Uncertainty remains on climate credentials while natural gas is promoted as a transport fuel.
The growing interest in the idea of using natural gas as a transport fuel to tackle air quality problems and climate change in the European Union (EU) makes it important to consider emissions from throughout the supply chain. Currently, the transport sector accounts for only 2 billion cubic meters (bcm), or 0.5%, of natural gas use in the EU, but it is likely to grow, as shifting to gas is one of the several options for complying with existing and coming regulations.

The natural gas industry foresees a 15-fold growth of natural gas use—up to 30 bcm—in transport by 2030. The main sectors that could see a partial shift to natural gas are the long-distance transport sectors, notably shipping and trucks, but in some countries, there is also a push to shift passenger cars and city buses to natural gas. The proposed justification varies from energy security, to local air quality, to combating climate change, depending on the stakeholder.

In the EU, between 1990 and 2012, methane emissions from natural gas operations, including pipelines, increased by 16% (data subject to high uncertainty), while overall methane emissions decreased. Now the EU accounts for 6% of global methane emissions. The EU plans to develop a methane strategy in the coming years to more consistently tackle the issue. So far, efforts to reduce methane emissions have been incomplete. For example, methane was not included as a part of the chosen atmospheric pollutants in its 2030 Clean Air Programme, the main tool to decrease industrial emissions.

**Renewable Natural Gas**

In the case of the production of biomethane, or renewable natural gas (RNG), for transport, unintended methane emissions released into the atmosphere are taken into account, as biomethane needs to meet a certain GHG savings threshold measured in CO₂-equivalent. If measurements are not taken, default values are used. In 2021, this will be expanded to all biogas and biomethane, as this will a requirement under the new EU Renewable Energy Directive.

**Liquefied Natural Gas**

The shipping industry may see a shift toward using liquefied natural gas (LNG) as a fuel, to meet the International Maritime Organization’s (IMO) sulfur and nitrogen oxides limits. Some stakeholders have unfounded expectations that LNG could also contribute to the IMO’s vision of decreasing overall emissions by at least 50% by 2050 compared to 2008. However, methane emissions remain an important problem, and significantly reduce any potential GHG savings from LNG to the extent that in some cases LNG’s carbon footprint can be worse than the existing liquid fossil fuels it is supposed to replace.
There are little data on actual real-world emissions of methane from shipping. A study by Norwegian research institute SINTEF puts the onboard methane slip on average at 3.1%, which strongly varies based on the engine technology used.\textsuperscript{4} This is enough to make LNG a worse option than existing marine fuels in terms of well-to-wake GHG emissions even without taking into account upstream methane leakage.

**Compressed Natural Gas**

In the case of passenger vehicles, methane emissions are not measured. Since the advent of EURO 5 emissions standards, there have been limits on total hydrocarbon and non-methane hydrocarbon emissions for gasoline and compressed natural gas (CNG) engines. For diesel vehicles, there is only a limit on total hydrocarbon and nitrogen oxides emissions. The standards relate to tailpipe emissions measured in the lab. Real-world emissions verification is not included and potential leakages before the exhaust are not included. Methane emissions are not a part of the CO\textsubscript{2} standard for vehicles as the metric is not CO\textsubscript{2}-equivalent. There are currently 1.2 million CNG passenger cars on EU roads, one million of them in Italy alone.\textsuperscript{7}

The EURO VI standard for trucks and buses has a limit of 0.5 g/km methane emissions for positively ignited LNG and CNG trucks and buses.\textsuperscript{8} It is unclear if the limit applies also to diesel vehicles, such as high pressure direct injection (HPDI) LNG trucks, which have higher energy efficiency and higher unburnt methane than spark-ignition LNG engines. As for passenger cars, the metric for the vehicle standard on GHG is CO\textsubscript{2}, and not CO\textsubscript{2}-equivalent; so for now, methane emissions are treated as a separate category. In the EU, there are currently 7,100 CNG trucks, 1,600 thousand LNG trucks, and 20,000 CNG buses in operation.\textsuperscript{7}

**Summary**

Natural gas currently represents a niche transport fuel, but it may see growth led by policies around climate mitigation and improving air quality. The climate performance of natural gas powered vehicles is highly dependent on methane emissions from the vehicle and the entire supply chain, both of which are still largely unregulated and uncertain in the EU context. This applies to all modes of transport, including public transportation. Policies at EU and global levels need to consider measuring real-world methane emissions to give a more accurate view of the climate credentials of natural gas. Current policies promoting the use of natural gas have been made with incomplete and over-optimistic information on methane emissions, leading to less-than-optimal policies, not necessarily meeting their objectives. \textsuperscript{em}

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**References**

8. A technical summary of Euro 6/VI vehicle emission standards; ICCB Briefing; The International