
PLANETARY
Impact Report
2024

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A Note from Mike Kelland, CEO

IPCC models say that to meet climate goals, we'll need 10 gigatonnes of carbon removal per year operational by 2050. It took the oil industry 100 years to get to 1 gigatonne of production, and we have 25 years. We need to start responsibly researching, developing and scaling CDR today to hit this massive target.

Planetary is collaborating with the top academics in the field along with forward-looking commercial and community partners to address this challenge directly.

The work is progressing so rapidly that the published science and public understanding of our field lags far behind the cutting edge. The number of OAE-related papers published in peer reviewed journals has doubled every year since 2020, and we expect to start to see the results of their work. In 2023, Planetary ran our first net removing project in Halifax, delivering the first 138 tonnes of OAE-based carbon removal to customers. In 2024 we hit 1000 net tonnes. All of this work was done in close collaboration with the top tier ocean research group at Dalhousie University. We expect to see the results of their work published starting in the next few months.

The results of this research show what we have been predicting - Planetary's process has no lasting measurable impact on the ocean environment at current scales and is highly likely to have positive, restorative impacts at higher scales and when continuously operating. In particular, papers are now coming out that show that alkalinity enhancement increases the growth rates of commercially important fish like cod and halibut.

Planetary's own extensive testing and ocean monitoring process has shown no increases of metal contamination in the water column or sediments and no impacts on the local phytoplankton populations. This gives us the confidence to continue to make incremental scale increases, while maintaining careful monitoring.

We've achieved similar advancements on the measurement of carbon dioxide removal. In 2024, we were able to directly and consistently measure the reduction of CO2 in the surface ocean. These kinds of direct measurements and observations significantly increase confidence in the net positive climate impact of our process.

Planetary's work in 2024 is a story of perseverance, learning and responsibility. It was a year of change - we welcomed new team members and bid farewell to others, we raised our series A, and we went from optimism through despair and back to confidence as we resolved operational challenges and ultimately hit our goals and targets.

- Mike Kelland, CEO & Co-Founder, Planetary

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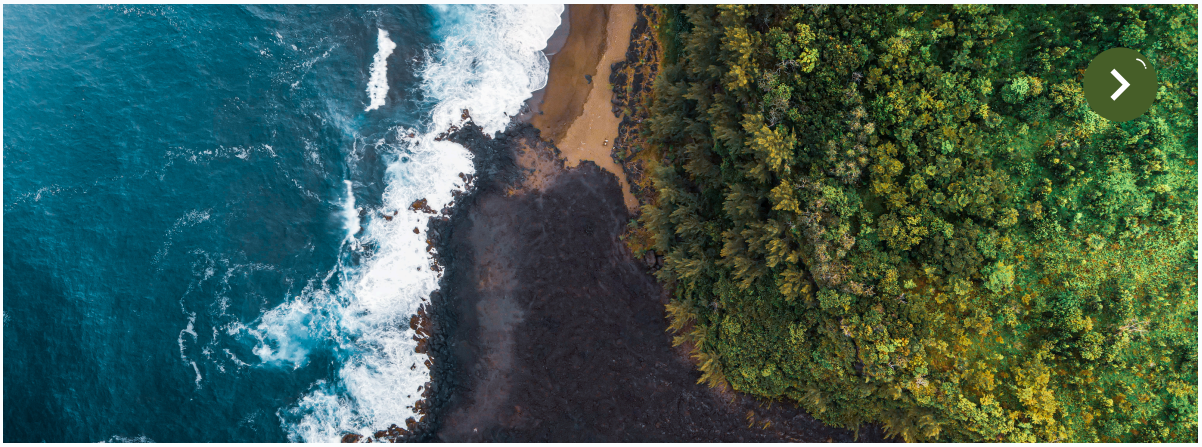
Restore the Climate. Heal the Ocean.

Planetary's **vision** is to protect and restore the ocean and climate for generations to come.

Our **mission** is to enhance the ocean's natural ability to fight climate change through carbon dioxide removal and storage. Our team combines expertise in ocean science, metallurgy and geochemistry to safely and effectively scale up ocean-based CO2 management solutions. Working collaboratively with all of our stakeholders, we develop a cost effective and sustainable set of tools aimed at protecting and restoring our oceans and climate, ultimately doing carbon dioxide removal and storage at gigatonne scale.



What is OAE

Ocean Alkalinity Enhancement (OAE) is a method that neutralizes ocean acidity which enables the ocean to remove carbon dioxide from the atmosphere. At Planetary, we describe OAE as a way to safely amplify the Earth's geologic carbon cycle — a process that has regulated atmospheric CO_2 for billions of years.

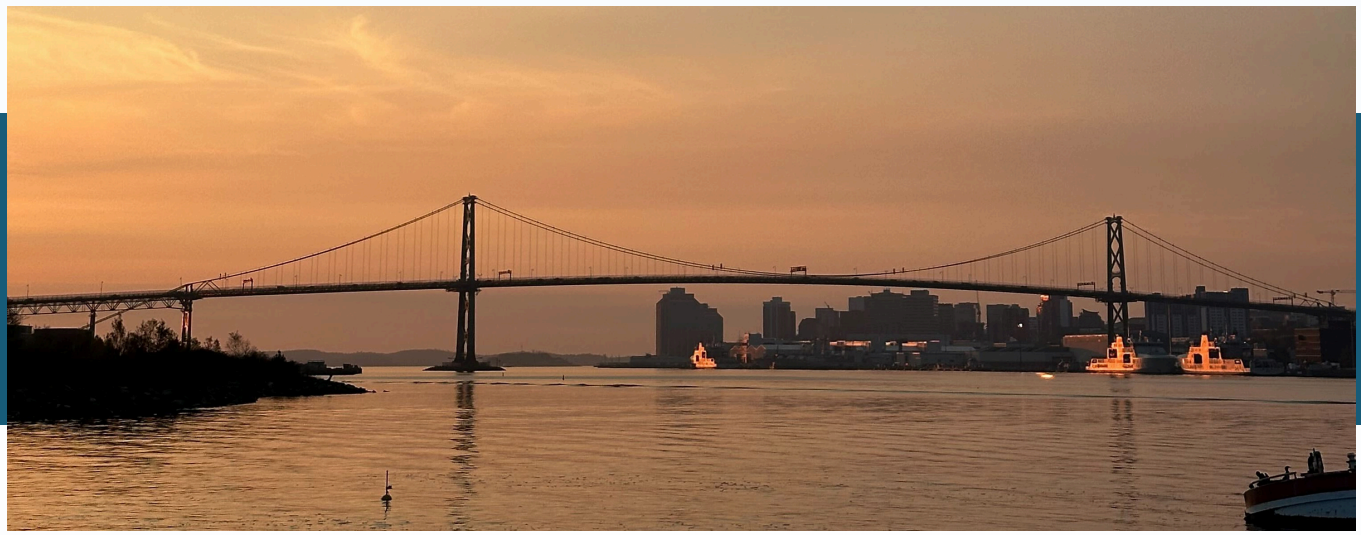
By adding alkaline minerals to seawater on the coast, we neutralize excess ocean acidity while enabling the ocean to absorb more atmospheric CO_2. This process mimics natural weathering, where rocks slowly break down over time, releasing alkaline minerals that help stabilize the Earth's climate.

Co-Benefits

- **Water Quality & Ecosystem Co-Benefits:** Alkalinity addition improves wastewater efficiency, enhances effluent quality, and may support marine life, including cod, herring, mussels, and oysters.
- **Transparent, Community-Driven Science:** We share valuable environmental data with local groups, like Elizabeth River Project and Halifax stakeholders, beyond our core project needs.
- **Local Economic Investment:** Our operations have contributed ~$700K to the Nova Scotia economy through local contractors, consultants, and university partnerships.

MILESTONES

- First verified OAE-based carbon removal delivery to customers
- 1,000+ net tonnes of CO2 removed
- Raised our Series A to scale our impact
- Expanded partnerships with global academic institutions and industry



2024: Our Journey

2024 was characterized by momentum: From our first phase of research in Virginia, to our Halifax project delivering the world's first verified OAE-based carbon removal credits, to achieving an ambitious goal: removing 1,000 net tonnes of CO2.

Progress, however, rarely comes without obstacles. Equipment challenges forced us to rethink our dosing system, and harsh, North Atlantic winter conditions tested both our technology and our team. At times, our goal seemed out of reach.

Instead of pushing harder, the Planetary team looked to our values. By accepting responsibility and collectively resolving our challenges with curiosity and creativity, we streamlined processes, improved safety protocols, and expanded our definition of team to create capacity beyond ocean scientists and site operators. By December, our system was running 24/7, and monitoring confirmed clear evidence of CO2 removal, rising alkalinity, as well as stable ocean chemistry.

By the end of 2024, we actually surpassed our goal, removing over 1,000 net tonnes of CO2. **But, more importantly, we have proven that scalable, safe carbon removal is possible.** Through challenges and persistence, we emerged stronger—ready to make a lasting impact.

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Embodying Our Values

Safety & Environmental Responsibility
In 2024, we faced operational challenges—including equipment issues, winter storms, and continuous dosing complexity—but upheld our values by pausing when needed, enhancing safety protocols, expanding real-time monitoring with no exceedances, and confirming through independent research that our dosing safely increased pH and alkalinity without harming ocean chemistry.

Transparency & Ethical Research Practices
We advanced transparency and ethical research in 2024 by building on our 2023 Impact Report, sharing progress through public communications, conducting ecotoxicity studies on seven species, implementing a stop-trigger framework during dosing, and collaborating with independent researchers to ensure our science was rigorous, accountable, and trusted.

Collaboration with Indigenous Knowledge Holders
Planetary deepened our collaboration with Indigenous knowledge holders in 2024 by engaging all 13 Mi'kmaw communities, launching a lobster-larvae monitoring study in response to fisheries feedback, and partnering with Ulnooweg to integrate traditional knowledge into our work through the Joint Learning Opportunity.

Our Values

Accept Responsibility

Curiosity & Creativity

Respect

Win For All

Values in Action

1,020.5 net tonnes of CO2 removed

29 research boat surveys conducted

24/7 safety-oriented continuous operations achieved

100% living wage for employees

Halifax, Nova Scotia, Canada

July 2024 - Present

Project Overview: **Halifax**

Our Halifax project achieved a major milestone in scaling safe, effective carbon removal, successfully removing 1,020.5 net tonnes of CO2. By leveraging pre-existing infrastructure, we demonstrated significant scaling potential with no regulatory exceedances and clear increases in pH and alkalinity. This project set a new standard for safe, scalable climate solutions.

Milestones

- **Streamlined** dosing system upgrades
- **Safety** improvements
- Improved operator **training**
- **Successfully removed 1,000 net tonnes of carbon dioxide**

Key Partnerships

- Nove Scotia Power
- Dalhousie University

Key Learning of 2024

We successfully improved our dosing processes for much better efficiency and improved environmental monitoring.

Operator Spotlight: Mack

"Since starting at Planetary's Tufts Cove Plant in June 2024, I have been exposed to both incredible people and experiences. Fresh out of university with a Marine Sciences degree, working as an operator on an industrial site was not my intended path. However, this job has taught me lessons in creativity, problem solving and the power of team work. If I had to describe the Tufts Cove environment in one word, it would be dynamic. From severe weather conditions to bursting pipes, you become adaptable and accept you will be covered in mud at the end of each shift. **To see how far we have come over the last year is amazing, I never thought when I started we would be able to achieve continuous operations, but here we are doing it!** Of course this would not have been possible without the incredible team at Planetary who have all contributed to helping us reach this goal and offered their unwavering support to us operators here at Tufts Cove."

Contact Information:

For any queries or additional information, please contact: halifax_project@planetarytech.com

Elevating Community Partnerships in Nova Scotia

Our Framework

We follow a clear community engagement framework: Inform → Consult → Involve → Collaborate → Empower —with transparency as a core principle.

We are committed to building long-term, trust-based relationships with Indigenous communities. Our work is rooted in collaboration, transparency, and respect for Indigenous knowledge and leadership.

Community Engagement Highlights

Building Meaningful Relationships

We have engaged all 13 Mi'kmaw communities through trusted bodies like the Confederacy of Mainland Mi'kmaq, APC, MEBO, and WMA. These relationships ensure ongoing dialogue, trust, and collaboration. Consistent communication and the use of Mi'kmaw language have helped honor cultural protocols and build stronger partnerships.

Listening and Leading Responsibly

We responded to local concerns by implementing lobster larvae monitoring to ensure ecological safety. We're pursuing third-party PAIR certification to benchmark our Indigenous relations practices. Our testimony to the Canadian Senate and collaboration with the Carbon Business Council demonstrate our commitment to responsible, community-informed leadership.

Centering Youth, Education, and Innovation

Pitupaq leaders have encouraged Indigenous youth involvement in environmental efforts. We're partnering with MEBO to co-create carbon removal and climate curricula for Indigenous schools. With Ulnooweg and the Mi'kmaw Native Friendship Centre, we're also supporting Indigenous-led innovation in shellfish farming and science education.

Elevating Indigenous Voices

We launched the "Breaking Ground: Making Waves" Speaker Series to spotlight Indigenous leaders driving economic and environmental innovation. Through media, newsletters, and events, we amplify these voices while highlighting the role of Indigenous knowledge in shaping sustainable climate solutions.

Elizabeth River, Virginia, USA

October 2024 - December 2024

Project Overview: **Elizabeth River**

Planetary successfully completed the first active trial of Wastewater Alkalinity Enhancement at the Elizabeth River in partnership with HRSD, University of Maryland, and University of Delaware. The trial demonstrated safe dosing of alkaline minerals, resulting in increased pH, alkalinity, and CO2 reduction, with continuous monitoring ensuring environmental safety. With this milestone complete, we look forward to phase two in 2025.

Milestones

- **Conducted first active trial of wastewater alkalinity enhancement (WAE)**
- Established automated dosing controls to align with with plant flow rates

Key Partnerships

- Hampton Roads Sanitation District
- University of Maryland College of Environmental Sciences
- University of Delaware

Key Learnings of 2024

After our research this fall, it is clear that automation will improve dosing efficiency and reduce operator requirements, helping us to scale our solution safely and efficiently.

Operator Spotlight: Omar

My visit at VIP for the 2024 trial was defined by how passionate the HRSD team was about **maintaining their plant to the highest standards while also being willing to try new things.** So many of the staff were interested in what we were doing, asked great questions, offered their help and advice and were excited that we could together improve plant operations. It really is a fun place to be for a Planetary trial. Taking a full plant tour with Charles was a highlight."

Contact Information:

For any queries or additional information, please contact: elizabeth_river@planetarytech.com

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Elevating Community Partnerships in Norfolk & the Elizabeth River

Our Framework

We follow a clear community engagement framework: Inform → Consult → Involve → Collaborate → Empower —with transparency as a core principle.

Planetary is cultivating strong ties with a broad network of Norfolk and Hampton Roads organizations including the League of Women Voters, Norfolk Botanical Garden, Virginia Service Commission, LR Now, Old Dominion University (ODU), Friends of Lamberts Point City Park, Keep Norfolk Clean, and the Elizabeth River Trail Foundation.

Community Engagement Highlights

Climate Leadership with Chesapeake Bay Foundation (CBF)

Planetary reached a major milestone by sponsoring CBF's flagship climate lecture series, featuring U.S. Senator Tim Kaine as the inaugural speaker.

We're also working towards collaborating on environmental education programs to bring hands-on climate and marine learning to local students.

Co-Development with Elizabeth River Project (ERP)

Planetary engaged ERP (Leading environmental group protecting Elizabeth River) early in the trial design process. Their input led to oyster monitoring being integrated into the study. ERP was invited to visit the site and received full post-trial data and results, reinforcing transparency and mutual trust.

Expanding partnerships

In partnership with the Elizabeth River Trail Foundation, Planetary will participate in an upcoming Community Trails Day, hosting a public education booth alongside other community groups and businesses. The Nansemond Indian Nation will also be present.

Citywide Learning Commitment

As a proud member of Believe in Learning Norfolk, Planetary is contributing to a city-wide, lifelong learning initiative driven by the City of Norfolk and over 100 community, business, and educational partners—ensuring climate science and environmental stewardship are embedded across all age groups.

Our Research: Grounded in Science, Strengthened by Collaboration

Research That Raises the Bar

Planetary's work is backed by rigorous, evolving science. In 2024, we partnered with Dalhousie University and the National Research Council of Canada on a series of lab and mesocosm experiments to deepen understanding of PC8 (our alkaline feedstock) and its interactions with marine species.

Mussel Flume Study

In collaboration with Prof. Ramon Filgueira, mussels were exposed to gradually increasing concentrations of PC8. Behavioral changes only appeared at very high pH (>9.3), and while behavioral indicators proved inconclusive, gill damage observed at extreme conditions informed future testing approaches.

Mussel Alkalinity Study

Over 49 days, mussels were exposed to low, medium, and high PC8 concentrations. While water chemistry showed no strong effects, some stress may be linked to particle exposure—guiding future research into the difference between chemical and physical impacts. This study gave us important insights into how to design longer-term exposure experiments and how mussel physiology responds to different stressors over time.

PC8 Mesocosm Experiment

In partnership with the MicroAlgal Process Evaluation Lab and NRC, we launched a larger-scale mesocosm study—results are forthcoming and will add to our growing body of independent, peer-supported data. This marks our first ecosystem-level experiment with PC8, expanding our understanding beyond single-species responses to whole-system interactions.

Experimental EQOH Method

We're developing an in-house method to estimate EQOH, which is the measure of the carbon removal potential of a mineral, helping us better screen potential alkalinity sources and understand how they dissolve in ocean conditions. This approach will help accelerate safe scaling by allowing us to evaluate the dissolution behavior of new materials more efficiently and consistently.

Prioritizing Safety

Science-first. Community-focused. Zero compromises.

At Planetary, safety isn't just a protocol—it's a foundation. Every step of our process, from feedstock selection to post-dosing monitoring, is grounded in rigorous science and real-time accountability.

A Comprehensive Safety Framework

We monitor metals and chemistry across water, sediment, and effluent before, during, and after dosing. Our public-facing stop-trigger framework ensures we can respond immediately—backed by real-time alert systems that track eight regulated parameters and 29 trace metals.

- To date, no exceedances of permitted thresholds have occurred.
- No negative impacts on ocean chemistry have been observed.

Feedstock Testing

Before any dosing begins, we ensure the feedstock is safe—through comprehensive third-party and in-house testing.

- Ecotoxicology: Independent lab studies tested seven marine species (from microalgae to fish) and found no effects below 4 g/L—more than 25x higher than our max dose of 0.15 g/L.
- Trace Analysis: Feedstock is analyzed for 40 trace metals (via ICP-MS) and key organic compounds, including PCBs, PAHs, dioxins, and petroleum hydrocarbons.
- Routine Validation: Every batch of PC8 is tested for performance (e.g., MgO content) and compliance with water quality guidelines.

Monitoring & Measurement

We track slurry characteristics, seawater chemistry, and environmental conditions around the clock to safeguard marine ecosystems.

- Continuous effluent monitoring with automated alerts keeps operators informed in real time.
- Field measurements validate pH increases, pCO_2 drawdown, and alkalinity dispersion in situ.
- 29 sampling campaigns ensure coverage across time and geography.

Independent Science Partnerships

Collaborations with leading academic researchers ensure we're held to the highest standards—and help push the entire field forward.

- Dilution modeling (via dye tracers) confirms safe dispersal.
- Biological assessments include phytoplankton physiology, benthic macrofauna surveys, mussel gill health, and eDNA monitoring.
- Carbon removal models integrate observations to calculate CO_2 removal and track alkalinity across the North Atlantic over a ~10-year timeframe.

Partnerships & Collaboration: Highlights

"Planetary Technologies approach to carbon capture is truly revolutionary. The Tuft's Cove project represents a new and exciting tool that Nova Scotians can be proud is homemade."

- Eric Christmas, Membertou Nation

Hampton Roads Sanitation District (HRSD)
HRSD was an extraordinary partner during our trial, guiding the Planetary team through the plant's systems and processes.

HRSD helped to engineer a major improvement by programming our dosing pumps to automatically follow the plant's flow rate—eliminating the need for 24/7 on-site staffing. They went above and beyond, learning the VFD system, staying late to implement it, and teaching our team to operate it independently.

CUR8 & British Airways
Planetary was proud to be part of the UK's largest carbon removal portfolio through CUR8's partnership with British Airways.

Being selected as a high-quality solution by the UK's leading airline purchaser of carbon removals affirmed our role in advancing real, scalable climate impact.

Shopify
Shopify continued their support of Planetary with their largest-ever purchase of OAE credits in 2024—2,000 tonnes to be delivered over two years.

Their ongoing partnership since 2020 has helped catalyze the growth of science-backed climate solutions like ours.

*"I think we've been particularly impressed by Planetary's ability to focus in on the ideal solution for them. It's mineral OAE, very focused, and I think that is paying dividends and helping Planetary move quicker. We're also impressed by the research component–**I think Planetary's focus on research for both their own needs as well as the whole ocean carbon removal ecosystem has been something we've been really impressed by**."*

- Mitch Selby, Sustainability Fund, Shopify

Governance & Financial Snapshot

Series A Funding Raised: $11.35M USD

In 2024, Planetary secured $11.35 million USD in Series A funding, led by Evok Innovations with participation from BDC Capital, Amplify Capital, and DNX Ventures. This investment will accelerate our efforts to scale carbon removal safely and responsibly, while continuing to collaborate with scientific partners, regulators, and local communities to ensure our solutions are both effective and sustainable.

Lead Investor
Evok Innovations

Welcome To
BDC Capital, Amplify Capital, and DNX Ventures

2024 Revenue

$1.35M CAD

- $535k CAD from grants
- $663k CAD from CDR sales
- $167k CAD of other income

Total Contracted CDR Sales

$4.1M USD

Governance

- Planetary Technologies Inc. is a for-profit organization incorporated in Canada with headquarters in Dartmouth, Nova Scotia.
  - Subsidiaries
    - Planetary Technologies, Inc. (American Subsidiary)
    - Planetary Technologies (B.C.) Inc. (B.C. based subsidiary)
  - B Corp Mission Lock - Stakeholder Interest added to articles of incorporation (December 2022) Read more about B Corp Mission Lock here.
- Board Members
  - Michael Kelland (CEO & Cofounder)
  - Jane Kearns (Evok Innovations)

Our Team

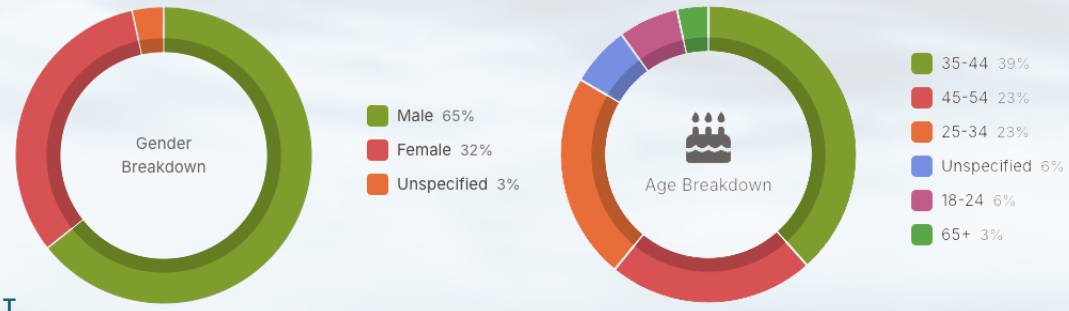
Planetary is dedicated to being a company for good. As such, we have adjusted our articles of incorporation to encourage Planetary to consider the needs of all stakeholders in business decisions instead of focusing solely on the needs of investors and shareholders. Additionally, we have adopted the three pillars of focus from B-Corp to support our JEDI strategy. Under racial equity, we have adopted diversity practices - from recruitment to education and retention - to create an inclusive space where different lived experiences thrive. Under distribution of power, we apply financial transparency and have systems that enable self-management and empowerment. Under accountability, we have a public code of conduct and engage with stakeholders for each of our ocean CDR projects. All JEDI practices are integrated into prioritized organizational goals to ensure best possible outcomes for all.

In 2024 Planetary introduced Intersectionality training to the team and began to look at the impacts of bias in decision making and giving feedback

29
Full Time Employees
+8 FTE from 2023

0%
Voluntary Turnover

100%
Employees paid above living wage



Looking Ahead: 2025

Scaling Responsibly. Strengthening Impact.

Expanding Research to Strengthen Results

Our 2024 research efforts laid a strong foundation—now we're expanding our scientific work to deepen understanding, validate safety, and build confidence in ocean-based carbon removal.

Continuing 24/7 Operations

We've proven our ability to operate continuously and responsibly in real-world conditions, and we're building on that success with smarter automation, improved integration, and increased efficiency.

Advancing Permitting for Future Projects

We're working closely with regulatory bodies and local communities to advance permitting for future sites, grounded in transparency, environmental stewardship, and shared goals.

Objectives for Growth

1

Safely demonstrate an investable OAE product backed by rigorous science, community engagement, and operational excellence.

2

Secure alkalinity sources for 250,000+ tonnes of CDR/year Aiming for durability, accessibility, and global impact.

3

Build a resilient, sustainable business Designed for long-term success and climate benefit.

We remain deeply committed to science, safety, and real solutions—not just for today's climate, but for a shared future that's better, healthier, and grounded in responsible innovation.

Thank you. Wela’lioq. Merci.

Contact Information :

info@planetarytech.com

www.planetarytech.com

HQ // Halifax, Nova Scotia, Canada