European Engine Power Plants Association

Public Consultation on legislation to measure and mitigate methane emissions in the energy sector

EUGINE Contribution

EUGINE thanks the European Commission for the opportunity to provide input on a policy proposal for a legislative act to further reduce methane emissions in the energy sector. As a complement to our consultation reply, this document provides some insights into our sector in the context of energy sector methane emissions in the European Union (EU) and beyond.

Methane Emissions and Gas Engines

In 2018, total anthropogenic methane emissions in the European Union stood at around 16 Mt, of which 2,9Mt were attributed to the energy sector[1]. Based on EU and national emission thresholds, **methane emissions originating from engine-based power generation are generally estimated at around 0.35 Mt in the EU**[2] - that is, 0,02% of total emissions and 12% of domestic EU energy sector emissions.

However, despite the low incidence of engine emissions on total emissions, engine manufacturers have been working for years to reduce methane emissions, which have considerably decreased over the years. New abatement technologies are being tested and implemented.

The key challenge: Not the technology but the gas used

The main source of methane emissions in engine-based power generation is unburned methane from the input gas. Even in the European Union, the methane content of the gas flowing through our networks varies between countries, depending on the origin of the natural (fossil) gas and on the shares of biomethane and hydrogen injected in the grid. Generally, natural gas is considered to have a methane content of at least 80%.

Although, as stated by the IEA[3], there is still "ongoing uncertainty" in methane emissions from oil and gas operations, unsurprisingly, the largest share of methane emissions from natural

[1] Eurostat, Greenhouse gas emissions by source sector (Last update 08-02-2021), https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_air_gge&lang=en

[2] GIE, Marcogaz et al., Potential ways the gas industry can contribute to the reduction of methane emissions: Report for the Madrid Forum (5 - 6 June 2019), https://www.gie.eu/index.php/gie-publications/methane-emissions/methane-emission-report-2019

[3] IEA, Methane Tracker 2020 (Abstract), https://www.iea.org/reports/methane-tracker-2020/methane-from-oil-gas#abstract

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gas stems from upstream and downstream activities and not its end-use (which consists in using the methane in combustion processes).

The most effective way to reduce methane emissions from gas power generation is, therefore and, in the first place, tackling the life-cycle emissions of the input gas itself.

In that line, **gas engine manufacturers are actively preparing their technology to be "hydrogen-ready"**, that is, to be able to run on certain blends of hydrogen and methane or to run fully on hydrogen. As a gas that does not emit any greenhouse gases, already a limited blend of hydrogen can help reduce emissions in gas-based power production. As stated in a previous position paper, the upcoming review of gas market rules should enable the blending of certain amounts of hydrogen into the network.

Gas engines are also very much adapted to run on renewable gases such as biogas. Latest data[4] by the European Biogas Association shows that at the end of 2019, there were 18 943 biogas plants in Europe – most of them run with a gas engine. When biogas is upgraded to the same quality than natural gas, it becomes biomethane. Especially when produced using waste, both biogas and biomethane contribute to the circular economy and emission reductions in other sectors.

In addition to reducing the life-cycle emissions from the input fuel, other measures exist to diminish methane emissions in gas engines, which stem in the largest part from incomplete combustion and in a much lesser part from starts, stops and engine failures. As incomplete combustion reduces the efficiency and profitability of the plant, operators and manufacturers have a strong interest in minimizing it.

As already explained in a paper by the global combustion engine association CIMAC in 2014[5], **methane emissions from gas engines can be reduced either by changing the design of the engine itself** (internal measures) **or through the use of after-treatment measures** of the exhaust gas. Regarding specifically after-treatment measures, research and development is currently ongoing to improve the technology and solve some of the issues posed by it (trade-offs between the reduction of NOx and unburned emissions, global efficiency of the engine)[6].

The current legal framework: A successful tool to control emissions

Today, gas engine power plants need to comply with the emission thresholds set in European legislation and their national implementation measures. The main texts regulating methane emissions are the **Industrial Emissions Directive** and the connected Commission Implementing Decision (EU) 2017/1442 of 31 July 2017 establishing **best available techniques conclusions for large combustion plants (LCP BAT)** for larger engine-based power plants and the **Medium Combustion Plant Directive (MCPD) for the smaller installations**.

For larger engine power plans of ≥ 50MW rated thermal input, LCP BAT sets emission levels for both new and existing plants and requires plants' methane emissions to be measured once a year. By August 2021, all the plants' permits will need to be updated to comply with those provisions.

[4] EBA, EBA Statistical Report 2020 shows significant growth and potential of biomethane to decarbonise the gas sector, https://www.europeanbiogas.eu/eba-statistical-report-2020-shows-significant-growth-and-potential-of-biomethane-to-decarbonise-the-gas-sector/

[5] CIMAC, CIMAC Position Paper WG 17 – Methane and Formaldehyde Emissions (April 2014), https://www.cimac.com/cms/upload/workinggroups/WG17/CIMAC_Position_Paper_WG17_Methane_and_Formaldehyde_Emissions_2014_04.pdf

[6] EUROMOT, EUROMOT Position: Methane Slip from Internal Combustion Gas Engines (April 2012)

While the MCPD does not require Member States to set emission levels for methane, some have done so. The best-know case is Germany, which has *de facto* regulated CH4 emissions for engines by setting emission levels for organic compounds, measured as "total (organic) carbon" in its 44. BImSchV.

Those emission levels are considered state-of-the art by the industry and have posed certain technical challenges requiring considerable R&D investments and technological adaptations, which, as already describe earlier, are still ongoing.

The **European Pollutant Release and Transfer Register (E-PRTR)** already today provides publicly accessible data on gas plants' methane emissions on an annual basis for larger plants. While EUGINE sees an interest in the annual measurement and reporting of data as set in current legislation, **constant measurement would in our view not be cost-efficient**, especially for smaller plants.

Finally, it should be noted that expected methane emissions of an engine are known to clients (utilities and others), given that the technology complies with emission levels. It should however be underlined that **the exact amount of actual CH4 emissions will depend on the input gas quality**. Notably, **a higher amount of hydrogen blended into gas networks could have a positive effect on total emission levels**.

Our engagement

Engine manufacturers have been working since years to improve the technology and reduce emissions. In addition, **gas power generation is in transition to reduce its overall GHG impact from CO2 but also CH4 by switching to renewable and low-carbon gases** (including hydrogen).

Existing legislation, as described in this paper, **has proven to be efficient in controlling and setting a path for emission reductions**. In our view, any changes with regards to methane emissions resulting from incomplete combustion (the largest source of methane emissions from engines) should be addressed within this framework.

EUGINE members are fully engaged with the EU climate goals, notably its net-zero target. We stand ready to continue working and look forward to engaging with policymakers and stakeholders on this important issue.