



Webinar on The Future Role of LNG in Europe

21 September 2020

Fostering energy markets,
empowering **consumers**.

Welcome

*Rocío Prieto and Yves Poncelet, Co-Chairs
of the CEER LNG Work Stream (WS)*

Agenda:

- World LNG Outlook for coming years
- LNG regulation in the EU
- Future trends in LNG markets and decarbonisation
- Summary of discussion and closing remarks





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World LNG Outlook for the Coming Years

Professor Jonathan Stern
Distinguished Research Fellow,
OIES





The OIES Natural Gas Programme

Global gas sector insight and expertise

- Unique academic focus on the gas value chain
- Research fellows with a broad range of geographical and industrial experience
- Research programme driven by sponsor interaction
- A forum for continuous discussion, debate and networking
- Output available over multiple platforms



Pre-crisis an LNG supply overhang (“the glut”) was expected in 2020; this has increased substantially as a result of COVID-19

2019

Rapidly falling spot prices in Europe and Asia as LNG supply outstripped underlying demand growth....but European storage absorbed much of the LNG import growth

Pre COVID-19

Global gas consumption was expected to rise by 1.5 per cent over 2019.

LNG export capacity was forecast to rise by 50 Bcm, broadly matched by growth in LNG imports.

Europe consumption was expected to rise marginally, production down, pipeline imports up slightly, LNG imports down a little.

Prices were expected to be around \$1 lower in 2020 than 2019 for both TTF (low \$4) and JKM (mid \$4).

Increase in supply overhang – “stranded” gas



Key Growth Rates and Issues for the Gas and LNG Outlook

2020: Global gas demand declines 3.5%; LNG imports similar to 2019 but 5% less than was expected

2021-25 Global gas growth 1.5% pa (IEA); 2.5% pa (OIES)

Key Issues

For 2021-25:

- Asian growth especially in China
- European pipeline gas and storage development
- Non-OECD countries – LNG pricing, costs and profitability of new projects

2025-2030:

- Overall emission reduction targets especially in Europe
- LNG and pipeline gas import emission reductions

Beyond 2030:

- Progress of coal and renewables in Asia which relates to...
- Environmental targets – especially air quality – and cost of LNG

LNG will account for the vast majority of future global gas trade – very few new large scale international pipelines are likely (except those from Russia to Europe and Asia)

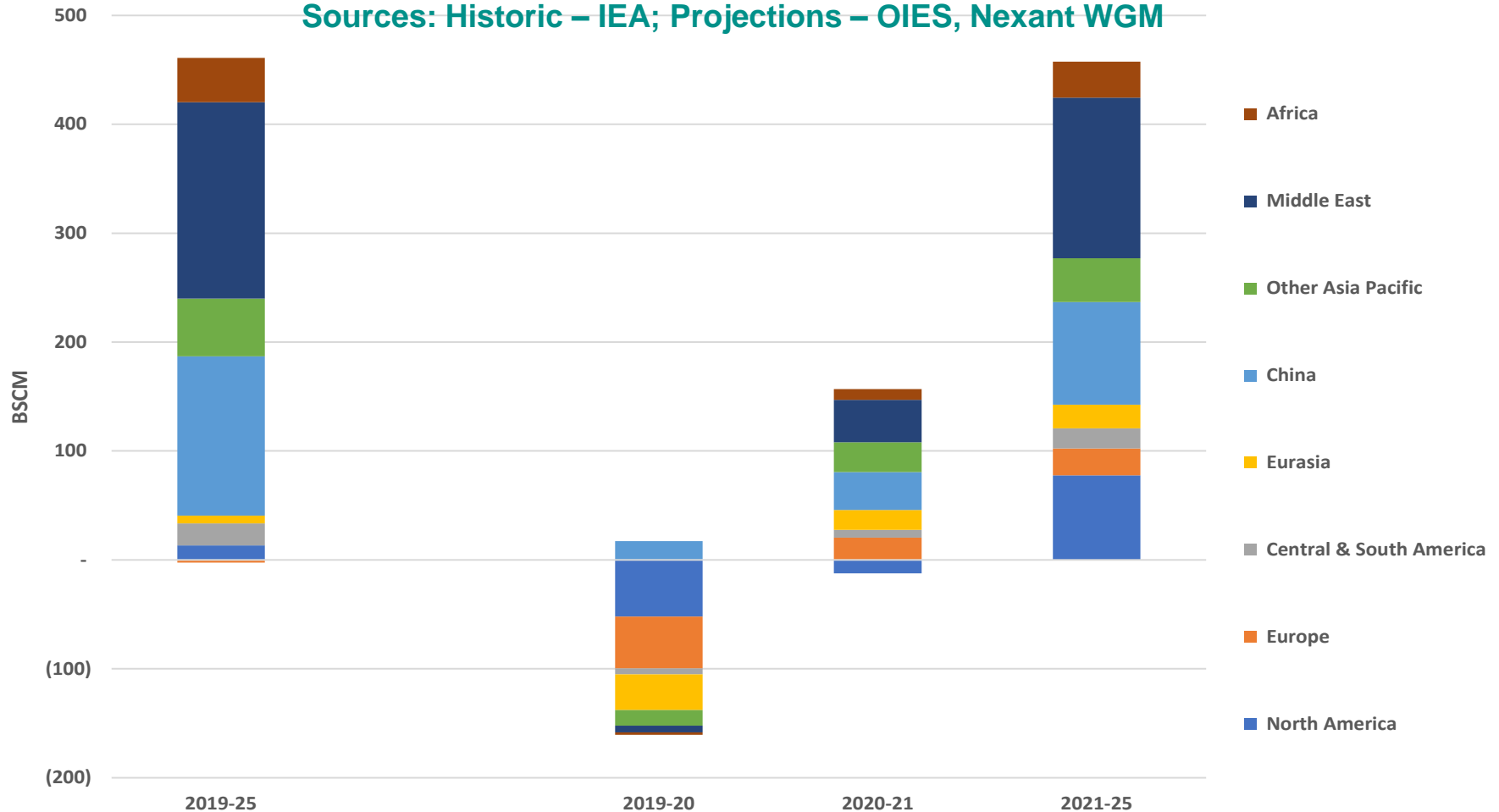


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Outlook to 2025

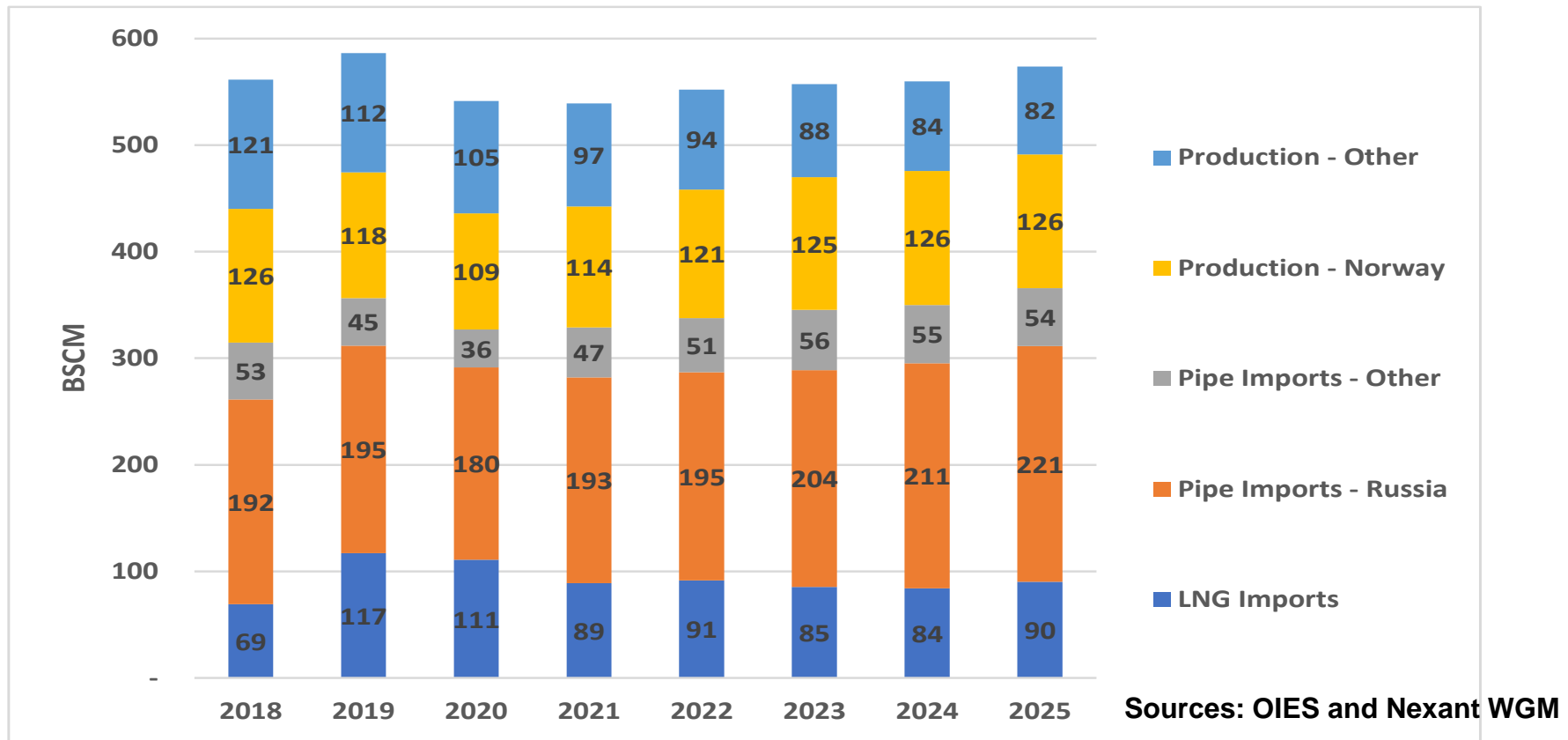
2019-25 Global Gas Demand Outlook

Sources: Historic – IEA; Projections – OIES, Nexant WGM



- 3.5% decline in gas demand on 2020 – return to 2019 levels in 2021
- Largest declines in 2020 in Europe, North America and Russia
- Across the board rebound in 2021 – Europe sluggish growth
- Asia and Middle East lead the growth post 2021
- Demand almost reaches the pre-COVID-19 projection in 2025

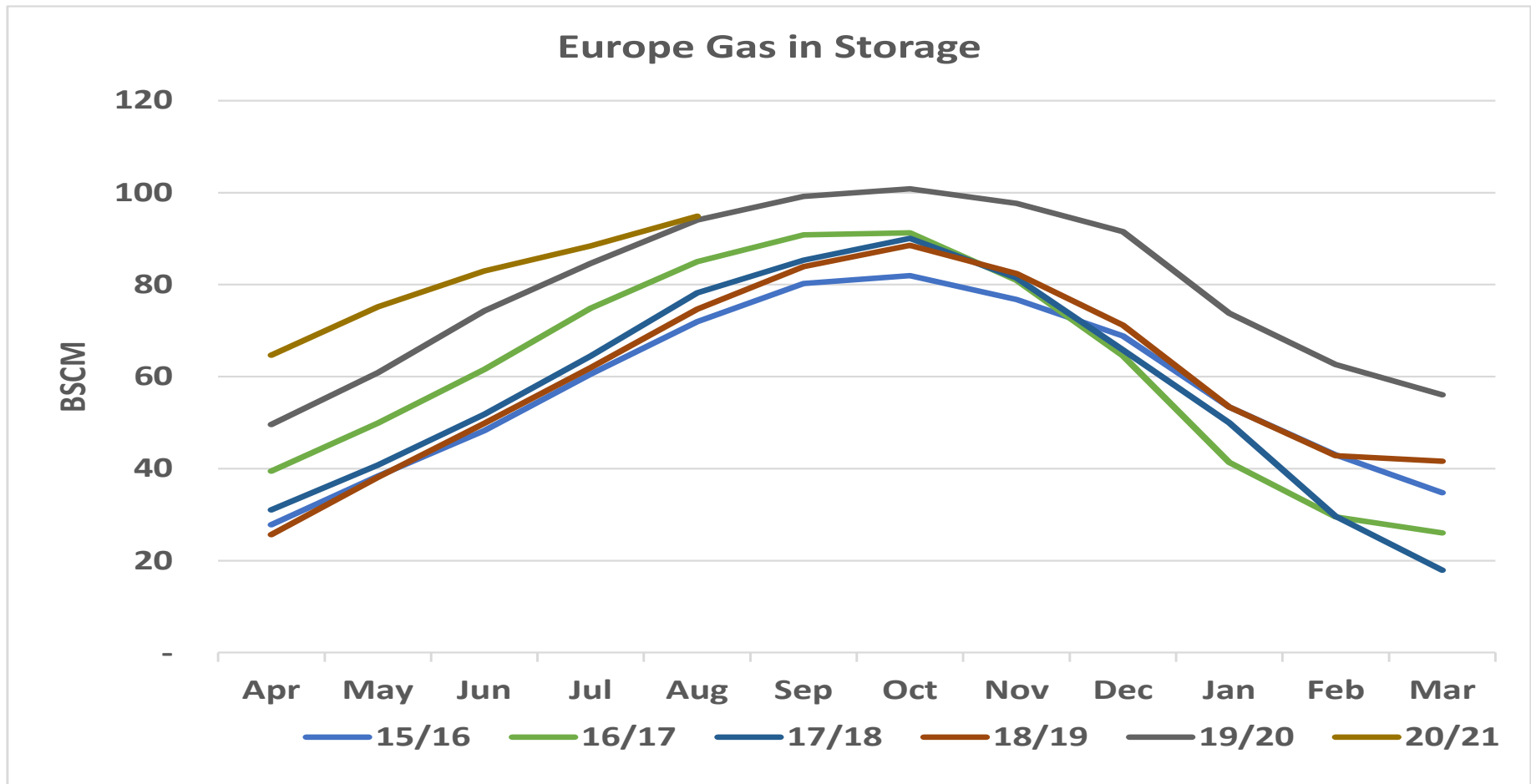
European Production and Imports 2018-25



- 2020 all sources squeezed but pipe imports especially
- 2021 pipe imports benefit most from rebound in demand
- LNG imports plateau to 2025 (displaced by pipe imports) but will depend significantly on storage fill (then surge up to 2030)



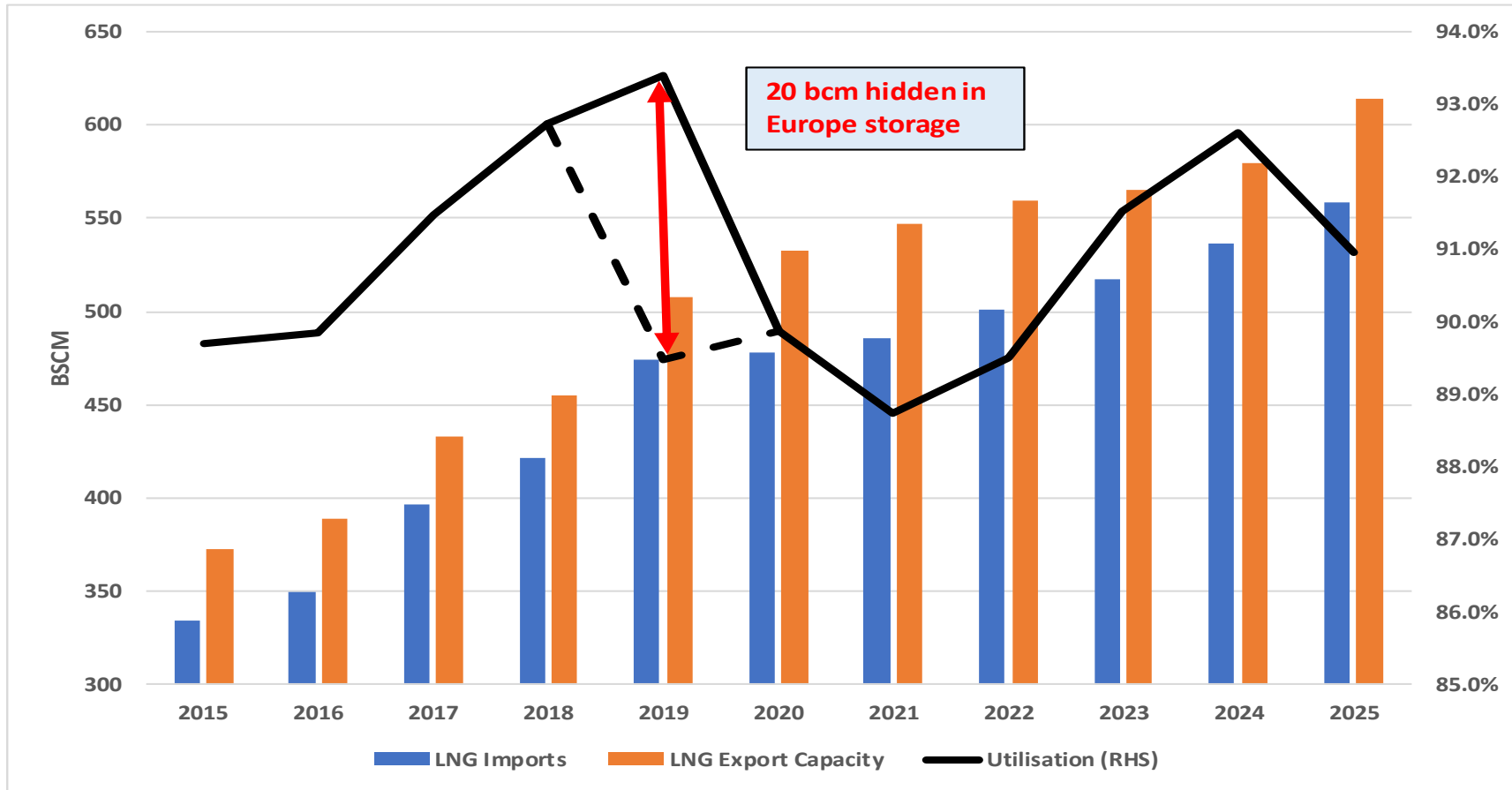
European Gas Storage 2015/16-2020/21



- End August 95 bcm – similar to last year – 91.5% full
- Model assumes that LNG import highly dependent on need to refill storage; LNG is 'the marginal molecule'



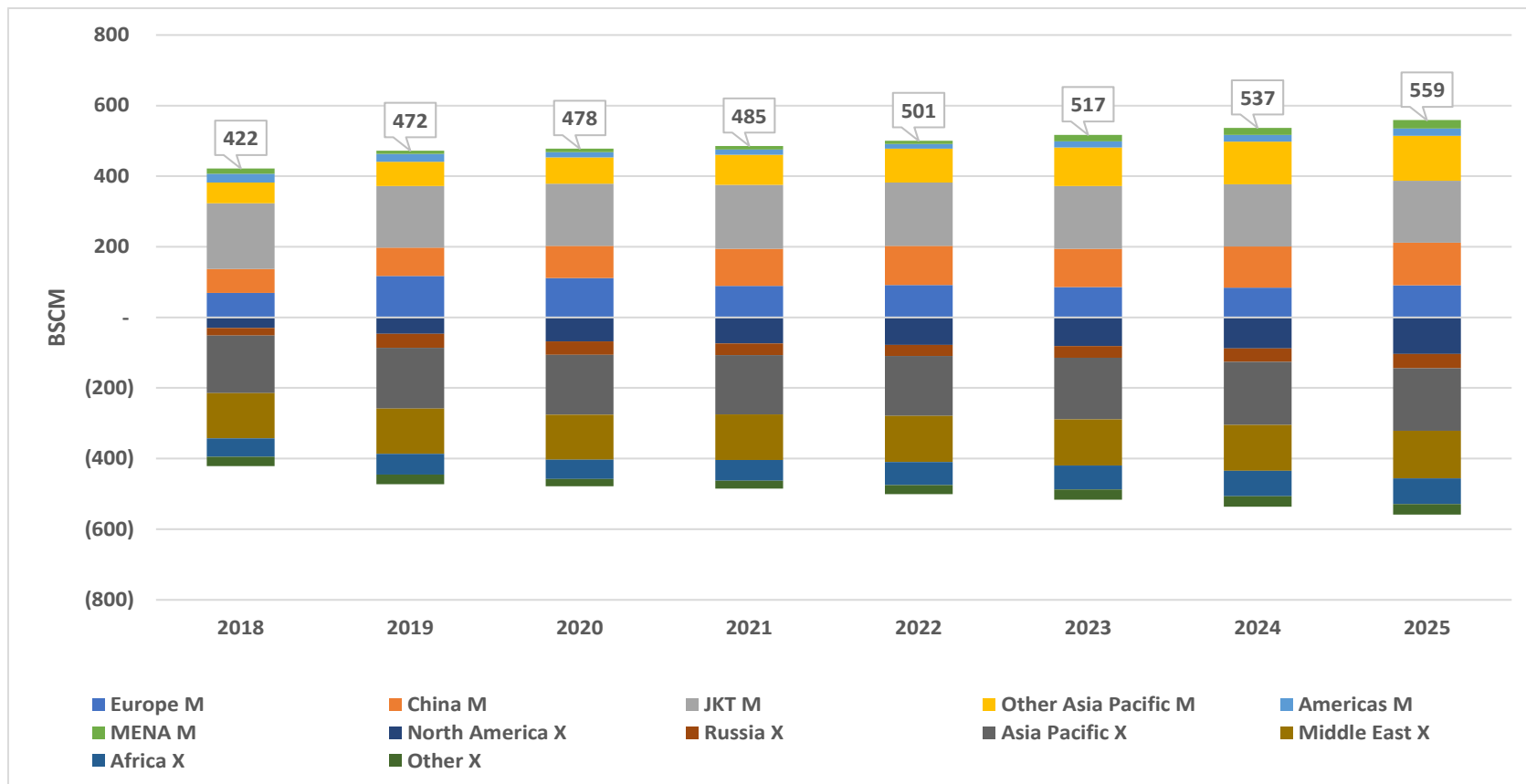
Global LNG Capacity Utilisation



Source: OIES and Nexant WGM

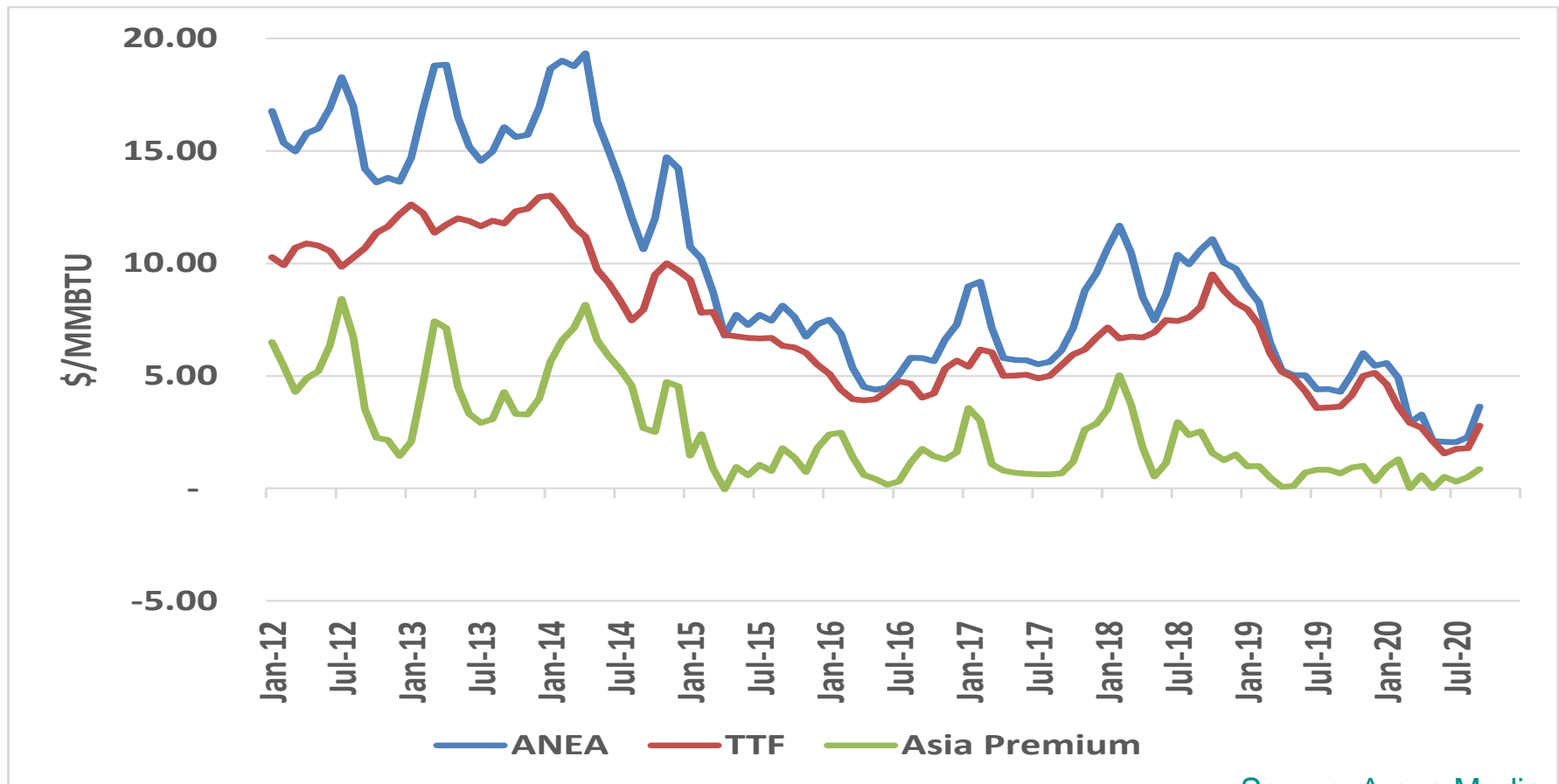
- Utilisation falls sharply in 2020 and further in 2021 if Europe doesn't absorb excess supply
- Market tightens through 2024 but next surge in supply reduces utilisation

Expansion of Global LNG Imports and Exports 2018-25



- LNG trade rises 87 bcm between 2019 and 2025 from already committed projects
- North America and Qatar dominate supply growth
- Asia (China/SE Asia) drives demand (India – ‘jury is out’)

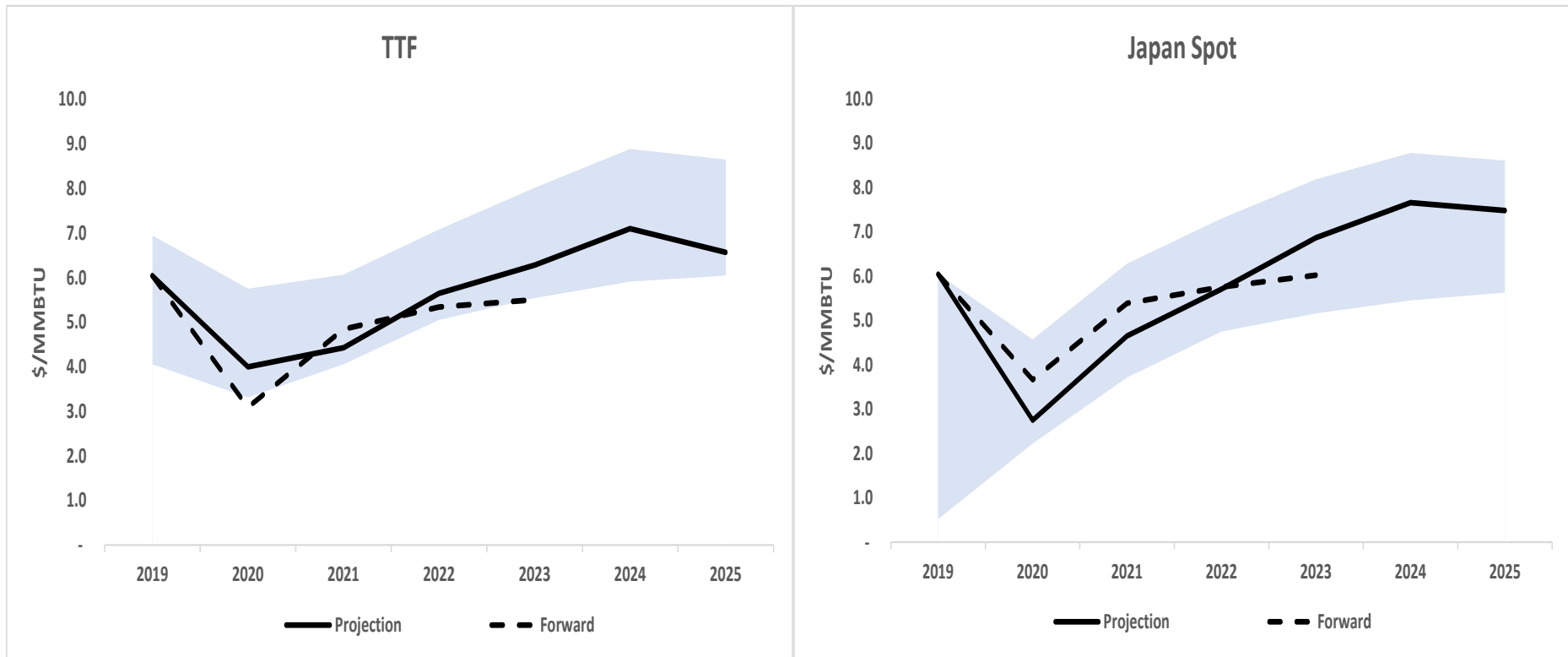
Converging European and Pacific Spot Gas/LNG Prices 2012-20



Source: Argus Media

- Excess supply has led to converging spot prices – Asia premium disappeared
- Little to suggest in supply/demand analysis that it will re-emerge until 2023/24 with COVID-19 impact still ongoing

European and Pacific Spot Gas/LNG Prices 2019-25



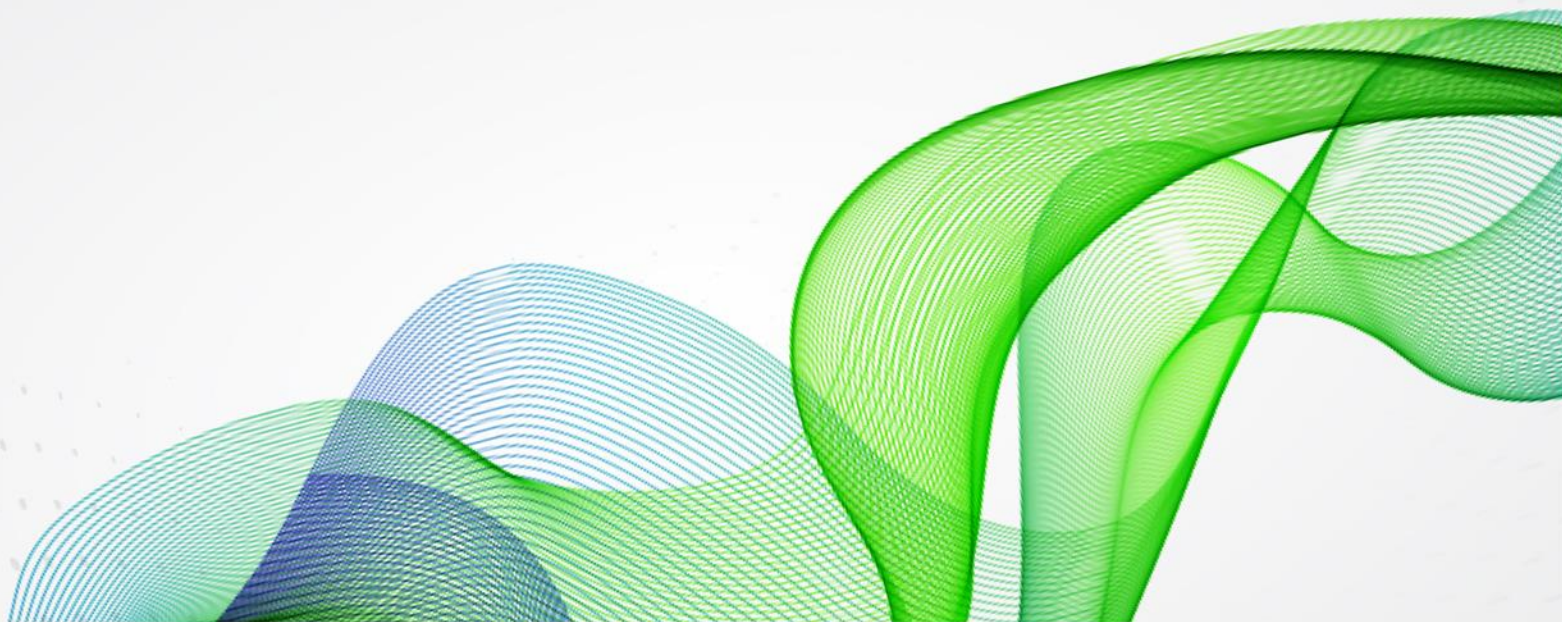
Sources: Argus Media, OIES, Nexant WGM

- Range of price outcomes – can go below SRMC or above LRMC
- Prices rise in 2021 if LNG is shut in again – if not and Europe storage fills then prices much lower
- Tightening market increases prices through 2024 but then next LNG supply surge starts to bring downward pressure
- JCC/JKM prices above \$6/MMbtu threaten Asian demand expansion



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Outlook Beyond 2025

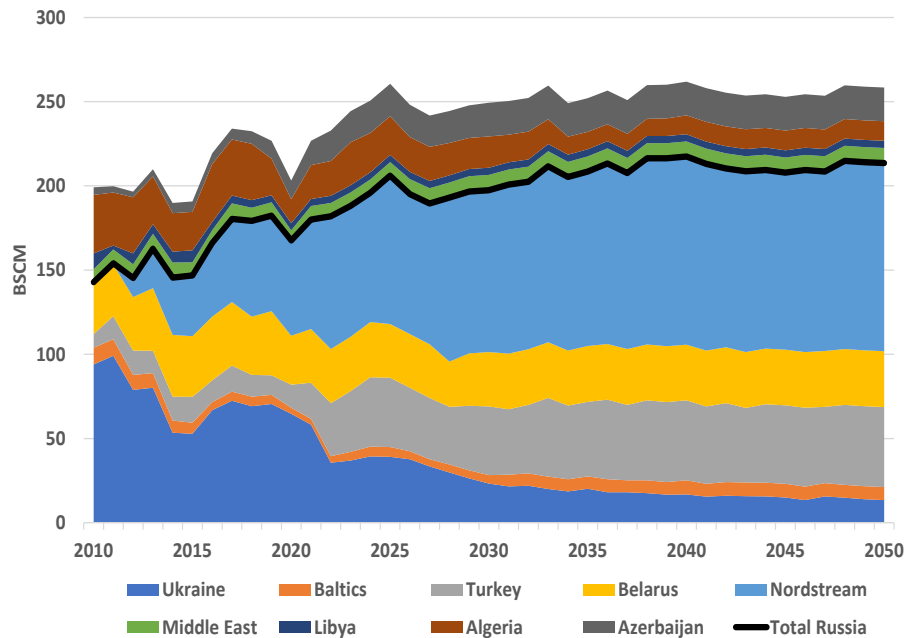




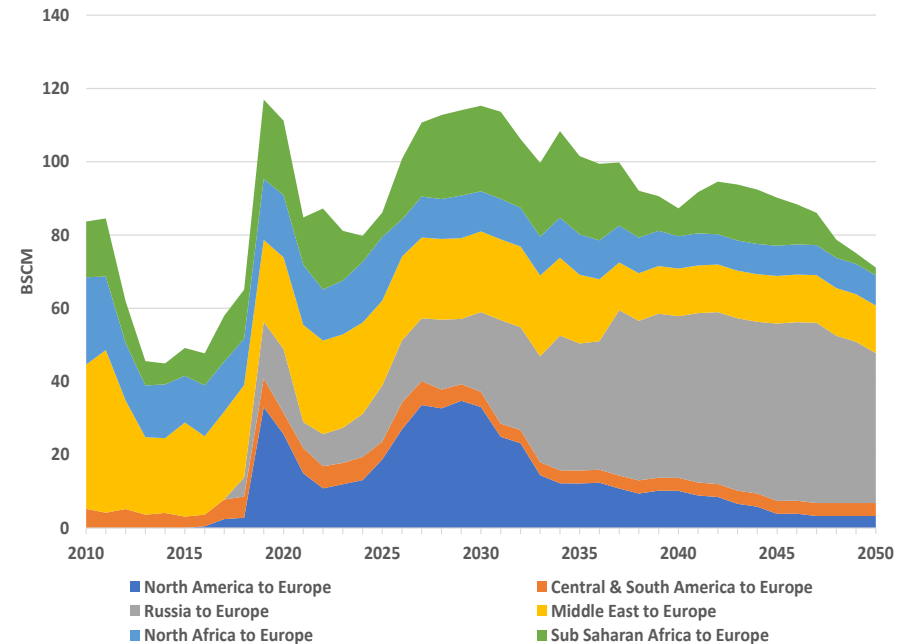
Europe Pipe and LNG Imports to 2050

Sources: Historic – IEA; Projections – OIES, Nexant WGM

Pipe Imports



LNG Imports



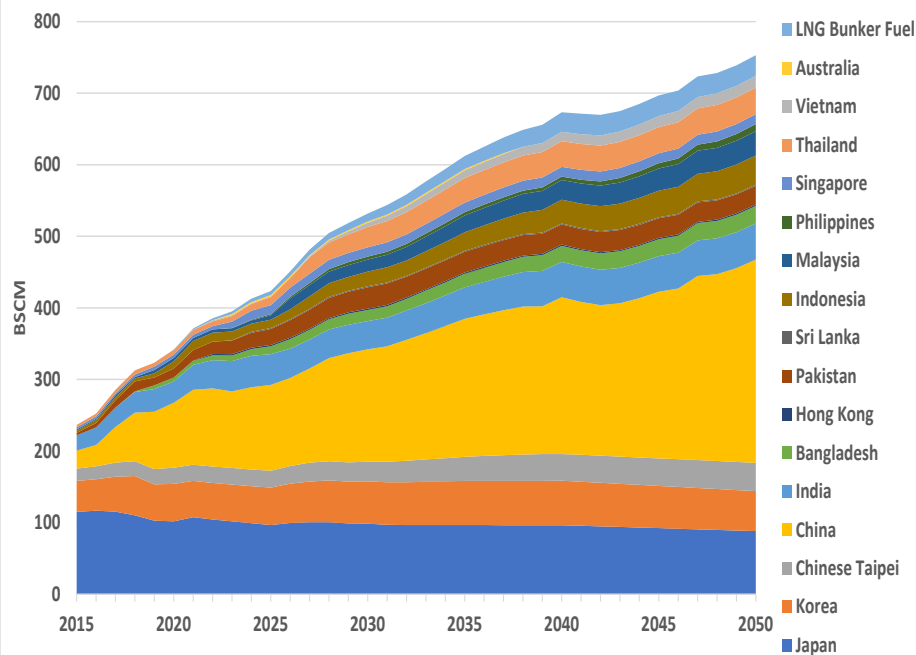
- Pipe imports increase gradually until early 2030s, apart from short term dip in 2025/26 – almost all Russia via Nordstream and Turkstream, with Ukraine route in decline – some growth from Azerbaijan
- LNG import growth from mid 2020s, largely by North America and Russia
- Sharp decline in LNG imports from late 2030s while pipe imports are maintained



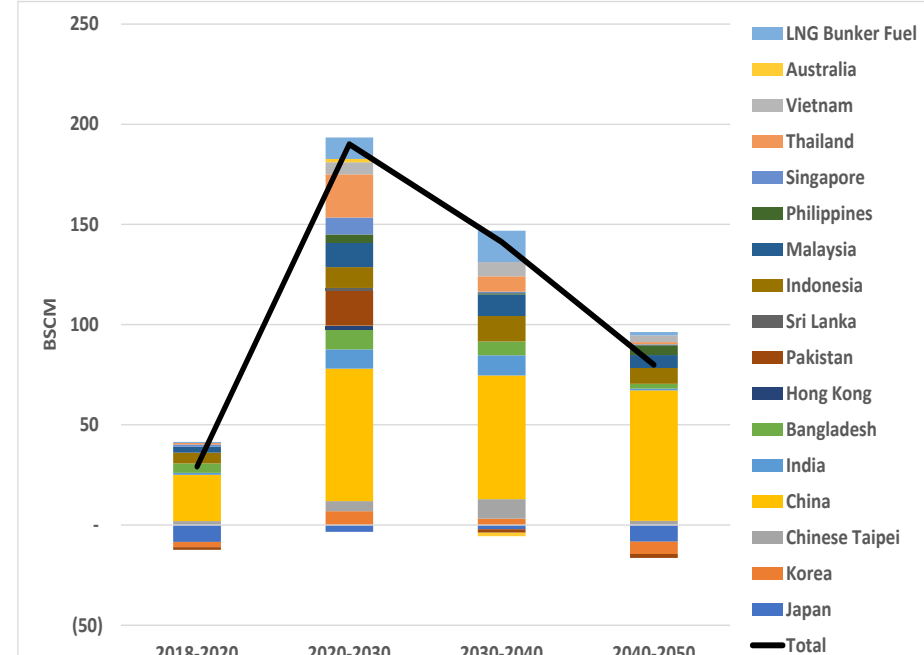
Asian LNG Imports to 2050

Sources: Historic – IEA, Projections – OIES, Nexant WGM

Imports by Country



Growth



- Growth driven by China, but ASEAN, India, Pakistan and Bangladesh all grow steadily
- JKT market largely flat, declining post 2040, with declines in Japan being offset by some growth in Korea and Chinese Taipei
- Excluding JKT, the growth in China (and India) through 2040 is matched by growth in all other Asian countries – post 2040 growth is in China

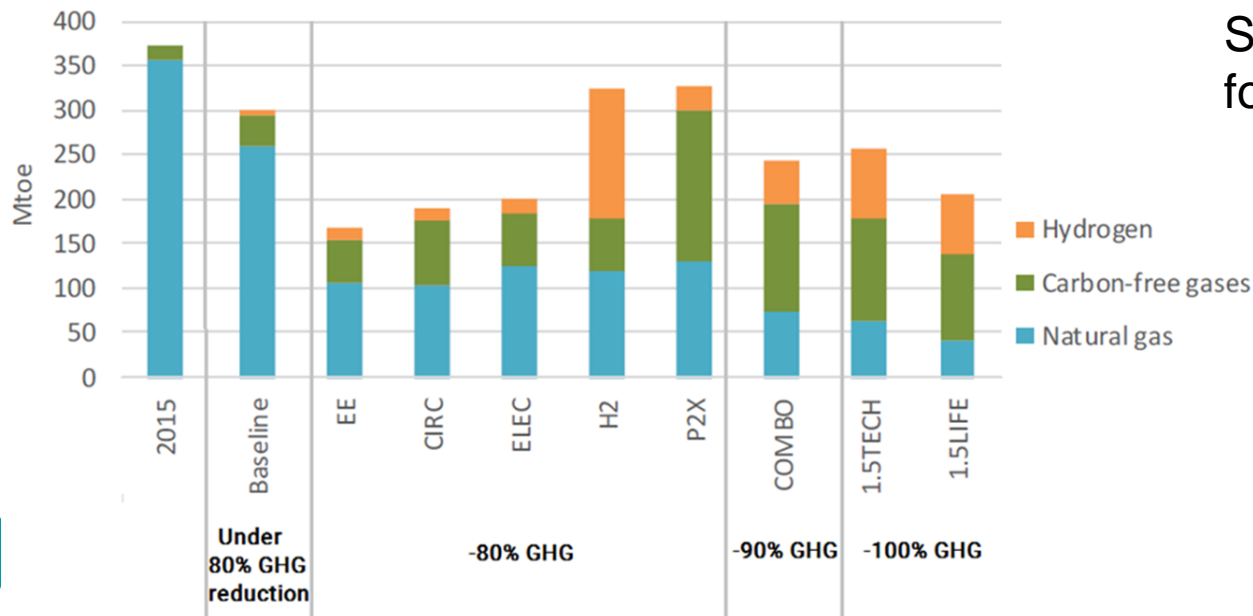


Major Unresolved Issues:

1. Achieving decarbonisation commitments

Outlook not consistent with Decarbonisation Targets most critical in Europe (less so in Asia until the 2040s). New regulations to be considered:

- accurate MRV of emissions from supply chain imports methane/GHG standards combined with higher GHG (and border) taxes; forest offsets?
- decarbonisation of gas/LNG with CCUS – multi-purposing of regas terminals
- new regulatory regime for pipeline repurposing and new hydrogen pipelines and storages (how far is 'liberalised gas model' appropriate?)



Source: EU Clean Planet for All (2018)

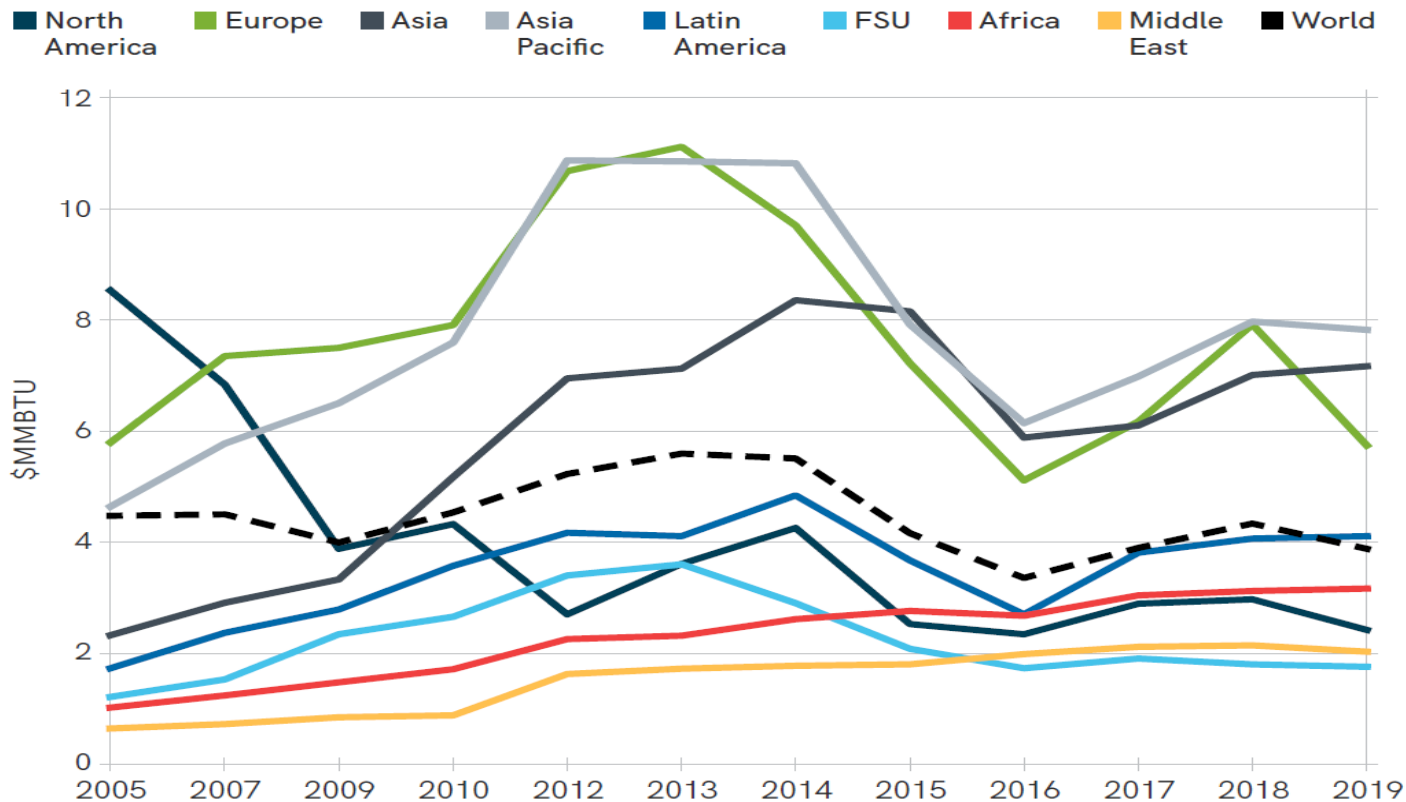


Major Unresolved Issues:

2. Maintaining profitability and affordability

Outlook prices do not look likely to remunerate new LNG projects:

- Most greenfield projects have delivered costs of \$8/Mmbtu or higher
- But prices above \$6/MMBtu will hold back demand in developing Asia
- Lack of investment in new projects may accelerate supply/demand tightening by mid-decade leading to higher prices.



Source: IGU
Wholesale Gas
Price Survey 2020



Thank you

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Q&A session

Moderators: Rocío Pietro and Yves Poncelet, Co-Chairs of the CEER LNG WS



LNG Regulation in the EU

- EC views and recommendation on LNG sector
- Access to European LNG terminals: a trading perspective
- Current regulatory challenges: congestion
- Small scale and virtual LNG services

*Moderator: Agustín Alonso, CEER LNG WS
Member*



EC views and recommendations on LNG sector

*Lukasz Lisicki, Policy offices, Unit B2
European Commission, DG Energy*





Upgrading the gas market

Study on Regulatory framework for LNG terminals

Disclaimer



This study has been prepared for the European Commission by the above consortium of consultants. It reflects the views of the authors only. These views have not been adopted or in any way approved by the Commission and should not be relied upon as a statement of the Commission's or DG ENER's views. The results of this study do not bind the Commission in any way. The Commission does not guarantee the accuracy of the data included in the study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

Main study tasks

Aims to:

- Identify and analyse shortcomings that could act as barriers to LNG entry and/or effective competition;
- Propose policy recommendations and measures, including of a regulatory nature, to address these shortcomings;
- Quantitatively estimate possible impacts of implementing potential measures.

Addresses two kinds of competition in EU LNG market:

- **Intra-terminal competition**, through which market players compete to use services offered by a specific terminal;
- **Inter-terminal competition**, through which LSOs compete to attract LNG market parties to their terminals over competing terminals in the same region.

Shortcomings and measures to address them

Capacity allocation and tariff levels

Key shortcomings

- Short-term third-party access to several terminals' capacity can only be secured by registered users in secondary markets, while most primary capacity is booked by one or a few users engaged in long-term contracts.
- Not all capacity allocation mechanisms are market-based, which can obscure market signals.
- Some LNG terminal operators do not seem incentivised to maximise capacity made available to market parties and to optimise its use (via adequate UIOLI/UIOSI or recalculation mechanisms).
- Lack of harmonised tariff principles and structures, as well as lack of transparency regarding tariff calculation methodologies and relevant input data at terminals, could obscure competition distortions between users of terminals and especially might impact small-scale shippers.

Considered potential measures

- Implement harmonised, market-based primary capacity allocation mechanisms at all EU LNG terminals by:
 - Standardising products;
 - Reserving a minimum share of capacity for shorter-term products
 - Auctioning capacity on single platforms per market area which can be used to set market-based tariffs for terminal services
- Consider introducing harmonised tariff principles and structures for LNG terminal services similar to governance for setting TSO tariffs in Commission Regulation (EU) 2017/460.
- Stimulate cost benchmarking at European level to incentivise efficient operations.

Information transparency and exemptions

Key shortcomings

- Entry into the LNG market, especially for smaller market parties and new players, can be complicated by a lack of adequate, user-friendly, and non-discriminatory information provision.
- Exempted terminals apply negotiated tariffs, such that a level playing field for all shippers using the same terminal is not ensured.
- Exempted terminals have more autonomy in determining their access conditions, and face less scrutiny in allocating their primary and secondary capacity.

Considered potential measures

- Mandate LSOs to develop and implement a centralised transparency platform:
 - Require LSOs to add harmonised metrics to their transparency platform, e.g., require that all terminals provide tariff estimate for single standard service offering so LSO tariffs can be easily compared across EU markets;
 - Provide legal basis for obliging all LSOs to use this platform.
- Review the requirements/criteria for granting new exemptions and adjust to include minimum transparency requirements regarding tariffs, capacity allocation and contractual terms, and to properly account for the exemption's impacts on competition at supra-national level.

Service offerings at terminals including small-scale

Key shortcomings

- Provision of a limited range of services or only bundled services might reduce market demand for a specific LNG terminal, reducing the competitive range of shippers interested in using that terminal.
- Development of new services in a timely, flexible and efficient way can be hindered by strict or inflexible regulatory oversight.
- Limited range of services at some LNG terminals might hinder supply of LNG to small-scale market and affect competition.
- Lack of harmonised capacity allocation procedures and limited transparency on capacities and tariffs for services to the small-scale market hinders further market development.

Considered potential measures

- Stimulate LSOs to ensure availability of different types of capacity products (bundled and unbundled products, different contract duration, firm and interruptible capacity) in response to market requests.
- Review and adapt where necessary the specific storage regulation in order to allow and facilitate LSOs to offer additional unbundled or bundled storage capacity.
- Mandate enhanced transparency on small-scale LNG services by requiring terminals to provide via centralised transparency platform adequate tariff info for services focusing on small-scale market.
- Develop and implement an EU-wide platform for small-scale LNG bookings, whereby slots at all terminals that offer truck loading, ship loading, etc. can be booked in standardised way.

Market access & market liquidity

Key shortcomings

- Terminals connected to immature or illiquid gas hubs offer limited trade opportunities for LNG importers.
- Lack of interconnection transport infrastructure limits downstream market opportunities for gas imported at more isolated terminals:
 - Remaining physical and contractual bottlenecks *are* being addressed by ongoing and planned investment projects and by policy measures to optimise the use of existing capacity.

Considered potential measures

- In gas markets with limited competition and liquidity, consider imposing gas release or market making obligations to dominant gas market players (as a general option, not targeted towards LNG only).
- Further improve, where necessary and justified by market test as required by NC CAM provisions on incremental capacity, gas market interconnectivity through investments in transmission capacity (incl. reverse flows) and enhance market integration by removing remaining barriers to cross border trade (incl. gas market mergers where appropriate)

Modelled impacts of selected potential measures

Modelling results in a nutshell

- The modelling results indicate that **the implementation of most measures tested would decrease the weighted average gas price for the EU-28.**
- The net benefits for end-consumers through decreasing gas prices exceed the cumulative negative impacts on revenues for regulated LSOs, TSOs and SSOs in all tested scenarios. This leaves room to recover potential missing money for infrastructure operators via other sources.
- **Introducing the considered measures would in general positively impact terminal utilisation rates and market competition, but the effective size of the impacts would highly depend on global and European LNG market conditions.**
- The global gas supply available to Europe and European gas demand levels. Implementing the measures in the short term would have a high positive impact, as global market conditions and trends in European gas demand are currently favourable. But most proposed measures would still provide benefits if market conditions would become less favourable (i.e., if the “LNG glut” would disappear, and/or the EU28 gas demand would stabilise or decline).



Main conclusions and recommendations

Main conclusions

1. The EU LNG market and its gas consumers would benefit from the development of an **EU-wide information platform** that ensures transparency on and comparability between terminal service offerings, tariff levels, and available capacities.
2. To enhance competition and to provide robust price signals to infrastructure operators and market parties, implementing **primary capacity allocation via auctioning** of standard products.
3. Although UIOLI or similar principles are applied at almost all EU terminals, terminal usage could be improved by introducing harmonised reallocation procedures at all terminals, increasing transparency regarding available slots, simplifying and harmonising general access procedures and implementing a **centralised tool for secondary capacity bookings**.
4. The co-existence of **regulated and exempted terminals** in the same market regions may lead to competition distortion between these terminals. Any new decision regarding exemptions should hence be carefully assessed to account for its potential impacts on competition in the relevant market areas.
5. In coordination with their NRAs, LSOs should systematically evaluate and adapt where necessary their services portfolios, in order to properly meet market needs for **additional flexibility** or specific (unbundled) services, such as storage or services that are specifically focused on the **small-scale market**.

Thank you

Link to the study:

https://ec.europa.eu/info/news/new-studies-upgrading-gas-market-context-european-green-deal-2020-jun-05_en



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Access to European LNG terminals: a trading perspective

*José Simón, Director Pavilion Energy
Europe*





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ENERGY



ACCESS TO EUROPEAN LNG TERMINALS: A TRADING PERSPECTIVE

The future role of LNG in Europe

Jose Simón | Managing Director, Europe & Global Head, LNG Portfolio & Europe Trading

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PAVILION ENERGY: AT A GLANCE

OVERVIEW OF EUROPEAN LNG TERMINALS

A TRADING VIEW ON EU TERMINALS

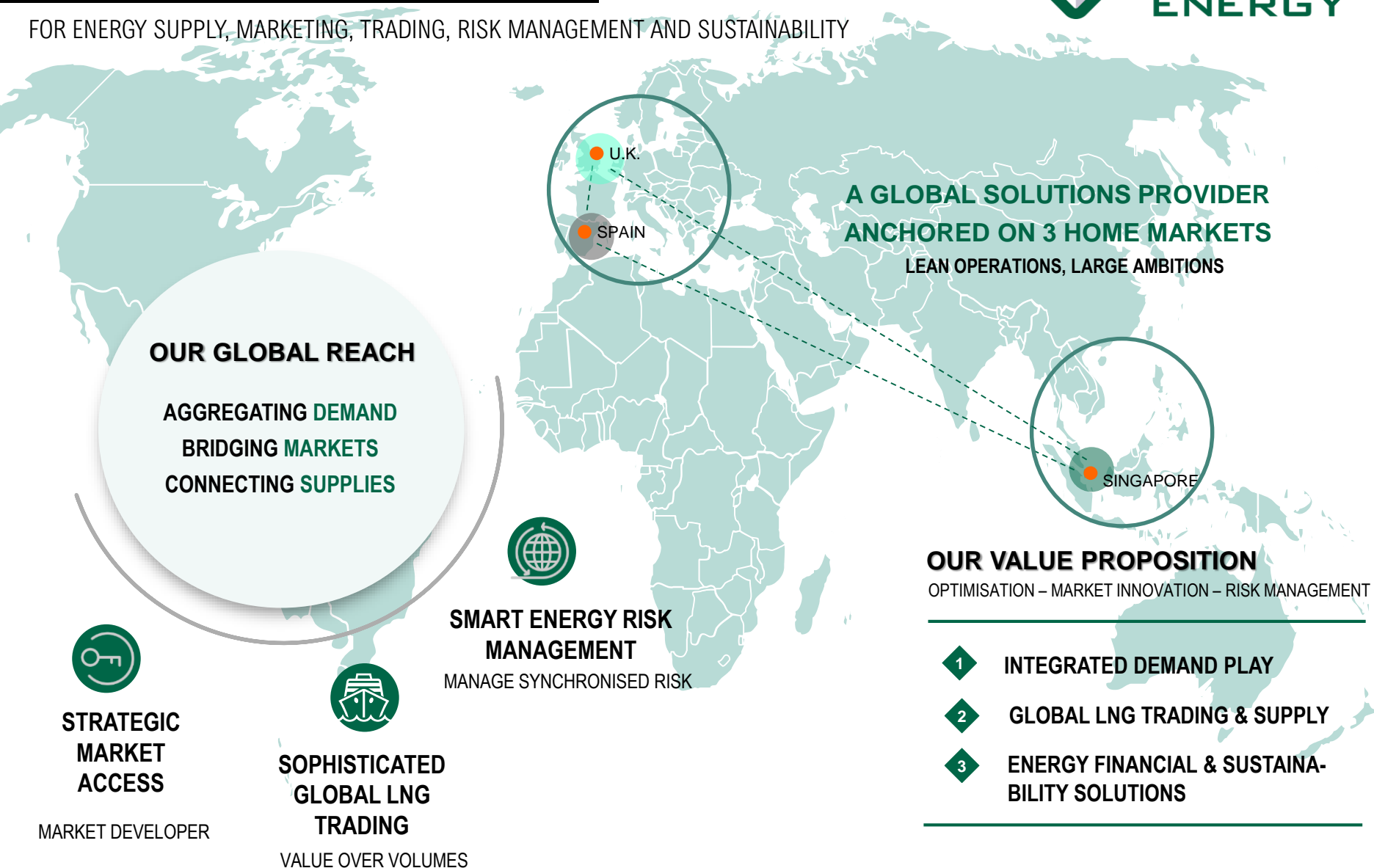
LESSONS LEARNT FROM SPAIN

A GLOBAL ENERGY MERCHANT

FOR ENERGY SUPPLY, MARKETING, TRADING, RISK MANAGEMENT AND SUSTAINABILITY



**PAVILION
ENERGY**





PAVILION ENERGY

SLNG
Singapore LNG Corporation

OUR PEOPLE

~150

Full Time
Employees

~60

Trading, Sales,
Marketing & Operations
Professionals

18

Nationalities
Represented



Twin headquarters
Singapore and Spain

OUR SHAREHOLDERS

TEMASEK

State-backed global
investment company

\$S306b

Portfolio value
as of Mar 2020

AAA/Aaa

Overall credit ratings
by S&P/Moody's

KEY FINANCIALS

US\$6.9b

Capital commitment
from Temasek

US\$1b

Revenue
(FY18/19)

US\$1.6b

Credit facilities

INDUSTRY AFFILIATIONS



Full Member of the
International Group of
LNG Importers (GIIGNL)

SIGTTO

Member of the Society of
International Gas Tanker and
Terminal Operators (SIGTTO)

EXPANDED GLOBAL PRESENCE & PORTFOLIO

SUPPLY DIVERSITY / STRATEGIC ASSETS / TRADING PLATFORM / RISK MANAGEMENT

~8 bcm

Global volumes
traded in FY2020/21



~6,5 bcm Global
Gas & LNG Portfolio



Global LNG Fleet
(joint ownership of
3 via BW-Pavilion JV)



LNG Import
Terminal Access
Singapore, Spain, UK



Market Maker
Position in Spain



France-Spain
Pipeline Access



Tanzania Offshore
Gas Blocks 1 & 4
(20% interest)

0

Safety incidents
since inception

DOWNSTREAM EXPERIENCE & EXPERTISE IN ASIA & EUROPE

> 4 bcm

Piped Gas/LNG Supply
1/3 of Singapore's
industrial gas demand

~10%

Share of LNG
Import Volumes
to Spain



SINGAPORE
LICENCES

LNG Importer
LNG Bunker Supplier
Gas Retailer & Shipper



Gas licences
in **Spain, UK, France
& Netherlands**

Overview of European LNG Terminals

LNG Terminals are increasingly playing a fundamental role in the European gas business

INCREASING NUMBER OF LNG TERMINALS

24 LARGE-SCALE LNG TERMINALS

operating in Europe across 11 Member States

12 NEW TERMINALS PLANNED

All* countries with access to the sea have regasification plants
**Except Bulgaria and Romania*

PLANNED & EXISTING LNG TERMINALS IN EUROPE (2019)



Source: European Commission. Study on Gas market upgrading and modernisation – Regulatory framework for LNG terminals. May 2020.

INCREASING UTILISATION

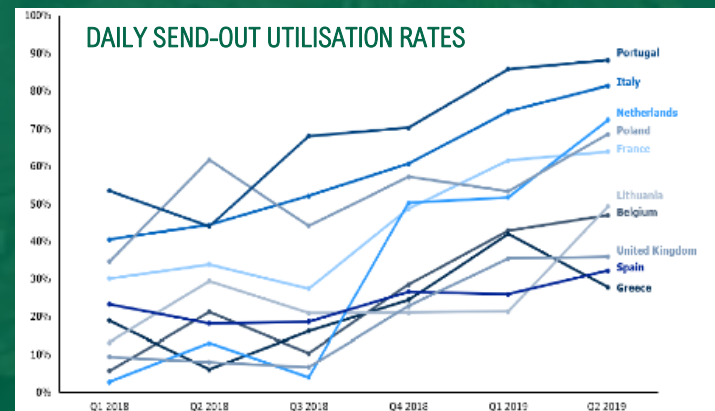
200 BCM/YEAR

Existing annual regasification capacity of LNG import terminals

TERMINAL UTILISATION HAS BEEN INCREASING

in a sustained manner in recent years

DAILY SEND-OUT UTILISATION RATES



LNG Terminals are changing the gas business rationale

LNG Terminals play a key role in geostrategy and market competitiveness

GEOSTRATEGY



As Europe is a net gas importer, LNG terminals will increase the **security of supply, the diversification** of origins and existing pipeline supply from certain politically unstable countries

ECONOMIC DEVELOPMENT



LNG terminals makes **gas markets more interconnected**, enabling trading between countries and assuring **access to cheaper prices**

MARKET COMPETITIVENESS



LNG terminals increase Europe's **potential for LNG import and trade**

EU LNG Terminals can be categorised into four main dimensions



MARKET ACCESS

LNG Terminals are the main gateway to most of the key gas markets in Europe



REGULATION

Regulation seeks to encourage the use of regasification plants



CAPACITY ALLOCATION

Having a transparent and market-based capacity allocation mechanism is key to boosting competition



SERVICES OFFERED

More terminals are increasingly offering new services to adapt to market developments and new businesses

EU LNG Terminals can be categorised into four main dimensions

MARKET ACCESS

LNG Terminals are the main gateway to most of the key gas markets in Europe

- Terminals that allows access to more mature / liquid trading hubs (i.e. TTF or NBP) VS. “Isolated” terminals (i.e. Baltic corridor)
- Physical location of the terminal

MORE TRADING OPPORTUNITIES

A terminal that provides access to a more liquid gas hub provides more trading opportunities, especially in the LNG/pipe gas arbitrages

FAIR COMPETITION

between terminals provides better prices and service.

EU LNG Terminals can be categorised into four main dimensions

- Regulated VS. exempted terminals
- Tariffs
- Transparency and comparability



REGULATION

Regulation seeks to encourage the use of regasification plants

LEVEL PLAYING FIELD

Among terminals to guarantee fair competition

HARMONISED PRINCIPLES

Transparent terminal tariffs

COMPETITIVE TARIFFS

Promote competition in each market

CROSS-SUBSIDIES MAY BE INCENTIVES

But could also impact inter-terminal competition

EU LNG Terminals can be categorised into four main dimensions

MARKET-BASED MECHANISMS (AUCTIONS)

Of standard products to promote competition, enhance transparency and to provide price signals

LIMITED EXISTING REALLOCATION OF UNUSED CAPACITY

Due to short notice period to procure a cargo



CAPACITY ALLOCATION

Having a transparent and market-based capacity allocation mechanism is key to boosting competition

- Primary VS secondary capacity
- Short VS long term capacity

EU LNG Terminals can be categorised into four main dimensions

UNBUNDLED SERVICES

Increase the flexibility and allow traders to react to new market needs

NEW 'EXPANDED' SERVICES

Increase competition among terminals, thereby increasing competitiveness of the gas market

- “Standard” services
- “Expanded” services

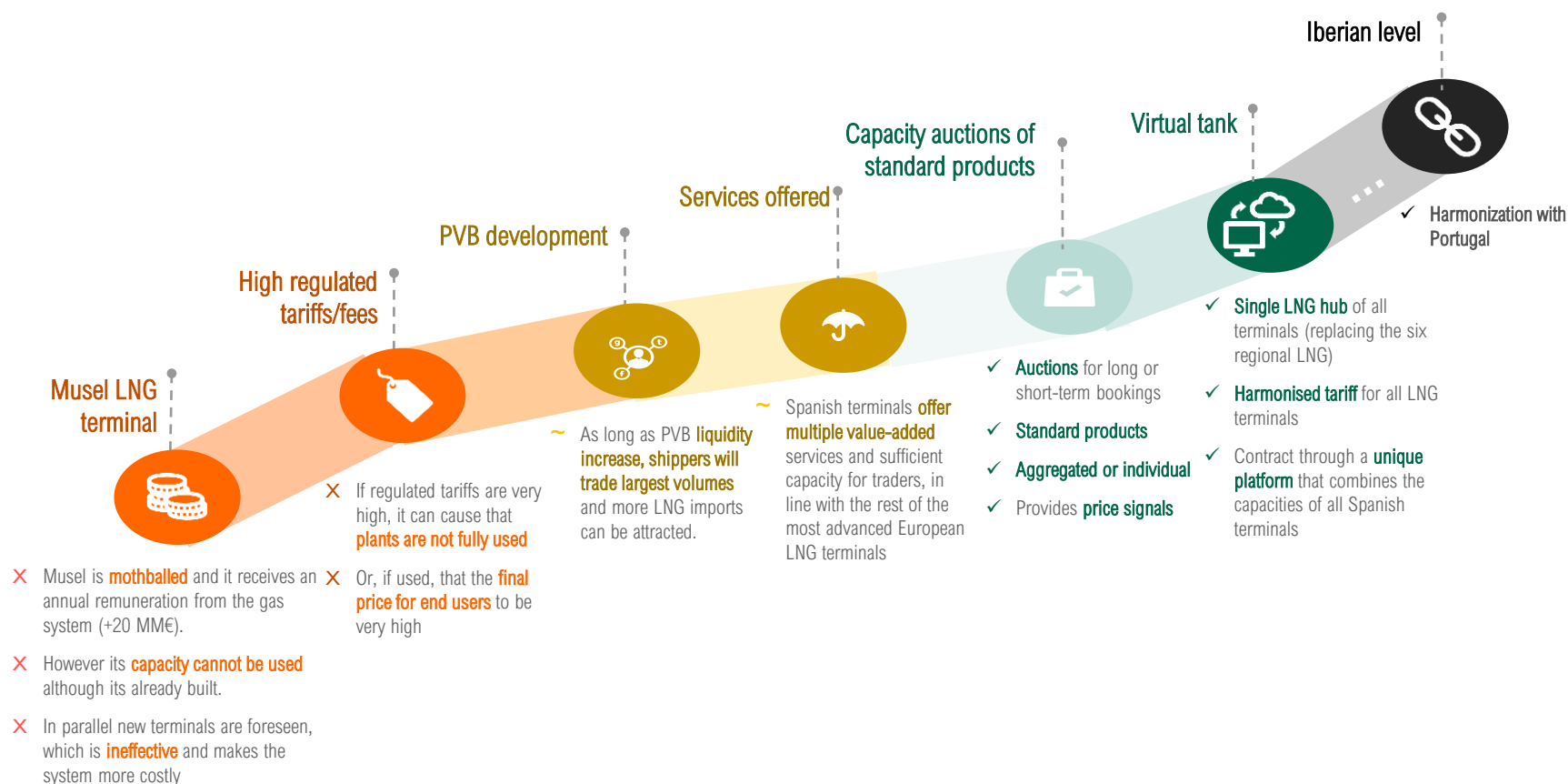


SERVICES OFFERED

More terminals are increasingly offering new services to adapt to market developments and new businesses

Lessons learnt from the Spanish case

Important developments have been carried out to promote competition and increase the competitiveness of Spanish LNG terminals, but there are still some areas of improvement that need to be addressed



Our vision of the future based on our trading experience

Regasification terminals have gone from being an stranded asset due to the **short supply of LNG** (no LNG from US and traders focusing on more competitive markets like Asia) to the current situation of **LNG oversupply, where terminals have become an essential asset to make feasible LNG entry into the EU.**

For a trader to optimise its LNG portfolio, it is essential to have **guaranteed access to NWE terminals** (especially in liquid markets such as NBP or TTF), and secondarily to have access to Southern EU terminals.

Previously, some agents guaranteed their access through options, but now, since the likelihood of being used is back, firm slots are more frequent. (e.g. Spain)

In the past, it was essential to have a customer base or a CCGT to be able to ensure the sales, now, with the hub markets, it is enough to have **regasification capacity.**

The LNG oversupply situation is expected to last for several years, and regasification slots will continue to be a scarce resource.



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THANK YOU!



Current regulatory challenges: congestion

Rocío Prieto

CEER LNG WS

CNMC Gas Director

The future role of LNG in Europe

Webinar, 21st of September 2020

Current regulatory challenges

Background and past CEER activities on LNG

- In **2016**, CEER activities were focused on gathering views from stakeholders on **existing and potential barriers** with regard to bringing LNG volumes into the EU, access to terminals and benefits of spreading LNG across Europe.
- In **2017**, CEER carried out analysis that aimed to identifying **ways to remove barriers** in LNG markets. It focused on services offered by the LNG terminals and tariffs applied; this analysis was CEER's contribution to the EC LNG and storage strategy.
- In **2018-2019** CEER decided to adopt a proactive role looking ahead to future challenges, with greater focus on **how to foster the development of the LNG sector** at an EU level, identifying solutions to real problems alongside the anticipation of new ones



Current regulatory challenges

Whatever the context, the main regulatory principles are the same...

General objectives:

- **Security** of supply
- **Diversification** of infrastructures & sources
- **Competition** improvement
- Non-discriminatory **access** to infrastructures
- Maximization of the utilization
- **Payback of the investments** on LNG infrastructures
- **Flexibilisation** of the use of the capacity
- **Service** portfolio to fulfil market needs
- **Transparency** ...



Current regulatory challenges

Nevertheless, the situation evolves...

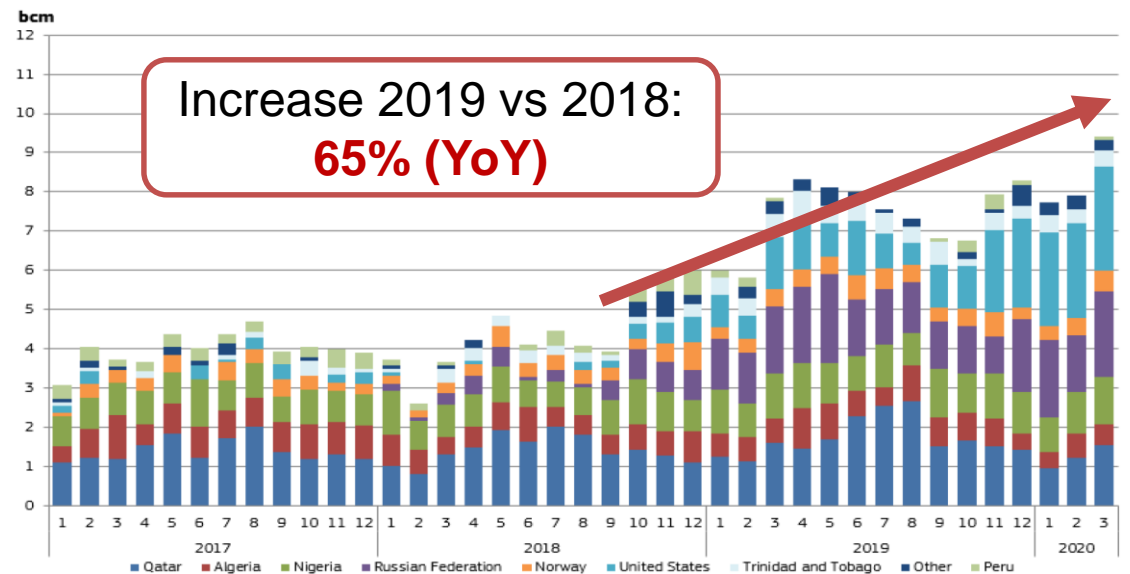
2 years ago...

One of the main assumptions made in the last CEER study (2018) about LNG terminals was:

“They compete in a general underutilisation context”

Nowadays...

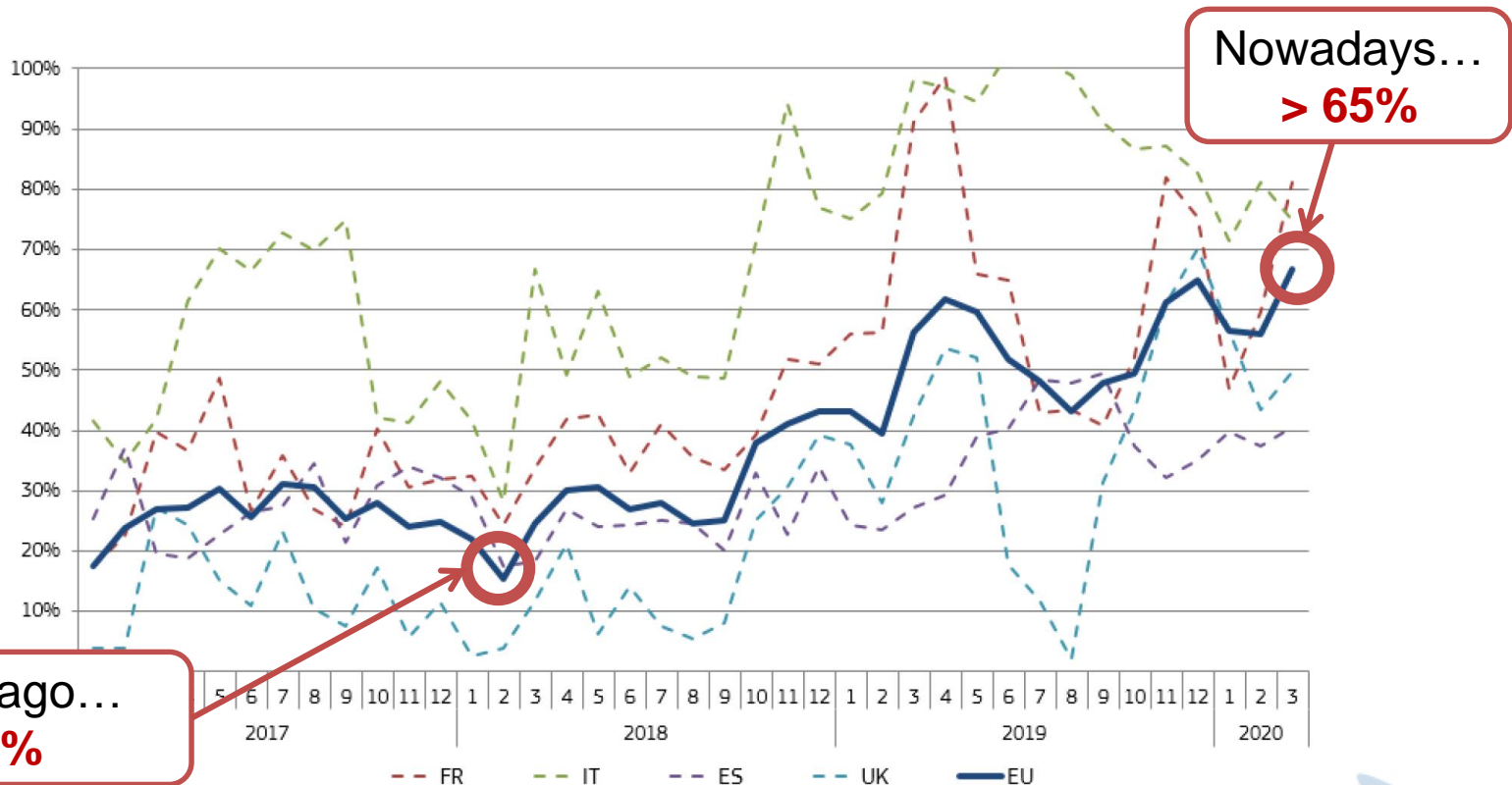
LNG Imports to the EU, by supplier:



Current regulatory challenges

Sometimes significantly...

Average monthly regasification terminal utilisation rates in the EU and in some significant LNG importer



Source: Commission calculations for LNG imports based on tanker movements reported by Refinitiv. Regasification capacities are based on data from International Group of Liquefied Natural Gas Importers (GIINGL) and Gas Infrastructures Europe (GIE)

Current regulatory challenges

The ways to reach the objectives also change, according to the evolving situation...

Services offer

- Must be **adapted** to the (changing) **needs of the users**
- Variety: Bundled and unbundled
- **Definition of the services** with market participation: LSOs, shippers, traders and regulators.
- New services in some terminals: **small scale** services.
- In the future (**possible new services**, i.e...)
 - Renewable gases - certificate of origin
 - H2
 - Carbon footprint...



Current regulatory challenges

The ways to reach the objectives also change, according to the evolving situation...

Capacity Allocation Mechanisms (CAM)

From (underutilisation) ...

Simple and non-competitive CAM mechanisms, i.e.:

- First Come First Serve

To...

Market based mechanisms to allocate the capacity in an efficient and competitive way



Current regulatory challenges

The ways to reach the objectives also change, according to the evolving situation...

Congestion Management Procedures (CMP)

From (underutilisation) ...

None or weak CMP rules:

- Payment of the capacity reserved
- Secondary capacity markets

To...

Robust CMP rules, that must take into account the **specificities of the services provided** by LNG terminals (different nature from transmission/distribution services)



Current regulatory challenges

The ways to reach the objectives also change, according to the evolving situation...

Congestion Management Procedures (CMP)

- Payment of the booked capacity
- Penalties in case the capacity is neither used, nor released.
- UIOLI LT (How to adapt this to discrete services i.e. ships unloading?)
- UIOLI ST (How to adapt this to discrete services i.e. ships unloading?)
- Over-nomination and Buyback
- Offer of interruptible capacity
- Surrender
- Others...



Current regulatory challenges

The ways to reach the objectives also change, according to the evolving situation...

Transparency

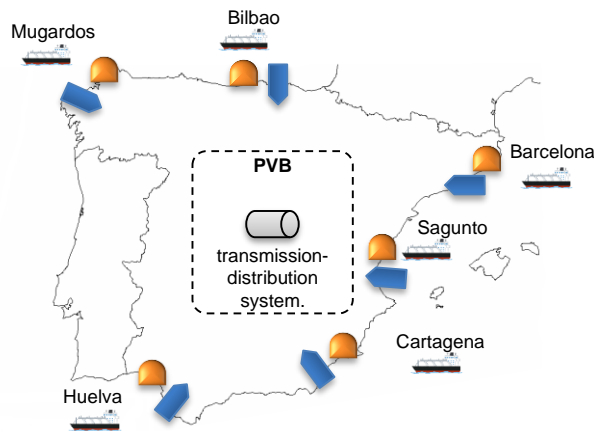
- Transparency is always **a must**, independently of the context: the greater level of transparency, the better.
- Current GLE LNG terminals **transparency template** should be implemented by all LNG terminals in Europe.



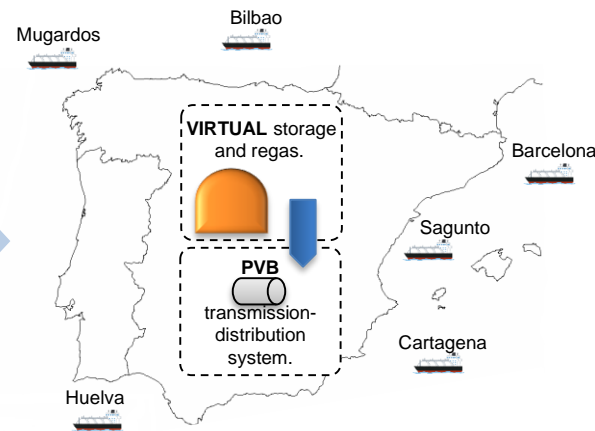
Current regulatory challenges

The Spanish case. How these challenges are being undertaken...

From (regulation in the past):



To (current regulation):



- CAM: First Come First Served
- Services offered: Bundled services (related to the send-out capacity)
- CMP: Payment of fix term for some services

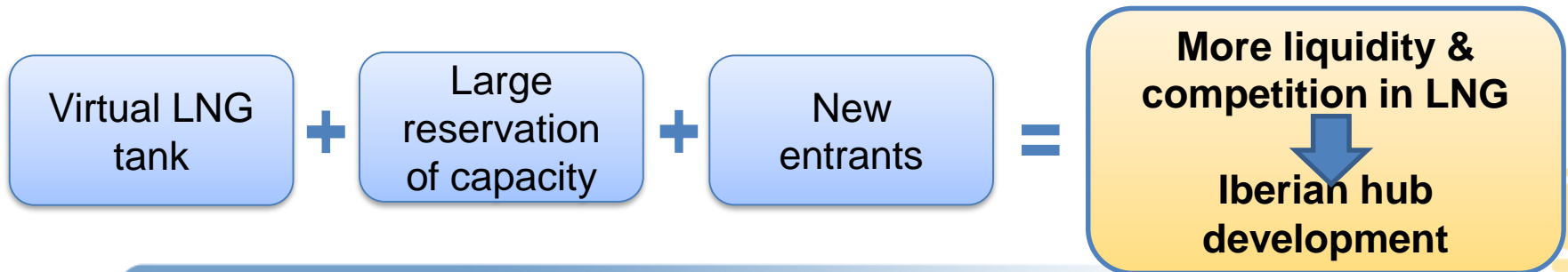
- CAM: Auctions of standard products for any service (similar to Interconnections)
- Services offered: Bundled and unbundled services (related to slot or LNG storage reservation)
- CMP: Full payment obligation of capacity allocated + surrender + no possible to sell the congested capacity in the secondary market (surrender) + **more undergoing..**

Current regulatory challenges

The Spanish case. How these challenges are being undertaken...

Some milestones achieved...

- In March 2020 the first auctions for the capacity were held (unloading slots)
- Capacity for the next 15 years was offered. There were bids for all the years.
- High level of participation i.e. large competition for the capacity for the first years (gas year starting Oct 20). There were significant premiums for many of the years:
- New entrants were allocated with capacity: Competition
- Gas better distributed along the 6 LNG terminals: facilitates operation





Conclusions

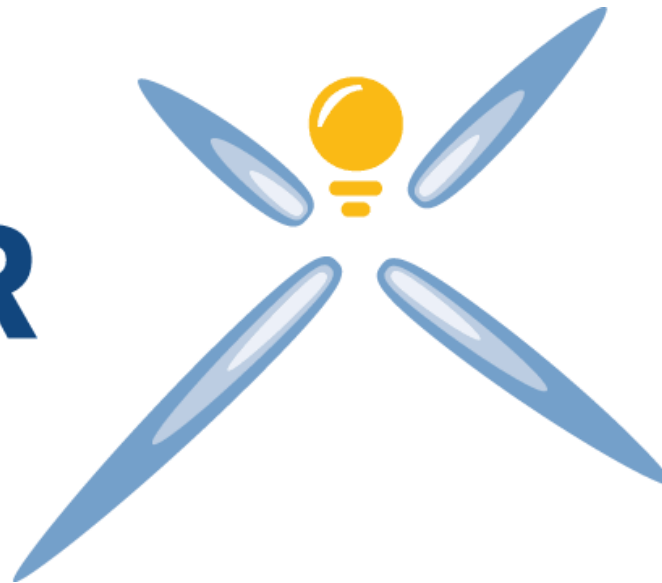
- **Flexibility allows to quickly respond to changing market conditions**, and to adapt to them in different ways, considering the peculiarities of each country, which contributes to the development of the LNG sector in the EU.
- **CEER doesn't identify a need for deep regulation harmonization of LNG terminals at European level** (similar to the transmission system).
- The development of new services, the way the terminals are regulated (or not), the eventual adaptation of rules and concepts must **follow market needs and innovation principles**.
- Regulatory regimes must **not hinder LNG market development** but must adapt quickly to changing conditions.
- **Further coordination of regulators, mainly regarding transparency about changes on access regimes conditions**, may be advisable, at least at regional level, granting predictability and the opportunity to adapt to the changing conditions for any party.
- The **importance of LNG will grow in the future**, as the market is expanding. Developing the analysis on the place that LNG can play in energy transition for the EU is needed to establish a shared vision of current challenges for ensuring sustainability and security of supply.



Thank you for your attention!

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The Future Role of LNG in Europe **Small Scale and Virtual LNG Services**

Yves Poncelet, *Co-Chair - CEER LNG WS*
Webinar, 21 September 2020

What is small scale LNG ?

Small scale LNG refers to the direct use of LNG in its liquid form, as opposed to the traditional model of regasification and subsequent introduction into the gas transmission grid.

Small scale LNG supplies are destined to:

- Consumers requiring liquid fuel
- End-users located in places that traditional infrastructure does not reach



Uses of small scale LNG

- Fuel for road transport
 - ▶ Typical end-users are heavy-duty and special trucks of haulage companies, large logistic operators, and retail and consumer companies.
- Fuel for ship bunkering
 - ▶ Vessels that are fuel intensive and follow regular and repetitive transportation routes, such as point-to-point cargo and passenger ships, ferries, and container ship – certainly in the European (S)ECA zones.
- Gas supply for industries
 - ▶ LNG can stimulate demand in areas of the market that were previously unsuited to natural gas as a fuel source, such as remote areas.
- Liquefaction of biomethane
 - ▶ A highly sustainable version of LNG, with almost the exact same chemical makeup, produced during the anaerobic digestion process, which breaks down organic matter.



Current situation in Europe

- Fuel for road transport
 - ▶ 280 LNG fuelling stations in Europe *
 - (200 last year)
- Fuel for ship bunkering
 - ▶ 9 vessels dedicated to ship bunkering *
 - (2 three years ago)
- Gas supply for end-users
 - ▶ This type of supplies are currently being implemented to supply industrial customers that are not connected to the natural gas pipeline system (virtual pipelines).
 - Virtual pipelines deliver liquefied natural gas (LNG) by road, rails and waterways between places that aren't connected by physical pipelines.

* sources : GLE



Virtual LNG

- New service that consists in swapping LNG in tank with pipeline gas to :
 - ▶ meet LNG regasification requests (through send-out nomination) and
 - ▶ enable the delivery of LNG to small-scale market participants
- This would enable participants in the small-scale LNG market to virtually source gas from liquid hubs at market-based price.



LNG Terminals in Europe

- 29 LNG regasification terminals in the EU 28
 - ▶ 16 terminals offer reloading services
 - ▶ Ship-to-ship transshipment services are offered only in some LNG terminals (2 jetties needed)
 - ▶ Ship-tank-ship transshipment services are offered in other terminals
 - ▶ Truck loading installation can be found 15 LNG terminals
 - ▶ Small scale LNG services are available at 8 terminals



Regulation of LNG Terminals in Europe

- 29 LNG regasification terminals in the EU 28
 - ▶ Most terminals have a Regulated Third-Party Access Regime
 - ▶ Five terminals (most recent ones) have been granted an exception and have negotiated access conditions
 - (Dunkerque, Gate and the three UK terminals)
 - ▶ One has an “*hybrid*” access regime
 - (Porto Levante with both regulated - 20% - and negotiated TPA - 80%)
 - ▶ Three of them are not connected to their national transmission networks
 - (1 terminal in Finland and 2 in Sweden)
- In terms of send-out capacity, 62 % of total capacity is subject to a regulated TPA regime, while 37% is exempted, and only 1% off-grid



Regulation of LNG Terminals in Europe

- Existing importing LNG infrastructures play an important role in the development of Small Scale LNG and, as said before, are mostly regulated.
- Midstream/downstream Small Scale LNG projects like LNG filling stations are not regulated.
- Although they are operated under different regimes, LNG terminals as well as Small Scale LNG projects have developed **services** that fit **market needs**. The driving force for such developments being the evolution of the LNG market for and in Europe.



Regulation of New Services in LNG Terminals in Europe ?

- LNG operators are currently swiftly **adapting to changing market conditions**.
- With regard to regulated terminals, regulators should seek to ensure that there are no undue barriers to **the development of new services**. The new projects can be developed via merchant approach which is **based on customers' needs** (case of Belgium).
- An adaptation of some current regulatory regimes might be required in order to react more promptly to the rapidly changing global LNG market that is facilitating the development of new services (case of Spain).
- It is also required to ensure that an equal **level playing field** is available for both sources of gas – LNG gas and pipeline gas and in particular with regard to virtual liquefaction.
- Regulators need to move to **Dynamic regulation** that is independent and uses a **pragmatic approach** and avoids complexities in LNG, in general and in Small Scale LNG in particular given its specificities.



Latest news : a few examples

- Fuel for road transport
 - ▶ Total Nederland and PitPoint.LNG have started construction of a new multiple-energy truck station at the new A1 business park in Deventer, the Netherlands (09/09/2020)
 - ▶ Rolande has opened its first LNG station in Belgium, together with its partner G&V Energy Group on the right bank of Antwerp harbor (28/08/20)
- Fuel for ship bunkering
 - ▶ Oristano in Sardinia : Italy's 1st small-scale LNG terminal nearing completion (05/06/2020)
- Gas supply for end-users
 - ▶ Engie installs an LNG station for two cogeneration units in a farm for disabled adult in Wallonia (15/09/2020). In a later phase it will fill-in vehicles with CNG
 - This station could use bioLNG via a biomethane production unit



Conclusions

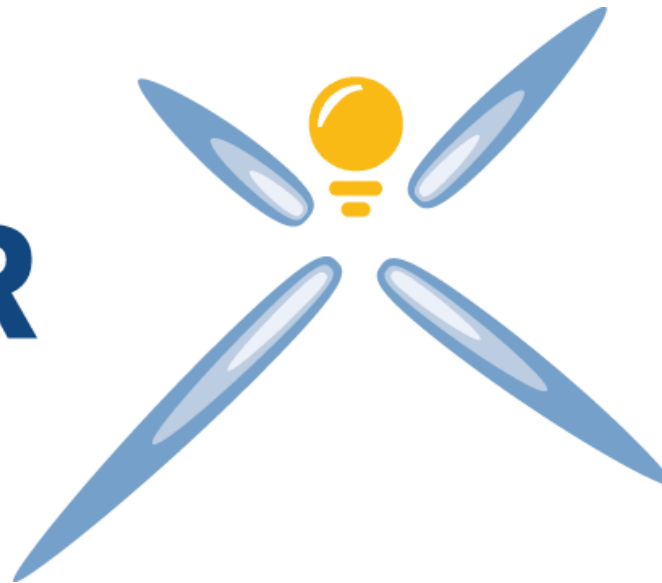
- The LNG market is a flexible one and is rapidly evolving.
- Small scale LNG projects are being developed in existing infrastructures as well as in new projects.
- The driving forces for new services like small scale LNG and virtual liquefaction are market needs.
- In case of currently regulated infrastructures, regulation has to be dynamic following a pragmatic approach.



Thank you for your attention!

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Q&A session

*Moderator: Agustín Alonso, CEER LNG WS
Member*







Webinar on The Future Role of LNG in Europe

21 September 2020

Fostering energy markets,
empowering **consumers**.

Future trends in LNG markets and decarbonisation

- Decarbonisation through LNG
- LNG as a fuel for road transport
- LNG as a fuel for maritime transport

*Moderator: Benoît Esnault, Vice-Chair of the
CEER Gas WG*





Gas Infrastructure Europe

Decarbonization through LNG

Arno Bux

GLE President and GIE Board member
Brussels, 21 September 2020

LNG is one of the mainstays of global energy



LNG is **enabling the energy sector integration and smart and sustainable mobility**;



LNG is **supporting a multimodal transport system** based on an efficient and sustainable combination between **waterborne, road and railway**;



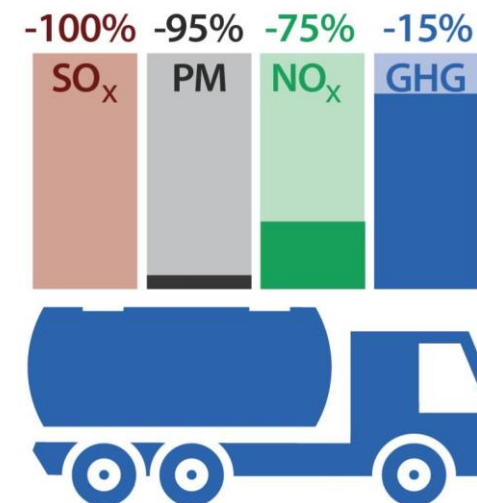
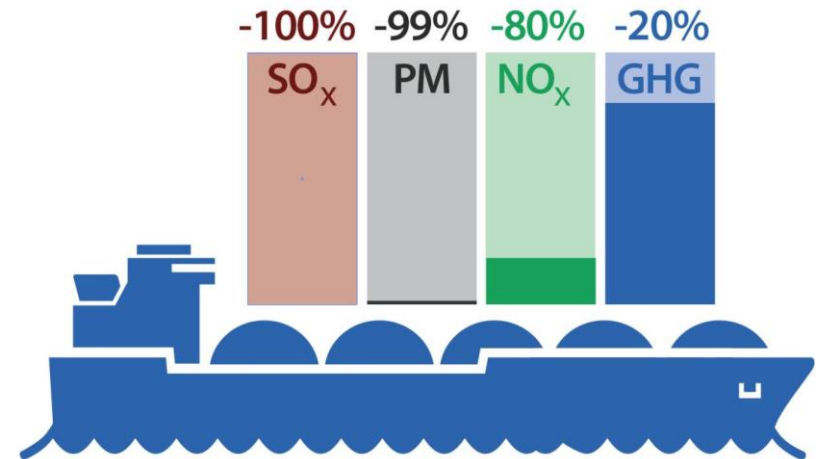
Security of supply with distributed storage and refuelling infrastructure ready for a **growing share of renewable gases** will be key;



Where it replaces more polluting fuels, **LNG improves air quality and limits emissions of CO2** (e.g. power generation and heating).

LNG is the only market ready alternative fuel available today in transport

- **Available** worldwide*
- Improves **air quality** in urban areas and ports
- **IMO 2020 Sulphur Cap compliant** and solution for the IMO 2030 and 2050 GHG targets
- **Technology is safe and mature** for commercial use**
- **Small-scale LNG infrastructure is developing**, but must be further incentivized to facilitate LNG uptake
- **No-lock in effects** on the infrastructure side
- Methane slippage **is being fixed** through the widened use of new technology and best practices.



*354,7 MT of LNG imports in 2019 and 907,4 MT of potential new projects. DG ENER reported that in Q4 2019 LNG was the second gas source to the EU

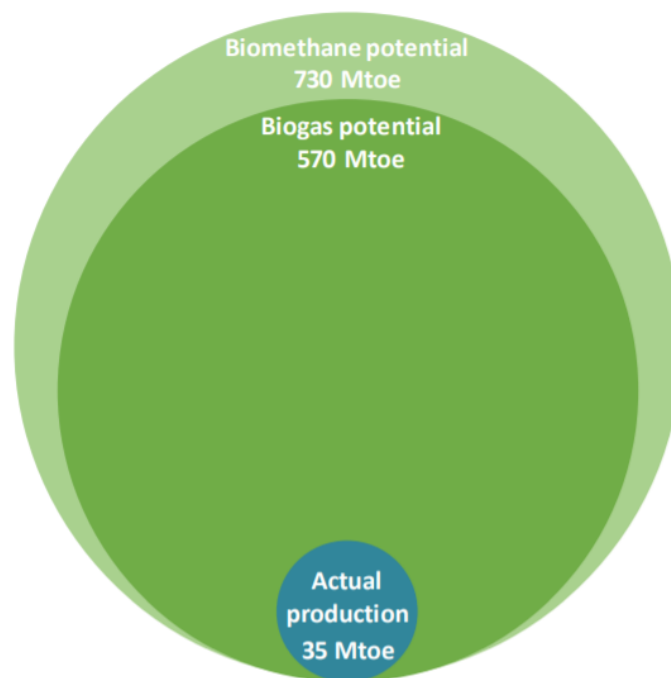
** More than 100 000 cargoes delivered since 1964 without major incident.

Source: Thinkstep

LNG paves the way for carbon neutral Liquid Biomethane (LBM) and Synthetic Methane (LSM)

- **Availability** of LSM will depend on the build-out of renewable electricity capacity;
- The feedstocks available for sustainable production of biogas and biomethane are huge and largely untapped;
- Where available, LBM and LSM **can be used now**;
- LNG-fuelled ships and trucks can use LBM and LSM with **little or no modifications**.
- The gradual replacement of LNG with LBM or LSM **will avoid**:
 - **devalued or stranded assets**;
 - **future capital intensive infrastructure**.

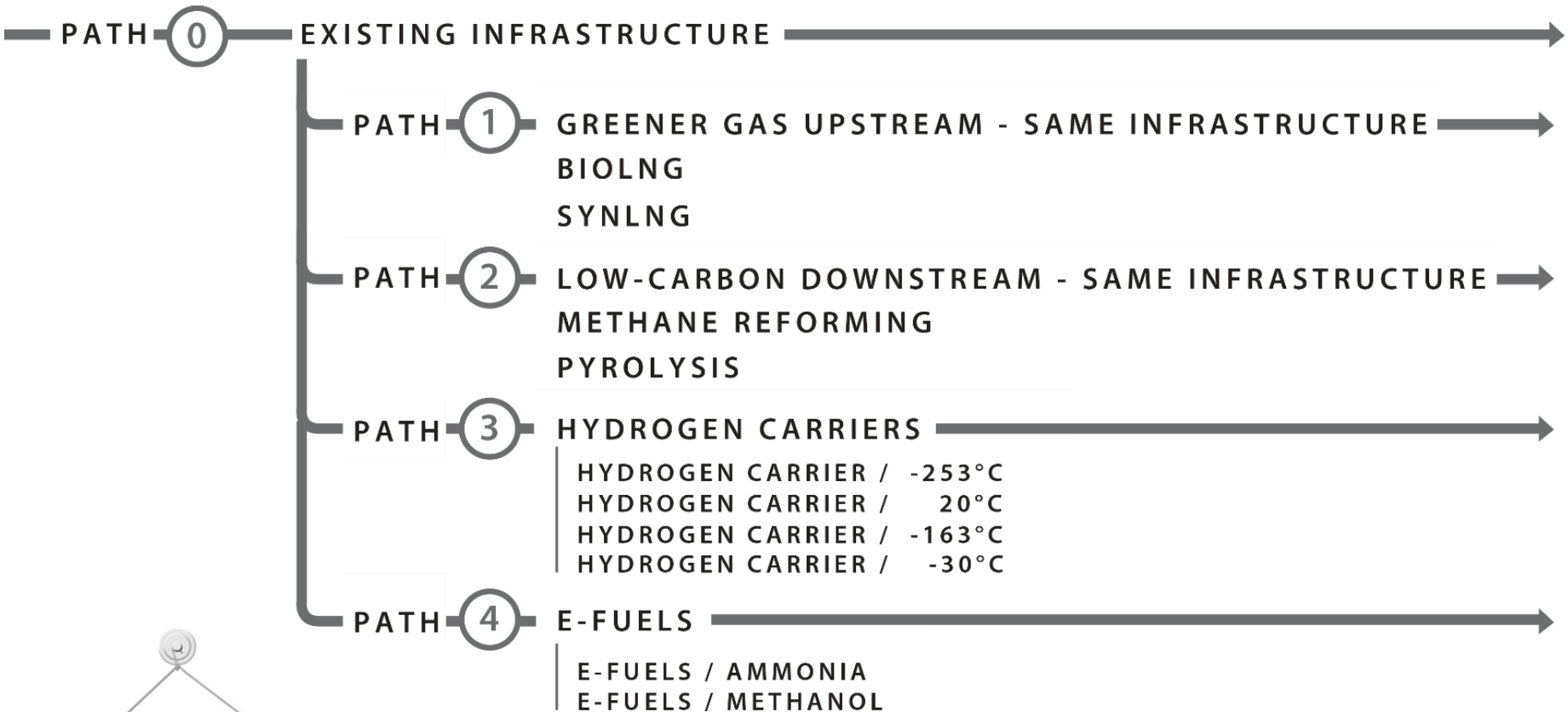
Biogas and biomethane production in 2018 against the sustainable potential today



Source: IEA, Outlook for biogas and biomethane

The role of LNG in the energy transition

Pathways to decarbonize



2 major industry studies soon available looking at:
regulatory and **technical/costs** questions

The role of LNG in the energy transition

Pathway 1 – Greener gas upstream

Existing infrastructure is utilised, therefore the key policy solutions are producer support and establishing a certification system.

	Bio-LNG	Syn-LNG
Role of LNG terminals	<ul style="list-style-type: none">Existing LNG infrastructure is used:<ul style="list-style-type: none">Import bioLNG or synLNGBunkering / fuelling infrastructure used with bioLNG or synLNGNo changes and no financial support required to equipment	
Policy implications	<ul style="list-style-type: none">No LNG-specific policy required to enable pathwayManagement of technical standards for commodity quality of bioLNG and synLNG imports could be supported by LNG terminals	

The role of LNG in the energy transition

Pathway 2 – Low-carbon downstream

A full hydrogen strategy is required, but downstream production may be easier to coordinate.

	Methane reformation	Pyrolysis
Role of LNG terminals	<ul style="list-style-type: none">Existing LNG infrastructure is used to import LNGSome existing LNG bunkering / fuelling infrastructure used for liquified hydrogenLNG terminal expertise and location could be used to develop CO₂ terminals for liquid shipping to offshore injection sites	
Policy implications	<ul style="list-style-type: none">No LNG-specific policy necessary to enable the pathwayEU policy clarity on roles of actors (LSO, TSO etc) within the hydrogen regulatory framework to ensure there are no unnecessary barriers, e.g. with respect to CO₂ capturing, transport and handling	

The role of LNG in the energy transition

Pathway 3 – Hydrogen carriers

A full H2 strategy is required, along with policy support for upstream production and coordination across the value chain.

	Liquid H2	LOHC	Syn-LNG	Ammonia
Role of LNG terminals	<ul style="list-style-type: none"> ▪ Possibility to convert LNG infrastructure to facilitate low-carbon H2 carrier ▪ Liquid H2 ships likely to be similar to LNG ships ▪ Cryogenic infra (e.g. storage tanks) could be adapted ▪ LNG bunkering infrastructure used for liquid H2 consumption 	<ul style="list-style-type: none"> ▪ No direct role for LNG terminal ▪ Potential role for LNG bunkering / refuelling infrastructure to be used for e-fuels 	<ul style="list-style-type: none"> ▪ Existing LNG infrastructure is used to import synLNG and for bunkering / refuelling ▪ No changes required to equipment 	<ul style="list-style-type: none"> ▪ No direct role for LNG terminal ▪ Potential role for LNG bunkering / refuelling infrastructure to be used for e-fuels
Policy implications	<ul style="list-style-type: none"> ▪ EU policy clarity on roles of actors (LSO, TSO etc) within the hydrogen regulatory framework to ensure there are no unnecessary barriers ▪ Government facilitating coordination / co-location of LNG terminals / other import facilities and hydrogen industrial cluster sites to provide security of supply (imports can complement domestic production) ▪ Regulation of H2 infrastructure including technical standards for commodity quality of H2 imports (could be managed/supported by LNG terminal operators) ▪ Capex conversion support (grant or RAB) to subsidise LNG infrastructure (or other import facilities) adaptation via an efficiently designed allocation process ▪ Competition between liquid H2 route and alternatives (e.g. pipelines) supported by ensuring H2 subsidies are neutral to the import route 	<ul style="list-style-type: none"> ▪ No additional LNG-specific policy necessary to enable sub-pathway 		

The role of LNG in the energy transition

Pathway 4 – E-fuels

Level playing field should ensure that LNG can compete with e-fuels.

	Methanol	Ammonia
Role of LNG terminals	<ul style="list-style-type: none">▪ No direct role for LNG terminals▪ Potential role for LNG bunkering / refuelling infrastructure to be used for e-fuels	
Policy implications	<ul style="list-style-type: none">▪ No additional LNG-specific policy necessary to enable sub-pathway	

Thank you for your attention.



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IVECO ALTERNATIVE TRACTIONS: Toward zero transport emissions

*Fabrizio Buffa, Gas Business Development
Manager, IVECO S.p.A.*

IVECO

A global manufacturer of light, medium and heavy commercial vehicles

IVECO designs, manufactures and markets a wide **range of light, medium and heavy commercial vehicles for road and off-road use.**

Committed to safe, efficient and sustainable mobility, IVECO has been investing in the development of alternative drive systems for over 20 years. It offers engines running on **diesel, HVO, Natural Gas and Biomethane** on its entire range.



COMMERCIAL VEHICLES

IVECO S-WAY NP 18 – 50 tons



Eurocargo NP 8 – 16.8 tons



Daily NP 3.5 – 7.2 tons



IVECO X-WAY NP 40 – 50 tons

ELECTROMOBILITY IN COMMERCIAL VEHICLES

NIKOLA TRE

A wide range of vehicles with innovative hybrid and full electric propulsion systems offer **fuel consumption savings and emission reductions** for sustainable mobility

IVECO BUS E-Way by HEULIEZ



IVECO Daily electric

- **Fuel Cell powertrain** for heavy commercial vehicles
- **e-Axle** for Battery Electric Vehicles and fuel cell heavy duty applications
- Advanced and integrated propulsion **control system** with dedicated software
- **Battery packs** for light commercial vehicles, buses, hybrid and full electric applications
- A **complete electric bus offering** with Overnight Charge, Opportunity Charge and In-Motion-Charge



PRESERVE AIR QUALITY

IVECO

A photograph of several icebergs floating in dark blue water under a clear sky. A large iceberg in the center is splashing, creating a massive spray of white water. The icebergs are white and blue, with some showing internal structures. The text "REDUCE GHG EMISSIONS" is overlaid in white, bold, sans-serif font.

REDUCE GHG EMISSIONS

IVECO



REDUCE NOISE

IVECO

PRESERVE TRANSPORTER'S PROFITABILITY

21/03/2020

IVECO

IVECO: our milestone towards zero emissions with LNG-CNG

EU Iveco Wholesales

> 35.000

1996	2000	2001	2007	2009	2010	2012	2015	2016	2017	2018	2019
1 st Truck	1 st LCV	1 st below EEV	1 st below Euro VI	1 st medium truck	1 st CNG Tractor	1 st LNG Tractor	1 st Rigid LNG Truck	1 st Long Haul LNG Truck	1 st Concrete Mixer 1 st Car Transport	Sustainable truck of the Year	IVECO S-WAY NP

COMMERCIAL VEHICLES

LIGHT 3,5 to 7,2t



MEDIUM 8 to 16t



HEAVY 18 to 50t



BUS & COACHES

10-12-18m Std & BRT
12m Low-entry & std height coach

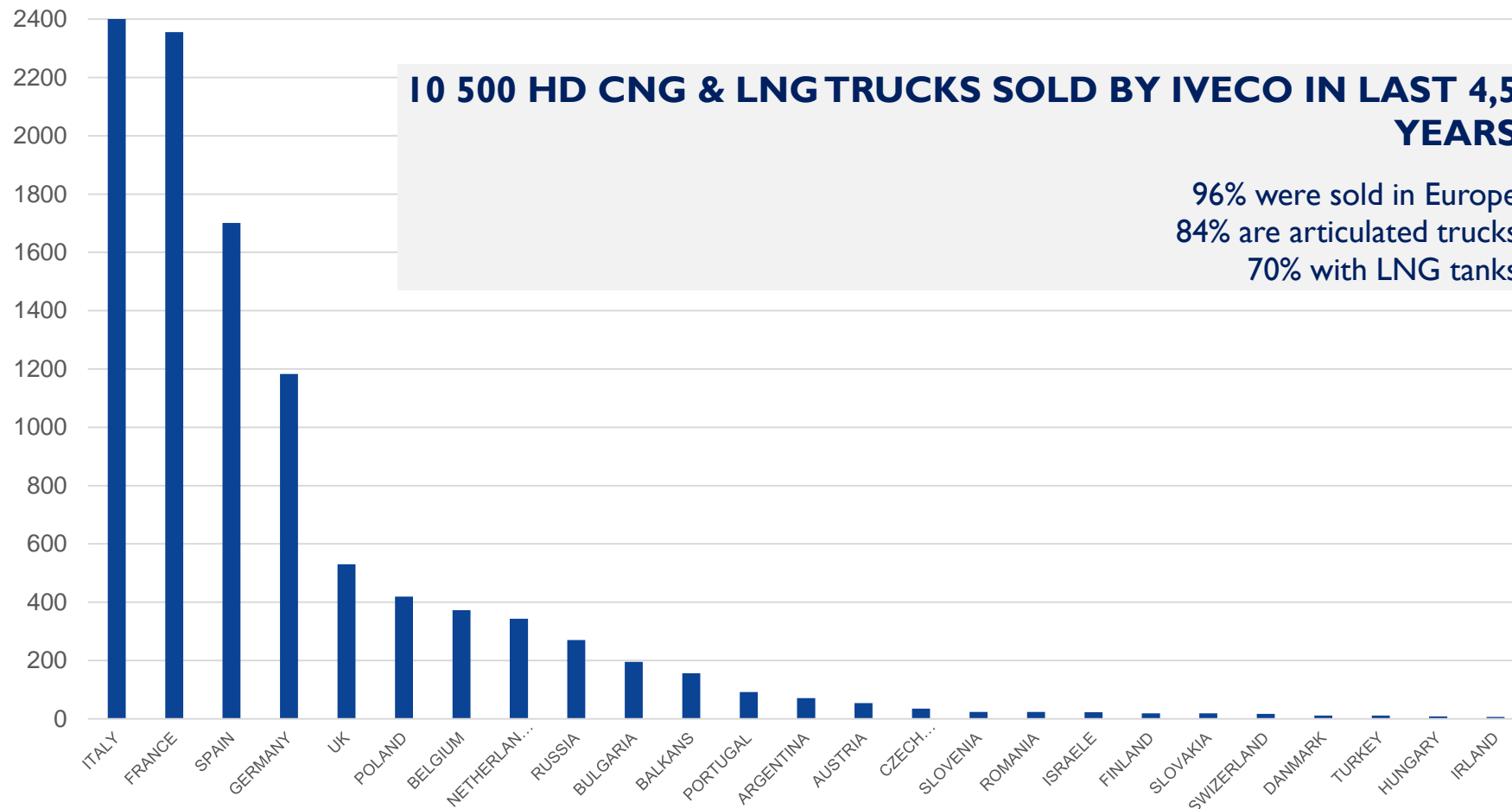


ENGINES

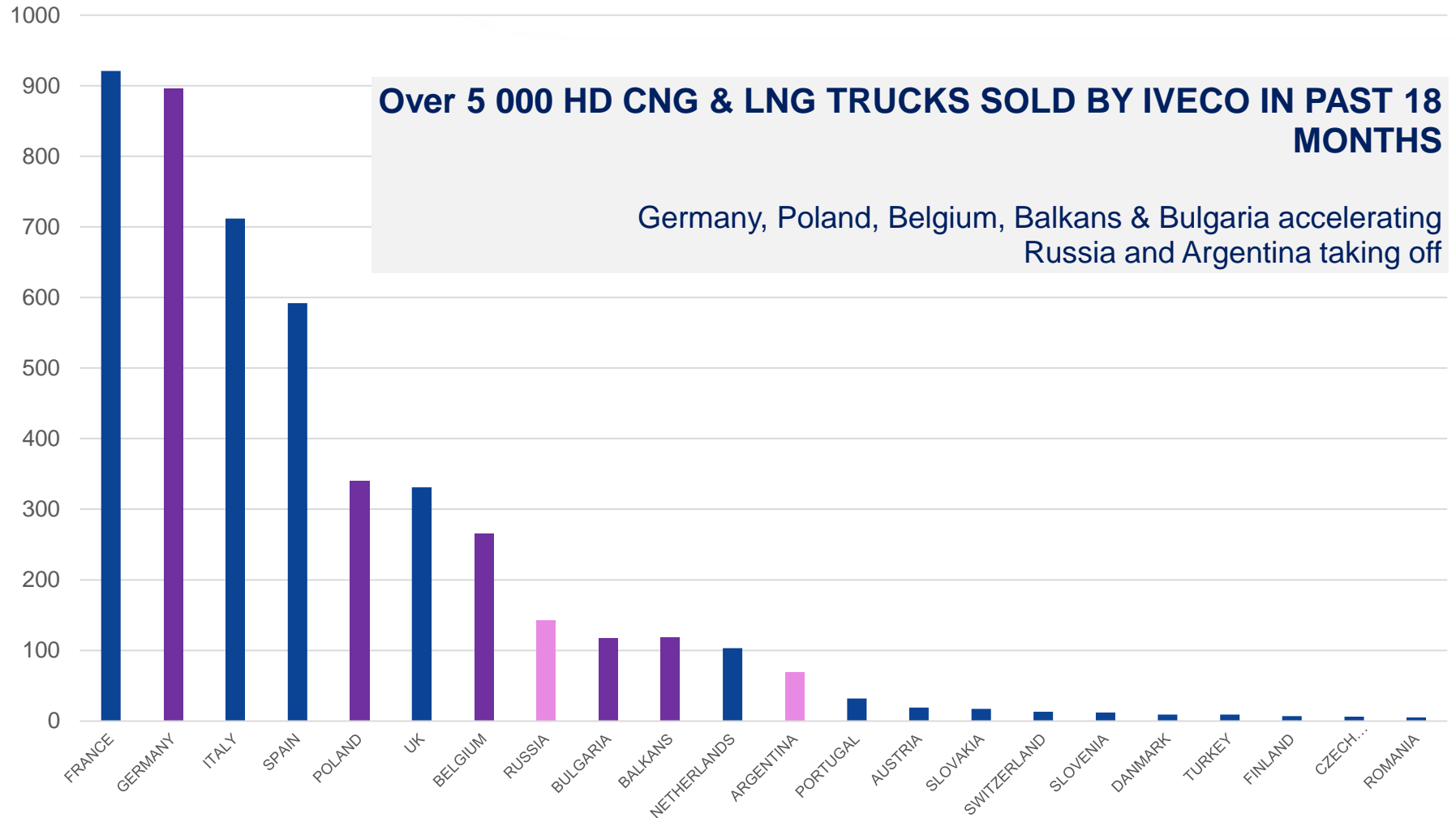
3, 6, 8, 9 & 13 L
136 to 460 hp



IVECO's CNG and LNG Heavy Duty Trucks Sales

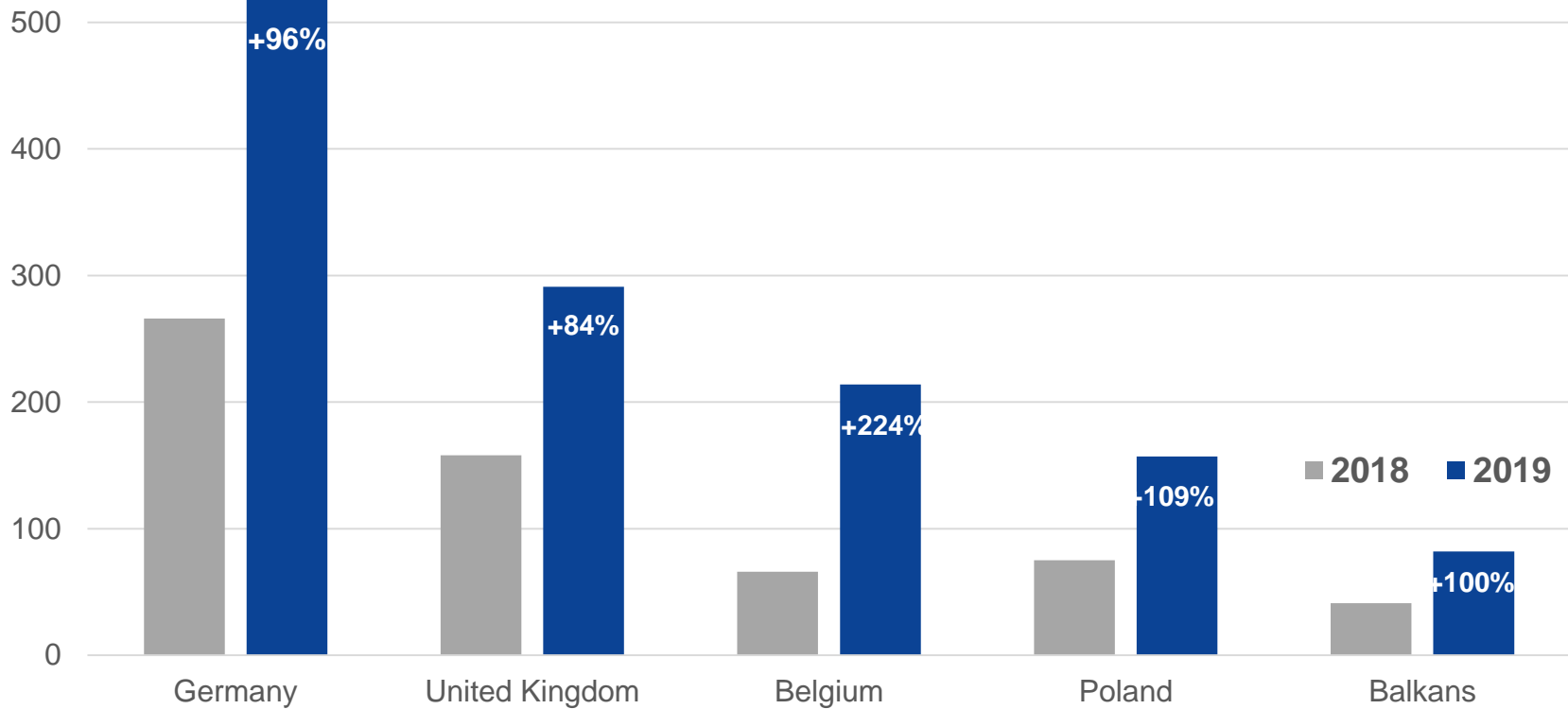


IVECO's CNG and LNG Heavy Duty Trucks Sales



IVECO's CNG and LNG Heavy Duty Trucks Sales

IVECO NG trucks sales (18-44t)



LNG advantages



Fuel price



Subsidies



Developed filling stations network



Exemptions
(es. MAUT)

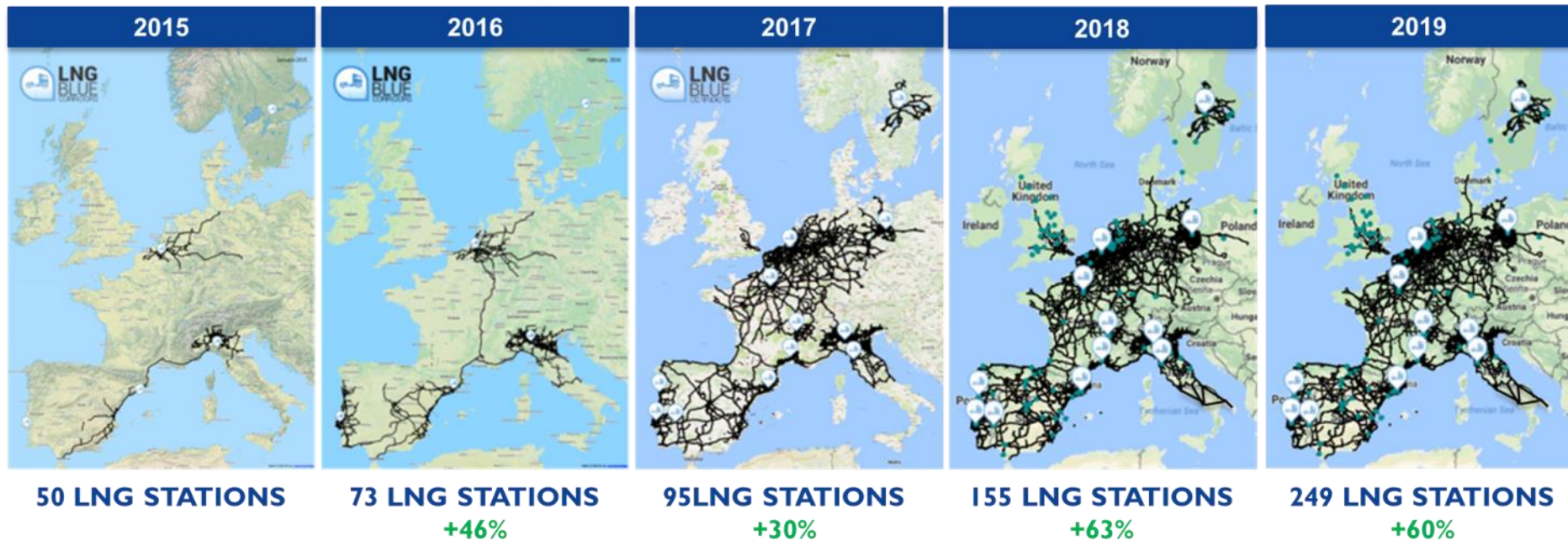


Monthly
operational costs

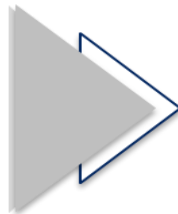


Sustainability

CNG LNG stations



**SEPT
2020**



3897

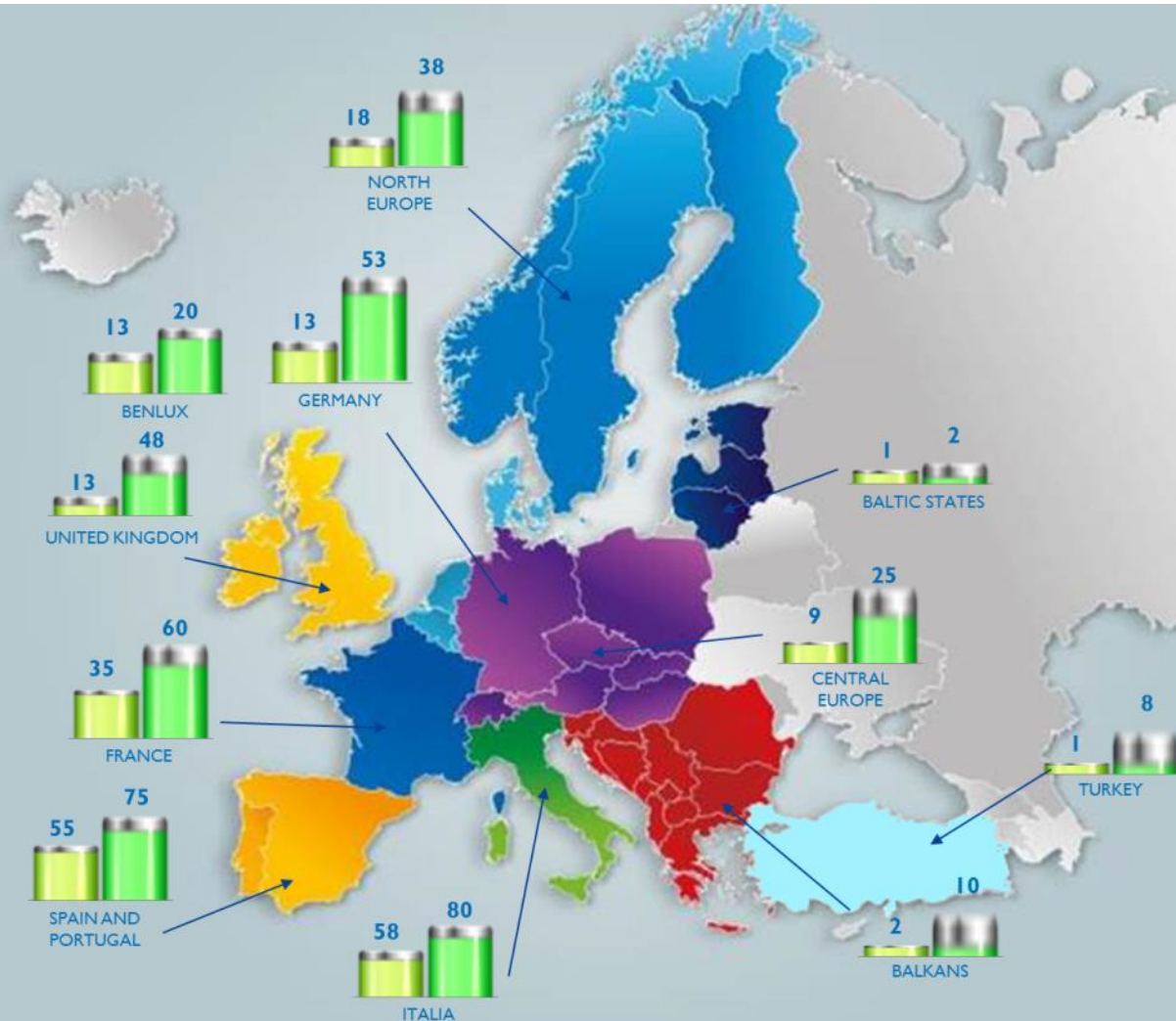


314



LNG stations

LNG TRUCKS STATIONS COVERAGE 2019-2021

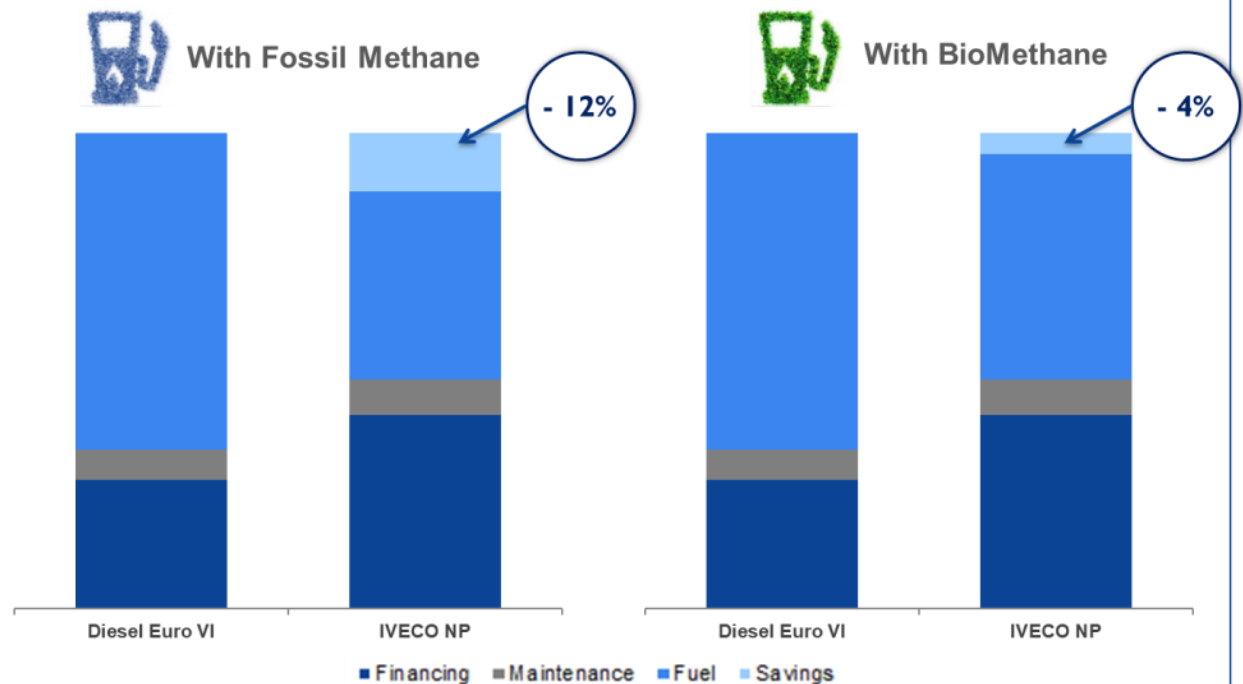


* Source NGVA Europe & Shell FCS & Market internal analysis

Gas VS Diesel TCO

COMPARISON ON MONTHLY OPERATING COSTS

- Operating costs Reduction from day 1
- Up to 10% fuel consumption reduction vs. diesel equivalent vehicle (KG methane vs L Diesel)
- Price at pump saving
- Kerbweight, payload and commercial speed aligned to equivalent diesel vehicles



Based on fuel spread >0,25 €/kg; 120.000km/year; BioLNG ~ +0,12 €/kg vs LNG

Sustainability calculation: Life Cycle Assessment



Life Cycle Assessment (LCA)

Well-to-Wheel (WtW)

Well-to-Tank (WtT)

Tank-to-Wheel (TtW)



Production of
the vehicle



Production & Distribution of
the fuel (power included)

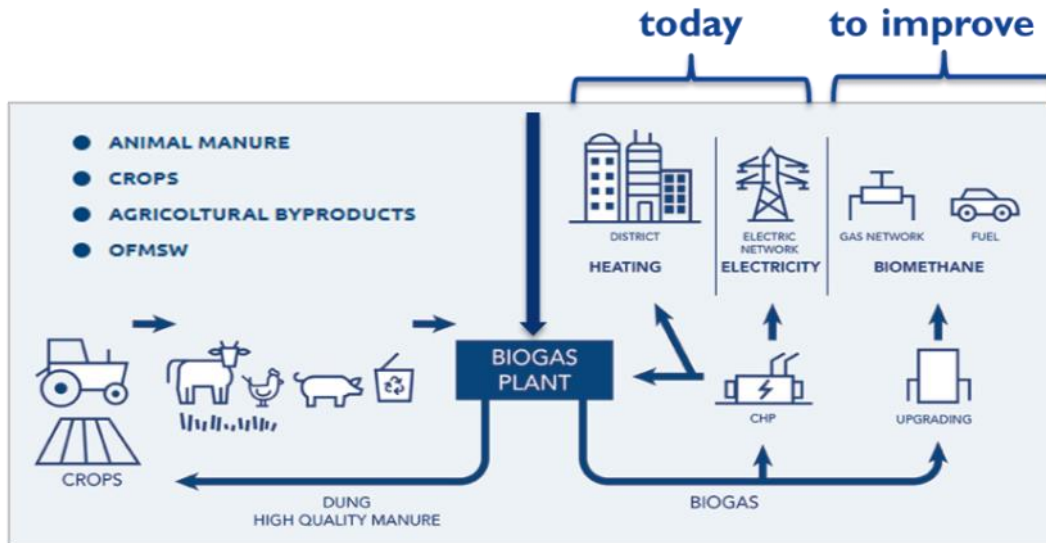


Use (combustion)
of the fuel



Recycling

Biomethane a strategic step for a Circular Economy



**Av. -95 % CO₂ vs
Equivalent Diesel**



**CO₂ reduction >100%
if waste re-used after
the process as fertilizer**



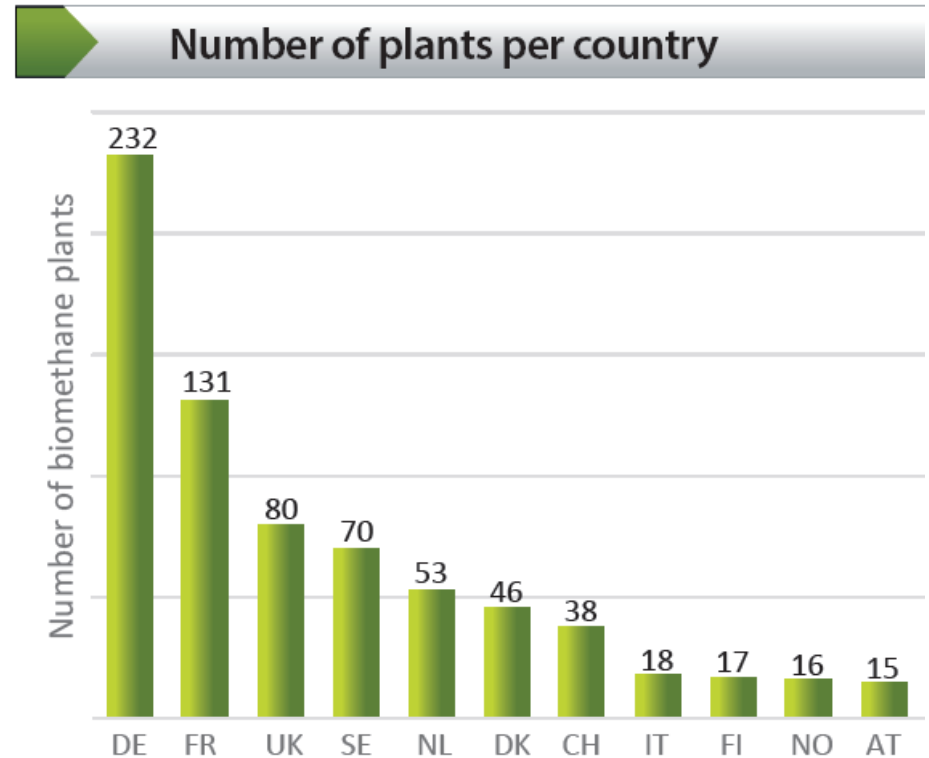
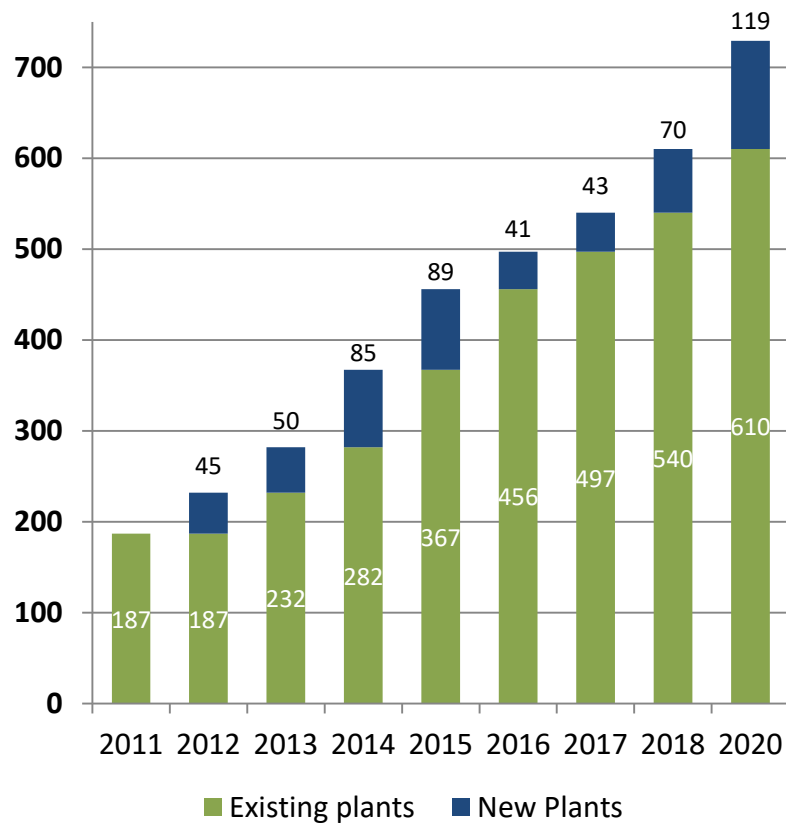
Main sources

- ▶ Agricultural biomass (crops, agricultural / animal waste, waste from the food processing chain)
- ▶ Organic Fraction Municipal Solid Waste (OFMSW)

Fuel supply independency

- ▶ Zero miles production
- ▶ 100% channeling system

Number of Biomethane plants in Europe



Source: EBA biomethane map 2020

IVECO: our milestone towards zero emissions with BioLNG-CNG



No2



PM



CO2
with BioMethane



Zero
Petrol, AdBlue,
DPF, EGR

100% Renewable energy,
100% Made in Europe

BioMethane & Sustainable Logistics



160T/DAY

~ 2000 RUNNING HDT



[Link to the case](#)



[Link to the case](#)



CODOGNOTTO



smp
SAN MARCO PETROLI



[Link to the case](#)

BioMethane & Sustainable Logistics

05/04/2018

Biomethane lorry, a circular solution



One of our key aims is to tackle food wastage! The circular economy is an increasing of how we operate. And one of its cornerstones is the use of biomethane, as covered Lorry plan. But what exactly does that mean? And why should we focus on waste?

It was back in 2012 – on discovering a few alarming statistics – that we decided to launch our tackling initiative: a third of all food throughout the world is thrown out, food wastage is



FRANCE

verbio
Biofuel and Technology

Iveco helps create Germany's first CO2 neutral fleet

Published January 2018 | Manufacturer: Iveco



Iveco has supplied five Stralis NP trucks to Verbio Logistik, which will run the new vehicles on biomethane generated from straw, taking a major step towards CO₂ neutral transport in heavy goods vehicles. This supply also marks an important milestone for Iveco: the 1,000th Stralis NP delivered.

ALDI South Field-testing Iveco Natural Gas Trucks in Germany

June 8, 2018 | Germany: Mülheim an der Ruhr



The ALDI SÜD group of companies in Germany's west is testing four natural gas trucks in daily goods traffic. Over a period of five years, it will be shown to what extent the climate-friendly drive technology can be used as an alternative to diesel models. The natural gas trucks operate in the catchment area of four ALDI SÜD regional companies.

In each case, they support the transport of goods between the ALDI SÜD logistics centers and branches in the vicinity of Düsseldorf, Frankfurt,

Stuttgart and Munich. "The test follows the guidelines of our climate protection policy, which stipulates that we consistently save CO₂ emissions in our own operations," explains Andreas Kremer, Head of Logistics Management at ALDI SÜD.

The test takes place in agglomerations where the limit values for nitrogen oxides have been exceeded many times. Each natural gas truck supplies on average about five to eight branches per day. "To reach the natural gas filling stations that are available regionally and for trucks without detours is a great challenge," says Andreas Kremer. "In Germany, only about six percent of gas stations offer natural gas – and not all can be used with semi-trailers."

Benefits for ALDI

The use of natural gas trucks promises many advantages. Using fossil natural gas reduces CO₂ emissions by about 16 percent compared to a diesel truck. In addition, the test vehicles generate 99 percent less particulate matter, 70 percent less nitrogen oxides and significantly less noise.



Thank you for your attention!



LNG as Fuel for Maritime Transport

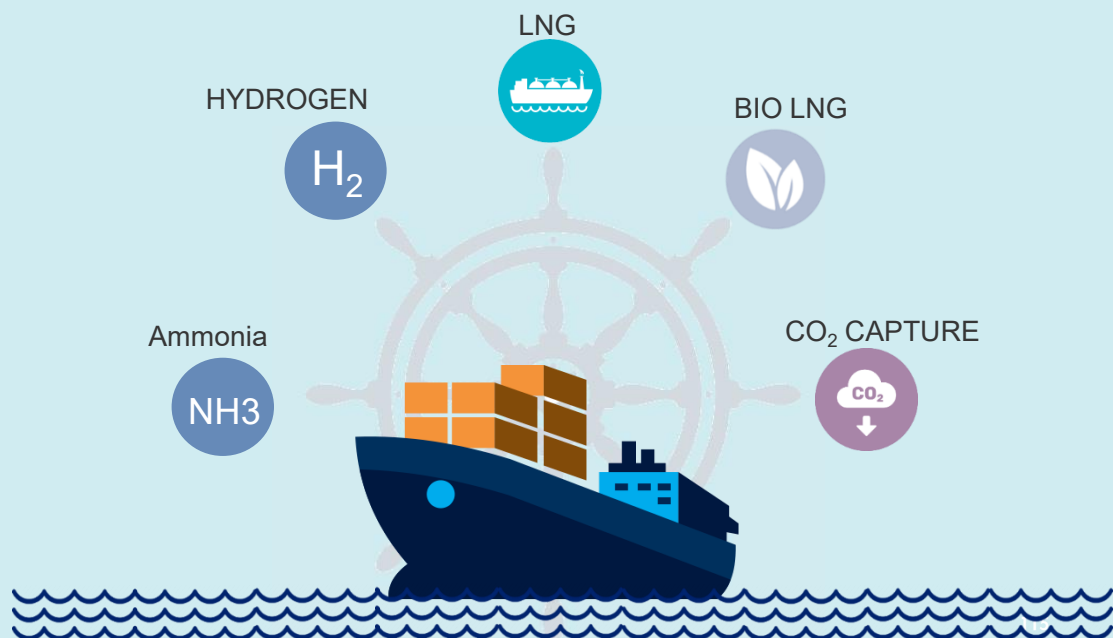
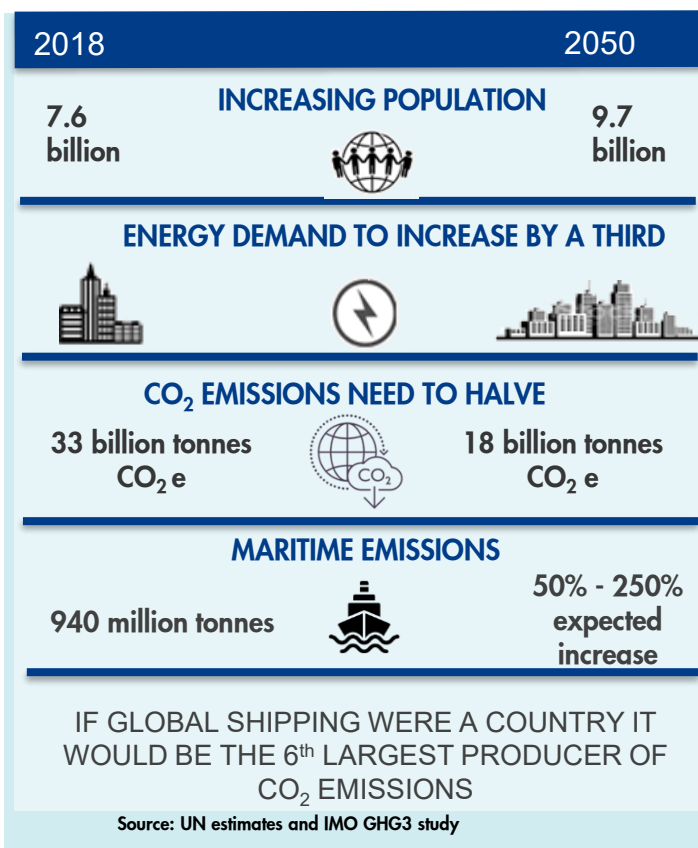
21 September 2020

Saheera Ahmad

Global Head of Business Development, Marine LNG – Shell LNG Marketing & Trading

Decarbonising Shipping - There are multiples solutions, but which one is the best?

Scale and complexity of the energy challenge requires a variety of cleaner energy solutions

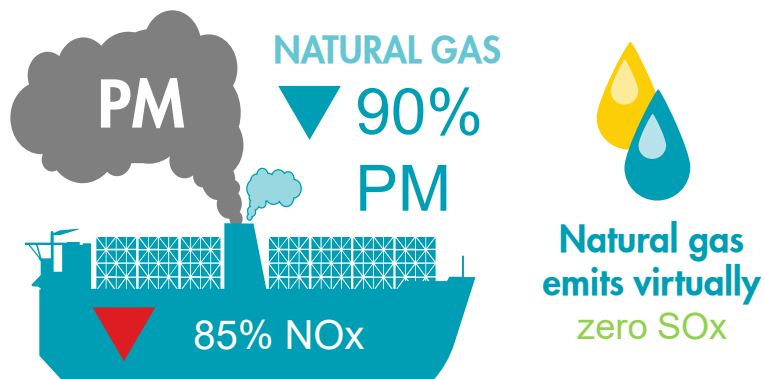


LNG is the most robust option that is available today. No other Net Zero Emission alternative is viable today; needs 10-15 years development cycle



LNG immediately supports the path to decarbonisation in maritime transportation

LNG has lower local emissions (PM, SO_x, NO_x)

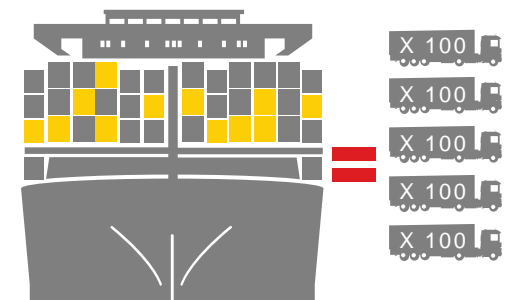


*Significantly reduced NO_x depending on tier 1/2/3 engine: Particle- and Gaseous Emissions from an LNG Powered Ship; M. Anderson, K. Salo, E. Fridell; Environ. Sci. Technol. 2015, 49, 12568-12575

LNG has lower GHG emissions

WELL TO
WAKE
GHG
EMISSIONS

▼
21%*



One ship equivalent to
250 heavy duty trucks removed from
the road

* Thinkstep, Greenhouse Gas Intensity of Natural Gas prepared for Natural & Bio Gas Vehicle Association (NGVA) Europe, V1.0, 05/05/2017 for ship and truck WtW savings. One example of emissions reduction using one large high pressure 2-stroke engine. Unburned methane in the exhaust (methane slip) has higher GHG impact than fuel completely combusted to CO₂.

However, certain LNG attributes create doubt in the market about its credibility as a long-term solution...

ISSUE

Methane Slip

Release of unburnt methane through the vessel engine

Reduction in WtW emissions savings

Fugitive methane emissions

Release of methane during U/S production & transport

Perception that LNG could be as (if not more) pollutive as fuel oil

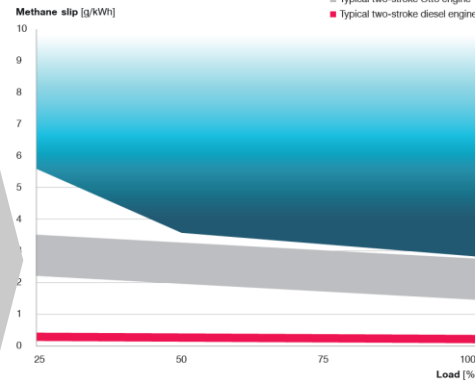
LNG is a Fossil Fuel

LNG only provides up to 28% reduction in TrW emissions

Perception that LNG vessels could be stranded assets if LNG is condemned

CHOICES & ACTIONS

Methane emissions, gas mode



Shell starts new project on BioLNG

17 Jun 2020 - ConferenciaGNL



In order to ensure the availability of BioLNG at its distribution stations, Shell has announced the construction of a production site in Germany, which is expected to be undertaken by spring 2021.

SHELL TARGET

20.25

Shell has announced a target to maintain methane emissions intensity below 0.2% by 2025.

This target covers all oil and gas assets for which Shell is the operator.

EXAMPLES OF SHELL'S GAS AND LNG SUPPLY CHAINS*

The supply chains – which include Shell assets as well as operations run by third parties – cover the full process (including liquefaction for the LNG supply chain) that gas molecules undertake from production to point of delivery to the customer.

Across over 80% of Shell's total gas and LNG supply chains, Shell estimates that the methane emissions intensity is less than 1%.



Netherlands
0.1%-0.4%



UK
~0.5%



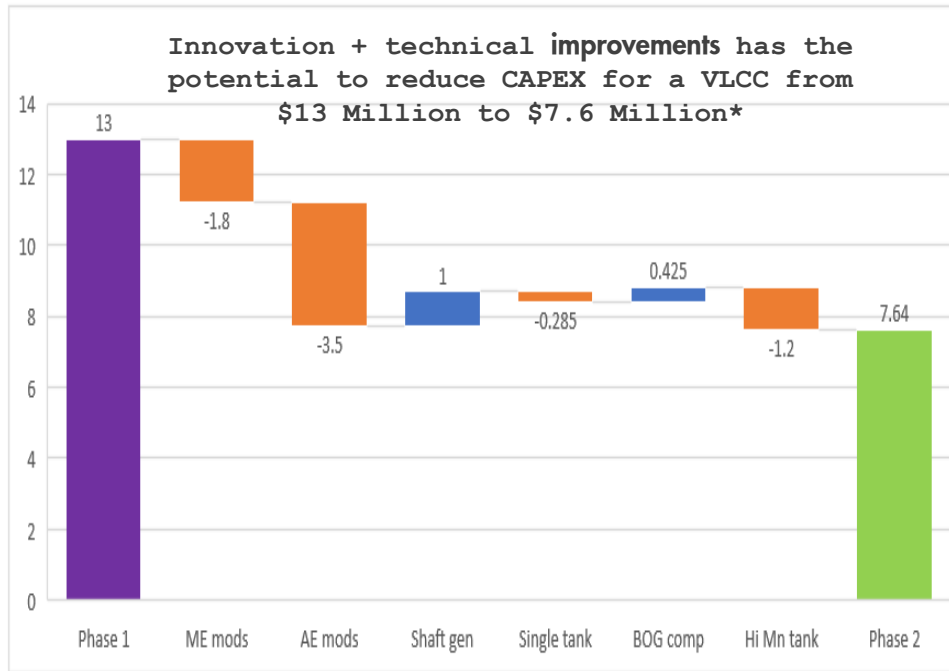
USA
~0.6%



Australia
QGC
~0.3-0.7%

Sources: *Shell internal assessment, MAN Energy Solutions

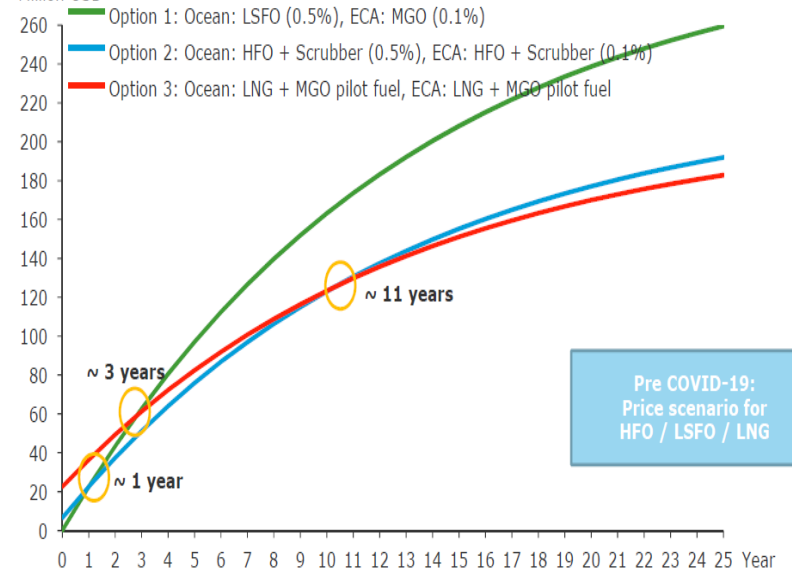
Economic feasibility in investing in LNG fuelled ships is improving



DNV-GL study comparing HFO/LSFO/LNG on 23k TEU container ship

Cumulated present value of fuel option-related costs

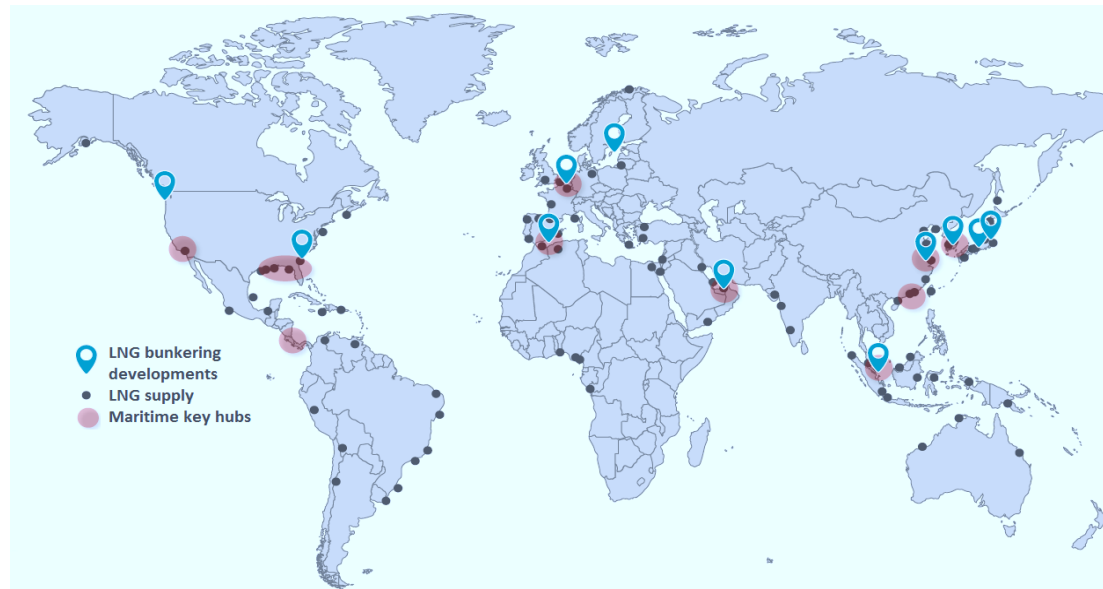
Million USD



Sources: *Shell internal assessment, DNV-GL

LNG supply capability is prolific and is growing

LNG bunkering infrastructure developing



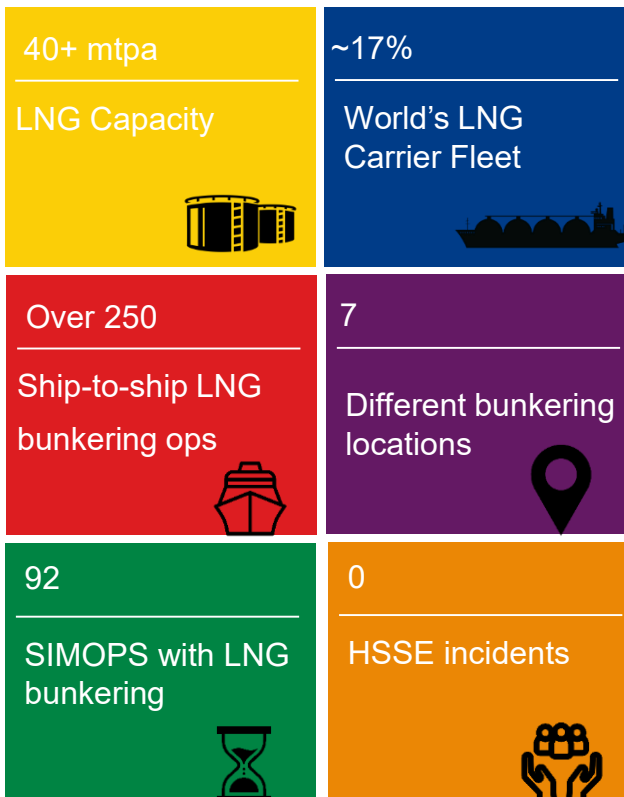
GLOBAL BUNKERING NETWORK



Summary

- The scale and complexity of challenge requires a range of solutions & immediate action.
- LNG is available NOW to take you one step closer to decarbonisation, cost competitively.
- LNG is a no-regrets investment – fit for future.

SAFE AND RELIABLE OPERATIONS*



*as of August 2020

PROVEN EXPERIENCE AND EXPERTISE

WORLD'S 1st
LNG powered
Aframax Tanker
Bunkering



WORLD'S 1st
LNG powered
Cruise Ship
bunkering



EUROPE'S 1st
SIMOPS LNG
bunkering





Q&A session

*Moderator: Benoît Esnault, Vice-Chair of the
CEER GAS Working Group*



Summary of discussion and closing remarks

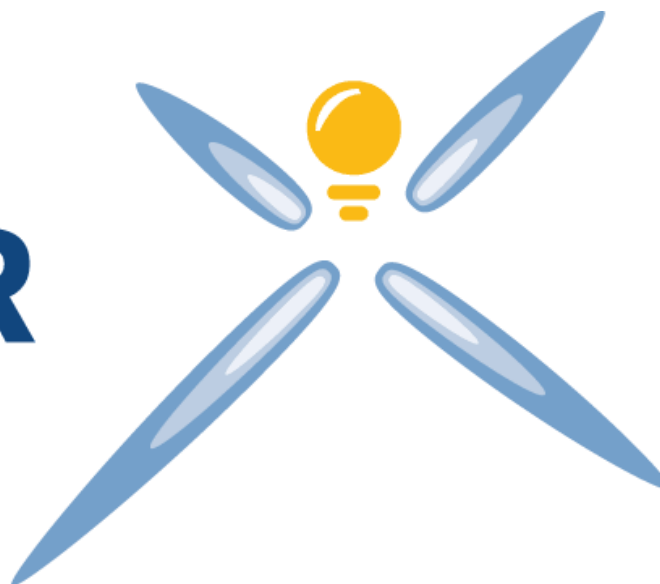
*Rocío Prieto and Yves Poncelet, Co-Chairs
of the CEER LNG Work Stream*



Thanks for joining the webinar

CEER

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Energy Regulators



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