THE Water Research FOUNDATION

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REQUEST FOR PROPOSALS (RFP)

Beyond Net Zero: Advancing Interdependencies Between Utility Greenhouse Gas Emission Reductions and Water-Energy-Food Nexus (RFP 5187)

Due Date: Proposals must be received by **3:00 pm Mountain Time on December 13, 2022**
WRF Project Contact: Ashwin Dhanasekar, adhanasekar@waterrf.org

Project Sponsors
This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives
- Develop a decision support framework and operational guidelines for WRRFs (Water Resource Recovery Facilities) to achieve Net-Zero Carbon and beyond (e.g., through Water-Energy-Food nexus).
- Synthesize case studies worldwide (e.g., North America, Europe, Asia, and Australia) that can help demonstrate the applicability of decision support framework for broader uses.

Budget
Applicants may request up to $200,000 in WRF funds for this project.

Background and Project Rationale
Many WRRFs are setting ambitious sustainability goals related to energy efficiency, greenhouse gas (GHG) reductions, and net zero emissions. To prepare for this goal, WRRFs must consider not only how to reduce GHG emissions from onsite processes, but also how to offset those emissions that cannot be eliminated.

Achievability of a net zero goal will depend on the carbon intensity of the electrical grid, treatment requirements and constraints, existing processes, the state of the utility's carbon accounting, proximity of heat sinks, and many other factors. Without a doubt however, to achieve net zero for all direct and indirect emissions, WRRF's will need to explore opportunities outside their fence lines. Questions around this are as follows:
- How many utilities worldwide have made net zero pledges? What are their drivers, and do their baseline emissions include Scope 2 and 3?
- What is the current state of GHG emissions quantification at utilities? How many utilities have quantified their Scope 3 emissions?
- Would it ever make sense for a utility to purchase carbon offsets in pursuit of a net zero goal? What other opportunities exist outside the facility fence line to reduce emissions offsite?

- Beyond mitigating identified facility emissions, what opportunities exist to mine and export the energy in wastewater to reduce emissions?
- Based on the current state of knowledge on WRRF GHG emissions, is it possible for a facility to achieve net zero emissions for all Scope 1, 2 and 3 emissions without buying offsets?

While many innovations are ripe for exploration and implementation, in many cases, WRRFs do not know where to start or what resources are available to support these strategies. Knowledge and tools for WRRFs to engage in cross-sector solutions to reduce GHG emissions, along with the information on upfront costs and financing strategies through carbon credits and other mechanisms, is needed.

Research Approach
The ideal proposal would include the following in the scope of work:

1. Literature Review
An extensive literature review should be included with worldwide scope. The following topics should be explored:

- Carbon accounting basics for WRRF's (Scope 1, 2 & 3)
- Overview of utilities worldwide with net zero pledges, including whether their baseline emissions include Scope 2 & 3
- Review of the current state of GHG emissions quantification at utilities
- Review of regulatory GHG emissions reporting requirements worldwide for WRRF's
- Overview and analysis of carbon offsets of relevance to water utilities, including what exists in jurisdictions worldwide, how these fit into broader cap & trade and carbon pricing schemes, and examples of utilities already purchasing or selling offsets
- A review of "beyond the fence line" technologies & approaches to achieve and go beyond net zero, including but not limited to:
    - Wastewater heat recovery and district energy systems
    - Digester gas utilization (e.g., for electricity production or Renewable Natural Gas production, keeping in mind implications of future decarbonization of electrical grids)
    - Co-locating WRRF's with other industries:
        - Bottled water production (e.g., Singapore)
        - Production of bioplastics or other high value products from WW (wastewater) (e.g., Netherlands- Kaumera)
        - Data centers (whose significant cooling needs could be met with wastewater, potentially boosting nitrification processes, and providing additional energy for WRRF district heating systems)
        - Industries that produce Fats Oils and Grease (FOG), to feed co-digestion
        - Household or commercial organic waste processing
        - Hydrogen production
        - Carbon capture & storage
        - Other
    - Clearly indicate maturity level of each technology (e.g., research, pilot, commercial)
- A review of the decision-making tools being used by water utilities for GHG-related decision-making, including a discussion of benefits and imitations, and including the following tools at a minimum:
    - Life Cycle Analysis (LCA)

- Use of an internal carbon price in lifecycle costing
- General sustainability frameworks (LEED (Leadership in Energy and Environmental Design), Envision)
- Weighted scoring tools
- Triple Bottom Line Analysis
- Others as applicable

2. Utility Interviews

Contact utilities known or discovered through the above literature review to have implemented innovative solutions for GHG emissions reduction, focusing on examples of cross-sector collaboration and external partnerships. Gather as much information as possible to provide detailed case studies (see below).

3. Synthesis of Case Studies

From the literature review and the utility interviews, compile a collection of at least 25 1–2-page case studies from all over the world that demonstrate "outside the fence line" approaches and cross-sector collaboration. Include the following information for each:

- Photo
- Description
- GHG emission reductions
- Decision-making tools or approaches used (e.g., LCA)
- Broad details of third-party agreements (cost and revenue sharing, ownership, operational responsibilities, carbon credit allocation)
- Co-benefits (sustainability benefits beyond GHG's, social benefits, resiliency benefits, or other)
- Critical success factors

4. Analysis framework and supporting tool

Provide best practice recommendations for water utilities to make GHG-related decisions for WRRF's, including:

- How much information is required for decision-making (e.g., when is a full lifecycle analysis necessary?)
- When is external support needed (e.g., carbon accounting consultants, university partners)

Provide a simple framework/tool that water utilities can use for decision-making.

Expected Deliverables

The outcome of this study is a comprehensive literature review, rigorous analysis framework and supporting tool, and synthesis of case studies for WRRFs to implement strategies across the Water-Energy-Food nexus to support net zero GHG emission goals.

Communication Plan

Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. The guidelines are available at https://www.waterrf.org/project-report-guidelines. Conference presentations, webcasts, peer review publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration
The anticipated period of performance for this project is 24 months from the contract's start date.

Proposal Evaluation Criteria
The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)
- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 15 points)
- Communication Plan, Deliverables, and Applicability (maximum 20 points)
- Budget and Schedule (maximum 15 points)

Proposal Preparation Instructions
Proposals submitted in response to this RFP must be prepared in accordance with the WRF document *Guidelines for Research Priority Program Proposals*. The current version of these guidelines is available at https://www.waterrf.org/proposal-guidelines, along with *Instructions for Budget Preparation*. The guidelines contain instructions for the technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Proposals that include the production of web- or software-based tools, such as websites, Excel spreadsheets, Access databases, etc., must follow the criteria outlined for web tools presented in the Web Tool Criteria and Feasibility Study for The Water Research Foundation Project Deliverables at https://www.waterrf.org/project-report-guidelines#deliverables.

Eligibility to Submit Proposals
Proposals will be accepted from domestic or international entities, including educational institutions, research organizations, governmental agencies, and consultants or other for-profit entities.
WRF's Board of Directors has established a Timeliness Policy that addresses researcher adherence to the project schedule. The policy can be reviewed at https://www.waterrf.org/policies. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF project contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards
WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's *Guidelines for Research Priority Program Proposals and* include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements, and the Statement of Direct Labor, Fringe Benefits, and General Overhead. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the

detailed instructions included in WRF's *Guidelines for Research Priority Program Proposals* and consult the *Instructions for Budget Preparation*, both available at https://www.waterrf.org/proposal-guidelines.

Budget and Funding Information
The maximum funding available from WRF for this project is $200,000. The applicant must contribute additional resources equivalent to at least 33 percent of the project award. For example, if an applicant requests $100,000 from WRF, an additional $33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost-share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33 percent to the project, but the maximum WRF funding available remains fixed at $200,000. **Proposals that do not meet the minimum 33 percent of the project award will not be accepted.** Consult the *Instructions for Budget Preparation* available at https://www.waterrf.org/proposal-guidelines for more information and definitions of terms.

Period of Performance
It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients have a contractual obligation to adhere to the agreed-upon schedule. Under WRF's No-Cost Extension Policy, a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted. The policy can be reviewed at https://www.waterrf.org/policies.

Utility and Organization Participation
WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their proposal.

Application Procedure and Deadline
Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 3:00 pm Mountain Time on December 13, 2022.

The online proposal system allows submission of your documents until the date and time stated in this RFP. To avoid the risk of the system closing before you press the submit button, do not wait until the last minute to complete your submission. Submit your proposal at:
https://forms.waterrf.org/222556076521858.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Ashwin Dhanasekar at 303-734-3423 or adhanasekar@waterrf.org. Questions related to proposal submittal through the online system may be addressed to Caroline Bruck at 303-347-6118 or cbruck@waterrf.org**.**

5187 Utility and Organization Participants

The following utilities have indicated an interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending upon your settings, you may need to click refresh on your browser to load the latest file.)**

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