

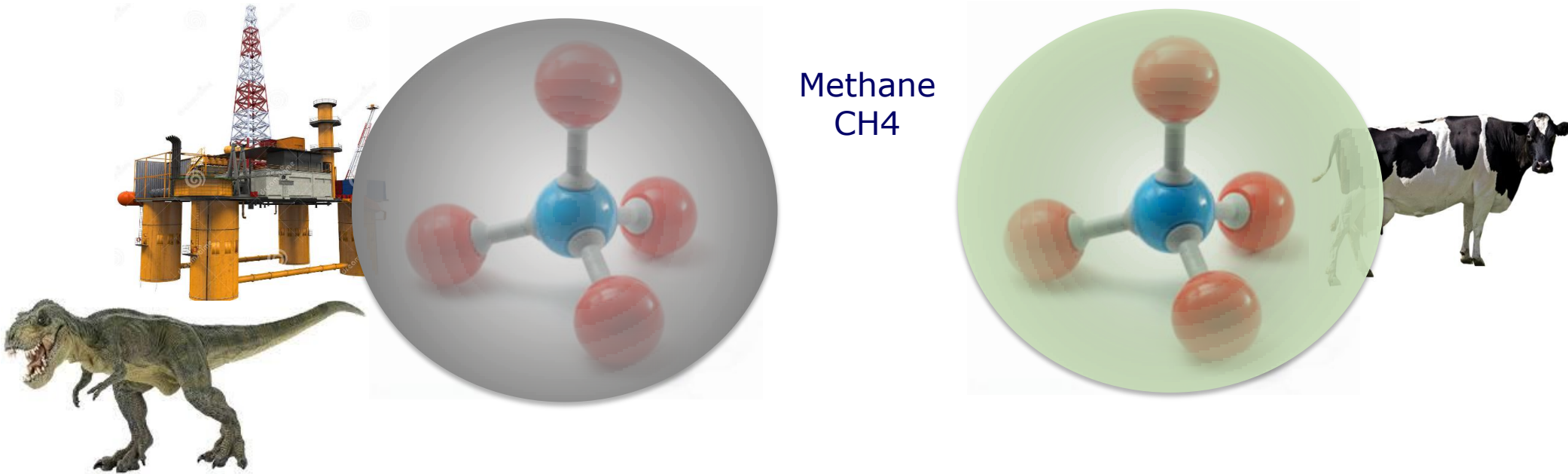
METHANE GAS IN MARITIME SECTOR

BIOGAS 2020, SKIVE 08.11.2017

GUNNAR HELMEN

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LNG or LBG basically the same



LNG and LBG infrastructure the bridge to future LBG chain.

The market will decide LNG/LBG based on pricing and regulations
(driven by opinion and availability)

LNG/LBG should go «hand in hand», focusing those markets that can justify or prepare
for more biogas production. Green certificates can boost the bio-production

LNG/LBG is a transport mode

Liquefied Natural Gas or Liquefied Bio Gas

By cooling down (-162 °C) reduces the volume by 600 times

1 m³ gas = 1,6 ltr LNG

1 ltr LNG = 0,45 kg

1 kg LNG = 15,1 / 13,7 kWh

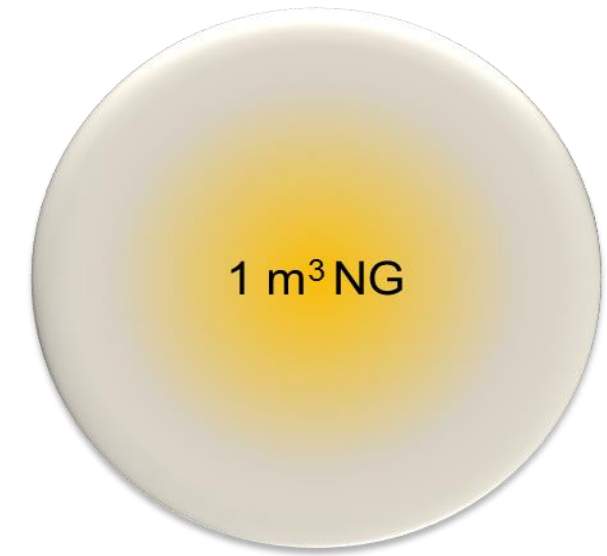
Nontoxic, Colourless, Odourless,

Lighter than air (when temp > - 110 ° C)

Logistical solution for storing and transporting

Truck 50-60 m³ = appr. 3-400 MWh

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Building a new supply chain?



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Yes, LNG is available!

LNG accessibility and LNG infrastructure

- High accessibility to LNG
- Medium accessibility to LNG
- No accessibility to LNG

Large scale terminals

- Existing/under construction
- Planned

With Smaller scale LNG services:
Y=existing / P=planned / N=no

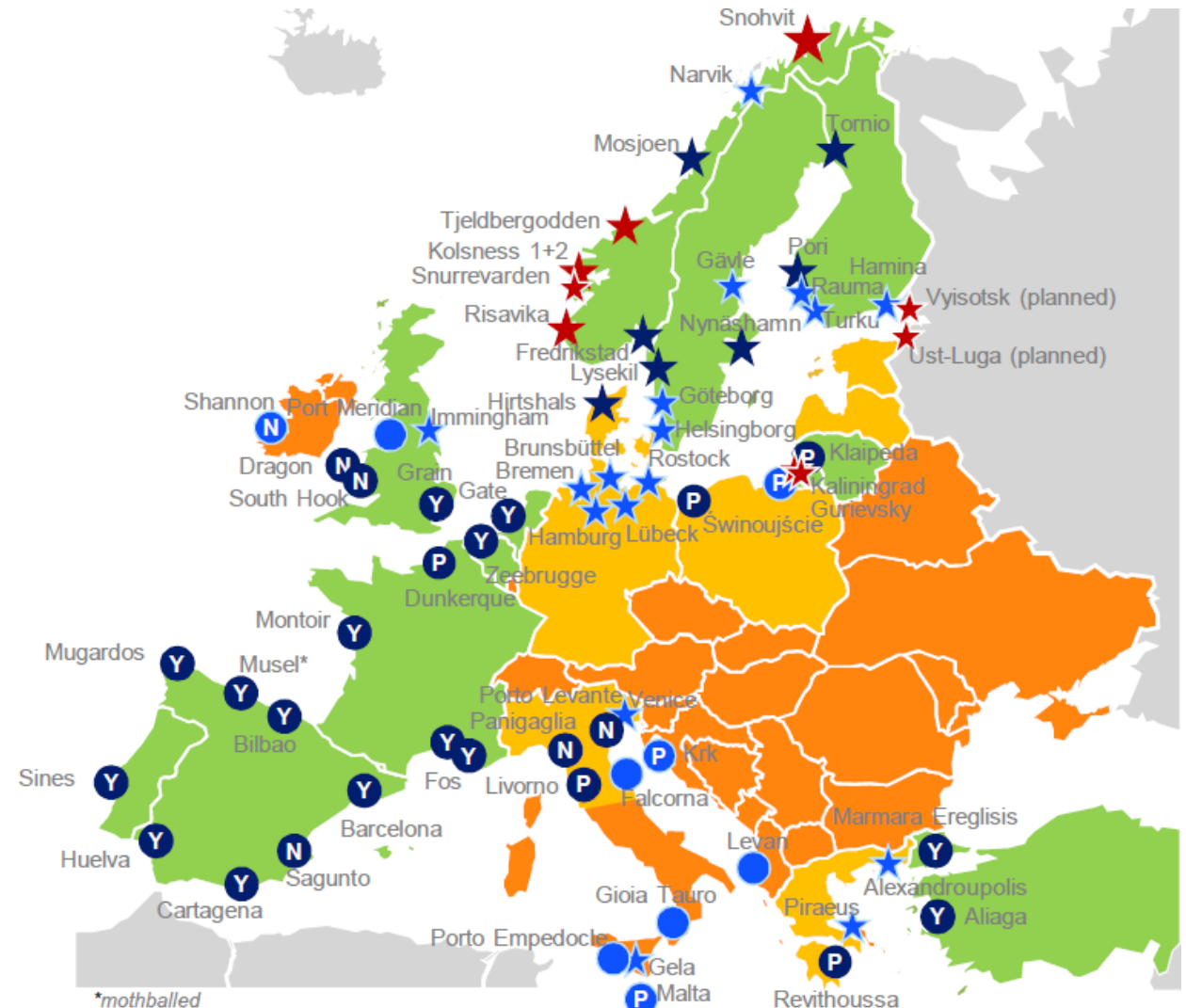
Smaller scale LNG terminals

- Existing or under construction
- Planned

- Liquefaction

*"Liquefied Natural Gas and gas storage will
boost EU's energy security"*

-European commission



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Source: Pöyry Management

LNG a significant role in cleaner marine transport

- One large container ship, powered by 3% sulphur bunker fuel, emits the same amount of sulphur oxide gases as 50 million diesel-burning cars
- In the world's top 100 ports, roughly 230 million people are exposed directly to the harmful emissions produced by shipping.
- The use of LNG in marine transport can deliver significant environmental, economic and social benefits



Source: International Gas Union (IGU)
March 23, 2017

Every day business in Skangas









Fjord Line, 2 vessels total consumption 30 000 t/y = 410 GWh
LNG is available, hence it reduces environmental pollution today

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Thank you for listening!

....please feel free to contact gunnar.helmen@skangas.com