

ETA Seminar – Experience operating LNG tugs



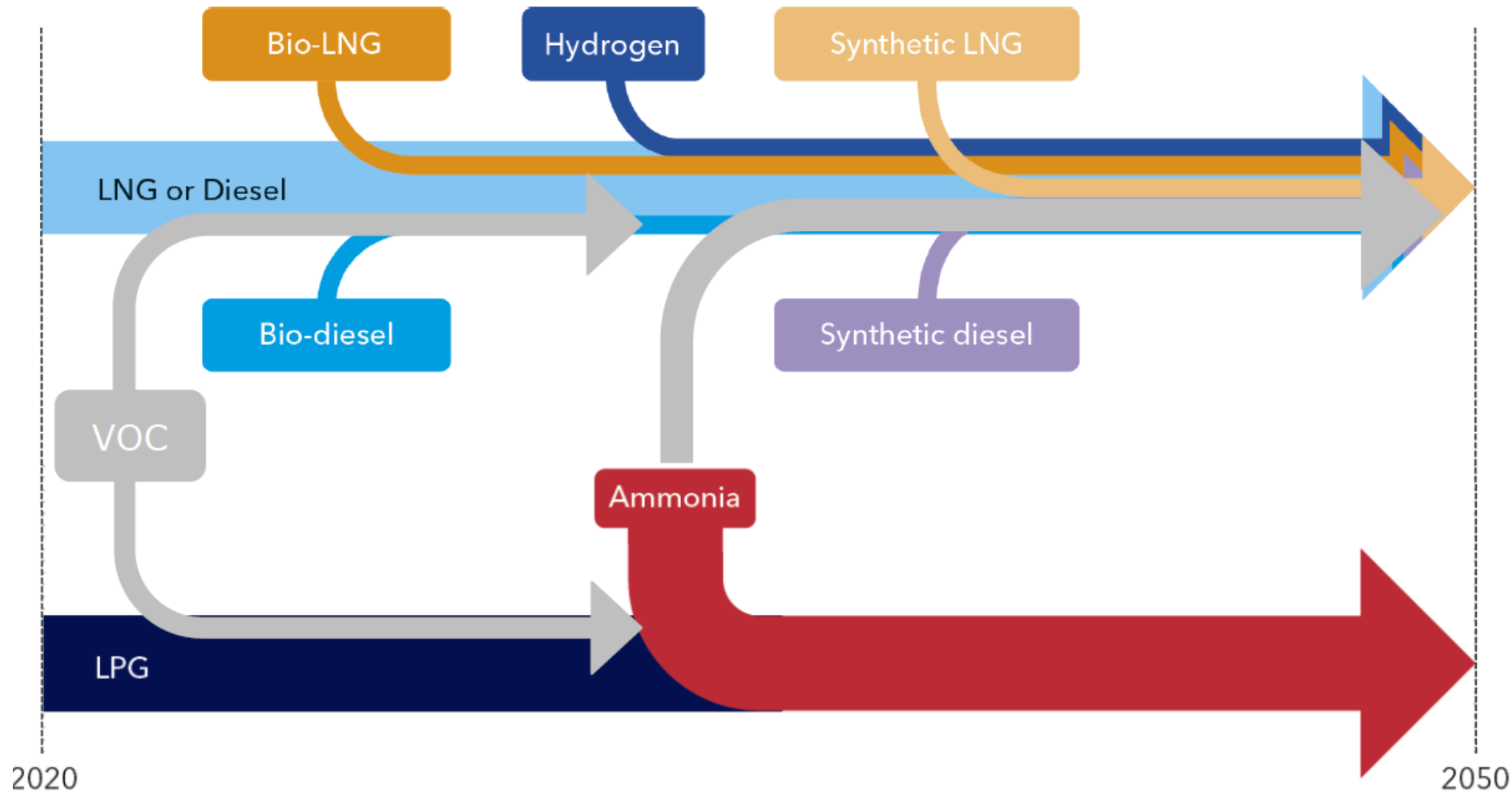
Buksér og Berging AS

17th February 2021

Vetle J. Sverdrup
Managing Director



LNG is seen as key component in future fuels

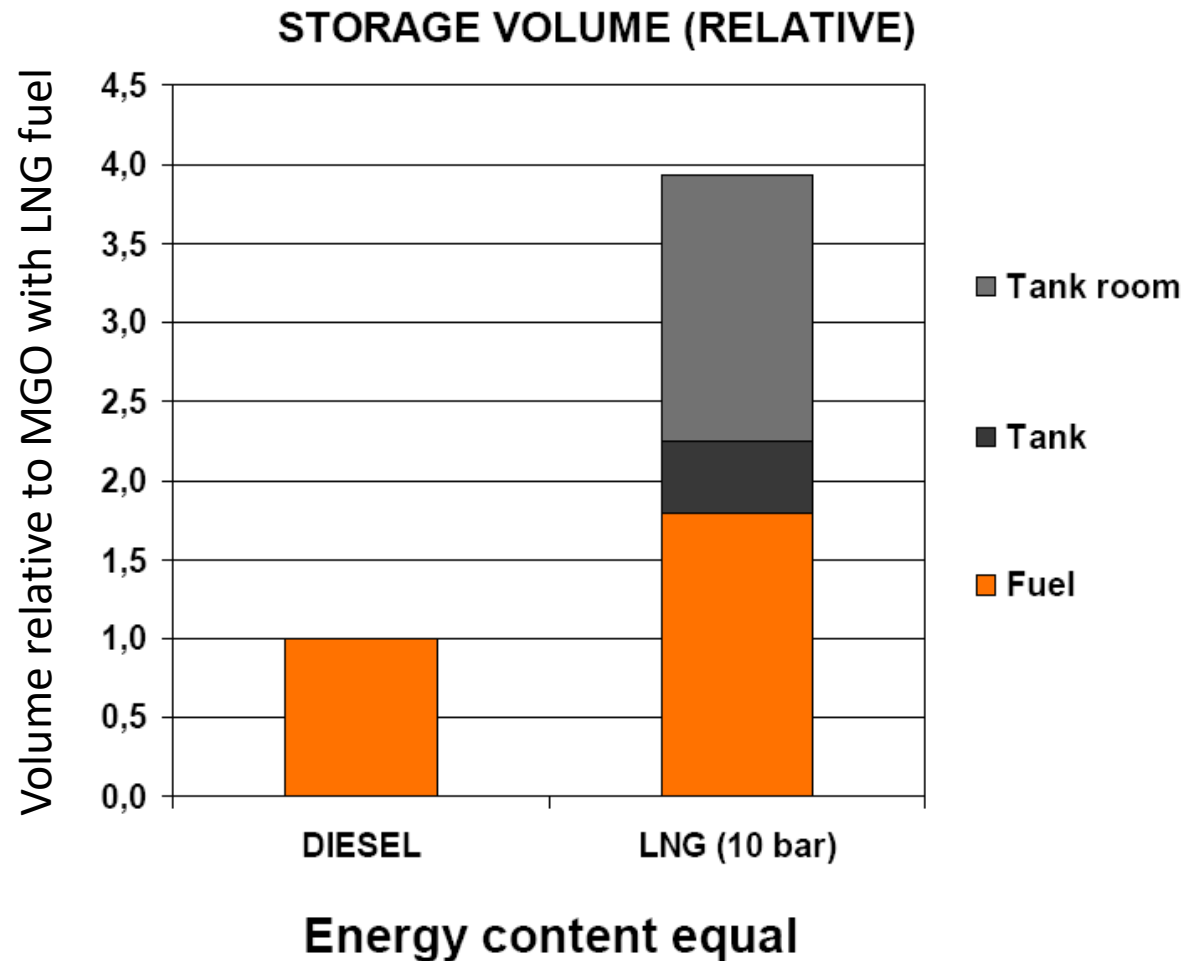


- ✓ Large number of vessels on order in all segments
- ✓ Presently there are 16 LNG tugs in operation and 2 under construction world-wide

World 1st LNG powered escort tugs (2014)



Challenge with LNG tug designs



RULES FOR CLASSIFICATION OF
**Ships / High Speed, Light Craft and
Naval Surface Craft**

PART 6 CHAPTER 13

NEWBUILDINGS
SPECIAL EQUIPMENT AND SYSTEMS – ADDITIONAL CLASS

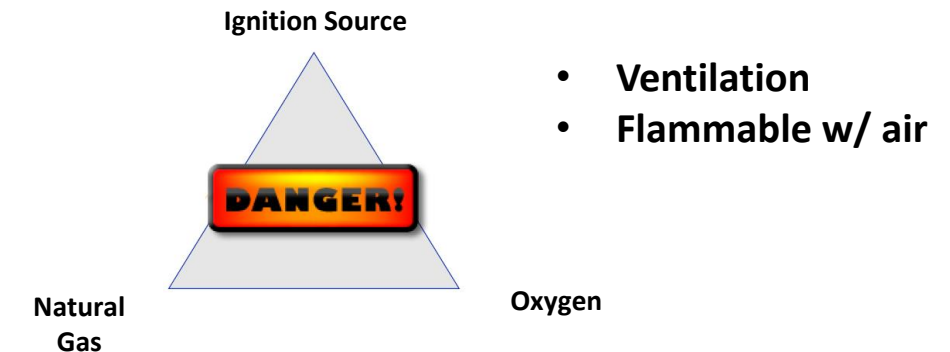
Gas Fuelled Ship Installations

JANUARY 2013

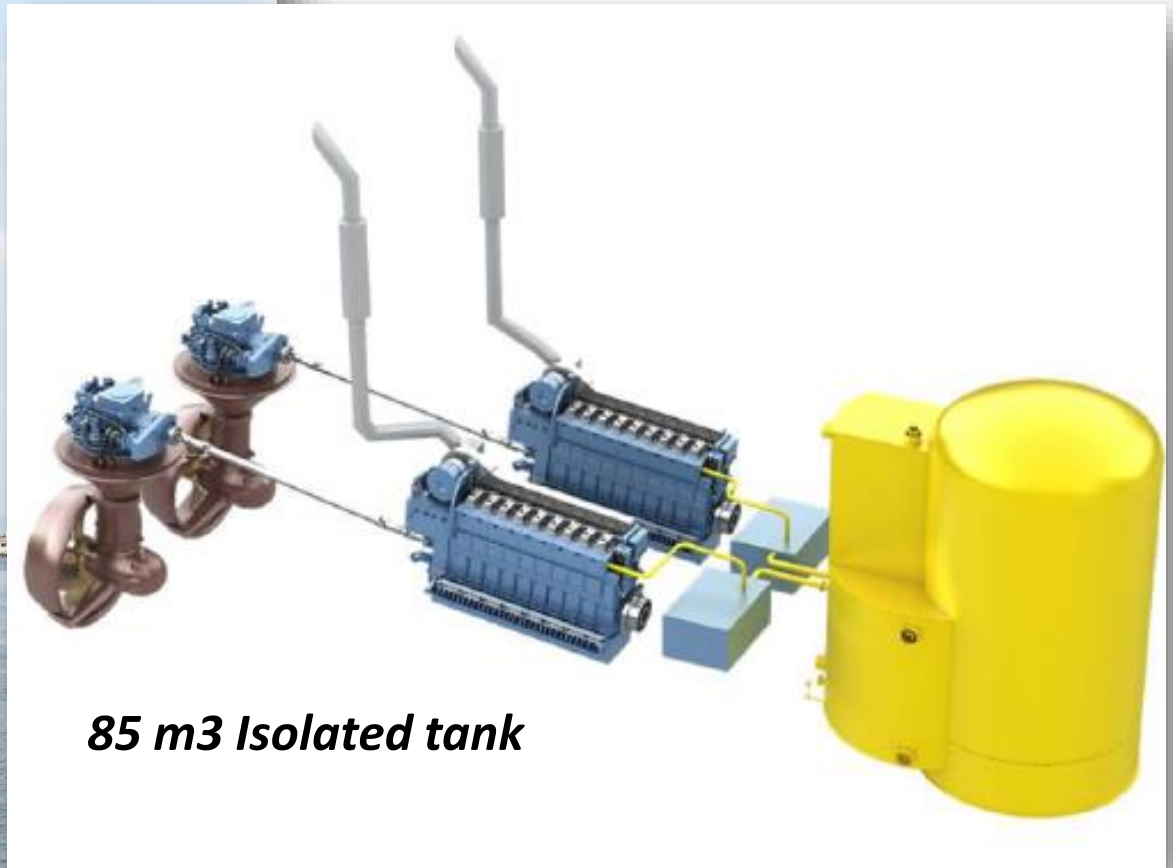
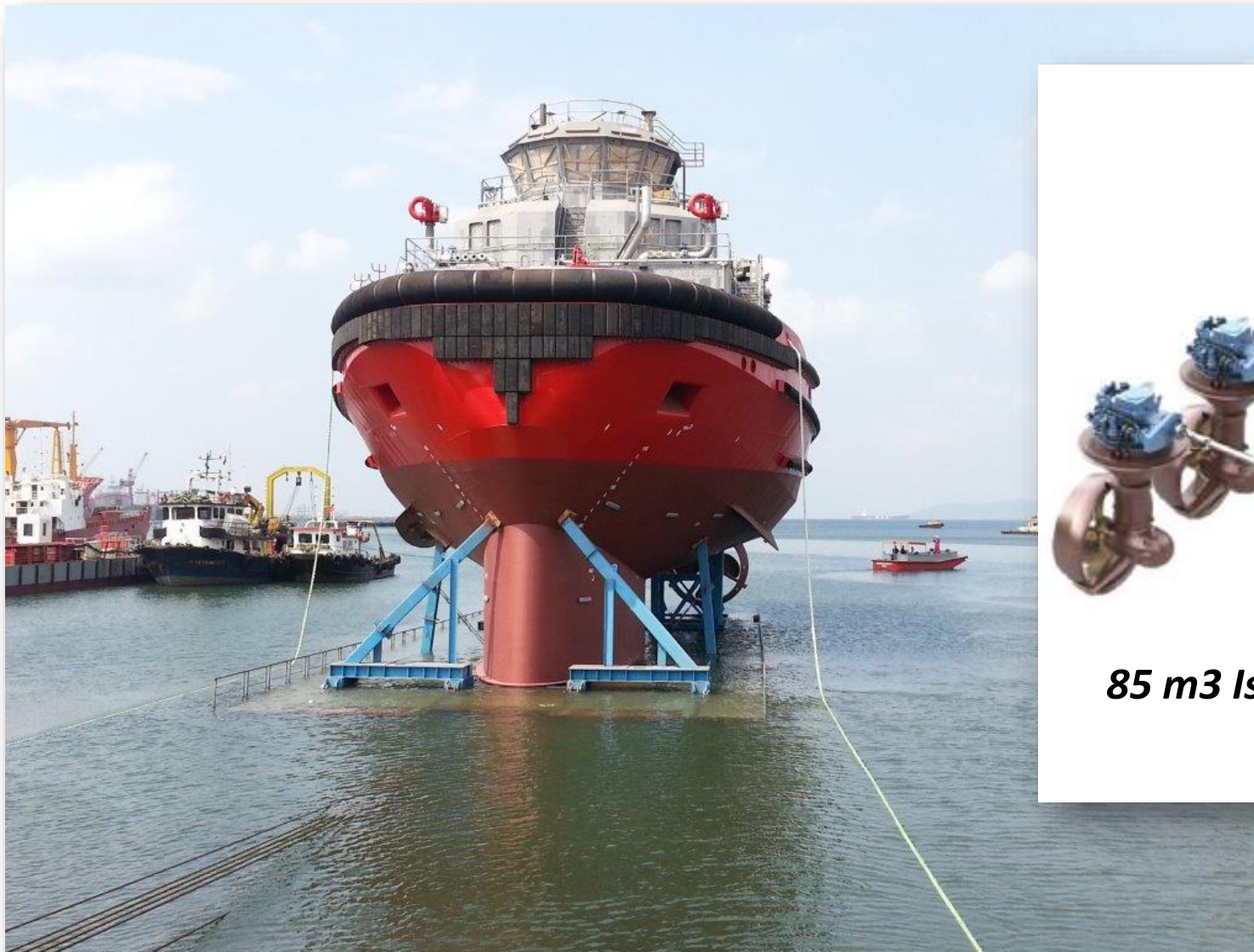
*This chapter has been amended since the main revision (January 2013), most recently in July 2013.
See "Changes" on page 3.*

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Launching at Sanmar Shipyard 2013



85 m3 Isolated tank

Delivered to Equinor for long term TC



Performance data



High engine efficiency ~ 50%

Spark ignited LNG engines offers;

- **Low documented methane slip**
- **25% reduction in CO2 emissions**
- **95% reduction in NOx emissions**

Similar ramp up times and acceleration compared to MGO.

Opex cost;

- ✓ **Annual added cost is around EUR 25k per year above MGO on main engines**
- ✓ **Annual added cost is around EUR 25k per year for the LNG system**
- ✓ **Fuel cost has been around 20% lower than MGO**

Capex cost;

- ✓ **around 25% higher than MGO**

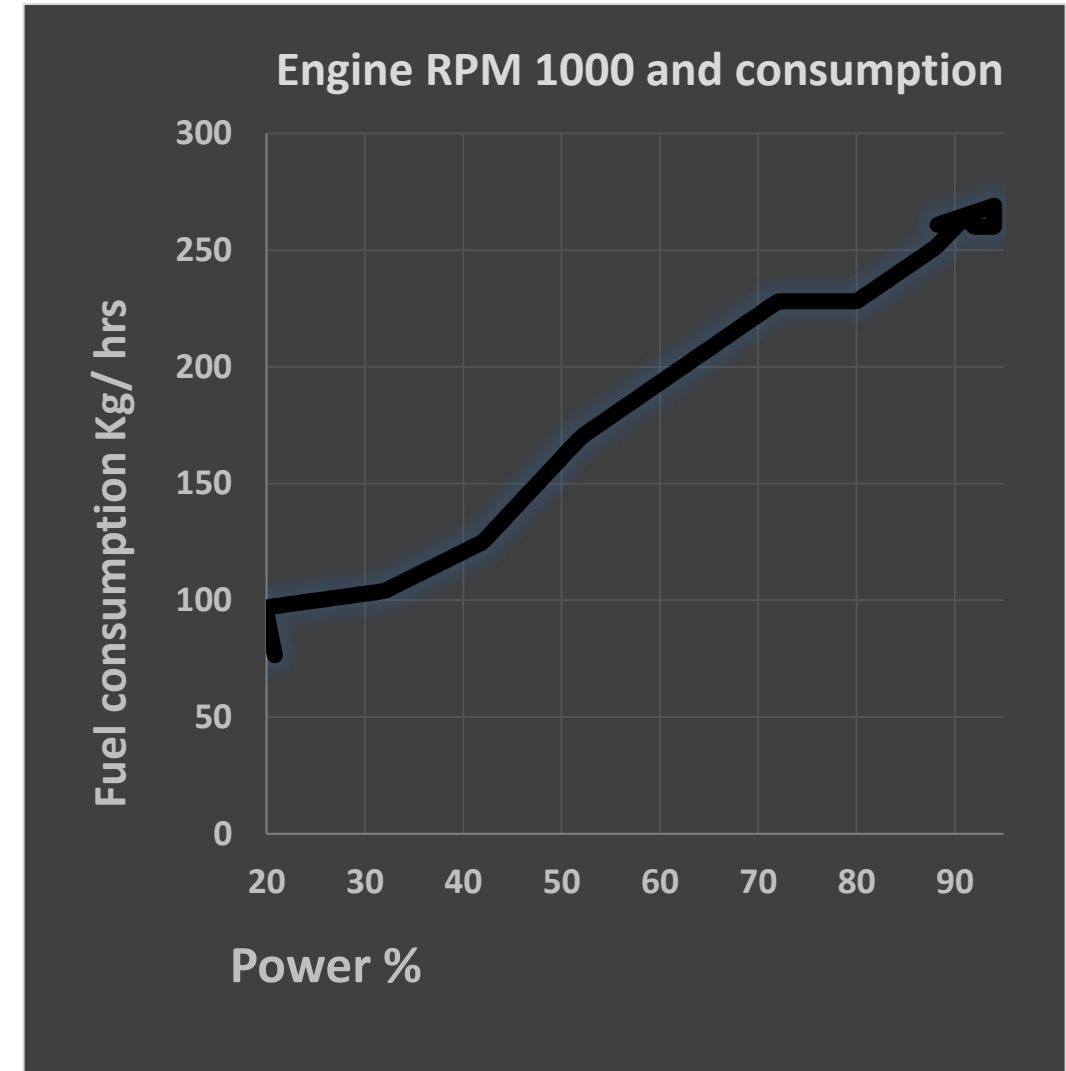
Operating LNG tugs



- ✓ Bunkering approx. once per month
- ✓ Clear check lists and crew training (-163 C)



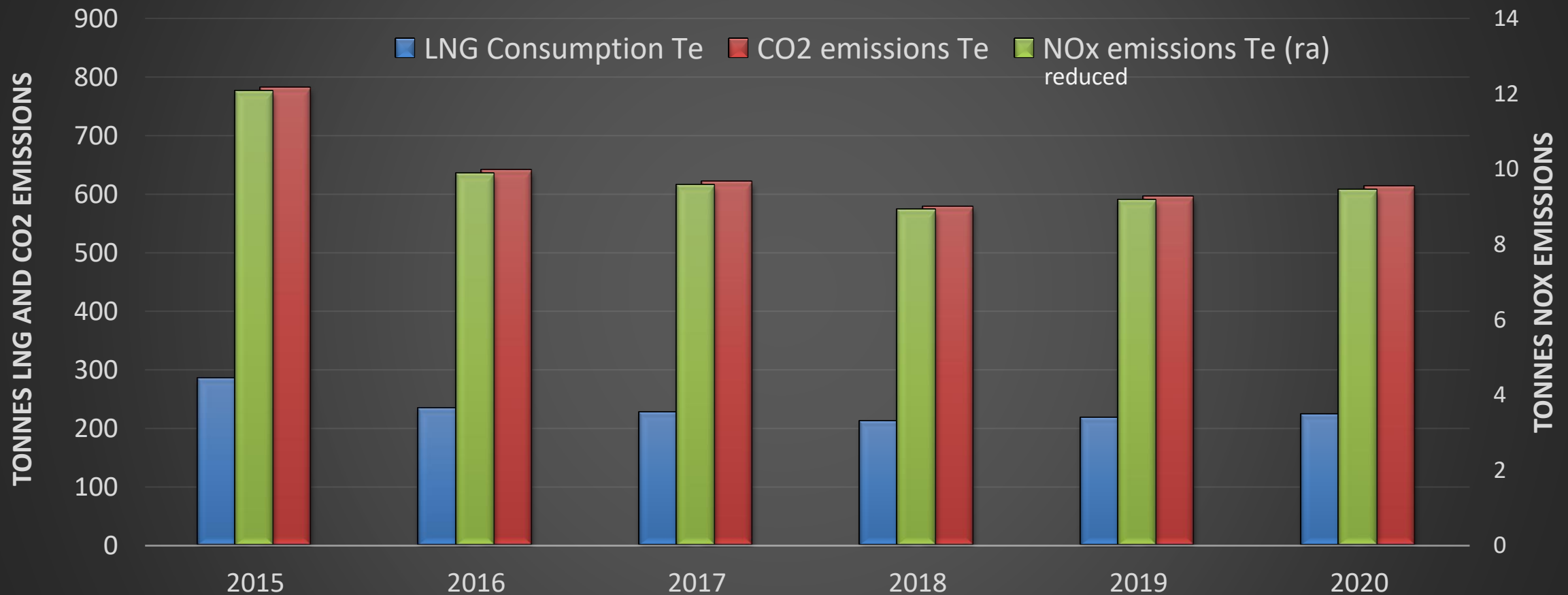
- ✓ Condition based monitoring of equipment
- ✓ Slightly higher opex than MGO systems



Consumption and emissions LNG Tug



Consumption and emissions @ 1200 running hrs/yr



Questions

