How to Apply to the Global Cooling Prize

January 22, 2019
Today’s Presenters

- Chad Gallinat
  Senior Program Manager, Conservation X Labs

- Elizabeth O’Grady
  Senior Associate, Rocky Mountain Institute

Available to Answer Questions

- Sudha Setty
  Director, Alliance for an Energy Efficient Economy

- Radhika Lalit
  Manager, Rocky Mountain Institute

- Ankit Kalanki
  Associate, Rocky Mountain Institute
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Housekeeping & Agenda

Housekeeping

- Webinar is being recorded
- Ask questions in the chat area by clicking on the question mark on the right side of your screen
- Future webinars will describe additional aspects of the Global Cooling Prize
  - February webinar will discuss technical criteria

Agenda

1. Introduction to the Global Cooling Prize
2. Timeline and Prize Stage Overview
3. Submitting the Intent to Apply Form
4. Submitting the Detailed Technical Application
Introduction to the Global Cooling Prize
Affordable cooling is increasingly becoming a global necessity, yet air conditioners’ energy use and refrigerants pose one of the single largest end-use risks to the climate.

By 2030 over 1/2 of the world’s population will live in hot climates with increasing exposure to potentially dangerous heat conditions.

Global cooling demand will boom 3x and increase 5x in developing nations by 2050.

~4.5 B Room Air Conditioner units will be in use globally by 2050 (compared to 1.2 B today).

Only 14% of maximum theoretical efficiency has been reached by today’s most advanced AC technology (most ACs attain between 6-8%).
We believe it is possible to develop a cooling solution that has 5x less climate impact

**What we mean by 5x**

- Responsible for one-fifth of the climate impact of...
- A 1.5 ton fixed speed EER 3.5 W/W R410A RAC unit
- Through a combination of 4-5x reduced grid electricity¹ (80% weighting) and low GWP refrigerant (20% weighting)

**And why we think it’s achievable**

- Current best-in-class units are already ~2x more efficient and when combined with a low GWP refrigerant are ~3x
- Most advanced commercially available units have only achieved 14% of theoretical maximum efficiency. EER 3.5 W/W RAC units translate to little more than 9% of maximum theoretical efficiency
- A number of emerging technologies hold promise
- There are several hypothetical pathways to 5x that involve using existing technologies in combination
- Using a low GWP refrigerant (e.g., R290) would lessen the need for radical energy efficiency gains

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¹ On-site solar electric or thermal, conforming to a limited footprint, is considered ‘free’ i.e. could directly be considered to achieve the 4-5x electricity requirement of the 5x climate impact
An overview of the Global Cooling Prize

<table>
<thead>
<tr>
<th>Goal</th>
<th>5x</th>
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<tbody>
<tr>
<td>Identify, award, and scale a breakthrough cooling solution that mitigates the climate risk from RAC growth. i.e., an RAC technology that:</td>
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<tr>
<td>• Has 5x less climate impact (electricity and refrigerant) than today’s standard (EER 3.5 W/W) units;</td>
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<tr>
<td>• Operates within predefined constraints on refrigerant type and use, water, full-load power consumption, scalability and operational requirements</td>
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<tr>
<td>• Is affordable and will cost no more than 2x the price of today’s standard units to the consumer</td>
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<tr>
<th>Approach</th>
<th>Host a global competition to spur innovation by multiple actors:</th>
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<tr>
<td>• Launched in November 2018 and running the competition for 2 years</td>
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<tr>
<td>• Administer and test competing technologies in India</td>
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<td>• Secure demand via public and private sector advance market commitments (AMCs) and work with standards bodies on a step-change in minimum energy performance standards (MEPS)</td>
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<tr>
<td>• Help winner(s) commercialize their technology by building a supportive ecosystem of industry experts, investors, and professional service firms</td>
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<tr>
<th>Prize</th>
<th>USD3M+</th>
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<tbody>
<tr>
<td>Financial rewards to support prototype development and commercialization</td>
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<tr>
<td>• At least USD2M as intermediate prizes to teams shortlisted based on their initial designs, in order to turn concepts into prototypes and enable them to compete for the final award</td>
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<tr>
<td>• At least USD1M to incubate, commercialize, and support investment in the winning technology</td>
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Timeline and Prize Stage Overview
Prize Timeline and Key Milestones

- **Prize Launch**: Nov 2018
- **Intent to Apply Deadline**: June 2019
- **Technical Application Deadline**: Aug 2019
- **Applications Evaluated**: July - Oct 2019
- **Announcement of Finalists**: Nov 2019
- **Prototype Development**: May - Sept 2020
- **Testing & Evaluation of Prototypes**: Oct 2020
- **Final Presentations**: Nov 2020
- **Final Award Ceremony**: Nov 2020

Prize Launch: Nov 2018
Intent to Apply Deadline: June 2019
Technical Application Deadline: Aug 2019
Applications Evaluated: July - Oct 2019
Announcement of Finalists: Nov 2019
Prototype Development: May - Sept 2020
Testing & Evaluation of Prototypes: Oct 2020
Final Presentations: Nov 2020
Final Award Ceremony: Nov 2020
Applicant submissions

Intent to apply
Due June 30, 2019

Technical application
Due August 31, 2019

TWO prototypes
Due April 2020

All applicants

Finalists only
Technology evaluation will occur across three stages

1. **Application Review & Screening**
   - Applicants will submit design documents detailing how they meet technical criteria
   - Initial assessment of solution cost (at manufacturing scale) will be completed alongside
   - Score will be given based on achievement of climate impact and affordability criteria
   - Up to 10 finalists will be selected for interim award and testing

2. **Lab & Field Testing**
   - A combination of lab and real world testing will allow further filtering and evaluation of each cooling solution based on performance against the prize criteria

3. **Final Assessment**
   - Results from field and lab testing will be used to update the score of competing solutions in order of performance on technical criteria
   - The winner will be selected based on updated score on the climate impact and affordability criteria
The technical application and prototypes will be judged based on the Prize Criteria

<table>
<thead>
<tr>
<th><strong>Primary criteria used to determine final award</strong></th>
<th><strong>Supplementary criteria used to shortlist finalists</strong></th>
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<tbody>
<tr>
<td><strong>CLIMATE</strong> One-fifth of the life-time climate impact (electricity and refrigerant) of the baseline unit(^1)</td>
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<tr>
<td><strong>AFFORDABILITY</strong> At assessed industrial scale, will cost no more than 2x cost of the baseline unit to consumers</td>
<td></td>
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<tr>
<td><strong>POWER</strong> Consumes less than 700W from the grid at rated cooling capacity or during test period</td>
<td><strong>EMISSIONS</strong> Zero onsite emissions from any captive power or heat source</td>
</tr>
<tr>
<td><strong>SCALABILITY</strong> Usable in existing homes, no “designed in” solution; less than 2x volumetric size of the baseline unit</td>
<td><strong>OPERATION</strong> Delivers 1.5 TR cooling capacity at standard outdoor conditions and Maintains below 27(^\circ)C DBT and 60% RH for the duration of the test period</td>
</tr>
<tr>
<td><strong>WATER</strong> Consumes less than 14 liters per day onsite for operation</td>
<td><strong>REFRIGERANTS</strong> Zero ODP, lower toxicity, and compliance with safety standards</td>
</tr>
<tr>
<td><strong>MATERIALS</strong> Minimal usage of high embodied carbon or rare earth materials</td>
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\(^1\) The baseline unit represents the most common RAC product sold in India and is in accordance with the BEE defined ISEER rating for a 3 star AC in 2018. It is equivalent to EER 3.5 of a 5 star AC in 2016-17.
All judging will be done by the Technical Review Committee

Omar Abdelaziz
Managing Director, CLEAT Consulting (Formerly at ORNL)

William Sisson
Executive Director, North America, World Business Council for Sustainable Development

Iain Campbell
Senior Fellow, Rocky Mountain Institute (Chairperson of the Technical Review Committee)

Dr. Sukumar Devotta
Former Director, Council of Scientific and Industrial Research-National Environmental Engineering Research Institute (CSIR-NEERI)

Gabby Dreyfus
Senior Scientist, Institute for Governance & Sustainable Development

Prof. S C Mullick
Former Professor, Indian Institute of Technology Delhi

Prof. Srinivasa Murthy
Professor, Interdisciplinary Centre for Energy Research (ICER), Indian Institute of Science Bangalore

Dr. Toby Peters
Professor, Cold Economy, University of Birmingham

Nihar Shah
Deputy Leader, International Energy Studies Group, Lawrence Berkeley National Laboratory
Submitting the Intent to Apply Form
Registration and applicant dashboard

In order to apply for the prize, you need to create an account on the applicant portal.

Register to Apply

- Email (required)
  - Enter email
- Password (required)
  - Enter password
- Confirm Password (required)
  - Confirm password
- Name (required)
  - Name
- Terms and Conditions (required)
  - By clicking below, you confirm you have read and agree to the Terms and Conditions
  - I have Read and Agree To The Terms and Conditions

Register

Global Cooling Prize

Chad Gallinat

APPLICATION FORMS

<table>
<thead>
<tr>
<th>Form</th>
<th>Start Date</th>
<th>End Date</th>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree to Terms and Conditions</td>
<td>12 Nov 2018</td>
<td>30 Jun 2019</td>
<td>View</td>
<td>Complete</td>
</tr>
<tr>
<td>Participant Intent to Apply Form</td>
<td>12 Nov 2018</td>
<td>30 Jun 2019</td>
<td>View/Edit</td>
<td>Pending</td>
</tr>
<tr>
<td>Detailed Technical Application Due</td>
<td></td>
<td>31 Aug 2019</td>
<td>n/a</td>
<td>Pending</td>
</tr>
</tbody>
</table>

Need Help?

EVENTS

"How to Apply to the Global Cooling Prize" - Webinar
January 22 + 23, 2019

Global Panel on Access to Cooling
January 31, 2019
Discussion Forum

Forums

Home > Forums

Search Forums...

FORUM

TOPICS

POSTS

FRESHNESS

COLLABORATION ACROSS TEAMS
If you're interested in collaborating with other teams or team members, please reply to this thread with the name of your team and the expertise you're looking to add to your team to begin the conversation

3

49

2 weeks ago

WEBINAR TOPICS
The organizing team is looking for your suggestions on webinar topics that will be most useful and interesting to you. If you have suggestions on topics or want to hear from specific experts in the air-conditioning industry please let us know!

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No Topics

Need Help?

EVENTS

Global Cooling Prize at COP24
Dec 3 - 14, 2018

Global Cooling Prize Awareness Event – Mumbai
Dec 11, 2018

Global Cooling Prize Awareness Event – Chennai
Dec 13, 2018

HELPFUL RESOURCES

Prize Criteria
Timeline & Milestone
FAQ
Participant Intent to Apply Form

Step 1 of 5

Do you have an innovative idea that can change the way the world looks at air conditioning solutions today?

The Global Cooling Prize is open for applications and we invite incumbent cooling technology providers, emerging innovators in space cooling and similar technologies, professors, students, and researchers from universities and laboratories around the world to participate in this prize.

By participating in the Global Cooling Prize, you will have the opportunity to revolutionize the global air conditioning industry and provide affordable access to cooling around the world, all while mitigating up to 0.5°C of global warming by 2100.

This Intent to Apply Form is intended to help us understand your technology better and support your overall application. Filling this form is the first step in the process. Subsequent to this form, participants will be invited to submit a detailed technical form for their technology submission. Interested organizations/individuals should submit this form no later than June 30, 2019.

Once this application form is received and reviewed, the participants will be provided access to all the necessary documents and resources for successful submission of their detailed technical application form.
Participant Intent to Apply Form

Step 2 of 5

Instructions for submitting the Participant Intent to Apply form

- Please fill out the application form in English language only.
- Participants must provide their contact details to allow Global Cooling Prize coalition members to contact them to communicate any information related to the prize.
- The participants are encouraged to look through the Prize Criteria page on the Global Cooling Prize website to self-assess how their cooling technology will meet each of these minimum cut-off criteria for the prize. While we expect you to answer some of these preliminary questions around the idea, we do not expect detailed technical calculations and designs as part of this initial application form.
- The participants are encouraged to save their work continuously by using the "Save and Continue" feature to be able to edit this form at a later stage. Once the form is submitted by clicking SUBMIT, the form can no longer be edited. Please note that this form is meant to gauge the interest and intent towards the competition and will not be evaluated. If the participants consider it necessary to edit the information provided in the form, kindly
Participant Intent to Apply Form

Step 3 of 5

This is only a preliminary application. You will be asked to submit a detailed technical application to qualify as a finalist. The information you submit in this form will help us understand your technology better and support your overall application.

SECTION A: Allow us to know you

I. Participant Category

Participant Category (multiple selection options) *

- AC Industry
- Research Lab/University
- Startup
- Individual
- Other Industry
- Non-profits
- Other

II. Team
SECTION B: Tell us about your Innovative Cooling Technology

IV. Provide a high-level explanation of your cooling technology/idea for the Global Cooling Prize.

Please include enough detail to establish that you can compete. This information will not eliminate you from participating in the prize but will help us understand your technology and support your overall application.

a) Briefly describe your cooling technology/idea. (250 words) *

xyz

b) How is your technology different from the existing room air-conditioning (RAC) systems on the market? Please briefly describe your innovative design or approach. (250 words) *
Participant Intent to Apply Form

Step 5 of 5

SECTION C: Final few thoughts

V. What is the readiness level of your technology? *
- Concept stage
- Laboratory/Research stage
- Prototype stage
- Testing stage
- Commercially available

VI. Do you have any Intellectual Property rights related to your idea? *
- Yes
- No, and I don't intend to submit a patent application
- Not yet, but I intend to submit a patent application

VII. If selected, what support would help you to compete in the Global Cooling Prize?
- Collaborate with other participants willing to form a team
- Facilitate investor and VC interactions in the future
- Connect with a technology incubator/accelerator
- Provide recommendations to users to help with the patent application

Need Help?

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- Global Cooling Prize at COP24
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  Dec 11, 2018
- Global Cooling Prize Awareness Event – Chennai
  Dec 13, 2018

HELPFUL RESOURCES
- Prize Criteria
- Timeline & Milestones
- FAQ
Submitting the Detailed Technical Application
Detailed Technical Application

Important Dates

• **Released: Mid February, 2019**; only accessible to participants who have submitted their intent to apply form

• **Due: August 31, 2019**

Submission Requirements

• Details on **underlying principle, key components, refrigerant used (if any), novel materials or smart controls** incorporated in the technology

• **Energy calculations** used for analysis with details of all assumptions and supporting rationale; clear pathway to electricity reduction compared to baseline

• **Technical drawings** with proper labels and markings to understand the size and components of the cooling technology

• **Estimate of manufacturing cost** at scale of 100,000 units supported with the Bill of Materials

• **Certifications, if available**, obtained from national or international accredited laboratories that demonstrate the technical performance, and environmental or safety compliance

Evaluation Process

The information provided will serve as the basis for the Technical Review Committee to **assess the performance of the cooling technologies against the prize criteria.**
Thank you!

• Please feel free to send in your questions by clicking on the question mark icon now

• Also, please check out the FAQ page on our website for answers to commonly asked questions: https://globalcoolingprize.org/prize-details/faq/
Next Webinars

1. Understanding the Technical Criteria for Winning the Challenge
   - February 20, 2019 at 5:00PM GMT (noon US EST)
   - February 22, 2019 at 6:30AM GMT (noon IST)

2. Testing Process
   - Date and Time TBD

3. Intellectual Property
   - Date and Time TBD