

WATER RESOURCE RECOVERY PRIZE

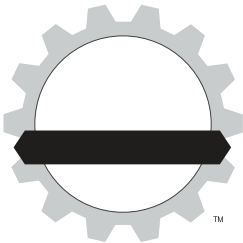


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Water Resource Recovery Prize: Official Rules Document

The U.S. Department of Energy (DOE) Water Resource Recovery Prize will be governed by this official rules document, which establishes the rules and requirements for the prize. The Prize Administrator and DOE reserve the right to modify this Official Rules document if necessary and will publicly post any such notifications as well as notify prize participants.

Executive Summary

The DOE Advanced Manufacturing Office (AMO) is launching a two-phased prize competition with the goal of accelerating the transition from conventional wastewater treatment to a model of resource recovery from municipal wastewater. Water resource recovery facilities (WRRFs) recover valuable resources, such as energy, water, and nutrients, to help lower the ultimate cost of wastewater treatment.

The Water Resource Recovery Prize is part of a larger effort known as the Water Security Grand Challenge, which is a White House-initiated and DOE-led framework to advance transformational technology and innovation to meet the global need for safe, secure, and affordable water. More information about the Water Security Grand Challenge is available at <https://www.energy.gov/eere/water-security-grand-challenge>. The prize also supports the U.S. Environmental Protection Agency's Water Reuse Action Plan (<https://www.epa.gov/waterreuse/water-reuse-action-plan>).

The Water Resource Recovery Prize focuses on the Water Security Grand Challenge goal of doubling resource recovery from WRRFs by 2030.

In Phase 1, teams will submit:

- Two high-level facility engineering schematics (i.e., diagrams for before and after implementation of the proposed resource recovery technology/strategy)
- A business case demonstrating improvement relative to the existing baseline conditions
- An accompanying technical description that demonstrates the potential for cost-effectiveness and viability of their resource recovery plan.

At the end of Phase 1, DOE anticipates selecting as many as 10 winning teams for cash prizes of \$50,000 each.

Teams selected during Phase 1 are eligible to participate in the second phase of the competition. During Phase 2, competitors will be expected to provide a more-detailed and validated technical and financial analysis that demonstrates the viability of the proposed technologies. DOE expects to provide teams 1 year from Phase 1 selection to submit final Phase 2 materials. At the conclusion of Phase 2, DOE expects to select no

more than two teams that will receive \$250,000 cash prizes. Specific rules governing Phase 2 submissions will be released at the conclusion of Phase 1 – i.e., late April or early May of 2020.

Introduction

Water is a critical resource for human health, economic growth, and agricultural productivity. The United States has historically benefitted from access to low-cost water supplies, but challenges for freshwater supplies could threaten U.S. economic competitiveness and water security.

Through this prize, DOE is seeking novel systems-based solutions from multidisciplinary teams to implement resource recovery at small- to medium-sized WRRFs. DOE expects at least one WRRF will be a part of any successful submission. The WRRF must provide a letter of commitment from an individual authorized to represent the facility. Such letters may be subject to verification by the prize administrator.

For purposes of this competition, terms are defined as follows:

- Recovered wastewater resources include, but are not limited to, 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.
- Multidisciplinary teams consist of a small- to medium-sized WRRF or a network of WRRFs, technology developers (e.g., engineering and design firms, product vendors, and inventors), resource customers (e.g., farmers, electric and gas utilities, and users of reclaimed water), and any other potentially relevant stakeholders (e.g., academic researchers, regulators, business/financial interests, local governments, and nonprofit organizations) to develop holistic community- or watershed-based resource recovery plans for their respective water resource recovery systems.
- Small- to medium-sized WRRFs are facilities that treat no more than 50 million gallons per day, on average.

Background

Resource recovery occurs at WRRFs across the country. Although many sizes of facilities can recover resources, recovery is often most cost-effective at the largest facilities. This prize competition seeks to stimulate further resource recovery among small- and medium-sized facilities. The competition is seeking creative system-wide solutions that link resource providers with customers. The competition seeks to identify coalitions of partners that may not have collaborated absent a financial incentive, considering the following key concerns:

- WRRFs purchase about \$2 billion of electricity each year¹ and face more than \$200 billion in future capital investment needs to meet water quality objectives.² These expenses can stress municipal budgets. For example, energy consumption at WRRFs can account for one-third or more of municipal energy bills.³ Energy costs are expected to increase over time⁴ and affect affordability of water for businesses and consumers.⁵
- Disposal of residual biosolids from water treatment is another significant cost for municipalities. WRRFs can address these challenges by recovering resources and turning them into marketable products. And doing so can create new revenue streams for upgrading water treatment infrastructure, and particularly in rural communities, can reduce nutrient pollution and provide 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.
- Resource recovery contributes to system-level energy efficiency because recovering energy from wastewater reduces the amount of grid electricity required to operate a wastewater treatment plant. Moreover, recovered water (i.e., 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 and phosphorus) can be less energy-intensive substitutes for fertilizer on agricultural land.

To make progress on the goal of doubling resource recovery from municipal WRRFs, the prize competition seeks to increase resource recovery from these plants across the United States. The prize is intended to target small- to medium-sized facilities (i.e., those with flows of up to 50 million gallons per day), as larger facilities are more likely to already be engaged in or developing resource recovery strategies.

¹ 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.

² This electricity dollar value is derived from electricity consumption estimates by C. Arzbaecher, K. Parmenter, R. Ehrhard, and J. Murphy, *Electricity Use and Management in the Municipal Water Supply and Wastewater Industries* (Palo Alto, CA: Electric Power Research Institute and Water Research Foundation, 2013), <https://www.waterrf.org/research/projects/electricity-use-and-management-municipal-water-supply-and-wastewater-industries>.

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* (U.S. Department of Energy, September 2017), <https://doi.org/10.2172/1413878>.

Prize Phases

Important dates and a description of milestones for the Water Resource Recovery Prize are summarized in Figure 1.

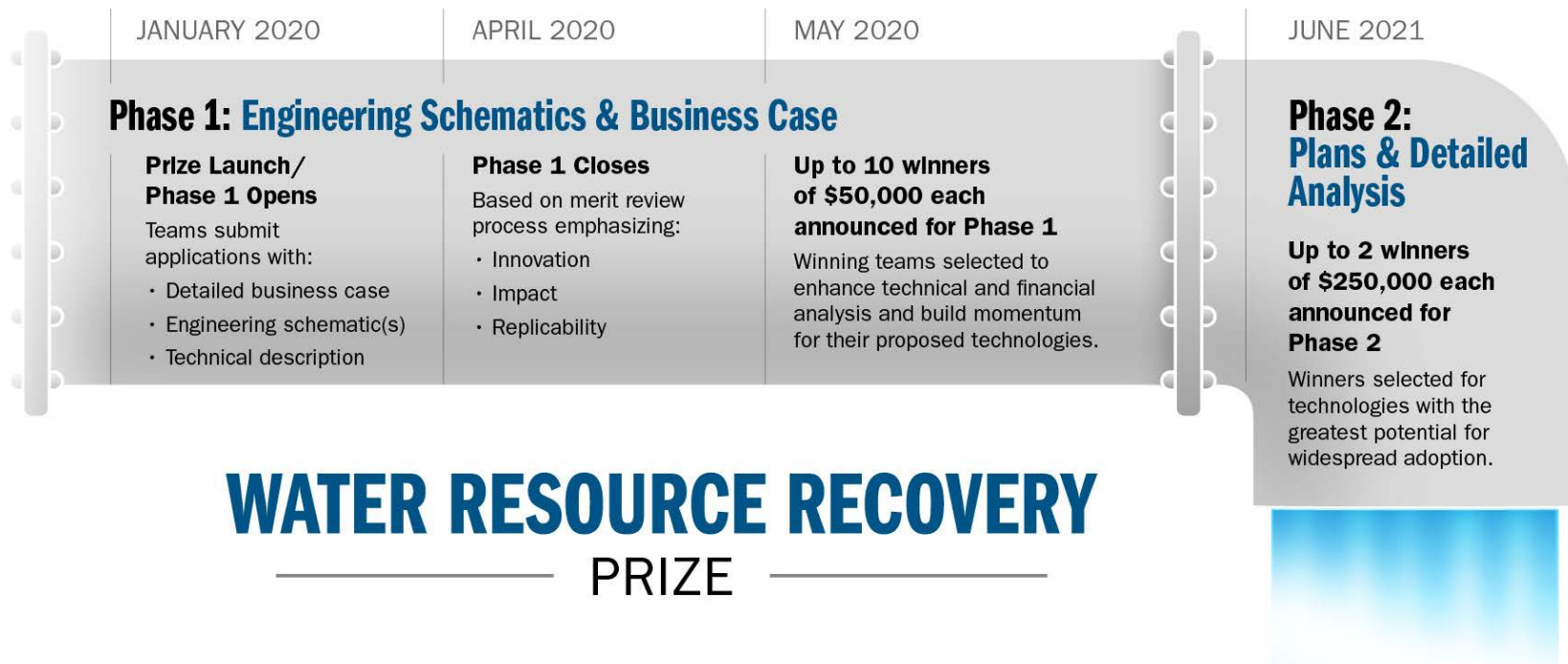


Figure 1. Prize competition schedule

Phase 1: Engineering Schematics and Business Case

In the first phase of the competition, teams will identify a problem or opportunity with respect to resource recovery. Teams are required to submit two high-level (i.e., one-page) facility engineering schematics that (1) characterize the existing operating conditions of the submitting WRRF or WRRFs and (2) define how the proposed new technology or process change would affect the facility configuration and operations. In addition, applicants are required to submit a business case that demonstrates improvement over the existing baseline conditions, as well as an accompanying technical description, which together demonstrate the potential for cost-effectiveness and viability of their resource recovery plan.

Successful plans should demonstrate how the approach (1) reaches the levels targeted by applicants as resource recovery metrics and (2) contributes to energy efficiency at the facility and/or system level, as discussed in the below sections. Plans will also be judged on their innovation and replicability.

DOE will launch Phase 1 on January 29, 2020 and will provide teams 3 months from launch of the competition until Phase 1 submissions are due (April 28, 2020). And DOE anticipates selecting up to 10 winning teams for cash prizes of \$50,000 each at the end of Phase 1. DOE may also publish the selected teams' plans (unless otherwise marked per Paragraph 10 of the appendix on a public-facing website to provide potential wastewater treatment recovery strategies that other wastewater treatment facilities might adopt.

Problem or Opportunity and Proposed Solution

Teams should clearly identify a problem or opportunity with respect to resource recovery and their innovative solution. The rationale for the solution should also be explained. Teams should describe the expected impact at their facility and the potential for transferability of the idea to other facilities.

Engineering Schematics

Teams should include two facility engineering schematics or process flow diagrams (e.g., Figure 1) to provide a technological context for the proposed water resource recovery effort. The teams should define the current state of operations of the WRRF—under both normal and peak/surge operating conditions—as well as its baseline performance with respect to a wide range of wastewater treatment parameters, including but not limited to those listed in Table 1.

Table 1. Wastewater Treatment Parameters

Operational Parameters	Wastewater Parameters	Resource Recovery Parameters
Flow rate	Influent volume	Phosphorous generated
Type of reactor	Biochemical oxygen demand	Nitrogen generated
Reactor volume	pH levels	Biosolids volume
Solids retention time	Total suspended solids (influent/inert/effluent)	Biogas volume
Type of aerators	Temperature	Usable water
Speed of aerators Elevation of facility	Ammonia concentration	Energy consumed/recovered Other resources recovered

When combined with a technical description, the two facility engineering schematics—one for before and one for after implementation of the proposed resource recovery technology/strategy—will help reviewers assess the technical performance and viability of the proposed technologies. An effective “after” schematic must incorporate any pathways or processes intended to recover resources and how they relate to the existing WRRF infrastructure. In effect, the resource recovery technologies would be displayed as inserts or additions to the standard treatment process. In addition, the schematics must be accompanied by a table that summarizes the proposed resource recovery efforts (e.g., Table 2).

Table 2. Summary of Proposed Resource Recovery

Resource	Current Recovery Level	Improvement Target	Unit of Measure
Energy: Electricity			
Energy: Thermal			
Biogas			
Usable Biosolids			
Usable Recovered Water			
Phosphorus			
Nitrogen			
Other			

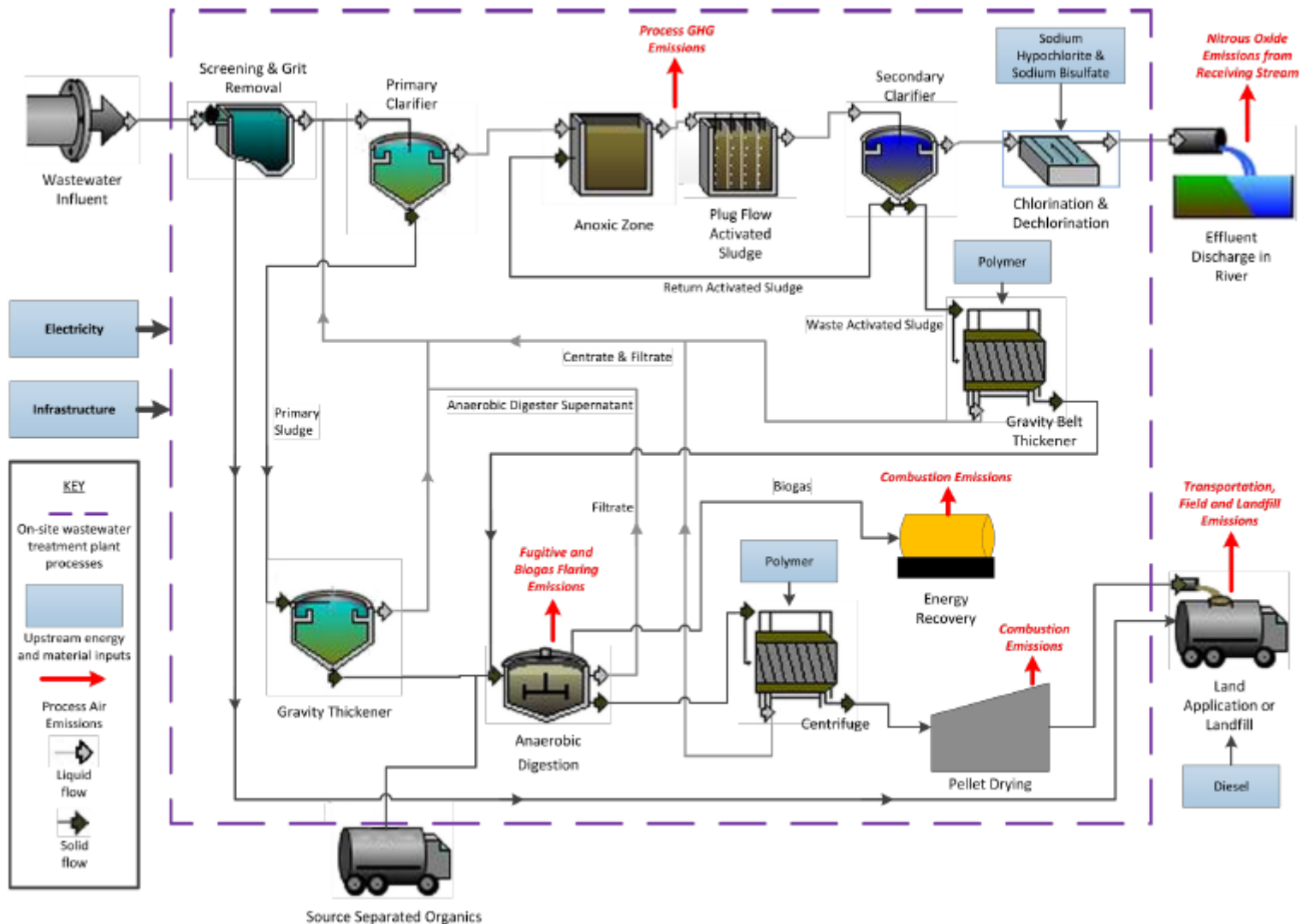


Figure 2. Sample engineering schematic/WRRF process flow diagram

Source: U.S. EPA Office of Research and Development, Life Cycle Assessment and Cost Analysis of Municipal Wastewater Treatment Expansion Options for Food Waste Anaerobic Co-Digestion (EPA/600/R-019/094, June 2019).

See also: EPA Office of Research and Development, Environmental Life Cycle Assessment and Cost Analysis of Bath, NY Wastewater Treatment Plant: Potential Upgrade Implications (EPA/600/R-17/207, June 2017, Figure 2.3 and 2.4) Water Environment Research Foundation, A Guide to Net-Zero Energy Solutions for Water Resource Recovery Facilities (2015).

Business Case

In general terms, a business case is a justification for a proposed project or undertaking on the basis of its expected commercial benefit relative to existing baseline operating conditions. A business case details the rationale to convince a decision maker to approve the investment recommendation or decision. The business case is particularly important to the Water Resource Recovery Prize, because simply recovering a resource is not enough for small- and medium-sized WRRFs—something of value needs to be created. Facilities need to consider the technological factors at the source as well as the midstream and downstream needs of their partners and ultimate “customers.” Applicants are encouraged to depict their business case based on Table 3, but an alternative format that contains the same key elements may be submitted.

Team Composition

Applicants should identify their team members and their affiliations, and they should summarize team members’ roles and responsibilities. Team member’s experience and qualifications should also be summarized. To increase their chance of success, applicants should also provide a strategy to further build relationships with customers, partners, and other stakeholders.

Table 3. Generic Business Case Structure

<p>Key Partners</p> <ul style="list-style-type: none"> • Who are our key partners and suppliers of goods and services? • What are their roles in the resource recovery process? • What other stakeholders affect our costs? <p>_____</p> <p>Examples</p> <ul style="list-style-type: none"> - Public authorities/utilities - Regulators - Engineering and design interests 	<p>Key Activities</p> <ul style="list-style-type: none"> • Which key activities are required for resource recovery? <p>_____</p> <p>Examples</p> <ul style="list-style-type: none"> - Production - Design - Construction - Permitting/approval 	<p>Value Propositions</p> <ul style="list-style-type: none"> • What products and services are offered? • What customer needs are satisfied? • What scale of resource recovery should be pursued? <p>_____</p> <p>Examples</p> <ul style="list-style-type: none"> - Primary supplier - Cost reduction - Risk reduction/resiliency 	<p>Customer Relationships</p> <ul style="list-style-type: none"> • What type of relationships exist with customers? • Which ones are already established and need to be developed? <p>_____</p> <p>Examples</p> <ul style="list-style-type: none"> - Personal relationships - Relationships with communities 	<p>Customer Segments</p> <ul style="list-style-type: none"> • Who are our most important customers and potential customers? <p>_____</p> <p>Examples</p> <ul style="list-style-type: none"> - Commercial - Agricultural - Electric utilities
<p>Cost Structure</p> <ul style="list-style-type: none"> • What are the most important capital and operating costs? • Which costs are associated with converting, processing, and delivering resource products? 		<p>Revenue Streams</p> <ul style="list-style-type: none"> • Which resource products are of most interest to our potential customers? • How much are our customers really willing to pay? • How much does each revenue stream contribute to overall revenues? • What other value do we bring to other stakeholders? • Are there other benefits that are difficult to monetize that should also be considered? 		

Phase 2: Plans and Detailed Analysis

Only teams selected during Phase 1 will be eligible to compete in Phase 2. More-specific rules governing Phase 2 submissions will be released at the conclusion of Phase 1 (i.e., late April or early May of 2020). And DOE expects to provide teams 1 year from Phase 1 selection to submit final Phase 2 materials.

Phase 2 will require the submission of detailed and technically rigorous plans that demonstrate how teams would finance and construct their resource recovery solutions, with such plans being supported by quantitative analysis and/or modeling. Successful plans will 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 2, as many as two teams will be selected to receive \$250,000 cash prizes.

Regarding financial viability, DOE anticipates aligning submission requirements with the application requirements of public financing programs (e.g., those from the U.S. Environmental Protection Agency's Water Infrastructure Finance and Innovation Act program and its Clean Water State Revolving Fund, among others) so that participants are well-positioned to apply for these and other funding sources.

Quantitative metrics will play a critical role in the judging of both phases of the competition. Applicants will need to articulate an ambitious target of resource recovery for one or more resources (e.g., energy, clean water, or nutrients). The target could be expressed as a recovery rate (e.g., the percentage of resource recovered relative to the total amount of that resource present in influent) or as an improvement rate (e.g., an increase in recovery rate over some baseline). In Phase 2, financial metrics will also be used for judging, which may include levelized cost of avoided disposal, net present value of recovery streams, life cycle costs of recovery, or other metrics. To ensure diverse solutions that apply 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.

Participant Eligibility

Both Phase 1 and Phase 2 of the competition are open only to:

- Citizens or permanent residents of the United States
- Private or nonfederal public entities, such as townships, tribes, corporations, or other organizations that are incorporated in and maintain a primary place of business in the United States
- A group of individuals, acting as one competitor, provided the online account holder of the submission is a United States citizen or a permanent resident.

Only small- and medium-sized WRRFs are eligible to participate. For purposes of this prize competition, DOE defines small- and medium-sized WRRFs as facilities treating no more than 50 million gallons per day, based on a calendar year average. In addition, technology developers, resource customers (e.g., farmers and electric and gas utilities), academic researchers, regulators, business/financial interests, and nonprofit organizations are eligible to compete.

DOE employees, employees of sponsoring organizations, members of their immediate families (i.e., spouses, children, siblings, or parents), and persons living in the same household as such persons, whether or not they are related, are ineligible to compete. Federal entities and federal employees, acting within the scope of their employment, are also ineligible. DOE national laboratory employees cannot compete in any stage of the prize.

Specific rules governing Phase 2 submissions will be released at the conclusion of Phase 1.

Rules and Requirements

How to Enter

Complete a submission package at <https://www.HeroX.com/WaterResourceRecovery> before the contest closing date.

Phase 1: Important Dates

Phase 1 Submission Open: January 29, 2020

Phase 1 Submission Close: April 28, 2020

Phase 1 Winner Notification: May 28, 2020

Phase 2: Important Dates

Specific requirements and official rules for Phase 2 submissions will be released later, but important milestone dates are shown here.

Phase 2 Submission Open: May 28, 2020

Phase 2 Submission Close: May 28, 2021

Phase 2 Winner Notification: June 28, 2021

What to Submit

The following items constitute the submissions package and must be submitted through the HeroX platform:

- Cover Page (to be made public, not scored)
- Submission Summary Slide (to be made public, not scored)
- Technical Narrative – up to 15 pages in length that includes the following components (all assumptions used in documentation, analysis, modeling and simulation must be explicitly stated):
 - Problem or Opportunity and Proposed Solution: Technical specifications of the WRRF and the interface with the proposed resource recovery technology, including details and a quantifiable projected value and/or impacts with credible supporting information.
 - Facility Engineering Schematics of the existing WRRF and the proposed WRRF after resource recovery technologies/strategies are implemented. Each schematic should not exceed one page and will not be counted towards the 15-page limit. A discussion of the technical specifications of the wastewater treatment system and the interface(s) with the proposed resource recovery technology must also be included. The schematics

- must be accompanied by a table that summarizes the proposed resource recovery efforts (see Table 1.1).
- Business case explaining the proposed recovery rates, efficiency gains, prospective markets/customers, etc.
- Team Composition: Individual member biographies (not resumes) and summary of team experience and qualifications.
- Letters of Commitment or Support

Cover Page

A cover page is to be made public but will not be scored. List basic information about your submission, including:

- Title
- Short description of the proposed solution
- Key project members (names, contacts, and links to professional online profiles)
- Your city and state
- Other partners (if any).

Submission Summary Slide

A one-page submission summary slide is to be made public but will not be scored. Convey the technical details of your proposal in a simplified format. The public-facing summary should contain technically specific details that can be understood by most people. There is no template, so feel free to present the information as you see fit. Please make any text readable in a standard printout and conference room projection.

Technical Narrative

You should address each of the following four elements. All assumptions used in documentation, analysis, modeling, and simulation must be explicitly stated. The suggested content bullets in Table 4 are provided to guide your responses: you decide where to focus your answers. The individual responses to the required elements do not have a word limit, but the aggregate response must not exceed 15 pages. You should also include two facility engineering schematic diagrams and up to four additional supporting images, figures, or graphs, as well as any letters of support or commitment from team members; these items are not included in the 15-page limit. The advisory judges will score the questions based on the content you have provided.

Table 4. Technical Narrative

Element 1: Problem or Opportunity and Proposed Solution	
<p>Suggested Content You Provide:</p> <ul style="list-style-type: none"> • Detailed description of the identified problem or opportunity • Proposed systems solution design and rationale • Discussion of transferability to other facilities and potential impact 	<p>Judges Score Each Statement on 1-6 Scale:</p> <ul style="list-style-type: none"> • The proposed approach is innovative. • The proposed approach to address the identified problem or opportunity is clearly and thoroughly described. • Potential impact is multiplied through transferability to other small- to medium-sized WRRFs.
Element 2: Facility Engineering Schematics and Performance Metrics	
<p>Suggested Content You Provide:</p> <ul style="list-style-type: none"> • Schematic of current operations • Schematic of proposed configuration including resource recovery technologies/process improvements • Summary matrix and technical discussion of recovered resources 	<p>Judges Score Each Statement on 1-6 Scale:</p> <ul style="list-style-type: none"> • The competitor provides a complete representation of key processes and operating parameters of the wastewater treatment facility. • The proposed systems solution is technically sound. • Resource recovery targets are well-described and ambitious relative to a doubling of resource recovery goal.
Element 3: Business Case	
<p>Suggested Content You Provide:</p> <ul style="list-style-type: none"> • Viable business case discussing financial viability and full market potential for recovered resources 	<p>Judges Score Each Statement on 1-6 Scale:</p> <ul style="list-style-type: none"> • The competitor provides a credible and comprehensive discussion of 1) capital and operating costs for the proposed systems solution and 2) potential revenue for recovered resources. • The competitor describes the approach to building relationships with customers for recovered resources. • The competitor discusses technical and financial risks and provides an approach to mitigate these risks.

Element 4: Team Composition

Suggested Content You Provide:

- Identification of team members and a summary of roles and responsibilities
- Summary of team experience and qualifications

Judges Score Each Statement on 1-6 Scale:

- The competitor has assembled a qualified team with credible and relevant experience.
- The competitor demonstrates involvement with a range of partners appropriate to the proposed project and business case from treatment to technology deployment to marketing and sales of recovered resources.
- The competitor articulates an approach to further build relationships with customers, partners, and other stakeholders to increase the chance of success.

Letters of Commitment or Support

Attach one-page letters from relevant entities (e.g., potential users of the proposed innovation) to provide context. This could include letters from partners or others you believe are critical to the success of your proposal.

How We Determine Winners

The prize administrator screens all completed submissions and, in consultation with DOE, assigns subject matter expert reviewers to independently score the content of each submission. The advisory judges will comprise federal and nonfederal subject matter experts with expertise in relevant areas. Advisory judges will review Phase 1 submissions according to the described evaluation criteria. Advisory judges and DOE reviewers may not (a) have personal or financial interests in, or be an employee, officer, director, or agent of any entity that is a registered participant in the prize or (b) have a familial or financial relationship with an individual who is a registered participant.

Expert Advisory Judge Panel Scoring: The scoring of submissions will proceed as follows (see Table 5):

- Each judging criterion will receive a score from 1 to 6, defined as follows:

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

- The final score from an individual judge for a submission package equals the total sum of the scores for all the bullets, multiplied by the weighting factor for that submission element (see Table 5).
- All judges' scores will then be averaged for a final score for the submission package.

Table 5. Scoring Matrix

Element	Score	Weight	Total
Proposed solution	1–6	0.2	Score x weight
Facility engineering schematics	1–6	0.3	Score x weight
Business case	1–6	0.3	Score x weight
Team composition	1–6	0.2	Score x weight
TOTAL	TBD	1.0	TBD

Interviews: AMO, at its sole discretion, may decide to hold a short interview with a subset of the Phase 1 competitors. The interviews would be held before the announcement of winners and would serve to help clarify questions the judges may have. Attending interviews is not required and interviews are not an indication of winning.

Final Determination: Final determination of winners by the director of AMO will take the advisory judges' scores and the interview findings (if applicable) into account. The director of AMO is the ultimate judge of the competition and will make the final determination of winners.

Announcement: Approximately 30 days after the contest closes, the prize administrator notifies winners and requests the necessary information to distribute cash prizes. The prize administrator will then publicly announce winners.

Program Goal Requirements

Only submissions relevant to the technology development goals, as laid out in Section 1 of this document, may compete. The prize administrator must conclude that all of the following statements are true when applied to your submission:

- The proposed solution utilizes innovative solutions to recover resources from municipal wastewater.
- The proposed solution represents an innovation that could move the sector of small- and medium-sized WRRFs beyond their current technological status.
- The proposed solution does not involve the lobbying of any federal, state, or local government.
- The proposed solution is based on sound fundamental technical principles.

Appendix. Additional Terms and Conditions

1. REQUIREMENTS

Your submission for the Water Resource Recovery Prize is subject to the following terms and conditions:

- You must post the final content of your submission or complete the submission form at <https://www.herox.com/WaterResourceRecovery> before the current phase closes. Late submissions or any other form of submission may be rejected.
- All submissions that you wish to protect from public disclosure must be marked according to the instructions in paragraph 10 of this appendix. Unmarked or improperly marked submissions will be deemed to have been provided with unlimited rights and may be used in any manner and for any purpose whatsoever.
- Submissions are not intended to be made public, except the portions of the submissions designated as public; however, see Section 10 regarding the Freedom of Information Act.
- You must include all the required submission's elements. The prize administrator may disqualify your submission after an initial screening if you fail to provide all required submission elements. Competitors may be given an opportunity to rectify submission errors that are a result of technical challenges.
- Your submission must be in English and in a format readable by Microsoft Word or Adobe Acrobat. Scanned hand-written submissions will be disqualified.
- Submissions will be disqualified if they contain any matter that, in the sole discretion of DOE or the prize administrator, is indecent, obscene, defamatory, libelous, lacking in professionalism, or demonstrates a lack of respect for people or life on this planet.
- If you click "Accept" on the HeroX platform and proceed to register for any of the phases described in this document, these rules will form a valid and binding agreement between you and DOE that is in addition to the existing HeroX terms of use for all purposes relating to this contest. You should print and keep a copy of these rules. These provisions only apply to the contest described here and no other contest on the HeroX platform or anywhere else.
- The prize administrator, when feasible, may give competitors an opportunity to fix insubstantial mistakes or errors in their submission packages.

2. VERIFICATION FOR WINNER PAYMENTS

The prize administrator will verify the identity of a participant selected to receive the prizes. Receiving a prize payment is contingent upon fulfilling all requirements contained herein. The prize administrator will notify winning participants using provided email contact information after the date that results are announced. Each participant will be required to sign and return all required payment forms to the prize administrator, within 30 days of the date the notice is sent, a completed National Renewable Energy

Laboratory (NREL) Request for Automated Clearing House ()Banking Information form, and a completed W9 form (<https://www.irs.gov/pub/irs-pdf/fw9.pdf>). At the sole discretion of the prize administrator, a winning competitor will be disqualified from the competition and receive no prize funds if (1) the person/entity cannot be contacted, (2) the person/entity fails to sign and return the required documentation within the required time period, (3) the notification is returned as undeliverable, or (4) the submission or person/entity is disqualified for any other reason.

3. TEAMS AND SINGLE ENTITY AWARDS

The prize administrator will award a single dollar amount to the designated primary submitter whether consisting of a single or multiple entities. The primary submitter is solely responsible for allocating any prize funds among its member competitors as they deem appropriate.

4. SUBMISSION RIGHTS

By making a submission and consenting to the rules of the contest, a competitor is granting to DOE, the prize administrator, and any other third parties supporting DOE in the contest, permission to use the submission consistent with this Official Rules Document. Portions of submissions that are marked as protected from public disclosure according to Section 10 will be treated accordingly. Potential uses of submissions include posting or linking to the nonprotected portions of the submission on the prize administrator or HeroX platforms, including the contest website, DOE websites, and partner websites, and the inclusion of the submission in any other media, worldwide. The submission may be viewed by DOE, the prize administrator, and judges for purposes of the contest, including but not limited to screening and evaluation purposes. The prize administrator and any third parties acting on their behalf will also have the right to indefinitely publicize the competitor's name and, as applicable, the names of the competitor's team members and organization, and the abstract for their idea on the contest website indefinitely.

By entering, the competitor represents and warrants that:

1. Competitor has not included third-party content (e.g., writing, text, graphics, artwork, logos, photographs, dialogue from plays, likeness of any third party, musical recordings, clips of videos, television programs, or motion pictures) in or in connection with the submission, unless (1) otherwise requested by the prize administrator and/or disclosed by competitor in the submission and (2) competitor has either obtained the rights to use such third-party content or the content of the submission is in the public domain without any limitations on use.
2. Unless otherwise disclosed in the submission, the use thereof by the prize administrator, or the exercise by the prize administrator or others acting on its behalf of any of the rights granted by competitor under these rules, does not and will not infringe or violate any rights of any third party or entity, including, without limitation, patent, copyright, trademark, trade secret, defamation, privacy,

- publicity, false light, misappropriation, intentional or negligent infliction of emotional distress, confidentiality, or any contractual or other rights.
3. Competitor is not and will not conduct any activity pertaining to this prize competition that would infringe on any intellectual property right of any third party, such as any patent, copyright, trade secret, or other intellectual property right, and that it has exercised reasonable efforts and diligence in making this representation and warranty. The foregoing representation and warranty shall be ongoing during the course of this competition and will be considered to have been made again and as of the date of each subsequent phase of the competition in which the competitor participates.
 4. All persons who were engaged by the competitor to work on the submission or who appear in the submission in any manner have:
 - a. Given competitor their express written consent to submit the submission for exhibition and other use in any manner and in any and all media, whether now existing or hereafter discovered, throughout the world
 - b. Provided written permission to include their name, image or pictures in or with the submission (or if a minor who is not the competitor's child, competitor must have the permission of their parent or legal guardian) and competitor may be asked by the prize administrator to provide permission in writing.

5. COPYRIGHT

Each competitor represents and warrants that the competitor is the sole author and copyright owner of the submission; that the submission is an original work of the participant or that the participant has acquired sufficient rights to use and to authorize others, including DOE, to use the submission, as specified throughout the rules, that the submission does not infringe on any copyright or on any other third-party rights of which the participant is aware; and that the submission is free of malware.

6. CONTEST SUBJECT TO APPLICABLE LAW

Contest is subject to all applicable federal laws and regulations. Participation constitutes each participant's full and unconditional agreement with the Official Rules Document and administrative decisions, which are final and binding in all matters related to the prize. This notice is not an obligation of funds; the final awards are contingent upon the availability of appropriations.

7. RESOLUTION OF DISPUTES

DOE is solely responsible for administrative decisions, which are final and binding in all matters related to the contest.

Neither DOE nor the prize administrator will arbitrate, intervene, advise on, or resolve any matters between team members or among competitors.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the participant. The "authorized account holder" is the natural person or legal entity assigned an email address by an internet access provider, online service provider, or other organization responsible for assigning email addresses for the domain associated with the submitted address. Competitors and potential winners may be required to show proof of being the authorized account holder.

8. PUBLICITY

The winners of these prizes (collectively, "winners") will be featured on the DOE and NREL websites.

Participation in the contest constitutes each winner's consent to DOE's and its agents' use of each winner's name, likeness, photograph, voice, opinions, and/or hometown and state information for promotional purposes through any form of media, worldwide, without further permission, payment, or consideration.

9. LIABILITY

Upon registration, all participants agree to assume and, thereby, have assumed any and all risks of injury or loss in connection with or in any way arising from participation in this contest or development of any submission. Upon registration, except in the case of willful misconduct, all participants agree to and, thereby, do waive and release any and all claims or causes of action against the federal government and its officers, employees, and related entities for any and all injury and damage of any nature whatsoever (whether existing or thereafter arising, whether direct, indirect, or consequential and whether foreseeable or not), arising from their participation in the contest, whether the claim or cause of action arises under contract or not.

In accordance with the delegation of authority to run this contest delegated to the director of AMO, the director has determined that no liability insurance will be required of participants to compete in this competition per 15 USC 3719(i)(2) in Phases 1 and 2. The director will evaluate possible activities in the rest of the Phases and make additional determinations. Participants may be required to obtain liability insurance in future phases

10. SUBMISSION MARKING AND FREEDOM OF INFORMATION ACT

All materials submitted to DOE as part of a submission become DOE records. Any confidential commercial information contained in a submission should be designated in writing at the time of submission.

Participants are required to employ protective markings in the following manner:

The cover sheet of the submission must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:

Notice of Restriction on Disclosure and Use of Data

Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or commercial or financial information that is privileged must be marked as follows: “May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure.”

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

Competitors will be notified of any Freedom of Information Act requests for their submissions in accordance with 29 C.F.R. § 70.26. Competitors may then have the opportunity to review materials and work with a Freedom of Information Act representative before the release of materials.

11. PRIVACY

If you choose to provide HeroX with personal information by registering or completing the submission package through the contest website, you understand that such information will be transmitted to DOE and may be kept in a system of records. Such information will be used only to respond to you in matters regarding your submission and/or the contest unless you choose to receive updates or notifications about other contests or programs from DOE on an opt-in basis. DOE and NREL are not collecting any information for commercial marketing.

Federal employees are subject to the nondisclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The government may seek the advice of qualified nonfederal personnel. The government may also use nonfederal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to DOE providing their response to nonfederal parties. Nonfederal parties given access to responses must be subject to an appropriate obligation of confidentiality before being given the access. Submissions may be reviewed by support contractors and private consultants.

12. GENERAL CONDITIONS

DOE reserves the right to cancel, suspend, and/or modify the contest, or any part of it, at any time. If any fraud, technical failures, or any other factor beyond DOE's reasonable control impairs the integrity or proper functioning of the contest, as determined by DOE in its sole discretion, DOE may cancel the contest.

Although DOE indicates in the Water Resource Recovery Prize phases that it may select multiple winners for each phase, DOE reserves the right to only select competitors that are likely to achieve the goals of the program. If, in DOE's determination, no competitors are likely to achieve the goals of the program, DOE will select no competitors to be winners and will award no prize money.

DOE reserves the right to request additional and/or required documentation from the competitors within a reasonable time after the close of the competition.

13. PRIZE ADMINISTRATOR

The prize administrator is the Alliance for Sustainable Energy, LLC operating in its capacity as the managing and operating contractor for NREL. AMO is the federal agency sponsor of the prize.

14. NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

DOE's administration of the Water Resource Recovery Prize contest is subject to the National Environmental Policy Act (NEPA) (42 USC 4321, et seq.). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, see DOE's NEPA website at <http://nepa.energy.gov/>. Though NEPA compliance is a federal-agency responsibility, the ultimate decisions remain with the federal agency. Participants may be asked to provide DOE with information such that DOE can conduct a meaningful evaluation of the potential environmental impacts.

ALL DECISIONS BY DOE ARE FINAL AND BINDING IN ALL MATTERS RELATED TO THE CONTEST.