

Destination Decarbonization Challenge

The objective of this challenge is to develop an innovative technology, solution or system that will accelerate decarbonization. Student problem statements can focus on either reducing carbon (CO₂) emissions or they can focus on capturing carbon emissions to be reused for beneficial purposes. The decarbonization technology, solution or system can be a new invention or an existing invention that is implemented into an action plan in an original way.

Background

Climate change is creating major problems around the world today including recurring wildfires, unprecedented flooding, persistent drought, and more frequent extreme weather events. Communities everywhere are experiencing the dramatic and harmful effects of climate change, and the consequences are significant.

Climate change is referred to as long-term shifts in temperatures and weather patterns.¹ Mitigation efforts are needed to keep the planet from warming at such a rapid rate. Understanding the causes of climate change is the first step in finding solutions to lessen the effects. The main factor contributing to climate change is the emission of greenhouse gasses (GHG) into the earth's atmosphere. The increase of GHG emissions in the atmosphere acts like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.¹ The four main GHG that are affecting the Earth are carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons.²

To significantly reduce the impacts of climate change, most countries, including the U.S., have goals to reach “net zero” by 2050. Net zero means that all GHG emissions produced are counterbalanced by an equal amount of emissions that are eliminated.³ Currently, carbon dioxide emission is the most important gas to focus efforts on due to its high emission rates and the variety of different ways that it is being produced.

Decarbonization is the effort to reduce and eliminate carbon emissions into the atmosphere as a way to significantly reduce climate change. Two pathways that lead to decarbonization are to develop solutions: 1) that capture carbon dioxide and use it for something beneficial rather than releasing it into the atmosphere; and 2) to eliminate or minimize the production of GHG such as replacing burning fossil fuels with other renewable energy sources, electrification, and increasing energy efficiency.

To tackle the global climate crisis and achieve net-zero emissions by 2050, decarbonization needs to be accelerated drastically. It requires everyone to be involved and no one is excluded. Global changes can start at the local level. The Destination Decarbonization Challenge is to come up with a solution that accelerates decarbonization in your local community or the region

1. <https://www.un.org/en/climatechange/what-is-climate-change>

2. <https://climate.nasa.gov/causes/>

3. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>

you live in. These solutions can entail either implementing a decarbonization plan with tools that already exist or by creating a new decarbonization invention. Teams should work to ensure equity and justice in their solutions by considering the needs of under-resourced communities, communities of color, and other historically excluded groups.

The Challenge

The challenge is made up of four different components:

1: The first component is the application. The teams will need to apply to the competition in groups of 2-4 students. After applications are reviewed, the teams will be notified if they are accepted into the challenge. Acceptance is based on the group's ability to fill out the application thoroughly and completely and submit it by the deadline. **Due: January 31, 2023**

2: The second component of the challenge is the abstract. The teams will submit a one-page abstract (max 250 words) outlining the preliminary findings and overview of the challenge solution. The student teams' abstracts will be judged and teams will be notified if they are selected to continue as competitors in the challenge. **Due: February 14, 2023**

3: The third component is a final report. This will include the entirety of the finding, solution and works cited. These components will be judged and students will be notified if chosen to move on in the challenge. The final report is not to exceed 3500 words. **Due: March 28, 2023**

4: In the fourth component students will be invited to participate in a presentation event. Here, students will be presenting to the public and judges on their solutions using a visual component. At the event, students will be judged and prize money will be awarded to the winners. **Due: April 21, 2023**

Mentorship

As a part of the challenge, students will be required to meet with a mentor who will provide assistance, review different components of the challenge, and offer feedback. Students can request their own mentor in the competition application or have a mentor assigned. For each component of the challenge, the student and mentor will need to meet at least one time to review the component and get pointers on ways to improve. Students will need to submit a short summary of the meeting along with the component that they are submitting.

1. <https://www.un.org/en/climatechange/what-is-climate-change>

2. <https://climate.nasa.gov/causes/>

3. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>

Webinars

For further support throughout the competition, Destination Decarbonization will provide students with opportunities to join three webinars and learn about different aspects of decarbonization. These webinars are meant as a tool to further aid students in developing their solution. These webinars are also a requirement to be able to move forward in the competition. Each group must have at least one member at two out of the three webinars provided. Failure to meet this requirement will result in disqualification from the competition.

Rubrics

Solution Report

Requirements	Points Available
Solution Please rate the solution and its ability to address the problem statement. The solution must be a technical solution and include one or more of the following components, as appropriate: economic, policy, technology, social, commercialization, codes and standards, or other. How well does the proposed solution address the problem and community needs?	10
Feasibility Please rate the solution's overall feasibility and potential, including its viability. For example, solutions that are not technically or economically possible or that lack a technical feasibility discussion will receive lower scores.	10
Novelty Please rate the originality and creativity of the solution and how significant the contribution will be to the community.	10
Impact Please rate the overall potential impact of the team's solution and the estimated carbon reduced per year. For example, can the solution be extended to communities, similar stakeholder groups, or a nationwide solution?	10
Community Characterization	10

1. <https://www.un.org/en/climatechange/what-is-climate-change>

2. <https://climate.nasa.gov/causes/>

3. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>

Please rate the team's understanding of their communities and the stakeholder group(s) identified by the problem statement.	
Implementation Please rate the team's proposed plan to bring the solution from a paper concept to installation or integration within communities and the team's overall economic efficiency.	10
Overcoming Adoption Barriers Please rate the team's identification of and plan for overcoming adoption barriers for proposed solutions.	10
Diversity Statement Please rate the team's diversity statement and how well it relates to the problem statement.	10
Environmental and Energy Justice Please rate how well the proposed solution addresses environmental and energy justice (justice 40).	10
Submission Requirements Please rate how well the student team followed all submission requirements. See the submission paper requirements section of this rules document and at the bottom of each Challenge description.	10
Total	100

1. <https://www.un.org/en/climatechange/what-is-climate-change>
2. <https://climate.nasa.gov/causes/>
3. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>

Presentation

Requirements	Points Available
<p>Organization: Please rate the overall organization of the presentation. Was the presentation easy-to-follow and did it include an introduction, objectives, approach, results, and a conclusion?</p>	10
<p>Supporting Figures: Please rate the effectiveness of the supporting figures that are included in the presentation. Do the figures that the speaker includes help support their solution and presentation?</p>	5
<p>Applicability and Diversity: Please rate the overall applicability and diversity of the presentation. Does the presenter clearly communicate how their solution contributes to the acceleration of decarbonization in regards to all people groups?</p>	10
<p>Communication Complexity: Please rate the speakers' ability to communicate complex concepts to a diverse set of backgrounds.</p>	10
<p>Conclusion: Presenter clearly wraps up and relates the main topics. Conclusions are definitive and come from the results</p>	5
<p>Completeness: Does the flow of the presentation make logical sense and is it well prepared?</p>	5
<p>Q&A Please rate the presenter's ability to clearly and succinctly answer impromptu questions regarding the team's presentation.</p>	5
Total	50

1. <https://www.un.org/en/climatechange/what-is-climate-change>

2. <https://climate.nasa.gov/causes/>

3. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>