

Energy Security in SE Europe and the role of LNG

*LNG production and export options
with particular reference to the East Med*

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Overview

In developing strategies for the East Med we must first understand what is happening globally:

- Global energy markets undergoing permanent structural change to low-carbon energy**
- Paris Climate Agreement impacting global energy**
- Trump's election to the US presidency affecting markets**
- Gas glut in global markets – low gas prices**

Review of global LNG markets

BP's Energy Outlook 2017 forecasts that LNG will account for over 50% of traded gas by 2035:

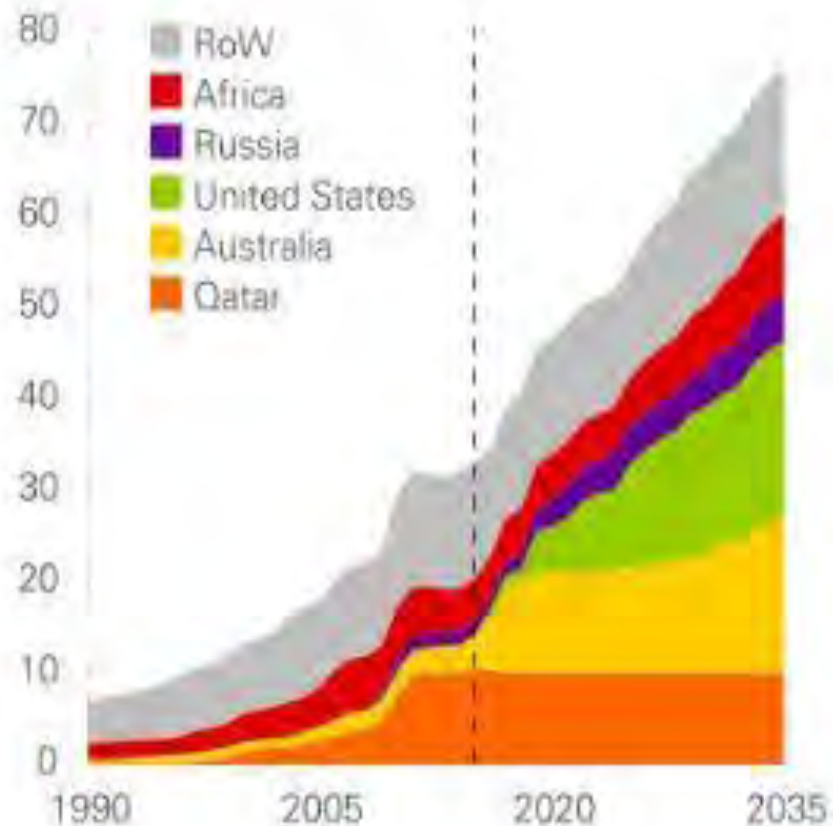
- LNG exports to be led from US, Australia, Qatar, Africa & Russia
- Asia will be the biggest destination for LNG
- Increased LNG availability is flattening global gas prices and is globalizing the gas market

BP in its Statistical Review of Energy Markets 2016 showed that:

- Global LNG market grew rapidly in 2016, but gas was muted
- Global LNG supplies set to increase by a further 30% by 2020
- A glut of LNG led to prices dropping up to 30% from 2015
- Prices will remain low for a long time, likely forever

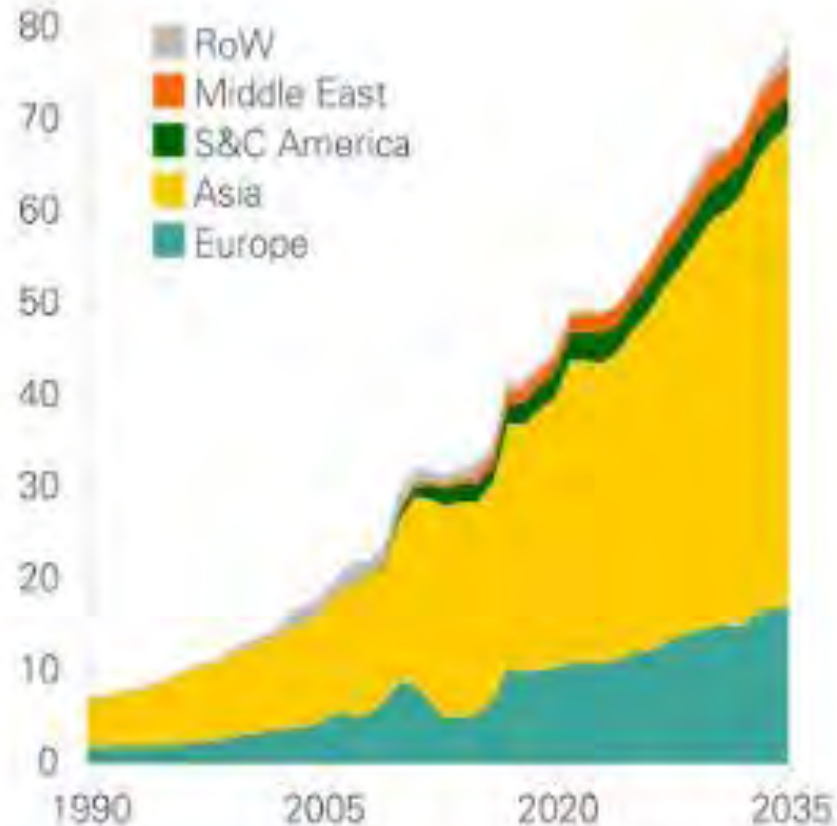
Key conclusion: A glut of LNG keeping prices low

LNG supply (Bcf/d)



Growth in global LNG supply is led by the US, Australia and Africa

LNG demand (Bcf/d)



Demand for LNG is rising; making gas is the fastest-growing fossil fuel among Asian economies

Global energy transition

IEA and IRENA issued a joint report in March on 'Perspectives for the energy transition':

- Achieving the 2degC goal requires emissions to peak before 2020 and fall by more than 70% by 2050
- Share of fossil fuels in global energy to fall, with 70% of global energy demand taken by low-carbon sources by 2050
- Oil to decline by 3.5%/yr and gas by 2.5%/yr and peak by 2030
- Will lead to permanent glut of supplies and stranded assets
- EC committed to 2degC – has increased emission target to 40% and renewables to 27% and is planning to enforce them

Key conclusion: Challenge to East Med gas exports to increase with time

Abundance of oil & gas resources

- Abundance of technically recoverable oil and gas resources
- Technically recoverable oil resources estimated at 2.6 trillion bls
- Slowing growth of oil demand between now and 2050
- BP estimates only 1.25 trillion bls oil will be consumed by 2050
- Similarly, IEA says that total remaining technically recoverable natural gas resources amount to at least 781 trillion m³
- Cumulative gas demand to 2050 estimated to be 155 trillion m³
- Only less than half of the known oil and gas resources will be consumed by 2050
- ***Outcome: The world is facing a long-term oil & gas glut and low prices***

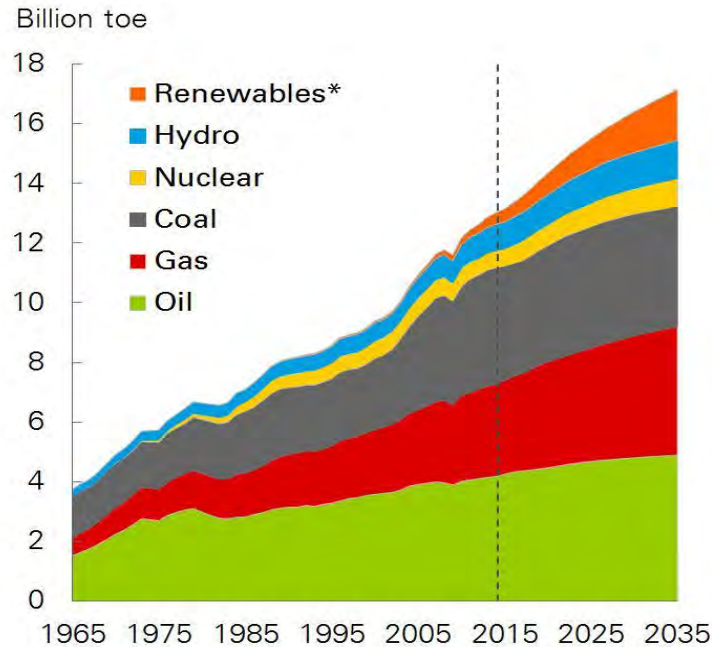
Global fuel mix transition

Base case: Primary energy

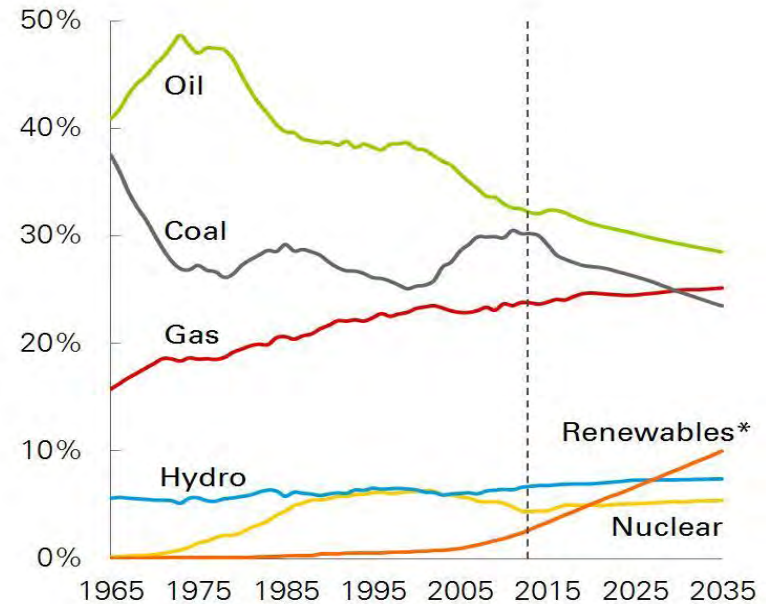


The gradual transition in the fuel mix continues...

Primary energy consumption by fuel



Shares of primary energy



*Renewables includes wind, solar, geothermal, biomass, and biofuels

The US LNG factor

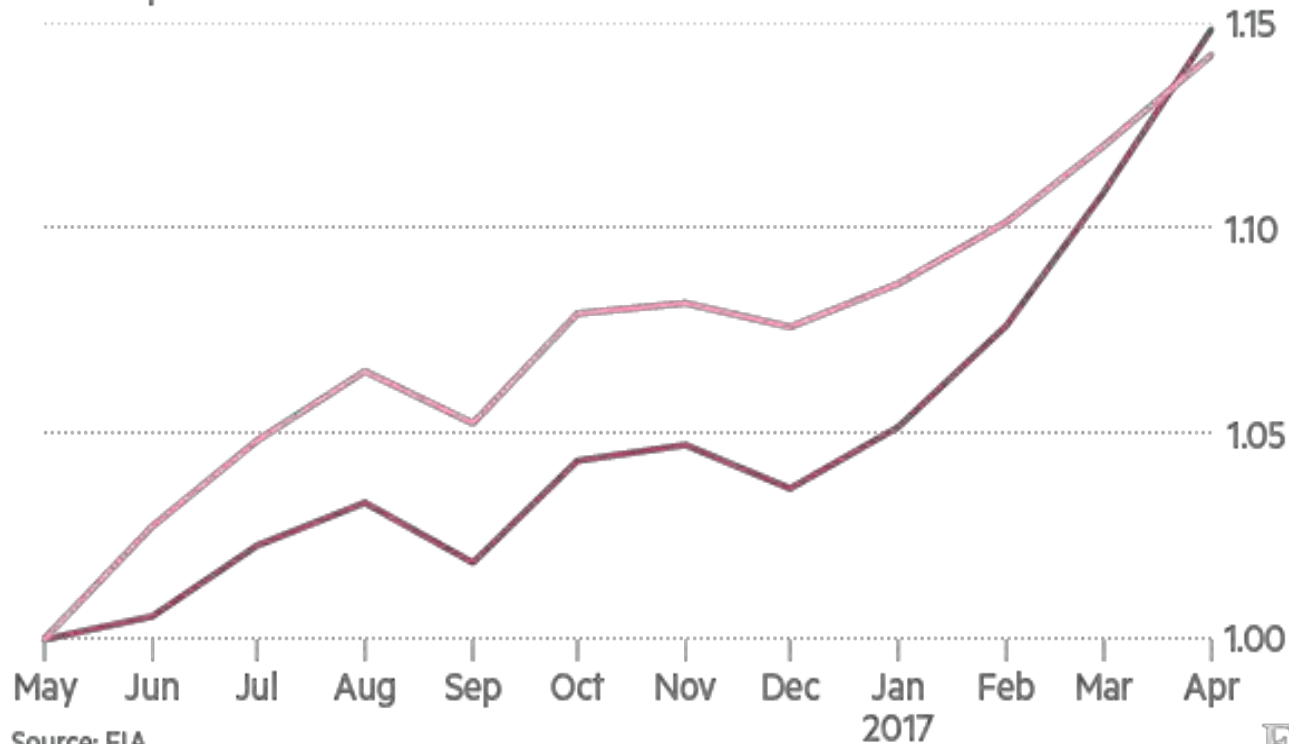
- Increasing shale oil produces associated gas at marginal costs
- US technically recoverable shale gas resources – 623 tcf
- Increasing US LNG exports impacting LNG contracts and trading
- DoE cleared 215bcm non-FTA LNG exports – 100bcm being built
- Will be providing a cap on LNG prices in Asia – similarly to what US shale oil is doing to the global oil market
- US LNG spot prices in Asia in the range \$5.50/mmBTU
- Cheniere Energy has no problems selling its LNG – started penetrating European markets
- President Trump supporting increasing US LNG exports
- ***Outcome: Substantial impact of US LNG on global markets & prices***

US shale gas production rises with oil

Permian Basin gas output rises with oil

Rebased from May 2016

- Oil production
- Gas production



Source: EIA

2017

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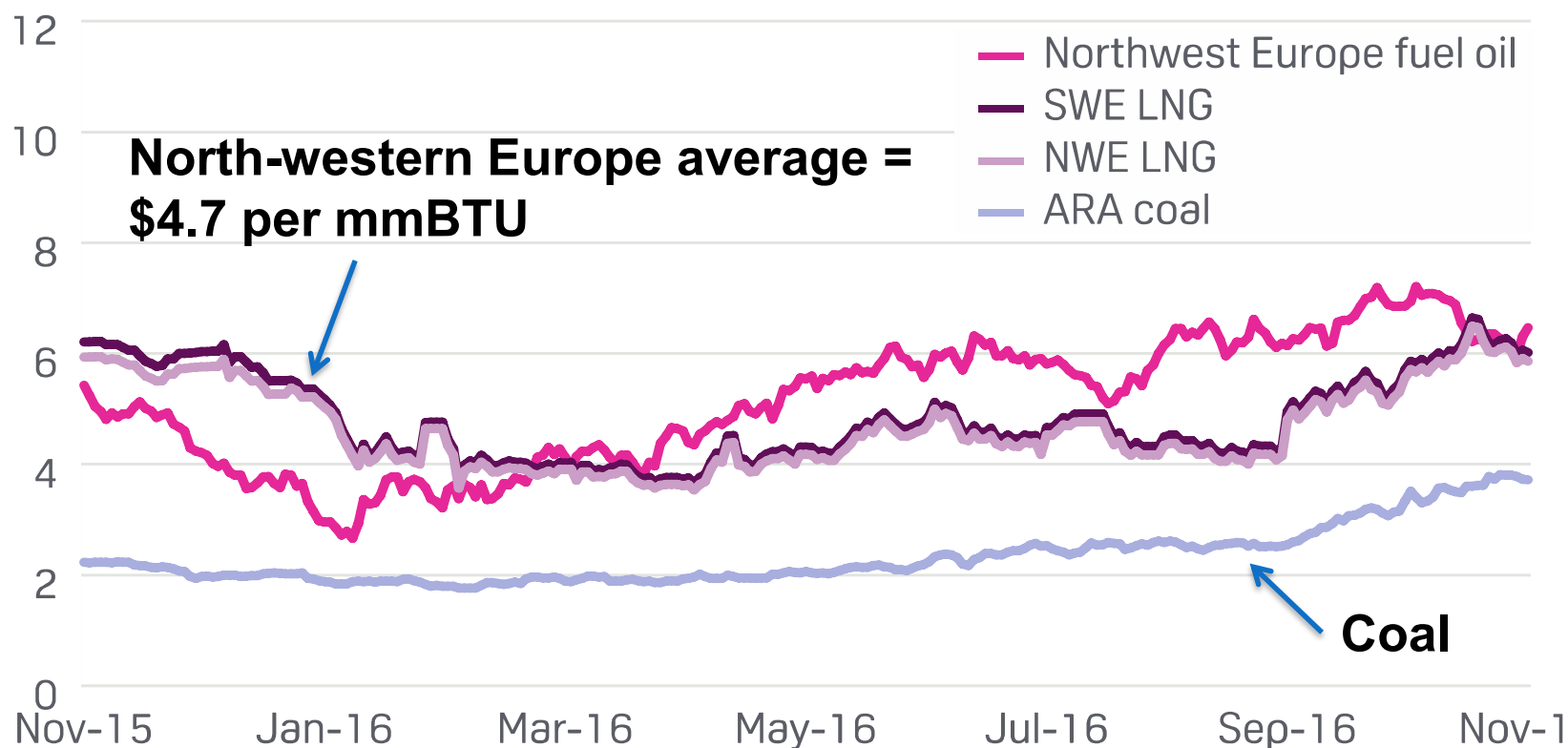
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Gas in Europe

- Overall EU gas demand increasing slowly at best at 0.5%/yr – down 20% from peak 10 years ago - It may have peaked already
- Key reasons are cheap coal and subsidized renewables
- But with depletion of indigenous gas, imports will grow
- In response Russian gas to EU increasing due to low price
- US LNG trying to get in but with limited success so far
- No prospect of low prices being reversed anytime soon
- Must remember that companies buy and sell gas for profit
- In North-western Europe average price in 2016 was \$4.7/mmBTU
- **Outcome: Costly to develop gas-fields dependent on exports to Europe may not secure such exports and may remain stranded**

European gas and coal prices

COMPETITIVE FUELS EUROPE (\$/MMBtu)



Source: Platts

Implications on global prices

- Fast-changing global energy landscape due to renewables
- Not all discovered oil&gas resources will be consumed by 2050
- Will lead to strong competition between producers to capture more limited markets – major impact from US shale
- Mostly less risky and cheaper resources in Middle East, Russia and US will be able to be developed and compete
- Low-cost producers will use their competitive advantage to increase their share relative to higher-cost producers
- Costly resources run the risk of remaining stranded
- ***Outcome: Prices are very likely to remain low for the longer term***

LNG prices and forecasts

Current LNG prices are:

- Europe NWE: \$4.75/mmBTU - Japan JKM: \$5.60/mmBTU

Average price forecasts over the next 20 years are:

- Europe NWE: \$5.50/mmBTU - Japan JKM: \$7.50/mmBTU

Allowance to be made of cost of shipping and regasification:

- Europe: \$1.50/mmBTU - Japan: \$2.50/mmBTU
- The challenge is evident
- ***Key conclusion: East Med gas has to work within these prices.***

East Med LNG exports and challenges

I will talk mostly about Israel and Cyprus

Egypt is well on the way to self-sufficiency in gas by 2018 and will be well placed to resume exports by 2021.

Prospects in Cyprus

- Drilling about to start – up to 12 wells planned to be drilled
- Block 11 – Drilling to start in July. Good indications for discovery of similar size to Aphrodite, ie 4-5 tcf gas
- Block 10 – Drilling planned for second half 2017. Has best prospects, for discovery similar to Zohr, ie 15-30 tcf gas
- Blocks 2, 3 and 9 – Drilling in January. Lower chances for gas discovery

Key conclusion: Cyprus has good chances to discover more gas

FLNG – Potential use in the East Med

Should pipeline options not materialise, FLNG may be an export option

- East Med deep-water gas fields – expensive to develop
- East Med FLNG comparable to ENI's Coral FLNG offshore Mozambique
- Coral FID - gas already bought by BP for export to Asia – price must be competitive in present environment

Observation: FLNG could be the game-changer in the development of East Med gas resources.

East Med LNG exports - The future

Collaboration key to developing East Med gas

- Must minimize costs from wellhead-to-export
- ExxonMobil + ENI discussing tie-up for block 10
- Total + ENI already in JV for blocks 6 and 11
- With more gas discoveries, a single JV with all players / gasfields key to minimize costs
- Single project, through subsea completions and pipeline tie-ups to new liquefaction trains to be built in Egypt's existing LNG plants may be the way forward

Conclusion: Only integrated LNG projects stand a chance to become financially viable and secure export markets. Even then it will be challenging.