

Task 6: Open Task

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 all STEM fields.**

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 Tasks 1-5 to generally understand the expected scope and outcomes of contest tasks.

When selecting a task, teams should be mindful of the need to:

1. Produce measurable results that serve as proof-of-concept for the design. For example:
 - a. If the project has the goal of cleaning up a particular type of air pollution, 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 model and collect the resulting air sample.
 - c. The contest staff will send this air sample to NMSU labs to validate the team's results.
2. Yield results that can be measured within a 48-hour period, due to contest time constraints.
3. At least one month prior to the contest (**March 2, 2020**), submit a detailed testing plan for approval, to allow contest staff time to prepare for analytical testing of your design.

Problem Statement

Your team must identify a real-life environmental, energy, or water-related issue and the market for your solution to this issue, design and demonstrate your proposed solution, and discuss the advantages and disadvantages of your solution versus both current technologies and other possible approaches.

Design Considerations

For this task, teams should design a solution to the problem identified, and create an experimental apparatus to demonstrate it. Identify a test protocol which may be used to evaluate your solution. Present a business case for your technology including potential incentives from appropriate levels of government and supporting economic metrics. Consideration should be given to the following:

- How variation in operational conditions impacts the performance of the technology
- What are the optimal conditions and limitations for the proposed solution
- What are the appropriate metrics for evaluating the technology (i.e. cost to implement and maintain, energy requirements, waste generation, ease of operation, etc.)
- How does this technology compare to other possible methods of problem mitigation
- Identification of appropriate federal (USA), state and local laws and regulations
- Identify the hazards of the proposed solution and approaches to mitigate the issue
- Safety issues should also be addressed in the Experimental Safety Plan (ESP).

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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 team should develop, demonstrate and present a complete package that includes technical performance as well as financial, regulatory, and safety information.

At least one month prior to the contest, your team must provide a detailed test plan for the proposed solution that will be used as part of the overall process of judging your solution. Be aware that if analytical testing of a treated sample is required, the testing must take place over no more than a 48 hour period. Samples must be made available with enough time for this testing to take place prior to the conclusion of the contest. Laboratory testing requiring an extended period of time cannot be done under the contest time constraints. Prior coordination with the Engineering NM team is required. If you have any questions, please contact werc@nmsu.edu.

Written Report Requirements

The written report should demonstrate your team's insight into the full scope of the issue that you have chosen and include all aspects of the problem and your proposed solution. The report will be evaluated for quality of writing, organization, clarity, reason, and coherence. Standards for publications in technical journals apply. In addition to the listed requirements, your report must address in detail the items highlighted in the Problem Statement, Design Considerations, and Evaluation Criteria.

Evaluation Criteria

Upon registration, you will be provided with a copy of the Public Involvement Plan and Participation Guide. Each team is advised to read the Participation Guide for a comprehensive understanding of the contest evaluation criteria.

Additionally, your proposed design will be evaluated on the following:

- Technical fundamentals, performance, safety and other issues stated in the problem statement
- The potential for real-life implementation
- Comprehensiveness of performance metrics
- Thoroughness and quality of the business plan and economic analysis
- Originality, innovation, functionality, ease of use, maintainability, reliability, and affordability of the proposed technology

FAQs/Deadlines

- Teams are expected to watch for FAQs related to this task for any updates in the task requirements.
- The Experimental Safety Plan (ESP) is due no later than 24 February, 2020.
- The Detailed Testing Plan is due no later than March 2, 2020.

Awards

Each year, the WERC Environmental Design Contest and its sponsors award more than \$25,000 in cash prizes. Successful completion of every stage of the design project qualifies each team for the following awards.

1. Task awards (First, Second, Third Place; minimum amounts: \$2500-\$1000-\$500, respectively).
2. Freeport-McMoRan Innovation in Sustainability Award (\$2500)
3. WERC Resources Center Pollution Prevention/Energy Efficiency Award (\$500)
4. Judges' Choice Award (\$500)
5. Peer Award (\$250)
6. Terry McManus Outstanding Student Award. (Minimum: \$500, according to funding).

Award amounts listed are minimum amounts and may increase with available funding. Detailed award criteria:

<https://iee.nmsu.edu/outreach/events/international-environmental-design-contest/guidelines/>