (Shareholder) is the Henry B. du Pont Chair in Chemical and Biomolecular Engineering and Founding Director of Center for Clean Hydrogen at the University of Delaware.

COMPANY OVERVIEW

LOCATION

Sherbrooke, Canada

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

Validation in relevant environment

PHYSICAL PRODUCT(S)

Yes

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent direct air capture, Enhanced weathering of ultramafic tailings)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Pre-seed; Grant

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Govt, Philanthropic, Private Equity, VC

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SKYRENU TECHNOLOGIES

COMPANY DESCRIPTION

Skyrenu Technologies is the result of research and development conducted at the University of Sherbrooke. We developed an engineering solution for an integrated capture and sequestration system including a new modular DAC system and enhanced weathering of ultramafic tailings. Skyrenu Technologies won an XPRIZE Student Award in 2021 and was named a Top 60 team. Since then, we have continued to scale up our technology with the support of the Natural Sciences and Engineering Research Council of Canada and the Ministry of Economy and Innovation of Quebec.

CORE INNOVATION

We propose an integrated capture and sequestration system comprising a novel, modular, direct air capture device whose high-concentration gaseous CO₂ output is used for the on-site carbonation of mine waste. Our DAC system uses a cheap, eco-friendly solid sorbent that minimizes energy demand to drive down capture cost.

CO₂ CAPTURE

By using a DAC system with multiple monolith sorbent cells in series, the breakthrough curve can be optimized for adsorption and regeneration reactors separately, eliminating both saturated and unused zones that would unnecessarily increase system losses; this also maximizes system duty cycle while reducing cycle time. Heat exchangers between the reactors allow for optimal thermal management of the system, eliminating thermal cycling. This innovative arrangement minimizes pressure losses and maximizes thermal efficiency, thereby minimizing capital and operating costs.

CO₂ SEQUESTRATION

This CO₂ feedstock is used to carbonate chrysotile serpentine (magnesium silicate) at low process temperature and CO₂ partial pressure without chemical additives by the extraction of magnesium in an aqueous medium which reacts with dissolved CO₂ to form carbonates. Serpentine is obtained from asbestos mine tailings from an abandoned open-pit mine (500 meters from demonstration plant).

CO-BENEFITS OR PRODUCTS

Mineral carbonation offers a large, currently untapped, potential for durable carbon removal by producing inert materials with demonstrated long-term chemical stability. Our modular DAC and carbonation concept allows for infinite scale-up just by adding more units. Installing systems in Québec offers the benefit of being powered by the 100% renewable Hydro-Québec grid.

LEADERSHIP TEAM

Skyrenu Technologies is led by Martin Brouillette as CEO and Gabriel Vezina as CTO. They are both inventors of the capture technology and co-founders of Skyrenu Technologies. Brouillette has extensive experience in technology transfer, with over 20 U.S. patents granted and the start-up of four companies. Brouillette has successfully raised over \$50 million for his start-up companies.

COMPANY OVERVIEW

LOCATION

Cary, NC, USA

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

0.5 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂

SELLING CREDITS

Yes

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A, Series B, Early Stage VC, Later Stage VC, Grant

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-Commercial Pilot

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Philanthropic, Venture Capital

Darsh Gupta
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SUSTAERA

COMPANY DESCRIPTION

Sustaera, a spinout from Susteon Inc., is developing a scalable, modular technology for direct air capture of CO₂. Key innovations that make this process robust, scalable, and lower the cost of capture include: use of inexpensive, abundantly available materials; structured support for low-pressure drop; and direct electrical heating of the sorbent to reduce overall energy use. Sustaera is now scaling up the technology to a 1 tonne/day pilot plant, planned to be operational in 2024.

CORE INNOVATION

Sustaera's technology utilizes an abundantly available sorbent; integrates directly with renewable sources of energy; and has a modular design, enabling the technology to scale rapidly. It can work in a variety of climates and does not need water to function.

CO₂ CAPTURE

Ambient air is vacuumed into each unit, which comprises a three-layer system known as a structured material assembly (SMA). Each SMA contains a substrate, heating layer, and sorbent. Air flows through the SMA and the sorbent separates CO₂ from the air. The sorbent is then regenerated through resistive heating to produce CO₂ that is collected and stored in the ground.

CO₂ SEQUESTRATION

The CO₂ captured through Sustaera's system will be stored in a Class VI well or mineralized with a clearly defined MRV approach.

CO-BENEFITS OR PRODUCTS

Sustaera aims to create new jobs around the world and expedite the growth of renewable infrastructure. The CO₂ captured through Sustaera's proprietary technology can be sequestered or utilized. Sustaera's DAC technology can also co-produce water for arid regions.

LEADERSHIP TEAM

Sustaera was co-founded by Dr. Raghubir Gupta, Shantanu Agarwal, Cory Sanderson and Sudarshan Gupta. The Sustaera team has over 100-person years of combined experience in the fields of energy and chemicals research, spanning over 40 years, primarily in applied research aimed at moving novel technologies from conceptual ideas into commercial reality. The team was directly responsible for the successful execution and management of more than \$300 million of federally funded (primarily DOE funded) research projects, which included lab-scale development and testing through a 50-MW_e pre-commercial demonstration of a novel syngas conditioning technology to produce 1,000 tonne/day of CO₂ from this plant.

COMPANY OVERVIEW

LOCATION

Ottawa, Canada

FOUNDED 2020

TRL 5

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

Validation in relevant environment

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed, Grant

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$1.6M

TYPE OF CAPITAL SOUGHT

Strategic Partnership, Government Funding

TYPE OF INVESTORS SOUGHT

Philanthropic, Government, Project Finance, Venture Capital

Vida Gabriel

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<https://www.terrafixing.com/>



TERRAFIXING

COMPANY DESCRIPTION

TerraFixing is a direct air carbon capture start-up with an unfair technological advantage: it leverages cold climates to remove CO₂ from the atmosphere. Their IP-protected technology and proprietary sorbent enable the lowest capital and capture costs in the DAC space and a direct path to GT capture.

CORE INNOVATION

TerraFixing's process employs adsorption technology (material for CO₂ capture = zeolites) instead of absorption technology (materials like amines and hydroxyl solutions). It was designed to operate in cold locations where separating CO₂ from air is thermodynamically easier and where there is the greatest potential for renewable wind energy to scale. Where other DAC technologies are not viable, TerraFixing thrives and can achieve <\$40/tonne CO₂ at the GT scale.

CO₂ CAPTURE

Using powerful fans, air is blown over two sorbent beds—the first removes water, and the second is filled with a proprietary zeolite to capture CO₂ at high efficiencies. Once saturated, the zeolite bed is isolated and gently vacuumed to remove impurities. The bed is then heated to release CO₂ at 99%+ purity, and is compressed to 15MPa for sequestration. Air is backflowed through the system to reuse heat from the zeolite bed to regenerate the water capture bed, and the cycle repeats.

CO₂ SEQUESTRATION

The CO₂ captured and concentrated is sequestered geologically. The DOE/USGS confirms that billions of tonnes of CO₂ can be stored permanently in geologic formations across the globe and that risks occurring during injections and well closures are minimal. At the large scale, we plan to sequester the CO₂ in saline aquifers.

CO-BENEFITS OR PRODUCTS

Cleaner air, the development of renewable power in remote locations, and some water production. DAC can enable the decarbonization of other sectors by providing a carbon neutral feedstock. The scale-up and deployment of our technology will create new job opportunities in manufacturing, construction, and installation. Operations and maintenance jobs will be created in northern underserved Indigenous communities where the projects are being developed.

LEADERSHIP TEAM

Dr. Sean Wilson: Founder & CEO, TerraFixing's research pioneer, author of provisional and PCT patents. Dr. Vida Gabriel, co-founder, PhD in Sustainable Chemical Reaction Engineering. Mr. Tim Wilson, co-founder, 40+ years P. Eng work in carbon intensive industrial processes. Dr. Pierre Rivard, former president, chair & cofounder of Hydrogenics. Mr. Laurent Abbatiello, president and CEO of Tugliq Energy Corp.

COMPANY OVERVIEW

LOCATION

Woburn, MA, USA

FOUNDED 2019

TRL 4

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Other

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

R&D

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

\$80M

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

Laurene Hummer
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www.verdox.com



VERDOX

COMPANY DESCRIPTION

Verdox is making scalable, cost-effective carbon capture and removal a reality. Founded in late 2019, the company is commercializing its electroswing adsorption (ESA) platform technology (originally developed at MIT) to remove carbon dioxide from industrial emissions and the air with 70% energy savings versus conventional approaches.

CORE INNOVATION

Verdox's carbon removal technology is entirely electrical in nature and requires no heat or water to operate. The electrochemical nature of Verdox's technology allows it to operate with up to 70% less energy than conventional solutions, resulting in a significant removal cost reduction.

CO₂ CAPTURE

Verdox's core technology relies on the electrochemical toggling of the affinity of the company's proprietary electrodes to CO₂. Upon charging the cell, the electrodes are activated and capture CO₂ from a feed stream at any concentration. When the cell is discharged, a stream of high-purity CO₂ is released.

CO₂ SEQUESTRATION

The CO₂ Verdox captures can be permanently sequestered geologically in a variety of ways. The company won its XPRIZE Milestone Award together with Carbfix, who has developed a proprietary process for rapidly mineralizing CO₂ in basalt formations. Verdox can also work with more traditional carbon sequestration processes, like storage in saline aquifers.

CO-BENEFITS OR PRODUCTS

Due to Verdox's ability to run its DAC facilities entirely on electricity (without the need for waste heat or water), the company has significant flexibility in plant siting. This means Verdox is able to deploy plants in disadvantaged communities and help distribute economic opportunities more evenly throughout the US and the rest of the world.

LEADERSHIP TEAM

Brian Baynes, CEO & founder (MIT PhD in Chemical Engineering, founder of Petri.bio, Midori Health, Celexion, and Codon Devices, general partner at Flagship Pioneering); Dr. Friedrich von Gottberg, COO (MIT PhD in Chemical Engineering, Cabot, Kornit, Voxel8); Dr. Sahag Voskian, CSO & founder (MIT PhD in Chemical Engineering, inventor of the core technology); Dr. Patrick Hurley (Purdue PhD in Inorganic Chemistry, Barnes Group, A123 Systems, Johnson Controls, and Air Products)

COMPANY OVERVIEW

LOCATION

Los Angeles, CA, USA

FOUNDED 2021

TRL 5-6

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

Validation in laboratory

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂, Building materials, Other

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Early

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

>\$10M

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

Dante Simonetti
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<https://www.xover44.com/>



X/44

COMPANY DESCRIPTION

x/44 delivers low-cost, modular, electrochemical direct air capture to catalyze carbon dioxide utilization and removal.

CORE INNOVATION

The x/44 technology uses a bespoke, multi-chambered electrochemical reactor that exploits water electrolysis to generate acid and base, in situ, to facilitate a pH swing that desorbs and regenerates CO₂-saturated solvents at ambient temperature and pressure. Hydrogen gas is generated as a by-product during electrolysis, which can be sold as a clean fuel or recycled via a fuel-cell or hydrogen turbine to power the process. The desorbed CO₂ (between 5-to-30 mol % CO₂) is durably sequestered as a solid carbonate and/or aqueous carbonates, bicarbonates, and hydroxycarbonates.

CO₂ CAPTURE

A pioneering high-rate contactor brings air into contact with the solvent, where rapid mass exchange enables absorption of acidic CO₂ into a basic solution at alkaline pH. The CO₂-saturated solvent is thereafter pumped into the electrochemical reactor wherein an acidic pH swing allows protons, electrically generated at the anode, to cross a cation exchange membrane accelerated by electromigration. The in situ acidification rapidly desorbs CO₂. Thereafter, the CO₂-lean, acidified solvent is restored to its original pH using the alkalinity generated during electrolysis at the cathode, thereby completing the pH swing.

CO₂ SEQUESTRATION

CO₂ is sequestered via mineralization reactions with divalent ions to form solid carbonates and/or aqueous Mg and Ca carbonates, bicarbonates, and hydroxycarbonates.

CO-BENEFITS OR PRODUCTS

Hydrogen is generated as a co-product during the electrolysis, which can either be sold as a clean fuel or recycled via a fuel-cell or hydrogen turbine to power the process.

LEADERSHIP TEAM

x/44 is led by Dante Simonetti, David Jassby, and Gaurav Sant. Dante is an Associate Professor of Chemical Engineering at UCLA and the Associate Director for Technology Translation at UCLA's Institute for Carbon Management. David is a Professor of Civil and Environmental Engineering at UCLA and the Associate Director for Knowledge Discovery at UCLA's Institute for Carbon Management. Gaurav is the Pritzker Professor for Sustainability in UCLA's Samueli School of Engineering and the Director of UCLA's Institute for Carbon Management.

COMPANY OVERVIEW

LOCATION

New York, NY, USA

FOUNDED 2020

TRL 7

NUMBER OF EMPLOYEES

10+

CURRENT OPERATING SCALE

Validation in relevant environment

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂, Building materials

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air (Solid sorbent direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$20M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$5M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Government, Philanthropic, Venture Capital

David Elenowitz

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ZERO CARBON PRODUCTION

COMPANY DESCRIPTION

Zero Carbon Production is a direct air capture company that combines well-established monolith/sorbent core technology with innovative engineering design to achieve capital and energy efficiency and low cost/tonne over time. ZCP is focused on developing megatonne+ units with the goal of achieving a minimum of 0.5 gigatonnes of CO₂ removal per year by 2050.

CORE INNOVATION

ZCP leverages longstanding, highly developed core technology (from a third-party) that is centered around a monolith-contactor – similar to a catalytic converter. This geometry combines (i) high surface area to volume, (ii) laminar flow (reducing fan energy required), and (iii) a sorbent that is highly selective for the capture of CO₂. An innovative engineering design allows for multiple high-capacity monolith panels to move continuously, with a rapid-cycle regeneration process, driving throughput and lowering capex/tonne. Finally, extensive heat recovery allows for greater energy efficiency, lowering opex/tonne. The net result is a highly scalable, low-cost, energy-efficient design able to run 100% on renewable electricity.

CO₂ CAPTURE

Large, industrial fans move a substantial volume of air across monoliths covered with an amine that is highly selective for capturing CO₂. The CO₂ is desorbed via a heat swing process utilizing steam. Substantial heat recovery throughout the process helps reduce overall energy needs required per tonne of CO₂ captured. The ultimate result is a highly scalable technology/design to the megatonne+ level that is expected to achieve cost/tonne well below \$100/tonne over time.

CO₂ SEQUESTRATION

The CO₂ is provided to a company in the CO₂-to-concrete industry who applies the gas to cement and other materials to form calcium carbonate, permanently sequestering the CO₂ in solid form.

CO-BENEFITS OR PRODUCTS

By applying our DAC-recovered CO₂ to the CO₂-to-concrete process, we are able to materially lower the carbon footprint of cement/ concrete, as well as provide additional strength to the concrete, lowering the amount of cement required in the construction process -- providing a further benefit in terms of CO₂ emissions avoided.

LEADERSHIP TEAM

The Founder and CEO of ZCP, David Elenowitz, previously formed Zero Carbon Partners, an investment/advisory firm focused on the low carbon space funded with \$50 million of his personal capital; to date, he has invested in and advised several companies engaged in CO₂ removal as well as CO₂ utilization, including Global Thermostat (DAC) and Solidia (CO₂-to-concrete). He has extensive experience scaling large companies, including Empire (flooring), which he purchased and grew from \$40 million to \$700 million. SVP Charles Sanderson is a world expert in new process technology development with prior experience in AspenTech's consulting group, Cargill's Corporate Research, and a cleantech startup, Renmatix.

COMPANY OVERVIEW

LOCATION

Calgary, Canada

FOUNDED 2020

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

Building materials

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Air, Rocks (Solid sorbent direct air capture, Electrochemical CO₂ separation from seawater and/or water splitting)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$5M-10M

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

\$5.5M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Convertible Debt, Strategic Partnership, Government Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Private Equity, Project Finance, Venture Capital

Doug Brown

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www.zs2technologies.com



ZS2 TECHNOLOGIES

COMPANY DESCRIPTION

ZS2 is accelerating the development and adoption of innovative construction materials that are stronger, safer, and healthier for the planet. Combining construction and material science, ZS2 is developing a vertically integrated solution to sequester CO₂ into value-added materials for the world's largest industry. ZS2's novel cement formulation produces better building materials that are fire-rated, low cost, carbon-negative, and energy efficient. ZS2 develops prefabricated building panels and cladding products that provide our clients with cost certainty, accelerated construction timelines, and lower environmental footprint. The process will generate carbon credits through embodied and operational emission reductions, as well as high-value direct air capture carbon credits.

CORE INNOVATION

ZS2's technology provides a circular solution for salty wastewater streams that, when combined with CO₂ capture technology, creates a highly scalable CO₂ storage route with an end use product as an alternative cement. This cement can be produced wherever high concentration Mg/Ca salty wastewater exists and offers an opportunity to repurpose oil & gas, desalination, and brine mining infrastructure.

CO₂ CAPTURE

We use a fan-based extruded solid sorbent material to strip CO₂ from the air that then undergoes a temperature swing to produce up to a 12% CO₂ enriched stream. The proof-of-concept unit operated successfully in 2022 for 3 seasons with efficiencies that were 3rd party validated.

CO₂ SEQUESTRATION

The captured CO₂ is provided to salty alkali waste brines for rapid mineralization of calcium and magnesium in our 2-step reactor using a novel low-voltage electrolyzer. These minerals are then mixed with other dry components to form a cementitious material that has a >10 weight percent CO₂ content in the final cement.

CO-BENEFITS OR PRODUCTS

We have created a waste-to-cement solution with high CO₂ storage capacity that repurposes reject brines and increases water quality through salt extraction. ZS2 is exploring potential collaboration with salty wastewater producers and companies in need of long-term CO₂ storage opportunities. The resulting cement can be used to produce more durable and energy efficient building materials.

LEADERSHIP TEAM

ZS2 brought together a diverse group of experienced technology and scientific leaders. Scott Jenkins (CEO & co-founder) has 30 years of experience leading private and public technology companies in construction, environmental solutions, and engineering industries. Kristin Davis (COO & co-founder) has two decades of experience in sustainable residential construction and prefabricated construction manufacturing. Dr. Doug Brown (CTO & co-founder) started his career as an original team member of Carbon Engineering before moving into R&D focused on low carbon materials.



LAND

COMPANY OVERVIEW

LOCATION

Ubud, Indonesia

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Biochar, Soil or soil additives

CURRENT OPERATING SCALE

100 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar, Trees, Forests, Agricultural land and crops, Soils, Grasslands, Terrestrial ecosystem restoration, Nutrient fertilization)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed

AMOUNT OF CAPITAL SOUGHT

\$1M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

\$150,000

TYPE OF CAPITAL SOUGHT

Project Equity, Convertible Debt, Strategic Partnership, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Philanthropic, Private Equity, Project Finance

Volker Kess
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AGROCAPTURE

COMPANY DESCRIPTION

AgroCapture is developing efficient nature-based carbon removal solutions. With backgrounds in development aid work, mining land restoration, soil and biochar research and community training, our team can draw on multiple types of expertise necessary to successfully operate in rural, remote areas throughout the Indonesian archipelago.

CORE INNOVATION

Purposely grown, highly productive carbon crops on depleted, remote, or otherwise unusable lands (e.g. ex-mining lands) carry untapped potential. Using these areas for biomass production, we can produce huge quantities of biomass while restoring and preparing soils for future use. Once biochar production is established, side products like heat, electricity, and potentially biofuel can empower rural communities by bringing additional agricultural value chains to those areas.

CO₂ CAPTURE

Crops grown for active carbon removal, combined with agricultural waste biomass, will allow us to operate at maximum capacity and sequester significant amounts of carbon. Through large-scale cultivation of the fastest growing biomass plants suitable for each region, we maximize CO₂ intake while adjusting biowaste collection to prevailing local farming and crop processing activities. Through pyrolysis the biomass is processed into biochar, and during the initial stage used as a soil amendment.

CO₂ SEQUESTRATION

Biochar is used as a soil amendment to restore ex-mining areas and otherwise depleted or arid lands. By introducing biochar as part of sustainable farming practices we help local communities become accustomed to adding "Terra Preta" to their soils. In this way, carbon is stored for 100+ years.

CO-BENEFITS OR PRODUCTS

Benefits include: introduction of sustainable farming practices to rural communities; soil restoration/erosion prevention; sustainable bamboo/forest management; reforestation; additional income/employment opportunities for rural communities; and introduction of charcoal-based water filter systems to communities. Once project locations are fully developed, electricity from gasification and efficient use of the excess heat will deliver additional agricultural value chains and contribute to an increase of local income. Trainings in the biochar sector and project implementation all over Indonesia will multiply the impact.

LEADERSHIP TEAM

Our leadership team has long-term experience in development aid projects in Indonesia and Timor-Leste, including field implementation and field research; an extended network in the mining sector; connections to the palm oil industry and ex-mining land concession holders; an international network of experts, institutions, and companies in the biochar and carbon credit sector; and an unbreakable enthusiasm for researching biomass crops and developing low-tech biochar solutions for rural areas.

COMPANY OVERVIEW

LOCATION

Windsor, CA, USA

FOUNDED 2008

TRL 9

NUMBER OF EMPLOYEES

11-50

PHYSICAL PRODUCT(S)

Biochar, Building materials

CURRENT OPERATING SCALE

Capacity for 138,500 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar, Trees, Forests, Agricultural land and crops, Soils, Grasslands)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$15M-\$25M

AMOUNT OF CAPITAL SOUGHT

Series A

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Philanthropic, Project Finance, Venture Capital

Kate Chilton
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www.bamcore.com



BAMCORE

COMPANY DESCRIPTION

BamCore's mission is to decarbonize the built environment by harnessing the power of nature and technology. We are transforming buildings into climate solutions while solving key construction industry pain points. Our carbon negative framing solution lowers the upfront embodied carbon and improves the building's energy efficiency, thus reducing operating carbon. The prefabricated wall system also lessens the need for skilled labor, decreases overall construction time and cost, and reduces waste.

CORE INNOVATION

The Prime Wall™—a patented, dual-panel, studless framing system—is unlike anything on the market. Its unique combination of attributes includes improved thermal, acoustic, and energy performance; low embodied carbon; load-optimization of strong and fast-growing, biogenic fibers; absence of steel, plastic, and concrete; and fast installation without the need of skilled labor, heavy machinery, or specialized equipment. In addition, our proprietary, cloud-based design-bid-build platform increases collaboration among subcontracting trades, reducing errors and further speeding the construction process.

CO₂ CAPTURE

Photosynthesis is one of nature's most fundamental technologies. Bamboo absorbs CO₂ passively, combines it with water, and uses sunlight to power a metabolic reaction, transforming CO₂ into extremely strong structural fibers. Timber bamboo culms mature in just 4-7 years, regrow to full height and diameter in 6-8 months, and are never clear cut. As a result, more tonnes of CO₂ are captured per hectare than with wood.

CO₂ SEQUESTRATION

Once CO₂ is turned into strong fibers, it must be converted from a hollow tube into a rectilinear shape. Once the culms are ready for manufacturing, we use patented mechanical processing to produce longitudinal pieces that are glued and pressed into highly engineered panels. Properly designed and engineered, high-performance frames like ours can durably store carbon via the walls of a building, for up to 75 years.

CO-BENEFITS OR PRODUCTS

Environmentally, bamboo can provide erosion-resisting windbreaks around cultivated fields, stabilize deforested or degraded hillsides, restore degraded riparian banks and corridors, and provide phytoremediation to soils laden with heavy metals. Socially, we are supporting job creation for less-skilled labor and indirectly increasing income within the global south by developing a global bamboo supply chain. Lastly, bamboo can extend into numerous other high-value industrial products.

LEADERSHIP TEAM

Hal Hinkle (CEO) took over executive leadership in 2015. Zack Zimmerman also joined in 2015 as CRO, running the sales and marketing teams. Kate Chilton serves both as Chief Sustainability Officer and Chief of Staff, helping to drive efficiency and further develop the company's sustainability assets and public voice. Nich Allan (Director of QC & Product Development) leads product design and research into fiber optimization and biogenic materials. Darlo Pack brings 25+ years of experience in the building products industry as our Director of Global Operations.

COMPANY OVERVIEW

LOCATION

Ames, IA, USA

FOUNDED 2021

TRL 7

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Biochar, Liquid fuels

CURRENT OPERATING SCALE

4000 tonnes CO₂/year

SELLING CREDITS

No

XPRIZE TRACK

Land (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Not currently fundraising

AMOUNT OF CAPITAL SOUGHT

Pre-seed

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

Robert Brown
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BIOECONOMY INSTITUTE

COMPANY DESCRIPTION

We are an academic team based out of Iowa State University. Some members of our team are in the process of starting a company to pursue the commercialization of technology developed at Iowa State University for carbon removal via autothermal pyrolysis of biomass to biochar.

CORE INNOVATION

Although we are not alone in proposing biochar as a carbon removal technology, our approach is unique in employing autothermal pyrolysis and production of value-added co-products. These technologies simplify, intensify, and improve the economics of carbon removal via biochar.

CO₂ CAPTURE

Waste biomass or crop residues are pyrolyzed to produce biochar for carbon removal and bio-oil for production of advanced biofuels. The biochar is applied to croplands for long term sequestration of this biogenic carbon, representing net carbon dioxide removal from the atmosphere.

CO₂ SEQUESTRATION

We sequester CO₂ as solid carbon in the form of biochar. We produce biochar under conditions that produce a highly recalcitrant biochar, which can remain in the soil for hundreds and possibly thousands of years.

CO-BENEFITS OR PRODUCTS

Unlike many other approaches to biochar production, we also produce bio-oil as a major co-product. We have demonstrated that this bio-oil can be upgraded to bio-asphalt or renewable diesel fuel.

LEADERSHIP TEAM

Our team draws membership from faculty and staff at Iowa State University but also has external partners in Stine Seed Company and Frontline Bioenergy – all of which are based in the state of Iowa. Our team has been working on carbon removal for over a decade, having started an initiative in carbon negative energy with support from the College of Engineering at Iowa State University in 2011. Our team has been working on carbon removal for over a decade, having started an initiative in carbon negative energy with support from the College of Engineering at Iowa State University in 2011. Our team has been working on carbon removal for over a decade, having started an initiative in carbon negative energy with support from the College of Engineering at Iowa State University in 2011.

COMPANY OVERVIEW

LOCATION

Blacksburg, VA, USA

FOUNDED 2021

TRL 6

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Building materials

CURRENT OPERATING SCALE

1,000 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Trees, Forests, Agricultural land and crops, Soils, Grasslands)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$5M

AMOUNT OF CAPITAL SOUGHT

Seed

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$250,000

TYPE OF CAPITAL SOUGHT

PE, Strategic Partnership, Philanthropic

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Philanthropic, Private Equity, Project Finance, Venture Capital

Esteban Londoño
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C2 TECH LLC

COMPANY DESCRIPTION

C2 captures carbon by crowd-farming bamboo (i.e.: platform that provides farmers the resources needed for producing high quality bamboo for the building industry) and stores such carbon by transforming it into houses through a decentralized network of open-sourced manufacturing toolkits (i.e.: microfactories deployed and operated by local communities). C2's goal is to store stable carbon in the built environment at the megatonne/year scale by 2035 and at the gigatonne/year scale by 2050, while transforming the world's housing deficit into a giga carbon warehouse.

CORE INNOVATION

Via crowdfunding and open source technologies we have the potential to simultaneously achieve the gigatonne CO₂/year scale storage and deliver housing solutions with a lower carbon footprint. Moreover, using high-resolution mapping techniques we deploy our solution where the housing deficit is acute via the decentralized microfactory network. These tools allow us to optimize carbon removal while eradicating low-quality living conditions, benefiting thousands of farmers worldwide.

CO₂ CAPTURE

Capture is achieved by crowd-farming bamboo, a very fast growing plant (i.e.: highly renewable with high capture rate).

CO₂ SEQUESTRATION

The crowd-farmed bamboo is transformed into high quality building material that is capable of replacing steel and concrete in the frame, floor, walls and roof of buildings, and that is installed in a way that can last >100 years.

CO-BENEFITS OR PRODUCTS

Bamboo poles are carbon negative and low-cost building elements for framing a building with a natural and rustic look and feel. Bamboo boards are a less carbon negative and higher cost multilayer board useful for flooring, interior architecture, and furniture with a natural but more refined look and feel, for fancy finishings. Bamboo production is well known for protecting water streams, conserving and restoring fauna and flora. Socially, manufacturing bamboo-made products brings employment opportunities to low to high-skilled workers, along with education opportunities and economic leverage to local communities.

LEADERSHIP TEAM

Esteban Londoño, is a biologist and architect. He is Head of Design in charge of system design and product development). Santiago Botia (Head of Science, is in charge of estimating and modeling carbon capture and storage). David Urquiza, Head of Mapping and Spatial Ecology, is in charge of developing the maps that optimize bamboo farming, carbon storage, and low-quality housing eradication.

COMPANY OVERVIEW

XPRIZE TEAM NAME

Wood Vault

LOCATION

Silver Spring, MD, USA

FOUNDED 2022

TRL 7

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

None

CURRENT OPERATING SCALE

5000 tonnes CO₂/year

SELLING CREDITS

Yes

XPRIZE TRACK

Land (Trees, Forests, Agricultural land & crops, Soils, Grasslands, Terrestrial ecosystem restoration, Hybrid nature-eng)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Actively fundraising; contact for details

AMOUNT OF CAPITAL SOUGHT

Seed

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$200,000

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Strategic Partnership, Government, Philanthropic

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Government, Philanthropic, Project Finance, VC

Ning Zeng
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CARBON LOCKDOWN

COMPANY DESCRIPTION

Carbon Lockdown is a Public Benefit LLC dedicated to the advancement and scaling of Wood Harvesting and Storage (WHS) via Wood Vaults (WVs) as a method of long-duration carbon removal.

CORE INNOVATION

Wood Vault (WV) is a specially engineered structure that durably stores sustainably sourced coarse woody biomass (CWB) based on the Wood Harvesting and Storage (WHS) method of CDR researched and developed by Carbon Lockdown founder Dr. Ning Zeng. The science can be summarized as a “reverse coal” process in which carbon in the form of woody biomass is taken out of the “fast” photosynthesis-decomposition biotic carbon cycle and transferred to a “slow” geological carbon cycle via human engineering. It is a hybrid nature-engineered method that is low-cost and highly scalable.

CO₂ CAPTURE

CO₂ is captured by trees using the natural process of photosynthesis. We bury all the raw wood with a high carbon efficiency (>90%).

CO₂ SEQUESTRATION

High durability (1000+ years) is achieved by burying CWB in an anaerobic subterranean environment several meters below ground, away from the active biosphere (vegetation, soil, and decomposers) that's typically limited to the first meter of the soil profile. Carbon Lockdown's patent-pending WV design ensures an oxygen-depleted environment that prevents wood decomposition and initiates the re-fossilization of carbon.

CO-BENEFITS OR PRODUCTS

Wood Vault co-benefits include: Beneficial valorization of unmerchantable woody biomass residues from fire thinning and other forest management; mine reclamation; creation of good green jobs and support for rural development.

LEADERSHIP TEAM

Ning Zeng (Founder and CEO) invented the WHS method and the concept of Wood Vault. Ning is a professor at the University of Maryland. He is a Clarivate Highly Cited Researcher and on Reuters List of Top Climate Scientists. He was Chair of the 9th International CO₂ Conference and is a coauthor of the Intergovernmental Panel on Climate Change (IPCC) Reports. Toby Bryce (Commercial Advisor to Carbon Lockdown) has 20+ years of experience in business development and corporate strategy. Additionally, Toby is the policy lead for OpenAir's Carbon Dioxide Removal Leadership Act and serves as curator and co-host of OpenAir's This Is CDR weekly online event series. Dillon Capalongo, a mechanical engineer by training, is the lead developer of Wood Vault MRV monitoring system. Kirk Steffes (Deployment Manager) has 15+years experience in management and market development in construction, real estate, and landscaping engineering.

COMPANY OVERVIEW

XPRIZE TEAM NAME

PlantVillage

LOCATION

State College, PA, USA

FOUNDED 2012

TRL 9

NUMBER OF EMPLOYEES

>500

CURRENT OPERATING SCALE

120,000 tonnes CO₂/year captured and 30,000 durably stored as biochar

PHYSICAL PRODUCT(S)

Biochar, Soil/soil additives, Building materials

SELLING CREDITS (Yes)

XPRIZE TRACK

Land (Biochar, Trees, Forests, Agricultural land and crops, Soils, Grasslands)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Debt, Grant, Corporate

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Growth (growing beyond initial customers)

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Project Debt, Corporate Debt, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Philanthropic, Project Finance

David Hughes
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<https://carbon4good.net/>



CARBON4GOOD

COMPANY DESCRIPTION

PlantVillage is a global public good at Penn State University that works with smallholder farmers across the world leveraging its best-in-class AI, cloud system and ground team to help smallholder farmers adapt to climate change. We reach >14 million farmers/week in 9 countries with climate change advice, and help farms adapt to climate change. At the same time we leverage the millions of farms we reach as AI powered Carbon Capture Cubes to mitigate climate change. This mitigation is a combination of rapidly scaled up carbon capture via improved agricultural, agroforestry, pest management and conversion of crop residue and weeds into biochar. Recently, we spun off Carbon4Good which is a profit for purpose company that works with communities in Africa to adapt to climate change and get paid for doing it via the carbon markets. Carbon4Good also uses the PlantVillage registering and tracking carbon captured.

CORE INNOVATION

We leverage the PlantVillage's software and the PlantVillage network (over 14 million farmers/week in 9 countries) to turn biomass waste into biochar and build trust in the carbon markets via transparent science, associated with an internationally renowned US Land Grant University.

CO₂ CAPTURE

CO₂ is captured via pyrolysis.

CO₂ SEQUESTRATION

Capturing via trees planted on farm borders and increased agricultural production via better crops, irrigation and pest management. Conversion via Kon Tiki Kilns and Artisan general (Ithaka Institute) farmer dug holes for pyrolysis. Durable storage of crop residue and weeds as biochar and also storing waste CO₂ in green concrete. Working closely with Biochar Life who secured a contract to deliver 100,000t to Carbon Future.

CO-BENEFITS OR PRODUCTS

We help communities across Africa suffering the worst extent of climate change to adapt and thrive. This ranges from growing food in deserts, helping communities suffering famine conditions due to an historically bad drought in the Horn of Africa, all the way to increasing food production without increasing greenhouse gas emitting fertilizers and pesticides. We also provide jobs for hundreds of casual workers and dedicated staff which brings substantial money into the community.

LEADERSHIP TEAM

David Hughes quit his rainforest work to found PlantVillage, a knowledge platform that raised >\$33m from an initial investment of \$120k in 2012. PlantVillage has >210 full time employees in PlantVillage across 9 countries and >300 casual staff. He was named by Newsweek in 2022 as among America's Top 50 Disruptors and FAST Company as part of their 2021 Most Creative List. He founded Carbon4Good to build on that success and enable African farmers to get paid for capturing carbon, further enabling their adaptation to climate change. Edward Amoah is a computer science student at Penn State studying in the ecology program. We are proud to have a female African CEO at the helm (Chelsea Akuleut, Kenya) and John Mayieka as COO (also Kenyan).

COMPANY OVERVIEW

LOCATION

San Francisco, CA, USA

FOUNDED 2018

TRL 8

NUMBER OF EMPLOYEES

51-100

PHYSICAL PRODUCT(S)

None

CURRENT OPERATING SCALE

Technology system completed and qualified

SELLING CREDITS

Yes

XPRIZE TRACK

Land (Trees, Forests, Agricultural land and crops, Soils, Grasslands, Subsurface CO₂ injection for geologic sequestration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Actively fundraising; contact for details

AMOUNT OF CAPITAL SOUGHT

Series B

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

\$1M - \$5M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Philanthropic, Venture Capital

Harris Cohn
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www.charmindustrial.com



CHARM INDUSTRIAL

COMPANY DESCRIPTION

Charm Industrial turns excess, inedible corn stalks and forest waste into bio-oil and puts that oil back underground. This financially supports rural farming and former oil & gas communities with new climate positive jobs. At large scale, Charm will also use bio-oil to produce fossil-free iron, which would swing steel's 8% share of global emissions to -6%.

CORE INNOVATION

Charm's innovation is to sequester carbon-rich bio-oil underground. Independent scientific review confirms that this process sequesters carbon for over 10,000 years.

CO₂ CAPTURE

Charm converts atmospheric carbon captured in ag and forestry residues into bio-oil via a mobile fleet of fast pyrolyzers. Without intervention, these waste biomasses would rot and return to the atmosphere.

CO₂ SEQUESTRATION

Bio-oil locks up the carbon from the original biomass in stable form. After the bio-oil is injected into EPA-regulated wells, it sinks within the geological formation and solidifies in place.

CO-BENEFITS OR PRODUCTS

Charm's removals support rural and agricultural communities biomass revenue and oilfield services employment. Charm seeks to work with communities to use bio-oil injections to plug old wells and improve community health while permanently storing carbon. Other benefits include wildfire fuel load reductions, air quality improvements, and expanding climate transition benefits to marginalized communities.

LEADERSHIP TEAM

Peter Reinhardt (CEO) was CEO at Segment, a software company he grew to 600 people and sold for \$3.2B. Charm's engineering leads have backgrounds in food (Impossible Foods, Sandymount), ag (Tortuga), aerospace (Lockheed, LANL) and physics (Stanford, South Pole). Nora Cohen Brown (Head of Policy) previously led policy at Sairdron; Tim Thomson previously led finance at Impossible Foods and Plenty; Harris Cohn previously led sales at ClearTrace and Carbon Lighthouse; Katie Holligan (Head of Operations) was previously at Carbon Lighthouse and Chevron drilling operations; Cecilia Pang (Head of People) was previously at Impossible Foods and Stripe.

COMPANY OVERVIEW

LOCATION

San Diego, CA, USA

FOUNDED 2013

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

Validation in relevant environment

PHYSICAL PRODUCT(S)

Algae as an end product, Food/feed, Polymers, Liquid fuels

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Trees, forests, Agricultural land and crops, Soils, Grasslands, Phytoplankton, Microalgae)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Debt, Grant, Corporate, Angel

AMOUNT OF CAPITAL SOUGHT

\$70M

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Convertible Debt, Project Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Government, Philanthropic, Private Equity, Project Finance

David Hazlebeck
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https://www.globalgae.com



GLOBAL ALGAE INNOVATIONS

COMPANY DESCRIPTION

Global Algae is a family-owned company guided by Christian values with the mission to change the world through technology, service, and compassion. Our vision is to harness the unparalleled productivity of algae to provide food and fuel for the world, dramatically improving the environment, economy, and quality of life for all. To lower the cost and energy use in algae farming, radical advances were necessary in every step of the algae production process; the company's R&D efforts have led to over 60 innovations in cultivation, harvesting, and processing, including eleven major breakthroughs.

CORE INNOVATION

Global Algae is a technology developer for low-cost microalgae farming. Global Algae's current productivity rates for simultaneous production of protein and vegetable oil are 23 times greater than soy and 9 times greater than palm oil, respectively. This unparalleled productivity will enable restoration of 30 acres of rainforest for every acre of algae installed.

CO₂ CAPTURE

The project sequesters carbon dioxide in two ways. First, algae cultivation directly captures carbon dioxide from the atmosphere and a portion of the algae oil is converted into polymer products for long-term sequestration of the carbon. Second, rainforest regrowth will capture carbon dioxide and store it in both above-ground and below-ground biomass. The initial megatonne project will capture and sequester 12 million metric tonnes per year: 1 million tonnes in polymer products and 11 million tonnes in rainforest regrowth.

CO₂ SEQUESTRATION

The CO₂ is durably sequestered in consumer plastics and in both above and below-ground biomass.

CO-BENEFITS OR PRODUCTS

Our farms simultaneously produce sustainable aviation fuel, feed, and food. The process is economical and scalable for worldwide implementation, so communities can improve their standard of living while restoring their forests and fighting climate change. Our farms have no runoff and use less water compared to traditional crops.

LEADERSHIP TEAM

Dr. David Hazlebeck (Founder & Chief Executive Officer) is a chemical engineer with over 32 years of experience in chemical and biological process research, development, design, construction, start-up, and operations. He is an expert in techno-economic analysis and has developed multiple technologies from conception to full commercialization. He is a proven leader and innovator in the algae industry, and was the project manager and principal investigator for the design, construction, operations and retrofitting of the Kauai algae facility. He has taken numerous technologies from R&D stage to pilot-scale design and operations.

COMPANY OVERVIEW

LOCATION

Ferndale, WA, USA

FOUNDED 2009

TRL 6

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Biochar, Soil or soil additives, Polymers, Industrial chemicals, Liquid fuels

CURRENT OPERATING SCALE

<1 tonne CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land, Air (Biochar, Agricultural land and crops, Soils, Grasslands)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Actively fundraising; contact for details

AMOUNT OF CAPITAL SOUGHT

Series B, SPAC, Early Stage VC, Later Stage VC, Grant, Corporate, JV

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Strategic Partnership, Government

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Govt, Private Equity, Project Finance, VC

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MERCURIUS BIOREFINING

COMPANY DESCRIPTION

Mercurius Biorefining Inc's patented Renewable Acid-hydrolysis Condensation Hydrotreating (REACH™) technology can convert any lignocellulosic waste stream material (such as agricultural/forestry residues or municipal solid waste) to carbon-negative hydrocarbons in the renewable diesel, aviation, and marine fuel ranges. In addition to fuels, REACH™ technology also produces carbon-negative renewable chemical products including FDCA, Formic Acid, Levulinic Acid and Furfural.

CORE INNOVATION

REACH™ technology uses liquid phase catalytic technology to convert lignocellulosic biomass to fuel and other chemicals. Liquid phase reactions allow for lower volumes, temperatures, and pressures than thermochemical conversion processes. Unlike pyrolysis, the feedstock does not require drying and no vapor products are produced. This results in lower volumes, smaller equipment and lower capital costs than other biochar/fuel technologies.

CO₂ CAPTURE

CO₂ is captured through photosynthesis by plants such as sugar cane, corn, wheat, and trees. Using sugar cane, carbon is sequestered in bagasse produced through milling process. Currently, sugar mills burn bagasse, re-releasing captured CO₂ to the atmosphere. When bagasse is processed by Mercurius' REACH™ technology, ~45% of its mass is converted to a lignin biochar product. Once buried or used as an asphalt additive, lignin biochar can sequester carbon for several centuries.

CO₂ SEQUESTRATION

CO₂ is sequestered in soil in the form of biogenic carbon contained within lignin biochar, which is highly stable in soil. Approximately 70-90% of total sequestered carbon remains sequestered for at least 100 years. Lignin can also be used as an additive in asphalt to replace bitumen from fossil fuels. In asphalt, degradation of lignin is expected to be minimal and even more carbon is sequestered.

CO-BENEFITS OR PRODUCTS

REACH™ technology produces hydrocarbons in the renewable diesel, aviation, and marine fuel ranges. These fuels are drop-in ready and require no infrastructure or equipment adjustments, and offset fossil fuel consumption. When the end products are renewable chemicals, further carbon is sequestered. One example product is FDCA which is a key component of several plastics, including PEF which can replace petroleum derived PET in plastic bottles. Lignin biochar has uses as a soil enhancer, and asphalt additive.

LEADERSHIP TEAM

Karl Seck (CEO) who has 30+ years of experience in management roles within the refining industry. Michael Vevera has started and run businesses in Japan and Australia. Knud Balslev has 25+ years of business development experience. The board of advisors consists of professors from UC Davis and the University of Maine. Mercurius also has a partnership with Queensland University of Technology.

COMPANY OVERVIEW

LOCATION

Paris, France

FOUNDED 2021

TRL 8

NUMBER OF EMPLOYEES

101-250

PHYSICAL PRODUCT(S)

Biochar, Electricity

CURRENT OPERATING SCALE

4,000 tonnes CO₂/year

SELLING CREDITS

Yes

XPRIZE TRACK

Land (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$8M

AMOUNT OF CAPITAL SOUGHT

Series A

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

\$18M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Debt, Corporate Debt, Government, Philanthropic

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Govt, Philanthropic, Project Finance, VC

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NETZERO

COMPANY DESCRIPTION

NetZero is a climate venture specializing in long-term carbon removal from the atmosphere. We turn agricultural residues into biochar, a very stable form of carbon. Plants capture carbon during photosynthesis; we extract and stabilize this carbon through a pyrolysis process. The resulting biochar is buried in the soil, safely storing the carbon out of the atmosphere for hundreds of years. The long-term carbon removal effect of biochar allows us to generate high-quality carbon credits with strong social co-benefits in agriculture and access to energy. We operate a unique model, leveraging proven technologies and our own R&D to maximize social and climate impact, optimize economics, and allow for scale. Our ambition is to remove over 2 million tonnes of CO₂ annually from the atmosphere before 2030.

CORE INNOVATION

We leverage almost limitless access to biomass in the tropics to produce biochar with our own technology, which is suited to our business model. We provide an end-to-end solution from R&D to plant operation, carbon credit certification, and distribution.

CO₂ CAPTURE

CO₂ captured by plants via photosynthesis is stabilized in the form of biochar. NetZero collects crop residues from nearby farmers and cooperatives in tropical, developing countries, and extracts carbon from these residues through pyrolysis, (i.e. heating at about 650°C in the absence of oxygen) to create biochar. The energy necessary for heating the biomass is provided by the biomass itself, which releases syngas (containing notably methane and hydrogen) that can be burned to keep the pyrolysis oven at operating temperature.

CO₂ SEQUESTRATION

Biochar is highly stable, allowing it to store the carbon in agricultural soils where it can remain for hundreds of years. Biochar carbon sequestration properties are validated by a number of scientific studies and are recognized by IPCC. NetZero has already certified its carbon credits, demonstrating a very efficient life cycle.

CO-BENEFITS OR PRODUCTS

We help farmers in tropical, developing countries improve their yields and reduce their dependence on fertilizers, hence improving their standard of living. By leveraging the excess syngas produced by pyrolysis, we also co-generate electricity, allowing access to energy in rural areas of developing countries.

LEADERSHIP TEAM

Leadership team is composed of seasoned executives with deep expertise in all the relevant fields. Prior to NetZero, Axel Reinaud (CEO) was Managing Director and Senior Partner at The Boston Consulting Group. Pedro Figueiredo (CTO) was General Manager of the forestry and pyrolysis business of Vallourec. Georges Neggear (CFO) was CFO of a scale-up in building material after various executive roles at Lafarge. Osvane Faria (R&D) was a researcher and inventor of pyrolysis and gasification systems. Pauline Dumons (Business Development) was Marketing Director at Veolia.

COMPANY OVERVIEW

LOCATION

Amsterdam, the Netherlands

FOUNDED 2019

TRL 8

NUMBER OF EMPLOYEES

101-250

PHYSICAL PRODUCT(S)

Biochar

CURRENT OPERATING SCALE

10,000 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series B

AMOUNT OF CAPITAL SOUGHT

\$9M in initial 2023-2025 phase; \$160M in stages towards 2030

COMMERCIAL STAGE

Growth (growing beyond initial customers)

REVENUE RANGE

\$5M-\$10M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Debt, Corporate Debt, Strategic Partnership

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Private Equity, Project Finance

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PERPETUAL NEXT

COMPANY DESCRIPTION

Perpetual Next aims to be a catalyst in the fight against climate change. By 2030, based on the blueprint of our current carbonisation plant in Vägari Estonia, Perpetual Next will build and operate 8 commercial scale carbonisation plants. By 2050 Perpetual Next will host an 'Uber'-like platform, a marketplace where the fighters for climate change will meet the carbon rich. This platform, Carbon-Republic, will disentangle the feedstock chain and democratize carbon removal. We will miniaturize and mobilize our carbonisation technology to become widely available at any location on the planet. We will do this with RF heating technology and local electricity, at peak-level availability, to power the process. Our solution can be scaled globally and offers the carbon rich an opportunity to turn their organic waste streams into their carbon removal legacy. The people who want to stop climate change won't be left powerless, they can contribute their share directly.

CORE INNOVATION

At Perpetual Next we believe in carbonisation: a process to produce renewable carbon from bio-residues such as forestry residues, scrap wood, etc., that we have perfected in our unique carbon converter, C-Vertr, reactor. It heats the feedstock with the syngas it generates in the process in a closed cycle. The material is conveyed through the length of the reactor and is dried then carbonized in an anaerobic atmosphere. Our C-Vertr reactor separates the combustion process from the carbonisation process. This separation has a positive effect on the mass yield (mass flow out/mass flow in), and thus on the financial performance of the process. Keeping these flows separate results in a controllable, homogeneous carbonisation process. This process is stable to run continuously and is inherently safe by design. We have two different proprietary large capacity C-Vertr reactor designs of either 5.000-15.000 ton/y, or 20.000-30.000 ton/y (depending on feedstock and product grade).

CO₂ CAPTURE

Biochar and biocoal are the main CDR mechanisms.

CO₂ SEQUESTRATION

By 2023 biochar will be used in the following applications (with different decay rates): 50% soil-amendment biochar for 5000 hectares, 25% building construction green concrete and dry-wall will be 2.414.000 m³ carbon-negative concrete. 25% abandoned coal mine filling a volume of 125.000 m³ biochar mixed with water will fill 167.000 m³ of empty mine volume. Adding up to a net sequestration of 1M tonnes CO₂.

CO-BENEFITS OR PRODUCTS

The Carbon-Republic platform is a catalyst for carbon removal via biochar. Biochar can act as fertilizer for depleted soils and can strengthen concrete or dry-wall building materials.

LEADERSHIP TEAM

In the Perpetual Next team many different backgrounds, levels of culture, expertise and experience come together. The diversity in this team is large and forms the foundation of our success.

COMPANY OVERVIEW

XPRIZE TEAM NAME

Biochar Challenge

LOCATION

Cologne, Germany

FOUNDED 2022

TRL 9

NUMBER OF EMPLOYEES

11-50

PHYSICAL PRODUCT(S)

Biochar

CURRENT OPERATING SCALE

4,000 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A, Mezzanine, Debt, Grant, Other

AMOUNT OF CAPITAL SOUGHT

\$10M

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

0

TYPE OF CAPITAL SOUGHT

Corporate Equity, Convertible Debt, Project Debt, Other

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Philanthropic, Project Finance, Other

Timo Herbrand
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PYROCCS GmbH

COMPANY DESCRIPTION

PyroCCS is implementing a biochar strategy for developing countries that combines low-tech machinery with high-tech certification to provide the cheapest and fastest-to-scale solution for converting waste biomass to biochar. PyroCCS plans to build over 2,000 sites over the next 10 years. These sites will produce 1M tonnes of biochar annually; sequester over 4M tonnes of net CO₂; and create 15,000 jobs in rural areas. With 1M tonnes of biochar, 50,000 to 100,000 hectares of agricultural land can be made fertile. PyroCCS is currently operating two pilot plants in Namibia and setting up another in India.

CORE INNOVATION

PyroCCS uses pyrolysis technology that is robust, inexpensive, and easy to operate, yet meets the highest standards for biochar production. This enables decentralized use in rural areas of developing countries. In the process, biomass owners will be given a revenue opportunity without having to invest. The biochar-sequestering farmers receive biochar for free. Financing of the plant investment, operation, and certification is done exclusively through the sale of CDR credits.

CO₂ CAPTURE

CO₂ removal results from the conversion of biomass to biochar with long-term chemical and biological stability, (i.e. high resistance to degradation process when placed in the environment). Carbon captured in biomass via photosynthesis is stabilized in biochar.

CO₂ SEQUESTRATION

PyroCCS's strategy provides for sequestration of biochar in the country of biomass extraction and pyrolysis, minimizing transport routes while ensuring the product and value chain remain in the respective country.

CO-BENEFITS OR PRODUCTS

When biochar is loaded with nutrients and incorporated into soils as a Terra Preta product, it can make degraded soils fertile as a humus initial, which has a positive effect on plant growth (food security) and leads to a higher water-holding capacity and less erosion (resilient to the negative effects of climate change). In Namibia, restoration of the savannah ecosystem has positive effects on biodiversity. Other benefits include: jobs creation in rural areas; improvement of the terms of trade; and production of wood tar and thermal energy as residual products.

LEADERSHIP TEAM

Timo Herbrand has an MBA and is a serial entrepreneur with a proven track record in real estate and nature tech. He took the first company he co-founded public in 2001 and turned it into a unicorn by 2006. Carlos Arrufat has a master's degree in engineering and is a gardener. Christopher Steins has a master's degree and PhD in engineering. He was technical director at Pyreg GmbH, the market leader in high-tech pyrolysis machines, and developed their flagship product PX1500. Florian Oberhofer is a banking and finance professional with a BA in international management and an honorary ambassador of the German Indian Startup Exchange Program.

COMPANY OVERVIEW

LOCATION

Vienna, Austria

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Biochar, Soil or soil additives, Building materials

CURRENT OPERATING SCALE

0 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar, Agricultural land and crops, Soils, Grasslands, Terrestrial ecosystem restoration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$1M

AMOUNT OF CAPITAL SOUGHT

Seed, Mezzanine Financing, Early Stage VC, Angel, Joint Venture

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corp Equity, Project Equity, Project Debt, Strategic Partnership, Govt, Philanthropic

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Project Finance, Venture Capital

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RCM SOLUTIONS GmbH

COMPANY DESCRIPTION

Reverse Carbon Mining is a carbon removal strategy where responsibly sourced excess biogenic residues are pyrolyzed into a char and moved to geolocated underground depots. The result is a superior CDR product that combines permanence (forever), substantial scalability, unequivocal definition, and future verifiability. The startup sells carbon-backed tokens containing the chain of custody from biomass source to coal location and a detailed life-cycle analysis as proof of actual removal. The stringent traceability, which meets all the criteria of a high-quality CDR product, allows it to be sold at a high price.

CORE INNOVATION

The team introduces a unique, high-quality CDR commodity (permanent, defined, and verifiable) generated in a process called "Reverse Carbon Mining" (RCM). The applied pyrolysis technology (highly scalable and readily available) transforms excess (joint- or by-product) biomass into a form of coal, and we put it back underground. The central element of RCM is our cradle-to-grave biomass tracking platform that documents the whole CDR process in a tradable digital token equaling a ton of CO₂ permanently removed from the atmospheric system. The transparency and control of the entire process guarantee the token's high value.

CO₂ CAPTURE

One of the most efficient ways to get CO₂ out of the air is through natural photosynthesis. Plants do this work for us, but the resulting biomass is subsequently burned or decays naturally. Each year, about 120Gt of CO₂ escapes into the atmosphere. This is where RCM comes in. The startup collects this biomass (and the carbon it contains) and converts it into coal through pyrolysis. This keeps it stable forever.

CO₂ SEQUESTRATION

As a first step, the carbon will be buried in still-laid coal mines, which are available all over the world. However, burial is possible in virtually any environment as long as it is covered with a layer of humus. This makes it possible to renaturalize a variety of sites (such as gravel pits, moorlands, or others) in an environmentally friendly way.

CO-BENEFITS OR PRODUCTS

The major co-benefit is the possibility of the revitalization of abandoned mining areas. This process also creates jobs and social value, especially in areas that are particularly affected by mine closure. In addition, pyrolysis plants generate heat, which in turn can be converted into electricity, creating additional value.

LEADERSHIP TEAM

The team from Austria consists of experienced engineers from the space sector who plan and execute in all technical and logistical areas with inherent precision. A business consultant with decades of experience building products, services, and business models covers the organizational and financial areas. And a mining expert with 12+ years of coal mine design experience rounds out the team. The team is accompanied by a solid Advisory Board covering all aspects essential for the business model.

COMPANY OVERVIEW

LOCATION

Munich, Germany

FOUNDED 2022

TRL 7

NUMBER OF EMPLOYEES

11-50

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂,
Electricity, Other

CURRENT OPERATING SCALE

300 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biomass combustion with CO₂ capture,
Subsurface CO₂ injection for geologic
sequestration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$50M

AMOUNT OF CAPITAL SOUGHT

Series A, Debt, Other

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

\$1M - \$5M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Convertible Debt, Project
Debt, Corporate Debt

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Private
Equity, Project Finance, Venture Capital

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REVERION

COMPANY DESCRIPTION

Founded in 2022 as a spin-off of the Technical University of Munich, Reverion is a tech-driven climate company. Over the years, we have successfully developed and patented our highly efficient, reversible, carbon-negative power plants. Our mission is to make carbon negative power generation possible at scale by making the most out of biogas and becoming the first cost competitive BECCS technology in the market.

CORE INNOVATION

Our containerized power plants achieve record efficiencies of up to 80%, doubling the electricity production from biogas compared to state-of-the-art solutions. In the process, no off-gas is emitted but instead pure CO₂ is separated, allowing for negative CO₂ emissions. Additionally, the plants can switch to gas generation (green hydrogen or renewable methane) and enable long-term energy storage. Reverion plants are modular, scalable and standardized container units. They are designed for series production and plug-and-play installation to easily replace existing engines and enable rapid market penetration.

CO₂ CAPTURE

CO₂ is separated during power generation from biogas through a membrane or adsorption process.

CO₂ SEQUESTRATION

The CO₂ is stored in geologically suitable locations, especially depleted natural gas fields.

CO-BENEFITS OR PRODUCTS

A Reverion power plant makes reliable green power from biogas when the power is needed and can produce green hydrogen or renewable methane through electrolysis when there is a power surplus. Both are valuable products. The so-produced synthetic, renewable methane can be used for electricity, heat, or mobility via the existing natural gas grid. By using the existing gas infrastructure, a long-term storage effect is achieved. In addition, our power plants switch between electricity and gas generation within seconds, bridging the gap between demand and fluctuating supply and thereby helping to stabilize and balance the power grid.

LEADERSHIP TEAM

Our founding team consists of Stephan Herrmann (CEO & Managing Director), Felix Fischer (COO & Managing Director), Maximilian Hauck (CTO), Jeremias Weinrich (CPO), and Luis Poblitzki (CDO). Together, they bring more than 30 years of research and development experience in the field of energy systems at the Technical University of Munich. Currently, Reverion's team has expanded with more than 30 employees covering positions in production, R&D, automation, sales, marketing, management, HR, and back-office.

COMPANY OVERVIEW

LOCATION

Sarasota, FL, USA

FOUNDED 2013

TRL 9

NUMBER OF EMPLOYEES

101-250

PHYSICAL PRODUCT(S)

Soil or soil additives, Building materials, Other

CURRENT OPERATING SCALE

17,000 tonnes CO₂/year

SELLING CREDITS

Yes

XPRIZE TRACK

Land (Biochar, Trees, Forests, Agricultural land and crops, Soils, Grasslands, Terrestrial ecosystem restoration, Nutrient fertilization)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$50M

AMOUNT OF CAPITAL SOUGHT

Seed, Series A, Mezzanine Financing, Equity Crowdfunding, Debt, Grant, Angel, JV

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

\$5M

TYPE OF CAPITAL SOUGHT

Project Equity, Convertible Debt, Project Debt, Corp Debt, Strategic Partnership, Govt

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Govt, Private Equity, Project Finance, Other

David E. Sands

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RIZOME

COMPANY DESCRIPTION

We are on a mission to develop noninvasive timber bamboo into a primary global construction material to sequester gigatonnes of CO₂. We sell carbon credits, manufacture bamboo-based construction materials, and are adding biochar. We are reforesting giant bamboo in the Philippines, where the former Secretary of Agriculture joined our board. We have a regenerative agriculture project in Florida and are expanding in Vietnam, Australia, and India. We are producing bamboo-based construction materials in the Philippines and manufacturing bamboo buildings in Vietnam.

CORE INNOVATION

RIZOME has developed an integrated system that is nature-based, technology-based, and community-based. We reforest at scale and implement regenerative agriculture. We have technological solutions for monitoring and storing carbon and manufacturing high value building materials. We implement community-based solutions that address all UNSDG17.

CO₂ CAPTURE

RIZOME plants noninvasive giant bamboos: the fastest growing woody plants. Mature in 6-8 years, each plant can live 120 years and be harvested annually stimulating further growth. Each plant sends up 5-15 shoots each year which grow to a height of 20-45 meters (60-150ft) in 2-3 months and become mature logs in 3-5 years. Based on our current operations (250 plants/hectare) our fully mature giant bamboo is capturing 293 tonnes of CO₂ every year/hectare.

CO₂ SEQUESTRATION

We annually harvest mature bamboo and make durable construction materials that store CO₂. Our production waste will soon be made into biochar for additional carbon storage. Bamboo plants can live 120 years and store CO₂ throughout their lifetime. Even after annual harvesting begins the below-ground rhizome continues to grow and builds soil carbon.

CO-BENEFITS OR PRODUCTS

We partner with indigenous groups to reforest denuded land and create multigenerational income for tribal members and address all UNSDG17. High-value construction materials are the economic driver for our solution. We can also create affordable SAF, hydrogen, and electricity. The emissions avoided by replacing steel and concrete with our wood significantly increases our climate impact.

LEADERSHIP TEAM

David Sands pioneered the structural use of bamboo including developing the first US Building Code. Russell Smith has a global software solutions background and over a decade in bamboo. Luis Lorenzo is the former Secretary of Agriculture for the Philippines and a Wharton business school graduate. Fred Murrell is an attorney and former VP of Fortune 500 energy and logistics companies. Joe Andrews is a manufacturing expert who previously managed the largest plywood operation in the world and has a decade with structural bamboo.

COMPANY OVERVIEW

LOCATION

London, UK

FOUNDED 2000

TRL 9

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Building materials

CURRENT OPERATING SCALE

3 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Trees, Forests, Agricultural land and crops, Soils, Grasslands, Coastal lands restoration, Mangroves, Blue carbon, Terrestrial ecosystem restoration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Not currently fundraising

AMOUNT OF CAPITAL SOUGHT

Grant, Corporate, Joint Venture

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Government, Philanthropic, Project Finance

Charlie Paton
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SEAWATER GREENHOUSE

COMPANY DESCRIPTION

Seawater Greenhouse Ltd is a design engineering company based in London but working in many parts of the world to develop agricultural solutions using seawater.

CORE INNOVATION

Evaporative cooling and zero-discharge desalination enables food self-sufficiency together with carbon drawdown in hot, arid coastal regions.

CO₂ CAPTURE

In plants, roots and soil capture CO₂ through the restorative process of regenerative agro-forestry.

CO₂ SEQUESTRATION

CO₂ is sequestered through photosynthesis as soil carbon.

CO-BENEFITS OR PRODUCTS

A major benefit is self-sufficiency in food and water, especially in regions prone to drought.

LEADERSHIP TEAM

Charlie Paton has been elected to the faculty of Royal Designer for Industry and is a fellow of the Royal Society of Arts.

COMPANY OVERVIEW

LOCATION

Richmond, CA, USA

FOUNDED 2018

TRL 5

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Biochar, Soil or soil additives, Building materials, Industrial chemicals, Other

CURRENT OPERATING SCALE

1000 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Prefer not to say

AMOUNT OF CAPITAL SOUGHT

Pre-seed

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Strategic Partnership, Government Funding, Philanthropic Funding, Other

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic

Kevin Kung
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TAKACHAR

COMPANY DESCRIPTION

Takachar deploys small-scale, low-cost, portable machines that can be loaded into the back of tractors and deployed to farms, turning crop waste into sellable bioproducts. Our patent-pending system broadens farmers' livelihoods with the generation of additional income by selling these on-demand bioproducts on the market. We have been recognized by XPRIZE Carbon Removal, Prince William's inaugural Earthshot Prize, and Bill Gates's Breakthrough Energy Fellowship.

CORE INNOVATION

Most crop residues (biomass) are loose, wet, and bulky, making them difficult and expensive to collect. As such, most existing biochar technologies are incompatible with the rural/distributed nature of biomass. Through patent-pending technology and internet-of-things-based coordination, we develop small-scale, low-cost, portable systems for on-site biochar production at a cost 100x smaller than state-of-the-art, while maintaining an input-output process that enables us to customize to the feedstock and output product needs of different rural communities without modifying the hardware system (which requires no external energy to run).

CO₂ CAPTURE

CO₂ is captured by growing crops. During harvest, crop residues in these communities are burned in open air, releasing the CO₂ back into the atmosphere. Through our process, only ~50% of the plant carbon returns to the atmosphere. The remaining carbon is turned into a solid, carbon-rich, recalcitrant form. When the same plants are replanted, they absorb more carbon from the atmosphere, leading to net sequestration.

CO₂ SEQUESTRATION

We blend the carbon-rich, recalcitrant biochar with locally available nutrient sources and package this as a standalone, government-certified, organic-certified fertilizer blend for farmers. Through localized biochar production, our process directly employs local labor in rural, underserved communities, enabling these communities to reduce their reliance on imported, unreliable, and expensive fertilizers and become more self-sufficient. By reducing the open-air burning of plant-based residues we reduce air pollution as well as the risk for catastrophic wildfires. By constituting biochar with locally available nutrients, at the same price farmers pay for their inputs, if they switch to our blend, they see improved yields by ~30%.

LEADERSHIP TEAM

Kevin Kung spent 10 years developing the core technology (initially as his PhD work at MIT). Vidyut Mohan is a user-centric design expert and has worked on decentralized solar deployment in India. Samuel Rigu and Joyce Kamande grew up as poor rural smallholder farmers and witnessed first-hand the issues that these communities faced. The team has worked on previous biomass-based projects, including selling more than one million low-toxin mosquito coils made from rice husks, and setting up a biofuel conversion in the Himalayas with pine needles.

COMPANY OVERVIEW

LOCATION

Arlington, VA, USA

FOUNDED 1951

TRL 9

NUMBER OF EMPLOYEES

1000+

PHYSICAL PRODUCT(S)

None

CURRENT OPERATING SCALE

500,000+ tonnes CO₂/year

SELLING CREDITS

Yes

XPRIZE TRACK

Land, Oceans (Trees, Forests, Agricultural land and crops, Soils, Grasslands, Coastal lands restoration, Mangroves, Blue carbon, Terrestrial ecosystem restoration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Other

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Mature (already have a large mature business)

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Corporate Debt, Strategic Partnership, Philanthropic Funding, Other

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Philanthropic, Other

Therese Tepe

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<https://www.nature.org/en-us>



THE NATURE CONSERVANCY

COMPANY DESCRIPTION

The Nature Conservancy (TNC) is a 501(c)(3) US public charity. TNC has grown to become one of the most effective and wide-reaching environmental organizations in the world. Thanks to the dedicated efforts of our diverse staff and over 400 scientists, we impact conservation in 76 countries and territories through programs and partners. TNC has pioneered methodologies for nature-based carbon projects for over two decades.

CORE INNOVATION

Research led by The Nature Conservancy and 15 other institutions, published in the Proceedings of the National Academy of Sciences, demonstrated that natural climate solutions (NCS) can provide up to 37% of the emission reductions needed by 2030 to keep global temperature increases under 2°C. TNC continues to contribute to advances in nature-based carbon methodologies, such as those used for forest, soil, and blue carbon.

CO₂ CAPTURE

Nature-based ecosystems play an outsized role in the capture and storage of carbon. TNC has projects in North America and globally that span several NCS pathways including those that generate carbon removals from improved forest management, reforestation and agroforestry, coastal wetland and mangrove restoration, peatland rewetting and improved grassland management. For example, although peatlands cover just 3% of Earth's surface, they store 44% of all soil carbon, exceeding the carbon stored in other vegetation types, including forests. However, 15% of global peatlands have been drained for agriculture, emitting almost 10 metric tonnes of CO₂ per acre per year. TNC sees an opportunity and an imperative to restore areas such as these. Peat restoration alone has the potential to achieve 815 MtonCO₂e/yr at the global level.

CO₂ SEQUESTRATION

TNC has 25+ early-stage carbon projects in its carbon development pipeline where carbon finance could fill the funding gap for long-term restoration, protection and monitoring of these high conservation priority places. Carbon is sequestered in biomass.

CO-BENEFITS OR PRODUCTS

Co-benefits include: biodiversity conservation, community equity and livelihoods, water conservation, climate resiliency and adaptation. Many TNC verified carbon projects have additional certifications such as Climate, Community and Biodiversity (CCB) and more.

LEADERSHIP TEAM

TNC's carbon projects are implemented locally through TNC and partner field offices and supported by a wide network of global scientists, policy, and finance experts. TNC's Carbon Markets Team sits within TNC's Impact Finance and Markets division which also includes TNC's Sustainability Science, Corporate Engagement, and NatureVest teams. NatureVest is TNC's in-house impact investing team.

COMPANY OVERVIEW

XPRIZE TEAM NAME

Carbon Down Under

LOCATION

Carbondale, IL, USA

FOUNDED 2012

TRL 4

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Soil/additives, Food, Other consumer goods

CURRENT OPERATING SCALE

0 tonnes CO₂/year

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Land (Trees, forests, Agriculture, Soils, Grasslands, Nutrient fertilization, Subsurface CO₂ injection for geologic sequestration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$1M-\$5M

AMOUNT OF CAPITAL SOUGHT

Pre-seed, Seed, Angel

COMMERCIAL STAGE

R&D

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Founders' capital

TYPE OF CAPITAL SOUGHT

Corporate Equity, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Government, Philanthropic, Venture Capital

Ken Anderson

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<https://thermaquatica.com/>



THERMAQUATICA INC.

COMPANY DESCRIPTION

Thermaquatica, Inc., a spin-off of SIU Carbondale, was created to manage commercialization of a breakthrough technology: Oxidative Hydrothermal Dissolution (OHD). OHD converts low-value organic materials, including many types of wastes, to high-value products and sequestration-ready fluids using only water, heat, and oxygen.

CORE INNOVATION

Artificially capturing atmospheric CO₂ is hard, but nature does it all the time. One pound of biomass contains about the same amount of carbon as one million liters of air. OHD is an efficient method to convert waste biomass (agricultural wastes, food wastes, sewage, etc.) into a non-toxic aqueous fluid that is easily injected into the deep subsurface, where natural microbes use the carbon, permanently sequestering it. The process is technically simple, scalable, deployable in diverse situations (urban, rural etc.), has a negative carbon footprint, and an estimated cost before optimization of <\$200/tonne CO₂.

CO₂ CAPTURE

Indirect Air Capture (iDAC) changes the DAC paradigm. Instead of building complex engineered systems, it relies on natural processes to capture and concentrate atmospheric carbon. Gigatonnes of biomass wastes are produced annually as a byproduct of human activities. OHD efficiently converts virtually any form of biomass into a low viscosity aqueous solution (liquor) containing ~80-90% of the original biomass carbon.

CO₂ SEQUESTRATION

OHD liquor can easily be injected into geologic reservoirs (depleted oil reservoirs, deep saline aquifers etc.) where the carbon it contains is readily used by natural microbes that are already present, ensuring long-term sequestration of the carbon. Unlike CO₂ sequestration, high pressure storage is not required. (Permitting requirements for subsurface liquid injection of captured carbon are much less onerous than requirements for subsurface storage of CO₂.) The effect is net transfer of carbon from the atmosphere to the deep subsurface where it is isolated from surface environments and unable to return to the atmosphere.

CO-BENEFITS OR PRODUCTS

Depending on the initial feed, OHD liquors can be used for a diverse array of purposes in addition to iDAC applications. Some liquors are useful as agricultural biostimulants or can potentially be refined to recover monomers for the production of biodegradable plastics. OHD liquors can also be fermented to produce a variety of useful products.

LEADERSHIP TEAM

Ken Anderson, PhD, Professor of Geology, Director of the Advanced Energy Institute at SIU-Carbondale, Founder and CEO/CTO of Thermaquatica. 30+ years' experience in industry, government, and academic positions. Scott Hamilton-Brehm, PhD, Associate Professor of Microbiology at SIU-Carbondale. 15+ years' experience in extremophilic microbiology and environmental biochemistry. John Yingling, 40+ years' diverse financial experience, 30+ in life science.



OCEAN

COMPANY OVERVIEW

LOCATION

Pasadena, CA, USA

FOUNDED 2021

TRL 6

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

1 tonne CO₂/year

PHYSICAL PRODUCT(S)

Stream of carbon dioxide

SELLING CREDITS

Yes

XPRIZE TRACK

Oceans (Electrochemical CO₂ separation from seawater and/or water splitting)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A, Series B, Grant, Corporate

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

~\$15M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Government Funding, Philanthropic

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Govt, Philanthropic, Private Equity, VC

Maya Kashapov
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<https://capturacorp.com>



CAPTURA

COMPANY DESCRIPTION

Captura provides safe, scalable, and verifiable low-cost atmospheric carbon removal by leveraging the world's largest natural atmospheric CO₂ absorber: the ocean. With minimal impacts on the environment and using only renewable electricity and ocean water, our direct-ocean capture technology generates a stream of CO₂ that can be sequestered or utilized for low-carbon products. With no purpose-built air contactors, no absorbents, and no by-products, Captura's solution enables large-scale carbon removal at low cost. Captura has been recognized by Frontier and XPRIZE for its solution and recently announced Series A funding.

CORE INNOVATION

Captura's technology is designed to offer virtually limitless scalability at low cost. By using the existing vast, no-cost ocean as our CO₂ absorber, we avoid the need for costly, energy-intensive air contactors and chemical absorbents. Our patented electro dialysis technology, the "secret sauce" of our process, is 7-10x more efficient than the commercial baseline. Because we add nothing and only temporarily remove CO₂ from the oceans (before it is eventually replaced with atmospheric CO₂), our process has no lasting consequences on ocean health.

CO₂ CAPTURE

Oceans absorb ~30% of emissions. However, this comes at the cost of ocean acidification. Captura's technology enables carbon removal without contributing to ocean acidification. Our approach removes CO₂ from oceans, making room for additional CO₂ to be absorbed. After decarbonizing ocean water and releasing it back to the ocean, Henry's Law drives an equivalent removal of atmospheric CO₂ — for every ton of CO₂ we remove from the ocean, the ocean removes a ton of CO₂ from the air.

CO₂ SEQUESTRATION

We will partner with CO₂ sequestration and utilization companies to safely and durably store our captured CO₂ or use it to produce low-carbon products like sustainable aviation fuels.

CO-BENEFITS OR PRODUCTS

Captura's technology is primarily designed for highly scalable and low-cost carbon removal. However, it also has applications in localized ocean deacidification. When run continuously in an enclosed bay, for example, Captura's technology can remove the excess ocean CO₂ that drives ocean acidification.

LEADERSHIP TEAM

Captura is led by Steve Oldham, former CEO of Carbon Engineering. Captura benefits from a close relationship with Caltech, with co-founders Harry Atwater and CX Xiang developing the key technology at Caltech and now playing crucial roles at Captura.

COMPANY OVERVIEW

LOCATION

San Carlos, CA, USA

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

100 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial chemicals

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Oceans (Ocean alkalinity enhancement)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series B

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Project Finance, Venture Capital

Ben Tarbell
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EBB CARBON

COMPANY DESCRIPTION

Ebb Carbon's mission is to remove gigatonnes of CO₂ from the air while reducing ocean acidification. We are pioneering an electrochemical ocean alkalization enhancement solution that accelerates the natural ocean alkalization process, permanently removing CO₂ from the air and restoring ocean chemistry in the process.

CORE INNOVATION

Ebb Carbon has developed an electrochemical system that uses low-carbon electricity, ion-selective membranes, and salt water to remove excess CO₂ from the air permanently at competitive costs. Our systems are modular and designed to integrate with existing facilities so we can install, scale up, and draw down carbon dioxide faster. Because we tap into the ocean's natural processes to capture and store carbon dioxide, our approach is less energy intensive than other engineered carbon removal methods. Once deployed at scale, our approach can also help reverse ocean acidification locally.

CO₂ CAPTURE

Ebb Carbon's electrochemical system separates salt water into slightly acidic and alkaline solutions. Ebb returns the alkaline solution to the sea, where it mimics the natural alkalization process: lowering the acidity of seawater locally, converting CO₂ in the air into bicarbonate in the ocean, and enabling the ocean to absorb additional CO₂ as atmospheric carbon dioxide re-equilibrates with seawater.

CO₂ SEQUESTRATION

Ebb Carbon's approach helps the ocean store excess carbon dioxide in the air as bicarbonate in the ocean. Oceanic bicarbonate forms when alkaline molecules react with dissolved CO₂ in seawater, and is a stable form of carbon storage for 10,000+ years. Because the ocean is a natural carbon sink, Ebb Carbon doesn't require energy to transport, store or use the CO₂ we remove from the atmosphere.

CO-BENEFITS OR PRODUCTS

Ebb Carbon's proprietary solution not only captures atmospheric CO₂ but simultaneously restores ocean ecosystems through de-acidification. By drawing energy at optimal times, we can provide grid flexibility services, which will support clean energy in the regions where we operate. The acid byproduct can neutralize alkaline waste streams like concrete waste or capture additional CO₂ through carbonate formation.

LEADERSHIP TEAM

Ebb Carbon is a team of leading scientists, engineers, and climate tech entrepreneurs who have over six decades of experience developing and scaling clean technologies at SolarCity, Tesla and Google X.

COMPANY OVERVIEW

LOCATION

Santa Monica, CA, USA

FOUNDED 2021

TRL 6

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

200 kg CO₂/day (50-70 tonnes CO₂/year)

PHYSICAL PRODUCT(S)

Industrial gasses, Building materials, Industrial chemicals, Liquid fuels

SELLING CREDITS

Yes

XPRIZE TRACK

Oceans, Air (Liquid sorbent DAC, Electrolytic DAC, Ocean alkalinity enhancement, Electrochemical separation)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Commercial

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

\$25M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Philanthropic, Venture Capital

contact@equatic.tech
www.equatic.tech



EQUATIC INC

COMPANY DESCRIPTION

Equatic (formerly SeaChange) has developed a first-of-its-kind electrochemical process for atmospheric carbon dioxide removal that leverages the size and scale of the oceans. The process immobilizes carbon dioxide permanently in the form of dissolved bicarbonate ions (in water), and in the form of solid mineral carbonates. Moreover, the process produces hydrogen—a green fuel—as a co-product that generates revenue and clean energy.

CORE INNOVATION

The Equatic technology offers key advantages over other CDR technologies, including: a) low energy intensity (gross energy intensity of ~2.5 MWh per tonne of CDR, and net energy intensity of ~1.5 MWh per tonne of CDR after accounting for the energy embodied in the co-produced hydrogen of ~1 MWh); b) simple process inputs: i.e., electricity, seawater, and alkaline rocks; c) non-reliance on geological formations for carbon dioxide storage; and d) The ability to leverage the oceans, an effectively unlimited resource. For these reasons, the Equatic technology presents a truly unique and scalable pathway for gigatonne-scale carbon removal.

CO₂ CAPTURE

The process uses natural components of seawater, solubilized Ca- and Mg-species, and dissolved carbon dioxide. A pioneering electrolytic process precipitates calcium carbonate (CaCO₃), and magnesium hydroxide (Mg(OH)₂). In addition, the process generates gaseous hydrogen and oxygen as process co-products. The precipitation of CaCO₃ and Mg(OH)₂ allows seawater to remove CO₂ from the atmosphere. Overall, the process immobilizes atmospheric carbon dioxide in the form of dissolved bicarbonate (HCO₃⁻) ions and in mineral carbonates that are both suspended in seawater.

CO₂ SEQUESTRATION

The sequestration is inherent to the process. Seawater has contained dissolved inorganic carbon for millions of years, and is in effect oversaturated with respect to CaCO₃ (as exemplified by the stability of sea shells). The Equatic process exploits this approach to immobilize, durably and permanently, carbon dioxide in the oceans.

CO-BENEFITS OR PRODUCTS

A primary co-product is gaseous hydrogen that can be used as green fuel. The precipitated CaCO₃ can be used as building material.

LEADERSHIP TEAM

Prof. Gaurav N. Sant (UCLA) and Lorenzo Corsini co-lead Equatic. Gaurav has spun off multiple companies out of the Institute of Carbon Management (ICM) and also co-founded Equatic and CarbonBuilt (Grand Prize Winner: NRG COSIA Carbon XPRIZE). Lorenzo founded and led PhagoMed Biopharma, exiting it to BioNTech in 2021. The leadership team includes Dante Simonetti (Associate Professor at UCLA), and Thomas Traynor (Head of Engineering). The Board is led by Edward Muller, a serial (past) CEO at multiple publicly listed companies. The Advisory Board is led by Lord John Browne, former CEO of BP.

COMPANY OVERVIEW

LOCATION

Nanjing, China

FOUNDED 2022

TRL 6

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

1,000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Biochar, Food/feed

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Oceans (Biomass combustion with CO₂ capture, Biochar, Coastal lands restoration, Mangroves, Blue carbon, Seaweed/kelp cultivation, Seagrass cultivation, Macroalgae, Artificial upwelling and downwelling)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed

AMOUNT OF CAPITAL SOUGHT

\$6M

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

\$1M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Venture Capital, Private Equity, Project Finance

Joshua (Yushun) Lian

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KELP FARM CAREER (KFC)

COMPANY DESCRIPTION

KFC focuses on renewing the cultivation technology for seaweed. KFC developed a mooring technology that uses new anchors and polyester ropes as cultivating and mooring lines of seaweed. In addition, we developed an artificial upwelling technology for providing nutrients to kelp. Recently, our team developed a new type of buoy that can adjust the depth of cultivating kelps. With this technological revolution, kelp cultivation can be extended to large offshore areas. Our team developed the high-value utilization technology of seaweed biochar.

CORE INNOVATION

To extend kelp farms from shallow- to deep-water areas, we developed mooring, artificial upwelling technology, cultivation technology, a new buoy technology for adjusting the depth of kelp, and high-value utilization technology of seaweed biochar. The mooring technology expands the area of kelp farms. The artificial upwelling technology provides nutrients from the bottom of the seabed to the kelp farms. Cultivated large-scale kelp farms absorb large amounts of CO₂, and mature kelp is processed into seaweed fertilizer and biochar. These approaches are a nature-based solution, which not only can achieve carbon removal but also bring significant economical benefits.

CO₂ CAPTURE

Seaweed is highly efficient at photosynthesis, absorbing CO₂ from the ocean and converting for storage in seaweed. As it grows, seaweed produces detritus as a result of wind, waves, grazing, and decay. Some detritus is transported to neighboring ecosystems as dissolved / particulate organic carbon, which is converted to recalcitrant dissolved organic carbon (RDOC). RDOC is stored in the ocean for ~6000 years and remains suspended in the sea for a long time. A further part is deposited in the deep sea where it is fixed as sedimentary carbon. Both RDOC and sedimentary carbon are considered long-term sequestration by seaweed. In addition to these two forms of carbon, mature seaweed contains large amounts of carbon, known as biomass carbon.

CO₂ SEQUESTRATION

Carbon absorbed by seaweed is the sum of recalcitrant dissolved organic carbon, sedimentary carbon, and biomass carbon. Mature kelps are processed into seaweed-fertilizer, biochar, and so on.

CO-BENEFITS OR PRODUCTS

Our method produces seaweed-fertilizer, biochar, food, and feed material. Besides, we can develop the mooring lines, anchors for utilizing the deep-water ocean resources.

LEADERSHIP TEAM

In 2019, we partnered with a team of seaweed experts. KFC's members come from Hohai University, Oregon State University, and so on. Our members are experts in seaweed cultivation, processing, and biochemistry; and biochar technology. We are also experts in finance, operations, fundraising, ocean engineering, and environmental policy. Our team has the passion and vision to tackle global climate change by developing new cultivating seaweed technologies.

COMPANY OVERVIEW

XPRIZE TEAM NAME

WhaleX

LOCATION

Sydney, Australia

FOUNDED 2004

TRL 4

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

0 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Other

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Oceans (Phytoplankton, Microalgae, Nutrient fertilization, Biological ocean ecosystem recovery and management, including whale action biomimicry)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$10M

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

\$2M

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Government, Philanthropic

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Philanthropic, Private Equity

John Ridley
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OCEAN NOURISHMENT

COMPANY DESCRIPTION

Founded in 2004, Ocean Nourishment is a process developed to address both climate and food security. Ocean Nourishment is a means of ocean mariculture involving the cultivation of marine organisms for food and carbon sequestration. The company is privately held and run by its original founders. In 2007 Ocean Nourishment was featured on the BBC documentary '5 Ways to Save the World'. ONC have been members of the World Ocean Council since 2012. The company has developed its own core IP, peer reviewed papers and carbon methodologies.

CORE INNOVATION

Ocean Nourishment works on the basis that nitrogen is the key limiting nutrient to open ocean productivity. Subsequently ONC developed novel nutrient formulas to restore chlorophyll levels suitable for ocean regeneration. ONC have specific patents on driving Ocean CDR from a floating vessel. WhaleX has now created its own Aquafood, a nutrient feed mimicking the action of whales in nourishing the ocean. ONC pioneered this approach and is now investigating scalability with core inputs derived from renewable energy and green hydrogen.

CO₂ CAPTURE

Plants are nature's answer to capturing carbon via photosynthesis. Ocean Nourishment increases ocean phytoplankton that capture carbon from the atmosphere. Permanence is a result of biological processes that take this carbon to the deep ocean. This transfer is from falling organic matter including plants, animals and organic waste. Efficiency is driven by multiple cycles of growth and decay. One tonne of Aquafood will remove 10 tonnes of CO₂ at less than \$50 per tonne.

CO₂ SEQUESTRATION

Permanence is driven by the depth achieved by the falling carbon. Zooplankton are the main carrier, but phytoplankton and fish waste are also key export pathways. Carbon exported to the deep ocean will be durably sequestered for 1000 years at a rate of 4-6 Mt CO₂/site/annum.

CO-BENEFITS OR PRODUCTS

ONC proposes to manage ocean spaces with precision nutrient addition, matching ocean plants with their specific nutrient requirements for optimal growth. Working at the base of the marine food chain the process can revive ocean ecology and restore wild fisheries for sustainable protein production (targeting small pelagic fisheries).

LEADERSHIP TEAM

John Ridley – Team Project Manager / Environmental Scientist; Dr. Edwina Tanner – Lead Marine Scientist; Dr. Sam Lavender – Satellite Monitoring & Modeling; Lakshmi Bala – Social Impact / License; Jill Storey – Carbon Markets; Associate Professor Robert Wheen – Marine Engineering; Dr. David Rissik - Ocean Phytoplankton Specialist. Directors: Murray Scott – Finance Director; Peter Wheen – Chairman

COMPANY OVERVIEW

LOCATION

Ottawa, Canada

FOUNDED 2019

TRL 5

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

2,000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Other

SELLING CREDITS

Yes

XPRIZE TRACK

Oceans (Ocean alkalinity enhancement)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Early Stage VC, Later Stage VC, Grant

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

\$CAD 5.4m in equity, \$CAD 4.3m in non-dilutive

TYPE OF CAPITAL SOUGHT

Corporate Equity, Government Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Government, Venture Capital

Peter Chargin

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PLANETARY TECHNOLOGIES

COMPANY DESCRIPTION

Planetary Technologies is the world's leader in carbon removal through ocean alkalinity enhancement (OAE). Our low-cost solution leverages the ocean's superpowers at GT scale to safely remove and permanently store CO₂. With funding support from Shopify and XPrize, Planetary has accelerated OAE progress, and is now selling carbon credits for redemption in 2023 and forward.

CORE INNOVATION

Planetary's unique CDR solution offers two core innovations to enable global GT carbon removal. Our patented technologies for the production of low cost, low CI alkalinity ensure safe carbon removals at 40x lower cost than is currently available, and our robust, proprietary ocean carbon removal monitoring and measurement system is currently the only accepted ocean MRV protocol in use.

CO₂ CAPTURE

Alkalinity works like an antacid to transfer CO₂ from the ocean and atmosphere into the ocean's existing carbon reservoir. Planetary is developing a portfolio of alkalinity products tailored to optimize removal under a range of oceanic conditions, including our own patented production method transforming mine waste into alkaline hydroxides. Once in seawater, alkalinity reacts with dissolved CO₂ and converts it into carbonate and bicarbonate ions. To restore a natural air-sea equilibrium, the ocean then draws CO₂ in from the atmosphere resulting in net permanent carbon removal at gigatonne scale over time.

CO₂ SEQUESTRATION

Planetary's targeted \$50/tonne CDR solution includes the cost of permanent sequestration. Bicarbonate and carbonate sequestration of CO₂ in ocean chemistry remain suspended in the ocean for ~100,000 years. The ocean is the largest reservoir of this form of carbon on Earth, with 34,000 GT in total, more than 75% of the planet's total carbon and 40x more than is present in our atmosphere. Scientists believe this reservoir should easily accommodate currently-targeted conversion and storage of 1 GT/year, increasing the ocean's carbon inventory by less than 0.003% annually. This enables capacity for permanent multi-gigatonne CO₂ removal and sequestration over time.

CO-BENEFITS OR PRODUCTS

Planetary generates multiple co-products, including green hydrogen and battery metals. Co-benefits include neutralization of toxic mine tailings, land reclamation, decarbonization of mining operations, reduction of ocean acidification, and restoration of marine habitats.

LEADERSHIP TEAM

Mike Kelland (CEO) is a serial entrepreneur with two successful exits and Dr. Greg Rau (CTO & co-founder) is widely recognized as a global leader in ocean carbon cycling. Kelly Wachowicz (CFO) has deep experience in ocean innovation and a 20-year career in real asset investing and capital management. Alex Mezei (Chief Metallurgist) is a Professional Engineer with 40+ years' experience driving successful metallurgy and mining projects. Lisa DeMarco (advisor) is globally recognized and an active leader in carbon markets.

COMPANY OVERVIEW

LOCATION

Woods Hole, MA, USA

FOUNDED 2017

TRL 7

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

1 hectare = ~100 tonnes CO₂

PHYSICAL PRODUCT(S)

Algae as an end product, Soil or soil Additives, Food/feed

SELLING CREDITS

Yes

XPRIZE TRACK

Oceans (Coastal lands restoration, Mangroves, Blue carbon, Seaweed/kelp cultivation, Seagrass cultivation, Macroalgae, Artificial upwelling & downwelling, Biological ocean ecosystem recovery & management)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A, Bridge Round, Grant, Corporate, Joint Venture

AMOUNT OF CAPITAL SOUGHT

\$25M

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

\$6M

TYPE OF CAPITAL SOUGHT

Convertible Debt, Strategic Partnership, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Project Finance, Venture Capital

Brian von Herzen

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www.SeaForestation.Co



SEAFORRESTATION.CO

COMPANY DESCRIPTION

SeaForestation is a public-benefit, climate-tech venture developing offshore seaweed mariculture platforms for food security, ecosystem regeneration and carbon removal. Using deepwater irrigation, essential nutrients accessed from the ocean's depths enable replete seaweed growth where seaweeds ordinarily fail to grow. We enhance yields and enable cultivation offshore in nutrient deprived conditions. Our beachhead market is seaweed biostimulants to support reduced-GHG agriculture.

CORE INNOVATION

Our proprietary deepwater irrigation technology accesses nutrients from depth to enhance seaweed productivity and extend cultivable ocean area. Our present focus is on diurnal deep cycling: lowering platforms at night for seaweeds to access nutrients and raising them during the day for sunlight. Seaweeds are harvested to create products for food, feed and fertilizer markets beginning with seaweed biostimulants using proprietary refinery technology.

CO₂ CAPTURE

CO₂ is fixed biologically through our cultivated seaweeds. The deep cycling approach ensures that most nutrient uptake occurs below the mixed layer, thereby not taking nutrients out of the surface waters and depriving phytoplankton of nutrients. Macroalgae's rapid growth rates, high Redfield ratio and the vast expanse of the open ocean makes this approach one of the most scalable carbon sequestration solutions in the world.

CO₂ SEQUESTRATION

Seaweeds regularly shed a portion of their biomass during growth, like leaves falling off a tree, which may be 20-40% of their primary productivity. The detritus sinks rapidly to the seafloor where it is sequestered even if remineralized. Most carbon reaching depths of 300 to 1000m will be sequestered for 100 to 1000 years respectively. SeaForestation's measures this carbon flux.

CO-BENEFITS OR PRODUCTS

Our seaweeds serve as a valuable commodity for food, feed, and fertilizer markets, concurrent with carbon sequestration. Our beachhead seaweed biostimulant can reduce NPK fertilizer use by up to 20% while maintaining yields, reducing negative environmental impacts from NPK fertilizer use. Drought and heat resilience can also be conferred to crops. Other benefits include seaweed ecosystem services and positive community impact.

LEADERSHIP TEAM

In 2018, we partnered with a team of seaweed experts to bring our seaweed mariculture platform to the Philippines. Our deployment team comprises North-South collaborations of expertise in seaweed cultivation, processing, and biochemistry; marine biology; project engineering; marine operations and local fishing and seaweed cultivation. Our executive team has experience in business development, finance, operations, scaling, fundraising, environmental engineering and delivering large, complex projects.

COMPANY OVERVIEW

LOCATION

Amsterdam, the Netherlands

FOUNDED 2021

TRL 5

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

1 tonnes CO₂/year capacity; 250 tonnes CO₂/year capacity by end of year

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Yes

XPRIZE TRACK

Oceans (Electrochemical CO₂ separation from seawater and/or water splitting)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed, Grant, Angel

AMOUNT OF CAPITAL SOUGHT

2M euros

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

350,000 euros

TYPE OF CAPITAL SOUGHT

Corporate Equity, Convertible Debt, Government Funding, Philanthropic Funding, Other

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Venture Capital, Other

Ruben Brands
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SEA02

COMPANY DESCRIPTION

SeaO2 is leveraging the Ocean's carbon removal power. Our solution is electrochemical carbon capture from the ocean. Our method needs only two inputs: electricity and seawater.

CORE INNOVATION

None of the technology currently available is sustainable, scalable, small AND ALSO affordable. Our technology already meets these three criteria, but is not yet cost efficient mainly due to the current high electricity prices. We are accelerating our development by taking advantage of new innovations in electrolysis and other electrochemical technology.

CO₂ CAPTURE

At SeaO2, we remove CO₂ from the atmosphere indirectly using the ocean. 24% of all CO₂ emissions end up in the ocean and form dissolved inorganic carbon (DIC). This DIC is mainly in the form of dissolved bicarbonate/carbonate ions. We use electricity and bipolar membranes to convert the bicarbonate/carbonate ions to dissolved CO₂. Subsequently, using a vacuum pump, the dissolved CO₂ can be extracted as gaseous CO₂. The captured CO₂ can be stored (CCS) or re-used (CCU).

CO₂ SEQUESTRATION

We capture CO₂ in gaseous form and intend to partner with storage companies for permanent storage. We are discussing partnership with many European CO₂ storage companies. We can disclose more information at a later stage.

CO-BENEFITS OR PRODUCTS

By removing carbon we also de-acidify our oceans, leading to healthier ocean ecosystems and greater biodiversity.

LEADERSHIP TEAM

We are a team of scientists and engineers with a rich combined background in groundbreaking research, industry innovation, and large-scale project execution. What binds us is our love for the planet.

COMPANY OVERVIEW

LOCATION

San Francisco, CA, USA

FOUNDED 2022

TRL 7

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

No

XPRIZE TRACK

Oceans (Seaweed/kelp cultivation, Seagrass cultivation, Macroalgae)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Pre-seed

AMOUNT OF CAPITAL SOUGHT

\$1M

COMMERCIAL STAGE

R&D

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Project Debt, Strategic Partnership, Government, Philanthropic

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Project Finance, Venture Capital

Catherine Berner

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<https://www.oceanupwelling.com>



TROFX

COMPANY DESCRIPTION

We increase the ocean's natural ability to remove carbon by giving phytoplankton growth an engineered boost. Our technology delivers nutrients to surface waters where algae grow at an increased rate and removes carbon. By amplifying a natural process, we can achieve carbon removal at very low costs without additional pollution.

CORE INNOVATION

Our core technology is a wave-powered upwelling device that is much like a wind turbine turned on its side. We've successfully shown upwelling in the ocean at >100x the flow rate of any previously demonstrated technology. This is game changing for artificial upwelling's global potential. The technology was developed through the ARPA-E Mariner Program with Otherlab and the University of New Hampshire. We are building MRV into our model from the start and working closely with a team of marine scientists to prove durable removal.

CO₂ CAPTURE

Phytoplankton in the ocean have the same carbon removal potential as plants on land. Phytoplankton need two things to grow: nutrients and sunlight. In much of the ocean, sunlight is at the surface and nutrients are trapped at depth. Artificial upwelling increases a natural mixing process that brings those nutrients to the surface. By doing this, we prompt natural growth of local algae species that then disperse into the ocean.

CO₂ SEQUESTRATION

The new phytoplankton biomass either sinks to depth (sequestration 100 - 1,000 years) or is recycled into other marine biomass. Sequestration is confirmed through a combination of modeling and data collection.

CO-BENEFITS OR PRODUCTS

Upwelling has tremendous co-benefits potential, from ecosystem restoration, to pollution mitigation, to fisheries management. Our first focus is on ecosystem restoration to provide cool coral reefs and kelp forests during heat events. We're also exploring partnerships with seaweed farms where nutrient upwelling can extend cultivation seasons and increase yield by 3x.

LEADERSHIP TEAM

Catherine Berner, experienced entrepreneur and environmental engineer, led product at a waste-to-energy startup where she designed award winning factories and has led commercialization for five climate startups. She holds an MBA from the Stanford School of Business and a bachelor's degree from UC Berkeley College of Engineering in Environmental and Energy Engineering. Pete Lynn is an R&D engineer with deep experience in taking hardware products from idea to reality. In addition to leading upwelling design, his specific areas of expertise include inflatable robotics, pressure vessels, heat exchangers, underwater anchoring robots, and hydrofoil ocean upwellers. Pete has a Masters of Engineering Management and BE in Mechanical Engineering both from University of Canterbury, New Zealand.



ROCKS

COMPANY OVERVIEW

LOCATION

London, UK

FOUNDED 2020

TRL 6

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Yes

XPRIZE TRACK

Rocks (Subsurface CO₂ injection for geologic sequestration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Pre-commercial Pilot

REVENUE RANGE

Pre-Revenue

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Project Debt, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Philanthropic, Private Equity, Project Finance, Venture Capital

Karan Khimji
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<https://4401.earth/>



44.01

COMPANY DESCRIPTION

44.01 eliminates CO₂ by turning it into rock. We do this by accelerating the natural process of mineralisation, offering a safe, scalable, permanent solution for removing captured CO₂. We work with a commonly found ultramafic rock called peridotite that has been mineralising CO₂ naturally for millennia. Our technology accelerates this process by injecting a carbonated fluid into peridotite formations deep underground and adjusting variables like temperature and pressure, turning CO₂ into rock in under one year.

CORE INNOVATION

44.01 is the only organization in the world capable of accelerating CO₂ mineralisation in peridotite. Because of its high olivine content, peridotite has unparalleled capacity for CO₂. Each ton of peridotite can mineralise 500-600 kg CO₂, far more than any comparable rock. Peridotite is found across the world, including in the Middle East, the USA, Europe and Australia. By accelerating the natural process of peridotite mineralisation so that it takes place in under a year, our technology unlocks the capacity to eliminate trillions of tonnes of CO₂ worldwide.

CO₂ CAPTURE

44.01 partners with DAC technologies to eliminate CO₂ captured directly from the atmosphere and also with hard-to-decarbonise industries to eliminate CO₂ captured from the point of emission.

CO₂ SEQUESTRATION

CO₂ mineralisation in peridotite is a natural process that has been happening for millennia. CO₂, dissolved in rainwater, reacts with peridotite, turning the CO₂ into calcite (or inert rock), and locks it away forever. In nature, this process takes decades, but our technology accelerates this process significantly. By injecting a carbonated fluid into seams of peridotite deep underground and controlling for variables like temperature, pressure and pH, we can mineralise CO₂ within a year. Once it has been converted to calcite, it is impossible for the CO₂ to naturally return to the atmosphere.

CO-BENEFITS OR PRODUCTS

Injecting CO₂ into peridotite requires similar skills and experience to those employed by the energy and oil & gas sectors. As the world transitions to clean forms of energy, 44.01 is offering new employment opportunities to engineers and scientists currently working in the fossil fuel economy.

LEADERSHIP TEAM

44.01 has an experienced management team across geology and mineralization, venture capital, energy, and technology development. Our leadership team is backed by a scientific committee consisting of two of the world's leading experts in geological sequestration of CO₂: Professors Juerg Matter and Peter Kelemen. Prof. Matter is a leading global expert in carbon mineralization with extensive experience in field trials of geological CO₂ storage and enhanced weathering. Prof. Kelemen is a leading global expert in the geology of Oman and the UAE and in carbon mineralization.

COMPANY OVERVIEW

LOCATION

Vancouver, Canada

FOUNDED 2021

TRL 4-7

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

1000 tonnes CO₂/year in 2023

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Yes

XPRIZE TRACK

Rocks (Enhanced weathering of ultramafic tailings, Mining rocks for CDR)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

Preparing for Series A; contact for details

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

~\$8M

TYPE OF CAPITAL SOUGHT

Corporate/Strategic, Venture Capital, Government Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Venture Capital

Paul Needham

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Bethany Ladd

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ARCA

COMPANY DESCRIPTION

Arca is a leader in carbon mineralization. The company captures CO₂ from the air and transforms it into rock, where it is safely stored forever. Arca works with producers of critical metals to decarbonize their mining operations and scale production of carbon-negative metals and minerals for the clean energy transition. Safe, permanent, industrial scale direct air capture and storage. Arca was co-founded by Professor Greg Dipple and other geoscientists from the University of British Columbia.

CORE INNOVATION

The company is developing a portfolio of technologies that measure and maximize the carbon mineralization potential of mine waste, ultramafic rock that is often present at critical metal mines. Our patent-pending mineral activation technology uses high-intensity bursts of energy to activate selected minerals which then become 10-50X more reactive to CO₂. Our process is electrical, powered by renewables and designed to operate at industrial scale and velocities. We also deploy autonomous robots to churn and manipulate stored mine waste, turning the tailings into a large-scale carbon sink. Our proprietary monitoring technology allows us to see and quantify CO₂ flux in real time, which facilitates process optimization.

CO₂ CAPTURE

Carbon mineralization is a natural geochemical process by which carbon dioxide is fixed in solid minerals via the aqueous reaction of CO₂ and base cations (Ca²⁺ and Mg²⁺). Carbon mineralization is generally too slow a process to influence changes in climate on short (human) timescale because the kinetics of silicate mineral dissolution on intact rock is very slow. However, these processes can be rapidly accelerated in finely ground rock such as is produced during mining. Arca's technology transforms minerals found in ultramafic mine waste, greatly increasing both the rate and capacity for carbon mineralization.

CO₂ SEQUESTRATION

CO₂ is mineralized into new carbonate minerals, a process that is thermodynamically downhill and stable forever (100,000+ years).

CO-BENEFITS OR PRODUCTS

Arca helps mineral producers decarbonize their operations and increase revenue while scaling production of the metals and minerals essential for the clean energy transition.

LEADERSHIP TEAM

Prof. Greg Dipple is a well-known academic leader in carbon mineralization. Paul Needham is a multi-time founder and CEO with 3 exits. Bethany Ladd is a hydrogeologist and master of execution. Peter Scheuermann invented the mineral activation technology and leads R&D. Sean Lowrie leads external affairs, ecosystem development and non-dilutive funding.

COMPANY OVERVIEW

LOCATION

Reykjavik, Iceland

FOUNDED 2019

TRL 9

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Rocks (Subsurface CO₂ injection for geologic sequestration)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Corporate

AMOUNT OF CAPITAL SOUGHT

Prefer not to say

COMMERCIAL STAGE

Growth stage (growing beyond initial customers)

REVENUE RANGE

Prefer not to say

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Prefer not to say

TYPE OF INVESTORS SOUGHT

Prefer not to say

Kári Helgason
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www.carbfix.com



CARBFIX

COMPANY DESCRIPTION

Carbfix is the world's first CO₂ mineral storage operator. Established as a collaborative research project in 2007, since 2012 Carbfix has mineralized >80 thousand tonnes of CO₂ in Iceland using proprietary technology. This proven, safe, permanent, and cost-effective carbon storage solution is ripe for significant upscaling both in Iceland and worldwide. In addition to international projects at various stages of consideration, Carbfix's largest current project is Coda Terminal, recipient of a EUR 115M grant from the EU's Innovation Fund, with an expected capacity of 3 megatonnes of CO₂/year.

CORE INNOVATION

Carbfix has developed, built, and demonstrated a unique patent-pending technology to capture and inject CO₂-charged water into subsurface basaltic rock formations. Once injected, the CO₂ reacts with metals in the basalt to form stable carbonate minerals. Studies have shown that over 95% of the CO₂ has mineralised within two years.

CO₂ CAPTURE

Carbfix's capture technology is today only applied to emissions from geothermal power plants. The system is a pressurized water scrubbing system. The process relies on the different solubility of gasses in water depending on the pressure and temperature of the water used for the capture process. It takes advantage of the variable gas solubility by compressing gas streams of various origin into continuously operating flow through a scrubbing tower, where CO₂ is selectively captured.

CO₂ SEQUESTRATION

CO₂ is dissolved in water, with no other chemicals added. Once dissolved in water, the CO₂ is injected into reactive underground rock formations (basalt), where it mineralizes through an entirely natural process, forming stable carbonate minerals.

CO-BENEFITS OR PRODUCTS

The Carbfix technology can be – and is – used to capture H₂S emissions from geothermal power plants, preventing the harmful compound from being released into the atmosphere.

LEADERSHIP TEAM

Research and innovation are in the DNA of the company leadership. Dr. Edda Aradóttir, CEO, chemical and reservoir engineer. Dr. Bergur Sigfússon, Head of CO₂ Capture and Injection, geochemist. Dr. Kári Helgason, Project Development, physicist. Kristinn Ingi Lárússon, Head of Business Development, MBA. Dr. Sandra Ósk Snæbjörnsdóttir, Head of CO₂ Mineral Storage, geologist.

COMPANY OVERVIEW

LOCATION

Brisbane, Australia & New York, NY, USA

FOUNDED 2021

TRL 8

NUMBER OF EMPLOYEES

1-10

PHYSICAL PRODUCT(S)

Soil or soil additives

CURRENT OPERATING SCALE

200 tonnes CO₂/year

SELLING CREDITS

Yes

XPRIZE TRACK

Rocks, Land (Agricultural land and crops, Soils, Grasslands, Enhanced weathering of ultramafic tailings, Mining rocks for CDR)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

\$8M

AMOUNT OF CAPITAL SOUGHT

Seed, Series A, Debt, Joint Venture

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

\$600,000

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Convertible Debt, Project Debt, Corp Debt, Strategic Partnership, Govt, Philanthropic

TYPE OF INVESTORS SOUGHT

Angel, Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Project Finance, Venture Capital, Other

Andrew Pedley
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<https://www.carbonaught.io/>



CARBONAUGHT

COMPANY DESCRIPTION

Carbonaught removes carbon from the atmosphere while increasing global food security. They combine mining and a proprietary enhanced weathering protocol to permanently remove CO₂ at a ratio of 9:1 while also restoring degraded agricultural soils and upgrading global food security. The company was an XPrize Carbon Removal Challenge Finalist (ranking #24) in 2022.

CORE INNOVATION

Carbonaught's main innovation is a patent-pending technique to measure carbon drawdown from enhanced weathering operations. This technique not only disproved long-held beliefs in the scientific community but also enables the company to scale deployment rapidly and at low cost. Their software allows for easy deployment of decarbonization projects that restore degraded farmland, deliver a physical and virtual platform for stronger community ties and addressing global food security.

CO₂ CAPTURE

Rock weathering involves chemical reactions where CO₂ hydration forms carbonic acid, breaking down silicate rock and releasing ions. When these ions enter the ocean, increasing its alkalinity, they capture twice as much CO₂ as calcium, depending on the rock composition.

CO₂ SEQUESTRATION

The CO₂ that is sequestered is in the form of bicarbonate ions in solution and solid carbonates on land, and it does not require active management or intervention for a minimum of tens of thousands of years. Bicarbonate ions move into the ocean through soil groundwater, while solid carbonates stay in the farmland after precipitation. The likelihood of bicarbonate-sequestered carbon re-emitting within 100 years is highly unlikely.

CO-BENEFITS OR PRODUCTS

Crushed basalt on farmland offers multiple benefits such as nutrient release, reduced fertilizer usage, improved soil structure, and pH increase. These improvements impact farm operations, water catchments, and soil biodiversity. Studies show that basalt acts as a slow-release fertilizer, providing calcium, magnesium, silicon, potassium, and phosphorus.

LEADERSHIP TEAM

Prof. Balz Kamber held the Chair in Geology at Trinity College Dublin and was Deputy Director of the Euro Irish Centre for Research in Applied Geosciences. He is a Mars Perseverance petrology specialist. Prof. David Rowlings specializes in sensing technologies for mitigating greenhouse gasses and improving crop and soil management. James Lyons has a PhD in signal processing/machine learning and focuses on mining asset health systems. Andrew Pedley leads technical teams across heavy industry and financial markets. Scott Keenan has 15+ years' experience in the energy industry, excelling in geological interpretations, prospect generation, and portfolio management.

COMPANY OVERVIEW

LOCATION

Halifax, Canada

FOUNDED 2012

TRL 7-9

NUMBER OF EMPLOYEES

101-250

CURRENT OPERATING SCALE

100,000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Industrial gasses including pure CO₂, Building materials

SELLING CREDITS

Yes

XPRIZE TRACK

Rocks (Biomass combustion with CO₂ capture, Enhanced weathering of ultramafic tailings)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Growth Stage

AMOUNT OF CAPITAL SOUGHT

\$75M

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

Available on request

CAPITAL RAISED TO DATE

Available on request

TYPE OF CAPITAL SOUGHT

Corporate Equity, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Private Equity, Venture Capital

Robert Niven
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www.carboncure.com



CARBONCURE

COMPANY DESCRIPTION

CarbonCure Technologies is scaling an integrated decarbonization platform, with hundreds of systems deployed across the global concrete industry, licensing to concrete producers a suite of carbon removal hardware, software and services to reduce the carbon footprint of their concrete products, reduce their production costs and meet the surging demand for green building materials.

CORE INNOVATION

Across its portfolio of technologies, CarbonCure's core innovation is the value-added use of carbon mineralization in concrete and concrete waste products to permanently store carbon dioxide and enable additional emission reductions through cement cuts. CarbonCure is the most widely deployed technology solution in the sustainable concrete and carbon removal categories due to its simple, efficient and low-cost retrofitting of existing concrete plants, with the technology delivering value-added benefits.

CO₂ CAPTURE

CarbonCure currently consumes post-industrial or biogenic CO₂ at hundreds of concrete plants worldwide. This fall, CarbonCure will launch a new business unit to capture and supply its own atmospheric CO₂ to supplement current sources, maximizing climate benefits and carbon credit value from the permanent removal of atmospheric CO₂.

CO₂ SEQUESTRATION

With commercialized solutions for ready mix concrete, precast concrete and reclaimed water, CarbonCure injects captured CO₂ during concrete manufacturing and it immediately mineralizes, becoming permanently embedded in the concrete as a nano-sized mineral. Even if the concrete is later demolished, the CO₂ gas is now a CaCO₃ solid and will never return to the atmosphere.

CO-BENEFITS OR PRODUCTS

CarbonCure's carbon mineralization solution increases the compressive strength of concrete, creating production and material cost savings. Furthermore, CarbonCure's system to mineralize CO₂ in reclaimed water or waste concrete aggregates at concrete plants also results in less fresh water usage and less waste in landfills. By retrofitting existing concrete plants, there are no additional land use requirements. The tech also enables the start of a green transition for concrete manufacturing without jeopardizing jobs.

LEADERSHIP TEAM

CarbonCure was founded in 2012 by Rob Niven in Halifax, Nova Scotia, where the company's headquarters remain today. Meet the full leadership team here: <https://www.carboncure.com/leadership/>

COMPANY OVERVIEW

XPRIZE TEAM NAME

ClimateADD

LOCATION

Marienhafe, Germany

FOUNDED 2022

TRL 9

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

2022 - 190 tonnes CO₂; 2023 - planned 750 tonnes CO₂

PHYSICAL PRODUCT(S)

Biochar, Building materials

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Rock (Biochar)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series A

AMOUNT OF CAPITAL SOUGHT

\$5M

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Strategic Partnership

TYPE OF INVESTORS SOUGHT

Corporate/Strategic

Axel Preuss

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www.carstorcon.technology



CARSTORCON TECHNOLOGIES

COMPANY DESCRIPTION

CarStorCon® Technologies GmbH is a startup from Marienhafe, Germany founded in 2022. As early as 2020, we undertook initial trials with different residual material streams. In this way, we succeeded in tailoring our technical carbon for various uses in such a way that initial applications in concrete and asphalt became possible.

CORE INNOVATION

Concrete is the most widely used construction material in the world and demand for new infrastructure projects as well as maintenance measures will continue to rise. Here lies a great opportunity for the construction industry to become climate heroes through new business models and products and to store more CO₂ than they emit. The incorporation of the aggregate we developed, Clim@Add®, creates the first climate concrete that can demonstrate improved material properties and even become climate positive. Our experience shows that a substitution of the resource-intensive cement of up to 15% is possible. Together with the carbon sink potential of Clim@Add® and the natural recarbonation of the concrete, a positive climate balance can be achieved.

CO₂ CAPTURE

The basis of our climate technology is the developed aggregate Clim@Add®. It consists of up to 96% technical carbon. This is produced during the thermochemical conversion of forest residues from sustainable forestry. The special process converts the CO₂ bound in the residual materials into technical carbon. This provides the basis for our Clim@Add® aggregate. 1 kg of Clim@Add® binds up to 3 kg of CO₂ that plants have absorbed from the atmosphere during their lifetime. The carbon used is EBC certified, chemically stable and can be reintegrated into material cycles.

CO₂ SEQUESTRATION

When technical carbon is incorporated into concrete and asphalt, the carbon forms a bond with the product matrix, thus the sinks remain permanent and can even last beyond the life of the products. Our technology is also compatible with existing sustainability measures such as recycling solutions.

CO-BENEFITS OR PRODUCTS

Another advantage is that mixing in our product improves the early strength of the concrete and reduces the depth of water penetration.

LEADERSHIP TEAM

Our advantage is that the inventor is also the CEO of our company. We have bundled all our knowledge in our company and are constantly developing our product further, enabling us to sink more CO₂ year after year. We have already taken the step from concrete to asphalt and will take further steps with our product.

COMPANY OVERVIEW

XPRIZE TEAM NAME

Project Hajar

LOCATION

London, UK

FOUNDED 2020

TRL 7-8

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

36 tonnes CO₂/year

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Rocks (Electrolytic direct air capture)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed/Series A

AMOUNT OF CAPITAL SOUGHT

Raising capital in late 2023; contact for details

COMMERCIAL STAGE

Commercial Pilot

REVENUE RANGE

\$1M-\$5M

CAPITAL RAISED TO DATE

\$5M

TYPE OF CAPITAL SOUGHT

Venture Capital, Family Office, Private Equity, Project Finance

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Venture Capital

Duncan Preston

duncan@missionzero.tech

www.Missionzero.tech



MISSION ZERO

COMPANY DESCRIPTION

Mission Zero is an electro-chemical DAC process which uses first principle thinking and off the shelf infrastructure to build an energy efficient DAC process. The combination with mineralisation with 44.01 allows for permanent sequestration of captured CO₂.

CORE INNOVATION

Our core innovation is to utilize biomimetic approaches to stabilize and manipulate CO₂ in water. We are able to store CO₂ in a solvent we have designed in the same way that CO₂ is stored in a can of Coca-Cola. We then regenerate the dissolved CO₂ via a proprietary CO₂ separation technology using off-the-shelf water purification technologies, as a commodity-grade gas stream. The solvent is co-regenerated in the process, allowing it to be immediately recycled to capture more CO₂. We use only electricity and have one of the lowest energy consumption metrics of any DAC technology being deployed or developed at this moment in time. Ultimately this leads to significantly lower costs, even at small scales.

CO₂ CAPTURE

Captured CO₂ is released from a liquid solvent for collection and sequestration.

CO₂ SEQUESTRATION

Our partner 44.01 takes the CO₂ and sequesters it within sub surface peridotite, locking it away, for all intents and purposes, forever.

CO-BENEFITS OR PRODUCTS

We will be bringing jobs and support infrastructure to rural Oman. We will also be supporting the growth of multiple high skilled industries internationally.

LEADERSHIP TEAM

Dr Nicholas Chadwick - CEO

Dr Gael Gobaille-Shaw - CTO

Dr Shiladitya Ghosh - CPO

COMPANY OVERVIEW

LOCATION

Dublin, Ireland

FOUNDED 2021

TRL 6

NUMBER OF EMPLOYEES

1-10

CURRENT OPERATING SCALE

1,000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

None

SELLING CREDITS

Yes

XPRIZE TRACK

Rocks (Enhanced weathering of ultramafic tailings)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Seed

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Early Commercial Demonstration

REVENUE RANGE

<\$1M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Strategic Partnership, Government Funding, Philanthropic Funding

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Family Office, Government, Philanthropic, Private Equity, Venture Capital

Maurice Bryson

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SILICATE

COMPANY DESCRIPTION

We are the first enhanced weathering company to use waste concrete to sequester carbon at scale, and have developed robust in-situ measurement and modelling capabilities to verify the rates of removal we enable. Concrete is the most abundant man-made material on earth, and the building industry generates billions of tonnes of surplus concrete each year. By milling this material and applying it to agricultural land as a soil pH amendment we can boost crop productivity, reduce the need for pesticides and fertilisers, and permanently remove excess CO₂ from the atmosphere. We were recently awarded the THRIVE | Shell Climate-Smart Agriculture Challenge, presented at SXSW, and have been supported by Klarna, Milkywire and Carbonfuture.

CORE INNOVATION

Concrete has significant advantages over basalt and olivine for terrestrial enhanced weathering applications: (i) it weathers about 20 times faster than basalt, (ii) it does not contain any toxic heavy metals, and (iii) it is an abundant waste material that is always close to the desired application site. Our industry-leading measurement protocol enables us to accurately measure carbon removal through a mass balance approach, and we have developed hardware and models that build on these robust field data to enable our solution to scale to climate-relevant volumes with integrity.

CO₂ CAPTURE

By enhancing how quickly calcium- and magnesium-rich materials neutralise carbonic acid in soils, a natural and permanent carbon removal process can be moved from geological timescales to human. Our material has the potential to capture ~0.4tCO₂/tonne of material applied, or about 3tCO₂/hectare at typical application rates.

CO₂ SEQUESTRATION

Our solution enhances a natural carbon removal process, the silicate carbonate cycle, to potentially remove hundreds of millions of tCO₂ cheaply each year. It also does not rely on the maintenance of storage facilities, as once the material is applied to agricultural land the rest of the carbon removal process is passive.

CO-BENEFITS OR PRODUCTS

Our material is beneficial to the fields and crops where it is applied: it can improve crop productivity through soil pH amendment, enhance plants' natural resistance to herbivory through the release of bioavailable silica, and provide vital nutrients to the soil. Most importantly, it contains no toxic heavy metals and is perfectly safe to apply to agricultural land.

LEADERSHIP TEAM

Maurice Bryson (5 years' working on world's largest farms and sustainable finance; BSc Marine Biology, University of St Andrews; MSc Carbon Finance, University of Edinburgh) is founder and director. Prof. Frank McDermott (>30 years' experience in geochemistry and igneous petrology and currently serves as Director of the (Irish) National Centre for Isotope Geochemistry) is science lead. Dr. Ruadhan Magee (PhD, igneous chemistry, University of Queensland) manages research; Teresa Geruson (MBA, Oxford; formerly Tesla) leads strategic partnerships.

COMPANY OVERVIEW

LOCATION

Beijing, China

FOUNDED 2014

TRL 9

NUMBER OF EMPLOYEES

11-50

CURRENT OPERATING SCALE

1,000 tonnes CO₂/year

PHYSICAL PRODUCT(S)

Building materials, Other

SELLING CREDITS

Plan to sell in future

XPRIZE TRACK

Rocks (Mineralization combined with CO₂ removal from the air)

FUNDRAISING DETAILS

CURRENT INVESTMENT STAGE

Series B, Other

AMOUNT OF CAPITAL SOUGHT

Actively fundraising; contact for details

COMMERCIAL STAGE

Growth Stage (growing beyond initial customers)

REVENUE RANGE

\$5M-\$10M

CAPITAL RAISED TO DATE

Prefer not to say

TYPE OF CAPITAL SOUGHT

Corporate Equity, Project Equity, Strategic Partnership, Government Funding, Other

TYPE OF INVESTORS SOUGHT

Corporate/Strategic, Government, Private Equity, Project Finance, Venture Capital, Other

Dr.Wang Qi

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YUANCHU

COMPANY DESCRIPTION

Yuanchu aims to permanently sequester CO₂ in massive and low energy manners. Our patented process is a true carbon negative process. Yuanchu completed its pilot project in Datong, China with a processing capacity of 1,000 tonnes of CO₂ recovered per year. It passed the technical evaluation of a number of top authority experts, and also passed the client acceptance appraisal. Yuanchu has also completed the feasibility study for a 100,000 tonnes CO₂/year project and we expect to kick-off this project in 2nd half of 2023.

CORE INNOVATION

Yuanchu's exclusive, patented, high-efficiency absorption and mineralization reactor can achieve CO₂ absorption rate greater than 90% within 2 minutes. Also, we only need to concentrate CO₂ from the atmosphere into a 5-40% wt gas which is sufficient for the subsequent mineralization process. We use a proprietary looping reagent to help solid waste react with the captured CO₂ to produce CaCO₃; meanwhile, our proprietary looping reagent is regenerated. Our mineralization process operates under room temperature and atmospheric pressure.

CO₂ CAPTURE

Our DAC process has the characteristics of adjustable alkalinity, exceptionally high capacity and good selectivity for CO₂ capture at low CO₂ partial pressure. We only need to concentrate CO₂ into a 5-40% wt gas which saves energy.

CO₂ SEQUESTRATION

Our technology captures CO₂ from the atmosphere and directly feeds it into our patented reactors. There it reacts with reagents to produce CaCO₃ fine particles. Our technology is able to sequester CO₂ into a solid carbonate product, which is very stable in an ambient environment. So, we can permanently store CO₂ for over hundreds of millions of years.

CO-BENEFITS OR PRODUCTS

Compared to the conventional production of CaCO₃, under the dual benefits of carbon removal and substitution, using Yuanchu's green CaCO₃ can bring about 0.5 ton of net carbon removal benefits per ton of CaCO₃. Globally, there will be 200 million tonnes of CaCO₃ needed in various commercial applications. Our technology uses solid wastes such as carbide slag, steel slag as raw materials, so a large amount of solid waste can be reduced and re-utilized while CO₂ removal. Additionally, the green CaCO₃ produced by our technology can protect geological resources and the ecological environment.

LEADERSHIP TEAM

Wei Wei (Chairman and founder) received an MS in Environmental Engineering from University of Texas at Austin, and MBA from the University of Southern California. He Won the EY Entrepreneur of The Year 2016 China. Dr. Qi Wang (CTO) received a PhD in Chemical Engineering from University of Texas at Austin. He is also the President of US-China Green Energy Council (Silicon Valley). Guoqiang Jiang (Chief Scientist) is an associate professor of Chemical Engineering department of Tsinghua University.