**European Commission Ref. 070201/2014/693666/FRA/ENV.C.3 Service Agreement 7:
Continued improvements of inventory methodologies**

**Task 3.4: Ammonia emissions from biogas**

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**Consultation paper for discussion**

1. **Context**

Ricardo-AEA Ltd, Aether Ltd and AMEC have been commissioned to investigate and propose improvements to inventory methodologies in a number of key areas identified by the Task Force on Emission Inventories and Projections (TFEIP) and other bodies. The European Commission, as part of a collaborative initiative, has provided funding for this project, which is expected to be the focus of discussion at the TFEIP meeting and workshops in May 2015.

Among the priority areas of the GB chapters for agriculture, the project aims to provide guidance on ammonia emissions from biogas.

1. **The issue to be addressed**

A new source category, ‘5.B.2 Biological treatment of waste – Anaerobic digestion at biogas facilities’, was introduced for the reporting of emission inventory data by the 2014 Nomenclature for Reporting. The current GB does not provide any specific guidance on the determination of emissions from this source. At present users of the GB are advised to contact the TFEIP’s expert panel on combustion and industry directly.

The objective of this subtask will be to provide an accurate and up to date methodology for the calculation of NH3 emissions from biogas facilities, which may be applied by EU member states in the preparation of national emission inventories. This will be achieved through the completion of a literature review of existing data on NH3 emissions from biogas facilities. Consideration will also be given to the potential for variations in emission due to differences in the nature of the site and the waste type.

1. **Proposed approach**

Ricardo-AEA has recently undertaken a review of the methodologies applied by EU member states for the reporting of emissions from the biological treatment of waste, in support of the UK’s 2014 NAEI Improvement Programme. The assessment considered the emission of several pollutants from composting, mechanical biological treatment (MBT), energy-from-waste (EfW), advanced thermal treatment (ATT), landfill and AD. In this review Ricardo-AEA identified the EFs provided by the Informative Inventory Report (IIR) for Switzerland as being the most detailed methodology for estimating NH3 emissions from biogas facilities currently in use by EU member states. However this approach does suggest a number of areas for improvement, including the introduction of variables such as waste and facility type.

We will build on this research by combining our understanding of current methodologies with a more detailed literature search. Our previous approach will be expanded to include data from national inventories, guidance documents and academic publications outside of the EU. The aims of this task will be to identify current research on NH3 emissions arising from biogas sites, with particular focus on the variation caused by:

* The nature of the facility (i.e. agricultural, industrial, demonstration etc.).
* The technological characteristics, such as the capacity, age and abatement potential of the facility.
* The composition of the feedstock.
* The influence of waste management practices on emissions (e.g. the periods of time that waste is left in the open).
1. **Key sources of data**

The key sources of data are:

* A review of the methodologies applied by EU member states for the reporting of emissions from the biological treatment of waste. Informative Inventory Reports from the following European countries have been checked (2014 Submissions): Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Malta, Republic of Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and UK.
* A review of the methodologies applied by other relevant non-European states for the reporting of emissions from the biological treatment of waste. IIRs from the following countries have been checked: United States of America (IIR), Canada (National Pollutant Release Inventory-NPRI) and Australia (National Pollutant Inventory-NPI).

Other technical documents and research papers:

* B. Amon, V. Kryvoruchko, G. Moitzi, T. Amon (2006). Greenhouse gas and ammonia emission abatement by slurry treatment. University of Natural Resources and Applied Life Sciences, Department of Sustainable Agricultural Systems, Division of Agricultural Engineering, Austria.
* K. Koirala, P. M. Ndegwa, H. S. Joo, C. Frear, C. O. Stockle, J. H. Harrison (2013). Impact of anaerobic digestion of liquid dairy manure on ammonia volatilization process.
* B. Amon, V. Kryvoruchko, T. Amon (2005). Influence of different levels of covering on greenhouse gas and ammonia emissions from slurry stores. Department of Sustainable Agricultural Systems, Division of Agricultural Engineering, University of Natural Resources and Applied Life Sciences, Peter-Jordanstrasse 82, A-1190 Wien.
* Tomlinson S.J., Dragosits U., Tang Y.S. and Sutton M.A. (2014). Ammonia emissions from UK non-agricultural sources in 2013: contribution to the National Atmospheric Emission Inventory. Centre for Ecology & Hydrology (Edinburgh Research Station).
1. **Your views**

Your views are sought on the following key issues:

1. Do you have, or are you aware of, data on emissions of NH3 from biogas facilities?
2. Do you have any other comments on the approach set out above?
3. **Consultation programme**

An introductory discussion has been held with the TFEIP management group at their meeting on 11 February 2015. Emissions of NH3 from AD of livestock manures will be discussed at the EAGER meeting on 16-17 April. Consultation with TFEIP members is planned to take place during the TFEIP meeting and workshop in May 2015. Following this, the project team will develop draft methodologies and Guidebook text. This will be circulated for consultation in late 2015, working with the TFEIP Expert Panel co-chairs.

Thank you for your co-operation with this process.

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