Task 7 Request for Proposals: Open Task

2026

Sponsored by Iron Sponsor: Jacobs Engineering Group

Background

The Open Task was developed to allow teams to identify their own real-world environmental challenge and address it through research, design, and development of a fully operational bench-scale demonstration of the solution.

Response to a current issue of national importance is highly encouraged, as is the participation of multi-disciplinary teams from STEM fields.

Updated on 9/22/25 to add the optional Design Proposal (p. 2) and to update requirements for the 30% Project Review (p. 4).

Topic Selection

Topics should focus on environmental issues, including, but not limited to, energy, food, air, and water. The topic chosen must maintain the goals of the contest: the pursuit of real-world, technically challenging, demonstrable, innovative solutions that are economically feasible and could be put into practice on a large scale.

To help teams design a project that is rigorous and will be competitive during judging, teams are encouraged to refer to Task 1-6 problem statements to understand the expected scope and outcomes of contest tasks.

When selecting a task, teams should be mindful that:

1. The design must produce measurable results that serve as proof of concept for the design. For example, if the project has the goal of cleaning up a particular type of air pollution:
    a. The team will bring their pollution-removing bench-scale model to the contest.
    b. The contest staff will provide an air sample containing the pollutant; the team will run this through their bench-scale apparatus and collect the resulting air sample (that should now be cleaner).
    c. The WERC staff will send this "cleaned" air sample to NMSU labs to validate the team's results.
2. The total time allowed for the bench-scale demonstration + analytical testing of the results may total no more than 48 hours, due to contest date constraints.
3. Plan a bench-scale demonstration that does not require a person to tend the apparatus overnight. We cannot monitor overnight processes.
4. Computer simulations should not be the primary means of demonstrating the design, unless approved by WERC.

Design Proposal (Optional)

Your team may wish to submit a proposal for a design challenge before getting deeply involved in your project. At any time before the 30% Project Review is due, email this to werc@nmsu.edu. Include:

- Describe the product or process and explain why it is valuable to society and the environment.
- Submit a process-flow diagram (PFD) that identifies and quantifies all inputs, outputs, and associated mass and energy balances for the proposed system, as applicable. Remember that simulations also have defined inputs and outputs. If a PFD is not relevant to your project, instead provide detailed process diagrams showing each component of your design, its function, and any associated waste streams.
- Discuss the advantages and disadvantages of your solution versus both current technologies and other possible approaches (consider cost, ease of operation, elegance of design, waste minimization, energy efficiency, etc.).
- Propose a first-order analytical testing protocol to evaluate your solution at the contest.

Problem Statement

Your team will identify a real-life environmental challenge in an emerging technological area, design the solution to the problem, and identify the potential market for your solution.

Your team will build an apparatus to demonstrate a bench-scale version of your proposed solution, evaluate the cost of building and operating a full-scale version of your proposed solution, and consider regulations and implications for implementing the full-scale solution.

Design Requirements

Your proposed design should provide specific details and outcomes as follows.

- Describe the product or process and explain why it is valuable to society and the environment.
- Develop, demonstrate, and present a complete package that includes technical performance as well as financial, regulatory, and safety information.
- Provide a process-flow diagram (PFD), complete with quantified inputs/outputs and mass and energy balances for the designed process (if applicable). Note that even a computer simulation has input and output. If a PFD does not apply to your project, provide process diagrams that illustrate each component in your design and include a description of its function. Waste streams, if any, should be addressed in the diagrams.
- Discuss the advantages and disadvantages of your solution versus both current technologies and other possible approaches (consider cost, ease of operation, elegance of design, waste minimization, energy efficiency, etc.).
- Build an experimental apparatus to demonstrate your process.
- Identify an analytical testing protocol that will be used to evaluate your solution at the contest. Share this with the WERC staff in your ESP and your 30% Project Review.
- Present a business case for your technology, including potential incentives from appropriate levels of government and supporting economic metrics.

- Economic Analysis.
  - Teams are advised to create a multi-disciplinary team by inviting a business major to help draw up economic plans for full-scale implementation of your designs.
  - If your solution is for a one-time build, then maintenance of a treatment process, present a Techno-Economic Assessment and Analysis (TEA) to construct a full-scale operation for your chosen technology.

    The TEA will include your estimate of capital costs (CAPEX) and operational costs (OPEX) for a full-scale solution and appropriate graphical representation of your cost data.
    - Capital expenses typically include, but are not limited to, equipment, pipes, pumps, etc. Do not include costs of buildings and appurtenances to the treatment process.
    - Operating expenses (OPEX) should include, but not be limited to, materials needed, including consumables (chemicals, sacrificial components, etc.). In addition to other operating costs that your team identifies, include these operating costs: staff labor rate of $70/hour; solids disposal costs ($50/ton); energy requirements using an electricity rate of $0.10/kWh. If your full-scale solution requires natural gas as an energy source, research and use up-to-date prices.
    - Include a financial analysis of any potential product salable value. Note that plant location in reference to raw materials and final consumers will have a major impact on the cost of the final product.
  - Visualization tools: Use tools such as sensitivity analyses, graphs, and other visuals to illustrate how key parameters impact system performance and economics.
  - If your team is designing a device, instead of developing a TEA, your team will present a rudimentary business plan. Include: *(List subject to change—watch FAQs.)*
    - Costs, cost-recovery structure, recovery rate and schedule.
    - Level of profit to show viability to a prospective lender (as an indication of ability to pay off a loan needed to set up the manufacturing process).
    - Projected sales forecast, market potential, potential market share
    - Reduction in the marginal cost of each device as manufacturing progresses over successive years (to reflect economies of scale: i.e., the cost of manufacturing a single car is $50M, but the cost of manufacturing 5M cars is $30,000 each).
- To be considered for the WERC P2 Award, in a separate section of the report (titled “Pollution Prevention”), document success in improving energy efficiency, pollution prevention, and/or waste minimization, as it applies to your project.
- Discuss your plan’s adherence to appropriate federal (USA), state, and local laws and regulations. Attend WERC’s EH&S Short Course for tips for addressing regulatory issues. (See website for info.)
- Include a Public Involvement Plan, as applicable (see Team Manual).
- Identify waste streams, if any, for your design and plans to address them.
- Identify the hazards of the proposed solution and approaches to mitigate them.
- Address safety aspects of operating your technology. Safety issues for the full-scale design should be addressed in the written report. Safety issues for the bench-scale demonstration should be addressed in both the written report and the Experimental Safety Plan (ESP).
- Discuss the intangible benefits of the product or process, if any.

Bench-Scale Demonstration

During the bench-scale demonstration, your team should plan to present a functional bench-scale model that clearly conveys the proposed solution.

Your 30% Project Review and your ESP will serve as your detailed plan for operating the bench-scale demonstration at the contest. The 30% Project Review focuses on the basic setup and PFD for your project and your intended bench-scale demonstration plans.

The ESP includes everything in the 30% Project Review, plus the addition of safety during the operation of your bench-scale demonstration at the contest. In the ESP, include:

1. A detailed list of analytical testing needed for WERC to evaluate the bench-scale results. (Do we need to send your resulting samples to a lab? What laboratory analyses will be needed? What will the samples likely contain? Will we need to make measurements at your booth? Etc.)
2. An estimate of the time needed to run the bench-scale demonstration.
3. An estimate of the time required for WERC to analytically test results from your bench-scale results.

Note that the time for the above items #2 and #3 must not exceed 48 hours, due to contest time limitations.

30% Project Review

Submission date: March 1, 2024 (you may submit earlier if you wish to receive feedback sooner).

Submit the 30% Project Review as early as possible. It should not exceed three pages. Although the review is not scored, your team will receive feedback from the judges on how to improve your project. You are allowed to change your plans after submitting this report. Include as many items listed below as possible. The more detail provided in your review, the better direction you will get from the judges. (See Team Manual for more information.)

As available, please include:

- ***A brief description of your project:*** One bulleted list outlining your planned solution to the problem and any anticipated drawbacks.
- ***A complete Process Flow Diagram*** (with expected mass and energy balances), ***Computer Architectures,*** or other means of illustrating your processes.
- ***A draft for your bench-scale setup.*** Provide a scaled 3-D view of the bench-scale prototype, with dimensions labeled.
- ***Preliminary data and/or calculations that support the proposed design, if available***. This might include expected chemical reactions (reactants, reaction times, etc.), flow volumes and rates, etc.
- ***Rough cost estimates that show the feasibility of the project.*** This will give your team and the judges a chance to consider modifications that might improve the feasibility of the project.
- ***All bench-scale setup requests***, such as indoor versus outdoor demonstration area, the potential need to run the process overnight (justify the needs and describe continuous monitoring, power needs, safety measures).
- ***Auxiliary equipment and supplies requests,*** if any, such as pressurized gas cylinders, bulky items, etc. Provide justifications for each requested item.
- ***Proposed bench-scale testing parameters:*** Outline the testing plan WERC will execute, including setup, controlled variables, measurement methods, data capture procedures, and specific success criteria for validating system functionality.

Evaluation Criteria

Each year, the WERC Environmental Design Contest and its sponsors award more than $30,000 in cash prizes. There are task-specific prizes and overall contest awards. See the Team Manual for more information.

Each team is advised to read the 2026 Team Manual for a comprehensive understanding of the contest evaluation criteria. For a copy of the Team Manual, Public Involvement Plan, and other important resources, visit the WERC website: https://werc.nmsu.edu/team-info/guidelines.html

Your team's response to this task includes five components (see Rubrics in the Team Manual):

- Written report,
- Formal oral presentation,
- Bench-scale Prototype Demonstration,
- Poster concisely conveying the essence of your work through text and graphics,
- Flash Pitch: a separately judged 3-minute investor pitch for your project

Judges' evaluation of your entry will include consideration of the following points specific to this task.

- Potential for real-life implementation, including expected reliability and maintainability and reasonable cost of setup and ongoing operations. Cost/benefit of your solution will be compared with those of other teams.
- Thoroughness and quality of the PFD or Process Diagram(s).
- Thoroughness and quality of the economic analysis for scale up.
- Originality, innovation, and real-world need are represented by the proposed technology.
- The quality of your bench-scale results.
- Other specific evaluation criteria that may be provided at a later date (watch the FAQs), including those suggested by judges as a result of your 30% Project Review.

Experimental Safety Plan (ESP) and Required Short Course

The ESP outlines your team's plans for safely operating your bench-scale demonstration at the contest. Your team should follow your school's safety procedures while conducting tests prior to attending the contest.

Teams will not be able to run a bench-scale demonstration if the ESP is not received by the deadline. This document is submitted no later than March 1, 2026 (see dates below). Instructions for preparing the ESP are provided in the 2026 Team Manual, and your entire team is required to attend a mandatory short course that outlines the ESP process.

Dates, Deadlines, FAQs (*dates subject to change—watch website FAQs*)

This Fall	Email us to reserve a spot for your team and get on the email list for this task. Registration is limited.
Weekly	Check FAQs for updates: • Task-specific FAQs: 2026 Tasks/Task FAQs • General FAQs: 2026 General FAQs
November 1, 2025 - December 31, 2025	Early Bird Registration (discount applies)
December 1, 2025 – January 30, 2026	30% Project Review Due (or as arranged with WERC).
December 1, 2025 – February 16, 2026	Mandatory On-demand Course: Preparing the Experimental Safety Plan. See Team Manual.
February 17, 2026	Final date to register a team w/o permission.
March 9 -13, 2026	Experimental Safety Plan (ESP) due to Juanita Miller. Include requests for chemicals, materials, etc.
April 2, 2026	Technical Report due
April 12 – 15, 2026	Contest in Las Cruces

Contacts:

ESP and Safety Officer: Juanita Miller, miljgh@nmsu.edu

All other questions and concerns: Ginger Scarbrough, werc@nmsu.edu