

6th Solar Cooker International World Conference 2017 At the Muni Seva Ashram In Goraj, Vadodara, Gujarat, India 16-22 January, 2017

Enhancing Capacity of Regional Cookstoves Testing and Knowledge Centre in Nepal

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Purpose

Testing stoves and fuels help us to evaluate, communicate, and improve performance and quality of Cookstoves and fuels, and thus improve adoption. Regional Cookstoves Testing and Knowledge Centre (RTKC) at Centre for Rural Technology (CRTN)'s supports local producers and manufacturers to improve products, communicate performance to customers, and provide training and other resources to catalyze stoves and fuel activities. Currently, testing service is limited to biomass Cookstoves. Solar cookers have been one of the integral technologies that utilize freely available solar energy with zero emissions but require evaluation and monitoring of the technology. Testing these stoves and generating data would be much useful to illustrate the clean cooking. RTKC is now opting to enhance its testing capacity to solar cooking in the coming days.

Capacities/Resources

Laboratory Emissions Monitoring System (LEMS) collects a more accurate sample by incorporating longer ducting, mixing baffles, and sample ports upstream from the blower. The solid sheet metal hood and large variable speed blower fan allow the LEMS to accurately measure the emissions of stoves ranging from tiny TLUDs to giant institutional stoves.

The Fumitron is a portable sampling system specialized to measure emission factors from small scale biomass combustion sources such as residential cooking and heating stoves.

The SpotScan™ Transmissometer bench top analyzer has been developed as a simple and robust way of assessing Black Carbon particulate matter (PM) from a variety of sample filters. The analysis can be easily performed in the field or the laboratory, and requires less than thirty seconds to provide optical attenuation and BC mass concentration results.

Stove Use Monitoring System (SUMS) directly measure the use of stoves by deploying data-logging temperature sensors. The SUMS store up to 2048 readings, which can be programmed to be recorded at different rates from 1 minute to 4.25 hours.

The Black Carbon (BC) Sample Train shares the sample pump of the gravimetric sample train, having a separate BC sample train allows for PM2.5 and BC samples of different masses to be collected simultaneously, and for different types of filter media to be used.

Indoor Air Pollution (IAP) Meter is the ultra-portable, small-size meter can be worn in a backpack with a sampling point near the nose and mouth of the user. The resulting carbon monoxide (CO) and particulate matter (PM2.5) measures give us an accurate assessment of personal exposure.

DustTrak™ DRX Aerosol Monitor can simultaneously measure both mass and size fraction. The DustTrak DRX monitor measures aerosol contaminants such as dust, smoke, fumes and mists.

The EL-USB-CO Logger is a USB data logger that measures and stores up to 32,510 Carbon Monoxide (CO) readings over a 0 to 1000 ppm measurement range. The data can then be graphed, printed and exported to other applications.

Calibration Gases and Gas Mixing Unit is set up at RTKC Lab. Now RTKC can calibrate LEMS Sensor Box and Fumitron at its own lab using various concentration of mixture of gases. It also offers its calibration service to the other interested testing centers.

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REGIONAL COOKSTOVES TESTING AND KNOWLEDGE CENTRE (RTKC), Nepal

Centre for Rural Technology, Nepal (CRTN)

Supported by:
 GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

March 2016

Background
 Centre for Rural Technology, Nepal (CRTN) is a partner of the Global Alliance for Clean Cookstoves (GACC), a public-private initiative led by the United Nations Foundation (UNF) to save lives, improve livelihoods, empower women and preserve the environment by creating a thriving global market for clean cooking solutions. GACC awarded the grant support to CRTN for the project enhancing capacity of "Regional Cookstoves Testing and Knowledge Centre" (RTKC). The project is a part of the strategy to strengthen the cookstoves sector's ability to evaluate, communicate, and improve performance of cookstoves and fuels and thus improve adoption of clean cookstoves. RTKC aims to address major gaps in global testing capacity and immediate steps needed to implement interim and future international standards emphasizing research and development on bioenergy sector.

Vision
 To be the region's experts in research, testing and development of bio energy products & services.

Mission
 To improve Technology, communicate performance and promote sales and adoption of clean cooking devices and support the process of standardization in the country and the globe.

Objectives

- Enhance Testing Capacity of RTKC mapping to the International Workshop Agreement (IWA-2012) Tiers of Performance and International Standard Organization (ISO).
- Promote Research and Development on Clean Cooking Technologies
- Establish effective knowledge dissemination and networking with other Stove Testing and Knowledge Centres at the national and regional level.
- Support National and International Clean Cooking Interventions - Clean Cooking Solutions for All (CCS4All), Sustainable Energy (SE4All), and Sustainable Development Goals (SDGs).
- Offer testing and monitoring services to organizations at national and regional level.
- Support ISO TC 285: Clean Cookstoves and Clean Cooking Technology in standards formation and advocate for National standards in compliance with the international standards.
- Pave way to enhance the centre's service menu to other environmental services such as industrial emissions monitoring, validating carbon projects, institutional energy audits design consulting etc.

RTKC Services

- Lab Test for different biomass and biofuel stoves using LEMS and ISO IWA Tier Reporting of following performance parameters:
 - Total Emission
 - Carbon Monoxide
 - Carbon Dioxide
 - PM 25
 - Thermal Efficiency
 - Safety Analysis
 - IAP measurements
 - Black Carbon Measurement
 - Safety
 - Durability
- Stove Performance Testing in the Field:
 - Water Boiling Test (WBT)
 - Control Cooking Test (CCT)
 - Kitchen Performance Test (KPT)
 - IAP Measurements
- Field based tests for portable/fixated biomass stoves along with user perception surveys
- Stoves Research and Development
- WBT, KPT and CCT training
- Training Cookstove Stakeholders (Stove Entrepreneurs, Researcher, Stoves Users, Institutions consuming biomass fuel etc) on different Biomass Laboratory Issues
- Support educational institutions, research centers and students for researches pertaining to biomass energy, stove designs and stoves performance research communications and related issues.



Key Achievements

- Cookstoves Laboratory Capacity has been enhanced with addition of Black Carbon Monitoring device, sootscan transmissometer to the existing gravimetric system (LEMS) for analyzing emissions.
- Chimney hood has been added with additional facility for testing chimney stoves.
- A prototype for Calibration Gas Mixing Unit has been established at the RTKC for calibrating equipment. The staffs have been trained for operating and conducting tests and calibrating the equipment.
- Business Plan and Strategy Development for the Centre is in progress with support from I-Dev International and GACC.
- Supporting the formation of International Standards as an expert member of ISO TC 285: Clean Cookstoves and Clean Cooking Solutions through National Mirror Committee hosted by NBSM.



Results

Global Alliance for Clean Cookstoves supported enhancing the testing capacities of various Regional Testing and Knowledge Centers (RTKCs) around the globe and CRTNs RTKC has been one of the centers to be supported since 2012. The center provides assurance on technology performance and quality for manufacturers, customers, and other stakeholders.

Discussions has been going on within ISO TC 285 about the inclusion of solar cooking to be included in the Working Groups deliverables – The Field Testing Guidelines has included in its working draft. During the discussions it is felt that there is a need for increased number of testing labs to generate more data and test the testing protocols developed during the ISO Processes.

Conclusions

RTKC could be a potential center with already existing testing infrastructures and commitments which seeks to collaborate with the researchers and scientists to establish a lab to be able to test solar Cookstoves in future.