

An EU Methane Performance Standard

- Scenario results from the Global Gas Model

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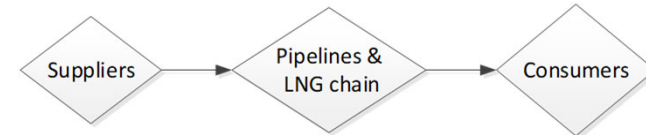
Webinar: Methane reduction and energy security – The EU's transformative role.



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***HOW DOES AN EU METHANE PERFORMANCE STANDARD
AFFECT METHANE EMISSIONS AND EU SUPPLY SECURITY?***

Global Gas Model



- Computes global gas trade and infrastructure investment
 - Country-level
 - Considering upstream market power
- Inputs:
 - Production and consumption values (source: e.g., International Energy Agency)
 - Capacities for liquefaction, regasification, and pipelines (source: e.g., ENTSO-G)
 - Methane emissions, abatement potentials, technologies (IEA GMT 2023)
 - Values for costs, reference prices, market power (various sources, own assumptions)
- Outputs:
 - What are effects of a market shock or a policy?
 - on methane abatement, gas production, consumption, prices, trade, investment...
- Co-developed with Prof. F. Holz, DIW Berlin.
- Over 15 publications based on global gas model research including contributions to several NSF, EU Framework & EU Horizon programs

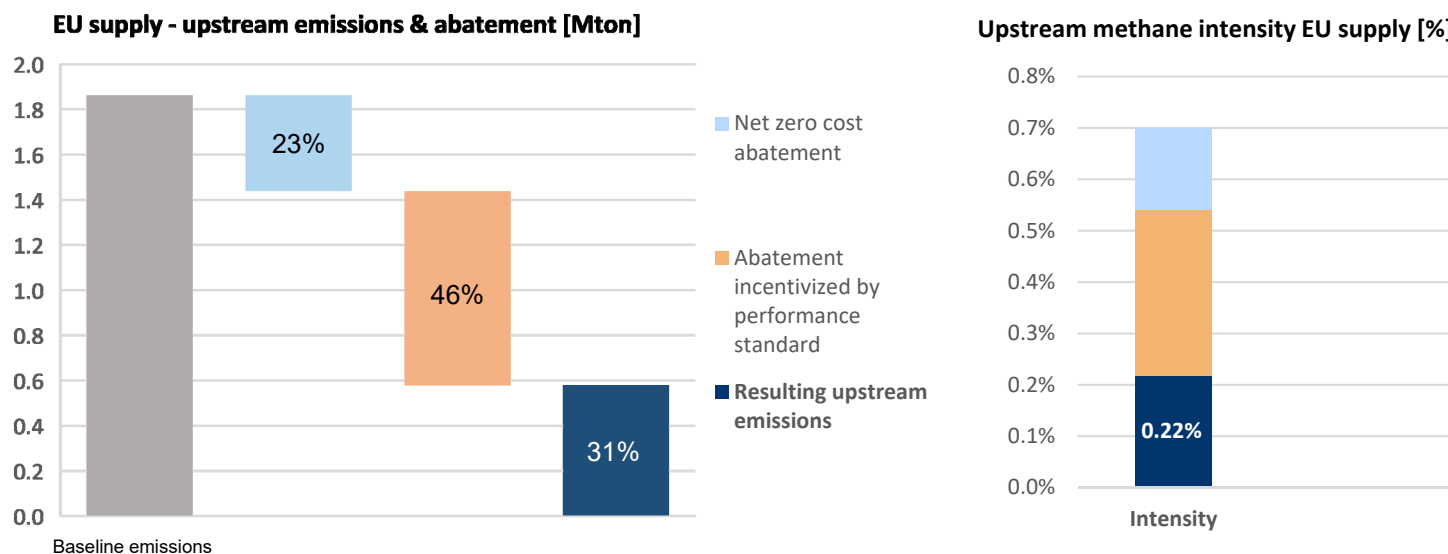
Why the EU should address methane emissions from imports

- EU is the initiator of the Global Methane Pledge together with the US.
- Over 95% of methane emissions related to EU supply are outside of its borders. Moral responsibility to abate such “embedded” methane emissions.
- Lead to set the stage for other gas importing countries: demonstrate it is achievable.
- Align with emissions intensity standard (0.2%) already committed to by oil and gas companies, and with Biden administration methane policy.

Policy Scenarios analyzed with the Global Gas Model

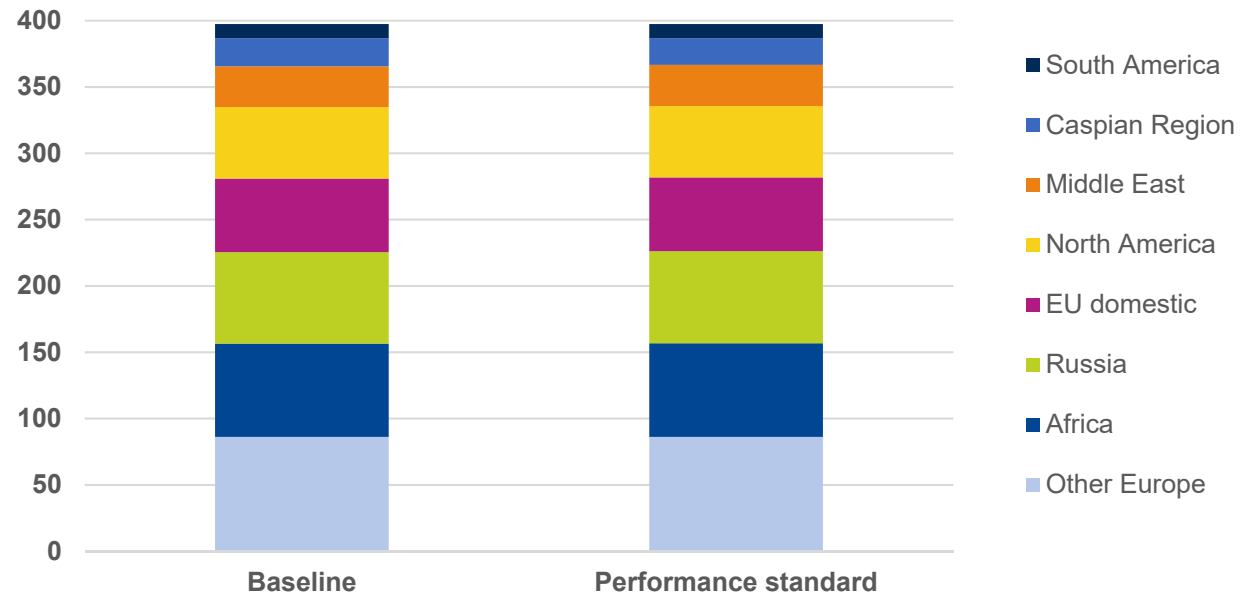
- The EU implements a 0.2% performance standard on embedded upstream methane emissions of natural gas (Oil And Gas Climate Initiative target value 0.2%; achievable)
 - performance standard is theoretically the most efficient measure as it allows suppliers in export countries and along supply chain to choose lowest cost abatement option for every asset
- Fee on emissions above the 0.2% standard: € 1500/ton (Biden Inflation Reduction act methane fee 2026 \$1500; social cost methane emissions \$1700)
- Baseline upstream gas-related methane emission levels (IEA Global Methane Tracker 2023)
 - Global emissions: 22 Mton;
 - EU-embedded emissions: 1.9 Mton, hence intensity = 0.7%
- Benchmark for comparison: Baseline scenario - “Near-term outlook” 2023-2026
- Performance standard scenario – Producing countries implement:
 - all net-zero cost abatement options, for their entire gas production
 - additional abatement options incentivized by the performance standard and associated methane fee, for supply to the EU only.
- Impact on EU-embedded emissions and security of supply?

EU embedded methane emissions from natural gas reduce by almost 70%



- 23% of EU embedded upstream methane reference emissions in gas supply could be abated at net-zero costs – a methane fee would make these abatement options even more profitable.
- 46% is estimated to be abated due to the performance standard and associated fee.
- Total impact: the methane intensity of EU gas supply goes from 0.7% to 0.22%.

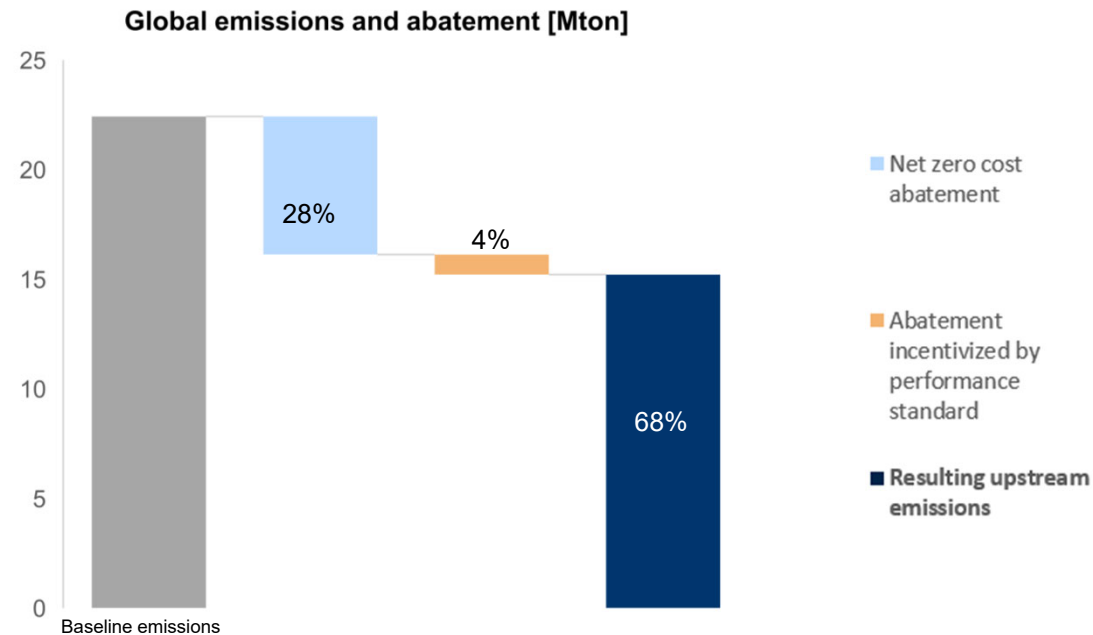
Gas supply mix to the EU: very little impact



- Total supply mix of the EU is hardly affected by the performance standard.
- This does not depend on baseline supply mix as impact on market prices less than 1-2%
- Actual US supplies will be higher and Russian supplies lower than in our baseline case.

Scenario	Other Europe	Africa	Russia	EU domestic	North America	Middle East	Caspian Region	South America	TOTAL
Baseline	86	70	69	56	54	31	21	11	397
Performance standard	86	71	69	56	54	31	20	11	397
Net zero cost only	86	70	69	56	54	31	21	11	398

Impacts on global upstream methane emissions related to natural gas



- 28% (6.3 million tonnes) of global upstream methane emissions related to natural gas could be abated at net zero costs.
- An *additional* 4% (+ 0.9 million tonnes) of global upstream methane emissions related to natural gas is estimated to be abated with the EU performance standard.

Conclusion

- EU 0.2% performance standard and associated methane fee €1500 / ton support abatement of 68% of EU embedded upstream methane emissions in gas supply
- Remaining methane intensity of 0.22% is almost on target; EU own production on target.
- €1500/ton is high enough to make the majority of methane abatement options cost-effective.
- Impacts on EU gas market prices are very moderate, trade diversion effects expected to be small.
 - For most suppliers to the EU, even if they would not abate at all, the fee of €1500/ton corresponds to a 1%-2% markup on current market prices.
 - A double fee level would correspond to at most 4% markup on gas prices.



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THANK YOU FOR YOUR ATTENTION



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ADDITIONAL NOTES

Some underlying assumptions

- IEA Global Methane Tracker assumes a 10% discount rate to determine annualized net abatement costs. This discount rate is implicitly used in our analysis as well.
- Gas prices in this analysis are in line with pre-Covid expected long-term prices.
- Post-Covid market prices and price expectations in major importing regions are significantly higher, however not so much in, e.g., USA. This should make a larger part of abatement options beneficial already at net zero costs.
- Gross abatement technology costs are computed based on net costs from IEA Global Methane Tracker
- The Global Gas Model is a long-term equilibrium model, and does, e.g., not account for supply contracts.

Methane data uncertainty

- The above analysis only considers upstream gas-related emissions
- Results presented only considers a performance standard *on natural gas and gas-related methane emissions, upstream*. I.e., analysis does not include a corresponding performance standard on oil, and does not consider downstream emissions.
 - **Gas-related *upstream* methane emissions - baseline emission levels**
 - Global total: 22 Mt
 - EU embedded 1.9 Mt — on average 0.7% of gas supplied to EU
- For reference:
 - total global oil and gas-related *upstream* methane emissions from the IEA Global Methane Tracker: 60 Mt.
 - total global oil and gas methane emissions (including upstream + mid-and downstream) from methane science studies: 80-140 Mt.

€ 1500 / ton → € / MWh

- € 1500 / ton is higher than the (annualized) cost of most abatement options, hence incentivizes abatement.
- € 1500 / ton for natural gas with a methane leakage intensity of 1% translates to € 0.8 / MWh, which is only about 2% of current market prices, hence hardly distorts market prices or trade flows.
- Details
 - Consider an intensity of 1% of 1000 m³ = 10 m³, at 0.671 kg / m³ = 6.71 kg of emissions
 - € 1500 / ton = € 1.5 / kg
 - Threshold 0.2%: [1% - 0.2%] = 0.8%
 - 0.8% x 6.71 kg = 5.4 kg
 - € 1.5 / kg x 5.4 kg = € 8 / 1000 cm (= € 0.008 / m³) = € 0.8 / MWh