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Progress in developing measurement standards and standardized test methods for biogas and biomethane assessment

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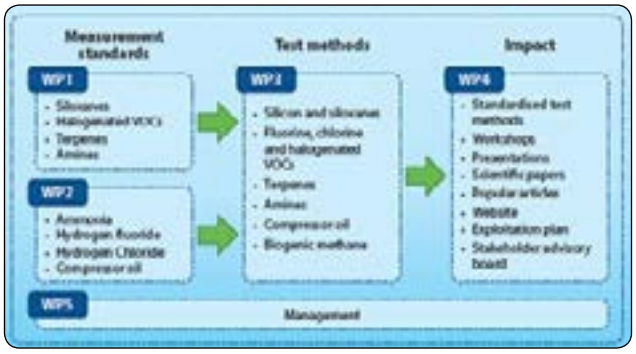
Under the Renewable Energy Directive 2009/28/EC, mandate M/475, CEN/PC 408 developed specifications for biomethane (i.e., EN16723). Currently, the test methods cited in EN16723 are neither harmonized nor validated, lack aspects of metrological traceability, and are usually not dedicated to biomethane. Thus, they are hampering the energy transition from natural gas to biomethane and are causing the realization of the EC's H2020 goals to be too slow. Regulators, grids and refueling stations, and testing laboratories urgently require harmonized and validated test methods to enable the transportation of biomethane using existing infrastructure as well as clear financial transactions without disputes. Recently an ISO Working Group for biomethane has been established, i.e. ISO/TC193/SC1/WG25 Biomethane. In order to assess conformity with the EN16723 specifications and to provide valuable input to ISO/TC193/SC1/WG25, as the successor project of EMRP ENG54 – Metrology for biogas, the European joint research project EMPIR 16ENG05 – Metrology for biomethane aims to develop standardized test methods for the parameters (mainly impurities) to be monitored when injecting biomethane into the natural gas grids and when using it as a transport fuel, for example the content of total silicone and siloxanes, halogenated volatile organic compounds, hydrogen chloride, hydrogen fluoride, ammonia, terpenes, compressor oil and amines in biomethane. A further objective of this work is to develop or improve the measurement standards for these parameters, in order to enable SI traceable calibration and measurement results. For legal purposes, a standardized test method is also needed for determining the fraction of biogenic methane in blends of biomethane and natural gas. This work will closely liaise with the biogas producing and upgrading industry, regulators and biomethane testing laboratories and other end-users to ensure that the developed test methods are robust and efficient and can readily be implemented. Latest progress of this work, with focus on results obtained at VSL (Laboratory, The Netherlands), will be reported and discussed.



Recent Publications:

1. Arrhenius K et al. (2017) Suitability of vessels and adsorbents for the short-term storage of biogas/biomethane for the determination of impurities - siloxanes, sulfur compounds, halogenated hydrocarbons, BTEX. Biomass and Bioenergy. 105:127-135.
2. Van der Veen A M H, Ziel P R and Li J (2015) Validation of ISO 6974 for the measurement of the composition of hydrogen-enriched natural gas. International Journal of Hydrogen Energy. 40(46):15877-15884.
3. Brown A S et al. (2015) Sampling of gaseous sulfur-containing compounds at low concentrations with a review of best-practice methods for biogas and natural gas applications. Trends in Analytical Chemistry. 64:42-52.

4. Brown A S et al. (2014) Traceable reference gas mixtures for sulfur-free natural gas odorants. Analytical Chemistry. 86(13):6695-6702.
5. De Krom I et al. (2017) First proficiency test on the siloxanes content in biomethane with traceable reference
6. values. Conference proceedings at the 9th International Gas Analysis Symposium & Exhibition (GAS Analysis 2017), 13-15 June 2017, Rotterdam, Netherlands.

Biography

Jianrong Li is currently working at the Van Swinden Laboratory (VSL), the Dutch Metrology Institute, as Scientist in the Research and Development Department. Her work focuses on metrology and gas analysis in the fields of energy and environment. She is currently coordinating the European joint research project "EMPIR 16ENG05 - Metrology for biomethane" and is leading a Task in "EMPIR 16ENG09 – Metrological support for LNG and LBG as transport fuel" project. In the past, she has led work packages and tasks in several other research projects under the European Metrology Research Programme (EMRP), such as ENG54 Biogas, ENG60 LNG II and ENV56 KEY-VOCs.

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