Bureau International des Poids et Mesures

Capacity Building & Knowledge Transfer

Metrology for Clean Air
A BIPM Capacity Building and Knowledge Transfer Programme
Outcomes and Impact of the 2016-2018 Activities

Introduction and Background: The Metrology for Clean Air programme, which started at the BIPM in 2016, enables knowledge transfer to National Metrology Institutes (NMIs) developing their national metrology infrastructure in support of their air quality and emissions measurement communities. The programme enables NMI scientists to undertake six-month knowledge transfer secondments in the BIPM's laboratories, where they gain skills in accurate gas analysis and the operation of Fourier Transform Infrared (FTIR) Spectrometers and analysis of FTIR spectra. The visiting scientists master and apply these measurement techniques for key air quality/emission gases and are able to introduce them into their own national laboratories, where they can be used in the verification and value assignment of gas standards developed to meet needs within their own countries.

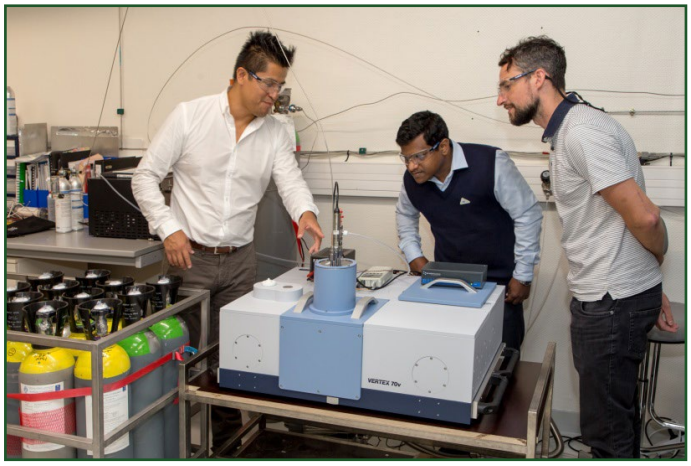
The BIPM programme is supported by voluntary funds, and in the period 2016-2018, the National Physical Laboratory (UK), via its International programme, has allowed three visiting scientists from India, South Africa and Kazakhstan to undertake 6 months secondments at the BIPM, and also provided NPL Primary Reference Gas Mixtures for the training programmes.

Supporting efforts for Clean Air in India

Tackling Urban Air Pollution in India is a major concern within the country

Following his six month secondment to the BIPM, Radhakrishnan Soman Radha and NPLI, are applying for further Indian Government support to develop analytical facilities to enable NPL-India to produce high quality and accuracy gas standards (CO_2, CH_4, CO, SO_2 and NOx) to meet industrial, emissions and air quality monitoring and research needs within India, to support a measurement framework that will help address urban air pollution in India.

The knowledge transfer programme is enabling NPL-India to develop its gas purity analysis and gas standard verification measurement facilities, which will result in high quality standards, and provide the basis of reliable data on air quality and emissions supporting Indian Government efforts to implement effective monitoring of air quality and emissions throughout the country.



E. Flores (BIPM), R.S. Radha (NPLI, India) and M. Ward (NPL, UK) setting up the FTIR for accurate measurements of NOx gases

Monitoring and mitigating greenhouse gas emissions in South Africa

The South African Minister of the Department of Environmental Affairs declared greenhouse gases as primary pollutants for South Africa in April 2017, and further policy and implementation decisions on greenhouse gas emissions are expected in the years to come. While there are no measurements of greenhouse gases at monitoring stations in South Africa at the moment, this situation is expected to change in the future. The training programme that Napo Ntsasa (NMISA) has been following will help the NMISA to prepare for providing measurement standards to support future policy decisions related to greenhouse gases.

The most accurate measurements of CO_2 require standards of known isotopic composition

N. Ntsasa (NMISA) and P. Moussay (BIPM) measuring isotope ratios of CO_2 in air standards with FTIR

The NMISA's programme on greenhouse gases started in 2015, with the aim of supporting the South African Weather Service Global Atmospheric Watch programme with gas standards which are internationally equivalent to other NMIs' standards. Recent advances in laser-based sensing technologies for greenhouse gases have made these isotope-specific, requiring CO_2 standards with measured isotopic ratios. The CBKT training has provided Napo Ntsasa with the skills needed to make such measurements with FTIR, and develop and implement isotopic measurements at NMISA. These can be validated using the NPL gas standards that were already measured at the BIPM. This will enable NMISA to develop the capabilities required to provide high accuracy and commutable CO_2 in air standards to their greenhouse gas measurement community.

Metrology for Clean Air

https://www.bipm.org/en/cbkt/clean-air.html