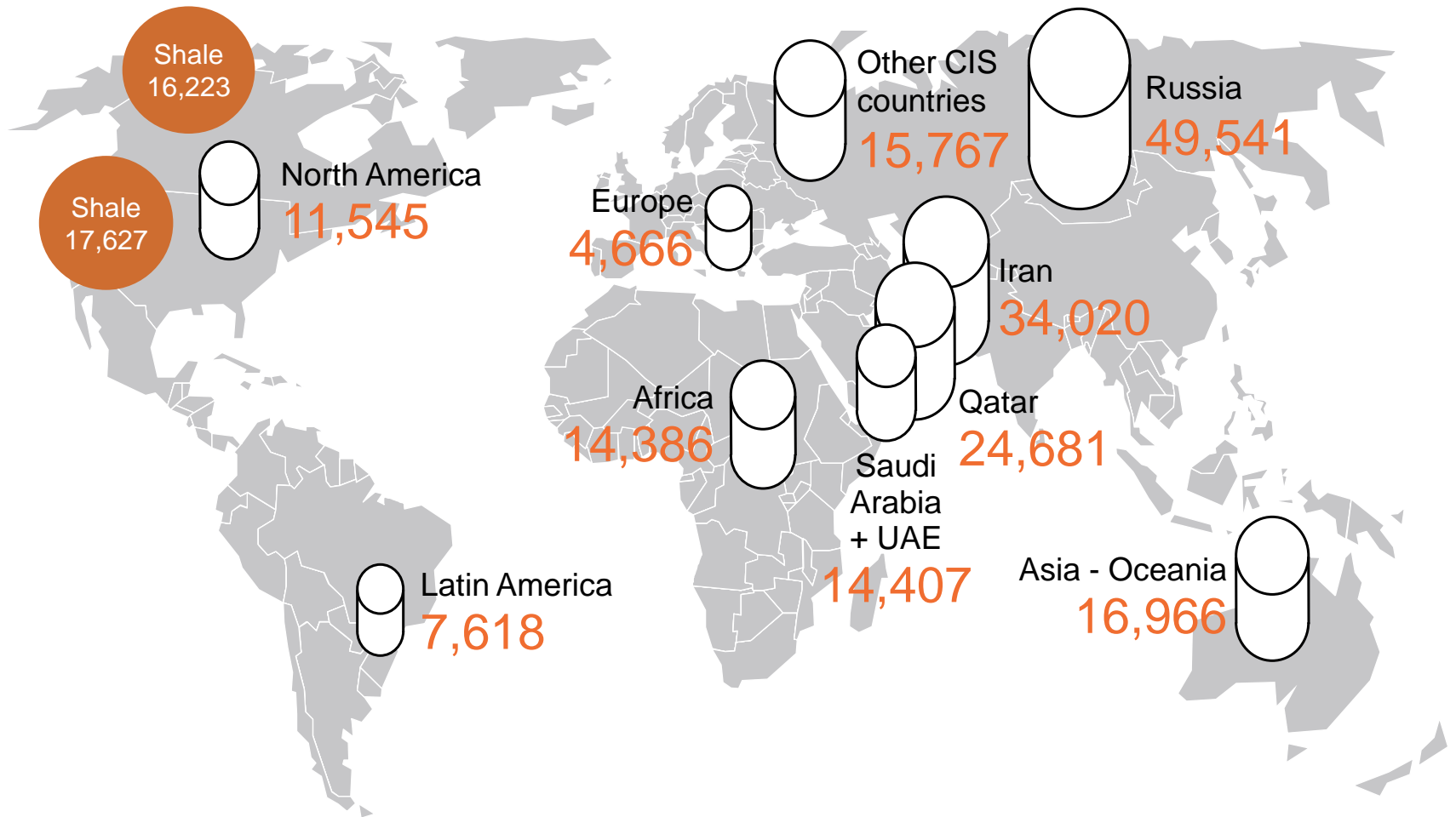




OUTLOOK
FOR THE
LNG
MARKET

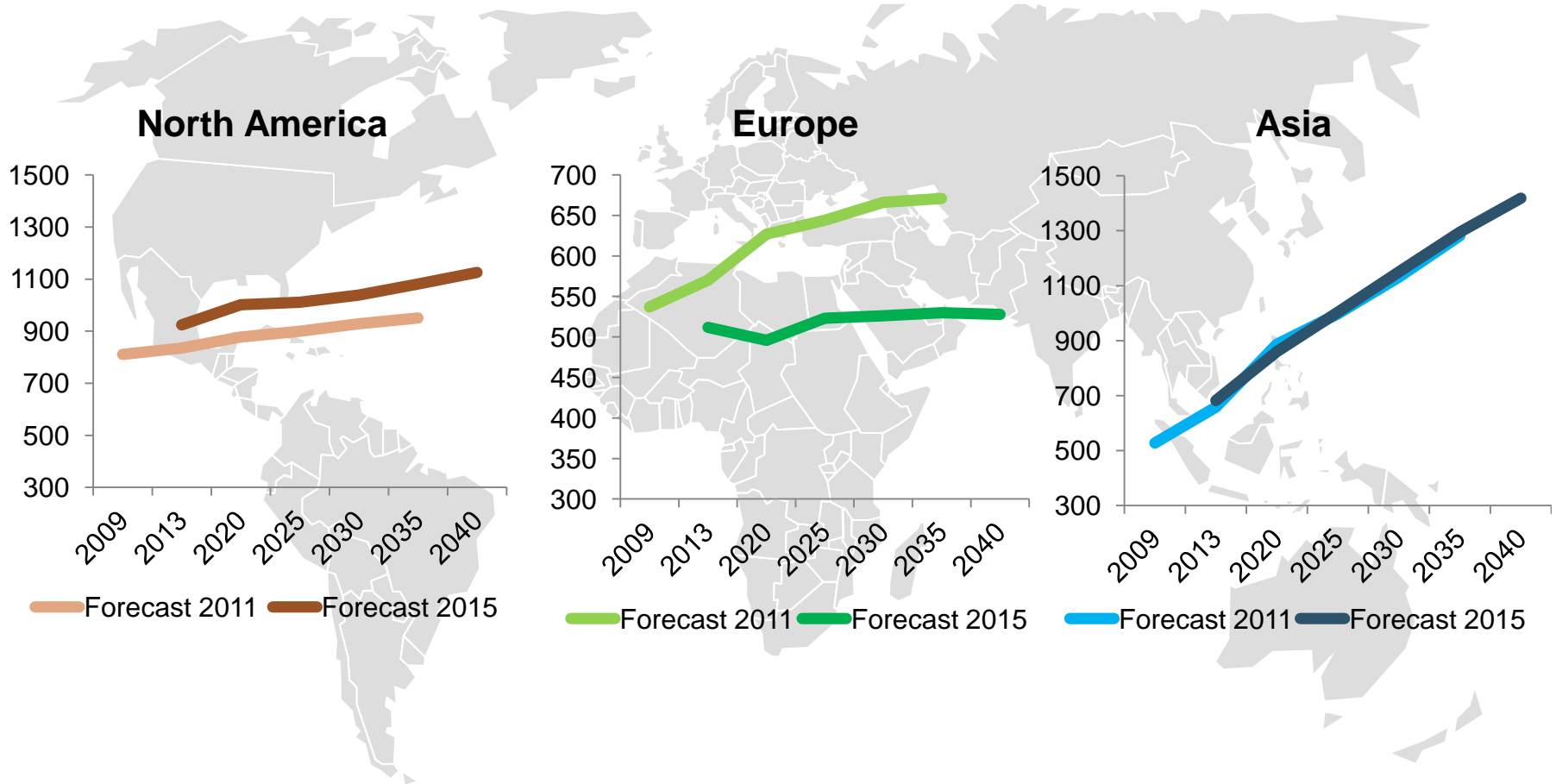
Rudy Van Beurden | Fluxys | Ghent - 27 April 2016

PRODUCTION OF NATURAL GAS: ABUNDANT & GEOGRAPHICALLY WELL-SPREAD RESOURCE BASE



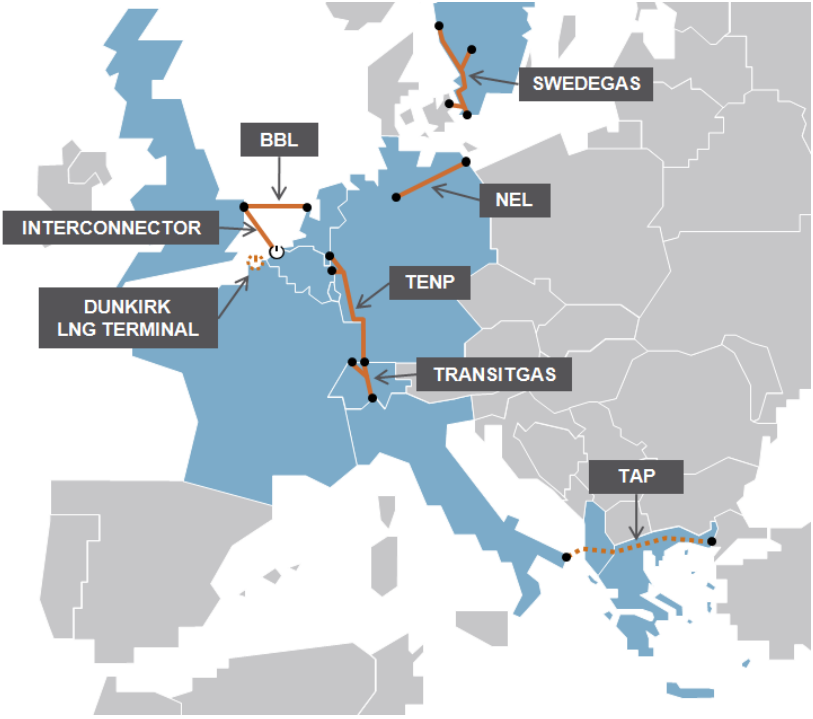
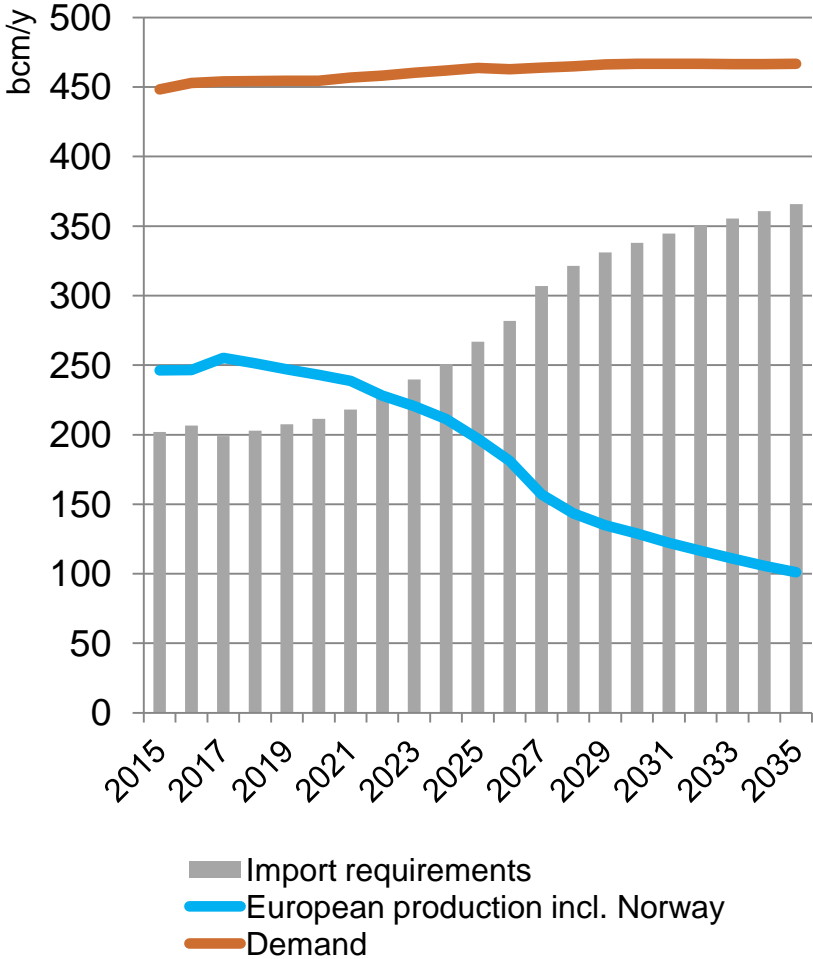
Source: Cedigaz Natural Gas In The World 2014 Edition - EIA – World Shale Resource Assessment (September 2015)
Figures: billion cubic metres (bcm)

DEMAND OUTLOOK FOR NATURAL GAS ACROSS THE REGIONS: EUROPE GOES FLAT



Source: IEA World Energy Outlook 2011 - 2015

DESPITE FLAT DEMAND OUTLOOK: SUPPLY GAP WIDENS AS INDIGENOUS PRODUCTION DECLINES

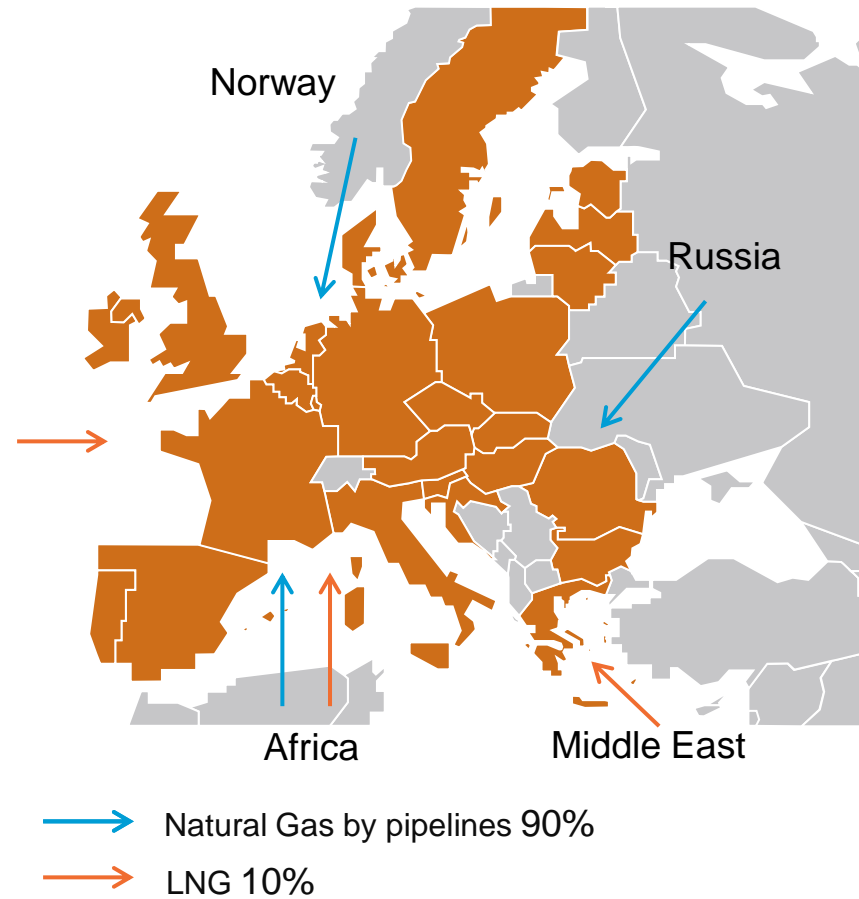
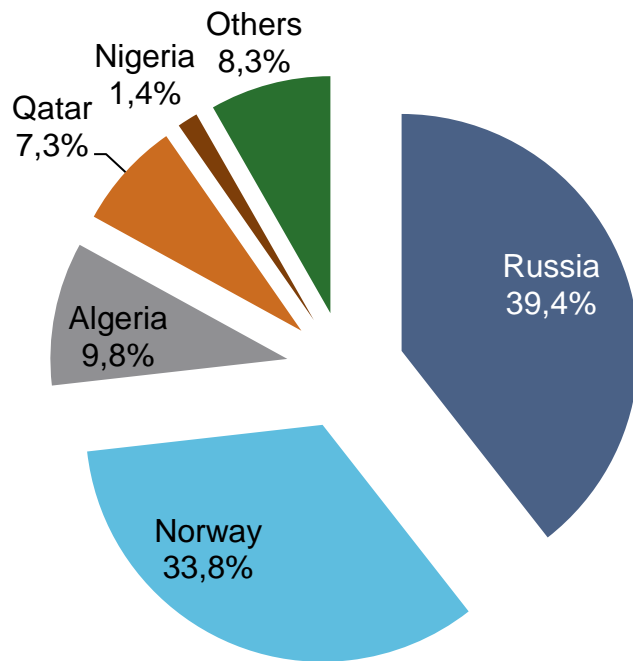


Fluxys: partner in c. 45-55 bcm/y additional supply capacity into Europe

Source: EntsoG TYNDP 2015

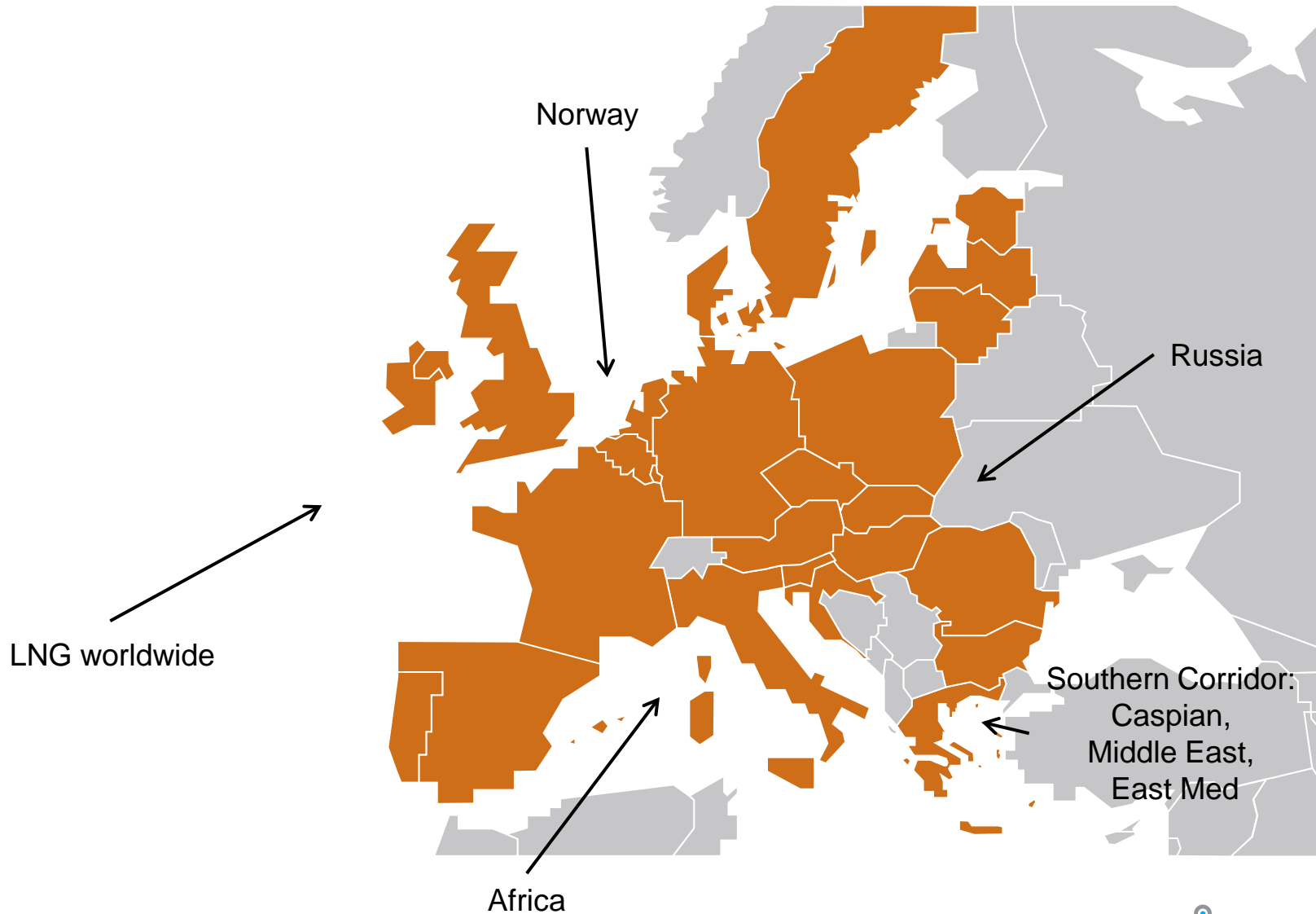
NATURAL GAS IMPORTS IN EUROPE

EU : imports (Norway incl.) cover 76% of consumption (2014)

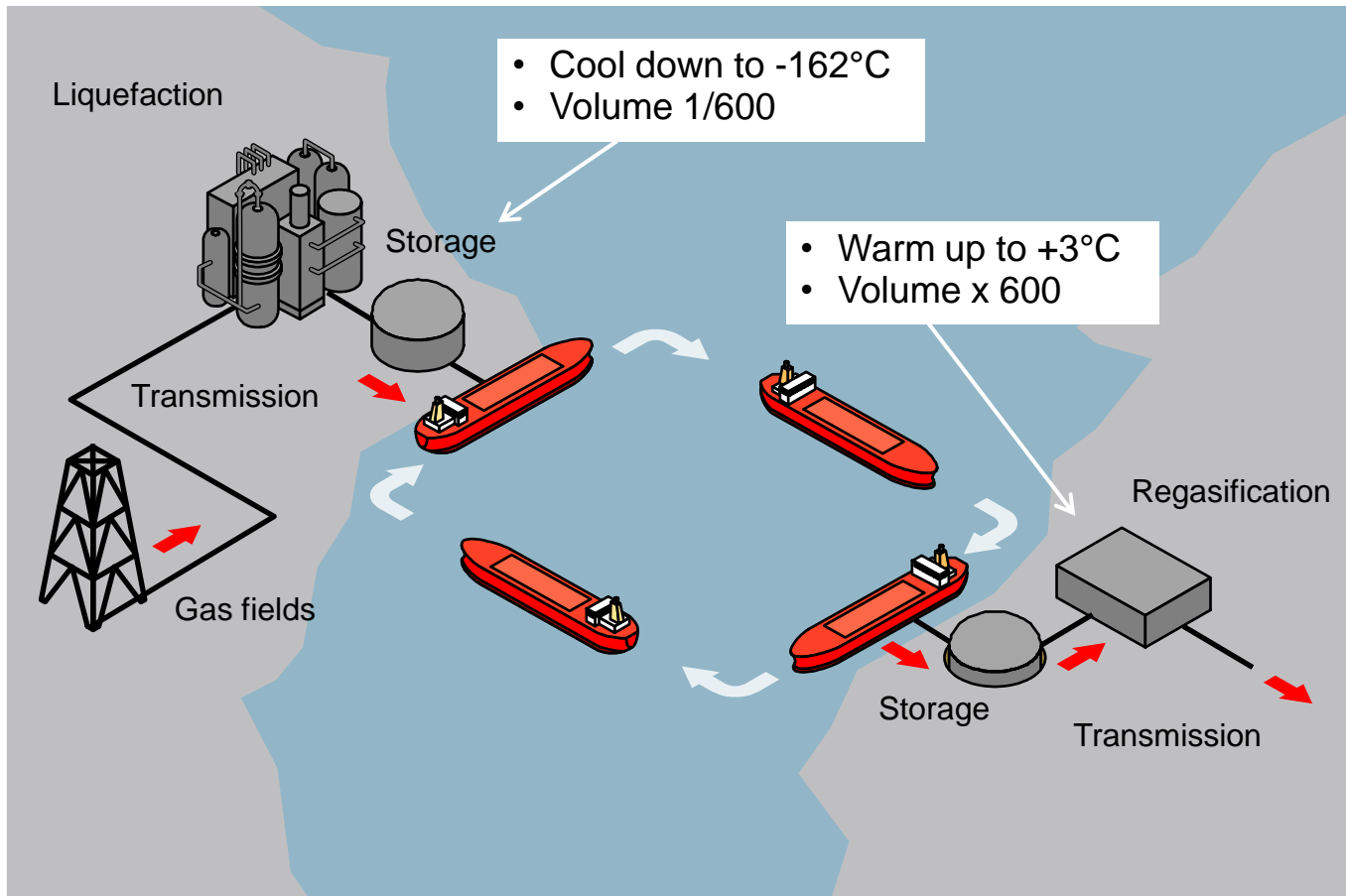


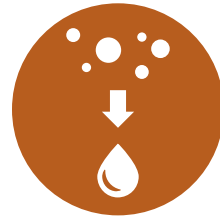
Source: BP Statistical Review of World Energy June 2015, Cedigaz Natural Gas In The World 2014 Edition

WHERE WILL TOMORROW'S GAS COME FROM?



FROM SOURCE TO END USER MARKET: PIPELINES AND LNG CHAIN (LIQUEFIED NATURAL GAS)

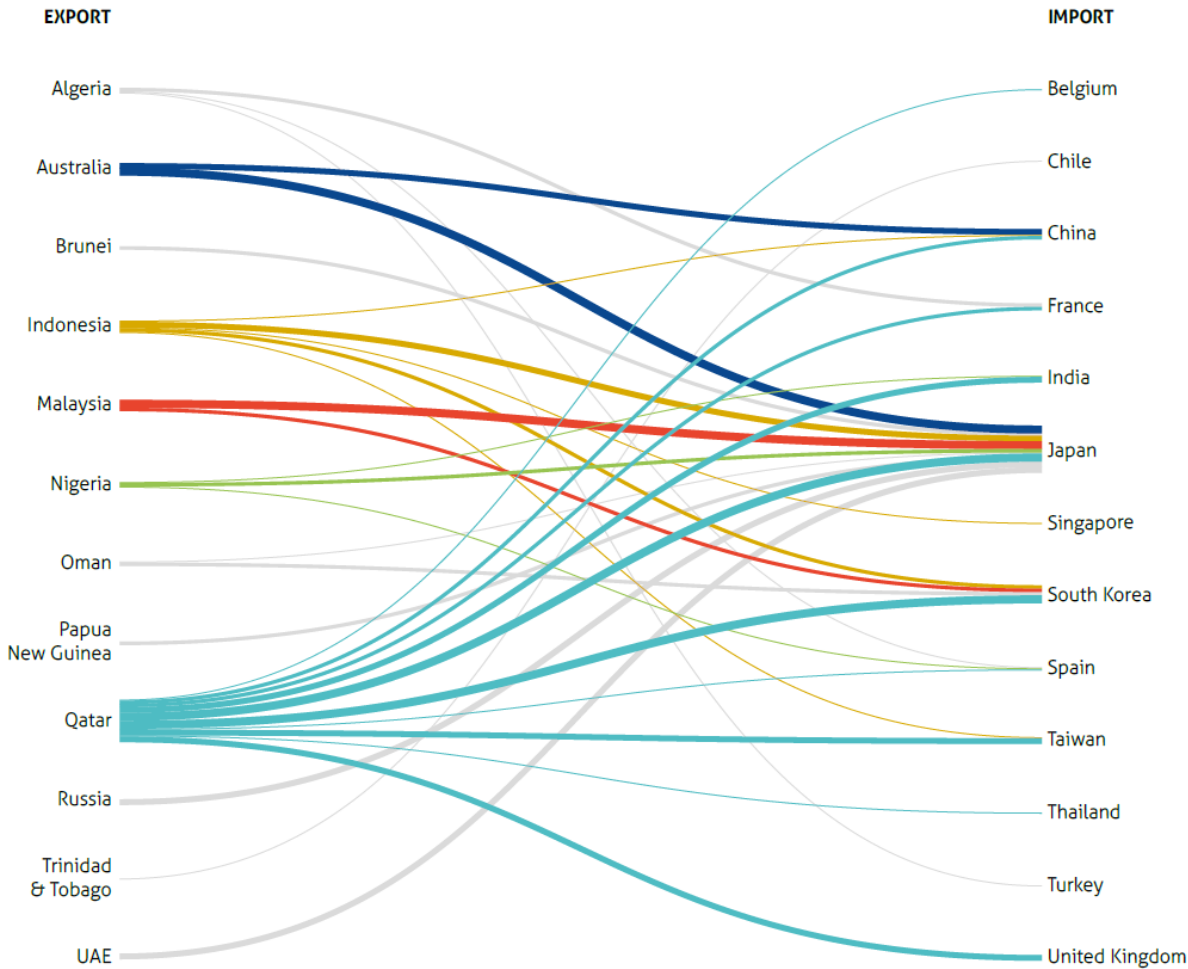




LNG = Liquefied Natural Gas

- Liquefied by cooling the natural gas to a temperature of **-162° C** at atmospheric pressure.
- **600 less volume** than natural gas
 - compact fuel, competitive with diesel
 - extremely clean, low-carbon fuel

MAJOR LNG FLOWS IN THE WORLD



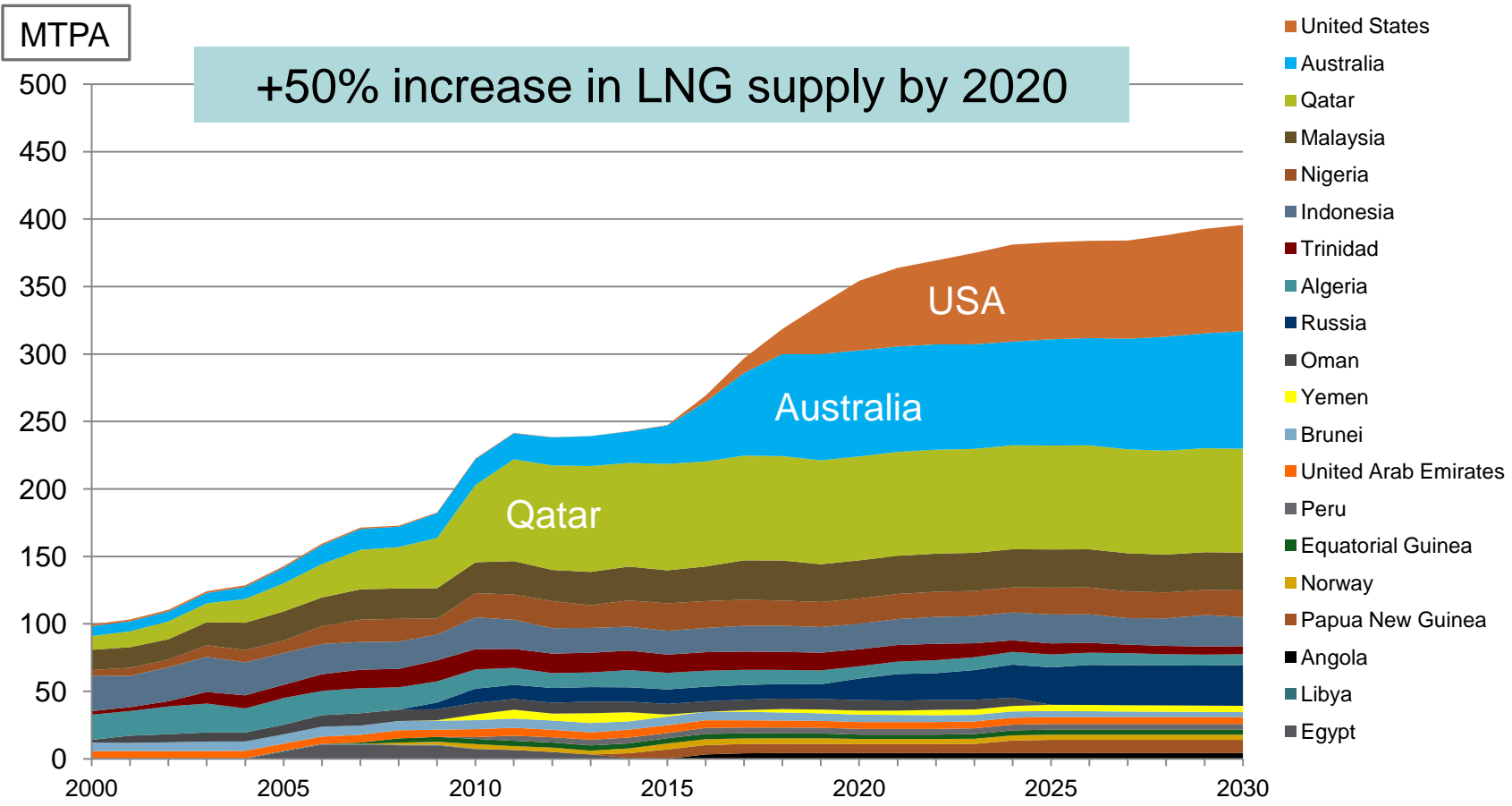
34
IMPORTING COUNTRIES

777 MTPA
TOTAL REGASIFICATION CAPACITY

19
EXPORTING COUNTRIES

308 MTPA
TOTAL NAMEPLATE LIQUEFACTION CAPACITY

LNG IS AVAILABLE: 240 → 360 MILLION TON/Y IN 2020

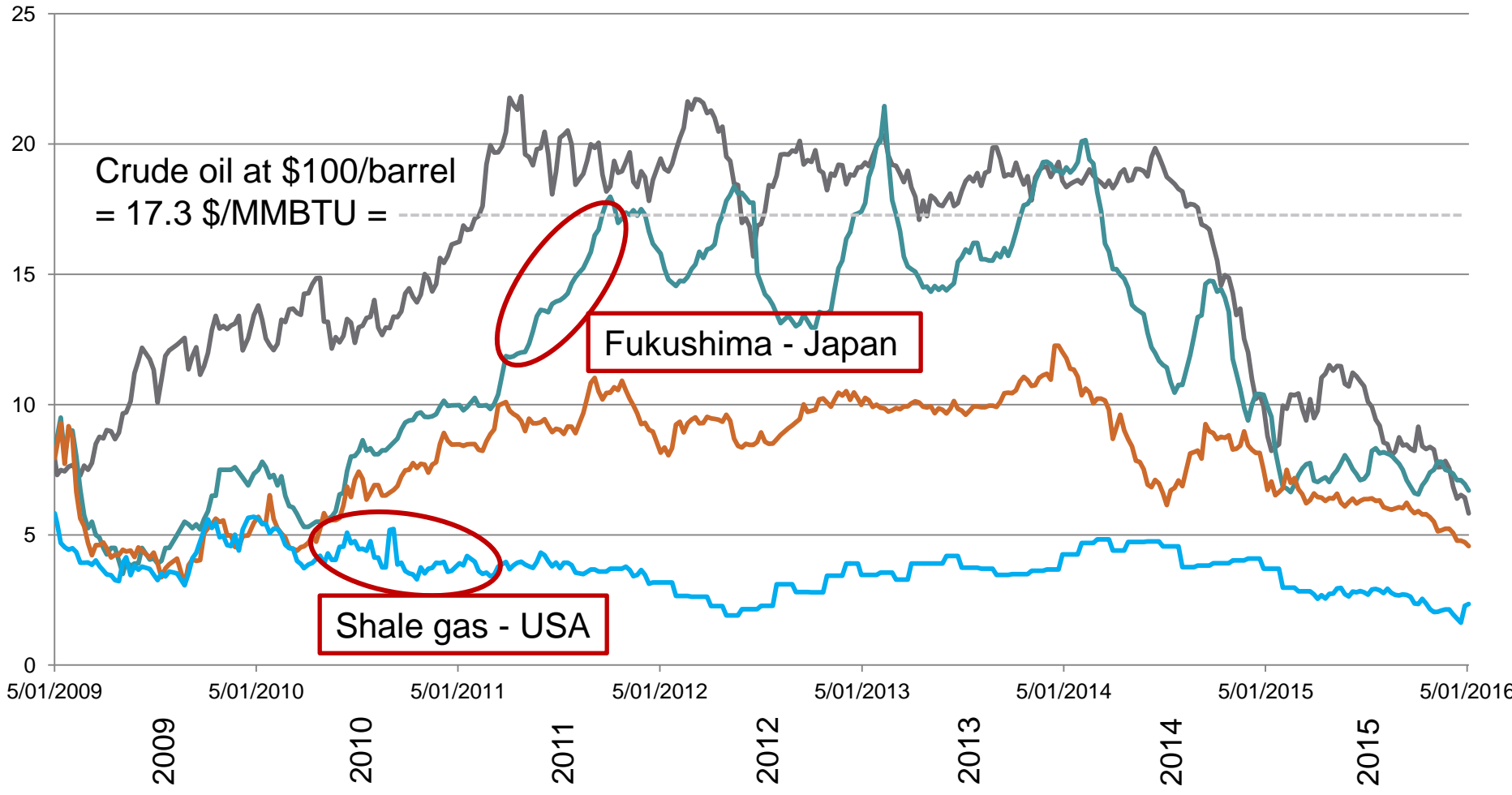


[IHS – exports operational terminals & terminals under construction]

CRUDE OIL VS. NATURAL GAS PRICE




\$ /MMBTU (*)

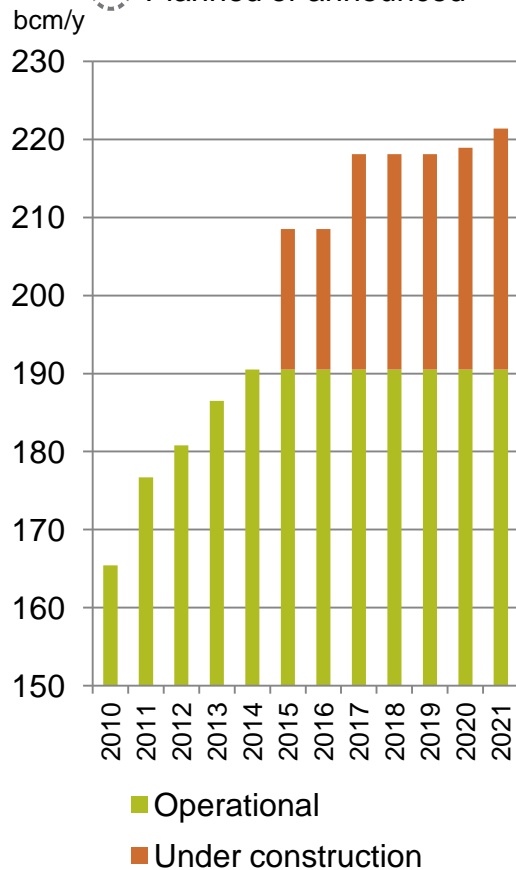
— Brent Oil — Japan — Belgium — US Natural Gas price



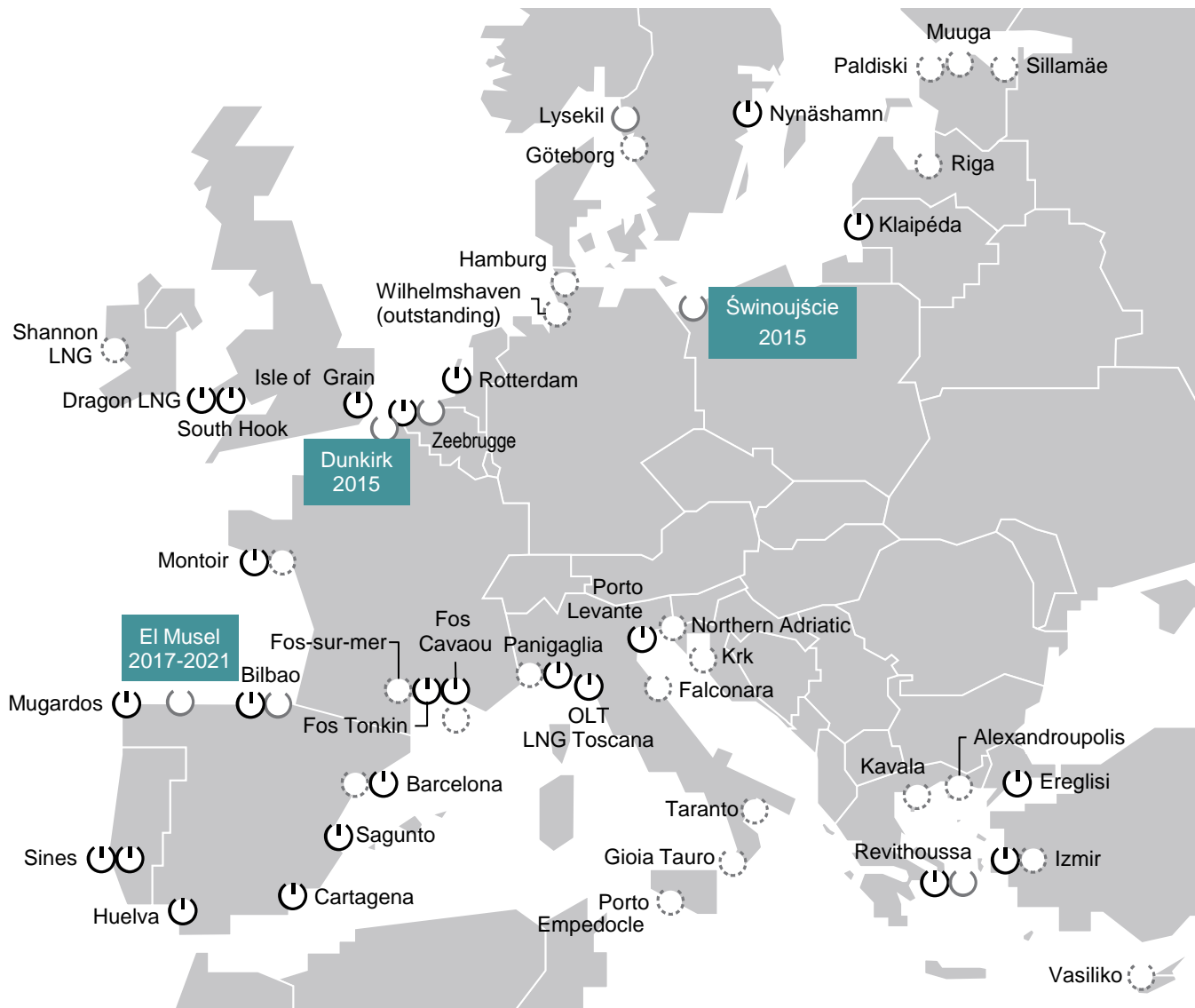
(*) 5 \$/MMBTU ≈ 15 EUR/MWh

LNG REGAS CAPACITY IN EUROPE BUT UTILISATION RATE AS LOW AS 20%

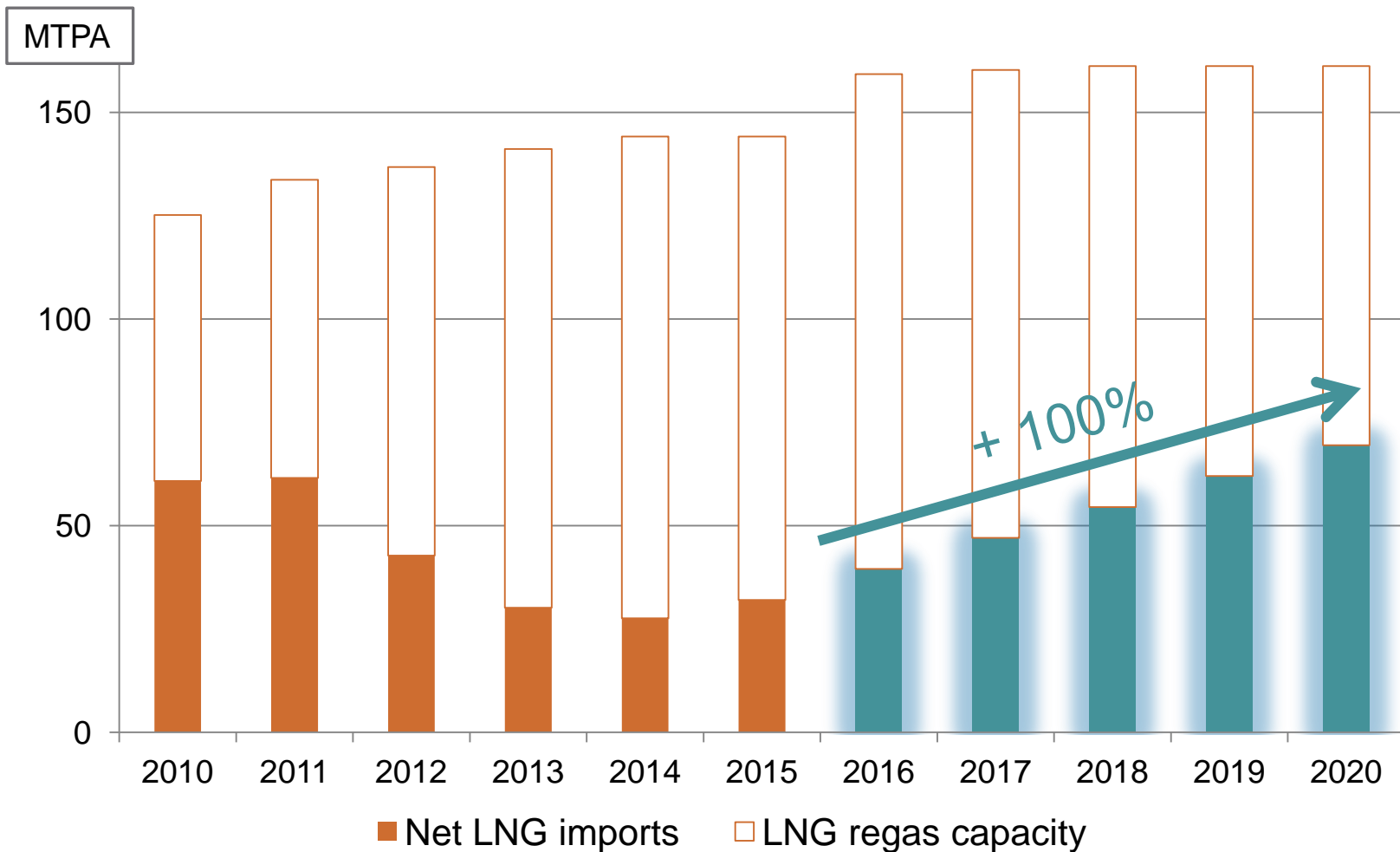
-  Existing LNG terminals
-  Under construction
-  Planned or announced



Source: GIE 2014 – GIIGNL 2014



LNG IMPORTS IN EUROPE EXPECTED TO DOUBLE BY 2020



[GLE – GIIGNL – Cedigaz – market expectation IEA]

ZEEBRUGGE LNG TERMINAL SINCE 1987

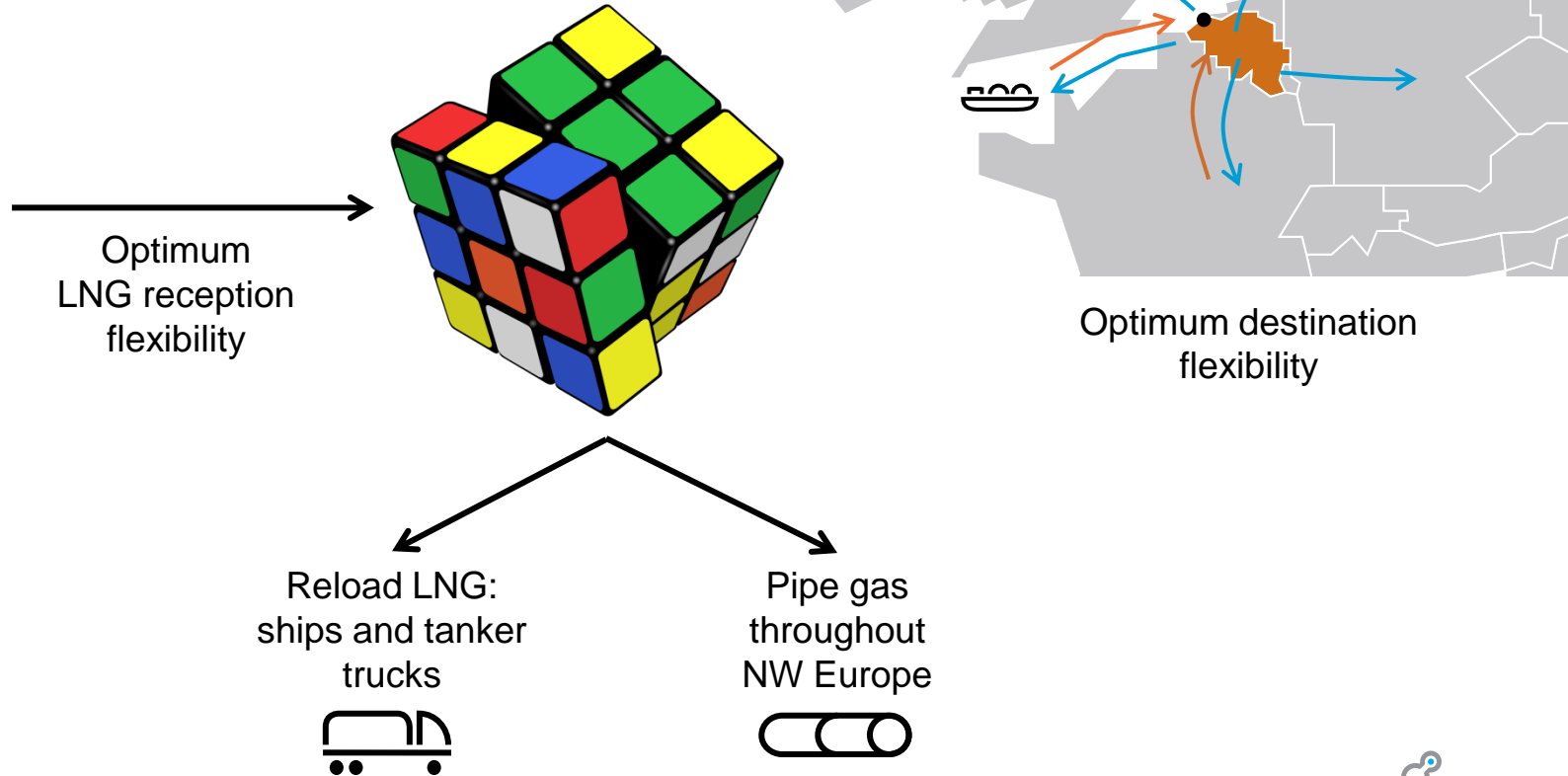


- 1,500+ LNG carriers received
- 80 million tonnes LNG unloaded
= 108 bcm of natural gas

- Unloading and loading of LNG vessels (7 500 m³ to 266 000 m³ LNG)
- Storage capacity : 380 000 m³ LNG in 4 tanks
- Regas and send-out in the transport grid 1 700 000 m³(n)/h

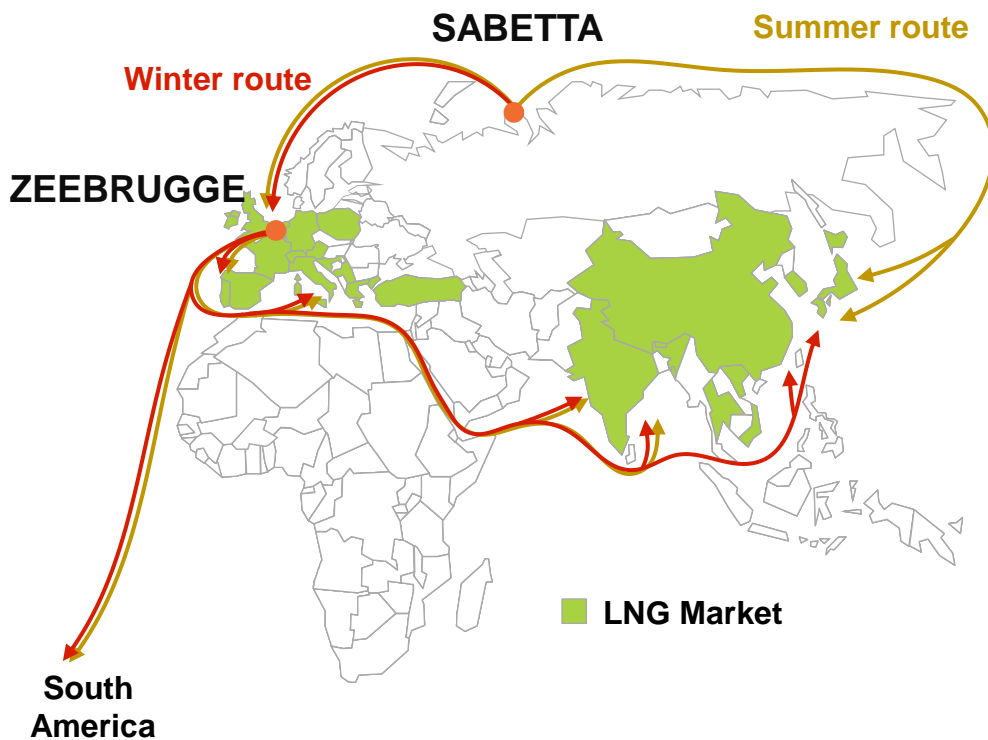
DEVELOPING THE ZEEBRUGGE TERMINAL AS A KEY LNG HUB

- Optimum take away capacity: security of supply instrument for NW Europe
- Developing the terminal as a versatile tool for our clients



NEW LT-CONTRACT: TRANSSHIPMENTS FOR YAMAL LNG

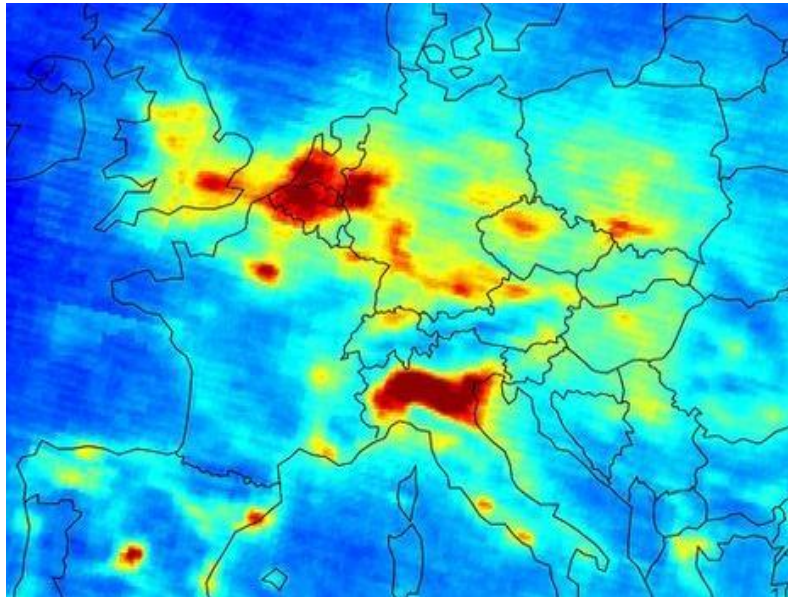
- Port of Sabetta, Yamal Peninsula:
Yamal LNG to produce 16.5 mt/y of LNG
- Yamal Trade - Fluxys LNG:
20y capacity agreement for up to 8 mt/y LNG
transshipment services at LNG terminal in
Zeebrugge.



TRANSSHIPMENT CONTRACT: INVESTMENT IN 5TH STORAGE TANK AND PROCESS INSTALLATIONS



SMALL-SCALE LNG = LNG AS A FUEL FOR INDUSTRY, SHIPS AND TRUCKS: BETTER FOR CLIMATE & HEALTH



Envisat, ESA

NO₂ tropospheric column density [10^{15} molec./cm²]



Attack the invisible killer: premature deaths from air pollution estimated at 420,000 for the year 2010 (EC)



HEAVY FUEL OIL
3.5% Sulphur



MARINE GAS OIL
0.1% Sulphur

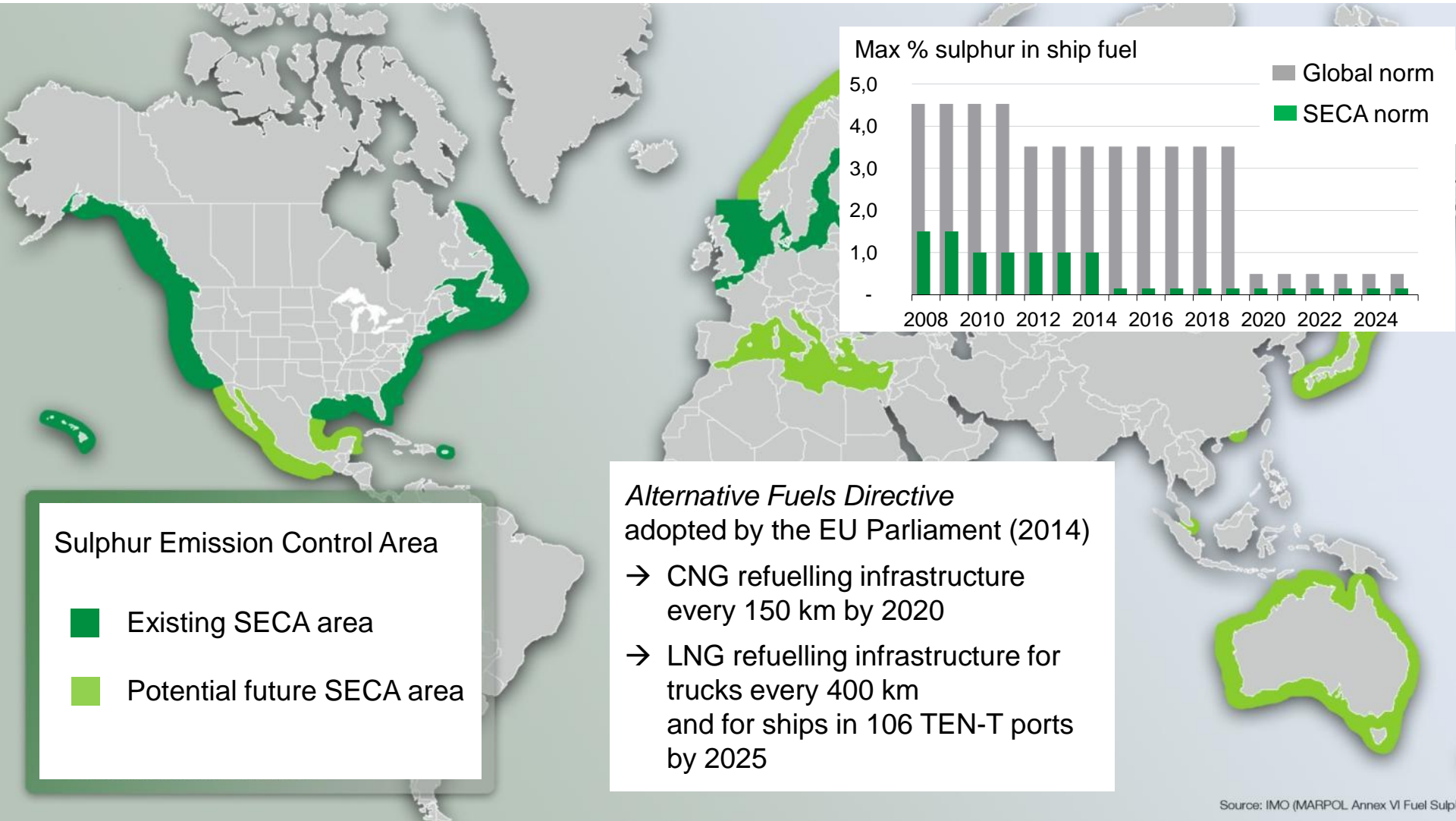


LNG

- 0% Sulphur
- Particulate matter: negligible
- Up to 90% less NO_x
- Up to 25% less CO₂

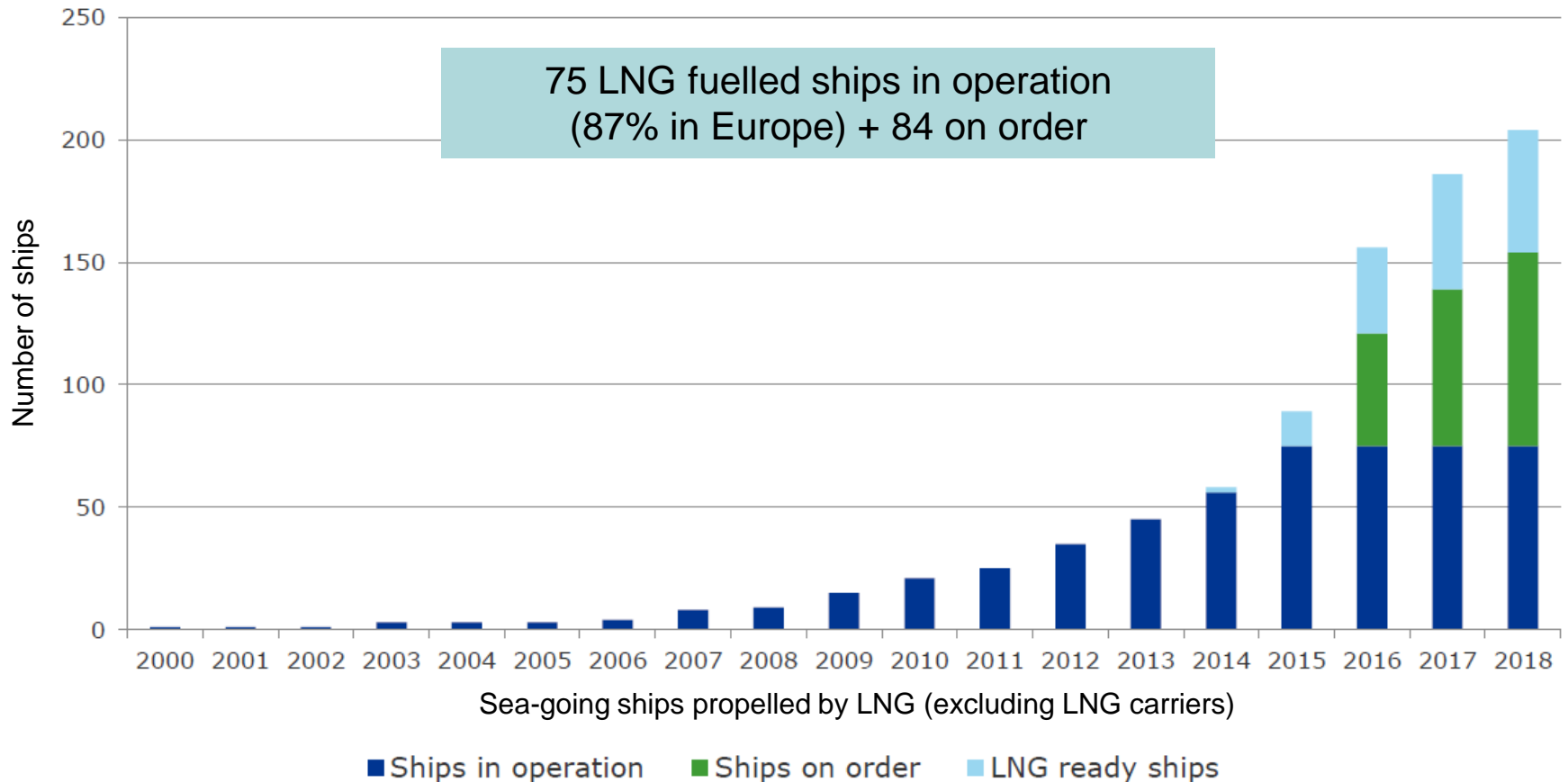
[European Commission SWD 2013 4]

WORLD-WIDE REGULATION FAVOURS LNG





LNG AS A FUEL FOR SHIPS IN 2015: 0.2 MTPA

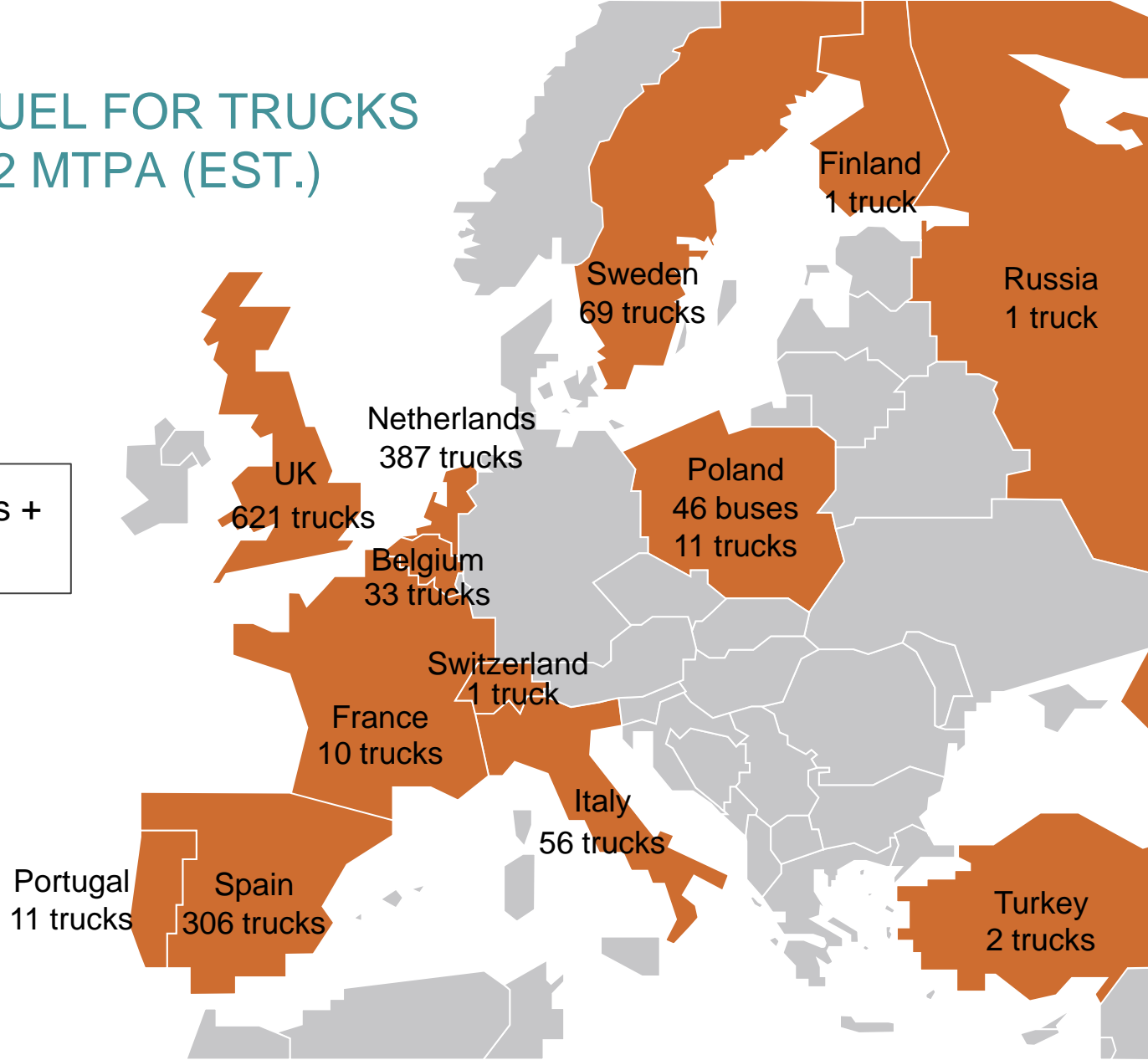


[DNV-GL 1/2016]



LNG AS A FUEL FOR TRUCKS IN 2015: 0.02 MTPA (EST.)

1509 LNG fuelled trucks +
46 buses in operation



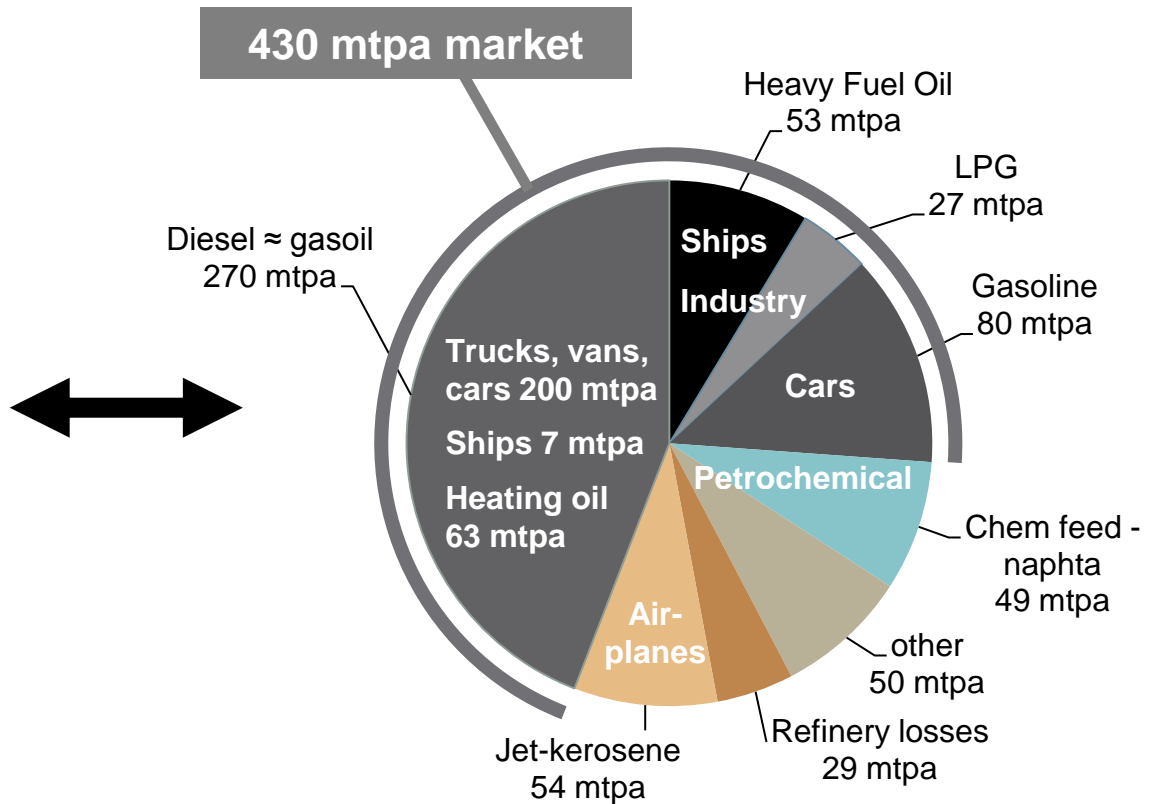
[NGVA Europe Jan 2015]

A NICHE MARKET TODAY, BUT WE ARE FISHING IN A SEA WITH LARGE POTENTIAL

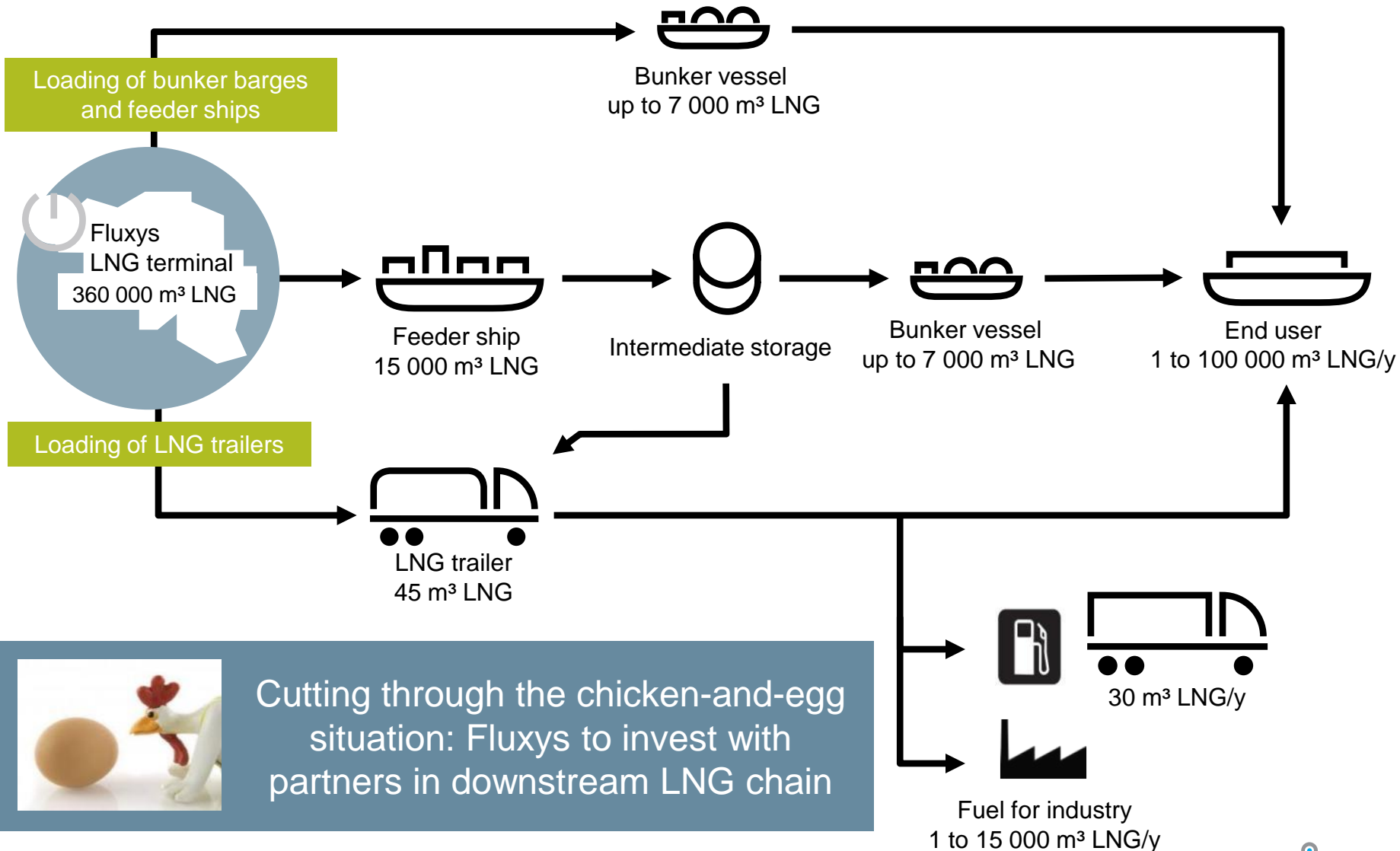
Small-scale LNG: 1.7 mtpa

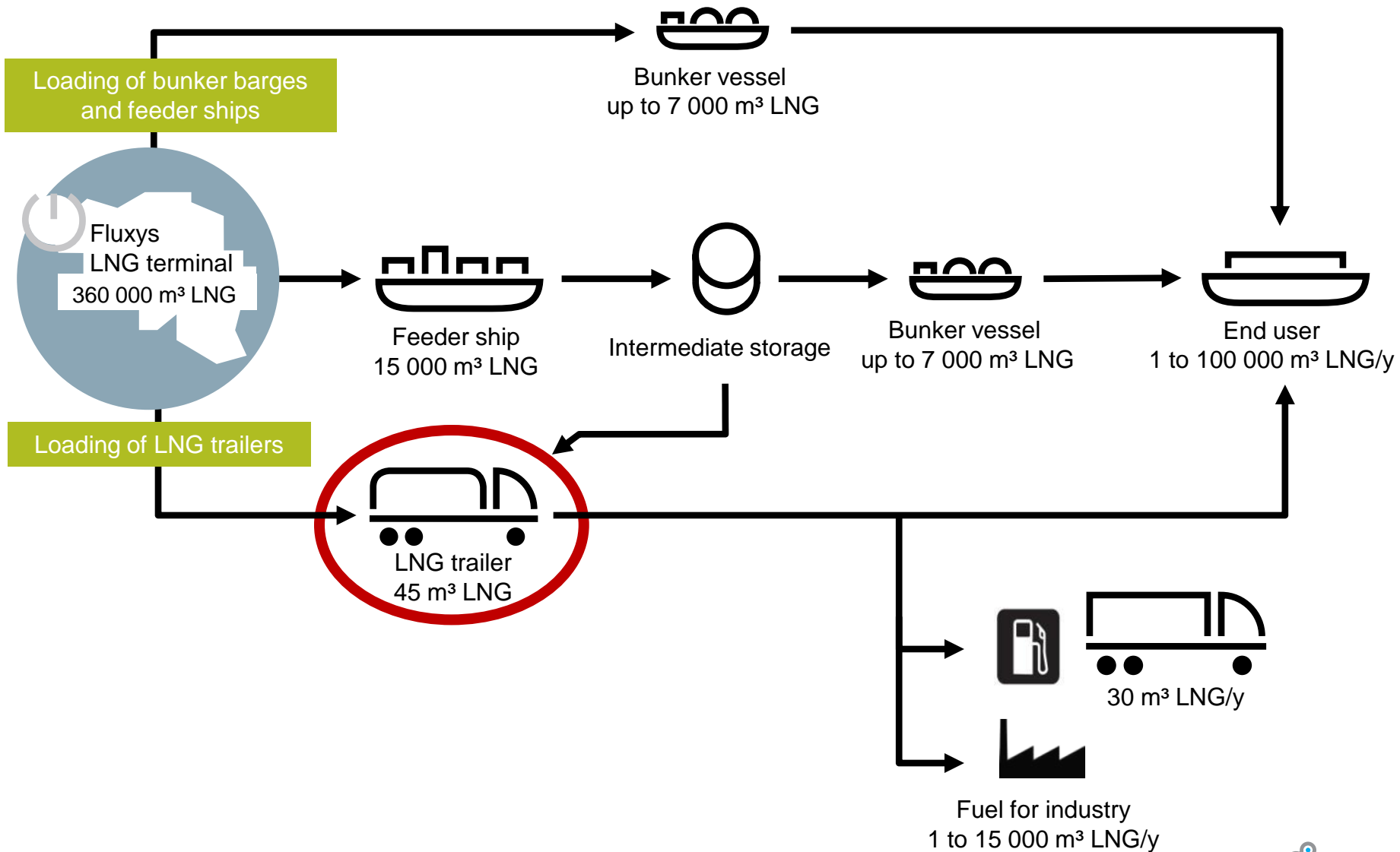


- Industry: 1.5 mtpa
- Ships: 0.2 mtpa
- Trucks: 0.02 mtpa

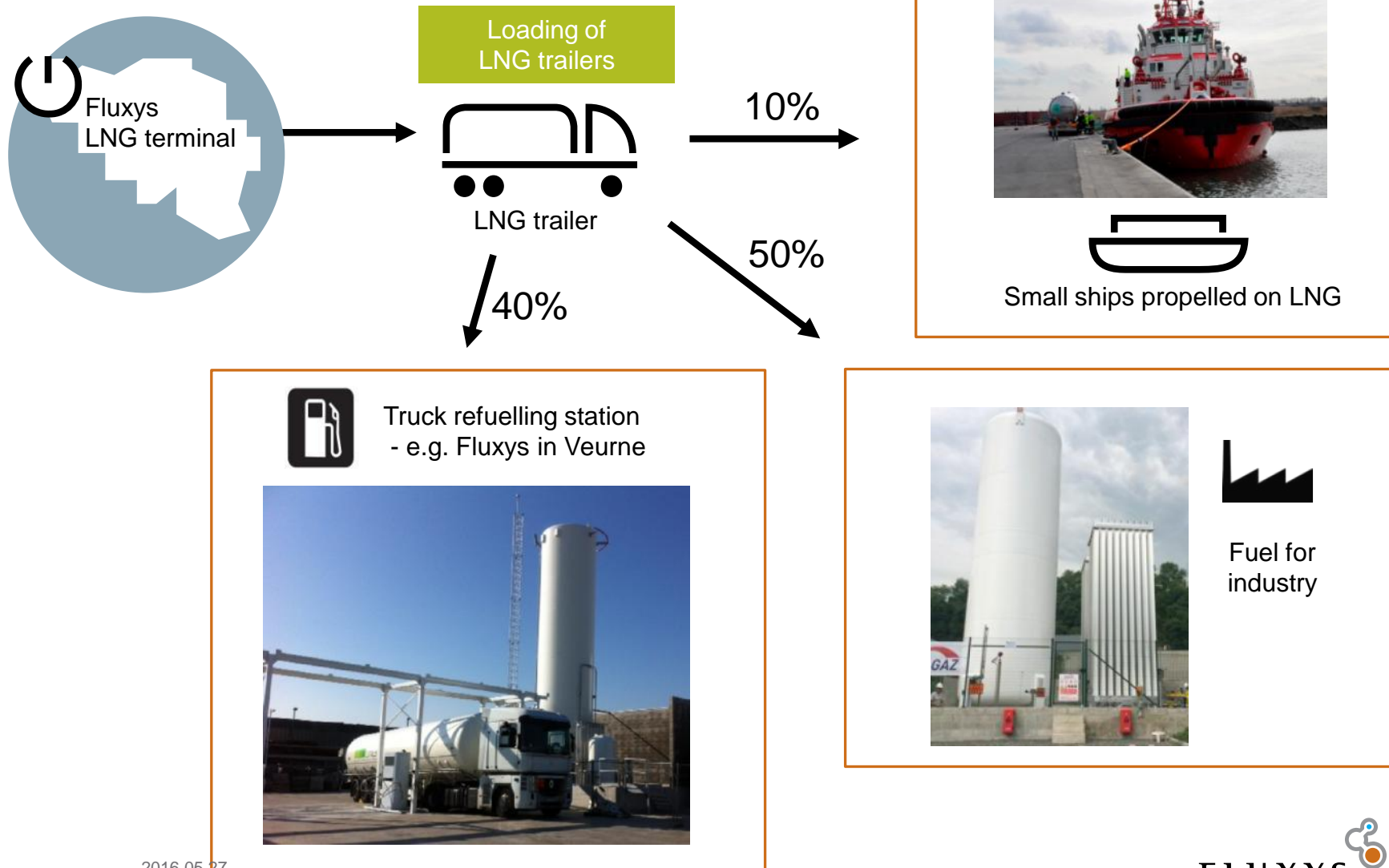


DOWNSTREAM SMALL SCALE LNG SUPPLY FROM ZEEBRUGGE: A CLOSER LOOK





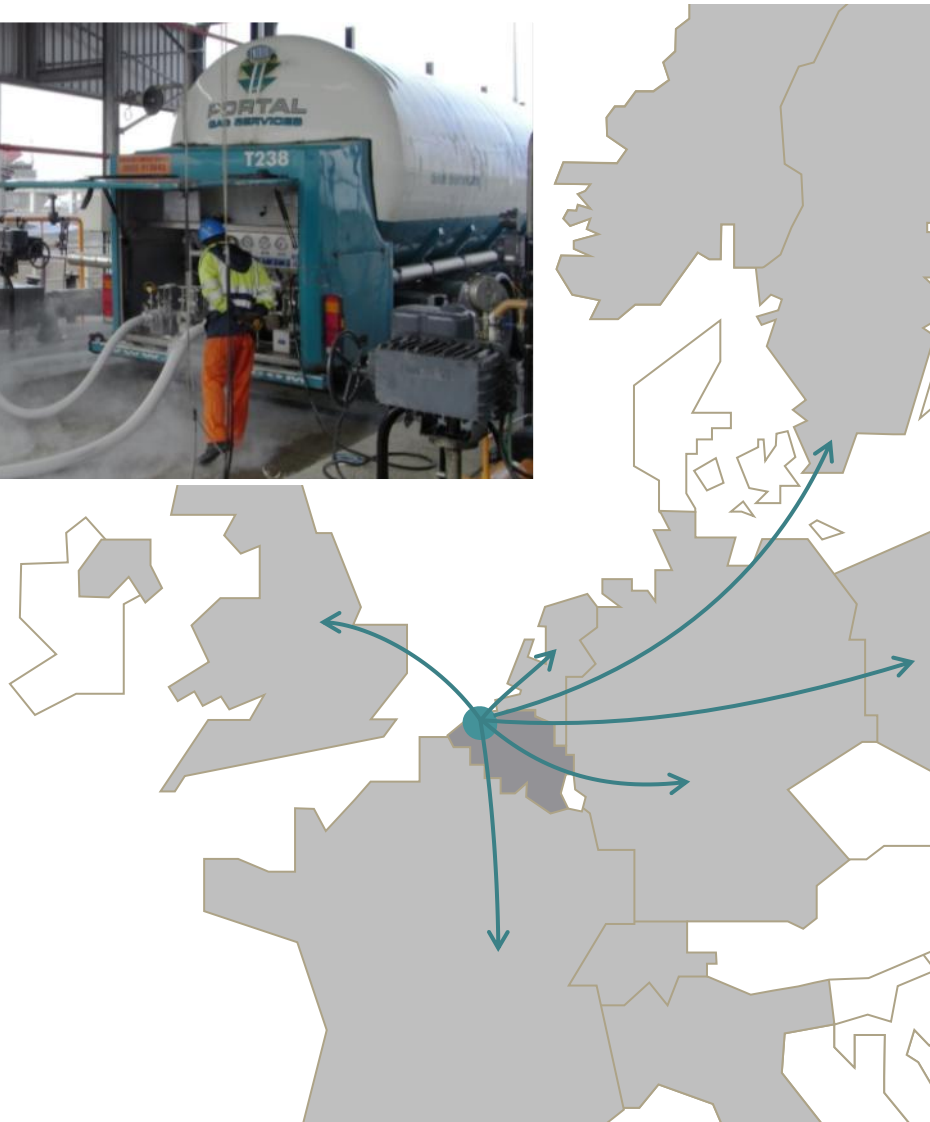
LNG AS A FUEL FOR INDUSTRY, SHIPS AND TRUCKS



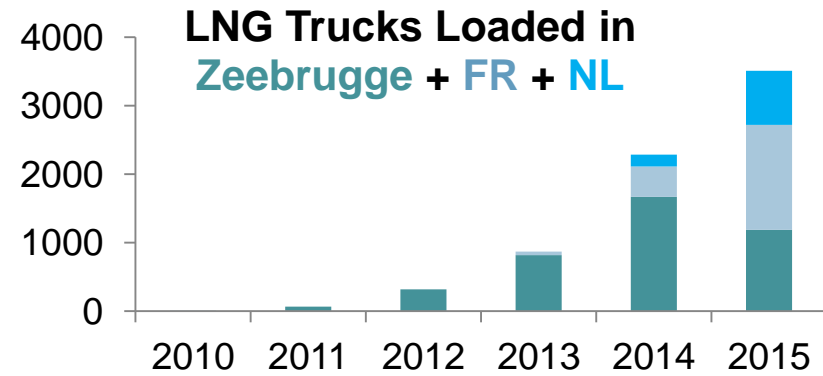
2016 05 27

LNG TRUCK LOADING

2010 2011 2012 2013 2014 2015 ...



- 19 active truck loading companies
- Capacity of 4 000 loadings/year
- 24/7, online day-ahead scheduling
 - > Industrial sites without pipe gas >50%
 - > LNG refuelling stations <40%
 - > LNG as fuel for shipping <10%
- Destinations: Belgium, UK, France, Germany, the Netherlands, Poland, Switzerland, Sweden, Norway, Italy





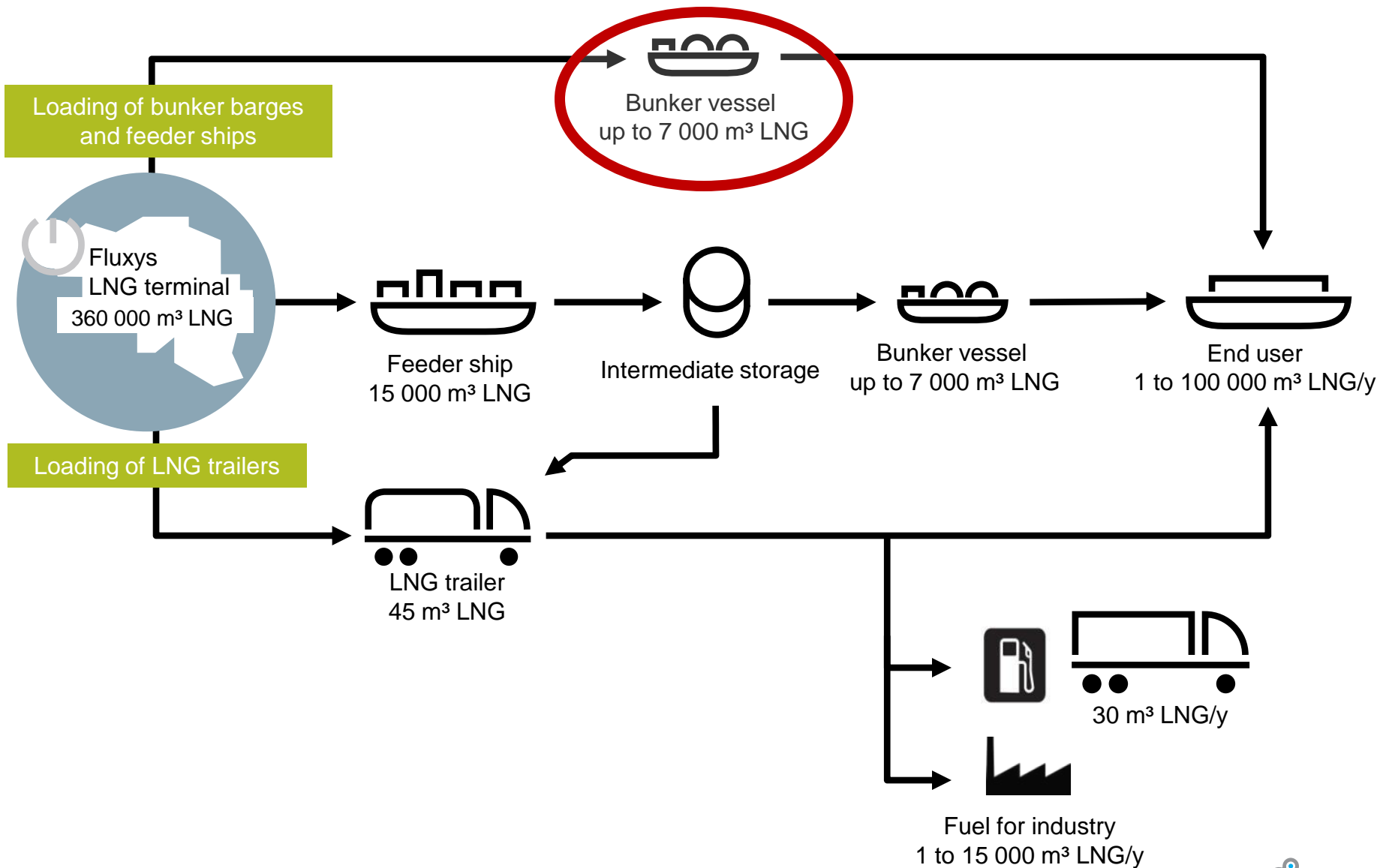
FIRST LNG REFUELLING STATION OWNED AND BUILT BY FLUXYS IN BELGIUM

PARTNERSHIP WITH HAULAGE COMPANY MATTHEEUWS



Co-financed by the European Union

Trans-European Transport Network (TEN-T)



2ND JETTY ABLE TO LOAD SMALL LNG BUNKER BARGES IN ZEEBRUGGE



Second jetty under construction

- Reception of LNG carriers with capacity as small as 2 000 m³ LNG
- Unloading and loading two ships simultaneously
- Ship-jetty-ship transfers



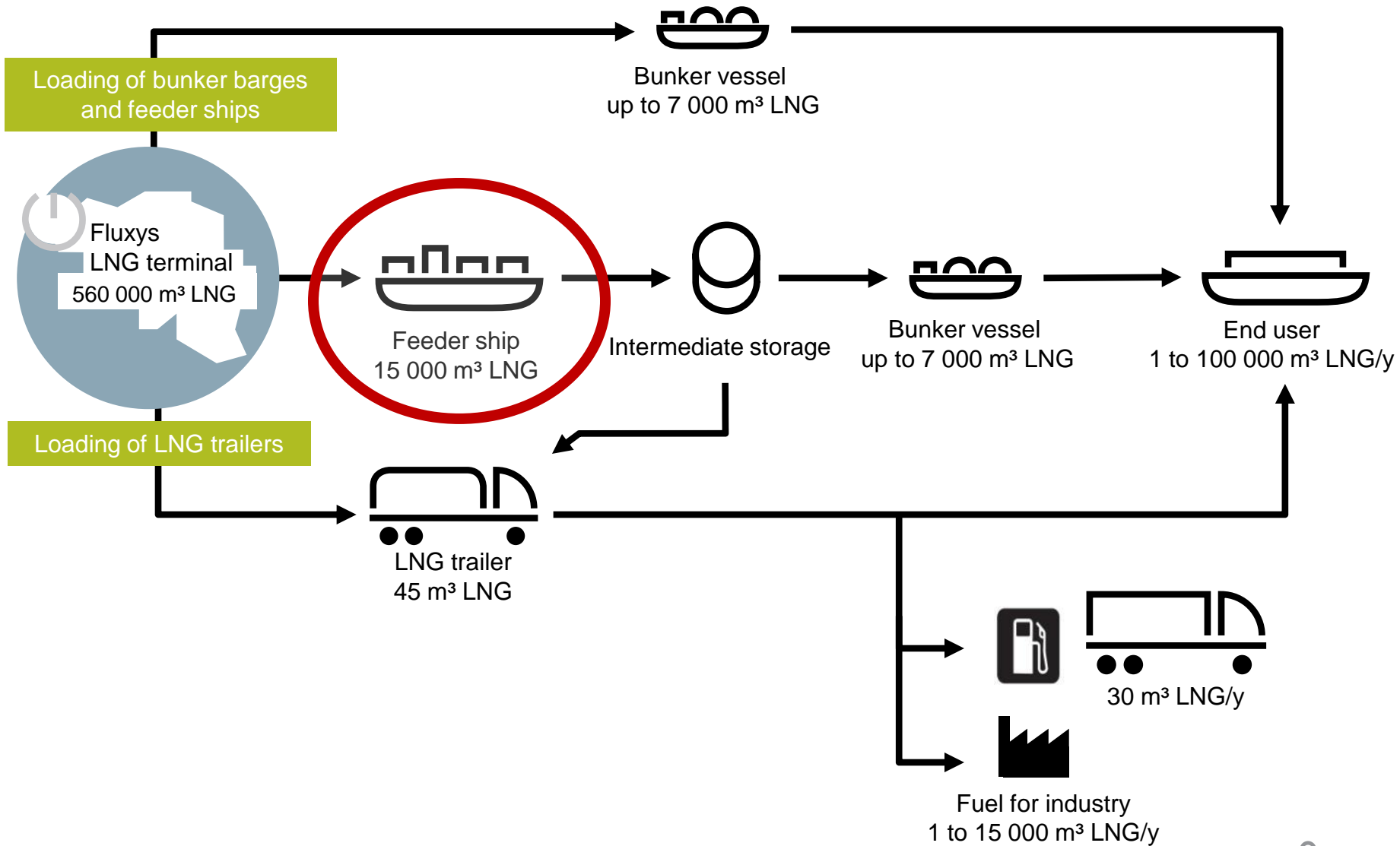
Co-financed by the European Union
Trans-European Transport Network (TEN-T)

LNG BUNKERING VESSEL WITH HOME PORT ZEEBRUGGE



Engie, NYK, Mitsubishi and Fluxys are building a new LNG bunkering vessel:

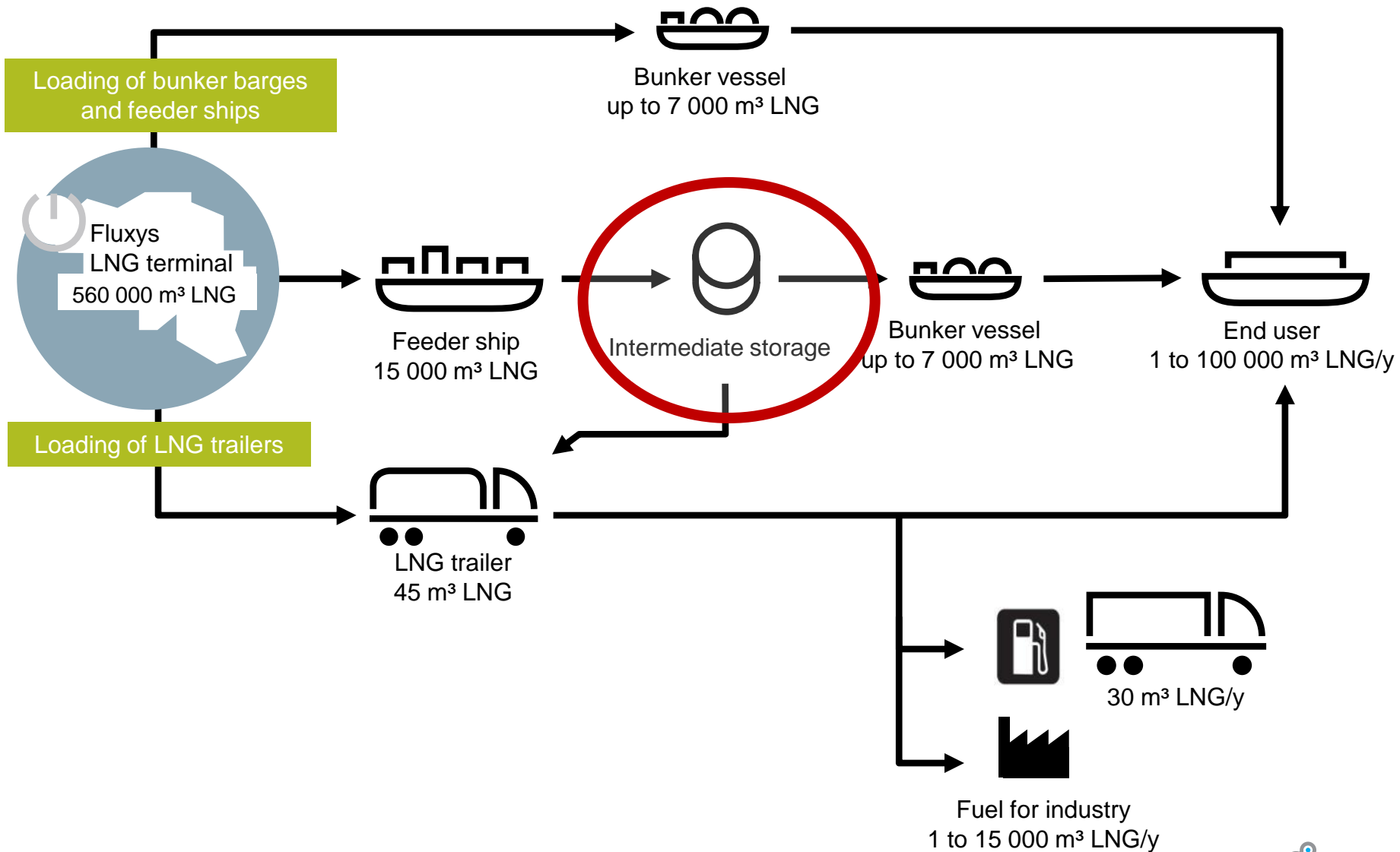
- 5 100 m³ LNG
- Commissioning 2016
- Bunkers for UECC United European Car Carriers
→ 2 dual-fuelled ships in SECA



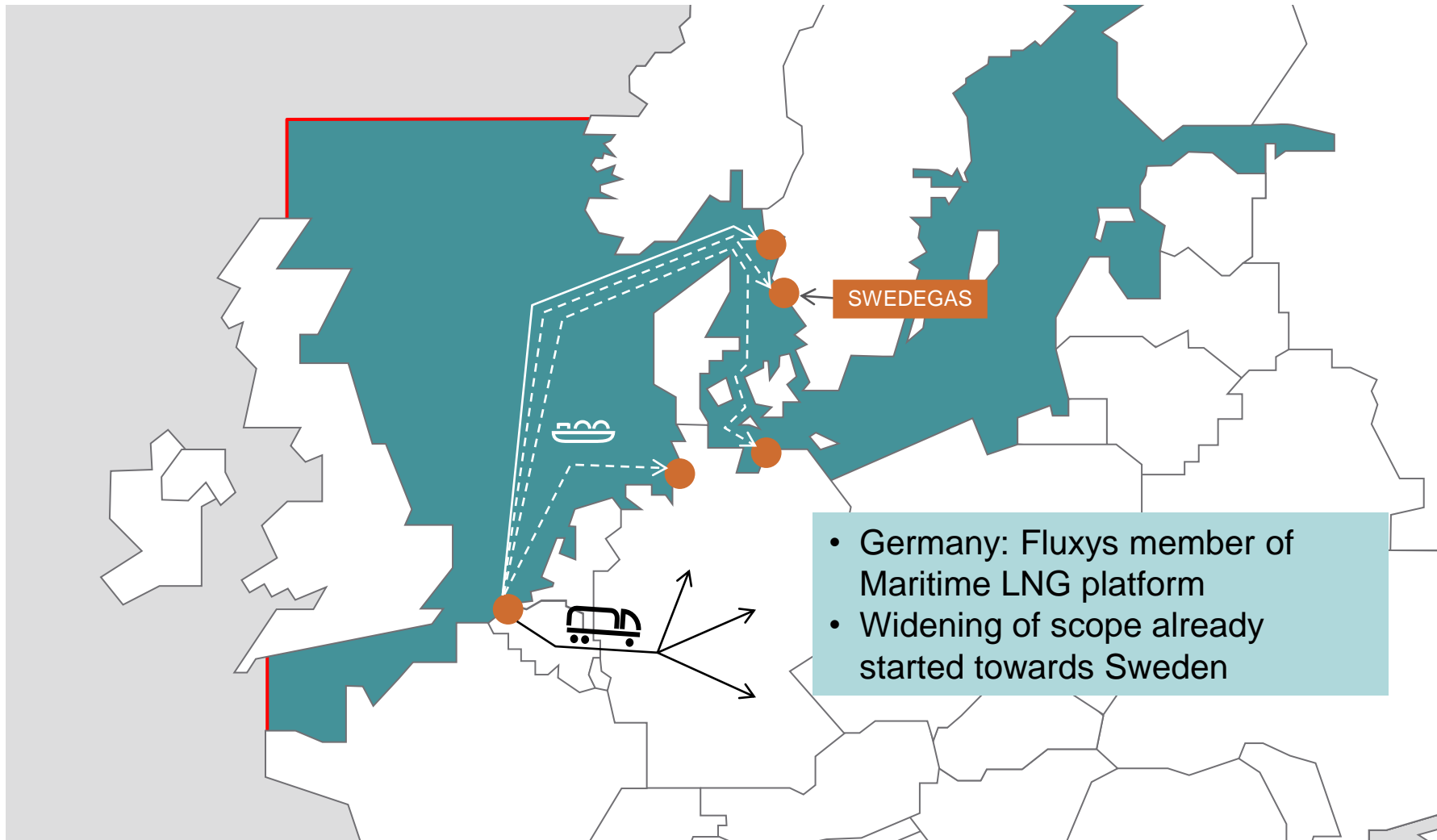
LOADING OF FEEDER SHIPS: 15 600 M³ LNG



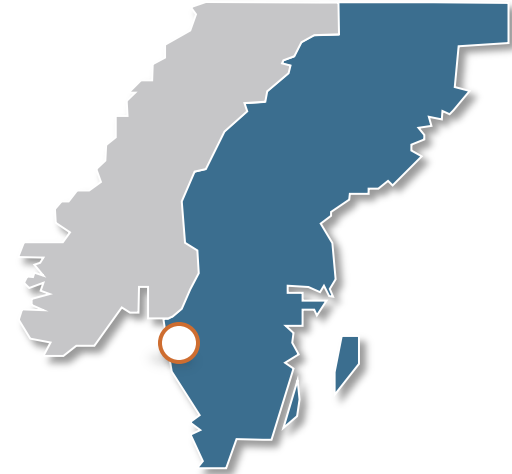
11/2014: agreement signed between Eni and Skangas to load 2 small scale LNG ships per month in 2015 and 2016



STRONG POTENTIAL FOR ENLARGING REGIONAL SCOPE



SMALL SCALE LNG TERMINALS UNDER DEVELOPMENT BY SWEDEGAS IN SWEDEN



- Significant **LNG bunkering market** in the Gothenburg port
- Main **industrial end users** via **truck and/or rail**
- Small **regional grids** by **truck and/or rail**
- **Truck fuelling** for heavy road transport
- Part of the Swedish **pipe gas market**

WRAP UP

- Large-scale LNG: supply to entire markets
 - Compared to pipe gas: advantage of flexibility and source diversification
 - Huge amounts of additional liquefaction capacity coming on stream
 - Europe expected to double LNG imports by 2020
- Small-scale LNG: LNG as a fuel for industry, ships and trucks
 - Strong demand to reduce emissions as well as costs
 - Challenge: developing downstream LNG infrastructure
- Fluxys: first mover in both large & small-scale LNG

FLUXYS

