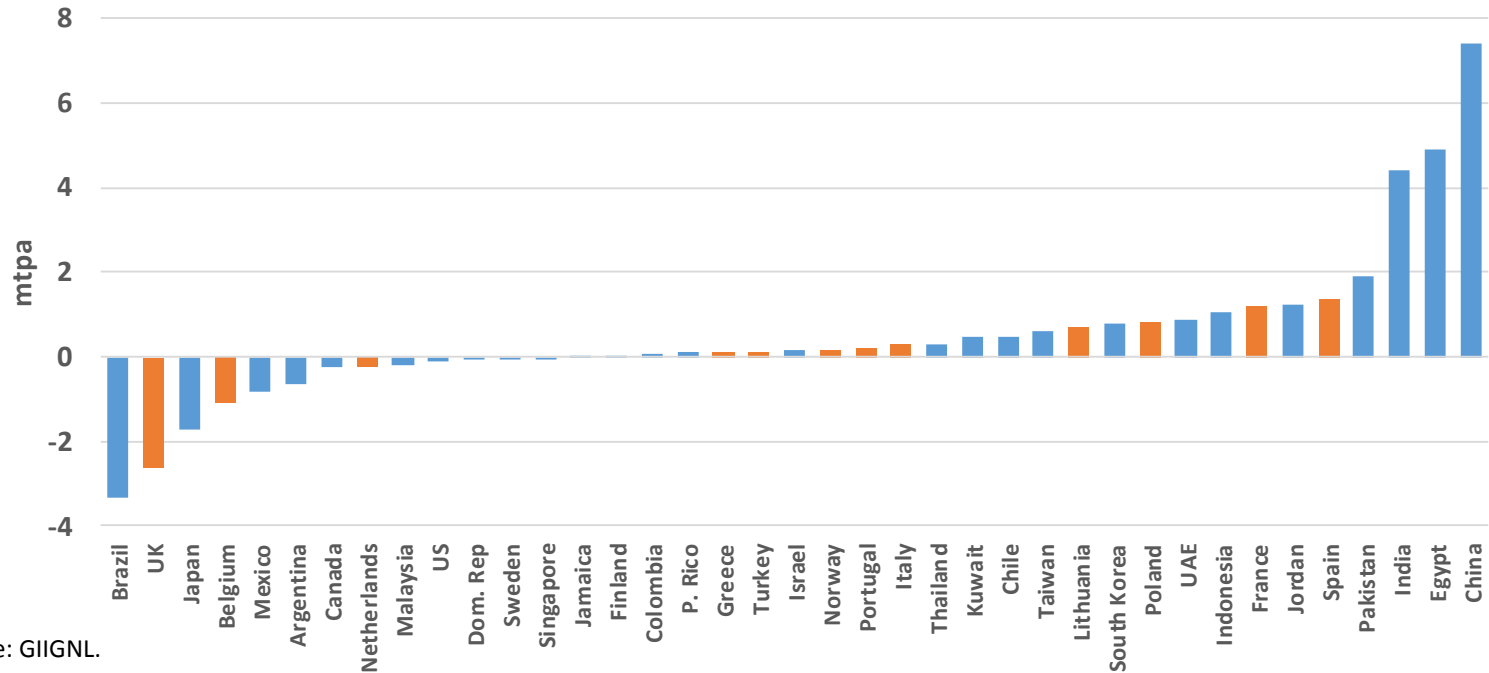


Global Gas Market Dynamics

Anne-Sophie Corbeau, Research Fellow II

So far, no LNG oversupply

LNG imports increase, 2016 levels against 2015

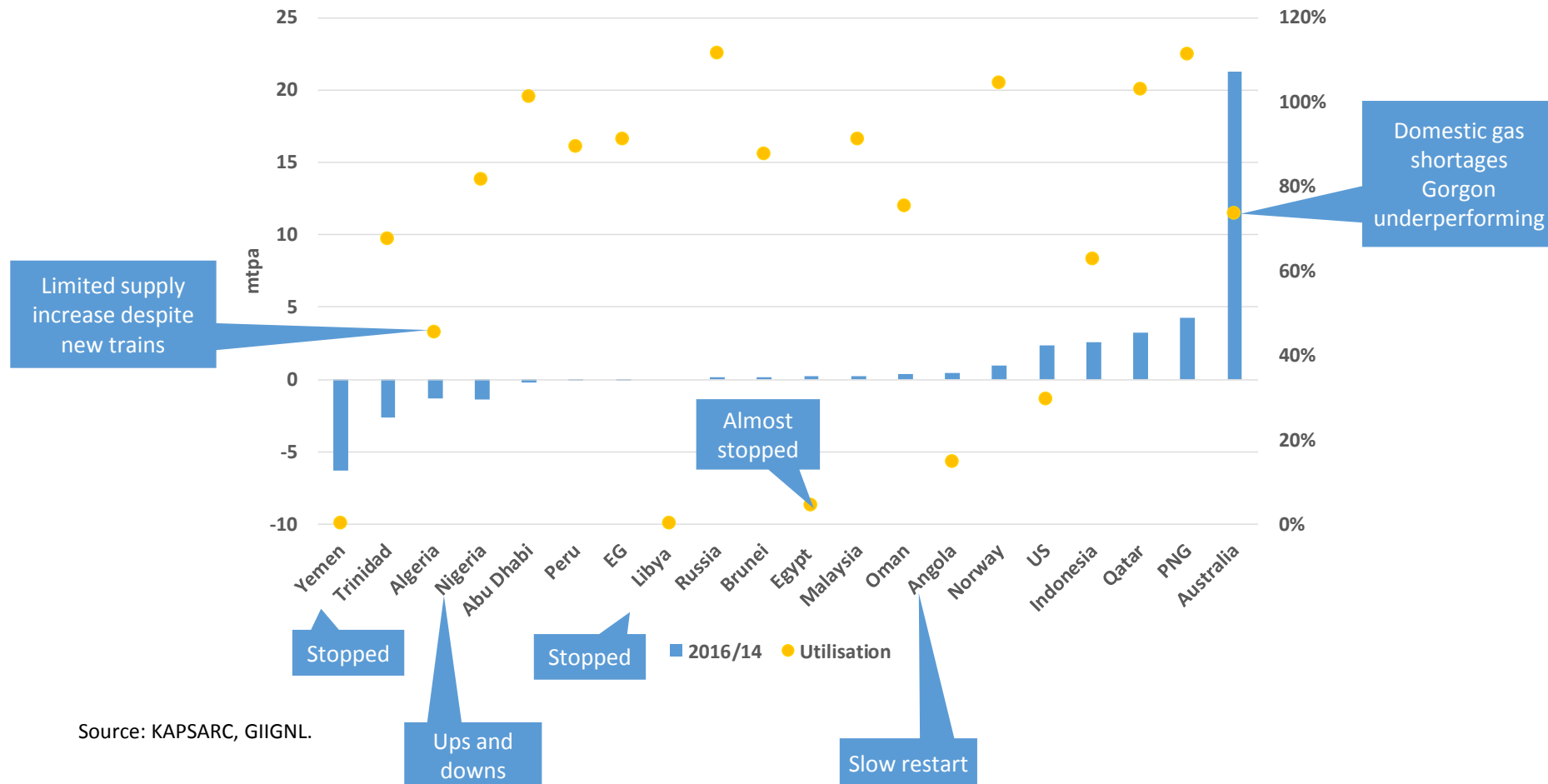


Source: GIIGNL.

- The role of Europe as a balancing market was limited (+1 mtpa absorbed), which largely benefited Russia (178 bcm exported to European countries, +20 bcm against 2015)
- A moderate increase in global LNG supply (+18 mtpa) was mostly absorbed by Asia (China/India) and new importers (Egypt, Pakistan and Jordan) absorbing 20 mtpa

A look back at the supply side – 2014-16

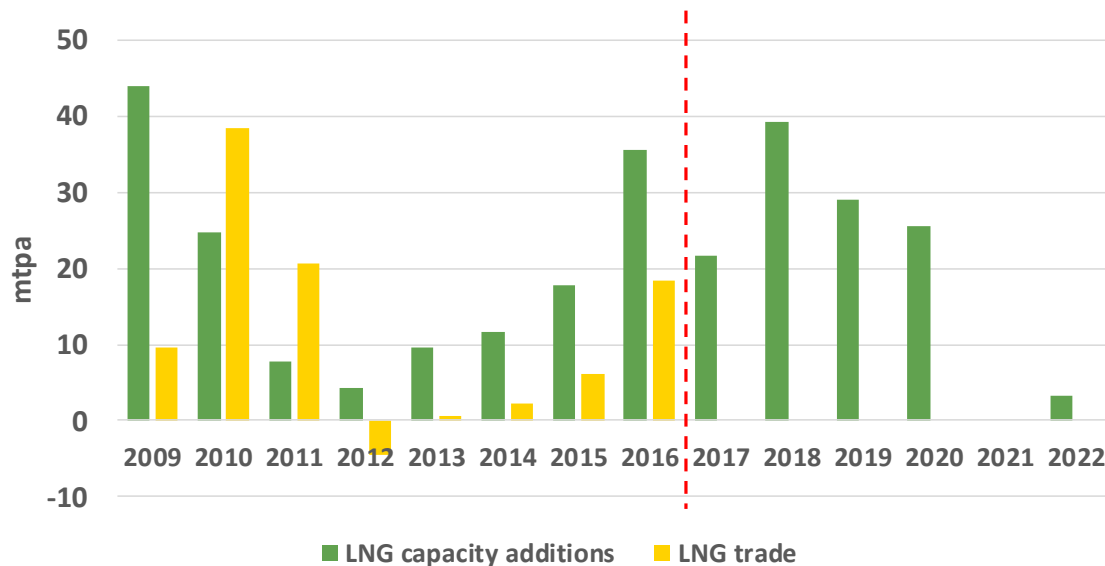
LNG supply change (2016 against 2014) and utilization of LNG plants (2016)



Source: KAPSARC, GIIGNL.

LNG supply did not follow capacity additions

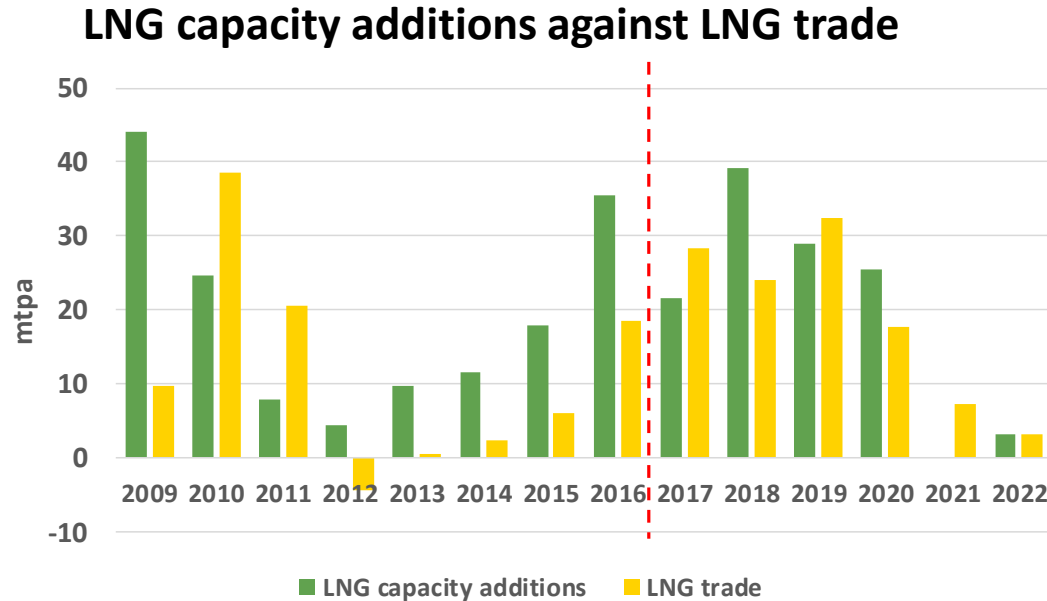
LNG capacity additions against LNG trade



Source: KAPSARC, GIIGNL (historical data).

- Given the large capacity additions over the past 3 years (+65 mtpa), one could reasonably have expected large LNG volumes to hit to the markets in 2016
- It did not happen as new liquefaction plants started late/ramped up slowly and existing ones faced issues
- LNG trade only increased by 27 mtpa over 2014-16

Looking forward...



These forecasts assume no major issue with existing plants and that new LNG plants start as announced

Qatar is not included

Source: KAPSARC, GIIGNL (historical data).

- Around 100 mtpa of additional LNG supply are expected to hit the markets over 2017-20
- The largest capacity additions will take place in 2018, with around 85 mtpa of additional LNG expected to be supplied over 2017-19
- Significant slow down post 2020 (excluding a potential +12 mtpa from Qatar)

Looking for new liquefaction projects

- Three LNG plants have taken FID since 2016 (as of early June 2017)
- All of them have only 1 train
 - One brownfield – Tangguh T3 (Indonesia)
 - One existing regas plant – Elba Island (U.S.)
 - One FLNG – Coral FLNG (Mozambique)
- Potential FIDs in 2017
 - Fortuna FLNG (E. Guinea) >> FLNG
 - Corpus Christi T3 (U.S.) >> expansion
 - PNG LNG T3 (PNG) >> expansion
 - Sakhalin II T3 (Russia) >> expansion
 - Pacific NW LNG (Canada) >> large greenfield

Where will new LNG capacity come from?

Likely winners

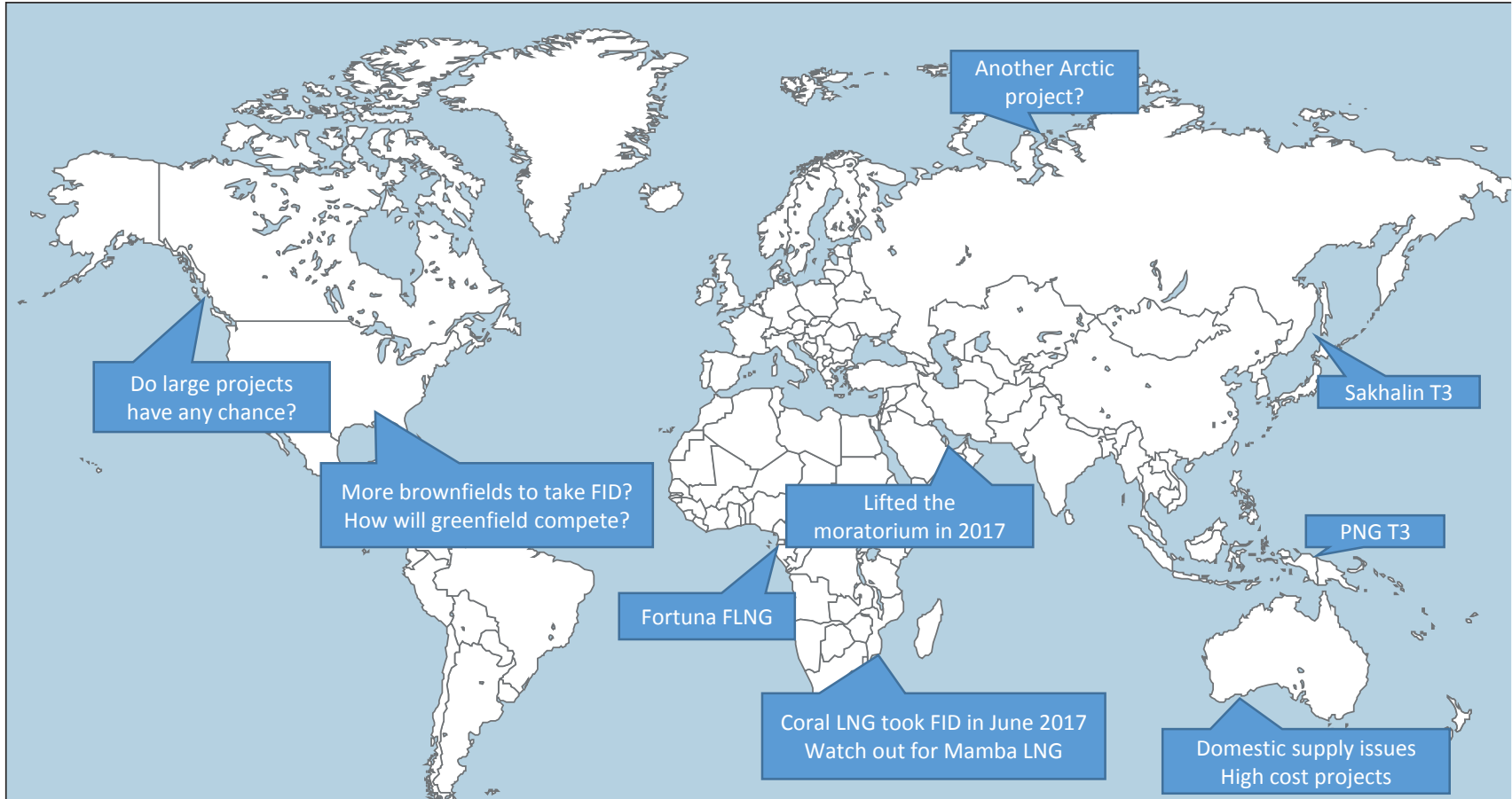
- Brownfield projects
 - Qatar
 - Utilization of existing capacity in Egypt, Trinidad or Oman
- Projects with strategic involvement from buyers
- Projects with specific cost conditions (tax exemptions, cheap gas/energy supply)
- FLNG – notably the Golar-type projects
- Liquid-rich projects

Potential losers

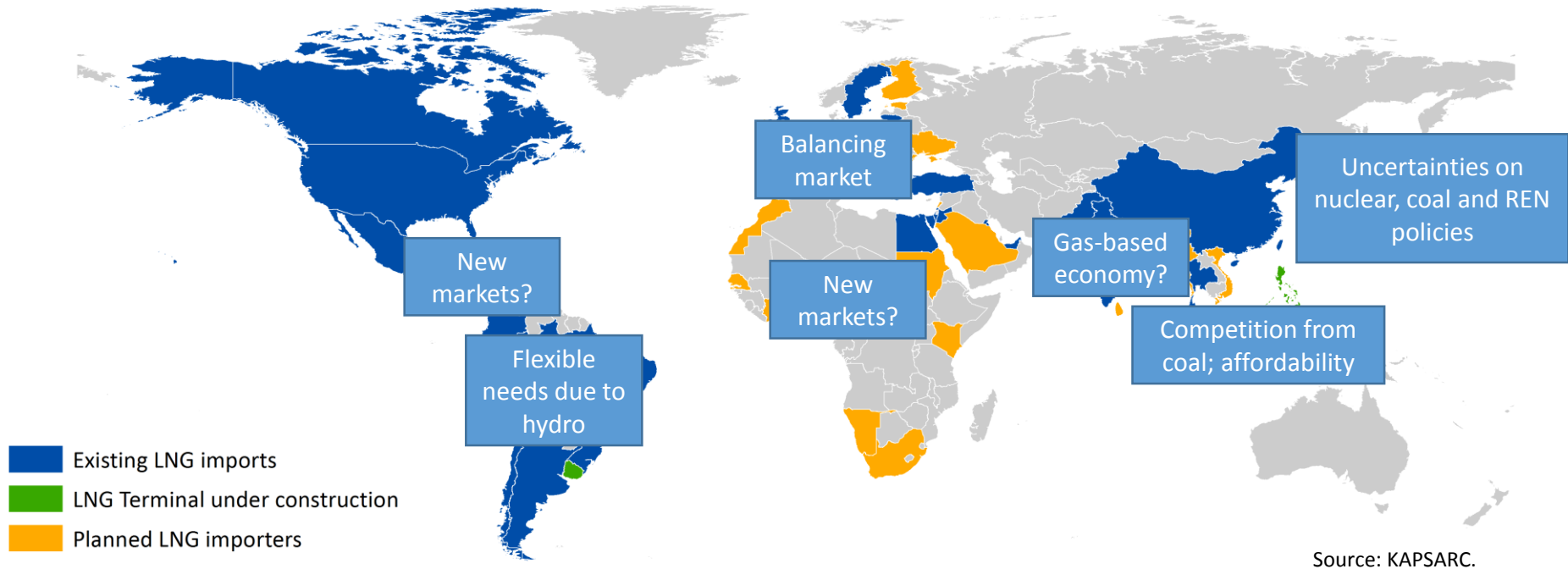
- Expensive greenfield projects in remote locations and strong local content requirements
- Uncompetitive fiscal framework, uncertain regulation
- Potentially rapidly growing domestic demand (like Egypt)
- Politically unstable
- Large projects (>10 mtpa)?

Will we ever again see a 15 mtpa greenfield project taking FID?

Who will provide LNG supply beyond 2020?



Anatomy of future LNG demand



- New buyers are emerging, interested in more “affordable” and more flexible LNG
- But they are no longer the AAA-creditworthy buyers able to commit for a 20-year long-term contracts. They are interested in small quantities, shorter periods and possibly different price indexations

In Africa, projects have two main characteristics

FSRUs/FSUs

- Faster to implement than an onshore terminal
- Cheaper than an onshore LNG terminal, lower environmental impact
- Scalability
- No need for large upfront investment from local gas company/local government
- Provides a medium-term solution in countries aiming at developing their gas production later
- Can sail away if no longer needed/FSRU owner is not paid

LNG-to-Power

- Large anchor consumer (if used baseload)
- Ability to support demand in other sectors (industry, transport) using same infrastructure
- Possibility to use existing oil-fuelled power plants to switch to gas
- Environmental and cost benefits of switching from oil products to gas
- Speed of delivery
- Dispatch will have significant implications for LNG procurement

Can the marine sector come to the rescue?

Comparison of gas consumption for different types of vessels and vehicles

<i>Vessel/vehicle</i>	<i>Annual LNG/CNG consumption of a single vessel/vehicle</i>		<i>Approximate number of vessels/vehicles with the same consumption</i>
	<i>MWh</i>	<i>m³</i>	
Ferry	395,000	37,335,000	1
Port vessel (tug)	5,900	557,700	65
Fishing boat	3,000	283,600	130
Bus	290	27,400	1,300
Taxi	40	3,800	10,800

Source: Lage and Pilskog (2014).

Source: Christophe Lefevre; OIES/KAPSARC

- Environmental rules are playing in favor of switching away from HSFO, but different options exist (MGO, LSFO, scrubbers)
- But cost matters in an industry which is quite conservative

Meanwhile, the LNG industry is no longer a cosy little club

LNG traders
(Trafigura, Vitol, Gunvor)

LNG trading platforms

FLNG developers
(Golar)

LNG importers moving into trading
(Japanese companies)

New sellers/developers
(Perenco, Schlumberger)

New LNG exporters
(U.S., Angola, PNG,
Cameroon, Eastern Africa)



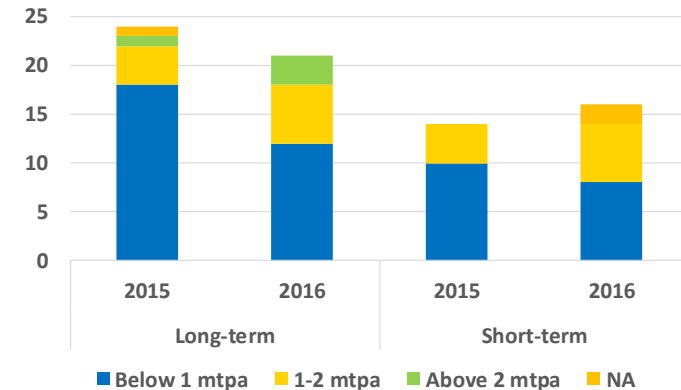
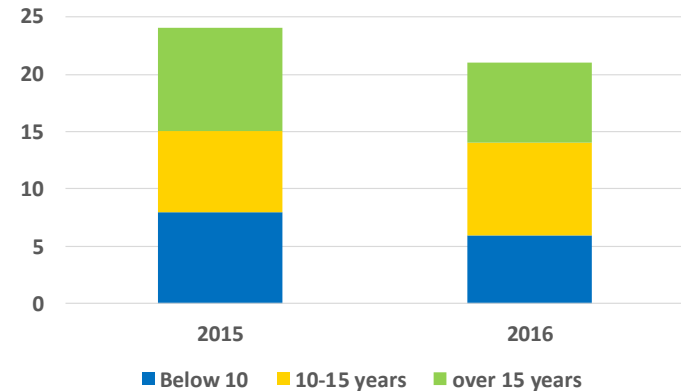
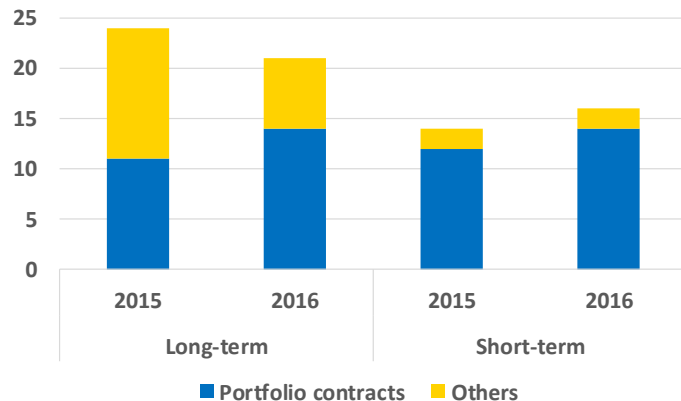
**New entrants in existing
LNG importing countries**
(Many Chinese)

New LNG importing countries
(Pakistan, Egypt, Jamaica etc...)



LNG contracts are changing

- Number of contracts by
 - Duration (top right)
 - Quantity (bottom right)
 - Origin (bottom left)



Source: GIIGNL, KAPSARC

Buyers are becoming more demanding and sellers are reacting

World's top LNG buyers form alliance to push for flexible contracts (Reuters)

Asia's LNG "Buyers Club" Is Shaking Up The Market



Top Indian gas utility pushes Gazprom for LNG price cut (Bloomberg)

Asia's U.S. LNG fever going cold as buyers seek supply swaps



Indian-Qatari LNG Pricing Negotiations: Yet Another Sign That LNG Markets Are Shifting (Forbes)

EXCLUSIVE-Qatar talks tough on project stakes in Japan LNG contract talks



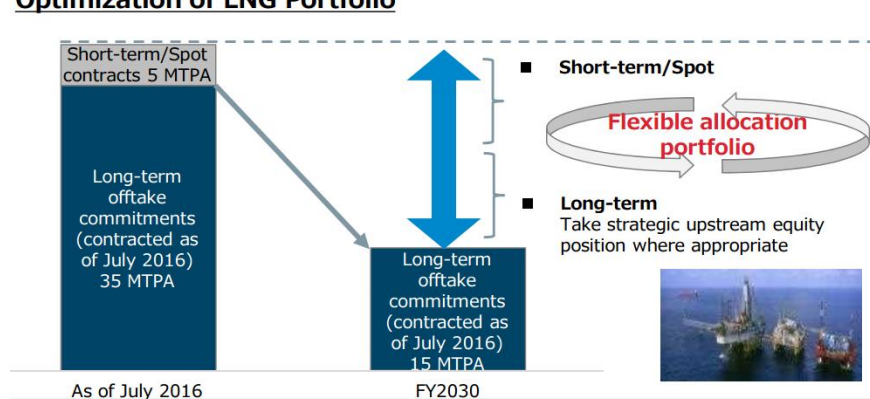
Japan: buyers urge flexible LNG contract terms, indexation (LNG World News)

The inevitable change in the nature of long-term contracts

This is what buyers want

- The end of final destination clauses
- Moving away from oil indexation
- More flexible LNG

Optimization of LNG Portfolio



Source: JERA, 2016.

This is why it will happen

- The Japan Fair Trade Commission is reviewing the legality of these clauses
- Three Asian countries trying to set up a trading hub
- More uncommitted LNG, flexible U.S. LNG
- More portfolio players long on LNG
- Less willingness/interest in renewing LNG contracts at times of oversupply
- Renegotiation of long-term contracts with smaller volumes or shorter duration



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Thank you for your attention