Category

Best EcoHealth Solution

Organization/Company Name
Provide the official name of your company or organization.

Greenore Holding Co.

Overview (Up to 500 words)
Provide key information about the company, including its origins, mission, and core philosophy. Describe the solution, impact, and sector focus (e.g., water management, renewable energy, circular economy, waste management, sustainable agriculture, net-zero initiatives, etc.).

Greenore is a Columbia Engineering spin-off since 2016. We turn challenges of industrial solid wastes and carbon emissions into unconventional resources. In 2023, Greenore commissioned the world's FOAK commercial-scale two-step carbon mineralization plant in China which originates from the 2015-2018 US-China EcoParterships. It is capable of capturing 25,000 tons of CO2 and processing 100,000 tons of steel slag per year. In 2025, featured as one of the Global Cleantech 100 by the Cleantech Group, Greenore has been one of the world's leading startups bringing the CCUS technology to the market.

Our mission is to combat climate change and industrial waste pollution by innovatively converting them into valuable green materials. Our philosophy centers on achieving "two birds with one stone", i.e., negative carbon emissions and solid waste treatment, creating a circular approach - "treating waste with carbon".

Greenore's core technology has integrated CO2 mineralization with industrial solid waste resource utilization. We use a weak acid "soda" system enhanced by chelating complex to extract calcium ions from industrial solid wastes (e.g., steel slag, iron slag, fly ash, carbide slag, mine tailing etc.) at ambient temperature and low pressure. This extracted calcium reacts with captured CO2 to produce two main products:
GOCARB®: the carbon-negative calcium carbonate which can be applicated as filler material for plastics, rubber & tire, paint & coatings and paper industries, etc.
GOSCM®: the carbonated fine slag powder which can be applicated as supplementary cementitious material for construction.

Impact:
- Environmental: Achieved negative carbon emissions by permanently sequestering CO2 into stable mineral products. Simultaneously solved major solid waste challenges (land use, groundwater/air pollution from stockpiling or landfill).
- Circular Economy: Creates a sustainable CCUS pathway with inherent economic value. Products (GOCARB®, GOSCM®) can directly replace higher-carbon footprint materials (e.g., cement clinker, resins) for sectors such as construction, plastics, rubber, and coatings, driving downstream decarbonization and establishing a green supply chain.

Sector Focus:
Greenore operates at the intersection of several critical sustainability sectors:

- Circular Economy / Waste Management: Primary focus on valorizing industrial solid waste (slag, fly ash, carbide slag) as a resource.
- Carbon Capture, Utilization, and Storage (CCUS): Core technology for mineralizing and permanently storing CO2.
- Net-Zero Initiatives / Industrial Decarbonization: Provides a key solution for hard-to-abate industries (steel, cement and chemical). Meanwhile, in partnership with the Global Centre for Maritime Decarbonisation (GCMD), Greenore is also pioneering off-shore to on-shore CO2 mineralization using CO2 captured from ships, establishing an integrated land-sea carbon-to-materials ecosystem for the global shipping sector.
- Green Materials: Produces low/negative carbon industrial filler materials and construction materials.

Climate Health & Alignment with UN SDGs / National Policy Guidelines (500 words)
Please explain how your innovation mitigates or adapts to climate-related health risks and aligns with the United Nations Sustainable Development Goals (SDGs) and national climate policies.

Greenore's innovation directly addresses the intersection of climate change and public health by transforming carbon emissions and industrial waste into carbon-negative materials. This reduces both environmental pollution and the indirect health risks caused by global warming, poor air quality, and resource depletion-particularly in industrialized and urban areas.

Greenore's unique carbon mineralization technology directly utilizes industrial flue gas emissions and reacts them with industrial solid wastes such as steel slag to produce GOCARB® and GOSCM®. The process not only reduces greenhouse gas emissions but also replaces high-carbon footprint raw materials such as traditional precipitated calcium carbonate, plastic resins, and cement, avoiding additional emissions from traditional productions.

By removing CO2 and industrial pollutants from the environment and turning them into safe, valuable materials, Greenore's technology mitigates climate and environment -related health risks including:

Illness linked to PM2.5 and microplastics;
Heat-related diseases driven by rising temperatures;
Water and soil contamination caused by mismanaged industrial waste.

The commissioning of Greenore's commercial project proves that we can offer a scalable pathway to decarbonize heavy industry while advancing eco and health - friendly waste management. Meanwhile, through its partnership with the Global Centre for Maritime Decarbonisation (GCMD), Greenore plays a key role in pioneering off-shore to on-shore CO2 mineralization from CO2 captured from ships, supporting IMO goals for maritime decarbonization and port-area air quality.

Alignment with the UN Sustainable Development Goals (SDGs):
SDG 3 - Good Health and Well-being: Reduces air pollutants and climate-related health threats.
SDG 9 - Industry, Innovation and Infrastructure: Drives green industrial transformation.
SDG 11 - Sustainable Cities and Communities: Reduces pollution and enhances urban ecological resilience.
SDG 12 - Responsible Consumption and Production: Replaces virgin raw materials with industrial waste.
SDG 13 - Climate Action: Enables large-scale CO2 utilization and sequestration.
SDG 17 - Partnerships for the Goals: Collaborates with corporates, governments, academia, and international climate bodies.

Alignment with National and Regional Policies:

US:
Aligns with DOE's funding for critical mineral recovery from waste streams like fly ash.

China: Supports China's dual-carbon goals ("peak carbon by 2030, neutrality by 2060") and the Ministry of Ecology and Environment's priorities in CCUS and waste utilization.

EU: Aligns with the EU Green Deal and Circular Economy Action Plan by decarbonizing the materials industry.

ASEAN and Global South: Matches regional strategies on air quality, waste-to-resource, and climate adaptation, while enabling local deployment of green technologies.

Greenore's work shows that climate solutions can go beyond carbon-restoring environmental health, protecting communities, and advancing shared climate and development goals worldwide.
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Measurable Impact (300 words)
Explain how you benchmark success and impact using scientific validation and quantifiable metrics where possible (e.g., peer-reviewed publications, Life Cycle Assessment (LCA) data, partnerships, net-zero targets, CO_2 reduction, resource efficiency, waste diversion rates, improved health outcomes, etc).

Greenore benchmarks its success through rigorous scientific and industrial validation and quantifiable environmental and health impact metrics. Its carbon mineralization technology has been validated by third-party LCAs (DNV/SGS) and peer-reviewed data quantify CO2/waste reductions, while industrial scaling proves commercial viability.

Processing one ton of industrial solid waste mineralizes 0.25 tons of CO2 while avoiding an additional 0.75 tons of CO2 equivalent emissions by replacing carbon-intensive materials like resins and cement.

Life Cycle Assessments (LCA) has been conducted by both SGS and DNV on Greenore's products, both GOCARB® and GOSCM®, demonstrate a negative carbon footprint, accounting for emissions reduced and avoided by substituting traditional raw materials like limestone and cement. This contributes to resource efficiency and waste diversion by transforming industrial residues into high-value materials.

Greenore collaborates with leading academic institutions, industrial partners, and global organizations like the Global Centre for Maritime Decarbonisation (GCMD) to validate and expand its technology applications, including off-shore to on-shore CO2 mineralization from ships.

Health impact assessments link Greenore's emission reductions to improved air and water quality, which lowers risks of respiratory and cardiovascular diseases in nearby communities.

Overall, Greenore's scientific approach, combined with robust data on CO2 sequestration, industrial waste utilization, and health co-benefits, establishes a transparent, measurable impact model critical for scaling climate and health solutions.
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Current Stage & Market Potential (500 words)
Describe the current stage and potential for scaling your solution to new markets, industries, or geographies. If any, include details on market demand, regulatory considerations, barriers to scale, adoption strategy and long-term sustainability.

Greenore is currently at the commercial deployment stage, operating the world's FOAK commercial-scale two-step carbon mineralization plant in China since 2023. This facility processes over 100,000 tons of steel slag annually and sequesters 25,000 tons of CO2, demonstrating the technology's industrial viability and environmental benefits.

The company has established joint ventures with major steel producers, ensuring stable feedstock supply and integration within the industrial value chain. Greenore is actively expanding into globlal markets, focusing on North America, Europe and Southeast Asia, targeting decarbonization needs in heavy industry and the maritime sector.

China's steel industry generates nearly 100 million tons of unutilized steel slag annually, with traditional disposal methods causing resource waste and environmental pollution. Greenore's innovative solution not only achieves resource recovery but also transforms the slag into high-value green calcium carbonate products. These eco-friendly materials meet growing demands for low-carbon solutions in construction, plastics, and rubber industries, demonstrating broad market potential. This issue remains the same for the past steel producing giants like the US and the UK as well as rising production country such as India.

The Paris Agreement, the National policies like China's "dual carbon" strategy, the European Green Deal, and the International Maritime Organization's (IMO) shipping decarbonization initiatives provide strong regulatory support. Carbon pricing, subsidies, and solid waste valorization mandates further facilitate technology adoption.

Barriers to scaling include high upfront capital costs for equipment and infrastructure, lengthy regulatory approval processes, and conservative industry attitudes towards new materials. Greenore addresses these challenges through continuous process optimization, modular plant design, and strategic partnerships with exisiting leading player to reduce costs and accelerate market entry.
The adoption strategy emphasizes collaborative innovation with industry partners, using pilot and demonstration project to validate performance and build trust.

Long-term development is based on a circular economy model, converting waste into high-value products and permanently sequestering CO2. Greenore is exploring diversified applications in plastics, rubber, construction materials, and shipping to enhance business flexibility and resilience. Greenore and several Fortune 500 companies are now co-developing the application of environmentally friendly product with GOCARB®, including L'Oreal, P&G, Michelin, and others.

In summary, with a team of international backgrounds, a mature technology, strong industrial alliances, regulatory alignment, and a scalable business model not relying on carbon/tax credits, Greenore has significant global potential and is positioned to deliver profound climate and health impacts across multiple industries around the world.

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Staff and Advisors (500 words)
Describe your team’s expertise (e.g., academic standing, intellectual property contributions,

research collaborations, and professional communications). Highlight the team's role in innovation, policy influence, and industry leadership.

Greenore's U.S. president Dr. Will Morris holds a Ph.D. in Chemical Engineering from the University of Utah, with profound experience and former successes in pollutant control from NOx, SOx, to particulate matter on aerosol formation in air as well as post-combustion CO2 capture. He has provided engineering and business development counseling for CO2 capture and utilization technologies testing at the Wyoming Integrated Test Center (ITC). He is an expert in technology implementation and industrialization scaling up. One of Greenore's co-founder, Prof. Alissa Park, is the Ronald and Valerie Sugar Dean of the UCLA Samueli School of Engineering. Her research focuses on sustainable energy conversion pathways with emphasis on integrated carbon capture, utilization and storage (CCUS). Dr. Park was the Lenfest Chair in Applied Climate Science at Columbia University and the the Director of the Lenfest Center for Sustainable Energy at the Earth Institute. She was also the Chair of the CO2 Utilization for the Mission Innovation Workshop on Carbon Capture, Utilization and Storage held in September 2017.

This leadership combination ensures that the technology is both scientifically rigorous and commercially viable.

Greenore's leadership team holds key intellectual property rights related to carbon mineralization, reflecting their pioneering position in the field. The team actively collaborates with leading global academic institutions and research centers, including Columbia University, UCLA, GIST, Tsinghua University, and the Global Centre for Maritime Decarbonisation (GCMD).

Greenore's team integrates academic excellence, patented innovation, strategic partnerships, and policy influence to drive impactful climate, health, industrial and business solutions. Their interdisciplinary expertise underpins the company's mission to deliver sustainable technologies at global scale.

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Financial Structure. (500 words)

Describe how your innovation is funded and sustained (e.g., key investors, funding sources, financial stakeholders, royalties, grants, revenue-sharing agreements, strategic partnerships such as academic institutions, equity groups, corporate alliances, and angel investors, etc.).

Greenore's innovation is supported by a diverse and strategically aligned financial structure that integrates institutional investment, and corporate alliances.

In 2015, the company's foundation was laid through a U.S.-China EcoPartnership between Columbia University and Baotou Steel Group. This cross-border initiative served as the springboard for Greenore's research-to-commercialization journey, leveraging both U.S. academic research and Chinese industrial scale-up capacity.

In 2021, Greenore secured a Pre-A round investment from Yuanhan Energy, a leading Chinese industrial gas company owned by Pacific Alliance Group, PAG. This strategic investment supported pilot project deployment and validated the potential for integrating Greenore's technology into decarbonization strategies for hard-to-abate sectors.

In 2024, Greenore completed its Series A financing with investment from ATL, a wholly owned subsidiary of TDK Corporation, a global leader in electronics and energy storage.

Greenore's revenue model includes multiple income streams, including:

Product sales (e.g., GOCARB® and GOSCM®);

Technology service and licensing for globle heavy industry partners (e.g., Baotou Steel Group, CRH Group);

The company also collaborates closely with academic institutions (e.g. UCLA, Columbia University, GIST, Tsinghua) gaining access to shared infrastructure and technical support. Such partnerships reduce operational costs and promote long-term sustainability.

As demand for low-carbon materials rises, Greenore is transitioning from R&D-driven funding to revenue-driven growth, with increasing contributions from product sales and co-invested demonstration plants. This evolution reflects a robust and self-sustaining business model with scalable environmental impact.

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*Kindly clearly label your files with company name and asset name.

Attached Files:

- ISO 14067 repoertEnglish Greenore250403.pdf

Community & Social Impact (500 words)

Explain how your innovation benefits local communities, underserved populations, or public health (e.g., job creation, social equity, environmental justice, improved quality of life, tourism, etc.).

Greenore's technological innovation delivers measurable social value by addressing environmental, economic, and health inequities in heavy industrial regions. By converting industrial flue gas and solid waste into clean, high-value materials, the company helps local communities transform pollution into opportunity.

Greenore's carbon mineralization facilities are close to the carbon & solid waste-generating plants, contributing to improving air quality and reducing health risks caused by PM2.5 or soil and ground water polution. These improvements are especially meaningful for vulnerable populations such as children, the elderly, and workers exposed to long-term pollution.

Greenore fosters local green employment by creating jobs across plant construction, equipment operation, logistics, and materials processing. The company also provides vocational training to help traditional industry workers transition into the green economy, offering a just transition pathway for resource-dependent cities.

Greenore actively collaborates with local governments and industrial development zones, integrating its projects into regional low-carbon strategies and industrial upgrading plans. By doing so, it channels infrastructure investment into underdeveloped areas and supports inclusive economic growth.

Environmental justice is a core component of Greenore's mission. The company prioritizes regions with high pollution burdens and limited economic resources to ensure that the benefits of low-carbon technologies are not confined to affluent urban centers. At the same time, Greenore's circular economy approach reduces the need for virgin material extraction, thereby protecting rural and indigenous lands from environmental degradation associated with mining.

Public education and outreach are also central to Greenore's impact strategy. Through open days, industry site tours, school engagement, and partnerships with NGOs, the company promotes climate literacy and community involvement, helping to make the green transition more inclusive and transparent.

In summary, Greenore not only contributes to carbon reduction but also creates healthier living environments, green job opportunities, and equitable development pathways-showcasing how climate technology can deliver benefits for both people and the planet.

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Attached Files:

- ISO 14067 repoertEnglish Greenore250403.pdf
- SGS test reportSVHC.pdf
- ISO 14067 repoert Greenore250403.pdf
- 20240119_TBM and Greenore.pdf
- 20250630_GCMD.png

Background information and need for drug / device
(please be as specific as possible in your description; limit 500 words)

N/A

words remaining :

500

History of the development of the solution/product *
(please be as specific as possible in your description; 500 words)

N/A

words remaining :

500

Why this drug or device is innovative, the broad implications for future research, and/or how it will improve the human condition *

N/A

words remaining :

500

Please provide appropriate references (PubMed, Abstract, Website) *

N/A