

Methane Emissions in Europe: exploring Threats and Opportunities

A Workshop within the IASS Program "Transformation of the Energy System"

Date: 11th, February 2016

Venue: IASS Potsdam

Workshop concept

Over the past years European countries and in particular Germany have taken important steps toward a low-carbon future. Renewables and emerging technologies are expected to play a central role in achieving a meaningful reduction in GHG emissions. In this context, the role of natural gas in the future energy transition is being discussed. Worldwide, natural gas finds wide application in sectors such as heating, electricity generation, petro-chemical industry and transport, and its present global consumption of 3500bcm is projected to rise steadily in the net decades¹.

Natural gas emits about half carbon dioxide than coal during combustion. However, methane leakages occur at many stages of the natural gas supply chain, from well drilling and production to processing, transportation and distribution. If methane leakage accounts for more than ~2.7% of gas produced, advantages of natural gas versus coal are lost in the immediate². This is because the Global Warming Potential (GWP) of methane is 84 times the one of carbon dioxide over a 20-year period according to the 2014 IPCC report³. This raises the question of what the true carbon footprint of natural gas is once regional leakage rates are taken into account, and therefore its real benefits as a "transition" fuel.

According to the US EPA, natural gas and petroleum systems are the largest source of methane emissions accounting for 29% of the total natural and anthropogenic gas released to the atmosphere⁴. The break-down of methane emissions by segment shows that gas transmission and distribution accounts for almost 50%⁵. Although the topic of fugitive emissions from the O&G sector have been widely discussed in the US in the past years, to date very little attention has been paid on European gas pipeline systems. The extent of methane leakages in Europe and Russia is still a matter of investigation, and accurate updates are lacking. Russia indeed has a considerable energy saving potential, and several international organizations (e.g. IEA, US EPA, Wuppertal Institute, Eon) have been engaged to investigate it within the gas transmission and distribution system. Official Russian inventories estimate methane leakage ranging between 3 and 6 bcm per year.

Similarly ,accurate data on methane emissions in the EU are very scarce. In 2005 greenhouse gas emissions of natural gas from the European transmission, storage and

¹ WEO, 2015

² EDF, 2015

³ 5th Assessment Report (AR5)

⁴Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013.

⁵<http://pubs.acs.org/doi/pdf/10.1021/acs.est.5b01669>

distribution systems were recognized as an important subject to study by nine European countries. Accordingly, several working groups and initiatives were established by business community, research institutes and governments, although no significant progress has been accomplished since. At a global scale, self-reporting methane emissions from the O&G sector notify significant discrepancies: in the Middle East area for instance, Kuwait report leakage rates 26 times lower than Bahrain, although they show similar natural gas production profiles. Amongst the 20 largest NG producers, while the US, Canada and Russia report gas leakages between 1% and 3%, other countries like Qatar, Saudi Arabia, China, Norway and the Netherlands report almost no emission. Even larger disparities are reported for upstream oil leakage rate⁶. Factors responsible for such leakage offsets are currently poorly understood, and needs to be searched amongst measurements methodologies and the state of national infrastructure. Large efforts are needed to prove whether those estimates accurately reflect on-the-ground conditions, and uncertainty levels remain high also in Europe.

High leakage rates could have tremendous negative impacts on climate, especially if considering the expected rise in global production. The future role of natural gas and its contribution to lower current emissions goes hand-by-hand with the methane leakage reduction potentials through implementation of mitigation measures at global scale. Curbing fugitive methane emissions gives a chance to achieve rapid progress in slowing climate change and improve air quality. On the other hand, lack of efforts would dissipate the relevant NG potential to act as a bridging fuel to future renewable energy generation. Economic viability of mitigation and prevention strategies, technical solutions and reasons for delay of their implementations must also be accounted.

In the context of the energy transition occurring in Europe and Germany, it is crucial to address the real carbon footprint of NG, whether if imported from Middle East (i.e. LNG), through long-distance pipelines (i.e. from Russia), or if domestically produced. Negotiations on climate will benefit from investigating into these unknowns, guiding geopolitical debates and energy trading towards cleaner NG supplies and lower national GHG emissions. Rising understanding and concerns on both value and threats of methane might also trigger wider international efforts to minimize unwanted gas losses. It is therefore key to identify the role that European countries might play in this context, promote best practices so to maximize the economic return and environmental benefits of NG utilization.

The **workshop aims** to initiate debates on current status, potential and limits of methane emission reductions in the European NG supply chain. Furthermore, the workshop also seeks to analyze the stakeholders approach when facing the issue of methane leakage, in both contexts of international climate policies and energy trading. More precisely, the workshop will address the following research questions:

- 1) What is a current status of methane leaks from the natural gas supply chain in Europe and Russia?
- 2) What options are available to mitigate methane leaks and what are their limits?
- 3) According to the potential of curbing methane leakages, what role could natural gas play in the future transformation of energy systems?

⁶ Untapped potential. Reducing Global Methane Emissions from Oil and Natural Gas Systems. April 2015

PROPOSED AGENDA

08:30-09:00 – Registration

09:00-09:15 – Opening, Prof. Dr. Mark Lawrence, Managing Scientific Director, IASS

09:15-09:30 – Introduction, IASS

Session 1: Future role of gas in energy transition and climate policy

09:30-10:00 – Is there a significant place for gas in Europe's future energy mix? – **Dr. Thierry Bros, Société Générale**

10:00-10:30 – Potential role of gas in transport sector – **Alexey Mozgovoy, Gas- und Waerme Institut, Essen**

10:30-11:00 – Vision for gas in a future more integrated and more renewable European energy market - **Frnazjosef Schafhausen, German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMBU), Berlin**

11:00-11:30 – Coffee break

11:30-12:00 – The role of methane emissions in climate negotiations – **Markus Klingbeil, IEA, Paris**

12:30-13:30 - Lunch

Session 2: Current status of methane leaks in Europe and Russia

14:00-14:30 – Methane emissions from European and German gas sector - **(TBC)**

14:30-15:00 – Current projects on methane emissions from gas supply chain in Germany– **Gert Müller-Syring, DBI Leipzig**

15:00-15:30 – Gazprom activities on methane emissions reduction - **Gretta Akopova, Gazprom Laboratory of Environmental Protection and Resource Saving**

15:30-16:00 – Coffee break

16:00-16:30 A case study in opportunities and challenges in reducing short-lived forces in Russia – **Meredydd Evans, Pacific Northwest National Laboratory, USA**

16:30-17:45 – Discussion

17:45-18:00 – Closing remarks

18:30 – Dinner