

Methane emissions in the chemical industry

EC request to Cefic: the European Commission's (EC) energy department (DG ENER) reached out to Cefic in January 2021 to get more information on methane emissions across the value chains of the chemical industry.

Background:

- Following the Green Deal, the European Commission (EC) published its methane strategy in October 2020.
- Methane is a powerful greenhouse gas which has at least a 28 times higher global warming potential than CO₂. It is after carbon dioxide the second biggest contributor to climate change. In addition, it is also a potent local air pollutant causing serious health problems.
- Reducing methane emissions is therefore essential to reaching EU's climate targets as well as contributing to the EU's zero-pollution ambition. The EC focusses with its methane strategy on methane emissions in the energy, agriculture, and waste sectors.
 - With regards to the *energy* sector, the EC is currently developing a legislative proposal for Q4 2021. It will include binding rules on monitoring, reporting, verification, leak detection and repair in the energy sector and will consider rules on routine venting and flaring. The EC published already an inception impact assessment and will launch a public consultation in the first quarter of 2021.
 - In *agriculture*, the EC will improve reporting of emissions through better data collection and promote opportunities to reduce emissions with support from the Common Agricultural Policy.
 - In the *waste* sector, the EC will consider further action to improve the management of landfill gas, harnessing its potential for energy use while reducing emissions, and will review the relevant legislation on landfill in 2024.
- The EC is examining all sources of methane emissions in the EU and therefore asked Cefic for more information about methane emissions of the chemical industry. The following information has been submitted to European Commission's DG ENER. Cefic aligned its response below with Plastics Europe and Fuels Europe.

Cefic response to EC:

The analysis shows that methane emissions from refineries and chemical plants represent only a small fraction of the methane emissions reported by other EU industrial facilities covered by EPRTTR and are very small compared to the CO₂ emissions from refineries and chemical plants.

Methane emissions in the chemical industry:

When looking closer at methane emissions during the life cycle of e.g. plastics, methane emissions occur at the following stages of the supply chain:

1. Methane emissions during the exploration and production of oil and gas.

This is by far the largest contributor of emission across the supply chain, which (or as) has been documented by PlasticsEurope.¹

2. Diffusive emissions of methane in refineries and crackers.

Most EU countries have LDAR (Leak Detection and Repair) programs, which aim to reduce diffusive emissions. However, only NMVOC (Non-Methane Volatile Organic Components) are often reported. The impact of LDAR programs is to reduce diffusive emissions by repairing leaking equipment, instrumentation, and piping. So even though the reporting obligations only concern NMVOC, these LDAR programs do help reduce both NMVOC and methane emissions.

Remark: Some countries oblige to report TVOC (Total Volatile Organic Compounds) and NMVOC, so it is possible to get an indication on the order of magnitude of these methane diffusive emissions in these countries by subtracting NMVOC from TVOC.

3. Emissions of methane during combustion in furnaces and boilers of refineries, crackers and polymerization units.

4. Emissions of methane during the end of life phase of plastics ending up as non-collected litter in the environment. This would be due to anaerobic decomposition of plastics.

As indicated above, the largest contributor to methane emissions is the exploration of gas and oil. Contributions from items 2 and 3, when converted to equivalent CO₂ emissions, are minor if compared with the total CO₂-eq emissions from refineries and crackers. Emissions from end of life of plastics are estimated to be relatively small as the decomposition of plastics is a slow process and plastics will only be converted partially to methane. These emissions can be avoided by preventing plastic waste from ending up in the environment.

One source of quantitative indication of methane emissions in the EU is the *European Pollutant Release and Transfer Register (E-PRTR)*. Although emission data are only reported if exceeding a certain threshold value, the EPRTR still provides a good indication of methane emissions in Europe. Data below are reported total emissions in 2017 for all reported states for E-PRTR.

- Methane emissions in the EU **chemical industry**: 8,3 kton (versus 110.382 kton of CO₂ emissions)
- Methane emissions from **EU refineries**: 16.6 kton (versus 134.793 kton of CO₂ emissions)
- Methane emissions from **all EU industrial activities** covered by EPRTR: 1.642,0 kton

Conclusion

Methane emissions from refineries and chemical plants represent only a small fraction of the methane emissions reported by other EU industrial facilities covered by E-PRTR and are very small compared to the CO₂ emissions from refineries and chemical plants.

¹ <https://www.plasticseurope.org/en/resources/eco-profiles>