

decarb connect

ONES TO WATCH: CLIMATE TECH START UPS & SCALE UPS

2024



ABOUT

It's not news that for industrials and regions to hit net zero targets there's a need for innovation, there's a need for climate tech.

It's estimated that 40% of cumulative emission reductions rely on new climate technologies and so far, we've met some amazing startups and scaleups disrupting the space across: CCUS, alternative fuels, energy efficiency, circularity, electrification and more.

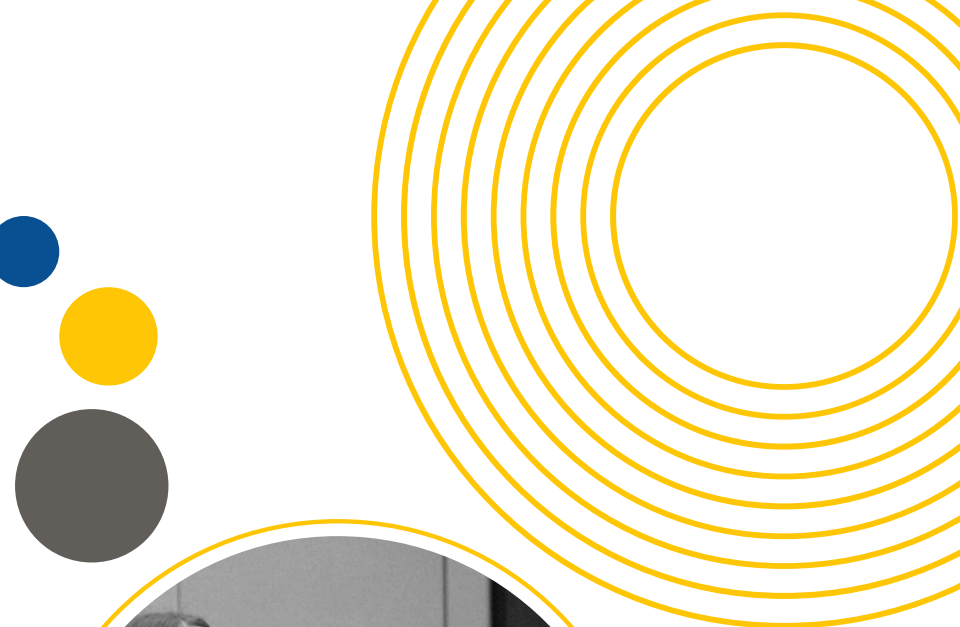
To support investors and financiers in identifying these innovative tech disruptors, we've compiled all of the applications we've received across the Decarb Connect North America and Decarb Connect Europe 2024 Next Gen Awards. Bringing to you a Startups and Scaleups 2024 Report.

We've provided a brief introduction to the company (as they explain who they are) and where available we've included their tech readiness level (TRL), website link and key contact information.

The Next Gen Awards are a crucial aspect of Decarb Connect North America and Decarb Connect Europe flagship events. They recognise and celebrate innovation towards industrial decarbonisation. These companies are only a snapshot of the many amazing climate tech companies out there.

Whether you're a startup, scaleup, industrial, or investor, this report will provide you with some insight into new technologies driving down emissions and changing our future.

If you're interested in featuring in this report next year, or connecting with one of the companies featured - let us know! Email: hello@decarbconnect.com



“

Don't hesitate in applying for the Next Gen Awards, don't think you are too small or too young because there are a lot of opportunities and all of the big companies are looking for partners and for energy from entrepreneurs.

Daniel Orient, Special Project Manager, Matteco

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Seedling Award

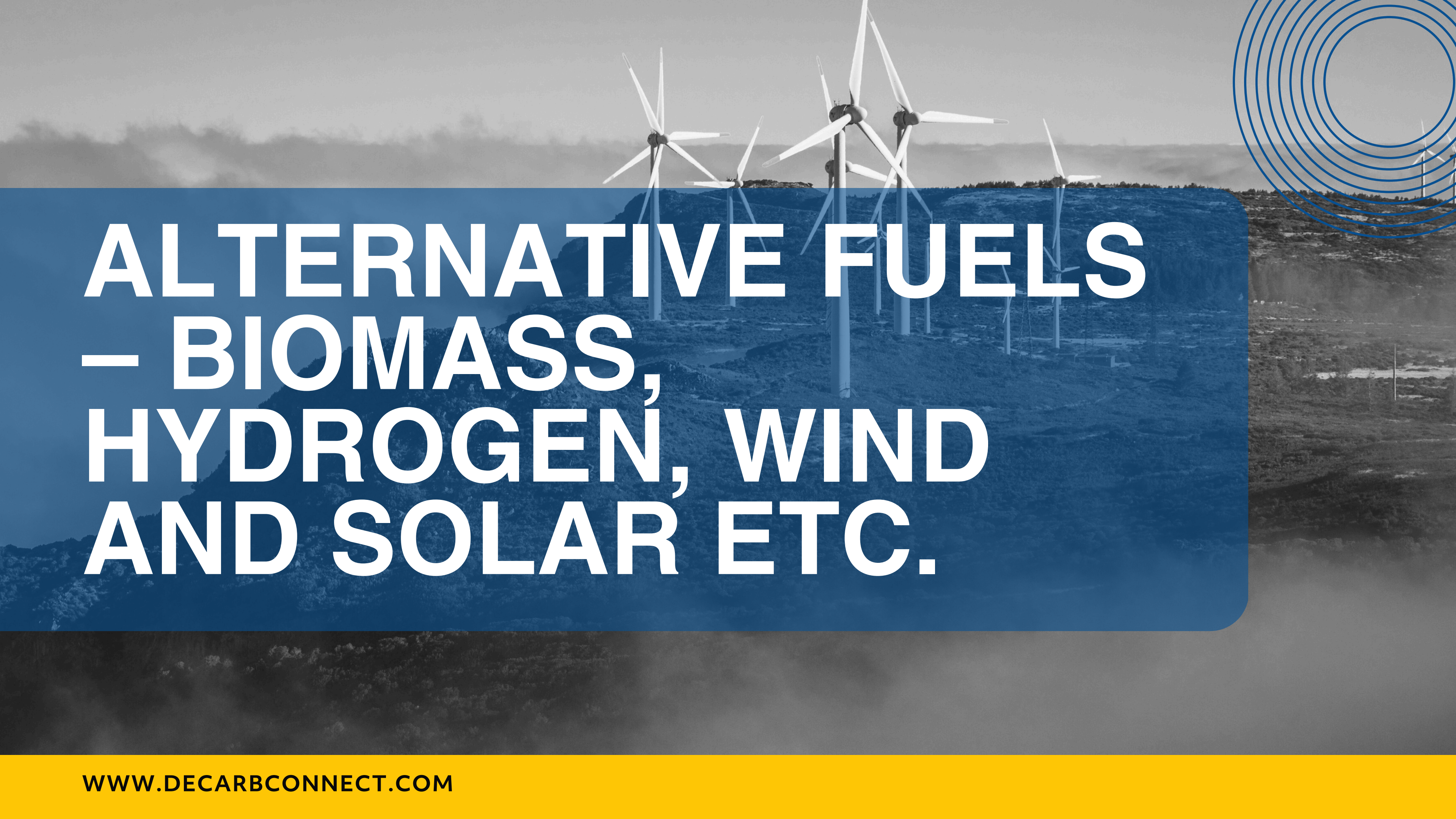
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“
By being here (Decarb Connect Europe), we've made some great connections already with lots of folks who we've kind of wanted to get in front of and speak to for a while in both the steel and the cement industry, but it's always nice to get an award. It's something to talk about, it gets new hires interested in what you're doing, as well as potential partners and clients.

**Eliot Brooks, CEO & Co-Founder,
Cocoon Carbon**

”



ALTERNATIVE FUELS – BIOMASS, HYDROGEN, WIND AND SOLAR ETC.

ALTERNATIVE FUELS



Key Contact

Iker Marcaide
Co-founder & CEO



Matteco

TRL: Alkaline Anode (TRL7/8)

The main barrier to large-scale deployment of green hydrogen is the high cost of production. With ambitious targets for installed electrolysis capacity to reach net-zero by 2030, significant efforts are needed to make electrolysis more efficient.

This is where we come in. Matteco is a materials technology company focused on new solutions to make hydrogen production cost competitive. We have developed next-generation materials to decarbonize the economy through the mass deployment of green hydrogen in industries that are difficult to electrify.

Our technology is setting a new performance standard in alkaline and AEM electrolysis. Our first innovation goes right to the heart of the production process and green hydrogen value chain: PGM-free advanced catalysts, catalytic coatings and electrodes, key elements in water electrolysis.

Matteco's patented materials are transforming the economics of green hydrogen production by reducing operating costs through up to 30% reduction in energy consumption and reducing capital costs by enabling up to 3x higher current densities. This means that the same hydrogen production can be achieved with smaller, cheaper stacks. Or more hydrogen can be produced with the same stack size, optimizing the capital investment for hydrogen production facilities. In this way, Matteco helps electrolyzer manufacturers and plant designers to achieve their targets for the levelized-cost-of-hydrogen (LCOH).

The company is based in Valencia, Spain and is part of the Zubi Group. It was co-founded by Zubi Labs and a group of scientists in August 2023 after a decade of research. It is currently expanding its manufacturing capacity to reach GW scale by Q2 2024.



Kyoto Group

TRL: 7 (Aalborg Plant)

Heat accounts for two thirds of industrial energy consumption. Traditionally, nearly all of it is based on fossil fuels. Kyoto Group's Heatcube, is an innovative thermal battery tailored for industry. This sustainable plug-and-play solution effectively decarbonizes process heat, replacing gas boilers. It efficiently captures and stores intermittent renewable energy from decentralized installations or the grid, ensuring a steady thermal energy supply to industry. Established in 2016 and headquartered in Oslo, Norway, with subsidiaries in Spain and Denmark, Kyoto Group is dedicated to empowering industries with renewable thermal energy.

ALTERNATIVE FUELS



IPG Energy

TRL: 6/7

IPG Energy is a British climate tech startup developing a clean, fuel-agnostic generator to accelerate the transition to renewable fuels in industries like construction.

Despite the progress made with battery storage and the drive to green fuels, the diesel generator market is set to nearly double to \$34 bn by 2030, and it remains the go-to solution for onsite power in industries like construction. For many construction companies, achieving carbon reduction targets means using renewable fuels. But today's costs are high, and the infrastructure in its nascency. As a result, many businesses are forced to continue using diesel until alternative fuels are as abundant and cost-effective.

The IPG Flameless Generator uses patented Flameless Combustion technology to overcome the cost and availability challenges to using 100% renewable fuels by unlocking pollutant-free power from any fuel, at a competitive cost.

Offering huge baseline carbon savings even using diesel, and precision cost control thanks to the flexibility to blend fuels, businesses can tailor carbon savings to clients' budgets, and enjoy a cost-effective, low-risk route to reducing carbon at scale.

As a plug-and-play replacement for the diesel generator, the benefits of IPG Energy's award-winning product are not limited to the construction industry. Indeed, the IPG Flameless Generator holds a lot of promise for supporting decarbonisation wherever clean, on-demand power is needed, such as manufacturing, EV charging, or maritime.

Key Contact

Toby Gill
CEO

 www.ipg.energy



Luminescent
Heat Engine



Luminescent

TRL: 6

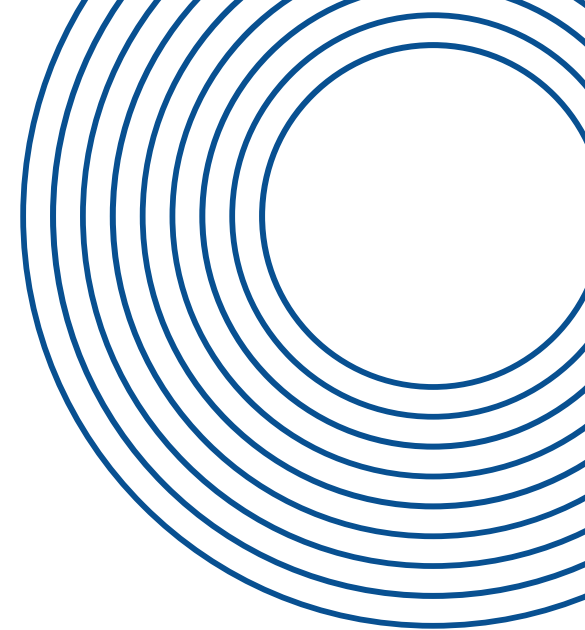
Luminescent is the world's most efficient heat engine, and the only solution that turns waste heat into zero-emission electricity with a rapid ROI of 1-3 years.

Key Contacts

Doron Tamir, CEO
Carmel Rotchild, CTO

 luminescentpower.com

ALTERNATIVE FUELS



ELECTROGENOS

Key Contact

Augusto Bartolome
Co-founder & CEO



electrogenos.co.uk

Electrogenos

TRL: 5

Electrogenos introduces a groundbreaking advancement in green hydrogen production with its enhanced alkaline electrolysis stack, achieving today the 2050 goals set by the International Energy Agency in both OpEx and CapEx efficiency—positioning us 30 years ahead of the industry.

Our approach markedly diverges from existing methodologies by integrating advancements across three critical domains: stack architecture, catalysis and electrode manufacturing. This comprehensive innovation strategy establishes Electrogenos as the only hydrogen startup simultaneously addressing operational efficiency and manufacturing cost, propelling us beyond the incremental improvements of competitors. We reach an unprecedented 93% efficiency, a 12 percentage points advantage over the next best-in-class alkaline electrolyser, while achieving a stack cost of \$80 per kW, a 4x cost reduction compared to European competitors, and 1.5x compared to Asian manufacturers—all while manufacturing locally.

The key to Electrogenos' success lies in its strategic reduction of reliance on costly platinum group metals, opting instead for our proprietary, low-cost, and highly active catalyst that costs \$30 per square metre—a stark contrast to the \$400 to \$1,500 per square metre cost of the best available catalysts. The innovation occurs at both a macroscopic and microscopic level, introducing a novel catalytic texture that significantly boosts the efficiency of bubble detachment, a critical factor in electrolysis.

This bio-inspired design, mimicking the open structure of coral reefs, creates vortical flows that increase mass transport by up to 400%, facilitating rapid bubble detachment and thus substantially improving efficiency.

This strategic innovation not only addresses the issue of cost but also mitigates supply chain risks associated with precious metals, enhancing the resilience and accessibility of green hydrogen production. Additionally, our use of extensively available industry-standard materials like traditional diaphragms instead of trendier, 4x more expensive and 3x shorter-lifespan membranes, ensures our systems are not only high-performing but also built to last.

ALTERNATIVE FUELS



Key Contact

Dr. Wilhelm Stein
Chief Executive Officer



sunmaxxsolar.com

Sunmaxx PVT

TRL: 9

Sunmaxx is a Dresden-based company that offers innovative photovoltaic thermal (PVT) solutions incorporating cutting-edge automotive technologies. With exceptional efficiency and a unique heat exchanger system, Sunmaxx's PVT modules offer a complete decarbonization solution for communities, industrial sites, and commercial buildings. They provide these innovative solutions at a competitive price, making sustainable energy accessible to all. Our hybrid PVT modules deliver superior performance, with high PV and thermal power, > 80% area efficiency, and over 30% cost savings compared to alternatives. Our mass manufacturing processes, adopted from the automotive sector, offer high productivity and cost efficiency. The Sunmaxx PVT GmbH product is designed for a long service life (at least 30 years) and is completely recyclable. In addition, the majority of the supply chain is mapped in Europe in order to shorten transport routes.



Key Contact

Dr Markus Rondé
CEO



www.exergy3.com

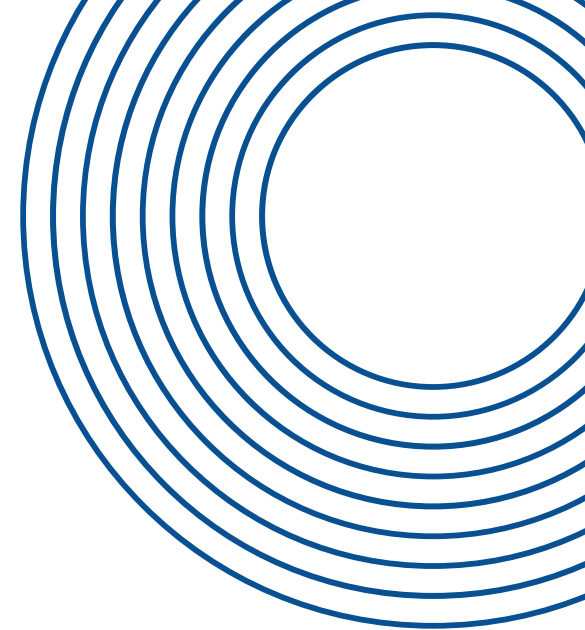
Exergy3

TRL: 5

Exergy3 is a spin-out of the University of Edinburgh that has developed innovative ultra-high temperature thermal energy storage technology. Our technology is a game changer in Europe's and the world's journey to net zero.

Taking green electricity from the grid or a renewable energy source, our system converts it into thermal energy and stores it at temperatures of up to 1200 °C. This energy is then discharged as hot gas to power thermal processes between 80-1000 °C. Our technology can be used to easily decarbonise a broad range of sectors from industrial processes to the heating of large-scale buildings or district heat networks, and can also support a green energy system. Funded by the UK Government's Department of Energy Security and Net Zero, we are currently building and installing a demonstrator at Annandale Distillery to enable its first-ever production of low-carbon whisky.

ALTERNATIVE FUELS



Protonera

Key Contact

Jack Chengzhi Guo
CEO and Co-Founder



www.protonera.com

Protonera

TRL: 4

Protonera are a Cambridge University spin-out turning mixed and contaminated waste plastics into green hydrogen. We have been in operation in three months but our company is based on two strong IPs from two years of research at the Department of Chemistry. The technology addresses the \$180B value loss from burnt and discarded plastics that are not recycled every year around the world because they are contaminated and unsorted.



Haffner Energy

Decarbonize • Innovate • Regenerate

Key Contact

Nathalie Ionesco
North America Senior Advisor

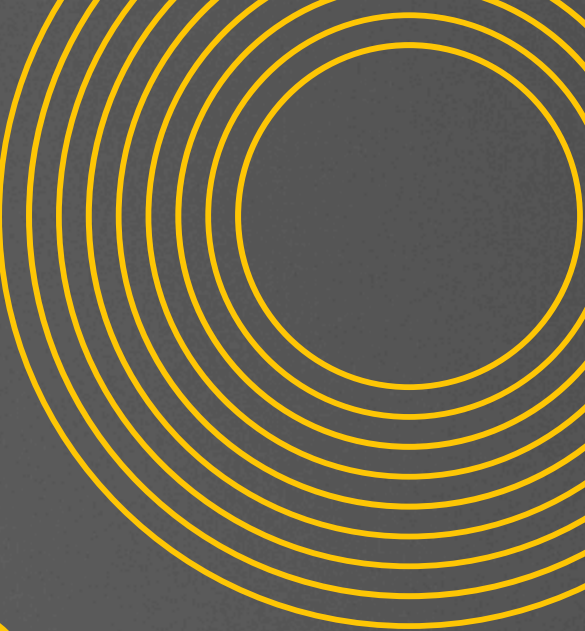


www.haffner-energy.com

Haffner Energy

TRL: 9

Haffner Energy is a family-owned company that designs, manufactures, supplies, and operates solutions to produce renewable energy from biomass residues. Its innovative, patented thermolysis technology, protected by 15 patent families (i.e. 80 international patents), provides a competitive response to the challenges of decarbonizing industry, land, air, and sea mobility, as well as governments and local authorities.



CARBON CAPTURE UTILISATION & STORAGE (CCUS)

CCUS



Key Contact

Nic Renard
Director of Carbon Solutions

 www.ardenttechnologies.com



Ardent

TRL: FTM Technology (TRL6/7), in the Carbon Capture application (TRL5)

Ardent (formerly known as Compact Membrane Systems (CMS)) pioneers advanced membrane technologies to accelerate decarbonization and transform the global industrial and energy landscape.

Ardent's state-of-the-art Facilitated Transport Membranes (FTM) give it a patented 'unfair advantage.' Unlike conventional high-pressure separation methods, Ardent's technology relies on the chemistry of the membrane itself for energy-efficient separation. The result is a low cost, fully electrified, and easy to use solution with versatile applications for today and tomorrow.

Ardent's Optiperm™ platform holds the key to unlock cost-effective and energy-efficient point-source carbon capture across heavy industries like cement, steel and petchem that are underserved by conventional carbon capture and other decarbonization pathways. Ardent's modular, bolt-on separation technology addresses the cost-efficiency and scalability issues of incumbent solutions, delivering a proven, scalable, energy-efficient, and cost-effective solution that can decarbonize heavy industry at the Gigaton scale.

Ardent has over 30 years of manufacturing experience across power generation, industrial chemicals, pharmaceuticals, and O&G operations. Ardent has a proven track record of taking new technologies from the lab to the field, partnering with global leaders like Chevron, Pfizer, and Braskem to deliver end-to-end solutions at commercial scale.

“We've been coming to the Decarb Connect conferences for a while, it's a really good environment to meet a lot of industrial players.”

Nic Renard, Director of Carbon Solutions, Ardent

CCUS



Key Contact

Danielle Rapson
COO



Mantel Capture

TRL: 6

Mantel is pioneering a high-temperature liquid phase carbon capture material – molten borates – to address emissions reduction in heavy industries and power generation. Unlike traditional low-temperature capture methods that are energy-intensive and costly, Mantel's technology captures CO₂ at high temperatures, which allows for the recovery and reuse of heat, thereby reducing costs and energy penalties. Furthermore, the liquid phase operation overcomes performance degradation challenges faced by solid materials. Mantel's technology is applicable in a variety of sectors, including industrial heat, cement, steel, hydrogen production, and power generation, and can be paired with biogenic emission sources for atmospheric carbon dioxide removal. Compared to current solutions like electrification and alternative carbon capture methods (e.g., amines), Mantel's technology could reduce costs by up to fivefold.



Being an award winner at Decarb Connect is a huge honour. I think this conference (Decarb Connect North America) represents some of the biggest emitters in the space and so being an award winner will absolutely help us propel a lot of our partnerships and conversations.

Danielle Rapson, COO, Mantel Capture

CCUS



Key Contact

Amir Shiner
CEO



RepAir Carbon

TRL: 6

Driven by a novel electrochemical cell technology, our next-generation, carbon capture innovation is affordable, easily scalable, and energy-efficient, consuming 70% less energy as compared to conventional solutions. Our solution operates entirely on electricity, eliminating all heat-related issues commonly encountered with conventional Direct Air Capture (DAC) and Diluted Point Source solutions. This enables exceptionally low energy consumption for direct air capture at 600kWh per ton and for diluted point source 300kWh per ton.

As a result, RepAir can offer high-integrity carbon credits to off-takers, such as Microsoft, at an affordable price, extending the same affordability to point source as well. RepAir's low energy consumption and efficient, continuous process, leads to minimal operating expenditures (OpEx) and its modular design is built for scaling up, resulting in low capital expenditures (CapEx). This combination positions RepAir for large-scale production and rapid global adoption, facilitating swift and sustainable implementation.

Projected levelized capture costs are \$70 per ton at the megaton scale and \$50 per ton at the gigaton scale.

How it works:

RepAir's DAC technology is based on proprietary electrochemical cell technology, requiring 70% less energy (0.6MWh/tCO₂) than its competitors. Similar to battery technology, the process utilizes two electrodes positioned on either side of a selective separator, forming a cell. These cells are 'stacked' to multiply the carbon-removal capacity. Atmospheric air is drawn into the cathode, where an electrical current generates hydroxide ions that bind to CO₂ molecules, forming carbonate and bicarbonate ions. Only these ions cross the separator into the anode, wherein the binding process is undone, the hydroxides are consumed, and pure CO₂ gas is drawn out.

Continuous carbon removal for optimized energy efficiency is achieved through systematic cell polarity switching every few hours.

CCUS



Key Contact

Mistry Ronak Yogesh
Director - R&D,
Greenovate Solutions



Greenovate Solutions

TRL: 5

At Greenovate Solutions we combat climate change by converting Industrial Emissions into Resources. We aim to capture Industrial CO2 emissions to utilize as a resource to alternate imports & production of LCO2. Leading to a carbon -ve & revenue +ve ecosystem. "Waste to Best for CO2 emissions." end-to-end support of captured carbon, from source point to sink, with our Industrial clusters, Creating & developing global to local partnerships amongst stakeholders of Carbon Market.

We enable Small & Medium-Scale Industries (i.e. Textile, Fertilizers, Chemicals etc.) to CCUS, with our plug & play, portable, zero-infrastructure, low-energy, modular CCUS systems. Certifying them as Green Manufacturers & Green Industries by supporting their Carbon auditing & compliance in CBAM, BRSR, ESG & GHG. Also, purifying captured CO2 emissions & supplying to up-cyclers (CO2 to fuel).

At Industrial sites, CO2 capture is a very capital intensive and long-term (permanent) establishment, with heavy Op-Ex aswell. This is due to the heavy volume operation and civil infrastructural establishment with lot of space occupancy. Also limiting to operational volume capacity rigidity. They also incur a need for expensive speciality chemicals for their operation with heavy energy duty.

TubeCCU is a compact 40ft container – plug & play carbon capture system for point source emission capturing. The TubeCCU Capture System employs a regenerable solvent. A proprietary amine technology captures the CO2 from the flue gas and releases it as a pure stream, which is delivered to the client for sale into the EOR and commodity markets or for eventual sequestration.

We provide end-to-end support of captured carbon, from source point to consumption/sink point.

We aim to capture & re-purpose 500 Tonnes (≈50 Units Deployed) of CO2 by developing value added products by Dec 2025. & 1 million Tonnes by 2035.

- Aiming for supporting the IPCC short-term goal to peak carbon emissions as soon as possible, Maintaining under the carbon budget & avoiding ir-reversible climate change.
- Enable Medium & Small scale industries incorporate to CCUS at their sites.

CCUS



Key Contact

Albert van Pabst
CEO



SDS Seperation

TRL: Separator (TRL9), Scrubber (TRL6/7)

SDS Separation develop separators and scrubbers for the energy transition with the smallest footprint and the highest performance and reliability in the market.



Key Contact

Christopher Wood
Chief Strategy Officer



Verdant Carbon Zero

TRL: 4/5

We have built an encapsulated, proprietary carbon removal system. Our fantastic in-house built photobioreactor has patent pending technologies and processes which are highly measurable and deliver effective, durable, high confidence carbon dioxide removal (CDR) with nature as the source. Based upon renewable systems integration the additionality is profound. Utilisation and permanent storage options exist as we drive our impact to the wider circular economy of agriculture and construction. We have prepared a project to provide the basis of our advanced research for a new in ground storage technology centred around old disused mining communities of the Northeast of England and beyond.

CCUS



NEOCARBON

Key Contact

René Haas
Co-Founder & CEO



www.neocarbon.tech

NeoCarbon

TRL: 5

NeoCarbon's mission is to revolutionize the fight against climate change by leading the transition to a CO₂ negative world.

Our goal is to develop and implement efficient, scalable, and cost-effective Direct Air Capture (DAC) solutions that empower businesses and communities to effectively capture and store or utilize CO₂ from the atmosphere effectively. Thanks to our groundbreaking technology, we can make a significant and lasting impact on the reduction of atmospheric CO₂ levels, aligning with Intergovernmental Panel on Climate Change (IPCC) targets.

Across Europe and worldwide, thousands of cooling towers process massive volumes of air, generating substantial waste heat. By retrofitting these infrastructures with our unique modular approach and novel reactor, we can reduce CO₂ capture costs by up to 90%. As a result, our innovative solution effectively removes the main hurdle to the widespread deployment of DAC technology, which is paramount to achieving net-zero goals.



Blue
Skies
MINERALS

Key Contact

Hannes Scholz
COO



www.blueskiesminerals.com

Blue Skies Minerals

TRL: 4

Blue Skies Minerals helps ore mining companies decarbonize their business and eliminate two major environmental liabilities related to their waste. They do this by storing CO₂ that was sequestered from the atmosphere safely and permanently in a mineralized form together with the mining waste. Their method can be seamlessly adopted as it is a bolt-on to existing mining processes.

CCUS

UNDO

Key Contact
Jim Mann
Founder and CEO



UNDO

TRL: 7

UNDO is a world-leading carbon dioxide removal project developer specialising in enhanced rock weathering. Our mission is to permanently remove over a billion tonnes of CO₂ and make carbon removal technology accessible to all.

Enhanced weathering is a nature-based technology that permanently locks away CO₂ from the atmosphere. The geological process of weathering has happened naturally for millions of years, removing billions of tonnes of CO₂ over Earth's history. UNDO accelerates this natural process by spreading crushed silicate rock with a high reactive surface area onto agricultural land, where plants and microbes in the soil speed up the weathering process. The breakdown of the rock by CO₂ dissolved in rainwater releases nutrients and bicarbonates, which end up in the oceans as solid carbonate minerals, permanently removing CO₂.

Part of Microsoft's and Stripe's Carbon Portfolios, UNDO is scaling operations in the UK, Australia and Canada. The rock, a byproduct of the aggregate and mining industry, is given to local farmers for free and spread on agricultural land using existing infrastructure.

In addition to permanent, rapid and scalable carbon removals, UNDO's holistic partnership model delivers significant co-benefits such as improved soil health, ocean deacidification and increased profits for farming communities.

EARTH XCG

Key Contact

Michael Fox
CEO and Co-Founder



EarthXCG

TRL: 5

EarthXCG is solving the biggest problem in the carbon industry, carbon credit integrity. EarthXCG provides CCS project developers an advanced digital measurement, reporting, and verification (dMRV) platform for ongoing verification of CO₂ removals, reporting, and carbon credit asset management. We work with all types of CCS project methodologies.

CCUS



pyropower GmbH

TRL: 7

pyropower GmbH is a pioneering force in the realm of sustainable energy solutions, driven by a steadfast commitment to environmental conservation and innovation. Founded by visionary leaders Sebastian and Lucie, our company is at the forefront of revolutionizing the energy landscape through cutting-edge technology and comprehensive consulting services

At pyropower, we believe in the power of sustainable energy to drive positive change and mitigate the impacts of climate change. Our mission is to provide businesses and industries with the tools and expertise they need to transition towards cleaner, greener energy practices while achieving significant reductions in their carbon footprint

Central to our offerings is our proprietary Pyro-ClinX technology, which combines pyrolysis and afterburning to generate renewable energy while actively capturing and sequestering carbon emissions. This innovative solution not only provides a sustainable alternative to traditional energy sources but also contributes to the restoration of ecosystems by producing valuable biochar.



Key Contact

Elodie Morgan
Co-founder and COO



SpotLight

TRL: 7

SpotLight offers Predictive Maintenance for CCS by frequently monitoring specific locations to validate CO2 injection dynamic models. The company operates onshore and offshore worldwide, and as the official partner of the GreenSand Project.

SpotLight's innovation relies on survey design and data processing, so that the acquisition is easy and requires standard equipment.

In a nutshell, SpotLight provides reservoir/production engineers with a dynamic detection of subsurface changes on strategic subsurface areas (spots) using seismic measurement and only one surface seismic source/receiver pair.

CCUS



Key Contact

Martin Keighley
CEO



carbonfree.cc

CarbonFree

CarbonFree is a carbon management company dedicated to reducing emissions produced by hard-to-abate industries, which account for approximately 30 percent of global emissions. Its 104 patents through 50 countries have led to the development of SkyCycle, which is built alongside industrial plants to capture their carbon emissions and convert them into carbon neutral chemicals that are available for wholesale markets or stored in an environmentally friendly method. SkyCycle is one of the few carbon capture solutions that does not require infrastructure for long-haul pipelines or disposal wells, enabling the technology to safely bypass years of environmental reviews and permitting. CarbonFree's first generation SkyMine plant is operating alongside a cement factory in San Antonio, and SkyCycle is ready to be deployed with pre-commitments secured from major industrial producers.



WATCH ON-DEMAND: Decarbonizing Heavy Industry: U. S. Steel and CarbonFree Share Best Practices for Reducing Emissions through Carbon Capture and Utilization

[CLICK HERE TO WATCH](#)

CCUS



Key Contact

Olivier Dufresne
CEO



Exterra Carbon Solutions

TRL: 4/5

Exterra has developed a groundbreaking method to combat climate change and manage industrial waste. Our approach involves rapidly deployable CO₂ storage at the surface, utilizing CO₂ captured from the atmosphere, oceans, or other biogenic sources. This process, known as ex-situ mineral carbonation, uses mineral waste from mining operations to transform CO₂ into stable carbonate minerals. Not only does this method effectively remove CO₂ from the environment, but it also repurposes and cleans up mining waste, transforming it into valuable assets. Once the CO₂ is stored, the carbonates are used to backfill and rehabilitate mine sites. Our solution stands out in its efficiency and scalability.

We employ mature, proven equipment to ensure rapid deployment of our proprietary low-carbon alkalinity production process. Our process involves two steps: i) production of low-carbon magnesium or calcium oxides (alkalinity), and ii) mineralization of oxides into carbonates. Not only is our technology applicable to CO₂ from DAC and DOC, but it also facilitates the storage of biogenic CO₂ from renewable natural gas production, pulp & paper operations, and other biogenic sources.

By mineralizing CO₂ at the emission site, our system allows to skip the compression and liquefaction steps of capture – significantly reducing operating costs. It is also possible to directly mineralize biogenic flue gas CO₂, potentially skipping the capture step altogether and going straight to storage. Our solution is a win-win: addressing the urgent need to reduce CO₂ while also cleaning up and finding a purpose for mining waste and generating useful products.

CCUS



Key Contact

Ben Tarbell
CEO and Co-Founder



Ebb Carbon

TRL: 6

Ebb Carbon is pioneering a new carbon removal solution by enhancing the ocean's natural ability to safely store CO₂. This electrochemical ocean alkalinity enhancement method has the potential to be one of the largest scale and lowest cost approaches to removing excess CO₂, while reducing ocean acidity.

Our process uses low-carbon electricity and ion-selective membranes to separate the NaCl in seawater into dilute HCl and NaOH. The base stream is returned to the ocean to safely enhance ocean alkalinity, which in turn pulls atmospheric CO₂ from the atmosphere and transforms it into bicarbonate and carbonate ions, accelerating the oceans' natural carbon cycle.

Once in the ocean, bicarbonate is a stable form of carbon storage for 10,000+ years. Electrochemical OAE is expected to be among the most durable methods of carbon removal. Ocean alkalinity enhancement can help reduce the acidity of seawater locally.



Key Contact

Alireza Aslani
CEO and President



NeXsi

TRL: 6

NEXSI: We are a pioneering Albertan startup at the forefront of direct carbon capture. Our expertise lies in direct air capture and clean power solutions, with a profound commitment to environmental sustainability. We have over 20 years of experience in research and development within prestigious universities worldwide. Our modular direct air capture units can be installed anywhere, capturing CO₂ directly from the ambient air. These units can be (not necessarily) powered by renewable energy sources like solar, ensuring a carbon-negative footprint. We operate during periods of minimal power prices, reducing operational costs and contributing to efficient grid load management. We use advanced, reliable, and efficient technology that minimizes operation and maintenance costs. With over two decades of experience in R&D, we have developed revolutionary technology in these fields and explored versatile applications of captured CO₂ in agricultural, food, and construction industries.

CCUS



Key Contact

Charles Grace
Director of Technology



Grace Carbon Capture Systems

Grace Carbon Capture Systems, Inc. is a new company in the carbon capture space focused on developing ultra-efficient Direct-Air Contactor equipment for the carbon capture industry.

We are founded on a strict principle of efficiency – working with a small, expert and experienced staff, comfortable in start-up mode and capable of planning for long-term success. We structure the company at any given time around the project(s) we are working on, building teams that can deliver. This requires us to work with many subcontracted experts that are focused on the particulars of the device we are developing or the technology we are working on.

We are serious about generating as many carbon capture devices as we can imagine: Researching, designing, engineering, prototyping, testing and optimizing and getting them implemented where they will do the most good as quickly as possible.



DigiKerma

Key Contact

Paul De Havilland
Head of Marketing



DigiKerma

TRL: 5

DigiKerma has created a carbon credit trading platform for CCUS-derived carbon credits. All credits are high-quality: permanent, measurable, and EPA-regulated or ISO standard-compliant. DigiKerma's goal is to offer emitters a way to offset their emissions, while scaling up the only viable, scalable pathway to our Paris Accord goals: CCUS.

CCUS



CarbonBuilt

TRL: 9

Key Contact

JJ Steeley
Head of Marketing and
Strategic Partnerships



CarbonBuilt has developed ingenious carbon utilization technology that both avoids and removes CO₂ at the same time.

Its technology enables concrete manufacturers to produce concrete with 70-100+% less embodied carbon at no additional cost compared to traditional concrete. The technology both avoids the production of new CO₂ and removes CO₂ through a process that both utilizes the CO₂ to produce concrete and stores it in the finished product.

CarbonBuilt's ultra-low carbon concrete technology replaces most of the expensive, high-carbon Portland cement (responsible for 7-8% global emissions) with its proprietary low-cost, low-carbon cement alternative. A single production line will avoid 2,500-3,000 tonnes of CO₂ per year.

CarbonBuilt's cement alternative hardens by chemically reacting with CO₂, to strengthen the blocks and permanently store the CO₂. CarbonBuilt can use a range of captured CO₂ sources, including point source Carbon Capture or Direct Air Capture (DAC) delivered to the concrete plant. Or, the CO₂ can be directly integrated into CarbonBuilt's technology via onsite colocation and integration. A single production line will remove about 500 tonnes of CO₂ per year.

CarbonBuilt's technology can be rapidly adopted by the nearly 800 concrete plants in the U.S. alone. Add in future plans for wetcast and other concrete products and it's clear that the global concrete industry is well positioned to become the world's largest repository for non-geologic sequestration.



CCUS



Key Contact

Dante Luu
Marketing



Partner of:

decarb
tech invest
10-11 SEPTEMBER 2024

Carbon Upcycling Technologies

TRL: 8/9

The world needs solutions at an unprecedented pace and scale to meet critical 2030 targets. DAC and CCS are necessary but are not widely accessible to meet 2030. Carbon Upcycling fills this void with a readily deployable carbon capture & utilization (CCU) solution that captures and abates emissions while creating a circular economy.

We're building a world where CO₂ is a resource for a sustainable tomorrow by utilizing carbon emissions to create value-added products and prevent more emissions. Carbon Upcycling's CCU technology sequesters CO₂ into industrial byproducts, upcycling them into an enhanced material to replace clinker – the most carbon-intensive ingredient in cement. In turn, our material can reduce cement emissions by up to 60%. Concrete that uses the enhanced cement demonstrates up to 40% greater strength and is more resilient to weathering, meaning infrastructure built to last.

Our technology's ability to valorize non-traditional materials using low-purity CO₂ directly from flue gas without pre-capture removes regional and cost limitations faced by CCS and DAC. This versatility opens our technology up to wherever there is CO₂ and supplies of byproducts like reclaimed fly ash, steel slags, or mine tailings.

Carbon Upcycling has three commercial projects in commission with CRH, Cemex, and LafargeHolcim.

CLICK HERE to find out more about Decarb TechInvest. This event focuses on connecting the full capital stack to series B+ decarb hardtech

The background of the slide is a grayscale photograph of an industrial facility, likely a steel mill, showing large rolls of metal coils and a complex ceiling structure with numerous lights. In the top right corner, there is a graphic of several concentric orange circles of varying sizes, centered on the right edge of the frame.

CIRCULARITY – CO2 REUSE, CO2 UTILISATION TECHNOLOGIES

CIRCULARITY



Cocoon

TRL: 5

Cocoon is building carbon capture for heavy industry and low carbon construction materials for the builders of tomorrow. Cocoon has developed a patent-pending process that upcycles underutilised steel slags into a high-value supplementary cementitious material, while mineralising CO₂ from a flue gas or already stored source. The technology has the potential to solve a looming supply/demand challenge within the market for supplementary cementitious materials, as traditional feedstocks such as blast furnace slag and fly ash decrease in supply, while demand is driving prices up. Cocoon is enabling the steel and cement industries to decarbonise in sync.

Key Contact

Eliot Brooks
CEO



Econic Technologies

TRL: 8

iEconic Technologies is a UK-based deep tech company focused on renewable carbon. Its innovative catalyst and process technology allows manufacturers to produce polymers based on CO₂ instead of petrochemicals. The use of CO₂ enhances sustainability while creating more cost-effective, higher-performing end products. Econic licenses its technology to polyols and surfactants manufacturers that supply some of the world's most iconic consumer brands. Econic was founded in 2011 by Dr. Charlotte Williams at Imperial College London. The company is part of Cleantech Group's Global Cleantech 100. Its global headquarters are in Alderley Park, UK just outside of Manchester.

Key Contact

Liz Manning
Commercial Lead



CIRCULARITY



Key Contacts

Valentin Gutknecht,
Founder and Co-CEO

Johannes Tiefenthale
Founder and Co-CEO



Neustark

TRL: 9

Neustark was founded in 2019 as an ETH Zurich spin-off by Johannes Tiefenthaler and Valentin Gutknecht, both of whom were, at that time, looking into the technological and commercial aspects of CO₂ storage in mineral waste streams, with an initial focus on recycled concrete aggregates (RCA).

Our company aims to create a scalable carbon dioxide removal (CDR) solution with a high degree of permanence that can contribute to achieving national and international climate goals, as well as promoting circularity practices, particularly in the construction sector.

Through our technology, we capture and mineralize biogenic CO₂ within waste materials such as recycled concrete, thus removing the CO₂ and storing it for thousands of years. Neustark's technology injects CO₂ into concrete granules, triggering a mineralization reaction that transforms the CO₂ into calcium carbonate. The partnering recycler can use the CO₂-enriched granules as per its usual process to produce recycled concrete or other materials for buildings or roads. Concrete recyclers can create an additional revenue stream by earning a payback from the sale of carbon removal certificates obtained from our process. Therefore, our project not only contributes to corporate and national climate targets thanks to a first-of-a-kind bio-CCUS value chain, but also further promotes the development of circularity practices within the construction sector.

To date (April 2024), we have permanently removed over 1500 tons of CO₂ from the atmosphere and safely stored it in RCA, slurry water and other mineral waste streams. Benefitting from this climate impact are also the buyers of our certificates, i.e., companies with ambitious climate targets such as Microsoft and UBS.



CIRCULARITY



Key Contact

Alex Ip
CEO and Co-Founder



CERT Systems

TRL: 5

CERT Systems is a carbontech company on a mission to produce essential chemicals without fossil fuels.

Conventional chemical production uses fossil fuels and is responsible for over 1.5 Gt of annual emissions. However, net zero commitments are driving the need for novel, non-fossil feedstocks. CERT Systems has developed a process called CO₂ electrolysis that converts carbon dioxide emissions into high-value chemicals using only water and renewable electricity. This modular, clean technology has the potential to displace over half a gigatonne of greenhouse gas emissions by 2050.

- CERT has been recognized globally for its leadership in developing sustainable chemical production technology. It was one of only 10 finalists in the \$20M NRG COSIA Carbon XPRIZE competition, which aimed to find the most promising carbon utilization technologies. It was chosen for the Breakthrough Energy Fellowship program, which supports the most promising decarbonization innovations through Bill Gates' foundation.



Key Contact

Mr Ferhan Rasul,
Director and CEO



Algae Products International Ltd

TRL: 9

Our commitment to sustainability is evident in everything we do, from reducing carbon footprints and promoting decarbonisation to creating eco-friendly and highly nutritious products.

We believe that microalgae is the key to a more sustainable future, and our products have a low carbon footprint, making them an excellent choice for businesses looking to reduce their impact on the environment.

API's diverse team of experts has extensive experience in the microalgae production industry, and we're committed to revolutionising the market with the latest technological advancements and sustainable practices.

Our goal is to create a brighter, more sustainable future for our planet through groundbreaking innovations in microalgae production for industries such as food industry, aquaculture, cosmetics, and pharmaceuticals.

We offer a wide range of products tailored to your business needs, from plant-based proteins to blue and red dyes for use in the textile industry. Our team of experts is dedicated to working closely with you to develop custom solutions that meet your specific requirements.

We understand the specialised knowledge and equipment, regulatory hurdles, and safety concerns associated with the use of microalgae-based products. That's why we've developed a unique process to extract the full benefits of algae, ensuring our products meet the highest safety standards and regulations.

CIRCULARITY



DECARBONX BY ANGARA

Key Contact

Alex Ip
CEO and Co-Founder



ANGARA Global

TRL: 8+

ANGARA Global is a UK / Netherlands and GCC-based AI & Climate Tech company.

- ANGARA developed a breakthrough technology protected with 33 patents granted and working with such global majors as ExxonMobil and TotalEnergies.
- Sales 2023 \$1M / 2024E \$5M / 2025E \$16M.
- DNV validated ANGARA's technology potential at TRL 8+ and its 400M million tonnes of CO2 /year reduction potential.
- UK expert IP company Metis Partners appraised ANGARA's IP at \$23 million.

ANGARA is pioneering SWARM AI-based maintenance to help heavy industries run their equipment efficiently with our patented Fouling Fracturing technology.

Heat exchangers of our clients operate cleanly and efficiently, resulting in significantly reduced energy usage and CO2 emissions reduction.

Thus, our heavy industry clients achieve profitable decarbonization through energy efficiency. The potential benefits for customers are huge. For example, oil refining emits a lot of CO2 because of fouled heat exchangers. In this industry alone, our technology has the potential to save over 400 million tonnes of CO2 per year, as confirmed by DNV. Additionally, \$40-70 billion can be saved each year.

Our DecarbonX AI solution enables self-monitoring, diagnosis, prediction, and maintenance - revolutionizing heat transfer.

- Our AI-enabled solutions enable heat exchangers to autonomously identify and communicate maintenance issues, transforming the way fouling (scale) - the major efficiency and emissions problem in heat transfer - is managed.
- ANGARA's AI is essential to cost-effectively automate data with complex interdependencies of plant equipment affecting heat transfer, making the new maintenance paradigm scalable.

Our commercial AI predictive analytics service already continuously monitors around 1000 heat exchangers, saving our customers millions of dollars and thousands of mtCO2. Business model-wise, Angara leverages the existing ecosystem of established players.

Our target client industries: biofuels, refining, fertilizers, plastics recycling, geothermal, petrochemicals, chemicals, etc.

CIRCULARITY



Key Contact

Jonathan Fenton
CEO and Founder



www.fetu.co.uk

FeTu

TRL: Waste Heat Recovery System (TRL5), Compressor (TRL7)

FeTu Limited is a year-six innovation-driven enterprise based in West Yorkshire, UK. Since FeTu opened its office, the team has grown from one person to eleven, including three directors. The company continues to grow as FeTu will shortly be purchasing a new 5-axis machine tool to bring manufacturing in-house to propel commercialisation of their novel, 'Fluid Energy Motor'.

The simple fluid machine seamlessly converts between rotational and volumetric sources, the fundamental principle of all compressors, pumps, expanders, and engines. With ruthless effectiveness, the machine has set new efficiency standards in various applications, including compressor, expander, and pump, before applying these in heat engine, refrigeration, and heat pump configurations. The hybrid machine's unique energy architecture looks and performs unlike any before it and has been described by sector experts as "the best combination of desirable attributes from reciprocating and turbine technologies". FeTu offers an ideal architecture with compact, lightweight, scalable, low friction, positive displacement, and continuous flow characteristics. It is manufactured in a variety of recyclable metals, including Aluminium. Due to its design, it scales inordinately well to a range of larger sizes.

Despite FeTu's various applications, critically, the core architecture at the heart of the concept remains the same no matter the use, with subtle design changes unlocking different machine configurations. One is FeTu's 'Compander', a fully integrated combined compressor and expander in a single device, perfect for applications requiring single-phase working fluids (e.g., air) for waste heat and heat pump applications. Able to run various thermodynamic cycles.

During its pilot test, the compressor exhibited >95% volumetric and isentropic efficiency. These machines are traditionally 65% efficient, showcasing a clear improvement FeTu bring.

The machine running in reverse (as an expander) demonstrated the ability to re-generate waste heat electricity from a heat source of only 40°C. Performances that are unheard of.

CIRCULARITY



Key Contact

Danielle Walsh
CEO



Together Global Ltd. (Trading As Clearly)

TRL: 6

The Clearly SaaS Platform uses AI to give Fleet Managers and suppliers transparency over their supply chain emissions to stay compliant, identify decarbonisation initiatives, and maximise their ROI.

Fleet Managers and operators are being pushed by regulation and publicly-set Net-Zero goals into offering greater transparency over their supply chain energy usage and emissions. This requires a level of data gathering and fusion already known to many as a driver of efficiencies, but deemed too difficult to execute. Without these insights, many organisations have little to no visibility over how their supply chains operate, are unable to remain compliant with regulation, and are unable to ensure a viable transition to net-zero.

Whether a company has trip level primary data or secondary data, the Clearly technology SaaS platform is able to generate the needed insights at the trip/journey/route levels to meet the highest standards, whilst driving operational sustainability.

Due to our hardware and data agnosticism, Clearly is uniquely positioned to blend datasets irrespective of source and format, to predict, simulate and generate meaningful insights across entire supply chains.



CIRCULARITY



Key Contact

Man Yong Toh
CEO



Aeroborn

TRL: 7

Aeroborn is a pioneering cleantech company that's tackling the challenge of climate change with innovative solutions. Their revolutionary technology focuses on capturing carbon dioxide (CO₂), a major greenhouse gas, and transforming it into valuable products.

Here's what sets Aeroborn apart:

- Point Source Capture: Unlike technologies that focus on capturing CO₂ from the atmosphere, Aeroborn tackles emissions directly at their source – factories and industrial facilities. This targeted approach makes a significant impact on industries with high carbon footprints.
- Transforming Emissions: Aeroborn doesn't just store CO₂; it creates valuable resources. Their technology converts captured carbon into usable products, promoting a circular economy and reducing reliance on fossil fuels.
- Carbon Black Products: One key application of Aeroborn's technology is the creation of high quality carbon black, a crucial component in tires and inks. By capturing emissions and repurposing them into these essential products, Aeroborn offers a sustainable alternative.
- Beyond Sustainability: Aeroborn's mission extends beyond environmental benefits. Its technology fosters economic growth by creating new markets for captured carbon and potentially reducing waste disposal costs for industries.

Aeroborn is a game-changer in the fight against climate change. By capturing emissions at the source and transforming them into valuable resources, they offer a sustainable solution for hard-to-abate industries.



The background of the image shows a blurred industrial setting with large pipes and machinery. A teal-colored rounded rectangular box is centered horizontally, containing the text 'ENERGY EFFICIENCY' in white, bold, uppercase letters. In the top right corner, there is a graphic of several concentric teal circles, resembling a signal or sensor icon.

ENERGY EFFICIENCY

ENERGY EFFICIENCY



Key Contact

Bob Thronson
VP Marketing & Business
Development



Vigilent

TRL: 9

Vigilent delivers AI-powered software and services that improve the value, operation, and sustainability of our customers' facility portfolios. Vigilent technology optimizes HVAC systems and indoor environments in colocation and enterprise data centers and in large buildings and institutional campuses. Vigilent maintains a robust customer portfolio consisting of over 1,000 deployments in 27 countries.

Facility managers in technical buildings like data centers and telecom exchanges have traditionally used rules of thumb and simple control technologies to manage HVAC systems. These practices have led to significant overinvestment in HVAC equipment, wasted capital, excessive energy costs and a risk of heat-related IT outages.

Vigilent delivers a comprehensive system including AI/machine learning software, sensors and analytics to solve the complex HVAC optimization problem for operators of data centers and telecom facilities. By deploying Vigilent, customers reduce energy consumption and receive other immediate, automatic and persistent benefits:

- HVAC energy reduction of 30-50%, which saves money and significantly cuts CO2 emissions
- Hot spot reduction of 99%, significantly reducing the risk of catastrophic outage
- HVAC capacity increase of up to 10-15%, which enables more revenue-producing IT applications to be added



We're always trying to show the value of what we deliver to data centre operators and these types of awards really to do that.

**Brandon Conti, Project Manager,
Vigilent**

ENERGY EFFICIENCY



Key Contact

Mike Francis
CEO and Co-Founder



NanoTech Materials

NanoTech started in a garage in Houston, Texas in 2020, blending its first products in old homebrew beer tanks and packaging them in Home Depot buckets. The company grew rapidly and joined the Halliburton Labs Clean Energy Accelerator and the Rice Alliance Clean Energy Accelerator. Supported by three venture capital firms, three corporate strategics, and seven family offices. NanoTech achieved ISO 9001 certification, ICC certified, and have completed Miami Dade Certification. Today, NanoTech can produce over 55 million square feet of material annually and continues to expand. Their cool roof coating stops virtually all heat transfer, resulting in up to 50% reduction in HVAC use drastically reducing CO2 emissions

NanoTech Materials, Inc. has revolutionized the science of heat control by integrating its novel Insulative Ceramic Particle (ICP)[™] into common building materials, coatings, and substrates, giving them uncommon heat conservation, rejection, or containment properties. NanoTech Cool Roof Coat is applied directly over the existing roof surface to deliver unprecedented heat rejection through a breakthrough in heat resistance. NanoTech Fireproof Coat delivers asset protection in an easy-to-apply coating that is fire resistant up to 3,272°F, ensuring safety without extensive renovations, dangerous VOCs, thick coatings, or compromised aesthetics. NanoTech seeks to decarbonize the built environment through energy efficiency delivered by their Insulative Ceramic Particle across the building envelope, starting with the roof

ENERGY EFFICIENCY



Key Contact

Troy Brandon
General Manager & Vice President



UCAP Power

TRL: 9

UCAP Power is a global provider of ultracapacitor-based power solutions across a wide range of markets. Ultracapacitor systems use green, sustainable based materials offering a long-lasting source of reliable high-power energy storage that can help eliminate lead-acid and other hazardous materials in batteries.

UCAP Power recently announced the acquisition of Maxwell Technologies assets from Tesla. The acquisition included the Maxwell brand, Maxwell Technologies Korea manufacturing business, and other assets and IP. With the addition of the Maxwell brand, UCAP Power is strategically placed to capitalize on the growing need for clean, renewable energy storage solutions in the >\$10B Automotive, Grid and Industrial markets.

An independent study from the Bay Area Air Quality Management Department (BAAQMD) estimates that using UCAP Power ultracapacitor products in place of lead-acid batteries for Wind Turbine Pitch Systems will save California 3,000 metric tons of carbon dioxide emissions and over 60,000 metric tons in the U.S. annually. The greenhouse gas reduction in the U.S. is 335,000 metric tons over a five-year period. Using ultracapacitors in place of lead-acid batteries in Battery Electric Vehicles (BEV) saves ~387kg GHG (kg CO₂e) per vehicle and 511kg for Internal Combustion Engine (ICE) vehicles.

ENERGY EFFICIENCY



Key Contact

Emmaline Atherton
Chief Strategy Officer



Arolytics

TRL: 8

Arolytics is a start-up headquartered in Calgary, Alberta, Canada. Arolytics delivers methane data management solutions to oil and gas producers. Our current commercial offerings include AroViz, a first-of-kind platform to integrate methane sensor data from any source for holistic management and insights, and AroFEMP, a methane model that simulates emissions to optimize methane programs based on cost and impact. AroViz automates data and compliance requirements, tracks methane reduction progress, and leverages multiple data sources to provide analytics and reports. Using AroFEMP, Arolytics is responsible for the design and regulatory approval of >80% of Alberta's methane management programs involving alternative technologies.

Our founding team formed out of one of North America's largest academic emissions labs where we spent multiple years researching methane emissions at over 10,000 oil and gas facilities. We published leading research internationally and developed methane detection technologies. Recently, we were recognized as the most promising start-up by investors at the RICE Energy Tech Venture Forum in Houston. Our expertise in emissions data analysis and gas measurement science is well recognized across numerous industry associations and companies with whom we've partnered.



ABEN HUB

TRL: 7

We are a cleantech startup that offers an AI-backed SaaS-based platform to renewable energy developers to aid in their design process - generating efficient and optimal designs

Key Contact

Syed Taqvi
CEO



ENERGY EFFICIENCY



Key Contact

Bashir Chalabi
Director, Marketing and
Communications



Symboticware

TRL:7

In the natural resources industry, fleets of heavy and light-duty vehicles generate over 4.5 gigatonnes of greenhouse gas emissions annually and expend over CA\$ 2.7 tr on fuel. As these companies commit to achieving carbon neutrality by 2050, digitization has emerged as a critical tool. However, hurdles like last-mile data access barriers and multi-vendor fleet management with poor interoperability of equipment data hamper progress. This is where Symboticware steps in.

We provide an end-to-end digitization platform designed specifically for the natural resources industry, integrating data capture hardware, connectivity solutions, and analytical software. Our platform collates, tracks, and analyzes data to streamline fuel usage, enhance equipment efficiency, and mitigate the carbon footprint caused by operational and behavioral inefficiencies.

Setting us apart, our technology offers a plug-and-play solution, ensuring no-loss remote connectivity and the quickest time-to-value, thereby addressing our clients' pain points head-on.

By adopting this strategy, Symboticware targets the CA \$60 billion global Industry 4.0 market within the natural resources sector. We have successfully deployed our technology with industry leaders such as Agnico Eagle and Freeport-McMoRan. Our current focus is accelerating growth across mining and other sectors, driving sustainable change throughout the industry.



Key Contact

Lucas Golka
Manager



FN NANO

TRL: 9

We are in process of commercialization of FN NANO TiO₂ based photocatalytic technology for reduction of energy and ecological load. A high performance buildings envelope system creates a positive ripple effect. Mitigate UHI, reduce GHG emissions, promote energy security, decrease landfill, create job opportunities, provide cost savings.

A grayscale photograph of industrial electrical equipment, featuring multiple vertical insulators and horizontal metal bars. A semi-transparent dark gray banner is overlaid across the middle of the image, containing the main title. In the top right corner, there is a faint, circular graphic consisting of several concentric lines.

INDUSTRIAL ELECTRIFICATION

INDUSTRIAL ELECTRIFICATION



Rondo Energy

High-temperature heat used to power industrial processes – from steel to cement to food processing – is responsible for 25% of the world’s fossil fuel use. Until now, we haven’t had a decarbonization option that is proven, affordable, or scalable.

The Rondo Heat Battery (RHB) replaces gas-fired boilers with heat derived from renewables; at the same time, RHBs stimulate the production of more renewable electricity through their ability to absorb excess energy and turn it into pollution-free heat. This addresses curtailment issues on the grid, speeds access for new renewables that would otherwise be stuck in interconnection queues, and unlocks the opportunity for large industrial heat loads to be a solution to grid congestion and over generation.

In the past year, Rondo has been on a hot streak; its inaugural RHB is in daily operation, providing the highest efficiency and highest temperature thermal storage in the world; it opened the world’s largest battery storage production facility with Siam Cement Group, which has a planned capacity of 90GWh, with 2.4GWhs of annual storage capacity already being produced today; and it recently secured \$60 million from a cross-industry group of investors, including Rio Tinto, Microsoft, Aramco, SABIC, SCG, and TITAN.



“Being an award winner at Decarb Connect is a huge honour. I think this conference (Decarb Connect North America) represents some of the biggest emitters in the space and so being an award winner will absolutely help us propel a lot of our partnerships and conversations.”

Danielle Rapson, COO, Mantel Capture

INDUSTRIAL ELECTRIFICATION



Brenmiller Energy

TRL: 7

Brenmiller Energy delivers scalable thermal energy storage (TES) solutions to industrial and utility markets. Its bGen™ ZERO is a modular TES system that replaces fossil fuel boilers to supply process heat for low- and medium-heat industries. The bGen charges via electricity from renewables or the grid, converts it to thermal energy at temperatures of up to 650°C/1,200°F, using electric heaters, and stores it in crushed rocks until it's ready to be discharged according to customers' needs.



Brenmiller lowers upfront capital and operational expenditures for customers by partnering with multinational clean energy utilities and renewable energy developers, and by taking advantage of various global decarbonization and energy market incentives. To maximize savings and ensure 24/7 operational reliability, Brenmiller's bGen offers industry-leading fast charging capabilities to capture ultra-low electricity rates or excess off-site renewable energy, while providing a steady heat supply, in terms of temperature and flow. The bGen can also absorb excess energy from the grid, making it ideally suited to provide power grid balancing services.

INDUSTRIAL ELECTRIFICATION



 www.clswind.com

CLS Wind

TRL: 4

To reach our renewable energy goals, we need to install between (depending on size) 10,000 to 20,000 WT's per year, until 2030. But we need to do it safely, cost-efficiently, and expeditiously, which is almost impossible due to the lack of long-reach, heavy-lift onshore cranes and offshore barges/vessels.

We have developed an elevating platform system that can lift ANY weight to ANY height without long-reach, high-capacity cranes, thus solving this problem. We can re-utilize existing (idle) low-capacity equipment and already-trained personnel, putting them back to work. For the onshore, we can mobilize in small roads, with minimal environmental damage, and a 75% reduction in truckloads – resulting in ~ 80% CO₂ and NO_x emission reduction - installing a wind farm 2X faster with 30-50% savings vs conventional systems. We can assemble WT's in parallel, versus one at the time for conventional installations, assembling an entire wind farm in one weather season. With our system, many port locations would be suitable for offshore wind, versus a few ports with ring-cranes in rich countries. We can maintain, repair, replace or decommission a WT more economically than any conventional system, achieving LCOE savings of 12% onshore and 18% offshore versus conventional crane solutions.



INDUSTRIAL ELECTRIFICATION



Key Contact
Phillip Stephenson
VP of Business
Development



Electrified Thermal Solutions

TRL: 6

Electrified Thermal Solutions' ("ETS") mission is to decarbonize industry with electrified heat. Industry is limited in its ability to electrify heat loads today because state of the art heating elements cannot reach the required temperatures without oxidizing and the cost of electricity is much higher than the fossil fuels used today. ETS's Joule Hive thermal battery solves both of these problems using MIT-developed and patented electrically conductive firebricks ("E-bricks") to convert electricity to heat up to 1,800C. The bricks in the Joule Hive can be charged opportunistically with cheap, off-peak electricity while delivering heat 24/7 to the most demanding industrial heat applications. The result is that the Joule Hive thermal battery can enable the decarbonization of industrial heat at a cost competitive with fossil fuels. ETS bricks are already manufactured using existing refractory brick supply chains, demonstrated to heat >1,700C and on track for initial customer deployments in 2025.



Calectra

TRL: 2

Calectra is a Bay Area-based thermal storage startup that provides high-temperature, carbon-free heat up to 1600°C to the most difficult to decarbonize industries at a cost-competitive price to fossil fuels. The Calectra thermal storage is charged with renewable electricity from the grid or on-site renewable energy assets. Heat is stored at 1800°C for several hours to days at a time in its patent-pending bricks. Up to 1600°C process heat is delivered to retrofitted industrial processes using air.

Calectra's core technology is based on our co-founder & CTO Nathaniel Weger's PhD at UC Berkeley and research at the Lawrence Berkeley National Laboratory. The Calectra team is backed by the US Department of Energy's Cradle to Commerce and MIT The Engine's Blueprint programs.

INDUSTRIAL ELECTRIFICATION



Photon Vault

TRL: 7



Photon Vault is a thermal energy storage technology company that has revolutionized the economics of energy storage. Our modular (5MW modules) design stores energy as heat and dispatches it as electricity. We hold three patents to our system with other defensible IP constituting a unique system that is cheaper than batteries on a short duration basis, and cheaper than other early stage technologies for long durations of 16-100 hours of storage. This particular advantage for long duration storage enables us to offer a combined energy contract to industrial customers made up of 8 hours of wind or solar power plus 16 hours of Photon Vault stored renewable power. This allows the first ever true 24/7 renewable power contracts, all with true time of production matching and nodal matching for customers. This unique contract will enable decarbonization of industries such as steel and cement among others. We have a complete scaled prototype to prove our technology and are preparing for construction of our first commercial system. We are in diligence-stage discussions with five potential customers for this first system that together represent over \$1Bn of potential future project EBITDA for our early development.



INDUSTRIAL ELECTRIFICATION



Mattiq

TRL: 7-8

The trillion-dollar chemicals sector is intricately tied to fossil fuels and is responsible for 10 percent of global greenhouse gas emissions. The production of clean chemicals from renewable electricity presents a transformational opportunity to address climate change. However, most electrochemical systems on the market today are not efficient enough for the commercial production of most chemicals.

Novel electrochemical systems are needed to make electrification of the chemicals industry commercially viable. However, the development of electrochemical solutions has been slow, linear, and siloed.

Developed by a team of world-renowned chemists and materials scientists, Mattiq's electrochemical systems development platform discovers decarbonization pathways at a speed and scale never before seen. Mattiq leverages nanotechnology and artificial intelligence to accelerate the design and deployment of commercially viable electrochemical systems to decarbonize the chemicals, fuels, and plastics that power our world. Mattiq delivers chemical and energy companies safe, scalable, and cost-effective solutions that support a cleaner planet and supply chain resilience.

INDUSTRIAL ELECTRIFICATION



Thermon

Thermon's Vapor Power business line manufactures a highly efficient and 100% emissions free solution for steam generation. The jet electrode boiler line is engineered for on-demand steam for plant process heating requirements. The heat duties can range from 1-50MW and be supplied with voltages up to 13.8kV.



SEG Solar

Founded in 2016 and headquartered in Houston, Texas, SEG Solar is an internationally recognized US manufacturer with a fully integrated supply chain for the production of high-quality solar modules. The company validates its product performance through independent third party testing and is accredited for social responsibility and legal compliance from trusted third party agencies. SEG Solar is dedicated to delivering reliable and cost-effective solar panels to the utility, commercial, and residential markets.

SEG Solar serves global customers with high-quality products and professional services, expanding its global capacity to over 5.5GW and cell capacity to 2GW in 2024. By the end of 2022, more than 2GW of SEG Solar products were installed in the US and European markets.



LOW CARBON FUELS & ENERGY STORAGE

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Adam Karnama
CEO



Spritju

TRL: 8

Energy accounts for 73% of carbon emissions in the world but energy is among the least traceable products in the world as we cannot tag electrons. Energy is currently made traceable with low-quality energy certificates for which corporate pay 32 MEUR per year. That's why we developed Spritju, a B2B marketplace for energy certificates, not only to reduce energy certificate procurement costs by 20% while increasing the granularity of certificates by 8760 times to be compliant with new global standards.



Key Contact

Lee French
VP Marketing

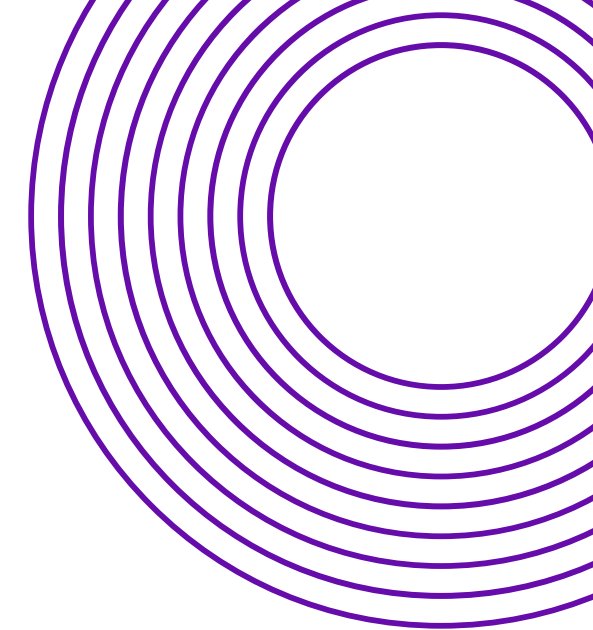


Syzygy Plasmonics

TRL: 8

Syzygy Plasmonics is a deep-decarbonization company. We are the only company in the world currently building all-electric chemical reactor cells that use light instead of combustion to power industrial chemical reactions.

In 2023, Syzygy manufactured and began testing the world's first hydrogen-producing ammonia e-cracker. When using green ammonia as a feedstock and renewable electricity, this new innovation has the potential to unlock the hydrogen economy with ammonia as an energy carrier.



LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Michele Blackburn
Commercial Director



Key Contact

Ryan DuChanois
CEO



Terra CO2

TRL: 7

Founded in 2015, Terra CO2 is an innovative construction materials company focused on decarbonizing the built environment. Terra has developed a proprietary, breakthrough technology that delivers low-carbon and cost-competitive cement alternatives through the processing of globally available silicate (aggregate) feedstocks. The Company's technology is highly scalable, with available feedstocks representing 90% of the earth's rock-bearing crust; over 10X more globally available than the traditional limestone feedstocks used to manufacture Portland cement and capable of being sourced from entitled and operating aggregate quarries. The Company is backed by notable investors, including Bill Gates' Breakthrough Energy Ventures alongside LENX and Rio Tinto and other leading venture investors. Terra's technology boasts an impressive Intellectual Property moat and is fully patented in the US (16 patents issued to date), with a robust, international filing strategy across 20 countries and 6 continents that is quickly approaching completion.

Solidec

TRL: 4/5

Solidec is a spinout from Rice University that was founded by engineers and physicists trained at Yale, Stanford, and Rice. We have developed a patent-pending technology, which has been published in Nature and Science, that simultaneously produces hydrogen and captures carbon dioxide electrolytically, eliminating any fossil emissions. Our dual-functioning electrolyzer reduces energy consumption of carbon removal by 45% and electrolytic hydrogen production by 20-30%, while reducing capital costs by 50%.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Chad Mason
Founder and CEO



Advanced Ionics

Advanced Ionics is pioneering a brand new category of electrolyzer technology for industrial green hydrogen production. Our water vapor electrolyzer lowers the cost of green hydrogen production to beat our fossil fuel hydrogen production, transforming the way industrial manufacturers (ammonia, petrochemical, steel) produce green hydrogen and solving for a cost-effective and efficient solution to replace fossil fuel-based hydrogen that dominates the market today.



Key Contact

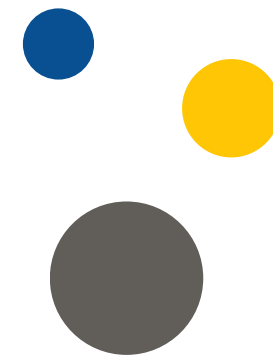
Edward Chan
Founder and CEO



Metasorbex Corporation

We capture carbons and convert it to raw feedstock through high-capacity graphene-based sorbent and catalyst in the hard-to-abate sectors with a lower cost than incumbent. The first product is e-methanol. Longer term, we will produce ethylene and propylene from carbon emissions waste.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Daisy Zhang
Marketing Operations
Coordinator



South 8 Technologies

South 8 Technologies, Inc. develops, manufactures and licenses LiGas®, the liquefied gas electrolyte for advanced lithium-ion batteries that solves lithium-ion's "Fire and Ice™" problems. South 8's patented LiGas electrolyte reduces fire risk and operates across a wide temperature range, from -60 to 60 °C. LiGas cells enable clean battery power to benefit more applications, environments, and people. LiGas is also compatible with common battery materials, increases energy, supports fast charging, and is cost effective for battery manufacturers.



Key Contact

Omar Sigurbjornsson
Director of Marketing and
Communications



Carbon Recycling International

TRL: 8/9

CRI is a recognized technology leader in the Carbon Capture and Utilization market, offering a one-of-a-kind CO2 to methanol solution. Founded in 2006 in Iceland, CRI has its origins in producing and selling the world's first certified e-methanol. Since then, the company has extended its reach by developing, scaling, and deploying CO2 to methanol plants worldwide.

Today, CRI provides a comprehensive range of end-to-end solutions, including its proven-at-scale ETL technology. With its current technology portfolio capacity to recycle over 300,000 tonnes of CO2 annually, the company stands at the forefront of harnessing carbon emissions and hydrogen for sustainable fuels and chemical production.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Doris Hafenbradl
CTO/Managing Director



electrochaea.com

Electrochaea

TRL: 8

Electrochaea's proprietary energy solution accelerates the decarbonization of the gas grid and allows for efficient and nearly unlimited energy storage for future use. The company synthesizes low-carbon intensity, BioCat Methane from renewable energy and carbon dioxide using a patented archaea as the biocatalyst. The result is clean, renewable synthetic methane that is reliable, practical, and safe for storage and distribution in the existing gas infrastructure. The high efficiency and robust nature of our biocatalyst enables our patented methanation technology to operate at lower capital and operating costs and with greater flexibility than conventional thermochemical methanation processes. The biocatalyst is remarkably compatible with variable duty cycles and common impurities in CO2 sources. P2G energy storage enables practically unlimited storage capacity via existing gas grid infrastructure. At grid scale, BioCat Methane provides fuel for transportation, residential, industrial, and all other traditional uses of natural gas. A long-duration energy storage solution is essential as intermittent renewable energy sources become a greater part of the energy mix. Conventional batteries are ill-suited for long-term grid-scale storage. Energy in the form of synthetic methane can be stored, transported, and used as a renewable replacement for fossil gas.



Key Contact

Anna Dai
Founder



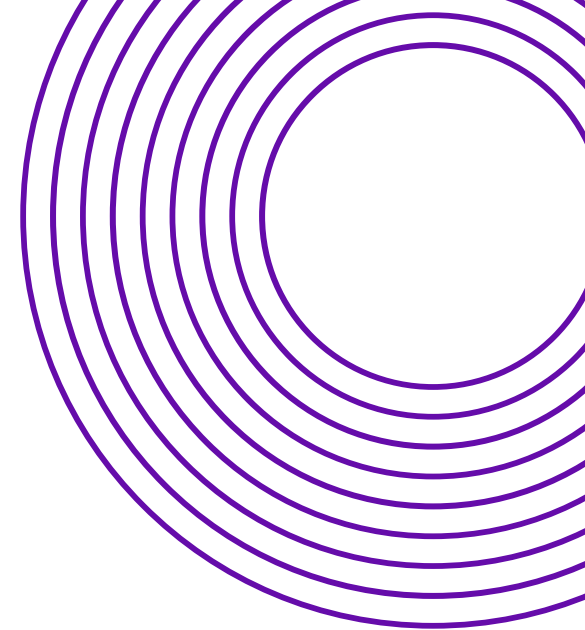
vareaenergy.com

Varea Energy

TRL: 2/3

Varea is developing a comprehensive geophysical approach for the identification and mapping of Geological Hydrogen Reservoirs (GHRs) by characterizing their seismic, gravity, and well-log signatures. This effort is aimed at leveraging existing exploratory seismic, density, and well data to explore the potential for GHRs of biogenic origin associated with hydrocarbon basins, contributing to the broader understanding of hydrogen resource exploration and utilization.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Leigh D'Angelo
Communications & PR Manager



modernhydrogen.com

Modern Hydrogen

Modern Hydrogen is a pioneer in the clean energy sector, founded with the mission to make energy both cleaner and cheaper. We specialize in transforming natural gas into clean hydrogen through a revolutionary process called Methane Pyrolysis, significantly reducing carbon emissions. Established in 2015, our technologies are designed to produce clean energy directly at the customer's location, serving a wide range of industries from utilities to industrial manufacturing. With a focus on distributed decarbonization, Modern Hydrogen is at the forefront of the clean hydrogen economy, offering scalable and innovative solutions to meet the urgent needs of climate action.



Key Contact

Anand Patel
CFO



ghpower.com

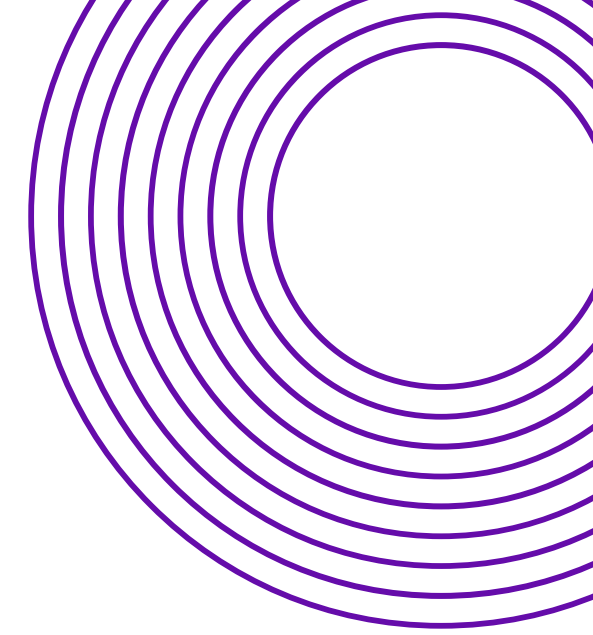
GH Power

TRL: 7

GH Power builds and operates highly efficient energy reactors that deliver green base-load power to industries that need renewable energy now more than ever. The Company's innovative systems can take recycled metal and react them with water to produce carbon-free metal oxides, green hydrogen, and dispatchable renewable energy. The company has successfully executed the build of a commercial 2MW reactor on-time and on-budget. GH Power will look to scale their tech by building out a pipeline of projects alongside global blue-chip strategic partners. Our cost of production is lower than our competitors as our main input aluminum is waste or end of life.

We have also been third party verified to have zero scope one emissions. Our zero carbon emission process will create Green Certificates enhancing the value of our products generating a higher ROI. The technology is modular and scalable creating a last mile green energy solution. We can produce aluminum-oxide, hydrogen, and thermal energy integrated within end-user's process creating savings in transportation and distribution relative to the competitive production methods. The company has filed provisional patents to use iron as an input lowering the costs basis of all products further than aluminum building our IP in metal fuels.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Alicia Dinges
Business Development Manager

 goldhydrogen.com

Gold H2/Cemvita

TRL: 5/6

Gold H2 is a spin out company from Cemvita, formed to commercially deploy Gold Hydrogen technology in the field. Gold Hydrogen is a novel source of low-carbon hydrogen produced biologically from depleted and/or low performing oil reservoirs that are ready for plug and abandonment, giving oil fields a sustainable second life and extending the revenue stream for 10-20 years that would otherwise become a financial liability. By utilizing existing oil and gas infrastructure we will be able to produce hydrogen at commercial scale economically at a low carbon intensity.



Key Contact

Wilson Hago
Founder and CEO

 hagoenergetics.com

Hago Energetics Benefit Corporation

TRL: 6

Hago Energetics is driven by a deeply rooted commitment to creating sustainable solutions to the climate crisis. Founded in 2017 the company continues working towards developing and implementing technology to convert cellulosic products into needed products, such as biochar and green hydrogen. Our company has steadily worked on the creation of solutions for farms, wastewater treatment plants, and other sectors looking to lower their carbon footprint. We also continue expanding our team and partnerships so that together we can be part of worldwide decarbonization.

LOW CARBON FUELS AND ENERGY STORAGE



Key Contact

Vibhu Sharma
CEO



InnoVent Renewables

Ever wonder where all your waste tires end up? Over 1 billion tires per year end up in landfills globally, with over 150 million in North America alone. This is a massive and unresolved climate and environmental challenge that needs to be addressed. Waste (end of life) tires in landfill can lead to GHG emissions, rodents, West Nile virus and leaching in the soil. It can also be a big fire hazard. Tires don't decompose on their own.

InnoVent Renewables is a technology and operations company with proprietary continuous pyrolysis technology that converts waste tires into valuable fuels and Chemicals. Recycling of 4 waste tires reduces Co2 equivalent emissions by 323 lbs. Our first commercial production site will process 1 million waste tires, which is equivalent to reducing Co2 emissions by 8 million pounds!

InnoVent Renewables will use its innovative technology and production facilities to convert this waste into high value products such as off-road diesel, natural gas, steel wire, and recovered carbon black (rCB), while leveraging a completely emissions-free process. After spending years on R&D and pilot test facilities, we are setting up first commercial production train in Monterrey, Mexico. InnoVent has assembled a team of world-class executives each with more than 25 years of energy and chemical industry experience, supported by a diverse team of senior advisors.



elemental
Advanced Materials

Key Contact

Ian Bishop
President



Elemental Advanced Material

TRL: 8

Elemental produces high performance graphene and hydrogen from mixed and contaminated plastics. EAM can also produce hydrogen and carbon nano onions from hydrocarbon gases such as acetylene, propane and methane. Both processes are single step and CO2e neutral. There are no waste streams that are produced by either. A unit the size of a large SUV is designed to produce 20,000 lbs/day of graphene and 5,000 lbs/day of hydrogen. This would be from a feedstock of 25,000 lbs of plastic. The graphene has been tested for use in EV batteries and supercapacitors. Material straight off the process passed 100,000 charge/discharge cycles where the standard is 2,500. There is a machine on the floor in Houston that is being commissioned to begin production within the next 2 months.



SEEDLING AWARD

WWW.DECARBCONNECT.COM

SEEDLING AWARD



Key Contact

Robert Rolnik
CEO



windeverest.com

WindEverest Corporation

TRL: 3/4

60% of EV drivers report climate as a motivator to their vehicle choice. WindEverest communicates to EV drivers in wind-rich grids the strength wind in electricity production in a letter grade format. Simple. Such reporting can level the playing field between drivers on different grids; and is amenable to gamification and social media bragging. Importantly, a version of the technology can return rebates to drivers' electricity bills, even though the drivers spend no more than 5 seconds, daily, to assess the wind-surplus prospects. Why? Because wind is the lowest cost of energy and benefits from federal subsidies.

As an alternative to time-of-use electricity pricing, we prompt users to capture renewable energy that lacks a market — increasing turbine utilization. The wind/infrastructure report is fine-grained enough to shape and shift demand to take surplus electricity. Moreover, avoiding explicit references to megawatts keeps the decision to charge simple during the critical car unloading phase at the end of the day. Further, use of the WindEverest report lets people avoid the times thermal generators are active. A B2B model returns to WindEverest a monthly fee per driver via the electricity provider, since no fuel inputs impact their costs.



Key Contact

Sydney Rodman
Founder and President



greenrevival.co

Green Revival

TRL: High due to use of existing tech

Green Revival is unlocking innovative and new sources of waste biomass for the bioeconomy. With species-level ecological understanding, we match species and removal project to the right use case to scale the green transition.

SEEDLING AWARD



Key Contact

Rhiannon Parker
Founder



loopbioproducts.com

Loop Bioproducts

TRL: 4

Loop Bioproducts is focused on cultivating renewable, perennial biomass from opuntia cactus to produce low carbon bioenergy and sustainable byproducts. Loop's offering is based on the belief that decentralized clean energy solutions play a vital role in realizing the energy transition.

Loop's biomass is grown on semi-arid land which does not compete with land used to address food insecurity. The regenerative agriculture methodologies we adhere to enable us to biologically sequester carbon and convert marginal land into thriving ecosystems backed by tangible data to demonstrate our impact.

The name Loop is in celebration of the closed nutrient loop our processes are based on as well as our commitment to principles of circular economics.



Key Contact

Nicholas Seet
CTO



undesert.com

Undesert Corporation

TRL: 7

Undesert Corporation can turn the world's dirtiest water, including produced water from the oil and gas industry, into perfectly pure water and dry salt. Currently this water is pumped underground where it causes water contamination and earthquakes.

Our patented water desalination technology can process this wastewater and use it for irrigation of desert forests in order to create novel nature-based carbon offsets. We are proud to announce that we are part of the Shell Gamechanger product accelerator.

SEEDLING AWARD



Key Contact

Ken Williams
CEO



GROW: Green Resources & Opportunities Workforce

GROW is a nonprofit coalition with a mission to create pathways for BIPOC communities to access education, workforce training, and economic opportunities in the growing green economy and energy transition. Fighting Climate Change With Economic Empowerment

GROW is on a mission to empower underserved communities to access climate education, green jobs/entrepreneurship and smart resilient communities.



Key Contact

Daman Walia
President/CEO

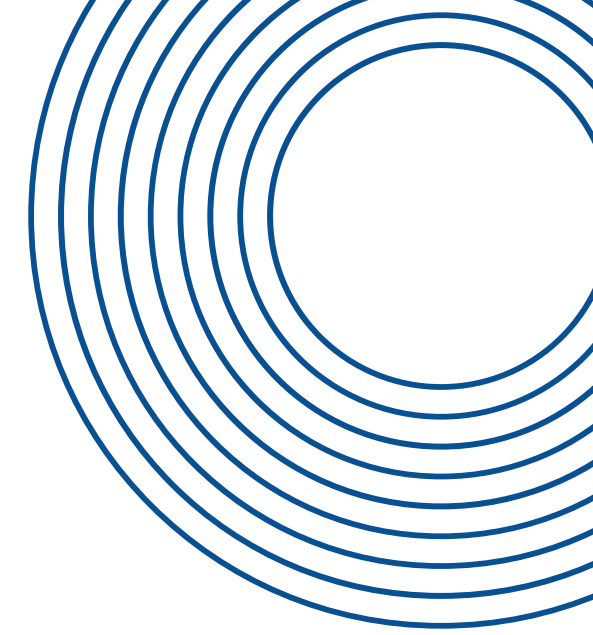


ARCTECH

TRL: 7

Seeking to deploy carbon farming with actosol organic humic fertilizer made by repurposing coals. It enhances photosynthesis and increases carbon removal from air and stores in soils while increasing crop yields by 20%+. Captures 10 Tons of CO2 per acre per year and rebalances two of the largest storehouses out of five of our planet, air, and soils currently most out of balance. Other three are sedimentary rocks, fossil fuels and oceans.

SEEDLING AWARD



MicroBio Engineering, Inc.

TRL: 3

Our startup will research and develop an innovative engineering technology, herein named the CarbonBank, for enhanced forest carbon (C) storage and sequestration. Integrating bioreactor landfill design principles, the CarbonBank will sequester C by burying woody biomass sourced from forest thinning operations under conditions that promote long-term preservation. Woody biomass, from forests thinning's, have a high C content and are highly resistant to anaerobic decay, producing only minor amounts of methane even in very long-term storage (100+ years).

The innovative technology to be demonstrated in this startup will reduce these greenhouse gas emissions to negligible amounts over the long-term time horizon required for C sequestration. The design, construction, and operation of each CarbonBank will emphasize principles of sustainability. Each facility will source materials on-site and will not require investment in synthetics or fossil energy, thereby improving the technoeconomic potential and reducing the lifecycle environmental impacts of our startup. We plan to study the ecological impacts of our technology and to establish a community benefits plan that addresses workforce and community diversity, equity, and inclusion components. Long-term co-benefits of this technology will include wildfire risk mitigation and resource recovery to meet future energy generation and timber needs for nearby disadvantaged communities.

Key Contact

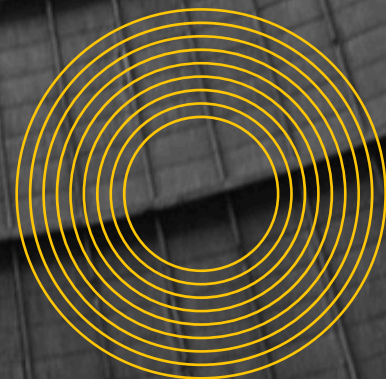
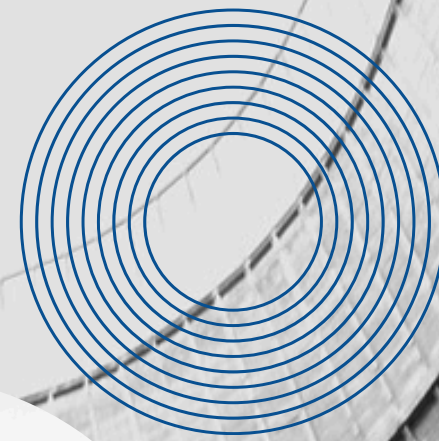
Derek Manheim
Senior Research Engineer

 microbioengineering.com

decarb
connect

**ONES TO WATCH:
CLIMATE TECH
START UPS &
SCALE UPS**

2024



**Interested in featuring or
collaborating at one of our future
events? Contact us:**



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