

## Green Alternatives or Solutions to Reduce Carbon Footprint of Refrigerators and Air-conditioners

<b>Challenge Owner</b>	<b>Haier Group</b>
<b>Opening date for proposal submission</b>	<b>12 November 2019</b>
<b>Closing date for proposal submission</b>	<b>14 February 2020, 12 pm (UTC+8)</b>
	Proposals and all accompanying attachments must be submitted through the Sustainability Open Innovation Challenge portal.

### BACKGROUND

Refrigerants used by the refrigerators and air-conditioners contributes to global warming. Although ozone-friendly hydrofluorocarbons (HFCs) have replaced chlorofluorocarbons (CFCs) that deplete the ozone-layer, HFCs can still cause greenhouse effect. In addition, the polyurethane (PU) foam used as heat insulator in these appliances also increases their carbon footprint. Haier is interested in environmental friendly refrigerants, as well as greener alternatives for PU foam with less environmental impact.

### DESIRED OUTCOMES

Haier is seeking collaborations with partners to integrate novel technologies into their products that can reduce the usage of refrigerants and/or PU foams, or partners who have low carbon footprint alternatives to replace existing refrigerants and/or PU foams. Applicants can propose other solutions that can reduce the carbon footprint and environmental impact of refrigerants and insulations used today, or disruptive chilling/cooling technologies (e.g. stirling cooling, peltier cooling).

### TECHNICAL SPECIFICATIONS AND REQUIREMENTS

- Alternatives to PU foams, should have thermal conductivity below 18 mW/m-K, and ideally below 15 mW/m-K.
- The design should be compatible with common refrigerators/air-conditioners, with no drastic change to existing design.
- Alternative materials should come with third party test reports stating their performance and/or safety and should be ready for scale-up. Proven solutions/technologies (e.g. in other industries or applications) are preferred.
- Applicants are required to have prototype or minimum viable product (MVP) of modules or design for evaluation, or demonstrate that the core technology has been proven in other industries/applications.
- Proposals should include information on any proof-of-concept (POC)/MVP that is non-sensitive.
- Applicant should indicate estimated commercial price of solution, cost of operation/maintenance and cost-benefit analysis of the solution in the proposal.

Besides addressing the above requirements, the proposed solution should also fulfil the following criteria:

- Not be readily or commercially available in the market, for this application.
- Wherever applicable, aim to:
  - Enhance safety of operations; and/or
  - Reduce environmental impact; and/or
  - Improve quality, consistency and performance of the appliances; and/or
  - Achieve cost-effectiveness.

#### **BUSINESS OPPORTUNITY**

If solution proves to be successful/effective, Haier may adopt and integrate the solution into the wide range of suitable commercial products under Haier and bring them to the global market.

#### **DEVELOPMENT TIMELINE**

Solution development and test-bedding should take 6-12 months, and pilot deployment within 24 months.

#### **THE RULES AND REGULATIONS ON THE CHALLENGE WEBSITE APPLIES, WITH ADDITIONAL INFORMATION BELOW.**

#### **FUNDING SUPPORT**

Enterprise Singapore may support shortlisted local SMEs/startups with funding of up to 70% of the qualifying project cost, capped at \$250,000.

Foreign solution providers are encouraged to work with local SMEs/startups for solution development.

#### **ADDITIONAL RESOURCES**

Haier will provide in-kind resources for development and verification of the proposed solution, such as user data, Haier products for pilot testing, and mentorship and channels to manufacturing in China etc.

## EVALUATION CRITERIA

Proposals will be evaluated against the following criteria:

- Technical feasibility of solution [30%]:
  - Effectiveness in addressing the challenge statement
  - Operational feasibility in using the new solution/technology
- Economic feasibility of solution [30%]:
  - Commercialisation strategy
  - Estimated commercial price
  - Estimated operating and life cycle costs (e.g. energy and maintenance cost to user)
- Capacity and expertise to execute project [25%]:
  - Requisite capabilities and committed resources to undertake solution development
- Clarity of proposal and accompanying information on POC/MVP [15%]

## TECHNICAL BRIEFING

A technical briefing will be held to provide interested applicants with more information. The details for the briefing are as follows:

<b>Date :</b>	18 Nov 2019 ( <i>Monday</i> )
<b>Time:</b>	9am to 12 pm
<b>Location:</b>	230 Victoria Street, Bugis Junction Office Tower, Level 10, Singapore 188024 - Room: Little Red Dot

Please register your interest [here](#) by 14 Nov 2019, 12pm.

## PROPOSAL SUBMISSION

Submit your proposal using the Application Form, together with all supporting documents, in the Sustainability Innovation Call portal.

## CONTACT

For further enquiries, please email:

- [jiangj@haiersingapore.com](mailto:jiangj@haiersingapore.com) – for matters pertaining to the challenge statement
- [Sustainability\\_Challenge@enterprisesg.gov.sg](mailto:Sustainability_Challenge@enterprisesg.gov.sg) – for assistance on:
  - *Using the Sustainability Open Innovation portal for registration, submission of proposal, etc.*
  - *Funding enquiry*