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REQUEST FOR PROPOSALS (RFP)

Establishing Industry-Wide Guidance for Water Utility Life Cycle Greenhouse Gas Emission Inventories (RFP 5188)

Due Date: Proposals must be received by **3:00 pm Mountain Time on Monday, April 10, 2023**

WRF Project Contact: Harry Zhang, PhD, PE, hzhang@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 utility-facing guidance document and a supporting spreadsheet tool that captures current best practices worldwide for developing a utility greenhouse gas (GHG) inventory over the life cycle of capital and operational emissions (with a specific focus on operational emissions).

Budget

Applicants may request up to \$150,000 in WRF funds for this project.

Background and Project Rationale

For water and wastewater utilities working to mitigate GHG emissions, understanding current GHG emission sources is the first step. Utilities do this through completing a GHG emissions inventory. Although many GHG estimation methodologies exist, there is no overall framework or easy-to-use resource that provides practical guidance on which emissions are most important to address and what the best available methods are for assessing them over the life cycle of capital and operational emissions (with a specific focus on operational emissions). Establishing industry-wide guidance and a suite of replicable accounting frameworks for GHG emission inventories is necessary to scale GHG reduction efforts across utilities of all sizes and geographic regions (local, regional, national, and international). The guidance document and supporting calculation tool will be mainly for wastewater and water utilities with potential applicability to stormwater and reuse utilities as well.

The outcome of this study will be a utility-facing guide and a supporting tool on how to estimate direct and indirect GHG emissions at utilities, using a life cycle approach. The guide will provide context for which types of GHG emissions are most important to include (e.g., because they may be significant in quantity), as well as areas of emissions with higher and lower certainty estimates. Thus, common strategies to address uncertainty and hard to abate emissions (e.g., process emissions) could be identified, which would help advance Net Zero Water goals. This guidance document incorporates the best publicly available information to date and can serve as a "living document" to support utilities'

climate action plans and inform decision making regarding climate mitigation with considerations of how to effectively update it in the future.

The second deliverable from this study will be an open access spreadsheet tool that utilities can tailor to their locality to generate GHG emission estimates. Where applicable, a life cycle assessment approach will be used.

Research Approach

The research team will conduct a comprehensive literature review including WRF's research efforts to date. In addition, the team will evaluate the state-of-the-practice in developing a utility GHG inventory over the life cycle (including capital and operational emissions) at a global scale. Based on all available published literature, including published WRF reports, the research team will review utilities in North America, Europe, the UK, Asia, Australia, and elsewhere, by assessing the carbon footprint of their water and wastewater operations and reporting on which emissions sources were included, which methodologies were used, and the relative contribution of different emissions.

The research team will conduct an online survey (focusing on the perspective of utilities and municipalities) and interview selected utilities virtually, aiming to build off of available work and synthesize the latest real-world GHG inventory practices of utilities and municipalities across diverse geographic regions. In addition, the research team will connect national organizations (i.e., Water Environment Federation, American Water Works Association, and US Water Alliance) and their respective technical committees and networks to advance the exchange of information regarding the current practices of life cycle GHG emission estimates.

The research team will build on the best available information to date. One such example is the IWA book *Quantification and Modelling of Fugitive Greenhouse Gas Emissions from Urban Water Systems*, published in 2022 - specifically, Chapter 6 "Full-scale Emission Results (N₂O and CH₄)" (Ye et al. 2022). Then, using process configuration and operating conditions, the research team will develop a rigorous methodology for choosing emission factors and uncertainty ranges for processing N₂O emissions. For the utility-facing guidance document, at a minimum, the following emission sources must be included (based on the best available information at the time of this study):

- Scope 1: Fossil fuel combustion, digester gas combustion, incineration/thermal processes, process and fugitive N₂O (including multiple biological nutrient removal process variations), onsite fugitive methane, collection system methane, fleet vehicles
- Scope 2: Electricity consumption
- Scope 3: Chemicals, construction emissions, embodied carbon, biosolids management, as well as upstream emissions from electricity, natural gas, and fleet vehicles.

Furthermore, the supporting spreadsheet tool must be meticulously referenced such that users can clearly access the methodologies, emissions factors, and calculations. This could be achieved by developing a user's guide for the spreadsheet. Given the current state-of-the-practice, the supporting spreadsheet intends to cover Scope 1 and Scope 2 with consideration of how it could be expanded to include Scope 3.

The research team will partner with selected utilities (taking utility size into account) and develop GHG inventories for each utility type. The selected utilities should include a variety of geographical regions, high-carbon/low-carbon electrical grids, and (if possible) different treatment process configurations.

Selected utilities need to be committed to providing high quality data on process, chemicals, fuel consumption, and other relevant data to produce the best possible estimates. The project team will bring together selected specialists and experts on GHG life cycle analysis, building life cycle emissions and wastewater process emissions for both N₂O and CH₄.

To facilitate feedback, the research team will host one invitation-only virtual workshop. The virtual workshop participants will include the Project Advisory Committee members, representatives from participating utilities, WRF's collaborators and partners, and other invitees recommended by WRF. For the identified research gaps that may not be addressed through the current study (given the level of effort and/or state-of-the-knowledge), the research team will provide recommendations on preliminary research concepts for future consideration. For broader community outreach, the research team will conduct one webcast hosted by WRF and collaborating organizations on the overall findings of this project. The research team should consider additional outreach activities (through the applicant's cost share, if possible), such as presenting project findings at conferences and submitting one paper to open access peer-reviewed journal.

Expected Deliverables

- A stand-alone literature review synthesis document, including annotations of the list of publications and resources used.
- A utility-facing practical guidance document (covering Scopes 1, 2, and 3) with case studies, which can be used as a standardized document across geographic regions and different utility sizes. In addition, this document will include a chapter and a supporting technical appendix that summarizes the knowledge gaps, research needs, and preliminary project concepts for recommended research projects.
- An open access spreadsheet tool that can be further customized by an individual utility as needed. (Should the knowledge surrounding this topic evolve quickly, revisions to this user-friendly spreadsheet may be necessary during the project period).
- One invitation-only virtual workshop along with workshop planning and all supporting materials (i.e., agenda, presentations, meeting notes, and workshop summary).
- Other applicable outreach efforts such as conference presentations and one open access peer-reviewed journal paper submission.

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 18 to 21 months from the contract's start date.

References and Resources

The following list includes examples of research reports, tools, and other resources that may be helpful to proposers. It is not intended to be comprehensive, nor is it a required list for consideration.

- Climate Disclosure Project. 2022. "2022 Public Authorities Questionnaire." CDP Worldwide. Accessed September 15, 2022.

<https://guidance.cdp.net/en/guidance?cid=38&ctype=theme&idtype=ThemeID&incchild=1µsite=0&otype=Questionnaire>.

- Climate Disclosure Project. 2022. "Guidance for Public Authorities (Including Water Systems)." CDP Worldwide. Accessed September 15, 2022. <https://www.cdp.net/en/public-authorities>.
- Green, D. 2022. *Workbook for estimating operational Greenhouse Gas emissions (CAW v16)*. UK Water Industry Research (UKWIR). <https://ukwir.org/view/cd5ef91a-bc34-46d7-a5ee-b107698812d3>.
- Henderson, P. 2022. *Calculating Whole Life/Totex Carbon*. UK Water Industry Research (UKWIR). <https://ukwir.org/view/e19ccbc9-955f-4fbf-8996-fb35097cdc64>.
- Intergovernmental Panel on Climate Change (IPCC). 2022. "Sixth Assessment Report (AR6)." IPCC. Accessed September 15, 2022. <https://www.ipcc.ch/assessment-report/ar6/>.
- International Council for Local Environmental Initiatives (ICLEI). 2022. "Greenhouse Gas Protocols." ICLEI. Accessed September 15, 2022. <https://icleiusa.org/ghg-protocols/>.
- Parravicini V., P. H. Nielsen, D. Thornberg, and A. Pistocchi. 2022. "Evaluation of greenhouse gas emissions from the European urban wastewater sector, and options for their reduction." *Science of the Total Environment* 838 (2022) 156322. <https://www.sciencedirect.com/science/article/pii/S0048969722034192>.
- Ren, Z. J., and K. Pagilla, eds. 2022. "Pathways to Water Sector Decarbonization, Carbon Capture and Utilization." International Water Association (IWA). <https://doi.org/10.2166/9781789061796>.
- Rennert, K., F. Errickson, B. C. Prest. 2022. "Comprehensive Evidence Implies a Higher Social Cost of CO₂." *Nature*. <https://doi.org/10.1038/s41586-022-05224-9>.
- U.S. EPA. 2022. "EPA Simplified GHG Emission Calculator (SGEC), Version 8 August 2022." U.S. Environmental Protection Agency. Accessed September 15, 2022. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.epa.gov%2Fsites%2Fdefault%2Ffiles%2F2020-08%2Fsgec_tool.xlsm&wdOrigin=BROWSELINK.
- U.S. EPA. 2022. "GHG Inventory Development Process and Guidance." U.S. Environmental Protection Agency. Accessed September 15, 2022. <https://www.epa.gov/climateleadership/ghg-inventory-development-process-and-guidance>.
- WRF (The Water Research Foundation). 2022. "Climate Change." Denver, CO: The Water Research Foundation. Accessed September 15, 2022. <https://www.waterrf.org/research/topics/climate-change>.
- World Resources Institute (WRI), and World Business Council for Sustainable Development (WBCSD). 2022. "Greenhouse Gas Protocol." Washington, D.C.: WRI; Geneva, Switzerland: WBCSD. Accessed September 15, 2022. <https://ghgprotocol.org/>.

- Ye, L., J. Porro, and I. Nopens, eds. 2022. “Quantification and Modelling of Fugitive Greenhouse Gas Emissions from Urban Water Systems.” IWA Publishing. <https://doi.org/10.2166/9781789060461>.
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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 \$150,000. 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 \$150,000. **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 particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular 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 Monday, April 10, 2023.

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.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Harry Zhang, PhD, PE, at (571)384-2098 or h Zhang@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.

5188 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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