



REQUEST FOR PROPOSALS (RFP)

Integrating Energy Data into Water Utility Operations: Energy Management Challenges and Best Practices (5249)

Date Posted

Monday, September 11, 2023

Due Date

Proposals must be received by 3:00 pm Mountain Time on Tuesday, November 21st, 2023.

WRF Project Contact

Ashwin Dhanasekar, Research Program Manager, 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

Establish a proposed universal approach for identifying/developing strategies and best practices with supporting system components involved in optimizing utility operations using energy data (i.e., power monitors, sensors, sensor data, communications, centralized data storage and management, data analytics, process decision modeling and controls, correlation of data sets, data collection parameters, administrative ownership, and management, etc.).

Budget

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

Background and Project Rationale

Many water utilities (drinking water, wastewater, distribution systems, collection systems) have goals to reduce energy consumption, become energy neutral, or even become net energy producers. Although previous research has highlighted energy reduction strategies, such as installing sensors, optimizing treatment processes, and using time-of-use power schemes, these strategies rely on data-driven systems and decision making. Innovations in sensor technology, the expansion of IoT (internet of things), and continual price reductions in these technologies have resulted in more sensor and IoT systems being implemented in water utilities. Key systems being monitored include chemical dosing, treatment process monitoring, aeration blowers, pumping, and others. Although data collection activities are growing, there are few concrete examples of how big data can help reduce energy consumption.

Energy generation and achieving net zero have been key priorities for many innovative utilities, and they can only be achieved by combining the strategies of energy conservation and energy generation. Utilizing and understanding energy data are critical to achieve these energy goals, including but not limited to type of data collected, frequency, quality, its dependence on plant/equipment operations, weather pattern, and other independent variables. Establishing various correlations between data sets, maximum electric capacity and demand management strategies, EV chargers' adoption, behavioral changes, and flexibility around operational practice feed into net zero strategy. Utilities need to understand what sensors/technologies are at their disposal, what the associated costs are, how their facilities could potentially benefit from them, and where and how various data could be used to improve overall energy management. Utilities are currently looking for these guidelines and standards to rely on when it comes to employing sensors and systems to optimize operations.

This study would document established practices and develop guidelines for implementing and utilizing big-data projects for reducing energy consumption in a cost-efficient manner. It would also document successful implementations of IoT sensor deployment and integration into current supervisory control and data acquisition (SCADA) environments leading to predictive decision-making systems. The proposer should refer to WRF projects 4978 and 5091 as references and resources to prevent any duplication of research efforts.

Research Approach

With both established and emerging technologies, there are multiple levels to the research approach. This project would likely require an extensive literature review (potentially building on WRF projects 4978 and 5091) and a survey to capture best practices that water and wastewater utilities have been using. Emerging technologies or approaches should also be tested at the pilot scale to demonstrate steps necessary for implementation. The goal of the project is to establish standards and guidelines for water utilities to rely on when implementing sensors and systems to optimize energy management. WRF encourages creativity and originality from the proposers. Proposers should describe how they will conduct research to meet the objectives listed above. The approach mentioned here is merely a starting point.

Expected Deliverables

- A final report that includes, but is not limited to, a literature review and case studies of successful implementations.
- A pilot/demonstration of optimized process control using dynamic real-time energy data.
- A webcast (WRF-sponsored) towards the end of the project to showcase the findings.

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#project-deliverable-guidelines>. Conference presentations, webcasts, peer-reviewed publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration

The anticipated period of performance for this project is 18 months from the contract 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.

Andrews, N. Forthcoming. *Developing a Framework for Quantifying Energy Optimization Reporting*. Project 5091. Denver, CO: The Water Research Foundation.

Cherchi, C., L. Edmonds, M. Loria, J. Cullen, J. Jacangelo, and P. Perciavalle. *Application of Big Data for Energy Management in Water Utilities*. Project 4978. Denver, CO: The Water Research Foundation.

WRF (The Water Research Foundation). N.d. *Energy Optimization Synthesis Report*.
<https://www.waterrf.org/resource/energy-optimization-synthesis-report>.

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 WRF's *Guidelines for Research Priority Program Proposals*. The current version of these guidelines and the *Instructions for Budget Preparation* are available at <https://www.waterrf.org/proposal-guidelines>. 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#webtool-criteria>.

Eligibility to Submit Proposals

Proposals will be accepted from both U.S.-based and non-U.S.-based 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% 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% to the project, but the maximum WRF funding available remains fixed at \$200,000. Proposals that do not meet the minimum 33% of the project award will not be accepted. Consult the *Instructions for Budget Preparation* available at <https://www.waterrf.org/proposal-guidelines#RPP-instr-budget-prep> 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 Tuesday, November 21st, 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. Submit your proposal at <https://forms.waterrf.org/cbruck/rfp-5249>.

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.

5249 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 on your settings, you may need to click refresh on your browser to load the latest file.)**

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