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Energy security of supply and market developments

1st AIEE Energy Symposium, Milan, 30 November-2 December

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5 Revolutions in the fast changing energy landscape of the 21st century

3 Revolutions on the supply side

1. US shale gas
2. US shale oil
3. A global quest for renewables

2 Revolutions on the demand side

1. Efficiency gains: an ongoing revolution (less energy per unit of GDP)
2. Energy storage: the next global revolution. The silver bullet to achieve a completely green energy supply.

- The future could look like a decentralised smart system where end-users select the kind of energy they have locally (wind, solar, hydro), are able to share it and use it when needed!

Crude oil market update

Oil price forecast

- Brent blend prices are estimated in the range of USD 48-54/bbl by the end of 2016. For 2017 prices are estimated in the USD 60-65/bbl and for 2018 in the USD 65-70/bbl range.
  - Inventories have risen more than we expected, suggesting the market rebalancing is taking a bit longer time.

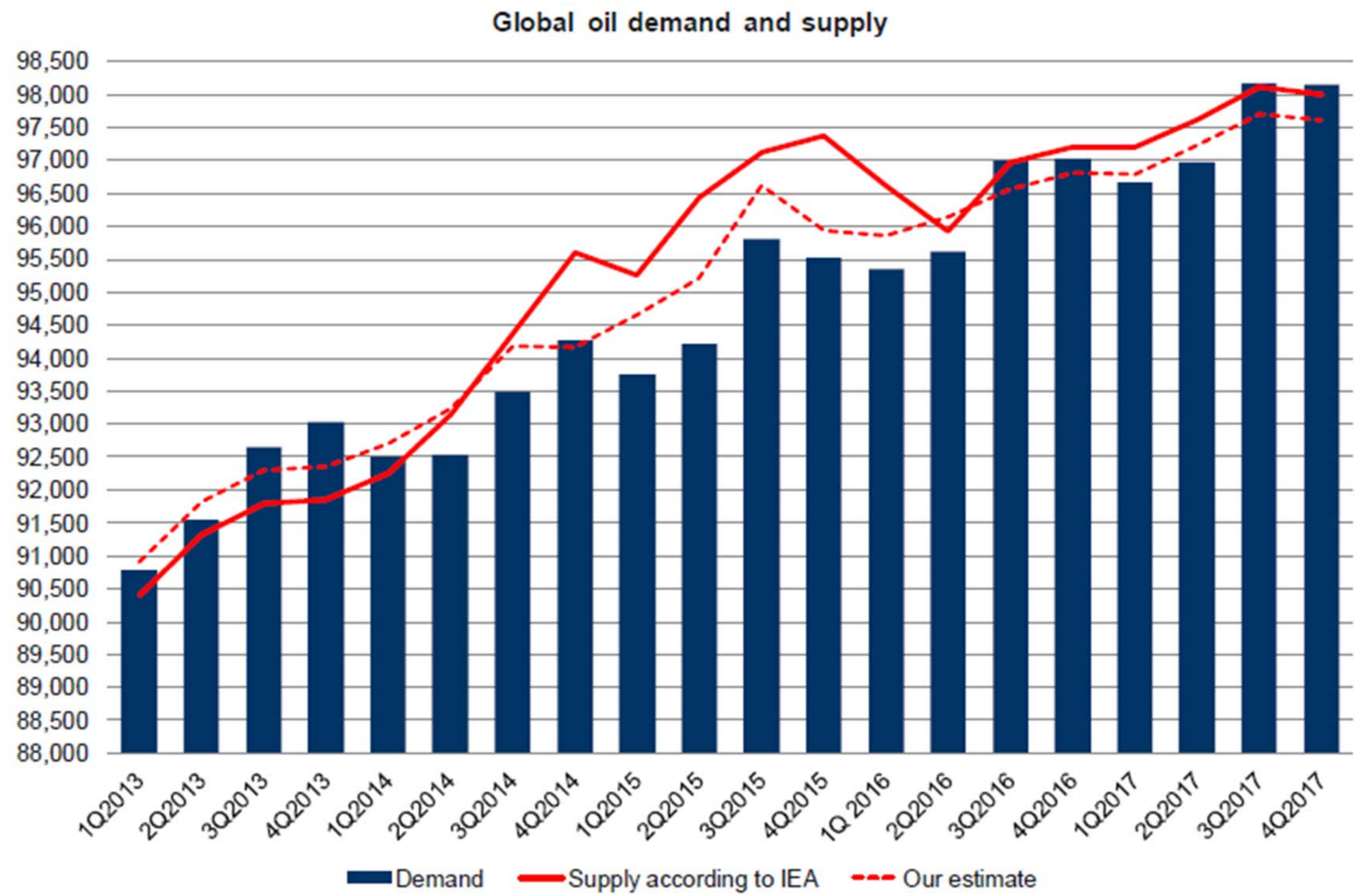
Most important

- We are still in an uptrend. Oil prices just HAVE to go higher, as onshore supply has already proved that recent oil prices have been too low, and offshore investments have clearly done the same thing, with the only exception that it still not shows in production yet, but that will come.

Why has the price recovery stalled?

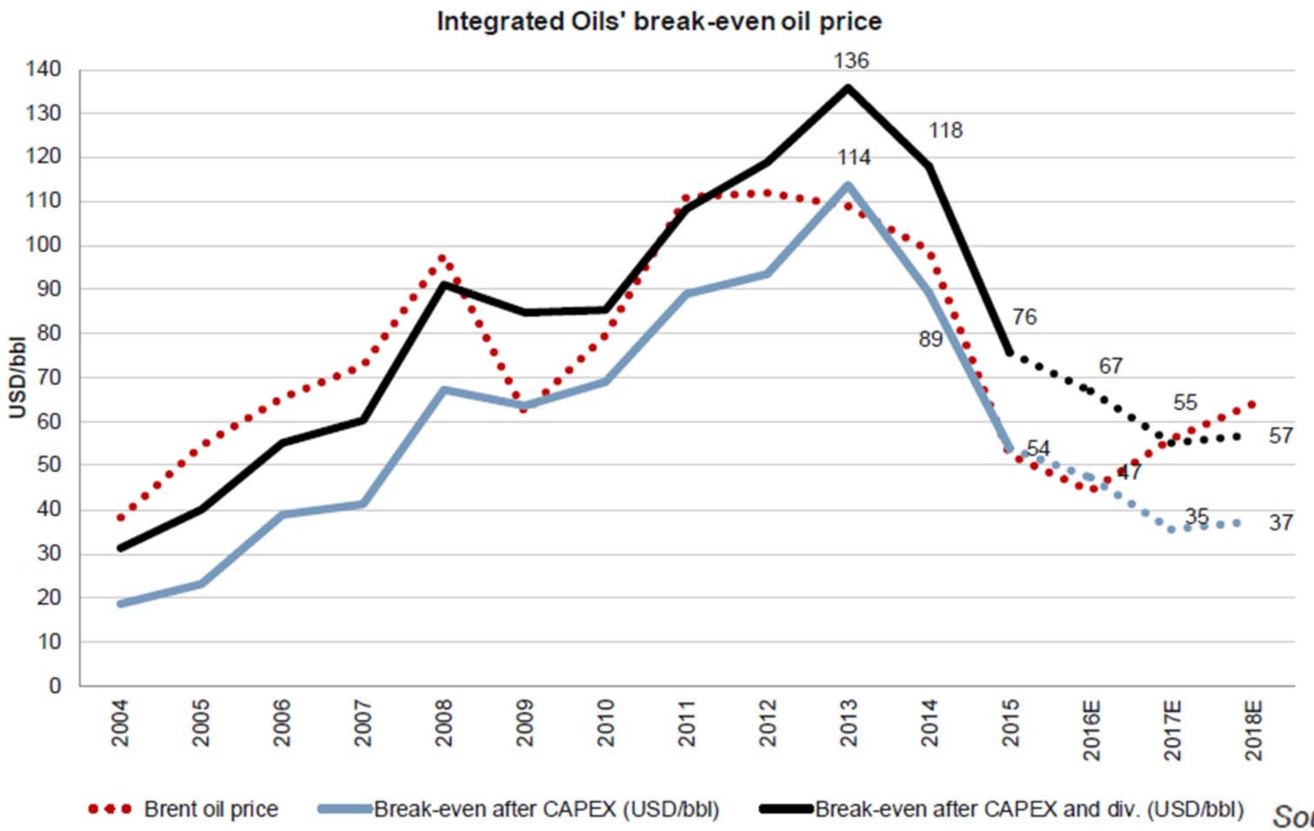
- Because short term focus is on US oil fundamentals where higher inventories have given a bearish signal, but it is due to higher imports, which leads to a tighter market outside the US, but here the data is not that timely.

Global oil demand & supply



Source: IEA and Nordea Markets

Costs and break-even prices are falling rapidly… even offshore



Source: IEA and Nordea Markets

In 2017 most of the large oil companies that stand for the majority of offshore investments will be able to cover their dividends with organic cash-flow with an oil price around USD 55/bbl. That suggests at least that they will have the ABILITY to invest. If they will, depends on the break-even price for the new offshore projects.

Crude oil market update cont.

What could go wrong? Only postponement.

- The main risk is that oil keep flowing from non-OECD areas to OECD inventories, leading to an impression of the rebalancing taking longer time than expected. This is however just a question about timing.
- There COULD be a supply shock, mainly a recovery in Libya, but the risk is low. Again, it will only be a postponement of the inevitable price increase.

Why is the US importing so much crude oil?

- US refiners respond to lower domestic crude oil production and higher domestic and export product demand.

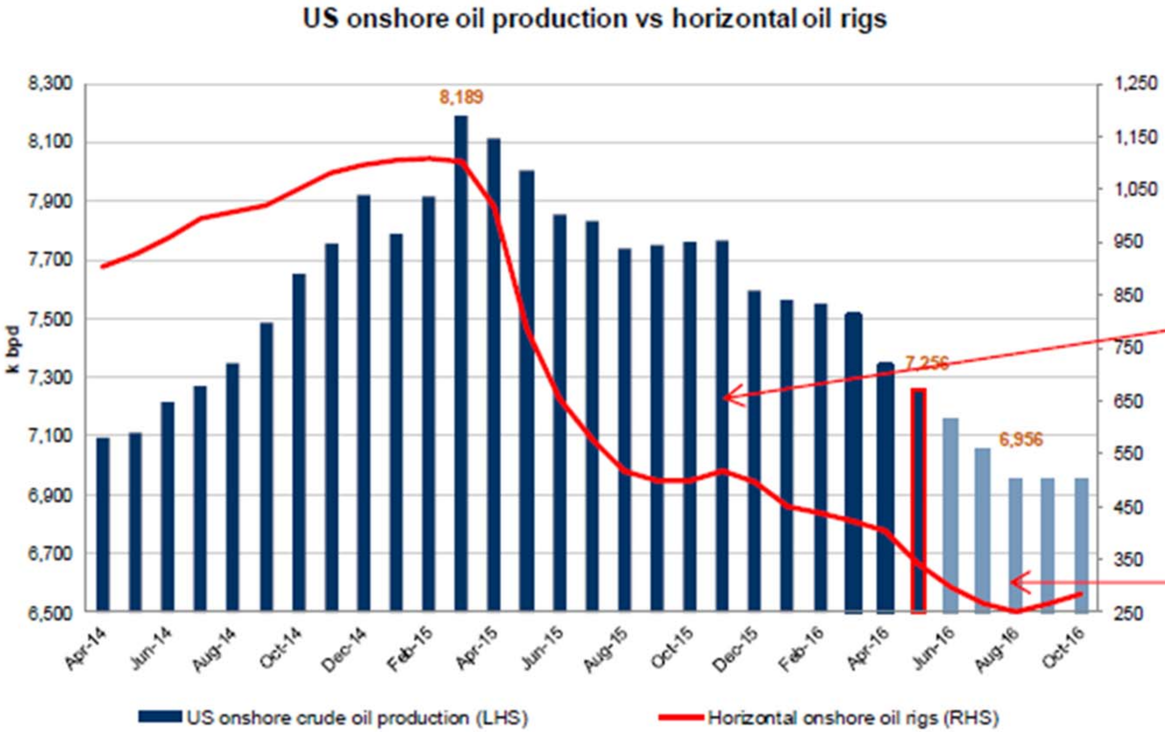
Why is the US importing so much gasoline?

- Jones Act transportation cost distortion. In addition, actual gasoline exports have disappointed somewhat due to competition from Asia.

What about the rig count recovery?

- The rig count will stall if prices don't go higher than USD 50/bbl and onshore production will stay flat at best.

Rig count suggest onshore production will fall..



Source: Bloomberg and Nordea Markets

Production is lagged 3 months in this graph.

August 2015 rig count gave higher November production.

May 2016 rig count will impact August 2016 oil production

Crude oil market update

And what about the fracklog?

- Some investors are worried by the fracklog (DUCs: Drilled uncompleted wells), which has increased steadily and is probably close to some 4.000 wells by now, according to different sources.
  - It is the number of completions that is important, and not so much if the wells are old or new. In 2014 and 2015 there were drilled around 40.000 and 20.000 onshore wells in the US, whereof most of them were completed.
  - In 2016 the number of drilled oil wells is on track to reach 4.000. Even if we were to assume that all of the DUCs were to be completed in 2016 (which is highly unlikely), the number of completed wells would nevertheless be only 8.000 in 2016, versus close to 20.000 in 2015.

Crude oil market update

What about China?

- China's oil demand growth has already cooled down and any dramatic further downward shift is not expected in the short term.
- Global oil demand growth has spread out to other areas, particularly Other Asia, and global oil demand growth is still very healthy, probably supported by low oil prices.

What about the USD?

- Sooner or later the Fed will probably have to raise rates, and definitely before the ECB.
- In periods when the USD strengthens, it usually creates headwind for the oil price, but when the USD stabilizes again, the oil price starts to live its own life, driven by oil market fundamentals.
- Hence, only a short and temporary negative effect is expected from a stronger USD.

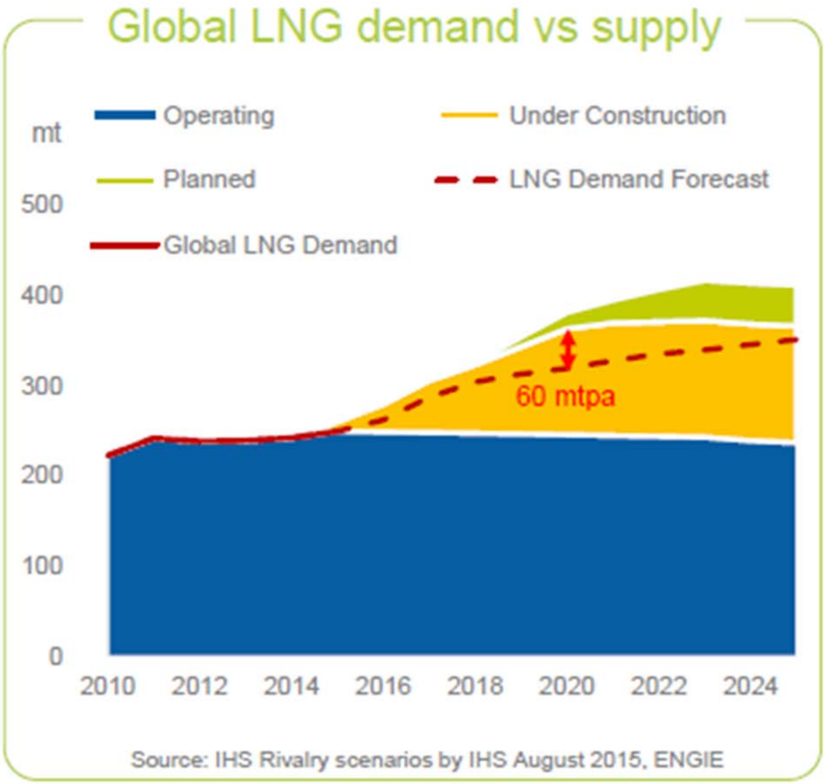
LNG Market Overview

The global LNG market has entered into a period of oversupply

- New volumes on the global market
- More than 70% of the volumes from projects under construction already committed to Asian purchaser

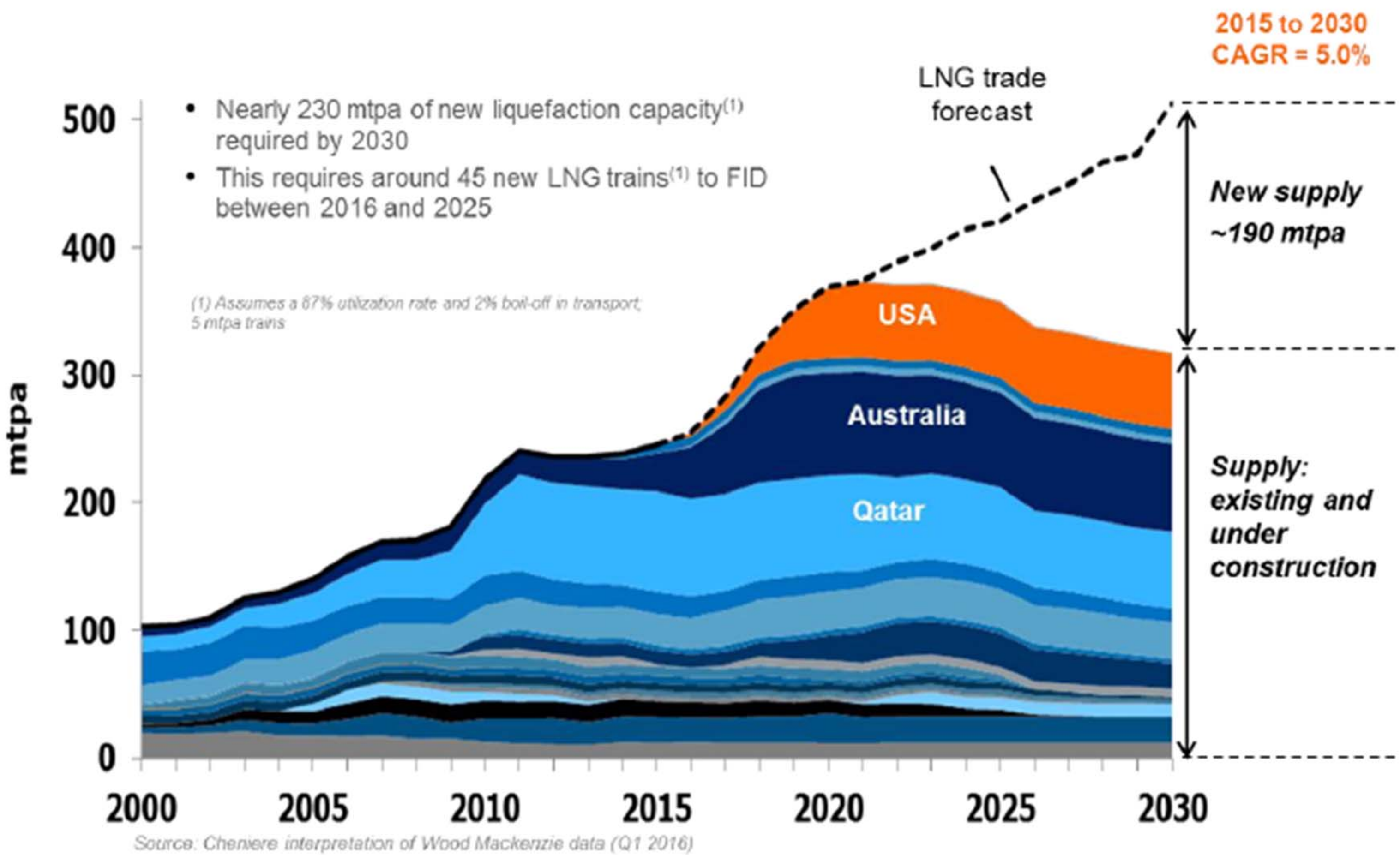
- Asian demand growth less than expected (3.6% vs 4.2% CAGR)

Flexible LNG has now to find another destination



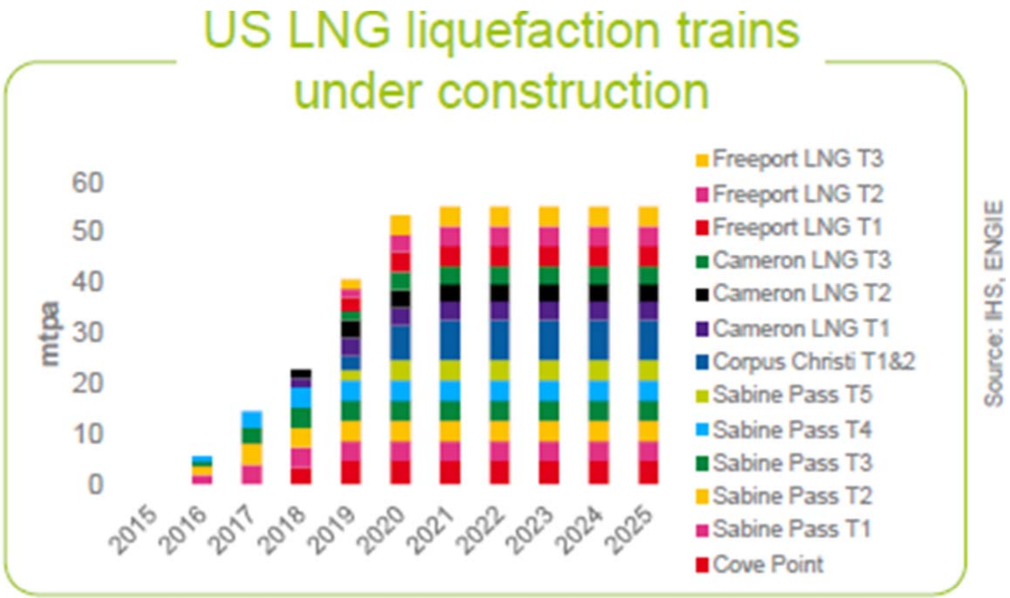
A different perspective on LNG demand..

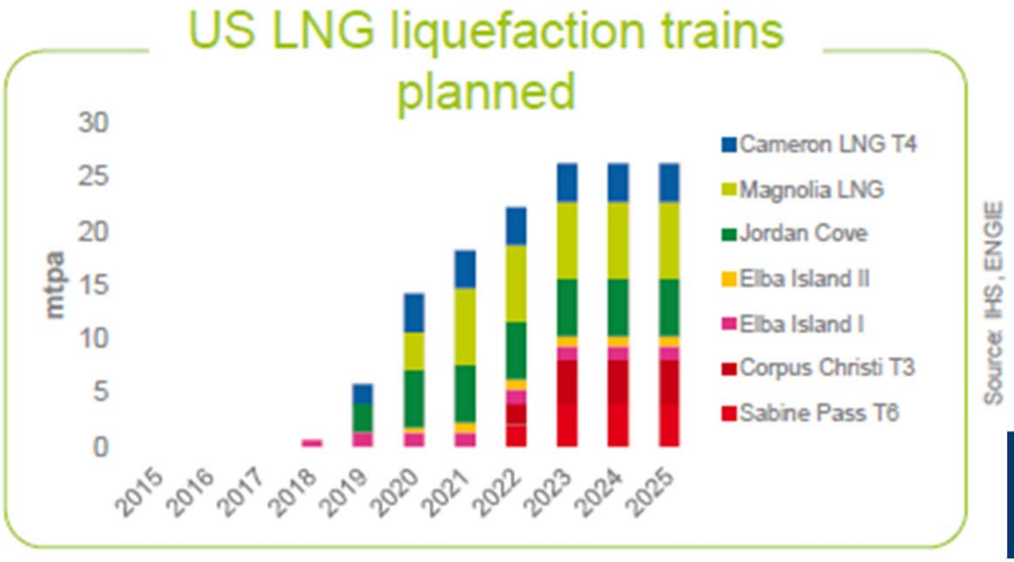
U.S. + Australia 140 mtpa by 2020



The first US LNG wave is about to start with 5 projects under construction

- 5 projects under construction, adding together ~ 60 mtpa by early 2020s
- About 50% of this capacity assumed to be uncommitted
- Most of the projects that haven't reached FID yet likely to be postponed

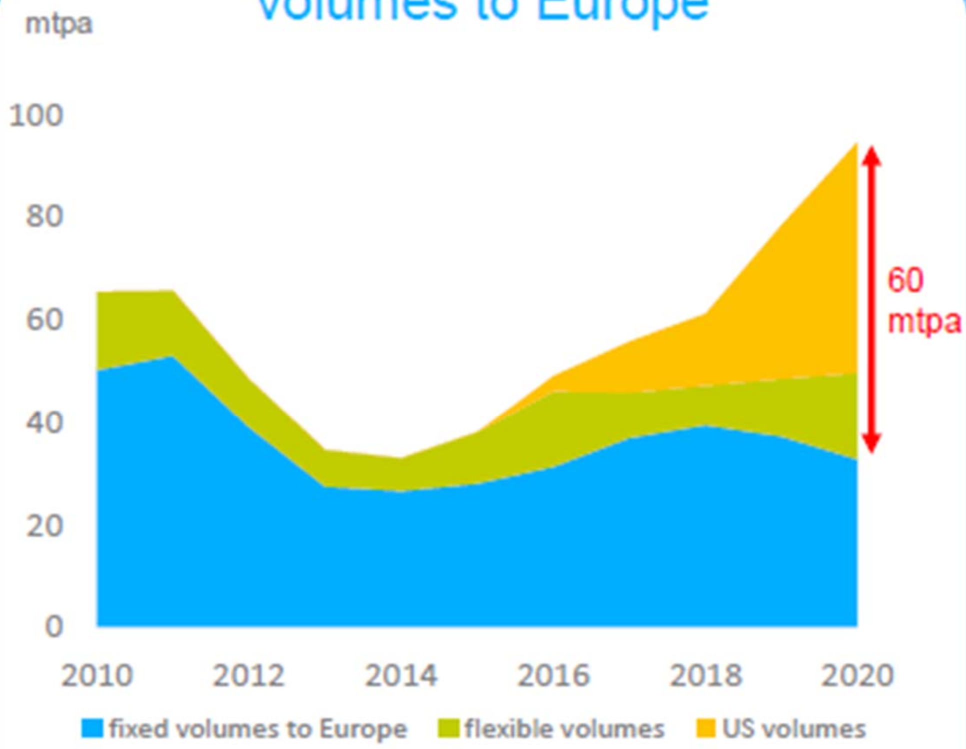




Europe stands as the last resort liquid destination for flexible LNG flows

- Australian LNG to stay in the Pacific Basin
- Conversely, US LNG flexible thanks to tolling structure:
  - Destination free
  - Full optionality of production
- Europe to be the last resort destination for flexible LNG
- 30-40 mtpa (40-50 bcm) of US LNG could flow to Europe in 2020

Flow back of flexible LNG volumes to Europe

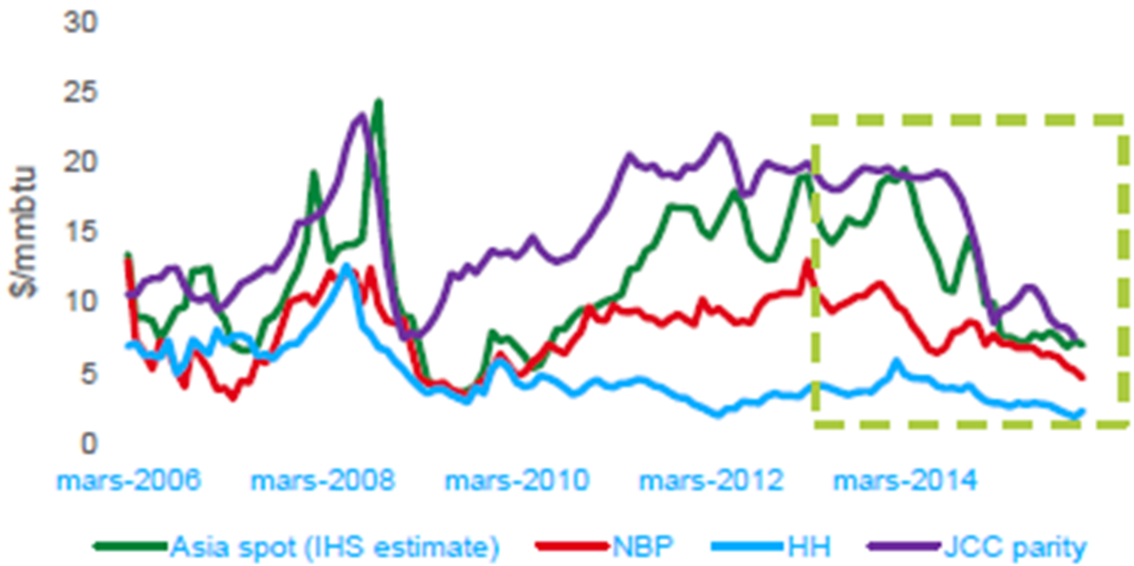


Source: IHS, ENGIE
Main assumptions:
- Based on IHS August 2015 demand scenario
- Including volumes from all planned projects

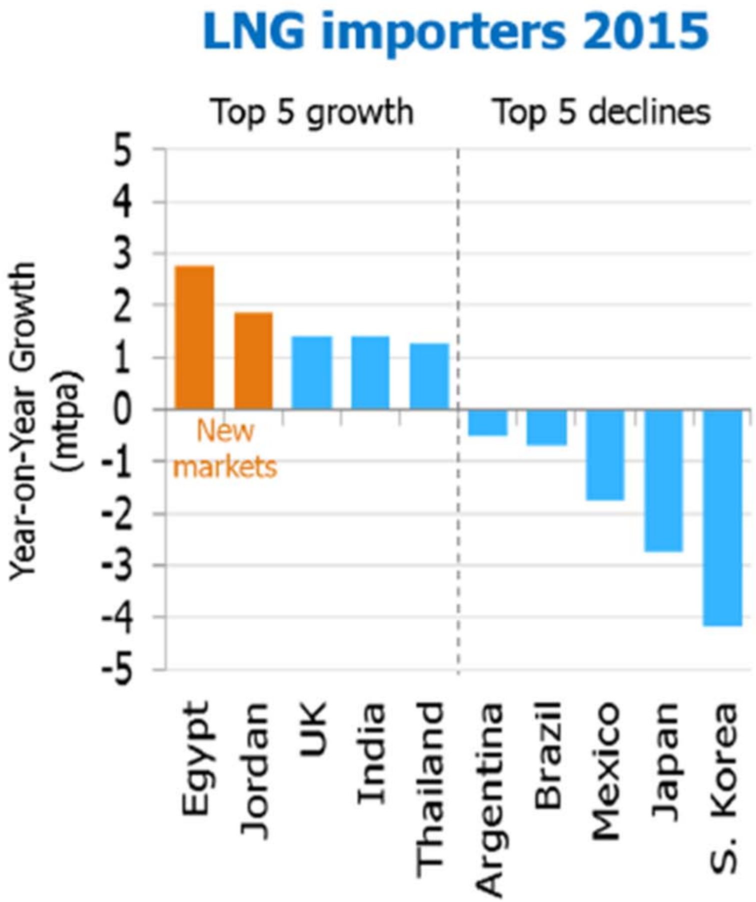
Market landscape: the market in 2015 in a few words

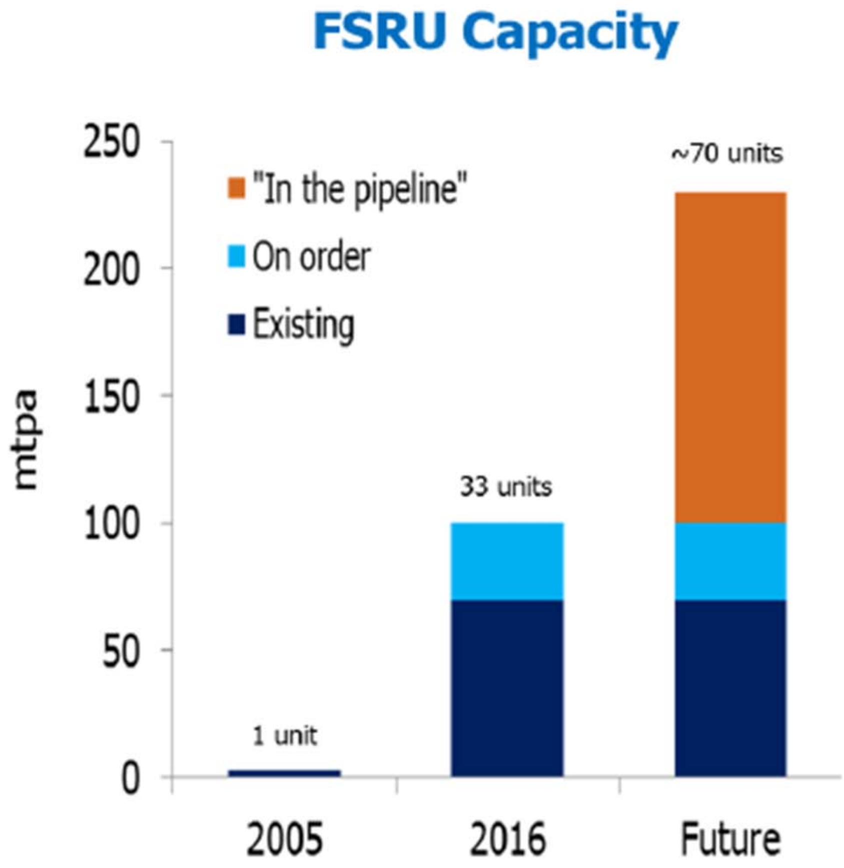
LNG markets are changing

- Increased competition
  - Traditional players consolidating
  - New market players
  - New disruptive players
- Switch to a buyers’ market
  - Supply glut at least till 2020
  - Buyers more demanding
- Market design is transforming
  - Increasing spot sales
  - Willingness of Asian buyers to create a liquid LNG price reference
  - Slow emergence of small scale
- Structural challenges
  - LNG competitiveness vs. coal and HFO
  - Long lead time to create new markets



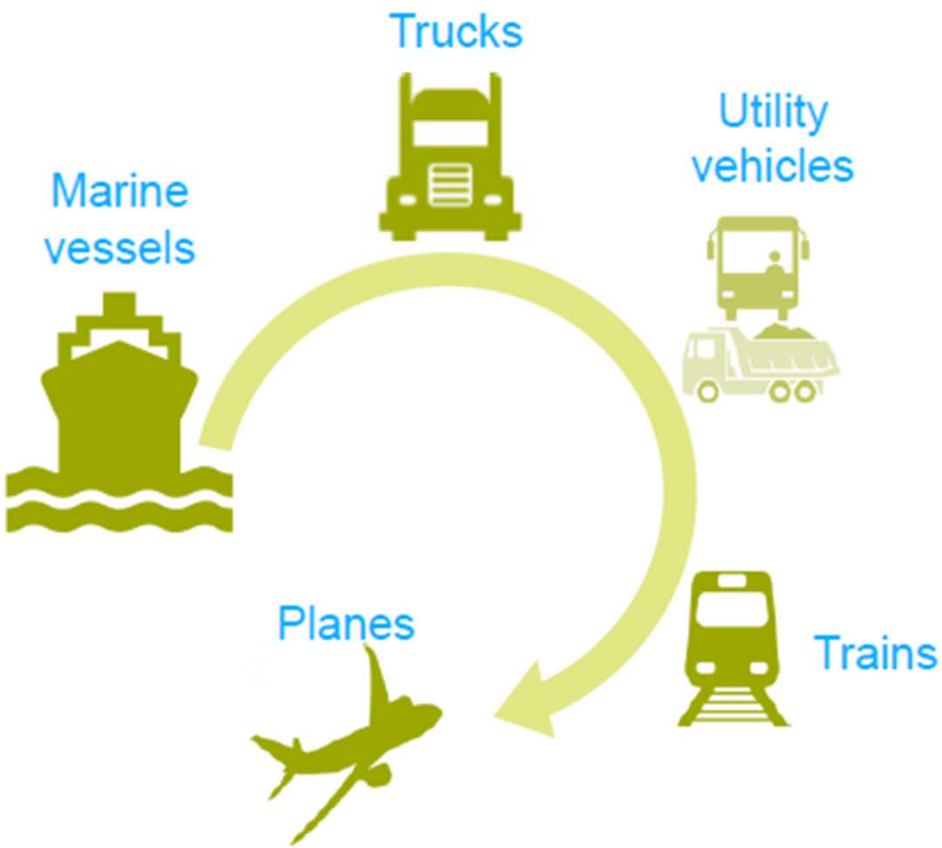
New Markets are Emerging





Using LNG as a fuel: a wide range of possibilities

- The global LNG market is expected to grow from today's 245 mtpa to ~470 mtpa in 2030.
- The retail LNG market will feature a continuous growth in the next decade and some estimate it could reach ~ 75 - 95 mtpa by 2030 (~20% of Global LNG market).



LNG as a fuel in Europe: bunkering and LNG for trucks are the two main nascent markets

- 3 LBV under construction
- More than 20 terminals equipped with LNG bunkering facilities[(1)]
- 73 LNG-fuelled vessels in operation and 80 on order[(2)]
- Depending on scenarios, LNG bunkering market forecasts in Europe range between 2.1 and 24 mtpa by 2025[(3)]

- Over 50 LNG filling stations already operating in Europe[(4)]
- More than 1,500 trucks running on LNG[(4)]
- Depending on scenarios, LNG road market forecasts in Europe range between 2.3 and 29 mtpa by 2030[(5)]

[(1)] Source: lngbunkering.org
[(2)] Source: DNV-GL Oct. 15, excl. LNG carriers and inland waterway vessels
[(3)] Source: IHS CERA, Lloyd's Register, WoodMackenzie, DMA
[(4)] Source: NGVA, lngbc.eu
[(5)] Source: IHS CERA, Cedigaz, Pace

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