



Breakthrough  
Energy

# REQUEST FOR INFORMATION

FOR

**GREEN HYDROGEN (GH<sub>2</sub>)**

**SUSTAINABLE AVIATION FUEL (SAF)**

**DIRECT AIR CAPTURE (DAC)**

**LONG DURATION ENERGY STORAGE (LDES)**

**COMMERCIAL STAGE PROJECTS**

**SEPTEMBER 20, 2021**



## Table of Contents

<b>1.0</b>	<b>Introduction to Breakthrough Energy Catalyst (BEC)</b> .....	<b>3</b>
1.1	Who is Breakthrough Energy Catalyst (BEC) .....	3
1.2	Our Mission .....	3
1.3	Our Strategy .....	4
1.4	Our Framework .....	5
1.5	Intent of RFI / Overall Process .....	5
<b>2.0</b>	<b>Technology Description</b> .....	<b>6</b>
2.1	Technologies of Interest .....	6
2.2	Technologies Not of Interest.....	6
<b>3.0</b>	<b>RFI Eligibility Information</b> .....	<b>6</b>
3.1	General.....	6
3.2	Eligible RFI Respondents and Criteria.....	6
3.3	Number of Submittals Eligible for Review.....	7
3.4	Felony Convictions and Tax Liabilities.....	7
<b>4.0</b>	<b>Application and Submission Information</b> .....	<b>8</b>
4.1	Requested Information .....	8
4.2	Submission Information and Process .....	8
4.3	Other Submission and Registration Requirements.....	9
<b>5.0</b>	<b>Definitions</b> .....	<b>9</b>
<b>6.0</b>	<b>Appendices</b> .....	<b>9</b>



# 1.0 Introduction to Breakthrough Energy Catalyst (BEC)

## 1.1 Who is Breakthrough Energy Catalyst (BEC)

Breakthrough Energy was established in 2015 when Bill Gates and a coalition of private investors began to focus their collective resources to fight climate change. Our approach builds on the proven model of public-private partnerships used to transform health, education, and public welfare around the world. Breakthrough Energy is a network of entities and initiatives, including investment funds, non-profit and philanthropic programs, and policy efforts linked by a common commitment to scale the technologies needed to forge a path to net zero emissions by 2050.

Breakthrough Energy Catalyst (BEC or Catalyst) is a new program to help bridge funding gaps to launch commercial stage demonstration projects by bringing together stakeholders – developers, buyers, and financiers – to increase the availability and scale of low-carbon technologies. In doing so, Catalyst seeks to reduce the green premium and displace fossil-based technologies in favor of cost-effective, climate-positive alternatives.

## 1.2 Our Mission

### FUNDING THE NEXT GENERATION OF NET-ZERO TECHNOLOGIES

The world will never reach net zero emissions unless products that do not emit greenhouse gases can compete with products that do. The IEA estimates that more than half of global emission reductions required for decarbonization will come from new technologies that are currently under development or do not yet exist. Commercializing new low carbon solutions will entail an unprecedented shift in technology, away from today's fossil-based incumbents to those which enable deep decarbonization, in less than 30 years. The world needs another industrial revolution.

BEC is launching the model approach to achieving the technology shift required to decarbonize global industry while, at its core, fostering economic growth.

The BEC mission is to catalyze \$7-10 billion in commercial scale projects that demonstrate the viability of emerging climate technologies. The program will support technologies at a critical juncture where investment and creative financing structures can significantly reduce the green premium — the difference between the price of a carbon-emitting technology and its clean alternative. Our initial investment focus will target technologies in the following clean technology sectors: sustainable aviation fuel, direct air capture, long duration energy storage, and green hydrogen.



Catalyst's projects will begin displacing fossil-based incumbents as soon as they begin operating and, in doing so, enable market creation. Our financing approach represents a blended capital solution which aims to lower the cost to deploy projects in target sectors while driving deep and measurable greenhouse gas and green premium reductions. The impact of Catalyst's invested capital will be measured using the Emerging Climate Technologies Framework, a unique impact quantification methodology co-developed with CDP, a leader in carbon reporting.

Catalyst will begin investing in select, high-impact projects in 2022 and aims to deploy \$3 billion over 4 years using a variety of investment vehicles. Notably, the program will align with third-party project financing to create an estimated 5-10x multiple on Catalyst's investments. Our strategic partners include governments, corporations, philanthropists, and individuals.

### 1.3 Our Strategy

#### **BEC SPEEDS THE DEVELOPMENT, COMMERCIALIZATION, AND ROLLOUT OF THE CLIMATE BREAKTHROUGHS WE NEED TO GET TO ZERO**

Through a creative, blended financing approach, Catalyst aims to significantly decrease the price of new clean products, increase their availability in the market, and demonstrate how to finance the infrastructure of decarbonization at scale.

Catalyst will start by focusing on four critical technologies that have reached the catalytic stage: green hydrogen (GH<sub>2</sub>), sustainable aviation fuel (SAF), direct air capture (DAC) and long duration energy storage (LDES). These clean innovations have already proven their potential at a smaller scale, but right now, the timelines for their development are still way too long. They are at the critical turning point where an influx of capital can turn them into viable commercial products much more quickly.

BEC has jumpstarted this process by catalyzing funds from philanthropists, governments, and companies who are focused on proving climate leadership by supplanting fossil-based technologies in hard-to-abate parts of the economy. Catalyst will make the large capital investments needed to bring down the cost of emerging technologies and create markets for green products in order to drive down their premium prices - what we refer to as the "green premium".

In the future, Catalyst intends to expand the BEC technology focus to other hard-to-abate sectors, such as low-carbon steel and green cement.



## 1.4 Our Framework

### RECOGNIZING COMPANIES FOR DECREASING THE COST OF NEW TECHNOLOGIES IS CRITICAL

Companies already have methods to quantify and take credit for the work they do to reduce their *direct* emissions. However, most of their emissions are indirect—that is, they are embedded up and down the supply chain. Measuring and reducing *those* emissions is a challenge, even for those companies genuinely committed to shrinking their carbon footprint.

BEC helps companies meet this challenge in two ways:

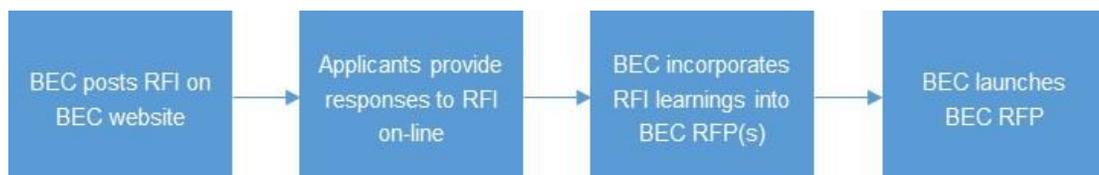
- By investing with BEC in the next generation of clean energy breakthroughs, companies can bring down the future green premium of a technology by support a clean transition within their supply chain.
- Catalyst will leverage the Emerging Climate Technology Framework (ECTF), developed by CDP, to help companies quantify and get recognition for their investments in BEC. The ECTF quantifies the estimated green premium declines and long-term emissions reductions that result from catalytic investment in emerging technology deployment. This enables investors to determine the impact of their investments on climate change through best-in-class climate reporting through BEC's partnership with CDP.

## 1.5 Intent of RFI / Overall Process

This Request for Information (RFI) aims to solicit certain input from respondents to gauge the scale of project developments, worldwide, in BEC's target technology sectors. The results of this RFI will help BEC define key criteria for one or more *Request for Proposal(s)* (RFP(s)), which Catalyst aims to launch in the coming months. BEC will use the RFP(s) as a means by which to select and award blended financing to a limited number of qualifying high-impact projects across its target technology sectors.

Respondents shall be responsible for all costs incurred in responding to this RFI. Catalyst will not be liable to reimburse or otherwise compensate respondents for costs they incur in connection with responding to this RFI. Responding to this RFI is not required to participate in an RFP (if, and when, issued) but will be critical to informing the timing, structure and process used by BEC to prepare and issue its RFPs.

The process is illustrated below:





## 2.0 Technology Description

### 2.1 Technologies of Interest

The technologies of interest include:

- Green Hydrogen – the creation of hydrogen using methods that limit carbon emissions (e.g., electrolysis using renewable energy)
- Sustainable Aviation Fuel (SAF) – the production of low carbon jet fuel (e.g., using sustainable feedstocks, power-to-liquids)
- Direct Air Capture (DAC) – the process of capturing CO<sub>2</sub> directly from the ambient air with the end result of reducing overall CO<sub>2</sub>
- Long Duration Energy Storage (LDES) – the storage of energy in a system that can discharge electricity over time for a duration greater than 8 hours, with a focus on storage of renewable energy resources

### 2.2 Technologies Not of Interest

The following technologies and/or technology characteristics are not within scope for this RFI:

- Technologies that are not proven at pilot scale and not expected to be through a pilot by the end of 2022
- LDES – Storage comprised solely of Lithium-ion batteries or providing storage of less than 8 hours
- LDES – Large scale pumped storage hydropower projects
- Any project which is projected to result in more carbon emissions during any day, month or year of operations than it reduces (as compared to a fossil equivalent resource where applicable)

## 3.0 RFI Eligibility Information

### 3.1 General

Respondents must meet the eligibility criteria set forth below. These RFI responses will be taken into consideration when developing the future RFP eligibility requirements.

### 3.2 Eligible RFI Respondents and Criteria

#### Eligible RFI Respondents

##### A. ENTITIES AND CONSORTIA

For-profit entities and consortia, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a national or sub-national government are eligible to submit an RFI response.



## B. GOVERNMENT ENTITIES

National, state, provincial, municipal, local, and other sovereign entities are eligible to submit an RFI response.

## Eligible RFI Criteria

### A. PROVEN TECHNOLOGY AT LAB SCALE

The technology has been proven at lab scale (TRL 5) to reduce overall CO<sub>2</sub> and is projected to move to a commercial scale project, with substantial development progress toward implementation of said project.

### B. EXPECTED OPERATION DATE BY END OF 2030

The project is expected to achieve full commercial operations no later than 12/31/2030.

### C. PROPOSAL IS FOR A PROJECT UNDER 1 OF THE 4 TECHNOLOGIES

The proposal is for a fully commercial scale operating project established in a geographic location that includes all components (or will include all components) to produce specification output within defined BEC technology sectors (GH<sub>2</sub>, SAF, LDES, DAC).

### D. SUBMISSION PERIOD

Respondents must complete and submit the on-line RFI response and requested attachments during the RFI response period (from 9/21/2021 to 10/20/2021).

## 3.3 Number of Submittals Eligible for Review

A separate RFI response shall be submitted for each project. If a proposed project includes aspects of more than one of the technologies of interest, respondent shall identify the dominant technology of interest and only submit the RFI response for this technology, but may submit separate submissions for the other technology if not sufficiently addressed by the initial submission.

## 3.4 Felony Convictions and Tax Liabilities

In submitting RFI responses, the respondent represents that:

1. It is not a corporation, or officer thereof, that has been convicted of a felony criminal violation under any law within the preceding 12 months; and
2. It is not a corporation that has any unpaid tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.



## 4.0 Application and Submission Information

### 4.1 Requested Information

Apart from the Commercial RFI Form, which will be completed first, each technology of interest has a separate form for the information being requested. The questions that will be requested as part of this RFI are contained in the Appendices as follows:

- Appendix A – Commercial RFI Questions
- Appendix B – Supplemental Commercial Questions
- Appendix C1 – Green Hydrogen (GH2) Technical RFI Questions
- Appendix C2 – Sustainable Aviation Fuel (SAF) Technical RFI Questions
- Appendix C3 – Direct Air Capture (DAC) Technical RFI Questions
- Appendix C4 – Long Duration Energy Storage (LDES) Technical RFI Questions

### 4.2 Submission Information and Process

RFI responses are to be completed on-line via the Breakthrough Energy website at [breakthroughenergy.org/catalyst-rfi](https://breakthroughenergy.org/catalyst-rfi) and will have two submission parts, along with various noted upload requirements. The second submission is primarily technical, and instructions will be sent after the completion of the first portion of the RFI. As the RFI responses will be utilized to develop future RFPs, respondents are strongly advised to undertake their best judgement on what information should be provided, but please be advised that BEC will not provide any assurance of confidentiality with respect to any submissions submitted. BEC may request clarification from respondents on RFI responses, if needed. Except for confirmation of submission/receipt, BEC will not provide feedback to respondents with respect to any information submitted under this RFI.

**Neither BEC nor any representative makes any commitment that any response or part thereof will remain confidential or treated as such after provided to BEC. Please use your best judgement to determine what information should be provided given that confidentiality cannot be assured.**

The following instructions provide the steps to access the web site for the RFI submission form and the process for submission of the on-line RFI responses, including the attachment of the requested documents:

1. Access [breakthroughenergy.org/catalyst-rfi](https://breakthroughenergy.org/catalyst-rfi)
2. Collect the data requested in the relevant Appendix and prepare the requested attachments.
3. Include the requested company and project information in the on-line form
4. Complete the on-line RFI response in a single session; partial work cannot be saved; we recommend that respondents prepare all answers and attachments in advance.
5. Once the form has been completed, press the Submit button. This will release the completed on-line form. Note, the RFI responses will be locked such that they cannot be modified.
6. After submission, an e-mail will be sent to the provided e-mail address with actions to be taken to submit attachments.



7. Should you need to make changes after the RFI responses are submitted, you will need to submit another response.

**PLEASE NOTE THAT YOU ARE NOT ABLE TO SAVE YOUR SUBMISSION AND RETURN TO IT LATER, SO PLEASE BE PREPARED TO COMPLETE YOUR SUBMISSION ONCE YOU BEGIN. AN OVERVIEW OF THE INFORMATION REQUIRED IN THE SUBMISSION IS PROVIDED IN THE APPENDICES LOCATED AT [BREAKTHROUGHENERGY.ORG/CATALYST-RFI](https://breakthroughenergy.org/catalyst-rfi) SO YOU MAY PREPARE IN ADVANCE OF BEGINNING THE PROCESS.**

### 4.3 Other Submission Requirements

Please check the website for any additional requirements that may arise after the launch of the online RFI.

## 5.0 Definitions

**Respondent** is the company/organization who has submitted or is going to submit a response to the RFI.

**Technology Readiness Level (TRL)** means the technology's maturity according to the International Energy Association (IEA)'s Technology Readiness Level (TRL) scale: (<https://www.iea.org/reports/innovation-gaps>)

## 6.0 Appendices

- Appendix A – Commercial RFI Questions
- Appendix B – Supplemental Commercial Questions
- Appendix C1 – Green Hydrogen Technical RFI Questions
- Appendix C2 – Sustainable Aviation Fuel (SAF) Technical RFI Questions
- Appendix C3 – Direct Air Capture (DAC) Technical RFI Questions
- Appendix C4 – Long Duration Energy Storage (LDES) Technical RFI Questions