ELIMINATING METHANE EMISSIONS FROM THE ENERGY AND PETROCHEMICAL SECTORS

Methane is the most potent greenhouse gas after CO$_2$ and has been regulated both by the Kyoto Protocol in 1997 and the Paris Agreement in 2015. Long underreported and mostly ignored, awareness of the true magnitude and climate impact of methane emissions has increased significantly in recent years, in particular from the energy and petrochemical sectors. The further extraction and consumption of fossil gas is incompatible with the EU’s objective to reach climate neutrality, calling for decisive action from EU policymakers and the need to phase out fossil gas by 2035.

The Paris Agreement, the European Green Deal, the Governance Regulation and the Strategic Plan for Methane provide vehicles for transitioning the EU economy away from its reliance on fossil gas and rapidly addressing methane emissions from the energy and petrochemical sectors. The EU has the responsibility to promote non-fossil alternatives, based on local and sustainable renewables, to achieve energy security and independence while protecting the climate system and boosting the economy. It is now only a question of political will.

Against this backdrop, the European Commission should propose in its methane strategy and related policy initiatives (revision of trans European energy networks regulation) immediate measures to reduce methane emissions from the energy and petrochemical sectors both domestically and outside the EU.

Although not addressed here, other sources of anthropogenic methane emissions, such as those from agriculture and waste, are equally important and will require their own package of policies. Mandatory EU ceilings and monitoring requirements to ensure limits on fugitive methane emissions from anaerobic digestion of biomass and agricultural waste are essential to complement fossil methane mitigation measures.

**KEY FACTS**

1 The term “fossil gas” is used herein instead of the term “natural gas” to differentiate between gas derived from fossil sources and gas derived from non-fossil sources, such as agriculture and waste.
2 Anderson, K., & Broderick, J., *Natural Gas and Climate Change* (2017, University of Manchester)
Recent studies show that actual global anthropogenic fossil methane emissions are much higher than reported—up to 40%—with the oil-and-gas sector identified as the main contributor to the rapid acceleration of atmospheric methane, and further exacerbating its impact on the climate system.4

According to EU reported emissions to the UNFCCC, annual fugitive emissions from gas, oil and coal equal approximately 80 million tonnes CO$_2$eq which represents about 2% of the EU’s total annual CO$_2$ emissions.5

Fossil gas currently comprises about one quarter of the EU’s energy mix; the EU is a major driver of global methane emissions at production sites and across the supply chain, importing over half of globally traded fossil gas.6

Methane is 86 times more potent compared to carbon dioxide (CO$_2$) over a 20-year period, making it one of the most potent greenhouse gas (GHG), contributing to 25% of the warming experienced to date.7 This means it is essential to reduce total and new methane usage, contrary to current intention.

Methane emissions occur across the entire fossil-gas supply chain—e.g. extraction, pre-production, processing, liquefaction, transmission, distribution, storage and use—both inside and outside the EU.

EU consumption of coal, oil and natural gas liquids (NGL) also contribute to methane emissions.

MEASURES TO ADDRESS METHANE FROM THE ENERGY AND PETROCHEMICAL SECTORS

The Commission should propose a package of policies that will ensure immediate cut of methane emissions from the energy and petrochemical sectors, headlined by:

(i) a phase-out of fossil gas by 2035 steered by national phase out plans including an immediate stop of fossil fuel infrastructure construction;
(ii) immediate policies to eliminate venting and flaring;
(iii) immediate policies requiring leakage detection and repair coupled with mandatory monitoring, reporting and verification;
(iv) a mandatory methane performance standard
(v) a ban on fracked gas

Scientists have shown that fossil gas can have no role beyond 2035 for the EU energy system to be compatible with the Paris Agreement.8

FOSSIL-GAS PHASE-OUT

Fossil gas is used predominantly in industry and for electricity and heating. While prioritising energy efficiency and renewable energy production, the EU should initiate a comprehensive transition away from the use of fossil gas in these sectors. It should plan for a forecasted phase-out of fossil gas excluding new gas infrastructure while developing a concurrent uptake of non-fossil alternatives.

Fossil-Gas Phase-Out Plans. By 2023, and linked to the review of National Energy and Climate Plans (NECP), Member States should be required to adopt fossil-gas phase-out plans with intermediate targets setting out an immediate and evenly paced pathway toward reducing fossil-gas consumption, outlining policies for eliminating reliance on fossil gas within twelve years (by 2035).

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4 Benjamin Hmiel et al., (Nature, 19 February 2020), Preindustrial CH4 Indicates Greater Anthropogenic Fossil CH4 Emissions
5 See section 3.2.6 from the European Environment Agency’s Annual European Union greenhouse gas inventory 1990–2017 and inventory report 2019
7 IPCC AR5 WGI Chapter 8
Ineligibility for Financial Assistance. Make existing and new fossil gas and fuel infrastructure projects - including pipelines, grids, LNG terminals, fossil-gas power plants and petrochemical facilities - ineligible for state aid, EU funding and loans. Financial assistance should be redirected toward promoting non-fossil alternatives.

ACCOMPANYING MEASURES TO ABATE METHANE EMISSIONS ON THE FOSSIL GAS SUPPLY CHAIN

The Commission found that, above a leakage rate of 3% along the supply chain, the climate impact of fossil gas is worse than that of coal in power generation, and increased trade in and imports of liquefied natural gas to Europe might prove to have a much higher global warming impact than anticipated.

Interim and immediate measures to reduce methane emissions across the gas supply chain, domestically and outside the EU, to the maximum extent possible should apply for as long as gas is used, be designed to promote compliance and, include third-party certification, verification and risk-based targeting mechanisms for inspections by EU competent authorities.

These measures are often a win-win as they make economic sense for gas suppliers.

- **Immediate ban on Venting and Flaring Fossil Gas.** Prohibit gas suppliers from placing on the market fossil gas, including energy derived therefrom, where venting and flaring occurs during production and processing unless evidence is provided that the limited use of flaring is for a legitimate purpose, e.g. safety testing or safe disposal of harmful gases, and no technique exists that could in actual fact capture the methane.

- **Immediate Leakage Detection and Repair (LDAR).** Prohibit gas suppliers from placing fossil gas on the EU market without undertaking mandatory and periodic (at least quarterly) leakage detection and repair (LDAR) at production sites, supported by verified evidence of reductions. The Commission should establish minimum LDAR requirements, drawing upon industry-wide source-by-source best practices.

- **Mandatory Monitoring, Reporting and Verification (MRV).** Prohibit gas suppliers from placing fossil gas on the EU market without systematic and mandatory methane monitoring, reporting and verification (MRV), including documentation of LDAR compliance. Reporting should be based on a comprehensive equipment survey and application of the most up-to-date emission factors, with a directive to move to actual measurement data within two years. Data on methane emissions and LDAR should be publicly available as open source data files, in a mandated prescribed format to ensure straightforward comparison, and serve as the basis for prioritising the phase-out of the most polluting forms of fossil gas.

- **Mandatory Methane Performance Standard.** Adopt a mandatory methane performance standard that caps methane emissions at 0.2% along the entire supply chain for both domestic and imported gas sold and consumed in the EU by 2025.

- **Immediate ban on Fracked Fossil Gas.** Fracking is a particularly egregious form of fossil-gas extraction, which can be at least as bad as coal from a climate perspective due to significant methane emissions.

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3 of 6
resulting from the process. To prevent further exploitation of fracked gas, the EU should immediately prohibit fracking within EU borders coupled with an import ban on gas produced through fracking.

- **Methane Emissions from Abandoned Wells.** A significant number of wells that have ceased production continue to emit methane into the atmosphere. Competent authorities should adopt policies to ensure those wells, where ownership can be documented, are capped or filled to stop methane leakage and make sure that those responsible for the leaks are paying the costs. At wells, where ownership is not known, a funding programme paid for by direct taxes on revenue from fossil fuel companies should ensure these abandoned wells are properly capped and leaks are stopped.

**ACCOMPANYING MEASURES ON OIL WELLS**

During oil drilling, fossil gas is sometimes produced as a co-product that is often wastefully vented or flared because energy companies deem it to be insufficiently profitable to be collected and sold. In those cases, accompanying measures specific to oil wells whose oil or oil products are destined for the EU market should be adopted to abate methane emissions and ensure any gas is collected and not wasted.

- **Ban on Venting and Flaring Fossil Gas.** Prohibit oil suppliers from placing on the market oil or oil products, including energy and fuels derived therefrom, where venting and flaring occurs during oil drilling and production unless evidence is provided that the limited use of flaring is for a legitimate purpose, e.g. safety testing or safe disposal of harmful gases, and no technique exists that could in actual fact capture the methane.

- **Leakage Detection and Repair (LDAR).** Prohibit oil suppliers from placing oil on the EU market without undertaking mandatory and periodic (at least quarterly) LDAR at production sites where gas is produced as well, supported by verified evidence of reductions. The Commission should establish minimum LDAR requirements, drawing upon industry-wide source-by-source best practices.

**ACCOMPANYING MEASURES ON COAL**

The EU’s UNFCCC data submission shows the EU’s coal mines leaked 31 million tonnes of CO2 equivalent of methane, representing 0.8% of the EU’s GHG emissions; over half of this is at Polish operational mines. The EU slightly leaked more coal methane in 2017 as was leaked from the domestic oil and gas sectors; this may also apply at global level. The amounts depend on a number of factors, the most important of which are coal rank, coal seam depth and method of mining. Methane leaks apply to thermal coal for power plants, and also to met coal used for steel-making. Methane from coal mines can be mitigated at active mines through degasification activities ahead of the mining wall, and through capture of ventilation air methane (VAM). Although the EU should phase out the use of coal as soon as possible, until such time accompanying measures to abate methane emissions are needed.

- 2030 phase-out of coal-fired electricity, and a 2035 pathway for a 100% coal-free steel production

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15 Carbon Brief Coal mines emit more methane than oil-and-gas sector


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• **Mandatory Leak Detection and Repair Measures.** Require ventilation air methane capture and utilisation at all active coal mines; require capture and utilisation of methane from coal degasification operations at both active and decommissioned coal mines; provide economic incentives for third-party companies to mitigate methane from abandoned coal mines where no existing owner is liable.

• **Monitoring, Reporting and Verification.** Prohibit coal suppliers from placing coal and coal products, including energy derived therefrom, on the EU market without first undertaking mandatory monitoring, reporting and verification of methane emissions from coal mining operations, including abandoned coal mines where ownership is known.

• **Mandatory Methane Performance Standard.** Adopt a mandatory methane performance standard that caps methane emissions along the entire supply chain for both domestic and imported coal sold and consumed in the EU by 2025.

**ACCOMPANYING MEASURES ON NATURAL GAS LIQUIDS**

Depending on the geological layers, some fossil gas production sites contain a higher percentage of natural gas liquids (NGL), which are hydrocarbons such as propane, butane and ethane separated out from the “dry” fossil-gas (i.e. methane) stream and used in a number of applications, including as feedstocks for the production of virgin plastic resins by petrochemical companies. The EU should ban new plastics infrastructure, co-products contributing to methane emissions during gas production. This must be aligned with the obligations under the Single-Use-Plastics Directive and combined with the clear need to drastically reduce plastic waste, including plastic pellet pollution.

• **Ban on Venting and Flaring during NGL Production.** Prohibit suppliers from placing NGL and NGL products, including pellets and plastics derived therefrom, on the EU market where venting and flaring occur during gas production and processing unless evidence is provided that the limited use of flaring is for a legitimate purpose, e.g. safety testing or safe disposal of harmful gases, and no technique exists that could in actual fact capture the methane.

• **Leakage Detection and Repair (LDAR).** Prohibit NGL suppliers from placing NGL and NGL products, including pellets and plastics derived therefrom, on the EU market without undertaking mandatory and periodic (at least quarterly) LDAR at production sites, supported by verified evidence of reductions. The Commission should establish minimum LDAR requirements, drawing upon industry-wide source-by-source best practices.\(^{17}\)

• **Ban on Fracked NGL and NGL products.** Prohibit the placement on the market of NGL and NGL products, including pellets and plastics derived therefrom, when produced from fracked gas.\(^ {18} \)

Action focusing on reducing methane emissions, in addition to reducing CO2 and other greenhouse gas emissions, will contribute substantially to stabilising the climate system.

**For more information**

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\(^{18}\) See e.g. US Energy Information Administration (website, last visited 9 March 2020). *Petroleum and Other Liquids.*
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