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REQUEST FOR PROPOSALS (RFP)

Integrating STEU and Other Emerging Water-Energy-Waste Technologies into Distributed/Decentralized Systems (RFP #4843/SIWM17-16)

Due Date: Proposals must be received by 2:00 Mountain Time
on **Thursday, August 6, 2020**

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 Objective

The objectives of this project are to develop a research agenda for integrating sewage thermal energy use (STEU) and other innovative technologies regarding wastewater and their associated solid waste into distributed systems, and to scope out a full-scale research project for distributed/decentralized systems in this subject area.

Budget

Applicants may request up to **\$25,000** in WRF funds for this project. WRF funds requested and total project value are evaluation criteria considered in the proposal selection process.

Background and Project Rationale

A recent WRF report, *State of the Science and Issues Related to Heat Recovery from Wastewater* (Kohl, 2019), found that technologies for sewage thermal energy use (STEU) at water resource recovery facilities (WRRFs) are market ready. Coupled with biogas production, STEU can help move a WRRF toward net-zero or net-positive energy. The report focused on technology readiness, as well as the ability of existing technologies to contribute to net zero emissions. The research determined that if off-site benefits were taken into account, STEU would produce net economic benefits, saying "profitability must be redefined to include what happens outside the fence line." The study called for additional research for STEU at WRRFs and in decentralized/distributed water system settings, as well as for educating planners, architects, and community leaders about STEU.

Other recent WRF projects have pursued research to promote collaboration between sustainable water planning and local urban development and planning and a risk-based framework for the development of public health guidance for decentralized non-potable water systems. Stoker et al. (2018) addresses collaboration mechanisms, but not emerging water-energy-waste technologies in the urban setting.

Many architects, planners, and engineers note that these are areas where additional research on economic benefits and analysis of carbon emissions can promote sustainability of the utility and city. Sharvelle et al. (2017) focuses on water quality guidelines. While an increasingly important topic for decentralized non-potable water systems, recent research has focused on water quality and not potential water-energy nexus considerations in these systems.

Economic research for fully integrated water--energy-waste systems at the appropriate scale (e.g., at the neighborhood and onsite building scale) is lacking in the industry. The costs and benefits of STEU for WRRFs, decentralized/distributed water systems, and the community would assist decision-makers examining opportunities to maximize both water and energy for sustainability. A key aspect to be included in the analysis would be the role of geographical location in the effective application of this technology. An assessment of the technology market in these areas would also be useful for utilities considering decentralized system programs in their service areas, as well as urban planning and development professionals.

Such research would benefit utilities by identifying challenges to, and risks of, STEU for utilities; identifying opportunities to mitigate each of those challenges and risks; identifying the carbon benefits for utilities that have energy and carbon neutrality goals; and assisting WRF in prioritizing research needs for distributed systems and identifying partners and co-funders for future research. This research will further inform WRF's activities as a member organization of EPA's Decentralized Partnership.

Research Approach

The proposer's research approach should involve a state of the science review, develop a research agenda for industry needs on STEU at the distributed/decentralized scale, and develop a project concept highlighting the research needs in this area.

A brief techno-economic analysis would be an excellent value-added addition to the deliverables, should the proposer feel it is feasible within the estimated duration of the project. The cost-effectiveness, optimal scale, and carbon emissions of emerging integrated technologies for new construction, retrofitting, single-family homes, multi-family, and other development densities in different parts of the country should be explored, as well as impacts on sewer infrastructure.

Tasks will include:

- Complete a literature review of decentralized integrated water-energy-waste efforts in North America, Australia, and Europe.
- Conduct an economic analysis of STEU and other emerging water-energy-waste systems for distributed systems.
- Conduct telephone interviews with 20 to 25 subject matter experts (SME) from the engineering, architectural, and planning community about issues and research needs.
- Draft a research agenda for integrated water-energy-waste systems at the distributed/decentralized scale.

Deliverables

Required deliverables for this project include (but are not limited to):

- Final research agenda with prioritized research needs
- Draft report including literature review, economic analysis, and critical inputs for next steps from SMEs.

- Final report

Communications Plan

Please review WRF's *Project Deliverable Guidelines* for information on preparing a communications 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

This project is expected to be completed within a maximum of 12 months.

References and Resources

Proposers should be aware of these and other resources. A strong proposal will leverage pre-existing information.

- Kohl, P. M. 2019. *State of the Science and Issues Related to Heat Recovery from Wastewater*. Project ENER10C13/4788. The Water Research Foundation: Alexandria, VA.
- Sharvelle, S., Ashbolt, N., Clerico, E., Hultquist, R., Leverenz, H., and Olivieri, A. 2017. *Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems*. Project SIWM10C15. Water Environment & Reuse Foundation: Alexandria, VA.
- Stoker, P., Pivo, G., Howe, C., Elmer, V., Stoicof, A., Kavkewitz, J., and Grigg, N. 2018. *Joining-Up Urban Water Management with Urban Planning and Design*. Project SIWM5R13/4853. The Water Research Foundation: Alexandria, VA.

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 20 points)
- Communication Plan, Deliverables, and Applicability (maximum 15 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.

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 \$25,000. 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 \$25,000.

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 2:00 pm Mountain Time on Thursday, August 6, 2020. All proposal documents must be compiled into two (2) PDF files consisting of your technical review documents and your financial review documents. All forms and components of the proposal are available in the *Proposal Component Packet* zip file on the proposal website at <https://proposals.waterrf.org/Pages/RFPs.aspx>. An FAQ and a tutorial are also available. A login is required to access the proposal website and download the packet. Proposers are encouraged to

create logins and verify the validity and compatibility of the system well in advance in order to avoid last-minute errors or delays.

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, 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.

Utility and Organization Participants

The following utilities have indicated 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.)**

James Mawa
Water Engineer
Rootzone Africa Limited
Plot: 32, Ntinda Road, Ntinda Kampla
Kampala Uganda
Phone: (+256)793338797
jamescradle03@gmail.com