Carbon to Sea Initiative

February 2026

REQUEST FOR PROPOSALS

Evaluating the Technical Potential for Municipal Wastewater Infrastructure to Integrate Alkalinity Enhancement to Benefit the Environment, Climate, and People

The Carbon to Sea Initiative, a non-profit ocean science program seeking to evaluate whether the ocean can help mitigate climate change through carbon dioxide removal (CDR), is soliciting proposals to identify the wastewater treatment and management benefits of integrating Ocean Alkalinity Enhancement (OAE) technologies.

The aim of this funding opportunity is to develop a technical report that provides an assessment of opportunities, potential risks, and co-benefits to inform public and policy dialogue on this topic.

Carbon to Sea intends to fund one 4-month award of no more than $125,000. Proposals are due no later than Friday, March 20, 2026.

Objective

This Request for Proposals aims to produce a technical report that identifies and evaluates opportunities for integrating OAE with municipal WWT technologies and addresses the climate, human health, and environmental benefits thereof. The report would form the foundational knowledge on the intersection of OAE and municipal WWT to inform integration of this topic in public and policy dialogues.

Context

Around the world, cities and communities face growing challenges in managing wastewater safely and affordably as population density increases and water infrastructure ages. At the same time, wastewater treatment contributes an estimated 3-7%[1] of global greenhouse gas emissions and exacerbates ocean acidification in regions where wastewater effluent pH is lower than the receiving coastal waters.

Updated alkalinity practices in municipal wastewater treatment have the potential to mitigate greenhouse gas emissions while reducing costs, leading to improved climate and environmental outcomes. We're seeking to evaluate the extent of this promise.

[1]https://www.pseau.org/outils/ouvrages/unesco_the_united_nations_world_water_development_report_2020_water_and_climate_change_facts_and_figures_2020.pdf

Meeting global climate goals will require both the rapid reduction of fossil fuel emissions and the large-scale removal of carbon dioxide from the atmosphere. While many carbon dioxide removal (CDR) efforts have focused on land-based approaches, scientists are exploring ocean-based approaches, which are still in the early stages of development. Ocean Alkalinity Enhancement (OAE) is emerging as a promising method that could increase the ocean's ability to safely store carbon through the addition of natural or artificial alkaline minerals to the surface ocean.

There are some municipal wastewater utilities that currently add alkalinity to their effluent to meet regulatory or process performance standards. For example, alkaline minerals may be used to raise pH to optimize biological nitrification processes. Additionally, alkalinity may be added in cases where effluent pH is below the common regulatory discharge threshold of pH 6[2], a level that still contributes to greenhouse gas emissions and exacerbates coastal acidification.[3] Raising wastewater effluent pH closer to coastal ocean pH of 8 could have positive benefits for marine life and climate.[4] This method, referred to specifically as "wastewater alkalinity enhancement," is considered to be a potentially scalable climate solution and already has an established carbon accounting protocol with various commercial and academic research projects underway.

Theoretically, integrating OAE with wastewater treatment (WWT) processes could help make wastewater disposal less harmful to the environment and reduce the emissions generated by current wastewater management practices, thereby unlocking revenue opportunities through carbon markets. Depending on local priorities, resources, and regulations, opportunities to integrate OAE with WWT are likely to vary widely across regions with highly regulated treatment facilities to regions with limited or newly developing wastewater infrastructure.

Scope of Work

This scope of work includes the research and synthesis of existing technical and scientific knowledge to identify and evaluate opportunities for integrating OAE with municipal WWT across different global geographies. Key tasks include:

- Provide an overview of WWT technologies and practices, with particular attention to aspects related to carbon chemistry and greenhouse gas emissions, where relevant to the integration of OAE approaches.
- Provide an overview of current OAE methodologies that can be integrated into municipal WWT processes. Include mineral-based and electrochemical

[2] https://www.cell.com/action/showPdf?pii=S2666-6758%2825%2900206-1
[3] https://pubs.acs.org/doi/10.1021/acs.est.8b00273
https://www.nature.com/articles/s44221-025-00490-z
[4] https://www.cell.com/action/showPdf?pii=S2666-6758%2825%2900206-1

approaches. Where possible, estimate implementation time and cost, and operational maintenance costs.

- Provide an overview of current WWT carbon accounting practices and opportunities. Greenhouse gas modeling should be used to estimate carbon dioxide equivalent emissions from typical WWT operations and the most critical up/downstream activities.

- Design and implement a framework to evaluate OAE integration with WWT against a baseline of existing practices, constraints, and other potential use cases (such as water reuse). Co-benefits may include, but are not limited to:
    - Avoided emissions (e.g., methane, nitrous oxide, carbon dioxide) associated with feedstock changes
    - Avoided emissions due to elevated pH
    - Carbon dioxide removal of effluent-mixed waters (estimated with carbon uptake modeling)
    - Cost improvements and carbon credit revenue
    - Biological processes improvements due to elevated pH
    - Infrastructure preservation due to elevated pH
    - Improved coastal ocean conditions through reduced acidification
    - Improved efficiency of WWT processes

  Potential risks and drawbacks OAE must also be identified and integrated in the framework. These may include operational impacts (e.g., fouling, mineral precipitation) and environmental impacts (e.g., displacement of greenhouse gas emissions, environmental risks of OAE). Negative impacts of discharge of untreated wastewater must be included for comparative purposes. Negative impacts of treated but acidic wastewater should also be included.

- Develop 5 illustrative case studies to demonstrate specific economic, climate, and environmental benefits and potential drawbacks of OAE integration in existing and developing WWT scenarios. Case studies may also be used to discuss policy implications. To ensure geographic diversity and utility, case studies are to be identified and recommended by the consultant and selected in partnership with Carbon to Sea.

- Develop recommendations for OAE integration in WWT based on general technological processes and potential co-benefits. This can include best practices for quantifying existing WWT emission footprints and frameworks for quantifying the climate benefits of changed practices through OAE integration. This can also include guidance on measuring localized environmental benefits associated with elevated pH of discharges against their current baseline. We anticipate greenhouse gas modeling, with a focus on avoided emissions and carbon dioxide removals, will be required to estimate climate benefits.

- Identify best fit geographies for OAE integration with the United Nations Sustainable Development Goals in mind given that other (potentially higher priority) uses of wastewater that would preclude discharge of wastewater to rivers and coastal waters.

Given the global diversity in municipal wastewater management practices, operations, and technologies, the scope of work can be divided into two distinct but complementary scenarios, Existing WWT and Developing WWT:

Existing WWT scenario: This includes regions such as North America, Europe, and others where wastewater management infrastructure exists, and enhanced practices could potentially lead to cost-benefits in addition to environment and climate benefits. Enhanced practices for existing WWT may include (i) transitioning to alkalinity sources with a lower carbon footprint to substantially reduce associated emissions and (ii) adding alkalinity before or during WWT process prior to ocean discharge (ii) increasing alkalinity level of discharged wastewater beyond minimal compliance, removing acidity, and positively impacting coastal and ocean health.

Developing WWT scenario: This scenario includes regions where wastewater management activities are being, or could be, newly introduced to reduce discharge of untreated wastewater directly into rivers and the ocean. For this scenario, the report should provide an overview of the environmental and human health benefits of developing WWT where there previously was no WWT and discuss the potential for OAE integration across applicable WWT approaches. This scenario should be informed by expert input from regions where OAE-relevant WWT infrastructure is newly being developed (e.g., regions prone to water scarcity may be inappropriate for OAE integration due to higher priority of water reuse).

Deliverables

- Interim report outline, interim draft case studies, and an interim draft report
- External technical review of the draft report by WWT experts and OAE experts
- Final technical report that clearly defines OAE-relevant WWT opportunities and quantifies climate, ocean health, and human health benefits under different scenarios of WWT management approaches and regulations.

Working Together

The primary points of contact at Carbon to Sea Initiative for this project will be:

Diane Hoskins
Director, Global Policy & Communications
diane@carbontosea.org

Brishelle Gamble
Senior Associate
brishelle@carbontosea.org

At the start of the project, we will establish a regular weekly check-in to align on scope and ensure timely input from the Carbon to Sea team. As project research begins, meeting cadence can taper to bi-weekly. Additional check-ins may be scheduled at critical milestones or when CTS input is essential.

Budget and Timeline

The budget is capped at $125,000 US Dollars (including indirect costs). The budget may be used for salary and minor research expenses (e.g., data access, computing services, honoraria for relevant expert engagement). The project timeline is 4 months and we request firm fixed pricing.

Team Criteria

The lead applicant must be affiliated with a consultancy or similar entity, such as an academic institution that can meet the contract requirements, and must be able to accept funding under a single contract agreement. There is no geographic restriction for the applicant team.

Required areas of expertise/skills:

- Wastewater treatment (WWT) systems, processes, technologies, and economics across a range of geographies and WWT levels.
- Municipal wastewater industry, for utility/plant operations and decision-making contexts.
- Greenhouse gas accounting, including basic carbon mass balance and flow modeling.
- Environmental and/or development economics (including costs, incentives, and distributional impacts).
- Climate science understanding, environmental impact assessment, and lifecycle assessment (LCA) capability.
- Risk–benefit analyses (including environmental and operational tradeoffs).
- OAE and biogeochemistry (e.g., wastewater biogeochemistry, ocean biogeochemistry, enhanced rock weathering expertise).
- Environmental impacts and ocean acidification biology and/or relevant industry experience familiar with pH management and impacts on ocean life, e.g. aquaculture.

- Applicable policy, regulatory, and social context (e.g., awareness of regional regulatory landscapes and wastewater policy drivers in relevant geographies, understanding of social and regional contexts, including how utilities and municipalities set priorities and balance compliance, cost, and climate goals).

Not all required areas of expertise need to be represented in the applicant team, however, proposals must demonstrate a robust approach to access the necessary expertise.

Application Process

Proposals must be submitted using this submission form, by Friday, March 20, 2026 by 6:00 PM ET. The proposals will undergo internal review by Carbon to Sea and potentially a few external experts. Carbon to Sea will make the final award decision.

Timeline

February 12, 2026	Submissions open
March 20, 2026	Submission deadline
April 8, 2026	Award decision
April 20, 2026	Project Kick-Off *(interim deadlines to be mutually agreed on)*
August 31, 2026	Final Technical Report Delivery

Instructions

1. Prepare the proposal components structured in the following order:
    a. **Written Proposals** must include**:**
        i. Detailed **roadmap and timeline** for the scope of work
        ii. Proposed **methodological approach** and external expert review touchpoints
        iii. Include **resume/short biographies** of key team members
    b. **Proposed budget** in a spreadsheet format, itemizing personnel costs and any anticipated research expenses
2. Name the written proposal and budget files with the following structure **"Entity Name_LeadApplicantLastName_WWT-RFP"**
3. Submit the **proposal** and **budget spreadsheet** using this submission form.

If you have any questions regarding your submission, please email RFP@carbontosea.org with "WWT RFP" included in the subject line.

About the Funder

The Carbon to Sea Initiative is a non-profit ocean science program to evaluate whether the ocean can help mitigate climate change through carbon dioxide removal. Carbon to Sea Initiative brings together the best scientists, engineers, and market shapers to 1) systematically assess whether ocean alkalinity enhancement can be a safe, scalable, and permanent climate solution, and 2) lay the groundwork for responsible OAE deployment in the future. In 2023, we granted $21M to scientific consortia and engineers around the world to accelerate science and technology in this field; we advanced policy priorities for a well-resourced and well-regulated CDR sector; we started building field research hubs around the world; and we heavily engaged in general field building to nurture a well-connected and mature community of practitioners. We are supported in this work by some of the most experienced funders in the world, who support us not only financially, but also help guide our work with decades of experience at the ocean-climate intersection.