[6450-01-P]

DEPARTMENT OF ENERGY

Notice of Request for Information (RFI) on Water Security Grand Challenge Resource Recovery Prize

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy (DOE).

ACTION: Request for information (RFI).

SUMMARY: The U.S. Department of Energy (DOE) invites public comment providing information and feedback on the design of a potential prize competition with a goal of increasing resource recovery from municipal wastewater treatment plants across the United States, and in so doing, lower the ultimate cost of treatment by extracting additional value from the wastewater (i.e., improve energy efficiency). Through this potential prize, DOE would seek novel, systems-based solutions from multidisciplinary teams to implement resource recovery at small-to-medium-sized wastewater treatment plants. Specifically, the intent is to encourage teams of wastewater treatment plants, engineering and design firms, technology developers, resource customers (e.g., farmers, electric and gas utilities), and others to develop holistic community and/or watershed-based resource recovery plans for their respective wastewater treatment systems. Input from this RFI may be used to further develop the competition objectives, rules, metrics, and incentives.

DATES: Responses to the RFI must be received by October 23, 2019, no later than 5:00 pm (ET).

ADDRESSES:

Interested parties are to submit comments electronically to WaterResourceRecoveryPrize@ee.doe.gov. Include Water Security Grand Challenge Resource Recovery Prize in the subject of the title. The RFI document is located at *https://eere-exchange.energy.gov/*.

FOR FURTHER INFORMATION CONTACT: Question may be addressed to John Smegal, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: 202-586-2222. E-mail: WaterResourceRecoveryPrize@ee.doe.gov.

SUPPLEMENTARY INFORMATION:

Background

The DOE-led Water Security Grand Challenge ("the Challenge") aims to advance transformational technology and innovation to meet the global need for safe, secure, and affordable water using a coordinated suite of prizes, competitions, early-stage research and development, and other programs.[1] The Challenge consists of five goals; this RFI focuses on the goal of doubling resource recovery from municipal wastewater treatment plants by 2030.

Wastewater treatment plants purchase about $2 billion of electricity each year and face more than $200 billion in future capital investment needs to meet water quality objectives.[2] These

[1] *https://www.energy.gov/eere/water-security-grand-challenge*

[2] Environmental Protection Agency (EPA). Clean Watersheds Needs Survey 2012, Report to Congress. January 2016. *https://www.epa.gov/sites/production/files/2015-12/documents/cwns_2012_report_to_congress-508-opt.pdf.* Electricity dollar value derived from electricity consumption estimates contained in Arzbaecher, C., K. Parmenter, R. Ehrhard, and J. Murphy. 2013. *Electricity Use and Management in the Municipal Water Supply and Wastewater Industries*. Palo Alto, CA: Electric Power Research Institute and Water Research Foundation. *http://www.waterrf.org/PublicReportLibrary/4454.pdf*.

expenses can stress municipal budgets. For example, energy consumption at wastewater treatment plants can account for a third or more of municipal energy bills.[3] Energy costs are expected to increase over time[4] and affect affordability of water for businesses and consumers.[5] Disposal of residual biosolids from water treatment is another significant cost for municipalities. Wastewater treatment plants can address these challenges by recovering resources and turning them into marketable products. This can create new revenue streams for upgrading water treatment infrastructure, particularly in rural communities, reduce nutrient pollution, and provide new sources of alternative water supplies. Recoverable resources include energy that can be used on-site or sold; nutrients such as phosphorous and nitrogen that can be used as fertilizer; and clean water that can be reused for agricultural, industrial, and potable purposes. When the value of the recovered resources more than offsets the cost of recovery, the overall cost of wastewater treatment is reduced. In addition, resource recovery contributes to system-level energy efficiency because recovering energy from wastewater reduces the amount of grid electricity required to operate the wastewater treatment plant. Moreover, recovered water (treated wastewater) can offer a substitute for water sources with a higher level of embedded energy (including desalinated water and water that is conveyed over a long distance) for industrial, agricultural, and municipal use. Recovered nutrients (e.g., nitrogen, phosphorus) can be a less energy-intensive substitute for fertilizer on agricultural land.

[3] EPA, Water and Energy Efficiency at Utilities and in the Home, *https://www.epa.gov/sustainable-water-infrastructure/water-and-energy-efficiency-utilities-and-home*.
[4] Arzbaecher, et al.
[5] DOE. Water and Wastewater Annual Price Escalation Rates for Selected Cities across the United States. September 2017. *https://www.energy.gov/sites/prod/files/2017/10/f38/water_wastewater_escalation_rate_study.pdf*

To make progress on the goal of doubling resource recovery from municipal wastewater facilities, DOE is considering a potential prize competition that seeks to increase resource recovery from municipal wastewater treatment plants across the United States. This prize is intended to target small-to-medium-sized wastewater treatment plants (e.g., facilities with flows on the order of up to 50 million gallons per day), as larger facilities are more likely to be already engaged in or developing resource recovery strategies. The envisioned outcome of this prize competition is the development of novel, system-wide solutions that leverage existing resource recovery technologies to improve resource recovery in these small-to-medium-sized facilities and also contribute to energy efficiency at the facility and/or system level.

Competition participants are expected to be multi-disciplinary teams of stakeholders that will develop holistic, community- or watershed-based resource recovery plans. Teams are likely to be comprised of wastewater treatment plants, engineering and design firms, technology developers, resource customers (such as farmers, electric and gas utilities), and others.

As currently envisioned, the prize would consist of two phases. In the first phase, teams would submit a high-level facility schematic and business plan that demonstrates the cost-effectiveness and viability of their resource recovery plan.[6] Successful plans would demonstrate how the approach reaches threshold levels on certain resource recovery metrics, while contributing to energy efficiency at the facility and/or system level as discussed further below. Plans meeting this threshold would then be judged on their innovation and replicability. At the end of phase one, DOE anticipates selecting multiple teams for relatively small awards (e.g., 10 selections

[6] Provisions for safe guarding sensitive or proprietary information submitted in response to the prize competition will be detailed within the rules and procedures for the prize to be published subsequent to this RFI.

receiving $50,000 each). DOE may also publish selected teams' plans on a DOE website. DOE expects to provide teams about six months from prize announcement until phase one applications are due.

Teams selected at the end of phase one would have the opportunity to progress into the second phase of the competition. Phase two of the competition would require the submission of detailed and technically rigorous plans that demonstrate how teams would finance and construct their resource recovery solutions, with such plans supported by quantitative analysis and/or modelling. In phase two, successful plans would be judged by modeled achievement of resource recovery metrics as well as by contributions to energy efficiency, financial viability, technical and engineering rigor, and the broad replicability of the plan. At the end of phase two, a smaller number of teams would be selected for higher-dollar prizes (e.g., two selections receiving $250,000 each). DOE expects to provide teams about a year from phase one selection to submit final phase two materials.

As part of the financial viability aspect of phase two, DOE anticipates aligning phase two submission requirements with the application requirements of public financing programs (e.g., from the U.S. Environmental Protection Agency's Water Infrastructure Finance and Innovation Act (WIFIA) program and Clean Water State Revolving Fund, among others), enabling participants to be well-positioned for applying for these funding sources.

Quantitative metrics would play a critical role in the judging process of both phases of the competition. DOE envisions applicants will need to meet a minimum threshold of resource

recovery for one or more resources (i.e., energy, clean water, and/or nutrients). This threshold could be expressed as a recovery rate (i.e., the percent of resource recovered relative to the total amount of that resource present in influent) or as an improvement rate (i.e., an increase in recovery rate over some baseline). Additional metrics or guidance would be developed to assess submissions on other criteria beyond these thresholds, including energy efficiency, innovation, replicability, and technical and engineering rigor. In phase two, financial metrics will also be used for judging, which may include levelized cost of avoided disposal, net present value of recovery streams, lifecycle costs of recovery, or others. To ensure diverse solutions applicable across a range of facility types, DOE may also introduce other factors to judging, such as geographic diversity of applicants, facility size, category of resources recovered, and treatment technologies used.

Request for Information Categories and Questions

Category 1: Overall Prize Concept and Objectives

1. Can a prize-based approach contribute to achieving the goal of increasing resource recovery across small-to-medium-sized wastewater treatment plants? If so, what aspects of a prize in particular can help achieve this goal? If not, what other approaches could be considered? Are there other complementary activities that can be pursued to increase the impact of the prize?

2. Are there other, similar initiatives that could help inform this prize?

3. One of DOE's primary objectives with a prize is to stimulate the development of multi-stakeholder, systems-based solutions. Please share any examples of these types of solutions you have observed as well as what you believe advanced these solutions. Conversely, what barriers exist to the development and execution of these types of collaborative integrative solutions?

4. What resource recovery technologies do you believe are most promising in the context of this prize, and what challenges exist in integrating these technologies into wastewater treatment plants? Are there promising systems configurations that incorporate multiple technologies?

5. What state and local policies are effective at enabling the acceleration of resource recovery at wastewater facilities? Conversely, what regulatory and policy barriers prevent acceleration of resource recovery?

6. What barriers prevent potential resource customers from purchasing and using resources from local wastewater treatment plants?

7. What stakeholders are important to engage as partners or competitors?

Category 2: Prize Design

1. Is the proposed two-phase prize concept the most effective way of ensuring actionable ideas emerge from broad stakeholder teams? Is the proposed timeline (i.e., about six

months for phase one and a year for phase two) sufficient to ensure DOE receives thoughtful, well-crafted application materials?

2. Does the lack of a demonstration phase in the current proposed prize design limit the effectiveness of the approach? How could the design of the prize competition be enhanced so that participants are best-positioned to implement their proposed solutions after the competition is over?

3. Are the proposed incentive levels (i.e., $50,000 for teams selected in phase one; $250,000 for teams selected in phase two) sufficient to incent participation?

4. Is 50 million gallons/day an appropriate cutoff for competitor facility size?

5. How can the prize competition be structured such that the lessons learned from the projects that are selected through the competition are generalizable and useful to other wastewater treatment plants and communities? How can the prize be designed to generate replicable outcomes?

6. A key objective of the prize is to position participants to successfully apply for financing from other public agencies. Does aligning phase two application requirements with the common application requirements from such programs help to achieve this goal? Are there other ways of achieving this? What financing programs are important to consider?

7. Please share any other perspectives on details of the prize design.

Category 3: Criteria and Metrics

1. As currently envisioned, the prize targets the recovery of energy, clean water, and nutrients. Are there other resources that are being recovered or could be recovered from municipal wastewater that should be included in this prize?

2. Within the categories of recoverable resources proposed for inclusion in the prize, are there industry-standard quantitative metrics that measure the level of resource recovery?

3. As discussed above, DOE may require applicants to demonstrate how the proposed plan reaches threshold levels on resource recovery metrics. For these "threshold levels," is a fixed recovery rate or improvement rate more appropriate as a threshold to measure resource recovery for small-to-medium-sized wastewater treatment plants?

4. What are ambitious but achievable targets for the metrics identified in questions two and three in this section at an individual plant level, i.e., what are the "threshold levels" that applicants should need to achieve at a minimum to be considered for selection?

5. What are ambitious but achievable targets for plant-level and/or system-level energy efficiency improvements for recovery of clean water, nutrients and other resources?

6. What metrics are appropriate to assess the financial viability of a submission as part of phase two judging?

7. How should DOE assess the innovativeness of prize applications?

Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to *WaterResourceRecoveryPrize@ee.doe.gov* no later than 5:00pm (ET) on October 23, 2019. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 20 pages in length, 12 point font, 1 inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed. This is solely a request for information and not an announcement for a prize competition. EERE is not accepting applications or submissions for a potential prize competition. If EERE pursues the potential prize competition, it would be announced through a separate solicitation.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name;
- Company / institution contact;
- Contact's address, phone number, and e-mail address.

Confidential Business Information

Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well marked copies: One copy of the document marked “confidential” including all the information believed to be confidential, and one copy of the document marked “non-confidential” with the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include: (1) A description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known by or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person that would result from public disclosure; (6) when such information might lose its confidential character due to the passage of time; and (7) why disclosure of the information would be contrary to the public interest.

Signed in Washington, DC on August 30, 2019

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Valri Lightner
Deputy Director
Advanced Manufacturing Office