**Metrological support for LNG custody transfer and transport**

**O. Büker1, K. Rasmussen2, O. Kerkhof3, J. B. Kondrup2, P. Lucas3, N. Pelevic3, K. Stolt1,   
M. van der Beek3, B. Gieseking4, G. Nieuwenkamp3, J. Rauch5, T. Mortensen6**

*1SP Technical Research Institute of Sweden,* *Brinellgatan 4, 504 62 Borås, Sweden*

*2FORCE Technology,* *Park Allé 345, 2605 Brøndby, Denmark*

*3VSL, Thijsseweg 11, 2629 JA Delft, the Netherlands  
4NPL, Hampton Road, Teddington Middlesex TW11 0LW, United Kingdom*

*5PTB, Bundesallee 100, 38116 Braunschweig, Germany  
6Justervesenet, Fetveien 99, 2007 Kjeller, Norway  
  
E-mail (corresponding author): oliver.buker@sp.se*

Liquefied Natural Gas (LNG) has an important role in addressing the global natural gas demand. The transportation of LNG by ship is, in comparison to pipeline transportation of natural gas (NG), nearly independent from political conditions and is expected to become as important as pipeline transport of NG. In this context the transport of natural gas by ships over long distances is technical and metrological more challenging as for other fossil fuels.

In the framework of the ongoing EMRP JRP ENG 60 “Metrology for LNG” (2014-2017) funded by the European Union, a number of metrological challenges associated with custody transfer and transport of LNG will be faced. The project consists of four work packages (WP) whereby the main objective is to reduce the measurement uncertainty of LNG custody transfer by a factor two.

The focus in WP1 is the design and development of a traceable mid-scale calibration standard for LNG mass and volume flow. The goal is to provide traceable mass and volume flow calibrations up to 200 m3/h (90 tons/h). In WP2 the emphasis is on the development and validation of a LNG composition standard based on a unique reference liquefier and a Raman measurement cell. The main target is to produce an accurate, lab-based sampling and analysis reference method to test and calibrate commercially available measurement systems. The priority in WP3 is given to the development and validation of a method for determining the methane number, including correlations based on the LNG composition and corrections for traces of nitrogen and higher hydrocarbons. Since physical properties and quantities play an important role in LNG custody transfer, WP4 concentrates on a validated and improved model for LNG density prediction and the uncertainty evaluation of the enthalpy and the calorific value. A highlight so far is the development of a novel cryogenic sensor for simultaneously measurement of speed-of-sound and density. The paper gives an overview of recently achieved objectives within the project and a look forward to future activities.