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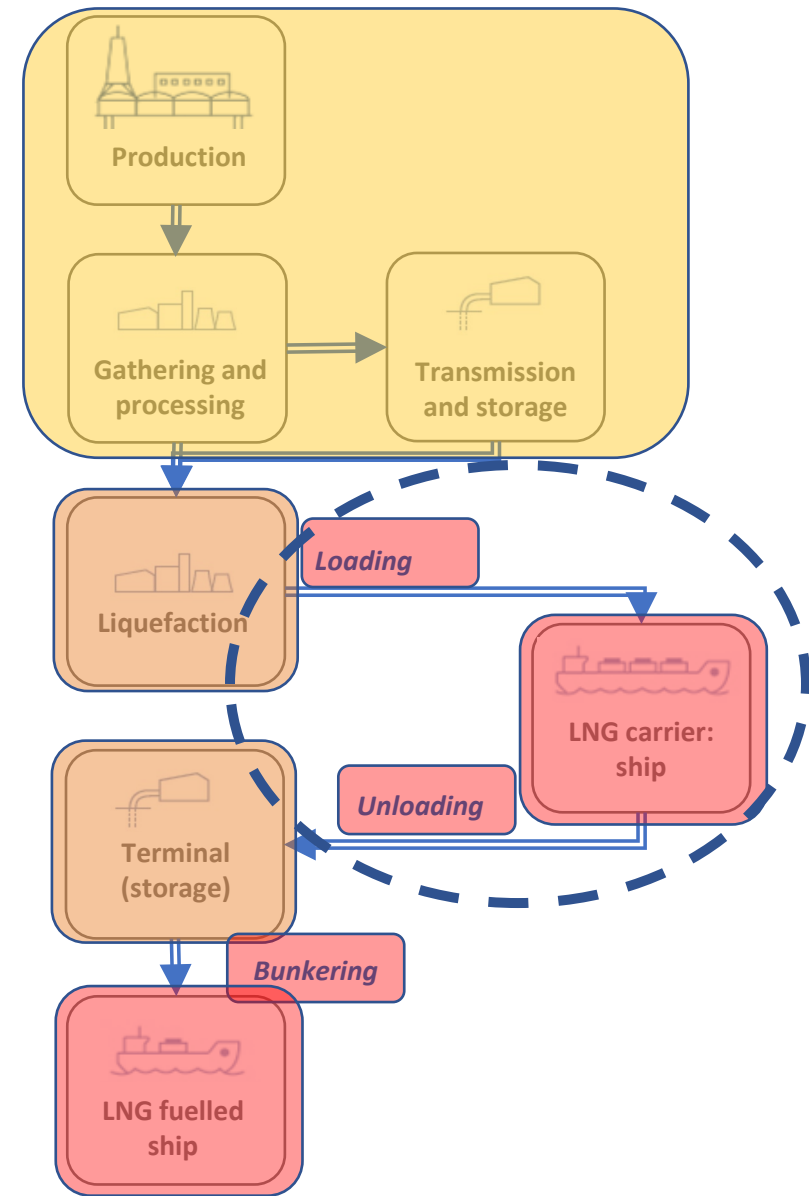
# Low carbon gas supply chain research group: methane research overview

European Gas Research Group, 60<sup>th</sup> Anniversary Conference

Paul Balcombe, December 2021

# Background

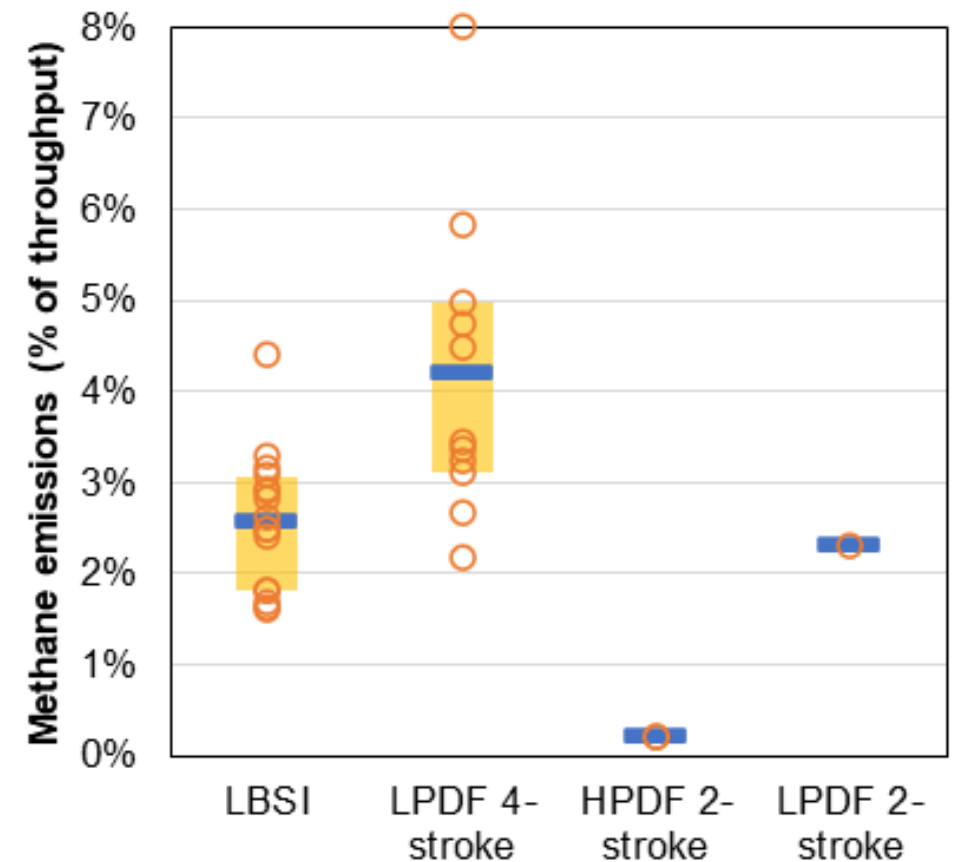
- Much progress on GHG and methane measurement from natural gas in the last decade
- But there are zero measurements of total methane emissions from LNG transport
- The current assumption is low LNG emissions, but some publications now question this.



# What do we know?

Key methane emission categories:	Independent, peer-reviewed published data
- Engine slip	~
- Vents	X
- Fugitives	X
- Maintenance and other activities (e.g. cold vent, gassing up)	X

- We have some engine slip data, but not enough real-life operational data to account for expected variability
- No publicly available vent/fugitives data, likely high variability across operators/ship types



New LNG carrier engine types: not enough data

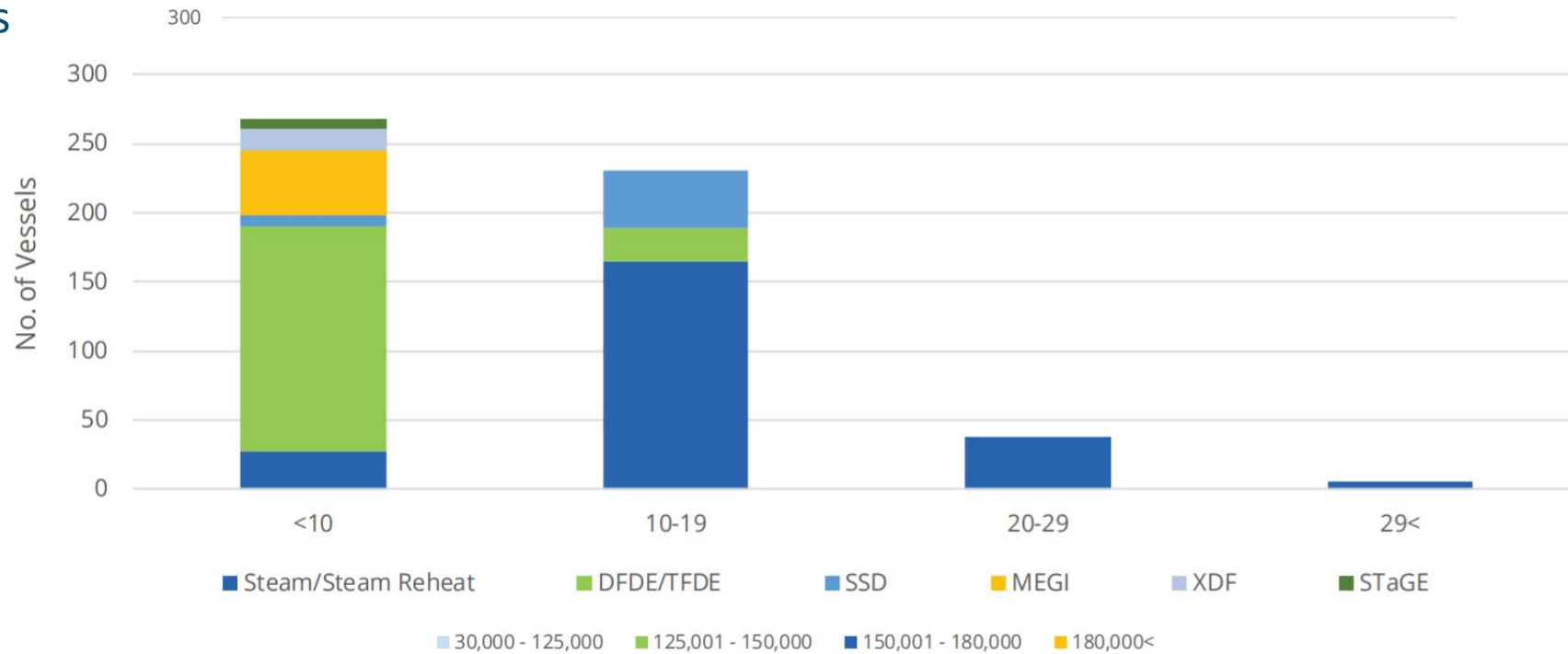
# Current shipping project

- Pilot demonstration: the measurement and modelling of a single LNG carrier for its key operations: loading; cargo transport; unloading; ballast transport
  - 2 aims: what are the emissions from this ship; and how do we effectively measure methane from LNG transport?
- Voyage: Gaslog Galveston (XDF), March 2021, US – Europe
- Measurements using continuous exhaust monitors and OGI cameras
- Outputs: end of the year! Nearly there
- Once this project is delivered, we need a representative sample of the ~550 LNG carriers...



# Next project: where we need to measure

- LNG shipping is a mixed bag... ~550 ships, varying by:
  - Age
  - Size
  - Engine type
  - Storage/ boil-off gas management
  - Operators



# Next project: how do we measure

- More bottom-up studies will help us understand emissions better/identify causes
  - Combine with predictive modelling to identify reduction opportunities
- Top-down measurements to increase number of ships and corroborate total emission estimates
  - Drone or aeroplane measurement
- Some ships already have continuous engine exhaust methane measurement
  - We need to collect this data to get more representative sample, collect ship data for better understanding of emissions and how to reduce
- Develop an understanding of emissions characteristics of different engines, technologies, ship types, operations
- Estimate total emissions from LNG fleet
- Identify reduction opportunities and quantify reductions

# Additional research- Effective MRV for methane: what are the main opportunities and barriers?

**Maria Olczak, PhD researcher at Queen Mary University of London**

**Aim:** to use stakeholder perspectives to help develop effective methane MRV and mitigation policy in the EU

## **Objectives**

- to identify the key barriers related to developing an effective MRV
- to suggest strategies to overcome these barriers
- to learn lessons from other regions' experience in methane regulation

## **Method**

- a series of semi-structured interviews with key stakeholders: companies, policy makers, regulators, civil society organizations, investors, etc.
- Stakeholders for EU and from other regions with existing methane regulation

## **Outputs**

- Critique of draft EU regulation and recommendations for effective methane MRV and mitigation



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