

# Emissions targets for transport sector can't be met using natural gas alone

January 28 2019, by Caroline Brogan

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Using natural gas fuel with other methods could help road freight and shipping industries meet targets, says new Imperial College London white paper.

The International Maritime Organization (IMO) - the United Nations' organisation for shipping—seeks to at least halve greenhouse gas emissions from ships by 2050 compared to 2008 levels. The road freight industry, which includes goods transport via trucks, is expected to work towards similar carbon reductions.

Long distance ships and trucks currently use heavy fuel oil and diesel, which emit [greenhouse gases](#) like carbon dioxide (CO<sub>2</sub>) that contributes to global warming. They also emit air pollutants like nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), and particulates which contribute to air pollution and harm human health.

In 2015 for example, road freight – which includes long haul trucks – contributed seven per cent of global CO<sub>2</sub> emissions, and ships contributed up to 2.5 per cent. However, reducing or eliminating carbon emissions from long haul vehicles and ships has proven difficult, with advanced battery electric or hydrogen fuel cell systems more expensive and potentially limited in the range they can deliver.

This new [white paper](#), penned by academics at Imperial's Sustainable Gas Institute, examines the potential benefits of using [natural gas](#) for ship and truck fuel. It looks at how the change could affect greenhouse

gas emissions, air pollution, and cost to industry.

The paper was co-written with academics at Imperial's Centre for Transport Studies, and the University of British Columbia's Clean Energy Research Centre.

## **Findings**

Using natural gas to fuel vehicles and ships releases less carbon than diesel. However the report found that some natural gases, like methane, leak as they move through the supply chain, which significantly reduces the benefit of switching fuel.

The report also questions the value of using natural gas in trucks. In recent years, regulations for trucks has improved their energy efficiency to an extent that switching to natural gas for fuel might not reduce the relative benefit of a switch to natural gas.

Therefore, to make switching worthwhile, natural gas should be combined with energy efficiency measures that will significantly improve greenhouse gas emissions, according to the paper.

They note that electrifying vehicles is an alternative, but that this might not benefit long haul trucks because batteries are currently expensive, heavy, and take up space on a vehicle. The charging time needed also limits the vehicle's time on the road transporting goods.

The authors say switching to natural gas as a transport fuel could provide cost effective emissions benefit and the technology is available, but it won't be enough to reach long term low carbon ambitions. Lead author Dr. Jamie Speirs, from Imperial's Department of Earth Science & Engineering, said: "The greenhouse gas benefits of natural gas as a transport fuel are useful in the immediate term, but must be coupled

with additional [energy efficiency](#) measures and longer term plans that include much lower carbon truck and ship technologies."

## Energy efficiency measures

Ships and trucks that use natural gas are expensive to make, but the authors say the money saved in fuel is likely to outweigh the initial cost over their lifetime as natural gas is currently cheaper than diesel.

Shipping manufacturers can also decrease the amount of energy, and money, used by installing solar panels to supplement energy needs and using sails to harness wind power. Another method is to use barnacle-repellent paint to prevent build up on the hull and keep the ship streamlined.

Similarly, [road freight](#) industries could improve efficiency, using a range of options including more energy efficient tyres to reduce resistance and improved aerodynamics.

The authors of the report say that a combination of options will be needed to meet the goals mainly set out by the IMO. The chosen options must allow for continually improving greenhouse gas emissions to 2050 to combat the emissions of the existing fleet and the expected increases in demand for trucks and ships.

Co-author Dr. Marc Stettler, of Imperial's Department of Civil and Environmental Engineering, said: "To get the full picture on [greenhouse gas emissions](#) we looked at the whole lifecycle and the [fuel](#) supply chain as well as tailpipe emissions. Our review shows that small amounts of methane leakage across the supply chain of natural gas can eliminate the benefit of substituting diesel for natural gas. We also found that natural gas engines tend not to be as energy efficient as diesel engines and that this also reduces the carbon benefits of trucks."

"To achieve deeper emissions reductions, we will require a mix of technologies including electric vehicles for short urban routes, electrification of long-haul operations and more efficient logistics processes."

"White Paper 4: Can natural gas reduce emissions from transport? Heavy goods vehicles and shipping" by Jamie Speirs, Paul Balcombe, Paul Blomerus, Marc Stettler, Nigel Brandon and Adam Hawkes, published 28th January 2019.

**More information:** White Paper 4: Can natural gas reduce emissions from transport? [www.sustainablegasinstitute.org ... -transport-WP4-1.pdf](http://www.sustainablegasinstitute.org/...-transport-WP4-1.pdf)

Provided by Imperial College London

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