



REQUEST FOR PROPOSALS (RFP)

Identification and Valuation of Innovative Wastewater Residual Products Beyond Conventional Biosolids (5286)

Date Posted

Friday, September 20, 2024

Due Date

Proposals must be received by 3:00 pm Mountain Time on Thursday, November 21, 2024.

WRF Project Contact

Maitreyi Nagarkar, PhD, mnagarkar@waterrf.org

Project Sponsors

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

Project Objectives

- Identify various end products that can be generated from residuals or biosolids, focusing on emerging and non-conventional products—beyond cake and dried material—that stem from technologies or processes that have been demonstrated at full-scale in trial or recent permanent installations.
- Create tools for utilities to assess the costs and benefits and business case considerations of end products that help inform decision-making, including (1) quantification of greenhouse gas (GHG) emissions from various uses of these products, (2) identification of potential markets for end products, (3) identification of obstacles for product entry into specific potential markets, and (4) prospective valuation of end products.

Budget

Applicants may request up to \$180,000 in WRF funds for this project.

Background and Project Rationale

The biosolids industry is in flux. Traditional methods of biosolids management (e.g., land application, disposal) are facing challenges stemming from a wide variety of concerns including, but not limited to, the occurrence of trace chemicals (e.g. PFAS, microplastics, pharmaceuticals, and other emerging contaminants of concern), odors, public perception, and GHG emissions related to energy use, incineration, drying, and trucking. In some markets, rising costs of traditional biosolids management have spiked to levels that are straining utility budgets (CDM Smith et al. 2020). These concerns are driving utilities to explore options beyond conventional

biosolids processing technologies and consider the adoption of innovative technologies that result in products other than federally classified biosolids per EPA part 503, such as Class A cake, compost, or dried material. These technologies offer opportunities for managing biosolids that address land application limitations associated with local weather, climate change restrictions and public concerns related to PFAS. They also generate new end products that do not have established market outlets.

WRF project 5169, *Evaluating Innovative and Sustainable Treatment Options for Biosolids*, slated for completion in spring 2025, will include an analysis of innovative biosolids treatment technologies, including evaluation of a variety of their end products. This research project will build upon WRF 5169's findings by identifying and characterizing an array of emerging and innovative end products and developing one or more tools to help utilities assess them. Assessments will focus on GHG emissions and other environmental impacts, market viability, and obstacles to market entry for these emerging products and the processes and companies that produce them.

Research Approach

This RFP is intentionally flexible in the research approach and choice of analytical methods to account for the fact that many of these emerging technologies are not thoroughly documented in published literature. Researchers may use a wide variety of research techniques including literature review, site visits and interviews at existing demonstration sites or installations, discussions with regulators and impartial industry experts, etc. Researchers should propose methods for analyzing the costs and benefits that they believe will best serve the WRF community within the constraints of the budget.

A successful proposal will examine innovative biosolids management technologies with a focus on the value of the end products in comparison to their costs, and evaluate mechanisms by which new and emerging end products could be utilized by utilities. At minimum, technologies/end products should be demonstrated at the full-scale level (permanent or trial), but this **can** include installations outside the U.S. or applied to other wastes/sludges. The proposal should clearly define additional criteria which will be used for selection of eligible end products included in the analysis (for example, a minimum technology readiness level, number of years in operation, etc.).

Technologies and end products assessed could include:

- Hydrothermal liquefaction (HTL) and associated oils for energy production
- Hydrothermal carbonization and associated hydrochar production
- Gasification (including hydrothermal gasification) and associated syngas, ash, and biochar products
- Pyrolysis and associated oil, syngas and biochar products
- Supercritical water oxidation (SCWO) and associated heat and phosphorus products

End products from technologies not mentioned above may also be considered at the discretion of the research proposal team. The end product evaluation should result in a detailed

characterization of the respective products or by-products, including but not limited to solids, liquids, or gaseous products (e.g. syngas, biochar, py-liquid, biofuel, minerals, etc.)

The project should also develop one or more tools to help utilities fully understand the costs and benefits associated with the end products, which will assist in selection of the most suitable technology for their needs. The design of these tools is also flexible. The key requirements are:

- Usability by utilities across the WRF subscriber base, which encompass a broad range of:
 - Sizes, from very small (50,000 gallons per day) to very large (500 million gallons per day) installations
 - Existing solids processing and handling equipment (e.g., digestion, dewatering, storage, loadout)
 - Geography and climate (taking into account variables such as energy costs, proximity from potential product end-users, local costs and availability of traditional biosolids management techniques, and local/state regulations such as prohibitions on land application or prohibitions on PFAS)
- Helping utilities holistically assess and compare the identified end products based on **at least** the following criteria:
 - Quantification of GHG emissions from various uses of the end products
 - Identification of potential markets for end products or steps toward developing such markets
 - Identification of obstacles for product entry into specific potential markets
 - Development of a value proposition for the end products

Expected Deliverables

- Research report (must use WRF's [Research Report Template](#))
- One or more tools/guides for utility users
- One or more conference presentations (e.g., WEFTEC, WEF Residuals and Biosolids, and/or regional conferences)
- One or more webcasts

Communication Plan

Please review WRF's [Project Deliverable Guidelines](#) for information on preparing a communication plan. 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.

- CDM Smith, NACWA, NEBRA, and WEF. 2020. *Cost Analysis of the Impacts on Municipal Utilities and Biosolids Management to Address PFAS Contamination*. https://www.nacwa.org/docs/default-source/resources---public/cost-analysis-of-pfas-on-biosolids---final.pdf?sfvrsn=a4b3fe61_2
- Dhanasekar, A. and S. Fevig. 2020. *Biosolids Research Summit*. Project 5055. Denver, CO: The Water Research Foundation. <https://www.waterrf.org/research/projects/biosolids-research-summit>.
- Dursun, D. *Evaluating Innovative and Sustainable Treatment Options for Biosolids*. Forthcoming. Project 5169. Denver, CO: The Water Research Foundation. <https://www.waterrf.org/research/projects/evaluating-innovative-and-sustainable-treatment-options-biosolids>.
- McNamara, P. Forthcoming. *Understanding the Value Proposition for Thermal Processes to Mitigate PFAS in Biosolids*. Project 5211. Denver, CO: The Water Research Foundation. <https://www.waterrf.org/research/projects/understanding-value-proposition-thermal-processes-mitigate-pfas-biosolids>.
- Olabode, L., J. Gan, L. Lee, D. McAvoy, M. Lono-Batura. 2024. *Unregulated Organic Chemicals in Biosolids: Prioritization, Fate and Risk Evaluation for Land Application*. Project 5125. Denver, CO: The Water Research Foundation. <https://www.waterrf.org/research/projects/unregulated-organic-chemicals-biosolids-prioritization-fate-and-risk-evaluation-3>.
- Schaefer, C. Forthcoming. *Direct In Situ Measurement of PFAS Transformation & Leaching from Land-Applied Biosolids*. Project 5214. Denver, CO: The Water Research Foundation. <https://www.waterrf.org/research/projects/direct-situ-measurement-pfas-transformation-leaching-land-applied-biosolids>.

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](#) and [Instructions for Budget Preparation](#). These 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 [Technology Deliverables Guidance](#).

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. 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](#).

Budget and Funding Information

The maximum funding available from WRF for this project is \$180,000. 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 \$180,000. Proposals that do not meet the minimum 33% of the project award will not be accepted. Consult the [Instructions for Budget Preparation](#) 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.

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 Thursday, November 21, 2024.

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-5286>.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Maitreyi Nagarkar at 571.384.2117 or mnagarkar@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 on your settings, you may need to click refresh on your browser to load the latest file.)**

Cameron Colby, P.E.

Technical Services Director
Fox River Water Reclamation District
1957 N. LaFox Street
South Elgin, IL 60177
(864) 918-1606
ccolby@frwrd.com

Mahmudul Hasan, Ph.D.

Chief Technical Officer
Baltimore City Department of Public Works
200 N. Holliday Street, 3rd floor
Baltimore, MD 21202
(443) 826-7293
mahmudul.hasan@baltimorecity.gov

Matthew Jalbert, P.E.

Executive Manager, Northern Region
Trinity River Authority of Texas
5300 S. Collins Street
Arlington, TX 76018
(817) 372-0303
Jalbertm@trinityra.org

Anna Schroeder, PMP, P.E.

Engineering Supervisor
South Platte Renew
2900 S. Platte River Drive
Englewood, CO 80219
(303) 521-9571
aschroeder@englewoodco.gov

Bina Nayak

Water Research Project Manager
Pinellas County Utilities
6730 142nd Avenue N
Largo, FL 33771
(727) 582-2306
bnayak@pinellas.gov

Benjamin Yoakum

Project Manager – Research and Innovation
Orange County Utilities
9150 Curry Road
Orlando, FL 32825
(689) 258-2361
Benjamin.Yoakum@ocfl.net

Janelle Hunt

Program Manager, Utility Residuals Mgmt.
Metro Vancouver
4515 Central Blvd.
Burnaby, BC V5H 4J5
(604) 220-5405
janelle.hunt@metrovancouver.org

Albrey Arrington

Executive Director
Loxahatchee River District
2500 Jupiter Park Drive
Jupiter, FL 33458
(561) 222-9992
albrey@LRECD.org