

## **Tackling black carbon emissions reduction by promoting micro-renewable solutions for space heating**

**Expression of Interest  
April 2025**

### **Summary**

The Clean Air Fund is seeking opportunities to support a pilot implementation project with a focus on **reducing black carbon emissions through promotion of sustainable space heating solutions in rural and urban areas of the Himalayan, Andes and/or other vulnerable Cryosphere regions**. The areas of interest include scalable space heating technologies and implementation projects that use renewable energy (not including any form of biomass or fossil fuel). The proposed programme is for approximately 18 months. Interested implementation agencies, grassroots organisations, research institutes, civil society/ non-governmental organisations and consortia (e.g. including private sector players as applicable) are encouraged to submit an Expression of Interest (EoI) for this funding answering the EoI questionnaire provided in the Annex (for a max of 3 pages).

EoI submission deadline: **27<sup>th</sup> April, 5 pm GMT**. Funding amount: Up to **US\$ 500,000**.

### **1. Background to Clean Air Fund and its Super Pollutants Programme**

Launched in 2019, the Clean Air Fund is a philanthropic initiative with a mission to tackle air pollution around the world. Our aim is to help build and support a powerful global movement for clean air. We achieve this by bringing together funders, researchers, policy makers and campaigners working on a wide range of issues to find and scale solutions that will provide clean air for all. More information about the Clean Air Fund can be found on our website: [www.cleanairfund.org](http://www.cleanairfund.org).

Clean Air Fund has a programme of work targeting action on super pollutants (also known as short-lived climate pollutants). Through this work, we are supporting and advocating for air pollution and climate change to be tackled together and delivering high-impact projects to help mitigate near-term warming<sup>1</sup>, avoid climate tipping points<sup>2</sup> and reduce the chronic health impacts of air pollution<sup>3</sup>.

A key focus of our work on super pollutants is on black carbon (see more details [here](#)). Black carbon plays a unique role at the intersection of climate and health as both a climate pollutant and an air pollutant. It is a key component of particulate matter air pollution, and it contributes to global warming. On a regional scale, it is also responsible for disrupting precipitation patterns and accelerating melting of snow and ice. Some measures to cut emissions from black carbon-rich sources present opportunities to deliver near-term climate change mitigation, avoid climate tipping points, and achieve clean air. At COP28, the Clean Air Fund launched [The Case for Action on Black Carbon](#).

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<sup>1</sup> Dreyfus, Gabrielle B., et al. "Mitigating climate disruption in time: A self-consistent approach for avoiding both near-term and long-term global warming." *Proceedings of the National Academy of Sciences* 119.22 (2022): e2123536119. <https://doi.org/10.1073/pnas.2123536119>

<sup>2</sup> Ritchie, Paul DL, et al. "Tipping points: Both problem and solution." *One Earth* 6.12 (2023): 1610-1613. <https://doi.org/10.1016/j.oneear.2023.11.016>

<sup>3</sup> [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)

This was followed by the release of the report titled '[Tackling Black Carbon: How to unlock fast climate and clean air benefits](#)' highlighting feasible solutions to reduce black carbon emissions, launched on the 1st World Day for Glaciers and World Water Day.

The vision of Clean Air Fund's 3-year multi-million-dollar programme of work is to realise 35% global black carbon emissions reductions by 2030 from a 2010 baseline. The programme will:

- (a) reduce scientific uncertainties and work towards resolving key scientific bottlenecks;
- (b) generate a compelling case for action;
- (c) build coalitions and alliances focussing on health and climate that demand greater action; and
- (d) analyse and showcase the feasibility and potential for impact of existing black carbon emission reduction solutions to drive momentum.

Clean Air Fund is committed to provide financial support to pilot implementation projects on black carbon and black carbon-rich emission sources. The goals of the implementation projects are to deliver on activity (b) and (d) mentioned above, and to provide momentum for scalable implementation projects.

## **2. Context to the project**

Black carbon (more commonly known as soot) is a powerful climate and air pollutant and comprises of visible, dark fumes emitted from incomplete combustion of carbon-based fuels, solid waste and biomass burning. Black carbon emissions are concentrated regionally in East Asia, South Asia, and North and East Africa, primarily from the residential, transport, and industrial sectors. The residential sector is a major contributor to black carbon emissions, accounting for 35% of total global emissions in 2022. It also contributes to 59% of black carbon emissions in South Asia and 31% in East Asia<sup>4</sup>.

Black carbon emissions are linked with 20% of snow and ice loss in the Arctic over the 20th century and have a direct impact on glacier melt in the Himalayas, Andes, Alps, Tibetan Plateau, and Rockies<sup>5</sup>. For instance, based on data from 2013, residential solid fuel burning and brick kilns together account for 45%–66% of the anthropogenic black carbon deposition in the Hindu Kush Himalaya region<sup>6</sup>. Given the importance of reducing emissions from residential energy use and its impact on glaciers, sustainable space heating solutions have been identified as a potential area of interest for the Clean Air Fund's Super Pollutants programme.

Despite the cold conditions of these regions, the energy needs for space heating have been largely neglected and under-funded. Community dependence on coal, fuelwood or other forms of biomass to meet energy needs is high, which leads to black carbon emissions and co-emitted pollutants. This challenge is also particularly felt in rural areas, where biomass fuels like wood, agricultural waste, and

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<sup>4</sup> Clean Air Fund (2025). Tackling Black Carbon: How to Unlock Fast Climate and Clean Air Benefits. London: Clean Air Fund.

<sup>5</sup> Gul C, Mahapatra PS, Kang S, et al. Black carbon concentration in the central Himalayas: Impact on glacier melt and potential source contribution. *Environ Pollution* 2021; 275(116544).

<sup>6</sup> Alvarado MJ, Winijkul E, Adams-Selin R, et al. Sources of black carbon deposition to the Himalayan glaciers in current and future climates. *Journal of Geophysical Research Atmospheres* 2018; 123(4): 7482–505.

fossil fuels like coal are primary sources of cooking and heating<sup>7</sup>. Hence, there is a need for the development and uptake of space heating technologies and products which can be implemented across a range of climatic conditions in both rural and urban areas.

### **3. Project Scope**

**3.1. Geographic scope:** This implementation project aims to focus on piloting and scaling up technically and economically feasible micro-renewable solutions for space heating in the Himalayan, Andes and/or other vulnerable Cryosphere regions across low and middle-income countries. Proposals from across Bolivia, Bhutan, Chile, China, Ecuador, India, Mongolia, Nepal, and Peru will be prioritised but other countries may be in scope.

**3.2. Setting:** The project should preferably target a rural setting or span both rural and urban areas. It can be directed at households as well as public/commercial institutions (e.g. schools/educational settings, healthcare facilities and hospitals etc).

**3.3. Space heating solutions' eligibility requirement:** Examples of sustainable space heating solutions that could have an impact on reducing black carbon emissions in scope for this EOI, include:

- Water based heating solutions such as heat pumps (indoor and outdoor)/ground source heat pump (GSHP)/ground source heat pump with solar PV or micro-water turbine
- Electric heating solutions like Coil heater/Infrared heater/Convection heater/Ceramic heater
- Solar solutions like liquid-based active solar heating/Integration of evacuated tube heat pipe (ETHP) with fan-coil unit (FCU)
- Solar thermal solutions like SolarSheat or similar
- Improvement of energy efficiency such as energy efficient windows/insulation solutions
- Wind energy solutions such as micro wind turbine coupled with GSHP and hybrid HVAC system

### **3.4 Examples of project activities:**

#### **1. Technology selection and stakeholder buy-in:**

- a. Identifying location for pilot demonstration(s) and establishing stakeholder buy-in (e.g. government, local authorities, community chiefs, etc.) to conduct the pilot intervention.
- b. Identifying/ describing best available space heating technology(ies) for installation and deployment that would be a technically, economically, and environmentally feasible solution for the chosen project location/community. The proposed solution(s) should be durable, easy to maintain, relatively cost-effective, and compatible with multiple weather conditions. Evidence of such features will need to be provided.

#### **2. Pilot Demonstration:**

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<sup>7</sup> WWF India and TERI. (2020). Sustainable space heating solutions in the Himalayan region.

- a. Solution installation in a pre-agreed number of households/institutions to act as a pilot 'demo'.
- b. Monitoring of the real-life use of the solution over at least 9 months (ensuring the worst weather seasons are covered).
- c. Conducting stakeholder and users' consultations or focus groups to get feedback on the feasibility of use of the new technology and any residual use of traditional fuels.

**3. *Creating enabling environment for future up-take:***

- a. Undertaking awareness campaigns and stakeholder engagement to increase buy-in and uptake of the solution.
- b. Establishing or strengthening market linkage and distribution channels for the solution(s) and any replacement parts.
- c. Capacity building of users/interested community members/self-help groups etc., to develop skills for the maintenance and repair of the solution(s).
- d. Conducting awareness building sessions on clean heating and the harmful effects of black carbon and particulate matter emission (especially in proximity of Cryosphere regions) for larger stakeholder dissemination/awareness raising.

**4. *Estimating black carbon emission reductions:***

- a. Estimating the reduction of black carbon emissions due to use of the space heating solution in the target setting.
- b. Estimating the potential maximum feasible reductions in black carbon emissions over a larger territory or among target recipients following full-scale implementation.

Note: We are open to considering other types of solutions or activities not explicitly mentioned above but that align with the scope of this project. This may include other types of innovative space heating solutions or distribution models.

**4. Intended outcomes**

The intended outcomes of this implementation project are to:

1. Demonstrate the feasibility, long-term use and potential for scaling up clean and sustainable space heating solutions.
2. Create a favorable environment for future uptake of the solution and ensure long-term sustainability of the project.
3. Estimate the impact of black carbon emissions (including co-emitted species) in the selected pilot area/region due to the implementation of the solution.

**5. Who could apply**

Implementation agencies, grassroots organisations, research institutes, academic institutions, civil society organisations, and consortia of interested organisations (including private sector players, as applicable) are encouraged to submit their Expression of Interest. The organisation/ consortia should possess the necessary technical expertise and/or have the capacity to independently find suitable vendors to design, supply, and install the solution(s).

If a single organization is applying under this Expression of Interest, they must have prior experience working at the community level in the identified countries/regions. If applying as a consortium, at least one partner (preferably the implementing partner) must meet this requirement.

## **6. How to submit your Expression of Interest**

Please compile your responses by filling in the EoI questionnaire template provided in the Annex. Kindly limit your response to a maximum 3 pages (excluding references).

The deadline for submission is Sunday **27<sup>th</sup> April, 5 pm GMT**. The filled EoI template must be submitted via email to [superpollutants@cleanairfund.org](mailto:superpollutants@cleanairfund.org).

If you have any questions, please contact us on [superpollutants@cleanairfund.org](mailto:superpollutants@cleanairfund.org) before the submission deadline.

## **7. Selection process**

All submitted EoI will be reviewed and scored against pre-selected scoring criteria by a team of at least three reviewers. Only organisations from the short-listed EoIs will be contacted to discuss the potential for a full project proposal, including budget.

**Funding will be made available for only one project.** However, the EoIs with greatest potential will be kept in our records and shared with our broader network for future funding opportunities.

Please note that the final selected project is expected to **start ideally by July 2025**.

## **8. Timeline**

<b>Activity</b>	<b>Deadline</b>
Publishing of the Expression of Interest	5 <sup>th</sup> April 2025
Questions/clarifications	24 <sup>th</sup> April 2025
Deadline for Expression of Interest	27 <sup>th</sup> April 2025 (5 pm GMT)
Review of Expressions of Interest	28 <sup>th</sup> April 2025 – 15 <sup>th</sup> May
Final CAF decision and notification	Expected by 16 <sup>th</sup> May 2025

**Annex: Template for EoI submission**

**1. Contact information and target area**

<b>Entity(ies) name</b> <i>(please specify the lead entity if submitting as a consortium)</i>	
<b>Lead contact name and email address</b>	
<b>Type of organization(s)</b>	
<b>Operational location of organization(s)</b>	
<b>Year of initiation of the organization(s)</b>	
<b>Target country/region of the project</b>	
<b>Target location and setting</b> (rural/urban)	
<b>Proposed length of the project</b>	
<b>Total anticipated budget (in USD) for the project</b> <i>(Please include a budget split if multiple organisations are applying as a consortium)</i>	

**2. Project Summary** (approx. 500 characters):

- *Highlight the broader project outcome(s) and proposed solution in 1-2 sentences, explaining why this solution is recommended for the target location*
- *Explain, at a broader level, how the implementation of the proposed solution could lead to reductions in black carbon emissions and what additional co-benefits (e.g. social, economic) it could deliver in the selected target location/region.*

**3. Strategic approach and proposed solution for the project**

- *Provide details on the specific space heating technology (or combination of technologies/distribution/business model) that you would like to implement through this grant.*
- *Specify the target location for the pilot, including the total number of households or commercial or institutional settings that will be directly benefited from this project.*
- *Outline what makes the solution technically and economically feasible in the identified region compared to existing solutions. Also highlight how the solution would be suitable for different weather and climatic conditions in the target location.*
- *Describe the financing/ business model (including any end-user's costs at pilot or later implementation stages).*
- *Indicate how the black carbon emissions reductions linked to this project will be quantified.*

**4. Main activities**

- *In this section, please describe the main activities along with the tentative timelines that will be undertaken to achieve the project outcomes (please refer to Section 3.4 and Section 4 above).*

**5. Technical expertise and sustainability of the project**

- *Outline the relevant experience and expertise your organisation(s) have on sustainable space heating solutions.*
- *Highlight the experience of working with communities in the target pilot area/region*
- *Provide insights into how this project can be scaled up further and sustained in the long-term*