

Global Oil and Gas

Global LNG: 2016 balances as demand kicks-in

Equities

Global
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2016 balances: The LNG market clears in an orderly fashion

We present our early snapshot of the 2016 LNG market. Like 2015, the global gas market was able to clear despite continuing fears of it moving to out of balance. In 2015, delays to new supply kept the market quite tight. 2016 saw a significant rise in new supply (~9%) but this was balanced by robust demand from existing large markets, strong growth from China and India and meaningful new demand sources especially in the Middle East. Of particular note, European imports were flat.

Robust demand

The increase in supply was entirely met with consumption increases in the Eastern Hemisphere. The core JKT markets were effectively flat while demand pull from China and India was likely aided by price effects but is also indicative of significant unmet potential that exists in these huge markets. Further, the continuing emergence of new countries to the list of LNG importers, facilitated by FSRU technology, confirms the dynamic nature of the demand side and the evolving nature of the global market.

Some interruptions to supply but market will continue to grow

As is invariably the case, supply disappoints in the short term but the new capacity adds are coming. Of more concern should be the absence of new investment, a trend mimicking the oil sector. The window for new supply in the early part of the next decade is now opening. There was only one new project sanction in 2016.

Continued prospect for med-term loosening but market breakdown unlikely

On the face of it the market is still moving into 'oversupply' for a period of 4-5 years (~9% against our bottom up demand estimates at its peak). In reality, the emergence of new demand and substitution in existing markets (perhaps facilitated by a period of lower spot prices) plus slower supply build-up (deliberate or more likely otherwise) will likely see the market clear. We note that each time we revisit our balances the scale and duration of the assessed oversupply reduces. Given this trend we don't see an obvious reason for a breakdown in the pricing of traded LNG in the way that has often been suggested. Our core view remains that as the market evolves, pricing and contract structures will change but the clear need for more capacity and the obvious global demand potential argues against a collapse in the market as some have argued.

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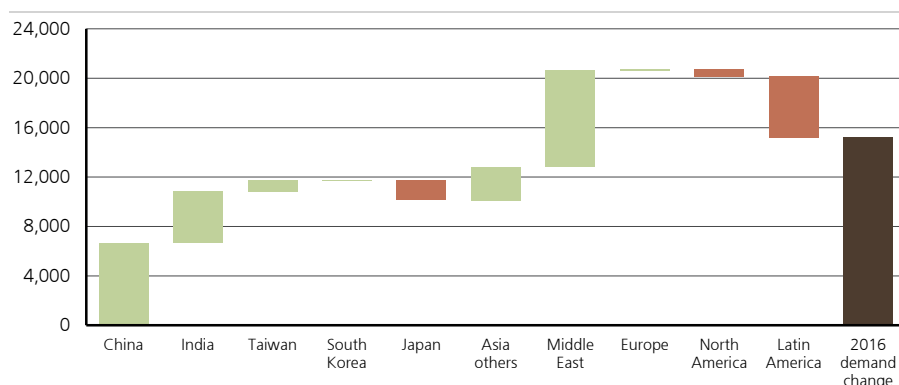
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Global LNG: 2016 balances as demand kicks-in

The numbers are in and the big news is that the global LNG market balanced in an orderly fashion - again. This runs contrary to a widely expressed view of a market tipping into disastrous over-supply. In 2015, the LNG market resisted being out of balance as the expected supply wave failed to materialise. In 2016, supply growth certainly came through although there were still the usual gremlins that meant projects were delayed or failed to hit expected production levels - but the big story was in consumption.

Our observation is that the supply-side is well understood (albeit views tend to be too bullish). Demand is less well analysed. This is because in the gas market consumers can only burn what is available to them. Consequently there is always risk that there is unmet demand. This appears to have been the case in global gas after 4 years of almost absent supply growth. Furthermore, the fall in the oil price which underpins the contract LNG market was quite serendipitous given the higher demand elasticity in natural gas.

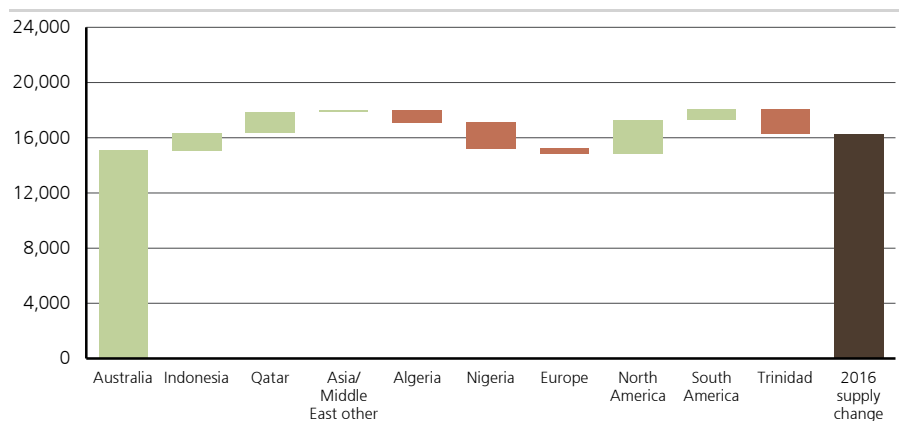
Figure 1: Global LNG demand 2016 vs 2015



China and India growth dominates part offset by LatAm. Japan declines but only marginally as nuclear reactors are slow to return. Europe barely features.

Source: UBS, IHS Waterborne

Figure 2: Global LNG supply 2016 vs 2015



As expected Australia contributes the largest slug of new supply and the US emerges as new player. Qatar exports have been at record highs, presumably compensating for low oil price. Western hemisphere stalwarts, Algeria, Nigeria and Trinidad record declines.

Source: UBS, IHS Waterborne

2016 review

Our model is based off the annual BP Statistical Review of World Energy LNG framework but the availability of 2016 trade data means we can close out early estimate of 2016 actuals. The market appears to have grown by ~9% with new supply growth dominated by Australia and consumption growth in Asia and the Middle East balancing this out.

Notable features on the consumption side:

- The 'collapse' in Chinese consumption failed to materialise. Indeed, imports rose by a whopping 33%. This appears to have been helped by a combination of cold winters, pricing reform in petroleum and coal and cuts in investment in the domestic oil and gas industry. Chinese policy and consumption patterns have been opaque and 2016 has seen some very unusual import spikes. However, it is worth noting that there remains ample import regas capacity (2016 utilisation was ~60%), China didn't actually import its full contracted volumes (although it's worth noting that some of this wasn't actually produced) but importantly the volume imported makes up only <20% of annual Chinese gas consumption.
- India has emerged as an important new market. Both India and China have significant air quality issues which suggest that the use of natural gas for power consumption isn't a strictly economic one. That said, we suspect that India, to an even greater degree than China, is price sensitive, and the fall in the oil price was helpful. A test will be whether appetite for more gas would survive a spike in the underlying oil price. India like a lot of the other emerging demand centres is an example of why the pricing of gas/LNG probably needs to change and become more flexible. A further constraint on Indian growth in the near term is likely to be import capacity and our forecast has volumes bumping up against forecast nameplate. There are plans to more than double import capacity out to 2020 but the Indian market is vulnerable to delay in infrastructure build-out.
- The slow return of nuclear reactors to service in Japan meant that this important market, the world's largest, barely declined. 5 reactors have been cleared by the regulators to resume operation although as of 4Q16 only two were in operation. We continue to forecast the return of >20 reactors by 2020 with a consequent drop off in LNG consumption, but this forecast must be increasingly doubtful. The shutting of nuclear reactor capacity in South Korea in 2H16 was also supportive to LNG demand running into the end of the year.
- The Middle East has consolidated itself as a major source of demand growth. On face value this may seem odd. The Middle East is the centre of the oil world and has some very important LNG exporters. However within the Gulf (Kuwait, UAE) imported gas can substitute out crude for export while in Egypt there is a temporary shortfall in domestic gas production allied to tremendous demand growth (including the forthcoming Egyptian power Megaproject).
- In recent years Latin America has been an important source of incremental demand. This has subsided in 2015 and 2016 especially as Brazil has seen better hydro conditions and a weak domestic economy. The size of the Brazilian market and the scale of the country do mean however that it is likely to remain a likely source of new FSRU/power projects for various cities.

- Conventional wisdom is that Europe is the market of last resort. This is because it has a large demand base, ample import facilities and a liquid hub facilitating price discovery. In effect, one can see it as the canary in the coalmine for the health of the global LNG market. If indeed that is the case then the global market remains in ok shape. Imports into Europe were being flat y/y in 2016. Our view is that insipid domestic economic growth, renewables, and ineffective carbon pricing (outside of the UK) mean little requirement for incremental LNG, until domestic production declines really have an effect in the 2020s.

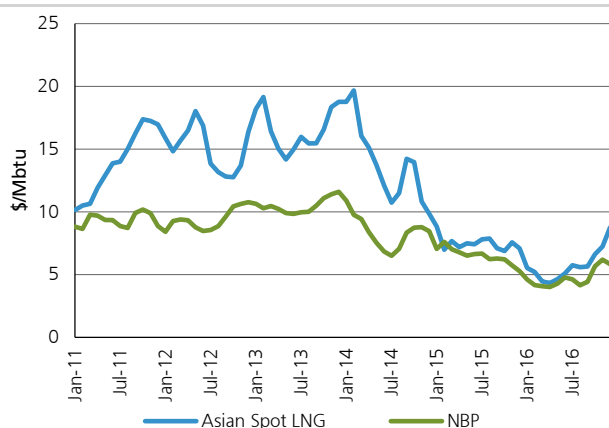
Notable features on the supply side:

- Australia recorded a significant uptick in supply as the CBM projects continued to ramp up and Gorgon got started. APLNG and GLNG have ramped up slower than BG/Shell's QCLNG and Gorgon's start-up has not been smooth, however. T2 at Gorgon came on in 4Q 16 and the third train is due on around mid-2017.
- Qatar exported a record level of LNG in the year, likely compensating for the lower oil price and gas price it was facing.
- There were declines at two of the Atlantic Basin's supply stalwarts. Nigeria has been hit by deteriorating security conditions in the Niger Delta. In Trinidad, a shortfall in gas production is impacting LNG. Also, noteworthy, Angola LNG registered very few cargoes in 2016 and the concern must be that this complex project never reaches its full design capacity.
- 2016 saw the start-up of the first exports from the US Gulf of Mexico projects with Sabine Pass start T1 in beginning to export LNG in May and T2 completed in September. Latin America has taken the largest proportion of Sabine exports (Shell has a Henry Hub based import contract into Chile) while other cargoes have found their way into Asia (facilitated by the enlarged Panama Canal), Europe and the Middle East.

Pricing

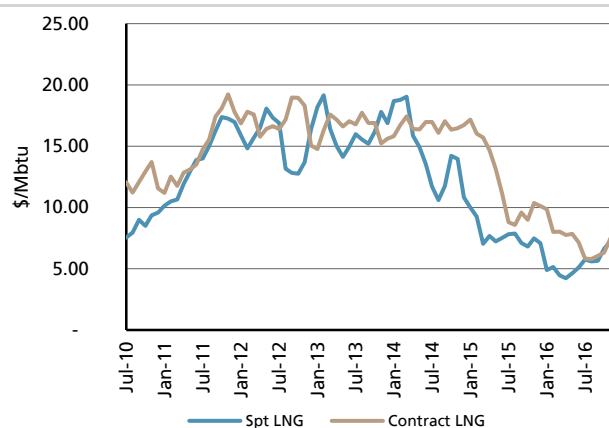
Spot pricing appears to have followed the oil indexed tracker suggesting no obvious breaking down of the relationship even as supply has risen. There has been no obvious arb of Asian gas into Europe suggesting demand remains robust.

Figure 3: Asian spot and European hub gas prices



Source: UBS

Figure 4: NE Asian spot and estimated contract prices



Source: UBS, Reuters

Updated outlook

We have re-cast our global supply/demand balances. There are a number of markets we need to conduct further work on as full data becomes available given their importance (Japan, China, India, Europe) but the trajectory continues to be one of loosening towards 2020/21 maxing out at a theoretical 9-10% of the market and a speedy tightening from then absent new supply sources. In addition, the theme of the amplitude and duration of the over-supply reducing on each revisit to the balances remains the case. In reality, the market will clear by way of further demand emerging or by lower spot prices/imports into Europe. Important to note is that large scale new supply for LNG requires 4-5 years construction time so the window for contracting and sanctioning new supply is already beginning to open. The risk is that if no meeting of minds can be reached on a pricing structure sufficient to offer developers a return, then the market moves to under-supply. Only one project reached FID in 2016 – Tangguh T3. Interestingly, as we have previously discussed, at a \$70/bbl oil price and \$3-\$4/Mbtu we think the incentive to build US export or new international greenfield is quite finely balanced.

Figure 5: Global LNG supply/demand (BCM)

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E
Australia	25	26	28	30	32	40	61	75	99	111	110	110	108	109	113	118
Other Asia Pacific	87	92	86	86	89	94	100	97	101	102	105	110	113	116	127	142
Middle East	101	130	131	134	131	126	130	124	126	129	128	128	128	128	128	128
Atlantic Basin	84	80	78	70	73	72	71	78	91	123	152	172	179	190	200	206
LNG supply	296	328	323	320	324	332	363	375	417	465	495	520	528	543	567	594
Memo: (M tonnes)	216	239	236	234	237	242	265	273	304	339	362	380	386	396	414	433
y/y (%)	22%	11%	-1%	-1%	1%	2%	9%	3%	11%	11%	7%	5%	2%	3%	4%	5%
LNG consumption																
Japan	93	107	119	119	121	118	115	109	106	106	106	107	108	109	111	112
South Korea	44	49	50	54	51	44	47	44	45	46	46	47	48	49	50	51
Taiwan	15	16	17	17	18	19	21	21	21	22	22	23	23	24	24	25
JKT	153	173	185	190	190	180	182	174	173	173	175	177	180	182	185	188
China	13	17	20	25	27	26	37	36	47	56	60	63	63	68	73	77
India	12	17	21	18	19	22	28	32	36	42	47	49	52	53	55	57
M East (incl. Egypt)	3	5	5	5	6	14	24	20	19	19	18	17	16	16	16	17
Other E Hemisphere	5	5	7	14	15	19	29	31	42	54	67	71	78	86	88	89
Eastern Hemisphere	186	216	237	251	257	262	300	293	317	344	366	376	389	407	418	427
y/y (%)	21%	16%	10%	6%	2%	2%	15%	-2%	8%	9%	6%	3%	3%	5%	3%	2%
US	12	10	5	3	2	3	2	2	2	2	2	1	1	1	1	1
Europe	88	91	69	51	52	55	52	63	62	63	64	75	87	123	135	149
Other Atlantic Basin	12	14	16	20	22	19	14	17	19	21	22	23	24	24	24	24
Western Hemisphere	112	115	91	74	76	77	68	83	82	85	87	99	112	148	160	174
	298	331	328	325	333	338	368	375	400	430	454	476	501	554	578	601
re-exports	-	3	4	5	9	7	-	-	-	-	-	-	-	-	-	-
Consumption	298	328	324	320	324	332										
Balance/re-export etc	-1	-1	0	0	0	0	-5	-1	17	35	42	45	28	-11	-11	-7
Balance (%)						0%	-1%	0%	4%	8%	9%	9%	5%	-2%	-2%	-1%

Source: UBS, BP Statistical Review of World Energy

Figure 6: LNG export currently under construction

Region/country	Project	Operator	Start-up (UBSe)	Capacity (Mtpa)
Atlantic Basin				
Cameroon	GoFLNG	Perenco	2018	2.4
Russia	Yamal T1	Novatek	4Q 2017	5.5
United States	Sabine Pass 3-4	Cheniere	2H 2017	9.0
United States	Sabine Pass 5	Cheniere	2019	4.5
United States	Elba Island Phase 1	Kinder Morgan	2018	1.5
United States	Elba Island Phase 2	Kinder Morgan	2018	1.0
Russia	Yamal T2	Novatek	4Q 2018	5.5
United States	Freeport T1/2	JV	2019	9.2
United States	Freeport T3	JV	2020	4.6
United States	Cameron LNG Tr 1/2	Sempra/GDF/Mitsui/Mitsubishi	2018	8.0
United States	Cameron LNG Tr 3	Sempra/GDF/Mitsui/Mitsubishi	2019	4.0
United States	Cove Point	Dominion Resources	2018	5.3
United States	Corpus Christi Tr1-2	Cheniere	2019	9.0
Russia	Yamal T2	Novatek	4Q19	5.5
				75.0
Asia Pacific				
Malaysia	MLNG T9	Petronas	1Q 2017	3.6
Malaysia	PFLNG 2	Petronas	2020	1.5
Australia	Gorgon T3	Chevron	3Q 2017	5.0
Australia	Ichthys T1	Inpex	4Q 2017	4.2
Australia	Ichthys T2	Inpex	1Q 2018	4.2
Australia	Wheatstone T1	Chevron	4Q 2018	4.45
Australia	Wheatstone T2	Chevron	2Q 2018	4.45
Australia	Prelude FLNG	Shell	2Q 2018	3.6
Indonesia	Tangguh T3	BP	2020	3.8
				34.8
				109.8

Source: UBS

Figure 7: Current FSRU import facilities and projects under construction

Project Name	Country	Sponsor	Capacity (Mtpa)	Start-up	Ship
Existing					
Northeast Gateway	USA	Excelerate Energy	3.80	Feb-08	Excelerate NE Gateway
Bahia Blanca GasPort	Argentina	ENARSA,Excelerate, Energy,YPF	3.80	Jun-08	Excelerate Excelsior
Pecem	Brazil	Petrobras	1.90	Jan-09	Golar Winter
Baia de Guanabara	Brazil	Petrobras	6.00	Jul-09	Excelerate Experience
Mina Al-Ahmadi	Kuwait	KNPC, GolarLNG	4.90	Aug-09	Golar Igloo
Dubai LNG	Dubai	DUSUP	3.00	Nov-10	Golar Freeze
GNL Escobar	Argentina	ENARSA,YPF	3.80	May-11	Excelerate Exemplar
Nusantara Regas Satu	Indonesia	Pertamina60%, PGN40%	3.00	May-12	Golar Nusantar Regas Satu
Hadera Gateway	Israel	Israel Natural Gas Lines	2.00	Jan-13	Excelerate Excellence
Sungai Udang Regas	Malaysia	PETRONAS	3.80	May-13	MISC
Tianjin LNG	China	CNOOC	2.20	Nov-13	Hoegh GdF Suez Cape Ann
OLT Offshore LNG Toscana	Italy	E.ON, IREN,ASA, OLT Energy Toscana	2.70	Dec-13	FSRU Toscana
TRBA Salvador	Brazil	Petrobras	3.80	Jan-14	Golar Winter
PGN FSRU Lampung	Indonesia	PGN	1.90	Jul-14	Hoegh PGN FSRU Lampung
Lithuania LNG	Lithuania	Klaipedos Nafta	3.00	Dec-14	Hoegh Independence
Port Qasim	Pakistan	Engro Corporation,IFC	3.80	Mar-15	Excelerate Exquisite
Ain Sokhana 1	Egypt	EGAS	4.20	Apr-15	Hoegh Gallant
Ain Sokhana 2	Egypt	EGAS	5.70	Oct-15	BW Singapore
Al-Sheikh Sabah LNG	Jordan	Aqaba Development Corporation	3.80	Apr-15	Golar Eskimo
Bali Regas	Indonesia	Pertamina	0.40	Apr-16	
Etki LNG	Turkey	Engie	5.30	Dec-16	Hoegh Neptune
SPEC LNG	Colombia	Promigas51%,BarulInvestment49%	3.00	Dec-16	Hoegh Grace
Malta LNG	Malta	Electro Gas Malta	0.50	Jan-17	
Under construction					
GasPortn	Pakistan	PGPC	3.00	2017	BW
Bahrain LNG(FSRU)	Bahrain		6.00	2018	Teekay
Ghana LNG	Ghana	West Africa GasLtd (NNPC60%,Sahara Energy40%)	3.80	2018	Hoegh
Aguirre GasPort (FSRU)	Puerto Rico	Excelerate	3.80	2018	Excelerate
GNL de Este	Dominican Rep	BWGas, Coastal Petroleum,Interenergy, Ipson,Promigas	1.80	2017	BW
GNL De IPlata	Uruguay	Gas Sayago	2.70	2017	Mitsui
Penco Lirquen	Chile	Cheniere	4.00	2018	Hoegh
Kaliningrad LNG	Russia	Gazprom	8.90	2017	Gazprom
Jaigarh LNG	India	H-Energy	4.00	2019	TBC
Kakinada LNG	India	VGS,Exmar	4.50	2019	Exmar

Source: UBS

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