World's first LNG research and calibration facility – Key Note Address

Dr. ir. P. Lucas

VSL Dutch Metrology Institute, Delft, The Netherlands

E-mail (Peter Lucas): plucas@vsl.nl

LNG is seen as a cleaner alternative to conventional fuels such as diesel as it contributes to significant reductions in CO_2, NO_x, SO_x emissions and noise. In addition to these environmental benefits, LNG is perceived as an important transition fuel, of which the infrastructure can be used for the roll-out of bio-LNG.

Reliable, accurate and commonly agreed measurement methods are a first requirement for trading of goods and related services. For existing transport fuels, a well established infrastructure for measurements of quantity and quality is already in place. For large scale LNG applications there is a commonly agreed measurement practice as described in various ISO standards and the GIIGNL Custody transfer handbook. For small and mid scale LNG applications such as refuelling and bunkering, agreements are being made on how to best measure the amount of LNG. However, for all LNG applications, there are currently no traceable calibration services available for calibration of LNG flow meters.

Type approval and (re)calibration of LNG flow meters is therefore currently based on calibrations with water corrected to cryogenic conditions, backed up by limited test data from small scale testing with liquid nitrogen. There is a concern that this approach is not sufficiently accurate and requires further validation and improvement.

In order to develop traceable calibration services VSL is developing, together with partners, an LNG research and calibration facility. This facility will be a closed loop system to calibrate LNG flow meters as well as sampling systems where LNG is kept at subcooled conditions using LIN based heat exchangers. The flow rate range of will be 5-200 m^3/h (uncertainty target 0.15% for mass flow), with the possibility to increase to at least 400 m^3/h, depending on customer demand. The calibration is based on the flying start stop method and/or a static start/stop test where the reference is the sum of multiple Coriolis mass flow meters. A standard for composition measurements, taking ISO EN 12838 into account, will be realized for calibration of sampling systems.

It is expected the facility will be taken into use Q1 of 2018. One of the key objectives will then be to investigate how water-based calibrations compare to LNG flow calibrations. Earlier we have performed a preliminary investigation into this aspect for small (0 to 25 m^3/h) LNG flow meters using the Primary Standard Loop. Although these results were promising, they may not be representative for larger flow meters.