

## CLEAN COOKSTOVE RESEARCH

### Problem

Nearly half of the people in the world still depend on the burning of biomass (wood, charcoal, crop residues, and dung) and coal in rudimentary cookstoves or open fires to cook their food. Burning these fuels pollutes the air, and using wood and charcoal contributes to deforestation rates in parts of the world where cookstoves are currently being used.

People in developing countries are exposed to smoke with high concentrations of pollutants such as fine particles composed of toxic compounds. Household air pollution now ranks as the world's 4<sup>th</sup> worst health risk, primarily in developing countries where cookstoves are used, and the 2<sup>nd</sup> worst health risk for women and girls, causing approximately 4 million premature deaths annually and a wide range of illnesses.

Traditional cookstoves are a major source of black carbon aerosols, producing one-fifth



Cookstove research aims to reduce black carbon emissions globally and save lives.

of all black carbon emissions globally. The black carbon emitted from these cookstoves not only contributes to climate change, but also disrupts weather patterns and accelerates the melting of snow and ice, which many people rely on for drinking water and farming.

Reducing black carbon directly combats climate change as it can no longer contribute to the immediate warming of the atmosphere. Because of the widespread use of traditional cookstoves around the world, the adoption of clean and efficient cookstoves is an important approach to mitigating climate change, as well as saving lives. Responding swiftly and comprehensively to climate change is crucial to preserving the integrity and availability of

essential natural resources such as land, food and water.

### Action

At EPA's laboratories in Research Triangle Park, NC, scientists are evaluating cookstove performance, measuring the amount and toxicity of emissions, and studying exposure related to cookstove use.

EPA scientists work in the lab and field settings to identify and characterize the various pollutants emitted when different types of biomass are used to fuel traditional cookstoves. EPA's focused toxicology research aims to identify the health impacts of specific pollutants emitted during biomass combustion and cookstove use, looking specifically at effects on the

pulmonary and cardiovascular systems.

In addition, research grantees, supported by EPA's Science to Achieve Results (STAR) program, are evaluating the benefits of cleaner cookstove methods in developing areas around the world. The grantees are:

- Colorado State University
- University of California at Berkeley
- University of Colorado at Boulder
- University of Illinois at Urbana-Champaign
- University of Minnesota
- Yale University

For more detailed information about cookstove research in progress at each of these institutions, please visit:

<http://www.epa.gov/research/airscience/cookstove-research-grants.htm>

### **Impact**

EPA's collaboration with stakeholders through the International Organization for Standardization (ISO) has informed the development of guidelines, testing protocols, and standards for cookstoves around the globe.

ISO guidelines and standards will inform governments, donors, and investors interested in supporting only high-quality stoves and will provide incentive for stove developers to innovate and improve performance.

In partnership with the Global Alliance for Clean Cookstoves, EPA is helping to build a global stove testing infrastructure. These efforts advance the Alliance's goal to foster the adoption of clean cookstoves and fuels in 100 million households around the world by 2020<sup>1i</sup>.

The environmental and health impacts resulting from air, climate, and energy resource dynamics expand beyond the borders of any one country. This requires engaging in research on a global scale. EPA is collaborating with other countries to develop and provide scientific information to address the health and climate change impacts of cookstoves worldwide.

### **Contacts:**

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<sup>1</sup> Pollutant Emissions and Energy Efficiency under Controlled Conditions for Household Biomass Cookstoves and Implications for Metrics Useful in Setting International Test Standards. James Jetter, Yongxin Zhao, Kirk R. Smith, Bernine Khan, Tiffany Yelverton, Peter DeCarlo, and Michael D. Hays. *Environmental Science & Technology* 2012 46 (19), 10827-10834

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<http://www.epa.gov/research/airscience/air-cleancookstove.htm>

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