



## TERMS OF REFERENCE

# TERMS OF REFERENCE FOR FIELD STUDIES TO PROVIDE BLACK AND ORGANIC CARBON EMISSIONS PERFORMANCE METRICS OF STOVE/FUEL COMBINATIONS DURING NORMAL USAGE IN HOMES

### BACKGROUND

The Global Alliance for Clean Cookstoves (Alliance) is a public-private partnership with a mission to save lives, improve livelihoods, empower women, and protect the environment by creating a thriving global market for cleaner, more efficient cookstoves and fuels, with a goal of enabling 100 million households to adopt clean and efficient cooking technologies by 2020.

Burning solid fuels releases emissions of some of the most important contributors to global climate change: carbon dioxide (CO<sub>2</sub>), methane, black carbon (BC), and other short-lived climate pollutants (SLCPs). Cooking technologies have the potential to impact climate change by reducing emissions of greenhouse gases and SLCPs. BC emissions are of particular interest, as residential solid fuel burning produces approximately one-fourth of total anthropogenic BC emissions.<sup>1</sup> BC is a climate warming agent and is estimated to be second only to CO<sub>2</sub> in its warming impact.<sup>2</sup> Since the atmospheric lifetime of BC is only a few days, reducing BC emissions can bring about a more rapid climate response than reductions in CO<sub>2</sub> and other long-lived greenhouse gases alone.<sup>3</sup>

Estimating the net warming or cooling impact of particulate emissions from cookstoves can be challenging, in part because particulate emissions also include organic carbon (OC) – which has a cooling impact.<sup>1</sup> Therefore, in order to understand the climate implications of fuel/stove combinations, obtaining BC/OC ratios of the emissions are also important.

The Alliance believes that building a strong evidence base is critical to adoption of clean cookstoves and fuels at scale. As part of this effort, the Alliance will be supporting efforts to better determine black carbon emissions from a range of cookstoves and fuels in key geographic regions. These efforts will help us better quantify the climate benefits of scaling up cleaner, more efficient cooking.

### SCOPE OF WORK

**The Alliance is seeking qualified experts to conduct field studies to provide black and organic carbon emissions performance metrics of stove/fuel combinations during normal usage in homes.**

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<sup>1</sup> Bond TC et al. 2013. Bounding the role of black carbon in the climate system: A scientific assessment. *J Geophys Res: Atmos.* 118:5380-5552

<sup>2</sup> Ramanathan V and Carmichael G. 2008. Global and regional climate changes due to black carbon. *Nature GeoSci.* 1:221-227

<sup>3</sup> Bond TC and Sun H. 2005. Can reducing black carbon emissions counteract global warming? *Environ Sci Technol.* 39:5921-5926.

Specific considerations for the study include:

- Study should provide data on stoves/fuel combinations which have limited data in the current literature, and include data from baseline (traditional) cooking practices in the study area
  - If possible, provide information on the distribution of cooking technologies within the proposed study area

- Specific technologies and regions of interest include:

<i>Location</i>	<i>Technologies</i>		
South America	Traditional wood	Biomass chimney	
Sub Saharan Africa	Traditional wood	Natural draft biomass	Forced draft biomass
South East Asia	Traditional wood	Natural draft biomass	Forced draft biomass

- Studies which compliment ongoing work relevant to health and exposure are preferred.
- Study should explicitly provide emission factors (e.g. g/kg or g/MJ)
- Characterization of the stove emissions should be conducted during **uncontrolled conditions** in homes.
- If possible, the study should provide emission rates (g BC/min) in addition to emission factors.
  - *If emission rates are unable to be obtained, please note the reason in the application.*
- To the extent possible, contextual information should be provided on factors which may impact the performance. This includes, but is not limited to: season, fuel type/conditions, and lighting techniques.
- Sample analysis methods should be justified and described.
- If possible, comparisons with corresponding laboratory-based measurements may be conducted / compared to determine if systematic relationships can be derived.

**Applicants proposing to provide BC concentrations will not be considered responsive.**

Experts will be expected to execute the following activities over a 6 month period:

- Conduct all field studies proposed
- Work in collaboration with Alliance staff to provide data in a manner that can be integrated into the Clean Cooking Catalog (<http://catalog.cleancookstoves.org/>)
- Write a non-technical executive summary (word document) articulating the main findings and key messages of the study
- Write and submit peer-reviewed journal article

**BUDGET**

Up to \$50,000 will be available to support field studies to provide black and organic carbon emissions performance metrics of stove/fuel combinations during normal usage in homes. Applications will be evaluated based on the quality of the proposal and the appropriateness of the budget for the proposed work.

**PROPOSAL INSTRUCTIONS**

Please submit a proposal describing the following (maximum of 6 pages, 12 point font, single-spaced):

- Description of proposed field studies to be conducted, including: project location, stove and fuel technologies (including number of samples each), and any other relevant information
- Detailed sample collection and analysis methods
- Unique qualifications and relevant previous experience of the team
- Biographical summaries of team conducting the work
- Budget
- Proposed timeline and approach for completing the work. The timeline should include dates for the activities as outlined above and specific deliverables

Please submit proposals to [research@cleancookstoves.org](mailto:research@cleancookstoves.org) by March 13, 2015. All Grantees must be an Alliance partner. To become a partner, please register on our website at: <http://cleancookstoves.org/partners/>.