



THE OXFORD
INSTITUTE
FOR ENERGY
STUDIES

Why the LNG industry needs to urgently address greenhouse gas emission issues

Professor Jonathan Stern





Why has LNG become important in the context of decarbonisation?

- Greenhouse gas reduction targets are tightening in many LNG-importing countries
- The energy needed for liquefaction is around 8-12% of gas produced at the wellhead (significantly higher than pipeline gas) and can be much higher for FLNG
- LNG as a percentage of natural gas trade is increasing
- Importers are concerned from about upstream emissions in exporting countries – where data may not be available (and very high emissions may be suspected)

Measurement of CO₂ emissions is relatively uncontroversial but methane emissions can significantly increase the total GHG footprint of LNG



The EU Methane Strategy (October 2020)

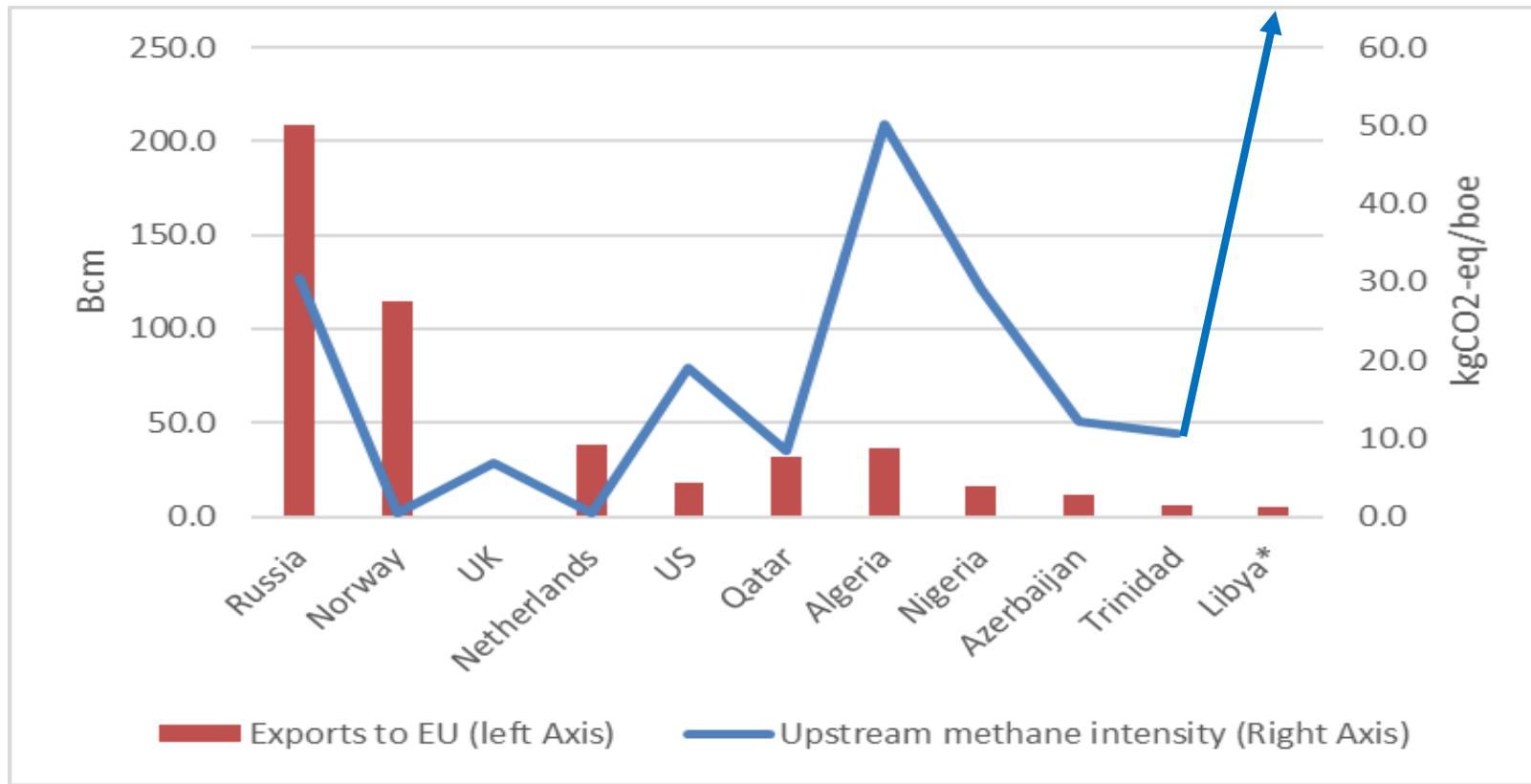
- The Strategy covers all sources of energy, agriculture and waste
- Make Tier 3 – actual measurement of emissions the ‘benchmark standard’
- Voluntary initiatives: Oil and Gas Methane Partnership (OGMP) is the best existing framework – extend through the value chain
- Legislation will require: obligations to report, repair (LDAR improvement), transparency of methodology and data; ‘routine’ venting and flaring to be banned by 2025
- Proposes a coalition of fossil gas importers (China, Japan, South Korea) to ‘coordinate energy sector methane emissions’
- “The EU will lead a diplomatic outreach campaign to fossil fuel producer countries..”
- “In the absence of significant [MRV] commitments from international partners, the Commission will consider proposing legislation on targets, standards or other incentives for fossil energy consumed and imported in the EU.”

Legislation to be proposed in mid-2021 to enter into force 2024



Average Upstream Methane Intensity of Major Gas and LNG Exporters to EU Countries (2019)

Source: Stern (2020)



This is national data for oil and gas exploration and production; intensity of gas and LNG exports may be very different



`Carbon-Neutral' LNG (mainly forest offsets*) and a methodology for GHG emissions from LNG cargos

- Shell-Tokyo Gas (June 2019) delivery in Japan
- Shell-GS Energy (June 2019) delivery in South Korea
- Jera Global Markets - Adnoc (June 2019) delivery in India
- Shell-CPC (March 2020) delivery in Taiwan
- Shell-CNOOC (June 2020) delivery in China
- Total-CNOOC (October 2020) delivery in China**
- Pavilion LNG tender – first contract won by Qatar Petroleum Trading 1.8mt/year for 10 years – each cargo will state GHG emissions from wellhead to delivery point

* The Shell and Total cargoes offset emissions from extraction to regasification; the Jera cargo only offset emissions from the regas terminal downstream **part forest/part wind power offset

- **No details of: how emissions are calculated, how offsets are determined, how and by whom data is verified**
- **Confidentiality poses a problem of credibility**



Options for LNG Projects as Importers Decarbonise

- Reduce emissions by using renewables to replace the feedgas used to power the liquefaction plant
- Divert cargoes to countries where GHG emission issues are less important with no carbon prices
- Recognise the limitations of offsets
- Decarbonise at the regas terminal (reforming+CCS) utilising offshore depleted fields for CO2 storage and offshore pipelines for CO2 transport and...
- coordinate with TSOs to ensure networks and customers can receive hydrogen
- Skip liquefaction, decarbonise in the exporting country, ship hydrogen or ammonia to 'multi-function' regas terminals

LNG exporters have more options than pipeline exporters but will face more competition from cargos with verified (lower) GHG emissions



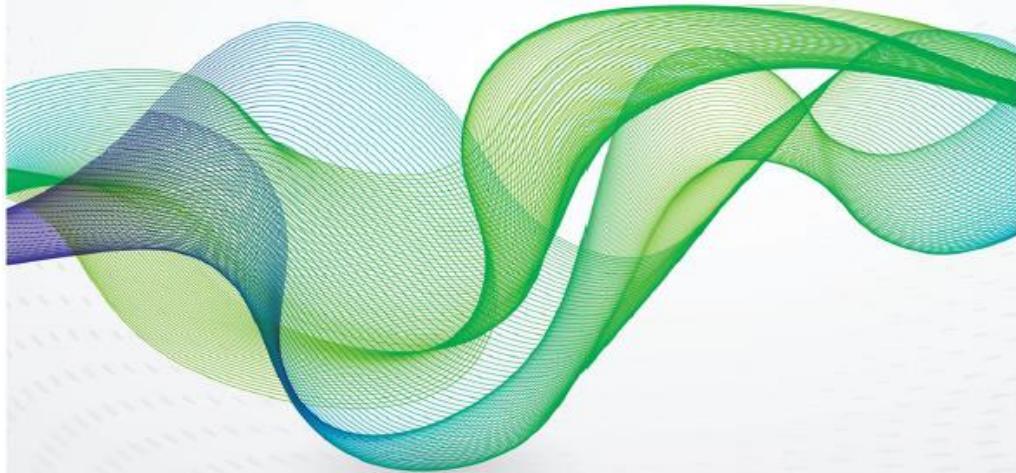
Some Concluding Thoughts About Urgency

- LNG is at the start of a decarbonisation journey and needs to be proactive about its future actions, not reactive in the face of environmental criticism and regulation
- Suggesting that there are more important sources of emissions (agriculture, waste) than LNG, or that distribution and use is much larger source of emissions than the LNG chain is unlikely to impress governments or civil society
- Failure to provide detail of the greenhouse gas (CO₂ and methane) content of cargos on grounds of confidentiality will be interpreted by NGOs as 'greenwash'
- Claiming GHG reductions through coal to gas switching via LNG will be regarded as valid in Asia (much less so in Europe) but needs to be backed up with data on the respective coal and gas value chains

The EU has proposed regulation of gas and LNG imports possibly followed by a methane standard or tax; other LNG importing countries may follow the EU example!

November 2020

Methane Emissions from Natural Gas and LNG Imports: an increasingly urgent issue for the future of gas in Europe



OIES PAPER: NG 165

Jonathan Stern, Distinguished Research Fellow, OIES

JONATHAN.STERN@OXFORDENERGY.ORG

NATURAL GAS PROGRAMME

Published November 30,
2020

download from
www.oxfordenergy.org