2024 | **Impact** Report

evōk™

Contents

Introduction

Our core mission at Evok Innovations (Evok) is to mitigate climate change by investing in and supporting exceptional entrepreneurs with bold visions and innovative technologies. We firmly believe that the scale and urgency of the climate crisis demands an equally ambitious vision and relentless drive to create solutions in partnership with heavy industry. Our mission is to empower the next generation of entrepreneurs to lead the charge in developing transformative technologies that redefine industries and drive meaningful change.

Over the past several years, we have observed leading climate investors develop reporting frameworks to measure impact and uphold their portfolio companies to the highest standards. This year, we collaborated with numerous clean tech venture capital funds across North America, with the goal of creating a unified survey establishing a consolidated set of best practices for impact reporting in early-stage climate startups. Having a unified approach is a critical step in driving accountability and efficiency through a single comparable set of metrics that provides startups with guardrails that help focus their efforts on tracking and improving metrics that matter.

We are proud of the collective effort across the venture ecosystem that has culminated in the first steps towards an aligned reporting framework. We are pleased to present our 2024 impact report which provides a comprehensive overview of our impact reporting methodology and the environmental footprint of our fund, alongside the measurable impact of our portfolio companies. Building on the feedback from last year's report, we have also included case studies showcasing the achievements of three portfolio companies across our Fund I and Fund II.

At Evok, we are committed to advancing transparency and best practices in impact reporting for early-stage clean tech startups. None of this would be possible without the support of our investors, portfolio companies, and the broader community. Your collaboration and guidance remain invaluable as we refine our reporting practices and continue to champion meaningful progress in the years ahead.

Our mission is to empower the next generation of entrepreneurs to lead the charge in developing transformative technologies that redefine industries and drive meaningful change.

A Note from our
Founding Partner

As we reflect on 2024, the extraordinary momentum of the climate tech sector is undeniable. Global investments in the energy transition surged past $2 trillion USD this year, according to the IEA—a 12% increase over 2023 and nearly double the investments in conventional energy. This growth underscores the rapid expansion of technologies like renewable energy generation and storage to meet rising energy demands, while also highlighting the urgent need for advanced extraction and processing technologies to secure the critical minerals essential for sustaining this development.

In the U.S., the Inflation Reduction Act (IRA) drove significant momentum in 2024, accelerating large-scale deployments as transformative technologies moved from pilots to full-scale operations. From advanced manufacturing to thermal energy storage, the past year demonstrated clean tech's ability to scale under strong policy support. However, under the Trump administration, federal priorities are expected to shift toward energy security, domestic resource development, and onshoring supply chains, particularly for critical minerals and strategic industries. Additionally, surging power demand—driven by industrial growth, data centers, and AI infrastructure—will shape investment priorities. We are working closely with our portfolio companies to navigate this evolving landscape.

Despite the progress of 2024, we continue to be faced with stark reminders of the climate crisis. 2024 was the hottest year on record, marking the first time global temperatures exceeded 1.5°C above pre-industrial levels. 2025 is set to continue on this path, with the LA fires setting a grim tone for the urgency of action as one of the worst disasters in U.S. history.

We find ourselves at a pivotal moment where the urgency of climate action has never been more apparent. At Evok, we are proud to see our portfolio companies leading in this rapidly evolving environment, with 2024 bringing significant milestones for many of them. Be it MineSense deploying advanced mining solutions across the copper sector, or Disa pioneering a solution to safely remediate and upcycle abandoned uranium mines into a resource for domestic energy security, we remain optimistic about the power of innovation to drive the climate and energy transition.

As we enter 2025, the road ahead demands boldness, resilience, and unwavering commitment. To our portfolio companies, thank you for your dedication and vision. Together, we are shaping a future defined by sustainability and opportunity, even in the face of unprecedented challenges.

Marty Reed

Our **Story**

Evok is a clean tech venture capital fund focused on supporting exceptional entrepreneurs with bold visions for scaling novel technologies within heavy industry. At Evok, we provide value beyond capital by leveraging our team of technologists and company builders, along with our limited partner group—which includes major financial institutions and industrial leaders—to help accelerate the success of our companies.

In 2016, Evok was founded with the thesis of collaborating with industrial partners to invest in and scale novel technologies in the energy sector. With the launch of Evok Fund II in 2022, we expanded this mandate, bringing in strategic partners across new industrial verticals, including critical minerals.

Since its inception, Evok has supported 25 companies over 67 investment rounds and has exited several investments. Evok is actively investing out of Fund II, a $284M USD fund focused on supporting Series A+ companies that are taking novel approaches to supporting the energy transition across a wide array of sectors and industries.

OUR PORTFOLIO COMPANIES

BRITISH COLUMBIA
DarkVision (exit)
Ekona Power
Expeto Wireless
Rotoliptic Technologies
Sanctuary AI
MineSense

ALBERTA
Osperity (exit)
SensorUp
Summit Nanotech
VEERUM

ONTARIO
e-Zinc

NOVA SCOTIA
Planetary Technologies

WYOMING
Disa Technologies

COLORADO
Koloma

MASSACHUSETTS
ZwitterCo

TEXAS
ARIX Technologies
Quidnet Energy
Syzygy Plasmonics

CALIFORNIA
Ebb Carbon
Kelvin Inc.
Mosaic Materials (exit)
Twelve (exit)
Stealth

OUR OFFICES

Vancouver
San Francisco
Calgary
Toronto
Washington DC

Investment **Focus**

Evok is focused on partnering with industrial majors to improve the environmental and economic performance of their operations. Addressing the challenges of hard tech requires a deeply technical, thesis-driven approach, leveraging our in-house expertise in developing and scaling technologies within these complex sectors.

We are currently deploying capital from Fund II across the U.S. and Canada, investing in companies who are driving industrial innovation that is both economically and environmentally sound. Our focus spans the broad energy value chain; the extraction, processing, and lifecycle of critical minerals essential for the energy transition; industrial optimization; and mitigating climate impacts while supporting the adaptation of industry and society to a changing world.

Energy

- Next-gen fuels and hydrogen
- Baseload energy generation
- Long duration energy storage
- Behind-the-meter electrical infrastructure

Minerals & Mining

- Mineral extraction optimization
- Novel refining technologies
- Circularity solutions
- Efficiency and process optimization
- Advanced exploration tech

Industrial Optimization

- Industrial heat and thermal management
- Molecular separation
- Advanced industrial hardware & software
- Low-carbon industrial chemicals
- Industrial water treatment

Adaptation & Mitigation

- Infrastructure resilience
- Disaster prediction and mitigation
- CCUS

Our **Methodology**

Throughout the year, we continuously monitor the impact reporting landscape, ensuring our internal practices and metrics evolve with industry best practices. This year, we have collaborated with other investors within the North American clean tech ecosystem with the goal of creating a unified reporting framework to standardize reporting practices to drive efficiencies for reporting requirements.

On an annual basis, data on key metrics is collected from our portfolio companies and reviewed and audited by the Evok team. The information gathered from our ventures is used for our Impact Report, reporting requirements to our limited partners, and in development of value-add services for our portfolio companies. Each year, the Evok team reviews the aggregate data, identifying trends across our supported ventures, and creates resources, tools, or events to help accelerate growth and share learnings within the portfolio.

Our Survey

In previous years, the Evok team created a bespoke reporting survey in the absence of an agreed upon industry standard for impact reporting in the clean tech sector. This year, we have worked with other leading investors with the goal of creating a unified reporting framework tailored to metrics that are impactful as well as reportable for early-stage clean tech companies. The survey has evolved over multiple iterations, with many aspects originating in the bespoke framework developed by Evok. Our hope is that this unified framework can serve as the building blocks for an industry standard. We look forward to working with our partners towards this goal in the years to come.

Impact

To provide a comprehensive review of the impact of our portfolio companies, Evok collects information on both the environmental impact from day-to-day operations, as well as the positive impact of the technologies they are working towards commercializing. Due to the differing stages of companies within Evok's Fund I and Fund II portfolios, reportable metrics can vary based on the stage of the companies. However, by illustrating the nature of future reporting requirements, we hope to encourage conversations around methodologies and processes that can be incorporated into our earlier stage venture's operations as they scale.

Demographics

For collecting demographic information Evok continues to utilize BDC's framework[1], which is regarded as the benchmark in the Canadian venture community.

Governance

Leveraging our board positions, Evok mandates strong governance practices, ensuring our portfolio companies have a solid foundation to build upon through their future stages of growth. Our Impact Survey collects data on which policies are currently in place, and allows us to provide recommendations and resources to improve governance practices in the future.

1 BDC demographic data reporting template

Our **Footprint**

Due to the nature of venture capital, the largest contributor to Evok's footprint are the emissions associated with travel. Evok has a 10-person team, working across two states and three provinces. With a geographically dispersed team, Evok can be actively engaged in multiple North American clean tech ecosystems, while limiting carbon intensive travel. As a team, we continue to practice discipline with travel and work to limit unnecessary emissions.

Traveling to the office

4 employees are fully remote, and do not commute to an office by any means.

6 employees are hybrid: **60% from the office** and **40% from home**

Out of the employees that commute...

1 employee drives an electric vehicle

3 employees take the bus &/or walk

2 employees drive an ICE vehicle, and their commute emissions are offset with durable carbon removals

CO_2 Emissions

When travel is unavoidable, the Evok team optimizes around the lowest carbon options (electric vehicles, public transit, direct flights). All emissions associated with the fund's activities, inclusive of both business travel and commuting, are tracked throughout the year and offset with high quality carbon credits.

CO_2 OFFSET POLICY

To offset emissions from operations, Evok purchases high quality carbon credits. Evok adheres to best practices for carbon credit purchases, as defined within our carbon credit policy. To qualify for purchase the carbon credit must meet the following requirements:

- Carbon removal technology needs to be an engineered solution that can adequately calculate CO_2 sequestered.
- The CO_2 must be sequestered for a minimum of 100 yrs.
- Credits must be certified and registered with a reputable credit registry.
- The carbon credit must be retired within a reasonable time frame.

For this year's offsets, we have pre-purchased 24 tonnes of durable carbon removals from our own CDR portfolio companies, all of which are set to be retired in the 2025 calendar year.

WATER USAGE

Based on the industrial focus of Evok's portfolio companies, water can be a significant metric, not just from their operations but as an impact of their novel technologies. With that in mind, the Evok team reviews our own water usage in an effort to hold ourselves to the same standards as our portfolio companies. However, due to the financial services nature of our operations, water usage at Evok HQ is negligible.

ENERGY USAGE

Evok's HQ is based in British Columbia, Canada, where the energy mix is 89% hydroelectric, 3% wind, 0.1% solar, 6% biomass, 1.4% natural gas and 0.1% petroleum[1]. In 2024, Evok operated from a Vancouver office space of 1,700 square feet, translating to minimal energy use and, based on the local energy mix, minimal related CO_2 emissions.

1 Canadian Energy Regulator, Provincial and Territorial Energy Profiles

Emissions from Travel

In the years since the pandemic, we have seen air travel and associated emissions steadily increase, reflecting an increasing number of conferences, board meetings, and ecosystem engagements that have returned to in-person formats. In tandem, we have seen a continuous decline in our footprint from ground travel, largely driven by the rise in electrified ground transport. While we expect incremental increases in emissions in the years ahead as our team and portfolio grows, we will stay vigilant in balancing the travel demands of our industry and continue our commitment to minimizing our impact.

	2024	2023	2022
NUMBER OF FLIGHTS	158 ↑	135 ↑	60
MILES FLOWN	142,978 ↑	137,774 ↑	50,809
NUMBER OF GROUND TRIPS	319 ↑	293 ↑	191
ICE MILES DRIVEN[3]	7,075 ↓	8,019 ↓	10,051
TONNES OF CO_2	20.93 ↑	17.18 ↑	8.34
	2.77 ↓	3.21 ↓	4.06
TOTAL CO_2 EMISSIONS	23.70 ↑	20.39 ↑	12.40

1 ICAO flight emissions tool used to calculate emissions
2 Passenger vehicle emissions from the EPA
3 ICE: Internal Combustion Engine

Our **People**

Building Strong, Impactful Teams

Success in frontier markets requires a broad range of perspectives, skill sets, and experiences. We believe that teams with complementary expertise and varied backgrounds drive better innovation and outcomes. At Evok, we apply this same principle at the fund level, ensuring our investment approach fosters a dynamic and high-performing environment.

Governance

Fostering a strong company culture starts with the bedrock of good governance. Evok's policies establish clear expectations for its team members and clearly defines what they can expect from Evok. All relevant Evok governance policies are made available to portfolio companies to ensure best practices are adhered to across the portfolio. At the fund level Evok adheres to best practice governance standards in accordance with the Institutional Limited Partners Association (ILPA) in partnership with the fund's Limited Partner Advisor Committee (LPAC).

Human Resources (HR)

To ensure Evok continues to evolve it's HR standards and practices, the fund retains a third-party HR firm that works closely with the team throughout the year, completing workshops and 360 employee reviews. An annual audit of Evok's practices and policies is also completed by the HR firm to ensure they are kept current with evolving regulations. All employees of the fund are advised on updates and are required to sign off on employee facing policies annually.

Compensation Structure

Evok's strategy is to attract and retain industry-leading talent that best advances the fund and its operations. To achieve this goal, Evok offers its employees a well-rounded compensation package, including:

- Highly competitive salaries
- Bonus pool open to all employees
- Carry pool open to all employees
- Unlimited vacation days
- Continued education assistance
- Extended health benefits with flex accounts

Our Team

Mike Biddle
Partner
San Francisco, CA

Michelle Chambers
Chief Financial Officer
Vancouver, BC

Naynika Chaubey
Partner
Washington, D.C.

Val Chiykowski
Senior Associate
Vancouver, BC

Emma Gaiger
Manager of Operations
Vancouver, BC

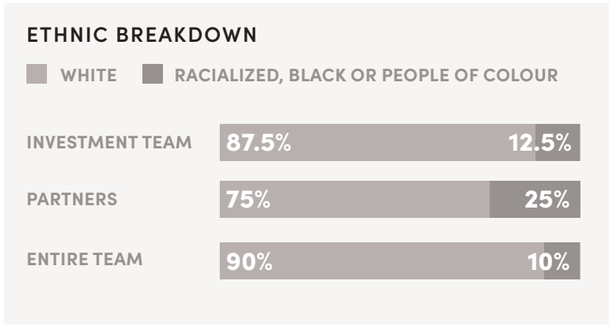
Jane Kearns
Partner
Toronto, ON

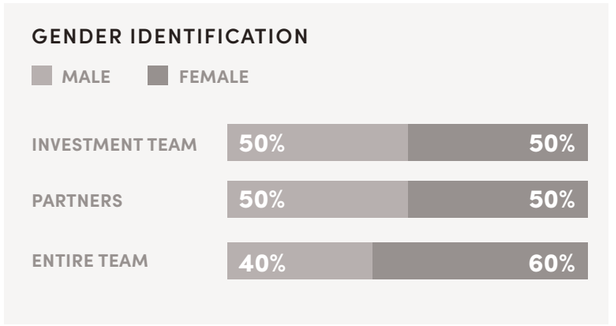
Darren Love
Senior Associate
Vancouver, BC

Erin Madro
Principal
Calgary, AB

Marty Reed
Partner
Vancouver, BC

Bill Shmygol
Associate
Vancouver, BC





Summary of **Results**

Survey Results

The following section highlights data gathered from Evok's portfolio companies for the 2024 Impact Survey. The information presented has been aggregated to a portfolio level in order to anonymize responses. These results represent 19 companies, across both Evok Fund I and Evok Fund II.

Within Evok's portfolio there are companies that range from early-stage pre-revenue, with headcounts of 8 employees, through to growth-stage revenue generating companies with head counts of over 250. The Evok team continues to iterate on the information collected from portfolio companies, with the goal of ensuring both measurable, reportable, and impactful metrics are at the core of any ask.

Survey Highlights

100%
RESPONSE RATE

9:10
RATIO OF EARLY STAGE: GROWTH STAGE COMPANIES

21%
VENTURES REPORTING IN TRADITIONAL IMPACT FRAMEWORKS

37%
IMPLEMENTING AN EMPLOYEE ENGAGEMENT SURVEY

63%
VENTURES WITH AN INDEPENDENT BOARD REP

87%
HARD TECH VENTURES WITH A HEALTH AND SAFETY POLICY

United Nations Sustainable Development Goals (UN SDGs)

UN SDGs continue to be a prevalent framework within the clean tech sector for reporting impact. The continued belief is that a unified framework for measuring impact within the venture capital sector will come to market and replace UN SDGs as the fundamental standard. In the meantime, Evok's portfolio companies have selected goals that align with the energy transition.

#1 reported SDG

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

13 VENTURES SELECTED

#2 most reported SDG

GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION

10 VENTURES SELECTED

#3 most reported SDG

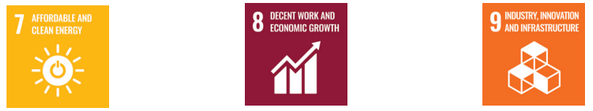
GOAL 7: AFFORDABLE AND CLEAN ENERGY

7 VENTURES SELECTED

#4 most reported SDG

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

6 VENTURES SELECTED



MOST REPORTED GOALS BY PORTFOLIO COMPANIES

UN SUSTAINABLE DEVELOPMENT GOALS

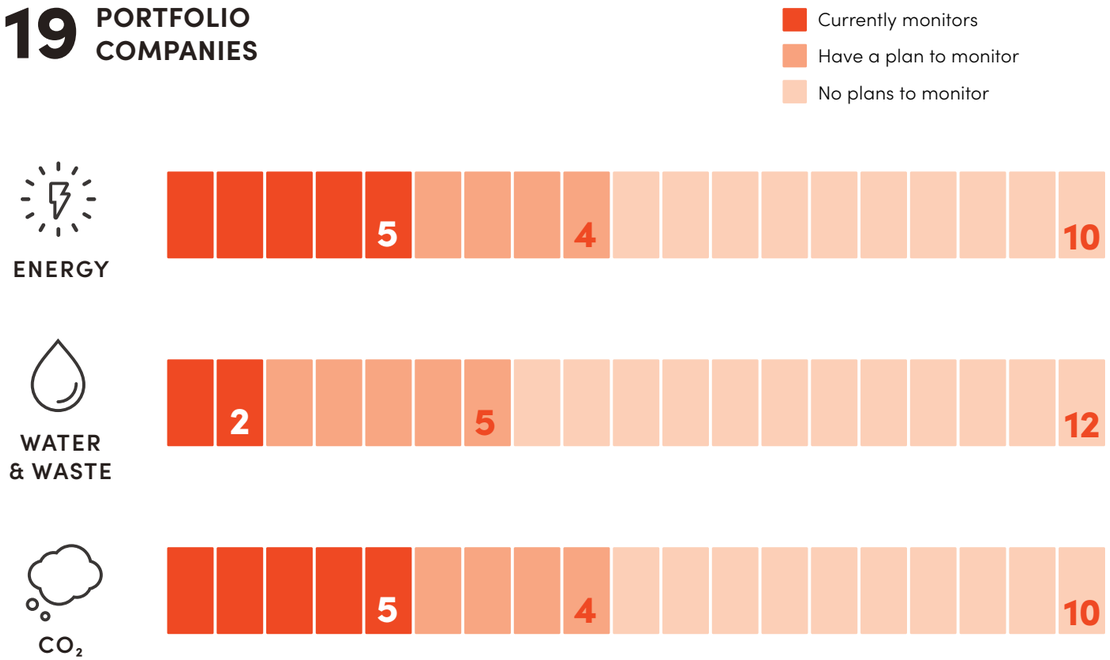
EVOK VENTURES ALIGN WITH 54 SDGS

Impact From Operations

Many of Evok's portfolio companies are in the early stages of development, with environmental impacts that will become more meaningful as they grow. In our 2024 portfolio, many of these early-stage ventures have a limited headcount and environmental footprint, and do not have a plan in place to report on operational metrics. As these ventures scale, our goal is to work with them to add monitoring plans, similar to what we observe across later stage companies in our portfolio and in the broader industry.

OPERATING METRICS

19 PORTFOLIO COMPANIES



Supply Chain

In recent years, global supply chain disruptions have become the new normal—a trend that began during the pandemic and has only intensified in early 2025. In our Impact Report, we outline what we see as the greatest potential risk categories for portfolio company supply chains, and encourage our companies to review these risks, their exposure, and the strategies to manage identified risks over time.

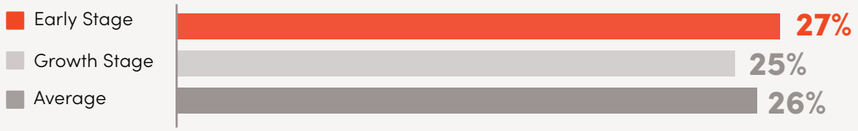
OVERSIGHT ON SUPPLY CHAIN RISK

	REVIEWED	EXPOSED	STRATEGY IF EXPOSED	NOT REVIEWED
CLIMATE RISK	5	0	0	14
HUMAN RIGHTS	6	1	1	13
ENVIRONMENTAL RISK	4	0	0	15
SCARCE RESOURCE RISK	5	1	1	14

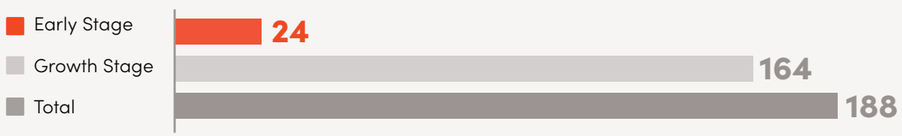
HR Statistics

Across our portfolio, we track employee turnover, promotions, new hires, and internship and apprenticeship programs, analyzing this data by company stage to reflect evolving HR dynamics as companies scale. In 2024, the broader startup and technology ecosystem faced continued contractions and layoffs, a trend reflected in our portfolio as companies focused on preserving cash amid a challenging fundraising environment. Despite these headwinds, Evok remains committed to fostering growth, supporting a total headcount of 1,143 full-time employees, including 329 new hires across the portfolio in 2024.

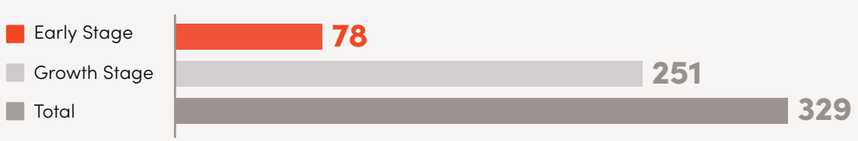
ANNUAL EMPLOYEE TURNOVER



NUMBER OF EMPLOYEES PROMOTED



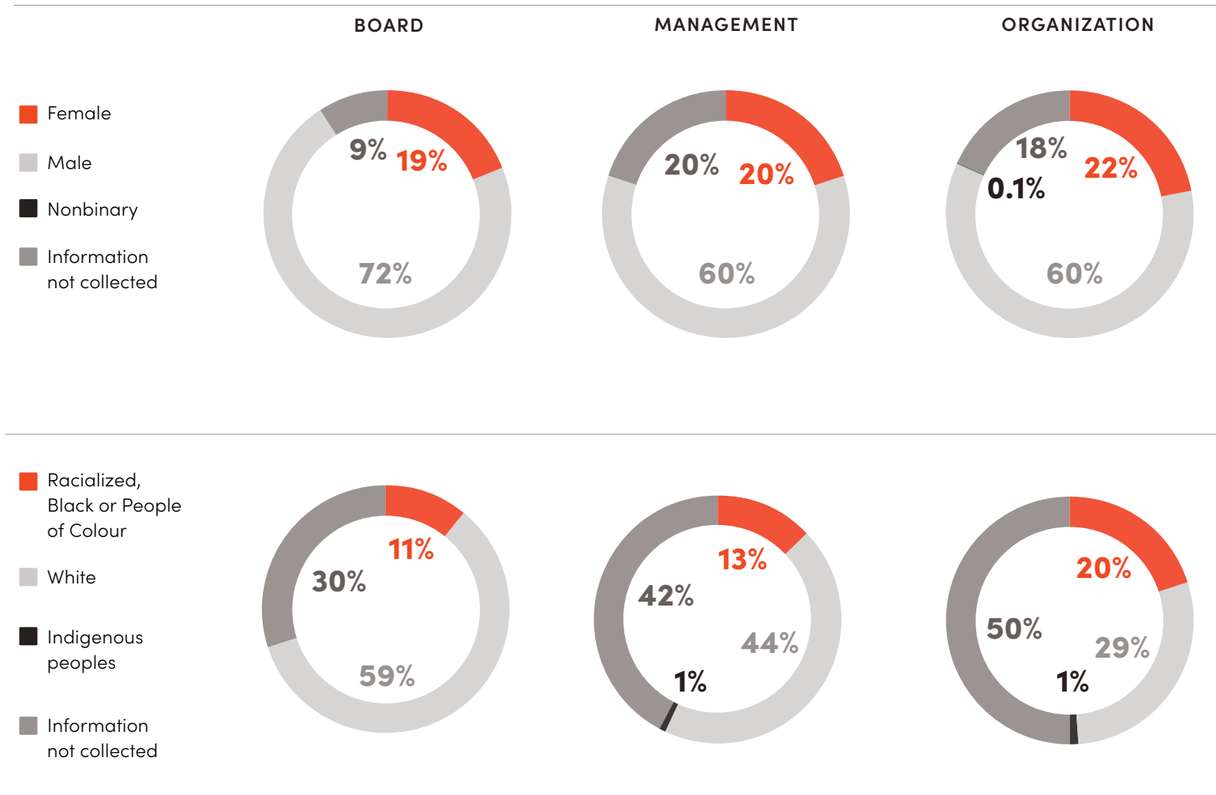
NUMBER OF NEW HIRES



Measuring Demographic Data

To measure demographics within our portfolio companies, we continue to use the best-in-class framework set forth by BDC[1]. At Evok, we advocate for best practice hiring standards from our portfolio companies through our positions on boards and hiring committees. We recognize that assembling teams with a wide range of perspectives, backgrounds, and experiences fosters stronger decision-making, innovation, and resilience—key qualities for navigating the challenges of scaling transformative technologies.

OUR VENTURES DEMOGRAPHIC OVERVIEW



1 BDC demographic data reporting template

Our **Portfolio**

The following section highlights each company in Evok's portfolio, giving a brief overview of the company, the impact of their technology and the UN SDGs they align with. The following information does not include any ventures which Evok has invested in over the first quarter of 2025.

Our Portfolio Companies

FUND I

ARIX · EKONA · expeto · Kelvin · Quidnet Energy · Rotoliptic · SANCTUARY AI · SENSORUP · SYZYGY PLASMONICS · VEERUM

FUND II

DISA · ebb carbon · e-zinc · KOLOMA · minesense · PLANETARY · SUMMIT NANOTECH · ZWITTERCO

Stealth: Accelerated CO_2 Mineralization

ARIX

ARIX Technologies is an integrated robotics and data analytics company that delivers inspection services through innovative platforms. ARIX develops, deploys, and operates robots for detection and management of pipe corrosion in the petrochemical and utility industries, with a wide potential range of additional use cases across numerous markets. The team's robotics platform aims to lower costs, enhance data, and improve safety for customers.

Robotic prevention of GHG and petrochemical leakages for communities and sensitive ecosystems

2024 MILESTONE

Completed first major commercial project offering inspection services at a refinery with an oil and gas partner in Texas.

Technology Impact

Currently, the inspection, maintenance and repair of energy infrastructure and pipelines relies on manual labour, resulting in preventable leakages and failures. ARIX's semi-autonomous robotic inspection technology provides customers with detailed inspection data, along with supporting analytics to detect GHG leakages, including methane and hydrogen sulfide. The company's solution allows for greater insights into asset health for improved productivity and safety.

GOAL 3: GOOD HEALTH AND WELL-BEING

Preventative robotic inspections and corrosion analytics of pipes reduces the number of deaths and illnesses caused by petrochemical contamination in water and soil.

GOAL 6: CLEAN WATER AND SANITATION

Using ARIX's technology to inspect waterlines for corrosion and leaks to prevent outages ensuring reliable, quality drinking water for communities.

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

By ensuring conduits and pipes are operating within regulatory scope, and with increased efficiency, ARIX facilitates reliable and sustainable infrastructure development.

GOAL 15: LIFE ON LAND

Inspection of pipelines using robots contributes to the prevention of petrochemical leaks in sensitive ecosystems and avoidance of natural habitat degradation.

Existing approaches to producing hydrogen are either emissions intensive, in the case of steam methane reforming, or expensive, in the case of electrolysis powered by renewable energy. Ekona Power is creating a new solution for producing industrial-scale hydrogen that is both inexpensive and clean by converting natural gas into hydrogen and solid carbon which can be easily stored or used.

Hydrogen production with up to 90% reduction of carbon dioxide emissions

2024 MILESTONE

Broke ground on a first-of-a-kind hydrogen production facility.

Technology Impact

Most of the world's hydrogen is produced through steam methane reforming (SMR)[1], which produces between 8-11 kg of CO_2 in process emissions and requires more than 12 kg of water per 1 kg of hydrogen. Ekona has developed a reactor that uses pulsed methane pyrolysis (PMP) to produce hydrogen and solid carbon (rather than CO_2), significantly reducing CO_2 emissions by 90% when compared to incumbent steam methane reformers. Additionally, Ekona's PMP reactor eliminates all freshwater consumption demanded by current SMR processes. By 2030, Ekona's PMP plant operations in Canada will produce 200,000 t-H_2/year and mitigate 1,600,000 t CO_2e/year of GHG emissions.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Ekona's methane pyrolysis technology will generate low-cost hydrogen for decarbonizing large industrial sectors.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

The transition towards a hydrogen economy will contribute to Canada's continued role in energy export markets, while creating jobs for Canadians and building economic value.

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

Ekona's approach to hydrogen generation will accelerate clean and environmentally sound industrial processes.

1 Hydrogen Production: Natural Gas Reforming. Department of Energy (n.d.) Retrieved March 15, 2023

Expeto Wireless is maximizing control of Industrial Internet of Things (IIoT) devices with transformative connectivity solutions for enterprises. Inspired to make IIoT connectivity simple, agile, and secure, Expeto has an experienced team of wireless, telecom and cloud technology leaders who are creating a new IIoT customer experience with a patent-pending technology platform.

IIoT solutions for reducing GHG emissions, enhancing energy efficiency, and facilitating the integration of renewable energy

2024 MILESTONE

Executed a wide scale partnership with Rogers, enabling IIoT & data solutions at resource sector sites across Canada.

Technology Impact

Expeto's technology is an IIoT platform that can be applied to increasing efficiencies in sectors such as automotive manufacturing, electrification of transportation, agriculture, and renewable energy deployments. By leveraging advanced 5G connectivity, Expeto's technology can significantly improve energy efficiency in enterprise operations. 5G networks are designed to be more energy-efficient than their predecessors, reducing the overall energy consumption of network operations and the enterprises that rely on them. More efficient operations mean less waste, lower energy consumption, and reduced emissions.

GOAL 2: ZERO HUNGER

Expeto's technology has the proven potential to enable advanced farming techniques to improve yields and reduce costs.

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

For industries and organizations moving towards IIoT applications, Expeto provides platform technologies that optimize performance and reliability.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Expeto's solutions enable smarter manufacturing, which can lead to greater efficiency and reduced environmental impact.

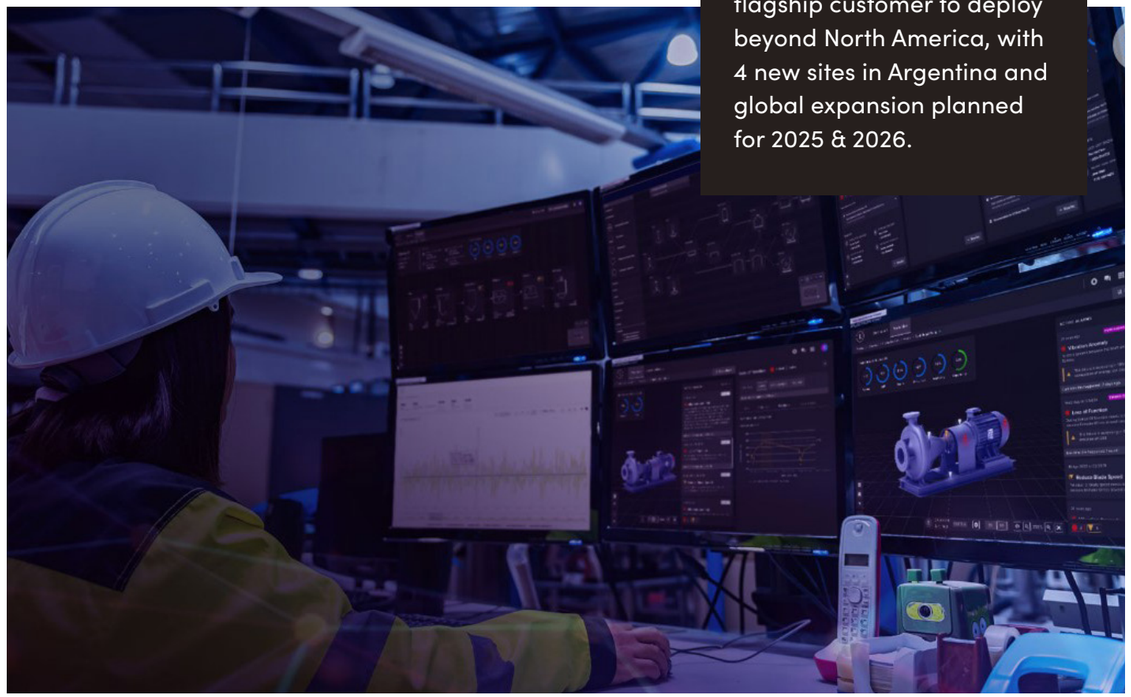
Kelvin

Kelvin Inc. provides an integrated software platform designed for creating and managing intelligent asset control applications on existing systems. Customers utilize these applications to enhance operations, assess business impacts, and fine-tune for optimal performance.

Increased operational efficiency resulting in 20-30% reduction in emissions

2024 MILESTONE

Expanded relationship with flagship customer to deploy beyond North America, with 4 new sites in Argentina and global expansion planned for 2025 & 2026.



Technology Impact

Kelvin's software and automation solutions come in the form of two products, Kelvin Maps and Kelvin Copilots, intended for a wide array of industrial sectors including mining, renewables, manufacturing, and oil & gas. Kelvin Maps aids in the visualization, simulation, and identification of emission bottlenecks. Kelvin Copilots provides critical information to equipment operators and control engineers to codify solutions. In oil & gas applications, Kelvin's solutions have resulted in a direct reduction of carbon emissions by 0.08-0.10 tonnes or 20-30% per well and has increased monitoring capabilities with the ability to identify and prevent accidents, leaks, and spills.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

Kelvin's technology processes and analyzes data from industrial assets to enable intelligent control for more sustainable and resilient operations.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Adoption of Kelvin's integrated software platform results in benefit to human health and the environment by reducing spills and leaks on industrial sites.

Quidnet Energy

Quidnet Energy provides low-cost grid-scale, long-duration (8-10+ hr) storage that can enable utilities, independent power producers, and large industrial consumers to reliably extend renewable energy usage. The company leverages mature oil & gas technology to develop wells into energy storage facilities that are both terrain-independent and are deployable across a broad geographical range in 1 MW to 15 MW modules.

Targeted avoidance of 150,000 tonnes of CO_2 at a single site

2024 MILESTONE

Validated geomechanical energy storage at MWh scale as a solution for firming grid-scale power to serve baseload growth.

Technology Impact

Quidnet's geomechanical pumped storage facilitates increased wind and solar penetration, reducing reliance on fossil fueled peaking generation, allowing for a significant reduction in GHG emissions to meet growing energy demands. Quidnet's 15-MW (150-MWh) planned installment with CPS Energy of San Antonio has the potential to avoid more than 150,000 tonnes of CO_2 emissions over a fifteen-year period. Energy storage facilities enable deployment of significantly more wind and solar power-generation installations, with larger-scale systems having even greater impact.

GOAL 6: CLEAN WATER & SANITATION

Quidnet looks to minimize water consumption by advancing subsurface lens-sealing technology and engineering operations to protect underground sources of drinking water.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Quidnet's technology offers a low-cost, reliable, and sustainable long-duration energy-storage solution to enable renewable energy penetration.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

Quidnet's technology can repurpose existing oil & gas workforce, supply chain, and infrastructure for low-carbon markets.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Geomechanical pumped storage enables renewable energy use during peak demand to promote resiliency of grid infrastructure.

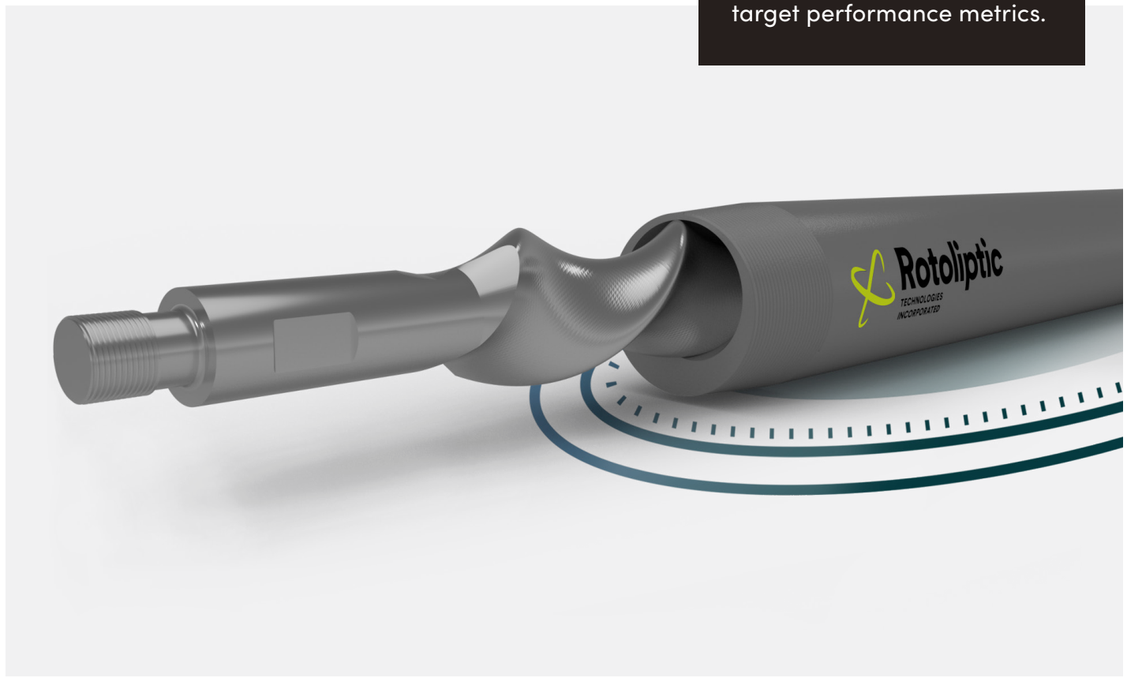
Rotoliptic

Rotoliptic Technologies has developed a revolutionary method to move viscous fluids with high solids content. Their patented positive-displacement pump design dramatically improves fluid transfer efficiency and pump durability, resulting in increased productivity, reduced downtime, and lower total cost of ownership.

Up to 46% reduction in pump energy consumption

2024 MILESTONE

Deployed artificial lift solutions across multiple O&G basins, achieving target performance metrics.



Technology Impact

Pumps account for 10% of the world's energy consumption, owing to their ubiquitous use in power generation, waste disposal, manufacturing, and countless other applications. Rotoliptic has developed an electronic submersible pump (ESP) with up to 46% energy efficiency improvement over incumbent all-metal pumps. By the end of the decade, the cumulative reduction of emissions from Rotoliptic projects will total over 642,000 tonnes of CO_2 through the adoption of their pumps. Rotoliptic pumps are also smaller and more durable, resulting in less frequent replacement and reduced waste.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Rotoliptic pumps enable more sustainable energy production by reducing parasitic energy use from operations.

GOAL 9: INDUSTRY, INNOVATION, & INFRASTRUCTURE

Rotoliptic encourages the adoption of clean and environmentally sound technologies by reducing the CO_2 emissions from operations.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Rotoliptic pumps require roughly half the steel that equivalent all-metal incumbent pumps use.

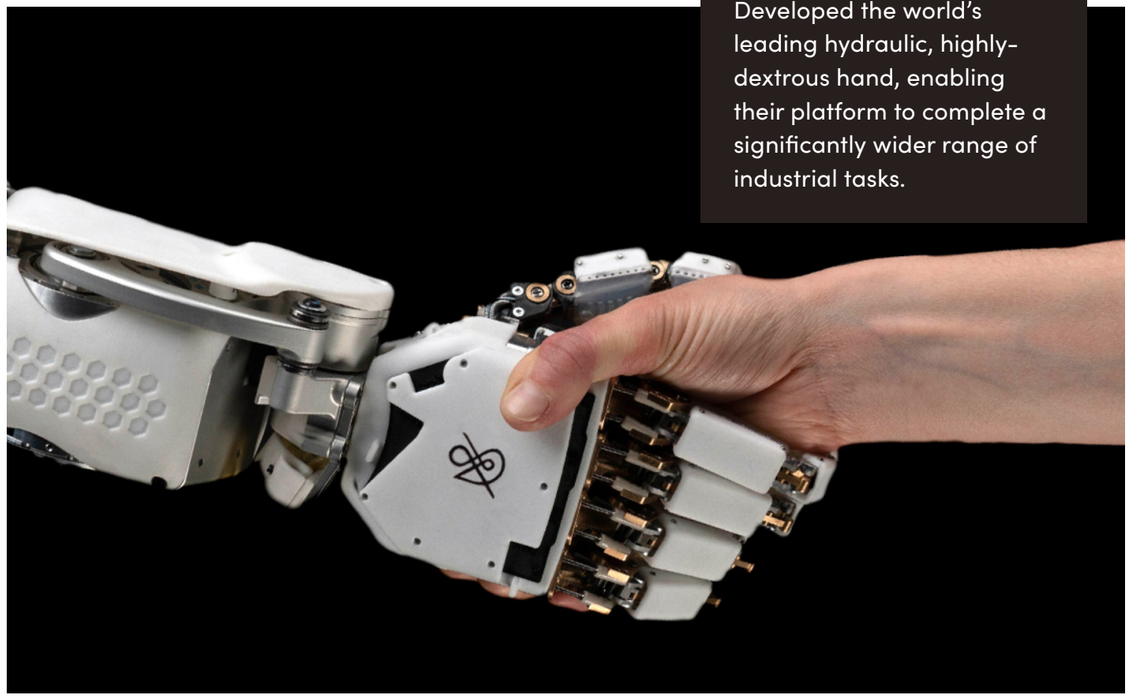
SANCTUARY AI

Sanctuary AI is on a mission to create the world's first human-like intelligence in general-purpose robots, which will increase the safety, efficiency and sustainability of physical work. The team is developing an AI control system (Carbon™ AI) that mimics subsystems found in the human brain, such as memory, sight, sound, and touch. When Carbon™ AI is paired with Sanctuary AI's Phoenix™ general-purpose robots, opportunities will exist to take on just about any human task. This will address projected labour shortages, help sustain economies and propel humanity forward.

General-purpose robots enable safer, more efficient and sustainable work, while creating new job opportunities

2024 MILESTONE

Developed the world's leading hydraulic, highly-dextrous hand, enabling their platform to complete a significantly wider range of industrial tasks.



Technology Impact

General purpose robots can replace human workforce in potentially hazardous environments, removing employees from harm's way, making work safer, more efficient, and sustainable. Sanctuary's remotely-piloted general-purpose robots can decrease emissions from remote operations by reducing workforce travel and can also open new labour pools to work in fields where geography or physical capabilities would have been constrained previously.

GOAL 3: GOOD HEALTH AND WELL-BEING

Sanctuary aims to reduce the number of deaths and illnesses caused by hazardous work tasks by using general-purpose robots.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

Sanctuary seeks to achieve higher levels of economic productivity by developing and deploying their general-purpose robots to labour-intensive, dangerous and/or dirty jobs.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Implementing a synthetic workforce can significantly reduce energy consumption using Sanctuary's hybrid-AI training approach, significantly reducing the GHG emissions caused by a human workforce.

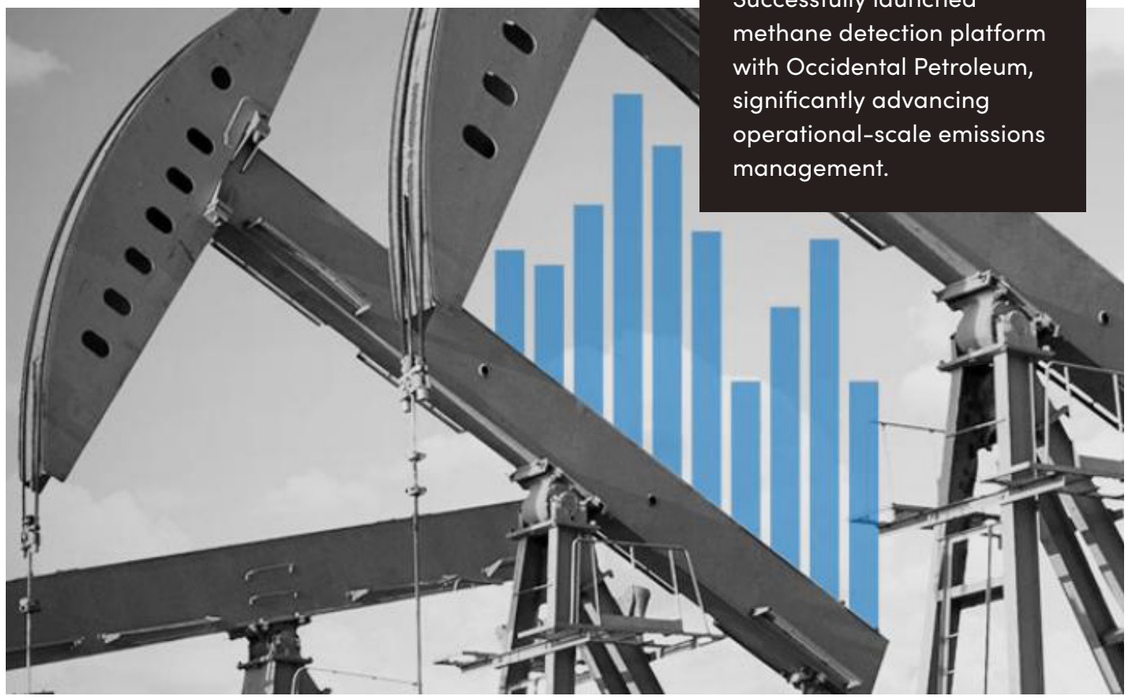
SENSORUP

SensorUp has developed an intelligence IoT platform, that aggregates infinite sources of data into a common operating picture, for complex operations of industries such as oil & gas, logistics, public safety, and the military. Operations teams can make just-in-time critical decisions, automate efficiencies, and achieve global visibility of assets and people.

IoT solution to reduce time and volume of fugitive methane emissions

2024 MILESTONE

Successfully launched methane detection platform with Occidental Petroleum, significantly advancing operational-scale emissions management.



Technology Impact

SensorUp has created a product platform that enables energy companies to optimize workflows and reduce emissions. Their hardware-agnostic IoT orchestration layer can detect and measure fugitive methane leaks, enabling timely response and management to reduce emissions.

Traditional oil and gas operators rely on manual inspections and siloed data systems, often leading to delayed leak repairs and elevated methane emissions. SensorUp automates compliance, unifies emissions and operational data, and enhances leak detection through 24/7 monitoring, helping reduce greenhouse gas emissions and streamline decarbonization efforts.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Energy producers can use SensorUp's Emissions Management platform to detect methane emissions early, creating reduced GHG emissions and improved operational efficiencies.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

Offering just-in-time field coordination, by equipping field teams with the appropriate tools, can improve employee performance, economic productivity and safety.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Reducing time and volume of methane leakages at energy production and transmission facilities enables more efficient and sustainable use of natural resources.

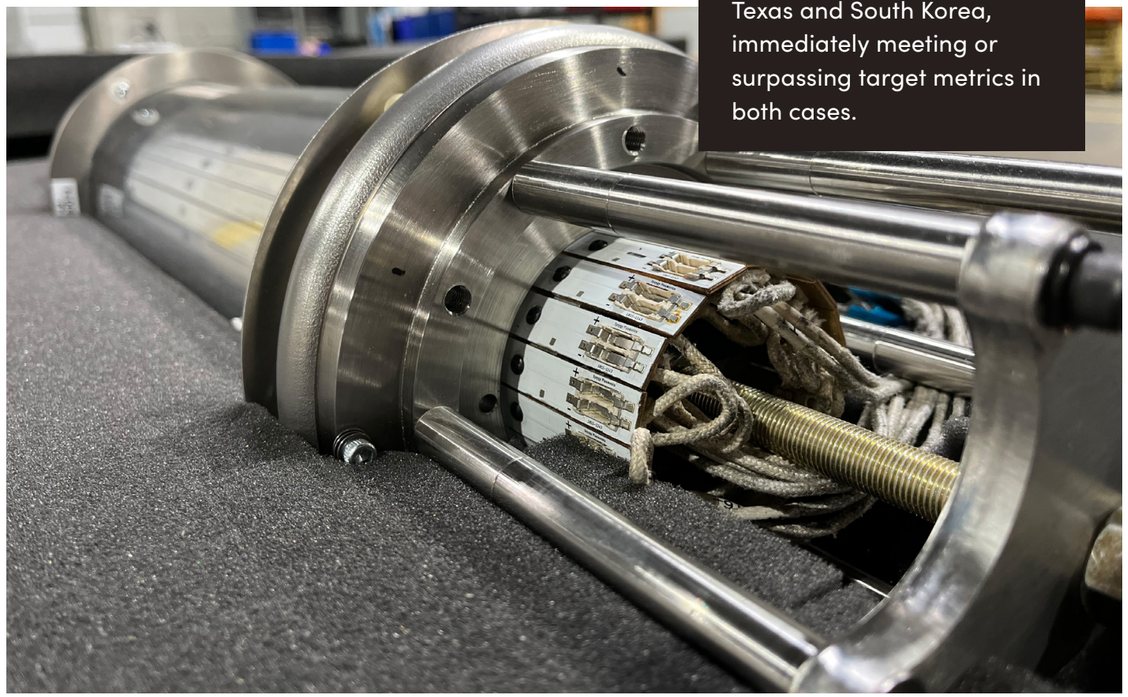
SYZYGY PLASMONICS

Syzygy Plasmonics builds reactors that use light instead of combustion to electrify chemical manufacturing and power a cleaner, safer world. Syzygy is commercializing low-cost, low-emissions hydrogen production, a platform for the decomposition of ammonia to enable large scale hydrogen transport, and a carbon dioxide utilization solution that can be used to produce sustainable fuels and methanol. Future plans include modifying the base reactor design to produce other commodity chemicals.

Hydrogen production with a 40% emissions reduction

2024 MILESTONE

Successfully commissioned and operated two full size field trial reactors in Texas and South Korea, immediately meeting or surpassing target metrics in both cases.



Technology Impact

Syzygy has developed a photocatalytic reactor to replace incumbent thermal catalysts, which require high-grade industrial heat and fossil-fuel combustion. Syzygy's photocatalytic process for hydrogen generation reduces emissions by 40% relative to incumbent technologies.

At commercial scale (>100 tons of H_2 production per day) Syzygy anticipates they will reduce emissions by 8 kg CO_2/kg H_2 or 290,000 tonnes per year relative to industry standard technologies. For their first commercial facility producing sustainable aviation fuel (SAF), Syzygy also expects to achieve an annual CO_2 emissions reduction of 15,000 to 20,000 tonnes relative to the production of conventional Jet A fuel.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Syzygy's photocatalytic reactor and catalyst platform will use CO_2 for methanol production, and reduce overall emissions associated with hydrogen and ammonia production.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Syzygy's technology is electrifying processes for the production of commodity chemicals that conventionally require high carbon industrial heat.

GOAL 11: SUSTAINABLE CITIES AND COMMUNITIES

Cleaner, lower-cost hydrogen production for transportation and industrial processes will reduce adverse environmental impacts, such as improving air quality in communities close to industries and transportation hubs.

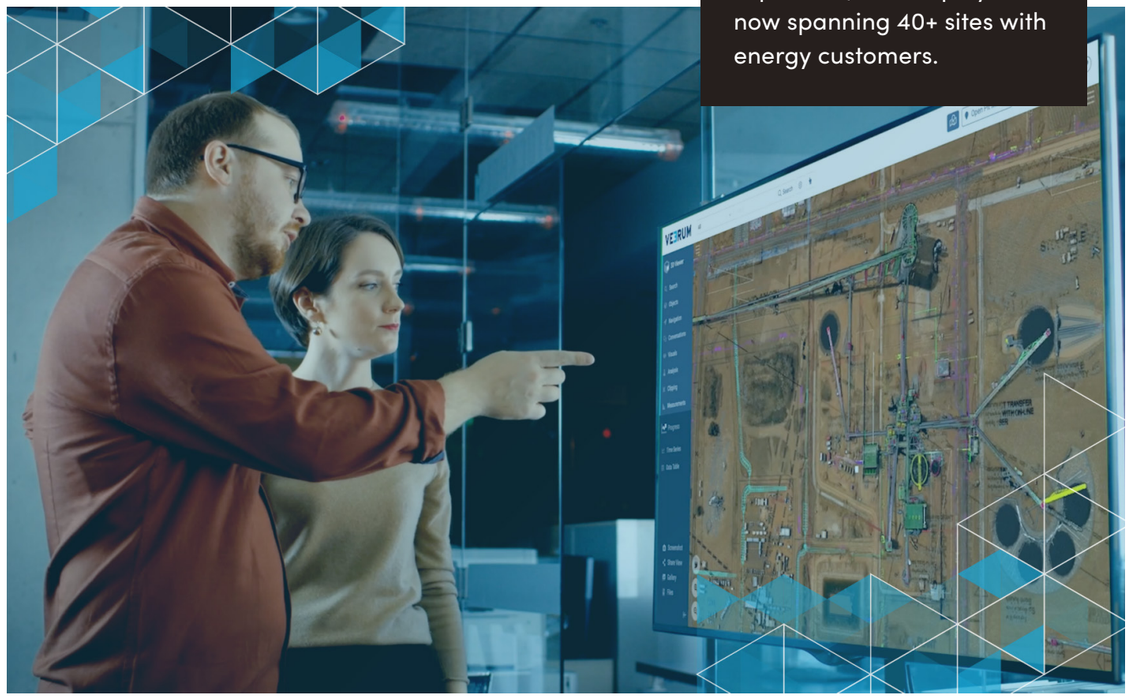
VEERUM has developed an asset visualization platform that can be up and running at new sites within 48 hours. It integrates asset data from survey data capture, engineering design systems, original equipment manufacturers, and document management systems.

Digitally verified information is available in near-real time for data-driven decision making. Users access verified asset data from a secure cloud-based web platform, enabling data management across the entire asset lifecycle. Asset stakeholders can view aggregated asset data in the context of a 3D model. All information is available for total audit history of the asset.

Integrating digital twin tools can enhance productivity up to 15x

2024 MILESTONE

Continued commercial expansion, with deployments now spanning 40+ sites with energy customers.



Technology Impact

Traditional asset visualization platforms suffer from data siloing and poor integration of systems. VEERUM's digital twin technology excels at system and data integration to increase operational efficiencies, reduce on-site hours and resulting transit emissions, and enable increased monitoring to reduce accidents and leaks with negative environmental impacts. This data can be securely managed on the cloud and made available to globally distributed teams to increase efficiency and safety in site management.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

VEERUM customers have reported that digital twin integration has enhanced productivity up to 15x through technological upgrading and innovation enablement in labour-intensive industries.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Applying accurate digital twins, while integrating formerly siloed data into one platform, enables industrial sites to be better managed, monitored, and optimized.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

Digital twin tools can reduce on-site hours by half, resulting in lower fuel consumption and GHG emissions for on-site and fly-in, fly-out workers.

The process of comminution (grinding/milling) of rocks in the mining industry accounts for roughly 4% of global energy use and is projected to increase as ore grades continue to decline. Disa Technologies has created a novel comminution technology called high-pressure slurry ablation (HPSA) that reduces the amount of energy, water and reagents used in minerals processing, while increasing the amount of material that can be economically recovered. In addition to minerals processing, Disa has also demonstrated early traction in remediation of abandoned uranium mines, and is currently the only validated treatment technology by the US Environmental Protection Agency.

Up to a 40% reduction in energy used in the grinding stage of a milling circuit

2024 MILESTONE

Scaled up their system 5X and deployed multiple commercial units to the field.

Technology Impact

Disa's High-Pressure Slurry Ablation (HPSA) technology offers a significant reduction in energy consumption for comminution (size reduction) in milling circuits within the mining sector. The exact energy savings from upstream milling depend heavily on the specific ore being processed and the downstream benefits achieved. However, at a recent deployment in phosphate processing, a 30-50% reduction in energy usage was calculated based on pilot observations, accompanied by a 2% increase in grade, all while maintaining comparable recovery.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Disa's technology can be utilized to upgrade and retrofit existing milling operations while increasing resource-use efficiency.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

In remediating abandoned uranium mines, Disa can achieve the environmentally sound management of waste uranium.

GOAL 15: LIFE ON LAND

Disa's technology can be used to remediate abandoned uranium mines to restore degraded land and soil.

The ocean is the largest global sink of carbon dioxide, absorbing roughly 30% of all anthropogenic emissions each year before slowly transforming those emissions into inert forms of inorganic carbon. However, the ever-increasing levels of atmospheric CO_2 are shifting this natural process out of balance, leading to the acidification of marine environments. Ebb Carbon is pioneering an electrochemical ocean alkalinity enhancement method that has the potential to be one of the largest scale and lowest cost approaches to carbon dioxide removal, while also helping to restore the natural balance and reduce coastal acidification.

Permanently removing atmospheric CO_2 while restoring ocean ecosystems

2024 MILESTONE

Signed the largest-to-date marine CDR deal, commissioning the removal of 350,000 tonnes of CO_2 over the next ten years.

Technology Impact

The Intergovernmental Panel on Climate Change (IPCC) considers carbon dioxide removal as necessary in all scenarios that limit global warming to 2°C or lower by 2100[1]. The ocean, which absorbs large quantities of CO_2 from the atmosphere, can be harnessed as a potential pathway to reach these targets through a natural process that initially forms a weak acid before slowly storing this carbon as inert dissolved ions which are stable for thousands of years.

As atmospheric CO_2 has increased, we have also artificially increased levels of ocean acid much faster than the ocean is able to transform it into stable forms, leading to the acidification of marine environments. Ebb is developing a safe, effective, and low energy electrochemical system to remove this excess ocean acid, allowing for the increased movement of carbon from the atmosphere into dissolved inorganic forms like bicarbonate.

GOAL 13: CLIMATE ACTION

Ebb's process can enable the large scale removal of atmospheric CO_2 using less energy and at a lower cost than other methodologies like direct air capture.

GOAL 14: LIFE BELOW WATER

Ebb helps to reverse ocean acidification locally in the regions where they operate, helping to restore marine environments that have been damaged by climate change.

1 IPCC AR6 Synthesis Report. IPCC (2023).

e-Zinc is enabling a zero-carbon energy future by developing a low-cost, flexible, and Long Duration Energy Storage (LDES) solution which will provide a platform for the world's energy markets to be fully powered by renewable energy. By storing electrical energy within zinc metal, the technology has the potential to store over a hundred hours of energy while being significantly cheaper than alternative battery technologies like lithium-ion. Low-cost LDES has the potential to dramatically improve the value proposition of intermittent, renewable electricity sources such as wind and solar.

Long duration energy storage to enable greater renewables on the energy grid

2024 MILESTONE

Produced the first of their commercial cells at their new manufacturing facility.

Technology Impact

e-Zinc has developed an electrochemical cell that stores electricity in zinc metal, a highly abundant and low-cost material with high energy density. The systems and materials are entirely recyclable, fire resistant, durable for long lifetimes and can operate in a wide range of temperatures.

e-Zinc's energy storage solution replaces legacy diesel generators used in remote and resiliency applications resulting in a 120t/kWh reduction in GHG emissions per kWh of diesel generators replaced by e-Zinc batteries. LDES solutions like e-Zinc's batteries will also enable greater renewable energy penetration in both the grid & utility and commercial & industrial markets with long-term implications on the carbon intensity of energy generation.

7 AFFORDABLE AND CLEAN ENERGY

GOAL 7: AFFORDABLE AND CLEAN ENERGY

e-Zinc offers a low-cost, reliable, and sustainable LDES solution to enable renewable energy penetration.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

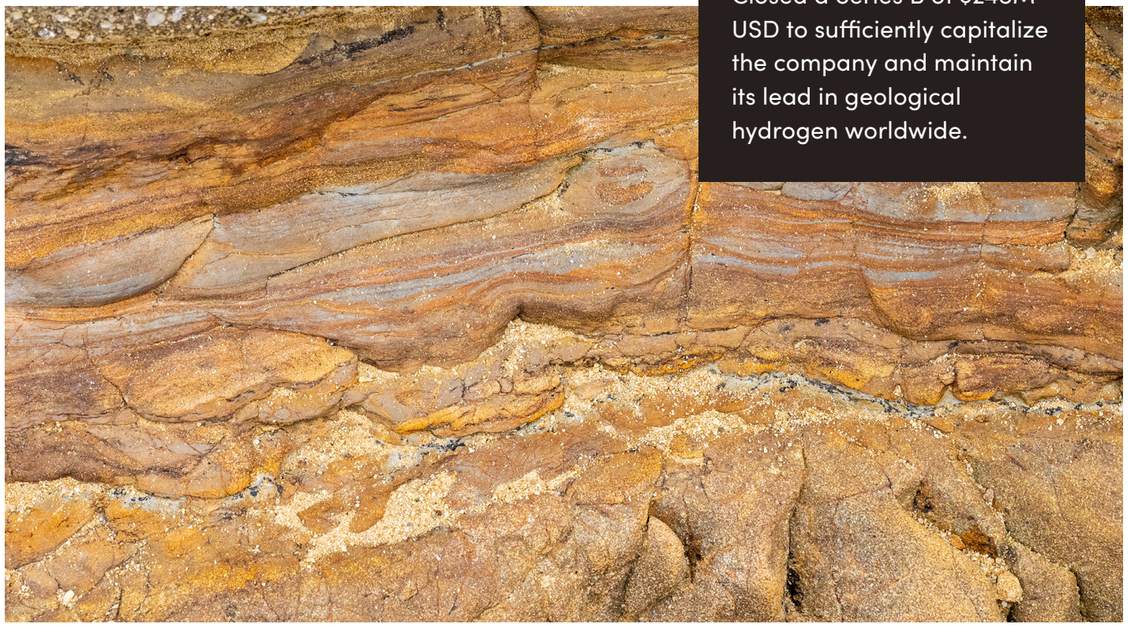
Electrochemical energy storage enables renewable energy at times of peak demand to promote resiliency of grid infrastructure.

KOLOMA

Conventional hydrogen production has historically been either emissions intensive, if from steam methane reforming, or costly, if from electrolysis. Koloma is a geologic hydrogen company that leverages technology, proprietary data, and human capital advantages to identify and commercialize the production of hydrogen from natural reservoirs within the earth's subsurface.

Koloma's goal is to produce clean and cost-effective hydrogen, eliminating the barriers that have historically hindered widespread adoption of hydrogen. They are actively engaged in identifying reservoirs that will play a significant role in US decarbonization efforts.

Hydrogen production with a >98% reduction in CO_2 emissions relative to incumbent technology[1,2]



2024 MILESTONE

Closed a Series B of $245M USD to sufficiently capitalize the company and maintain its lead in geological hydrogen worldwide.

Technology Impact

Conventional hydrogen production, via steam methane reforming or electrolysis, poses challenges due to high emissions, energy, land, and water requirements, creating environmental and geographic barriers to large scale production. Geologic hydrogen's unique attributes remove these conventional barriers, with a very low carbon intensity and minimal requirements for external water or energy inputs.

Geologic hydrogen is generated through a process known as serpentinization, whereby the natural interaction of water in the earth's subsurface with iron rich rocks generates massive quantities of hydrogen. Studies have suggested that the earth naturally produces up to 23 Mt/year (or 30% of today's annual hydrogen demand) through these processes.

GOAL 7: AFFORDABLE AND CLEAN ENERGY

Geologic hydrogen has the potential to unlock incredible quantities of low cost, clean energy on a global scale.

GOAL 8: DECENT WORK AND ECONOMIC GROWTH

Koloma's process leverages expertise from, and has a strong overlap with, the conventional energy sector, allowing for the participation of existing skilled workers in the energy transition.

1 Carbon intensity of hydrogen production values for SMR were obtained from the 2022 GREET model.

2 Greenhouse Gas Intensity of Geologic Hydrogen Produced from Subsurface Deposits.

The global mining industry is under pressure to deliver more metals to meet growing demand driven by the energy transition, while reducing environmental impact from operations.

MineSense's Mine-to-Mill product suite offers mine operators insights into ore grade and ore characteristics in real-time from the mine face to the mill. Greater visibility into feed materials allow mines to increase recovery rates while decreasing inputs and their environmental impact.

Hardware-enabled digital solutions to improve sustainability in mining

2024 MILESTONE

Expanded into new geographies and deployed Mine-to-Mill solution.

Technology Impact

MineSense has developed a suite of services that utilizes a proprietary and ruggedized x-ray fluorescence (XRF) system. The Mine-to-Mill service utilizes MineSense's two flagship products ShovelSense and BeltSense. ShovelSense is installed on excavation equipment allowing operators real-time insights into each bucket, this allows for improved mining efficiency by reducing the variability of feed materials to the mill. While BeltSense scans mineral content on conveyor belts to assess the grade and ore characteristics, enabling downstream process control of reagents and water, optimization of energy use and product control.

In early deployments, implementation of ShovelSense technology shows 6% reduction in carbon intensity per tonne of copper produced. Considering the 22 Mt of copper produced globally in 2023, these intensity reductions are meaningful.[1]

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

MineSense's technology drives innovation in the mining industry, moving towards increased resource-use efficiency.

GOAL 12: RESPONSIBLE CONSUMPTION & PRODUCTION

MineSense's technology improves sustainability in mining by optimizing efficiencies that result in reduced use of energy, water, and chemical reagents.

1 USGS - Copper Statistics and Information.

PLANETARY

Planetary Technologies is a leading ocean alkalinity enhancement (OAE) company focused on large-scale, durable carbon dioxide removal. By dosing ocean waters with environmentally benign alkalinity via wastewater outflows, Planetary enhances the ocean's ability to absorb and store CO_2 permanently.

Planetary's approach leverages industrial byproducts, minimizing technology risk and enabling low-cost deployment, with a single commercial project capable of removing 50,000 metric tonnes of CO_2—over 10 times the scale of today's largest Direct Air Capture plant. With industry-leading measurement, reporting, and verification (MRV) systems and strong scientific backing, Planetary is well-positioned to scale marine CDR globally.

150x more energy efficient at removing atmospheric CO_2 than leading DAC systems

2024 MILESTONE

Scaled demonstration site in Halifax, NS, to >1000 tonnes of CO_2 removed.

Technology Impact

Planetary's OAE process removes atmospheric CO_2 by converting it into stable bicarbonate ions stored in the ocean for over 10,000 years, counteracting ocean acidification. A single deployment can remove up to 50,000 metric tonnes of CO_2 annually, using just ~10 kWh per tonne—150x less energy than Direct Air Capture. With projected removals of 10,000 tonnes in 2025, scaling to millions of tonnes by 2030, Planetary offers a low-cost, energy-efficient, and durable carbon removal solution, validated through industry accepted measurement, reporting, and verification protocols.

GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION

Planetary repurposes industrial byproducts and uses existing industrial infrastructure to reduce waste and minimize resource extraction; leveraging a circular approach to create a scalable, low-tech solution for sustainable carbon removal.

GOAL 13: CLIMATE ACTION

Planetary's OAE process converts atmospheric CO_2 into bicarbonate ions that are stable in the ocean for >10,000 years, actively combating the root cause of climate change.

GOAL 14: LIFE BELOW WATER

Planetary reduces ocean acidification by introducing alkalinity through wastewater outflows, enhancing marine ecosystem resilience while minimizing disruption. This process preserves biodiversity through coastal remediation and strengthens the ocean's natural carbon sink.

SUMMIT NANOTECH

Summit Nanotech is transforming how the world accesses lithium for the global energy transition. Through their patented and sustainable direct lithium extraction (DLE) technology, Summit is conserving natural resources and optimizing operations for lithium producers in South America.

Summit's denaLi™ solution applies advanced chemistry and engineering to extract high-purity lithium from brine much faster than traditional methods, such as evaporation ponds. Their process also reduces the use of freshwater and reagents, enabling reinjection of brine back into the earth to support freshwater aquifers.

Up to 60% reduction in freshwater consumption for lithium extraction

2024 MILESTONE

Ramped up sorbent manufacturing to 150 kg/d capacity in Calgary, Alberta, and initiated construction on the first commercial demo (35 tonnes of lithium carbonate per year) at a customer site in Chile.

Technology Impact

Summit has developed a direct lithium extraction (DLE) process to enable more efficient and sustainable resource extraction. Using a combination of proprietary nanotechnologies for the separation and concentration of lithium-containing brines, Summit can extract lithium with reduced requirements for freshwater, energy and land, while increasing yield and purity of lithium production. Based on initial estimates for production of approximately 1,000 tonnes LCE (lithium carbonate equivalent) per year, this would result in the conservation of over 31,000 m³ of fresh water while avoiding over 100,000 tonnes of solid waste.

GOAL 6: CLEAN WATER AND SANITATION

Summit's technology consumes less freshwater than traditional lithium-extraction, and protects fresh groundwater, critical to the surrounding communities in water-scarce environments, by reinjecting brine after lithium extraction.

GOAL 9: INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Adoption of Summit's technology results in upgrading incumbent lithium-extraction infrastructure, like evaporation ponds, by replacing them with more resource-efficient processes and equipment.

GOAL 15: LIFE ON LAND

Summit's denaLi™ technology avoids large volumes of waste production and eliminates the need for vast evaporation ponds, thereby reducing the footprint required for lithium extraction.

ZwitterCo has developed a breakthrough membrane technology that prevents irreversible fouling, enabling long-lasting, high-performance filtration for industrial wastewater treatment. Its zwitterionic membranes can process 10,000 times higher organic loads than conventional ones without permanent clogging, making them ideal for applications like dairy wastewater, manure digestate, poultry processing, desalination, and landfill leachate.

With in-house production capabilities and a strategic plan to scale manufacturing, ZwitterCo aims to disrupt traditional membrane filtration markets and expand into new industrial applications where wastewater treatment has previously been challenging.

Capable of processing 10,000x higher organic loads than conventional membranes

2024 MILESTONE

Received first food contact certification, opening up new applications in food and beverage.

Technology Impact

ZwitterCo's innovative membrane technology enables the cost-effective treatment and reuse of industrial wastewater, significantly reducing freshwater consumption and waste discharge. Compared to conventional membranes, ZwitterCo's solution tolerates 10,000 times higher organic loads without irreversible fouling, cutting down chemical usage, energy consumption, and maintenance needs. Its membranes have already processed over 4 billion gallons of wastewater, with large-scale deployments expected to treat billions of gallons daily. By extending membrane lifespans and enabling waste-to-revenue applications, ZwitterCo plays a critical role in reducing industrial water footprints and advancing sustainable water management across multiple sectors.

GOAL 6: CLEAN WATER AND SANITATION

ZwitterCo enables the efficient treatment and reuse of wastewater, reducing freshwater consumption and improving access to sustainable water management solutions.

GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION

ZwitterCo contributes to the environmentally sound management of chemicals and waste throughout their lifecycle by reducing the chemical-intensity of membrane separation and waste treatment processes.

GOAL 15: LIFE ON LAND

ZwitterCo minimizes chemical use in membrane separation, enables waste-to-revenue in food manufacturing, and unlocks minimum or zero liquid discharge wastewater solutions. This reduces water consumption in manufacturing while limiting harmful pollutant discharge.

Case Study

Disa Technologies
Cleaning up Abandoned Uranium Mines with HPSA Technology

In the Western United States, there are over 15,000 sites associated with uranium waste, with 523 of these Abandoned Uranium Mines (AUM) sites on the Navajo Nation. Historically, the remediation of these abandoned mines has been prohibitively expensive – until now.

Abandoned uranium mines on Navajo Nation lands

Uranium exploration and production in the Southwest United States began in 1918 and was concentrated in the Colorado Plateau region (Colorado, Utah, New Mexico, and Arizona) which encompasses the Navajo Nation's lands. Between 1944 to 1986, nearly 30 million tonnes of uranium ore were extracted from Navajo lands. Many Navajo people worked the mines, often living and raising families in close proximity to the mines and mills. As domestic demand for uranium began to decrease, most uranium mines in the U.S. shut down, with over 15,000 of these sites being documented as abandoned, leaving behind significant environmental and health hazards.

On the Navajo Nation land there are 523 abandoned uranium mines containing an estimated 190 million tonnes of contaminated material. While some cleanup efforts have been initiated, all 523 AUM sites identified still require remediation. One of the most significant hazards on these sites is the waste rock that was mined but wasn't high enough grade to be economical to move to mills for future processing. These waste rock piles, which still contain uranium, were left above ground and are being exposed to the elements, resulting in the leaching of uranium into the soil and water tables, as well as being spread when picked up by winds. The exposed waste piles result in health issues for the Navajo, including lung cancer from inhalation of radioactive particles, impaired kidney function from exposure to radionuclides in drinking water, bone cancer, autoimmune diseases, reproductive problems, and birth defects.

523
ABANDONED URANIUM MINES

190M
TONNES OF CONTAMINATED MATERIAL

8.6M
TRUCKLOADS OF MATERIAL TO BE REMOVED

Challenges in remediating these sites

The standard practice for remediating contaminated sites is to either bury the contaminated materials on-site or excavate the waste piles and truck the material off-site to engineered disposal facilities or repositories. For the Navajo AUM sites, burying the contaminated materials is not an option, as they have explicitly expressed that they want the contaminated materials off their land. However, to haul all the contaminated materials offsite would require over 8.6 M truckloads of material to be moved. Hauling and removing is not only cost prohibitive, but there is not enough space at engineered disposal facilities or repositories to receive all the material. Even with the significant funds that have been raised through settlements with the previous mine operations, full remediation has not been completed due to lack of viable solutions.

How Disa Technologies is making a difference

Disa has developed an innovative technology called High Pressure Slurry Ablation (HPSA) that can effectively concentrate contaminated materials using high-pressure water. HPSA works by mixing contaminated materials into water and then pumping this mixture through opposing nozzles in a collision chamber. When the contaminated material collides with itself, the difference in hardness of the co-bound minerals in that material results in liberation of the contaminants and co-bound clean material.
In field demonstrations, HPSA has reduced the amount of contaminated material into just 20% of the original mass, with the remaining 80% of the now clean material being able to be left on site for remediation efforts.

The 20% concentrated uranium and vanadium can either be safely transported to disposal facilities or upcycled into the domestic uranium supply chain.

Disa has successfully demonstrated its technology at multiple sites on the Navajo Nation, completing a treatability study with the U.S. Environmental Protection Agency (EPA), and is currently the only EPA validated technology for these remediation efforts. HPSA has also been validated by the Navajo Nation EPA and Idaho National Laboratory.

What's next for Disa?

Disa Technologies continues to expand its remediation efforts. Recently, the company signed a Phase 2 agreement with the Navajo Nation EPA to conduct a commercial-scale site closure. Additionally, Disa is actively engaging with local Navajo Nation Chapters and has received five Chapter House Resolutions advocating for the deployment of HPSA technology in remediation projects.

As Disa moves forward, the company remains committed to restoring contaminated sites efficiently and sustainably while supporting the health and safety of the Navajo Nation and other affected communities.

Case Study

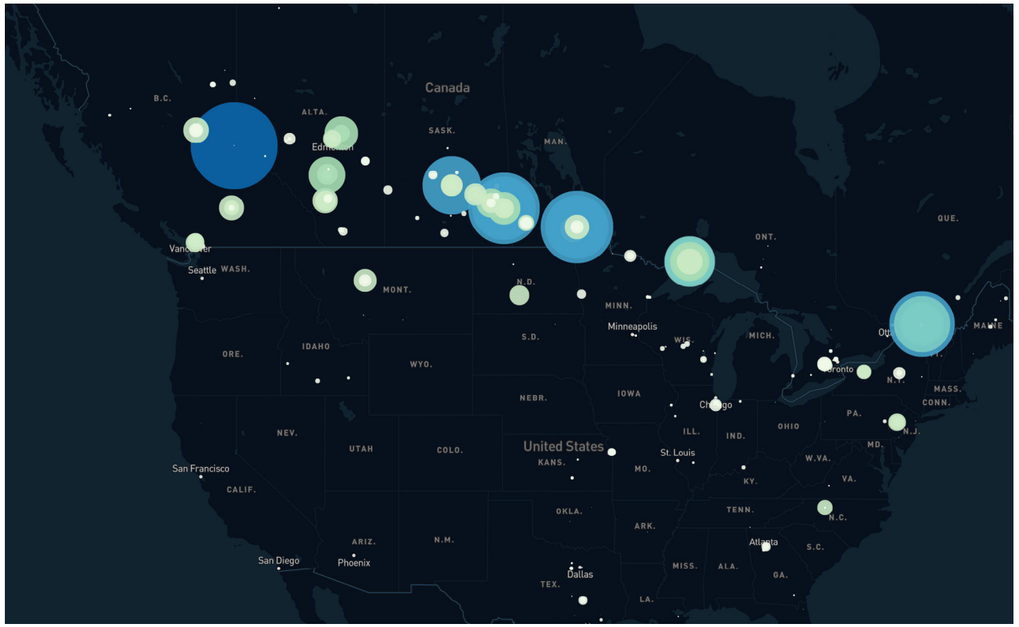
SensorUp
Transforming Methane Emissions Management with Scalable, Data-Driven Solutions

Tracking and reacting to methane emissions are major challenges for the oil and gas industry. How can companies move from fragmented monitoring to a platform that enables real-time detection and timely response?

SENSORUP

Solving fragmented and inefficient methane management

Reducing methane emissions is critical for mitigating climate change. However, traditional methane management systems are fragmented, slow, and costly. Many oil and gas operators struggle to consolidate methane data from various sources, making it difficult to translate into a clear and useful format supporting timely decision-making and compliance.



SensorUp's AI-Driven approach to methane management

SensorUp provides a comprehensive emissions management platform that aggregates and analyzes methane data, offering a unified, standards-based approach to emissions reduction, regulatory compliance, and operational efficiency. Their cloud-based platform enables oil and gas companies to track, quantify, and mitigate methane emissions in real time, which enables operators to act more quickly and ultimately reduce emissions.

SensorUp's platform leverages IoT, AI-driven analytics, and secure cloud infrastructure to enhance decision-making and streamline reporting. The system is sensor-agnostic, integrating seamlessly with multiple monitoring technologies while automating workflows.

Key benefits of SensorUp's platform include:

- **Centralized Emissions Data Management** consolidates methane-related inputs from SCADA, aerial surveys, continuous monitoring, OGI, and fence line sensors into a single interface, ensuring consistent tracking and eliminating data fragmentation.
- **Automated** and **Seamless Data Ingestion** manages data and metrics with minimal human intervention, freeing personnel to focus on higher-level analysis and decision-making.
- **Fixes Data Chaos** by normalizing mismatched timestamps, incomplete datasets, and siloed information, offering transparent calculation methods and robust audit trails for compliance and management review.
- **Contextualized Insights** and **Operational Efficiency** integrates maintenance schedules, drilling data, and SCADA readings to differentiate expected emissions from leaks, reducing unnecessary field visits and improving resource allocation.
- **Reduced Field Call-Outs** lower operational expenses by cutting emissions-related site visits through comprehensive data correlation within the platform.
- **Pre-Dispatch Triage** and **Root-Cause Analysis** leverages real-time data amalgamation to identify potential issues remotely, minimizing false positives and expediting genuine repair efforts.
- **Streamlined Regulatory Reporting** gathers all relevant data for compliance with programs such as OGMP, accelerating submission timelines and enhancing data quality for decision-makers.
- **Measurement-Informed Inventory Creation** compiles a continuous record of emissions events, thereby improving both operational responsiveness and long-term strategic planning for emissions reduction.

SENSORUP

A demonstration in scalable methane management with Oxy

Occidental (Oxy), a leading global oil and gas producer, partnered with SensorUp to modernize its methane emissions management. Like many companies, Oxy faced challenges in consistently reducing methane emissions, balancing large-area survey coverage with detection sensitivity, expediting detection-to-response cycles, consolidating multiple data streams for enhanced contextualization, ranking emissions sources by priority to avoid unnecessary call-outs, meeting evolving regulatory and industry requirements, and streamlining inventory management and reporting to satisfy both internal and external stakeholders.

By implementing SensorUp's Gas Emission Management Platform, Oxy automated emissions data integration, utilized AI-driven leak detection and repair (LDAR), accessed real-time visualization tools for methane tracking, and adopted a unified emissions reporting framework aligned with internationally recognized Oil and Gas Methane Partnership 2.0 (OGMP 2.0).

By implementing SensorUp, Oxy consolidated methane-related data from SCADA alarms, sensors, and continuous monitors into a unified platform, improving operational clarity and minimizing data fragmentation. Real-time contextualization of incoming alerts combined with maintenance and drilling logs reduced unnecessary site visits by distinguishing known or permitted events from genuine leaks. This approach and comprehensive aerial survey data contributed to a 35% decrease in field call-outs, translating to notable efficiency gains. The unified data management also streamlined compliance and reporting tasks, relieving teams of manual aggregation for programs like OGMP.

Oxy stated in its 2024 Climate Report that methane emissions across its global oil and gas operations were approximately 65% lower than in 2019 and about 16% lower than in 2022.

What's next for SensorUp?

SensorUp continues to evolve to meet net-zero initiatives, voluntary carbon markets, and global methane reduction goals. The company plans to expand its platform across more oil and gas operators to drive industry-wide adoption, enhance AI-driven analytics for more precise emissions detection, scale into international markets to support global methane reduction efforts, and integrate with voluntary carbon credit programs to enable the monetization of emissions reductions.

By providing a powerful, scalable, and automated approach to methane emissions management, SensorUp helps companies comply with regulations while leading in sustainability and climate action. With major industry partnerships, SensorUp is positioned to play a critical role in global methane reduction and environmental responsibility.

Case Study

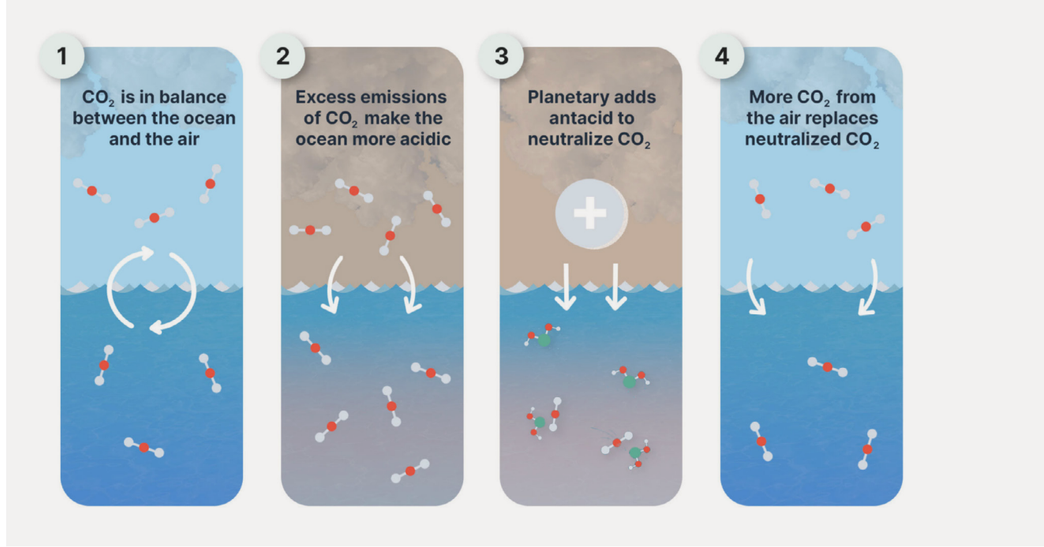
Planetary Technologies
Harnessing the Ocean's Natural Power for Lasting Carbon Removal

Ocean alkalinity enhancement (OAE) offers a promising pathway for durable carbon removal—so how can we scale this low-energy solution to gigatonne levels while ensuring environmental and community benefits?

Scaling ocean alkalinity enhancement for durable carbon removal

The ocean naturally absorbs about a quarter of anthropogenic carbon dioxide (CO_2) emissions each year, playing a critical role in regulating the climate globally. However, the increasing accumulation of CO_2 in the atmosphere and ocean has led to ocean acidification, harming marine ecosystems. Ocean alkalinity enhancement (OAE) is a carbon dioxide removal (CDR) method that accelerates the ocean's natural ability to absorb and store CO_2 by adding alkalinity, such as magnesium and calcium-based minerals, to seawater. These minerals react with dissolved CO_2, converting it into bicarbonate, a stable form of carbon that remains in the ocean for up to 100,000 years.

OAE offers a low-energy, scalable solution to climate change. OAE consumes less than 10 kWh per tonne of CO_2 removed and seamlessly integrates into existing coastal and industrial infrastructure, avoiding the large land footprint of alternative facilities and requirement for subsequent carbon dioxide storage. In the long-term scenario, OAE provides the added co-benefit of mitigating ocean acidification, creating a healthier marine environment and enhancing biodiversity.



Planetary Technologies' approach to OAE

Planetary Technologies sources and processes alkaline industrial byproducts, such as magnesium oxide kiln dust, ensuring it is safe and effective for use in the ocean. These minerals are carefully tested to verify their chemical composition, dissolution rates (i.e., how quickly they dissolve), and environmental impact before being introduced into seawater.

Planetary's OAE technology works with existing coastal infrastructure, maximizing efficiency and minimizing costs. For example, by leveraging wastewater treatment discharge systems, Planetary ensures rapid mixing and distribution of alkalinity into the ocean, which reduces additional infrastructure requirements, lowers operational costs, and enhances CO_2 removal efficiency by utilizing large-scale water flow systems.

Tufts Cove: A blueprint for scale

Planetary's largest demonstration of OAE took place at Tufts Cove in Halifax, Canada, where over several months, the company successfully removed over 1,000 net tonnes of CO_2—marking the largest credited carbon dioxide removal achieved via OAE to date.

As part of this effort, Planetary implemented a robust measurement, reporting, and verification (MRV) framework, developed in collaboration with Isometric & Dalhousie University, to ensure that the CO_2 removal process was both effective and environmentally safe.

Planetary prioritized strong community engagement by collaborating with Indigenous groups, fisheries, and local environmental organizations to ensure transparency and inclusivity. This effort included consultations with Mi'kmaq leaders and other First Nations groups, public outreach and educational initiatives, and performed a preliminary ecotoxicology study on larval lobsters.

With the demonstration in Halifax proving the feasibility of mineral-based OAE, Planetary is now poised for megatonne-scale deployment. By 2026, planned system upgrades will significantly increase the scale of CO_2 removals, and additional active projects under development in 3 continents. Long-term, Planetary envisions deploying OAE at industrial outfalls globally, leveraging existing infrastructure to remove CO_2 at gigatonne scales and combat climate change.

Conclusion

Throughout 2024, Evok has collaborated with key players in the clean tech ecosystem with the goal of developing a unified framework that equips portfolio companies with clear, measurable, and actionable metrics to define and track their impact. This framework will evolve in the coming years as new best practices emerge, and we are excited to continue working with our partners across the ecosystem to continue this effort.

The Evok team would like to offer our heartfelt thanks to our portfolio companies for dedicating time and effort to report in such depth. We would also like to acknowledge that this Impact Report would not exist without the feedback and guidance from our limited partners and ecosystem colleagues who have helped shape and guide the reporting program at Evok. If you have questions about this report, please email info@evokinnovations.com

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