

CO₂ Conversion Challenge – FAQ's



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1.0 REVISIONS SUMMARY:

<u>Section</u>	<u>Revision #</u>	<u>Description</u>	<u>Date</u>
	0	Original Document	08/30/2018
2.0	1	A2.1 – sentence added to reinforce the focus on conversion to glucose A2.2 – reworded to emphasize the importance of the need Add Q2.3 and A2.3	10/02/2018

2.0 CHALLENGE STRUCTURE:

Q2.1 What is the NASA CO₂ Conversion Challenge?

A2.1 The NASA CO₂ Conversion Challenge is a public competition that focuses on discovering ways to develop novel, **non-biological** synthesis technologies that use carbon dioxide (CO₂) as the sole carbon source to generate **sugars** that can **then** be used to manufacture a variety of products **using both microbial biomanufacturing and chemical synthesis processes**. The challenge asks individuals, teams, and organizations that meet the [eligibility criteria](#) to design and develop specialized technologies that **can produce glucose or other targeted sugars from CO₂ to help advance sustainable space and Earth-based manufacturing approaches**.

Q2.2 Why is this Challenge focused on CO₂ conversion?

A2.2 Future planetary habitats on Mars will require a high degree of self-sufficiency. This requires a concerted effort to both effectively recycle supplies brought from Earth and use local resources such as CO₂, water and regolith to manufacture mission-relevant products. **CO₂ is a readily available source of carbon that can be easily obtained from the Martian atmosphere and as a by-product of human metabolism. This carbon (and oxygen) is an essential ingredient in making organic mission products such as food, nutrients, medicines, plastics, fuels, and adhesives. While carbon-containing molecules may be present in mission waste products or in planetary soils, these materials are difficult to use as feedstock for effective manufacturing processes.**

Q2.3 Can competitors use a bioreactor technology?

A2.3 The focus of this challenge is to create physico-chemical processes that do not require living organisms or their catalytic products (e.g., enzymes) as a part of the process. Therefore bioreactors are not permitted to be a functional component of the proposed system. Also, systems such as immobilized enzymes are precluded as they rely on the growth, harvesting and purification of organisms to create the necessary process catalysts.

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Biologically-derived products such as plastics, wood etc. can be used for fabricating parts of the reactor system, but not as a catalytic agent.

3.0 PROCESS

Q3.1 I'd like to participate – how do I get started?

A3.1 You must first [register](#) no later than 5:00 PM Central on January 24, 2019. Registration is a simple two-step process. First, create a username and password and then check your inbox to confirm your registration. Next, complete the online registration form. Once you are registered, submit your application no later than 5:00 PM Central on February 28, 2019.

Q3.2 Do I have to participate in phase 1 in order to participate in phase 2?

A3.2 NASA envisions this competition having two phases. Phase 2 is contingent on the emergence of promising submissions in Phase 1 that demonstrate a viable approach to achieve the Challenge goals. Teams do not have to participate in phase 1 in order to participate in phase 2. However, any team registering for phase 2 must provide specific information that shows they are equipped to successfully compete in phase 2. The full description of requirements for phase 1 can be found in the official rules on the challenge site. The official rules and requirements for Phase 2 will be released prior to the opening of Phase 2.

Q3.3 How will submissions be assessed?

A3.3 During Phase 1: Concept, each valid application will receive scores and comments from a highly qualified [Evaluation Panel](#) who will use a [trait-scoring rubric](#) to assess their assigned submissions. All scores are normalized to ensure a [Level Playing Field](#) for everyone. Based on the rank order of submissions as determined by the Evaluation Panel, up to five top-scoring submissions will be named as Finalists and will receive \$50,000 each.

Q3.4 What can I win?

A3.4 During Phase 1: Concept, up to five Finalists will receive an award of \$50,000.

Q3.5 What is the collection method for the molecules? How should they be captured to use for conversion?

A3.5 In answering this question, it is assumed that the “molecules” referred to are CO2 molecules. For this challenge, no capture/collection/concentration of CO2 is required. It is expected that a pure source of CO2 (e.g., compressed CO2 in a tank) will be used as the CO2 source. While it is permissible to use other methods of CO2 sourcing, the source must not contain other carbon-bearing molecules (e.g., carbon monoxide, methane, etc.) that could contribute to intended CO2 conversion products. The products produced must be able to be made from CO2 and hydrogen source molecules only. It is up to the team members to decide how they would like to source hydrogen. Other consumable reagents/catalysts are of course allowed as part of the conversion process (e.g., acids/bases/metals).

Q3.6 Do we have to use a bioreactor for the conversion?

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A3.6 The use of a bioreactor is not allowed as a component in the conversion of CO₂ to products, nor required to demonstrate utilization of CO₂ conversion products.

Q3.7 Will there be potential to test/send the entries to space or ISS for further testing?

A3.7 At this time, the Challenge will not directly lead to space-based testing or demonstrations. There is, however, the potential for all eligible participants to apply for future NASA grants and other opportunities which could possibly lead to further testing and eventual testing in space.

Q3.8 What happens to my intellectual property?

A3.8 While the Proposal Title, Technical Abstract, and Video for your submission may be published on this website and/or the NASA website, neither NASA nor any of the entities administering this competition shall obtain any right, title, claim or interest in the Entry, except as expressly identified by You to us in writing in Your application. NASA claims no right, title, or interest to any such intellectual property solely as a consequence of your participation in the competition, including the winning of a prize. NASA reserves the right to share any submissions received with its civil servants and contractors, and reserves the right to approach individual participants about any future opportunities at the conclusion of the competition.

Q3.9 How can I contact someone at NASA about my application?

A3.9 Please direct all questions regarding your CO₂ Conversion Challenge to questions@co2conversionchallenge.org, and a member of our support team will respond as quickly as possible.

4.0 ELIGIBILITY

Q4.1 Who is eligible to participate?

A4.1 Anyone can participate in the competition as long as they meet the eligibility requirements as stated in the Official Rules, and they are not a citizen or an entity from a country listed on the NASA Export Control Program List of designated countries under Category 2/Column 2. (The current list of designated countries can be found at https://oiir.hq.nasa.gov/nasaecp/docs/DCList_02-15-2017.pdf)

NASA welcomes applications from individuals, teams, and organization or entities that have a recognized legal existence and structure under applicable law (State, Federal or Country) and that are in good standing in the jurisdiction under which they are organized with the following restrictions:

1. **Individuals must be** U.S. citizens or permanent residents of the United States, and **must be** 18 years or older.
2. **Organizations must be** an entity incorporated in and maintaining a primary place of business in the United States.
3. **Teams must be** comprised of otherwise eligible individuals or organizations, and led by an otherwise eligible individual or organization.
4. **Teams must** conduct their demonstration work in facilities based in the United States, to include AK, HI and U.S. territories.

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Refer to the [Official Rules](#) for a complete set of eligibility requirements.

Q4.2 Can a person with a green card (not US citizen) participate in the competition?

A4.2 Foreign citizens may only participate through an eligible US entity as

- (i) An employee of such entity,
- (ii) A full-time student of such entity, if the entity is a university or other accredited institution of higher learning,
- (iii) An owner of such entity, so long as foreign citizens own less than 50% of the interests in the entity, OR
- (iv) A contractor under written contract to such entity.

Q4.3 I am a Federal Employee, may I participate?

A4.3 U.S. government employees may enter the competition, or be members of prize-eligible teams, so long as they are not acting within the scope of their Federal employment, and they rely on no facilities, access, personnel, knowledge or other resources that are available to them as a result of their employment except for those resources available to all other participants on an equal basis.

U.S. government employees participating as individuals, or who submit applications on behalf of an otherwise eligible organization, will be responsible for ensuring that their participation in the Competition is permitted by the rules and regulations relevant to their position and that they have obtained any authorization that may be required by virtue of their government position. Failure to do so may result in the disqualification of them individually or of the entity which they represent or in which they are involved.

Q4.4 We're a Small Business Innovation Research (SBIR) program grantee. Can we apply?

A4.4 If you are a past grantee of the SBIR program, you may apply. If you are a current grantee, please note that no U.S. government funds may be used to prepare your submission. If you have any questions about your eligibility, please contact us at questions@c02conversionchallenge.org.

Q4.5 Can you participate as an individual in the competition?

A4.5 Individuals can participate in the competition as long as they meet the [eligibility requirements](#) as stated in the Official Rules.

Q4.6 Can we add additional team members after we have registered and completed the Team Registration form?

A4.6 New team members may be added to the team after the initial registration period ends. Team members previously registered for the challenge on one team may not switch teams during the same phase of the competition. The Team Leader must submit a revised Team Roster notifying NASA of the change, and the new team member(s) must sign an Adoption Agreement and Foreign Participation form (if applicable). Any changes to the team roster are not official until accepted by NASA. The existing Team Leader is accountable for any decision to make changes to the team roster, including bringing on new team members and/or releasing registered team members.

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