



**BERKELEY AIR
MONITORING GROUP**

protecting health and climate

Pilot Evaluation of the Diffusion and Use of Clean Cooking Technologies in Lagos, Nigeria (PEDUCCT)

Results Brief Annex 4

Notes on Laboratory Testing Results

Berkeley Air Monitoring Group

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Notes on Laboratory Testing Results

The performance of the kerosene and CleanCook ethanol/methanol stoves was tested for this project by the National Center for Energy Research and Development (NCERD), University of Nigeria, Nsukka. While testing might have been done at several different testing centers, including those with more advanced equipment in United States, NCERD was chosen because regional testing centers have easier access to the fuels and stoves being used in their areas as well as expertise operating locally-available technologies. Further, accessible and affordable testing centers are a vital component of health markets for improved cooking technologies and fuels and important partners in climate change mitigation.

Conversely, many of these regional testing facilities, including that at NCERD, do not have access to advanced equipment and resources, which are especially important when measuring low-emitting stove-fuel combinations such as ethanol, LPG, biogas, and others. For example, the scales used to measure the mass deposited on filters during testing likely do not have the precision needed to resolve the low mass depositions typical of clean-burning fuels. Additionally, the sensors used to measure carbon dioxide and carbon monoxide require periodic calibration, yet acquiring calibration gas is often prohibitively expensive or logistically difficult in developing countries.

These limitations suggest that the results reported here for the emissions of particulate matter and carbon monoxide likely have relatively large uncertainties compared to the quantities reported. Due to this uncertainty at lower concentrations, and because some of the climate forcing pollutants were not measured directly as part of the laboratory study, we incorporated data from other relevant sources into our analysis, as noted in the Results Brief Annex (see Annex 1, section 3.2).

While we cannot fully characterize the accuracy of the carbon monoxide and particulate matter presented in the performance testing reports, the additional uncertainty for these measurements means they should be interpreted within the context of the

measurement limitations. Certainly, previous testing has indicated lower particulate matter emissions for ethanol stoves, though again, whether those differences are due to instrumentation limitations, variability in technician operation of the stove, differences or contamination of the fuel, or other factors is not possible to determine here. In general, however, we suggest that any review of cleaner burning stove/fuel combinations account for results from as many sources as possible, including those with testing facilities capable of resolving lower quantities of particulate matter and carbon monoxide.

We also recommend the continued support and development of regional testing centers. The regional testing centers are an important part of a healthy ecosystem for the development, testing, and marketing of cleaner cooking technologies.