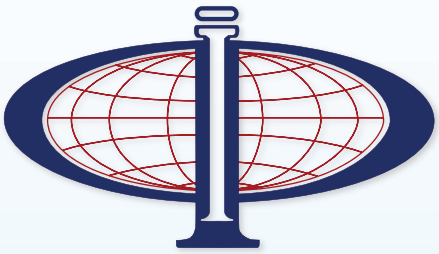
LPG IN WORLD MARKETS

A Monthly Report on International Trends in LPG

February 2015



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MONTHLY REVIEW

Global LPG trade rising, but low crude prices may curb US exports

The development of international LPG trade in 2015 hinges on the level of US exports. These could be anything between 16 million tons and 20 mm t depending on US-Europe and US-Asia arbitrage. The lower figure represents Poten's assessment of the contracted volumes to which US exporters are committed for 2015. The higher figure assumes a vibrant spot business on top of these contracts.

For much of Q4 2014, spot-based arbitrage from the US Gulf to Europe and Asia was uneconomic on a flat price basis (although exporters had hedged, so business was in fact still profitable). If Brent crude oil prices remain under $60 per barrel through 2015 and LPG values maintain a historically "normal" relationship with crude, then the price differentials between the USA and other regions will probably be too low for sustained spot arbitrage activity.

Just recently a spike in Asian LPG prices caused the US-Asia spot arbitrage window to re-open after several months of closure, but market sentiment is that such high US-Asia price differentials are not expected to last for long. In that case, most of the US exports in 2015 would be contractually-committed – since exporters are understood to have hedged through 2015, these should still be economically viable. As a result international trade in 2015 will increase, but not to the extent once envisaged. Poten forecasts that total seaborne exports will reach 80.2 mm t in 2015, a 3.0 mm t increase on the 2014 level. One third of that rise will be in greater exports of LPG going from West to East of Suez, set to rise from 5.4 mm t to 6.4 mm t in 2015 and thereby representing 8% of total international trade.

The US is, however, not the only region likely to increase exports in 2015. The Arabian Gulf is forecast to grow by around 1 mm t where, in particular, Poten expects more LPG out of Abu Dhabi, Kuwait and Iran. There may also be higher exports out of West Africa if Angola finally gets its new LNG plant operating properly towards the end of 2015. On the other hand, European exports are expected to decrease overall, with lower North Sea producer exports offsetting higher ex-Russia volumes. The majority of the increased global exports will go to Asia, which is forecast to see its imports rise from just over 43 mm t to 45.5 mm t. Imports into the Med and Latin America are also expected to rise. Within Asia, it is China and India looking most likely to show high growth – in China this is highly dependent on the start-up and operation of still more new propane dehydrogenation (PDH) facilities; in India it is the development of the rural LPG market that leads the way, although the size of this Indian growth increase will depend on the government's approach to subsidies. Thai imports may also expand, spurred on by high autogas demand growth, but here the withdrawal of government subsidies – if fully implemented – could have a dampening effect on retail market demand. The same proviso could also apply in Indonesia.

In this low US export scenario there is one major conclusion: the amount of LPG needing to be priced into flexible crackers across Europe, Japan, Korea and Taiwan will show little change from 2014. If, on

LPG Regional Trade Balance 2015

Figures in mmt

Exporter	Importer												Total	
	AG		Asia		W. Africa		Med		N. Europe		Lat Am			
AG	0.6	-0.1	34.9	+1.8	-	-	0.0	-0.7	-	-	-	-	35.6	+1.1
Asia	-	-	4.0	-0.2	-	-	-	-	-	-	-	-	4.0	-0.2
N. America	-	-	4.6	+1.6	0.3	0.0	1.1	+0.2	2.3	0.0	7.8	+0.3	16.1	+2.1
W. Africa	-	-	1.7	-0.1	0.4	0.0	1.4	+0.2	-	-	-	-	3.5	+0.1
Med	-	-	0.1	-0.5	-	-	11.4	+0.7	0.1	0.0	-	-	11.6	+0.2
N. Europe	-	-	0.0	-0.3	-	-	1.3	0.0	6.8	0.0	-	-	8.1	-0.3
Lat Am	-	-	0.2	0.0	-	-	-	-	-	-	1.2	0.0	1.4	0.0
Total	**0.6**	**-0.1**	**45.5**	**+2.4**	**0.7**	**0.0**	**15.2**	**+0.4**	**9.2**	**0.0**	**9.0**	**+0.3**	**80.2**	**+3.0**

Increase from 2014 | Decrease from 2014

No change from 2014 | — No significant trade

the other hand, US export volumes are above the 16 mm t level, it will be in effect these crackers that will have to absorb the additional material, once given the necessary price incentive.

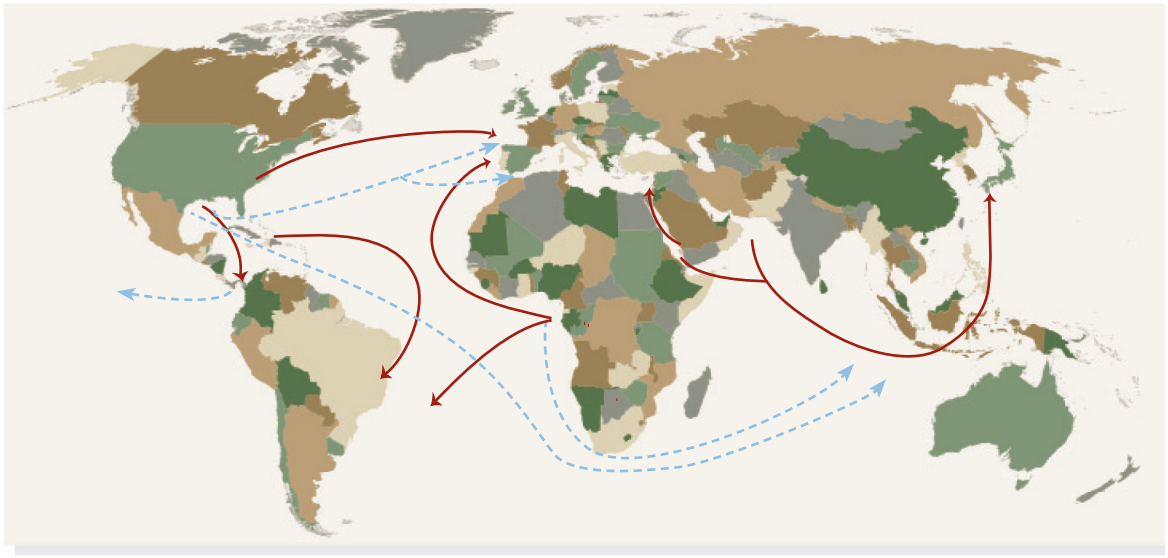
The overall change in West-East trade is of course essentially due to greater US exports, within which we also assume that US exports to Europe/Med/West Africa are up slightly from 2014 while exports to Latin America continue to rise. The actual final destination of US LPG exports will however be determined to a large extent by the particular netbacks on offer.

Our preliminary estimates for 2014, the full year just past, show the largest exporting region remained the Arabian Gulf, accounting for an estimated 45% of all exports with the majority of LPG from the AG going to Asia (96%). Of the total 34.48 mm t of AG exports, Qatar and Abu Dhabi accounted for 10.4 and 9.6 mm t respectively.

Shale developments in the US during 2014 significantly increased exports from there, with total US exports for the year estimated to be around 14 mm t, 5.2 mm t higher than in 2013. Trade between North America and Latin America increased, as well as from North America to Northern Europe, mainly at the expense of West Africa. As a result, West Africa moved more shipments east through 2014.

Poten estimates that Latin American imports from North America increased 32% from 2013 to 2014. US exports to the Med are also up, backing out imports from Northern Europe. Med (Algerian) exports also grew in 2014, resulting in part in more shipments to Med region importers – Turkey alone has seen imports from Algeria increase 38% year-on-year from January through November 2014. But a large part of this Algerian export increase also had to move east.

DIRECTION OF TRADE



Including those vessels loading product via STS shipments, Poten counts 15 VLGC-sized cargoes moving from West to East-of-Suez destinations in January.

Middle East

Demand was more visible for FOB cargoes, with at least six recorded large cargo transactions – Tasweeq and Bayegan looked to have awarded two tenders apiece. Saudi Aramco started the year off by significantly cutting January CP prices, down to $425/t for propane and $470/t for butane.

NW Europe

There were no VLGCs seen loading in the North Sea in January. Towards the end of the month, however, the LGC *Pazifik* was steaming for Kaarsto and understood to be loading early February for a Mediterranean discharge.

North Africa

Four Algerian large cargoes loaded at Arzew last month, with the Statoil-operated *Clipper Posh* the only one of the four to move outside of the Med, heading instead to Japan. The VLGCs *Djanet* and *Reganne* made familiar trips to Morocco and Turkey respectively while the LGC *Hassi Messaoud 2* called first at Lavera and then at Algeciras, Spain.

West Africa

There was a notable pick-up in activity for West African cargoes, with a total of 6 VLGC-sized cargoes loading in January:

Indicative Arbitrages - January					
Spreads ($/t)	Propane	Butane	Freight ($/t)*	Propane arb	Butane arb
USGC FOB - CIF ARA	3	-60	55	-52	-115
USGC FOB - Far East	141	105	148	-7	-43
AG Spot - CFR Far East	60	45	72	-12	-27
WAF Netbacks					
NW Europe	324	374	58		
Far East	375	388	112		

*Indicative freight assessment basis VLGC-sized vessels

- the *Hellas Glory* loaded the only Angolan cargo of the month and is currently bound for the Far East;
- the *British Commerce* and *BW Broker* are also heading for an Asian discharge, having loaded respectively at Bonny and Escravos earlier in the month, and both now having navigated past the Cape of Good Hope;
- the *BW Vision* loaded an evenly-split cargo and hit the Chinese port of Raoping early in February;
- meanwhile the *Reimei* is destined for Teluk Semangka in Indonesia according to ship tracking software;
- and having discharged a further Bonny cargo in Dortyol, the *Fritzi N* was the only ex-WAF VLGC not to have travelled to the East last month.

North America

For all the rumours circulating of US cargoes being cancelled, January's schedule was busy throughout with some 22 VLGC- or LGC-sized cargoes being lifted direct to their final destinations. On top of this, a further four VLGC-sized cargoes were seen being transferred via STS operations south of the Panama Canal, all four subsequently destined for either Japan or China. The *Clipper Sirius* discharged into the *Aurora Capricorn* which subsequently headed to Japan while the *Ronald N* discharged into the *Manifesto,* which is headed to Japan. Meanwhile the VLGCs *Gas Capricorn* and *Hellas Argosy* were both due in China having also picked up STS shipments.

Shell's Nederland terminal has loaded its first cargo onto the Captain Markos NL, however although the vessel is understood to be due to discharge in North West Europe, ship-tracking data suggests that she is still berthed at the Sunoco facility. She is next expected in Kaarsto between 8-10 February to load a Statoil cargo.

From the US Gulf, there was increased traffic heading for Asia. There were five VLGC movements to the East but only three movements to North West Europe, one less than last month:

- the *BW Cedar* moved a full propane cargo from Enterprise's terminal and is headed for an as-yet unknown destination in the Far East;
- the *BW Maple* is also bound for the Far East, and most probably Japan, having loaded a second propane cargo out of Enterprise for Astomos Energy;
- while December saw slightly lower overall imports LPG into China in December – just over 700kt compared to 750kt in November – exports setting off from the US to China meanwhile increased last month with the *Morston*, the *Yuyo Spirits* and *Yuricosmos* all now scheduled to arrive between the end of February and the first half of March.

In the LGC segment, the *BW Nantes* travelled through the Panama Canal and sailed to Taiwan where it is thought to have discharged a propane cargo. Of the smaller vessels travelling to destinations outside of the US or Latin America, the *Excalibur* (ex-Chesapeake) and the *Polar* together moved close to 25,000 tons of butane to Morocco. The semi-ref *Navigator Mars* and the *Waregem* travelled to Nigeria and Angola respectively while Sahara Energy fixed the *Mathraki* to hit Togo – a total of around 50,000 t of LPG between the three vessels.

PRICES

		November		December		January	
CONTRACT ($/t)		**Propane**	**Butane**	**Propane**	**Butane**	**Propane**	**Butane**
Middle East	Saudi Aramco (1)	610	600	550	570	425	470
North Africa	Sonatrach (2)	545	535	440	515	340	380
NW Europe	North Sea (OPIS) (3)	544	545	466	518	339	348
SPOT ($/t)		**Propane**	**Butane**	**Propane**	**Butane**	**Propane**	**Butane**
		November Averages		December Averages		January Averages	
Middle East	FOB cargoes	582	582	427	458	396	428
	FOB premium (4)	-5	-5	-10	-10	-10	-10
Japan	CFR cargoes	648	648	487	500	456	473
	CFR premium (4) (5)	49	49	37	37	55	55
West Med	CIF cargoes	521	553	379	438	318	313
NW Europe	CIF cargoes	519	545	382	432	318	308
USGC	Mt Belvieu (c/gal)	80	107	55	75	48	69
	Export FOB cargoes	484	538	351	394	315	368

Naphtha ($/t)		November Averages	December Averages	January Averages
Japan		672	530	428
NW Europe		630	492	398
Mt Belvieu	(c/gal)	178	133	132

Indicative Arbitrages - January Spot Averages			
($/t)	**US**	**Europe**	**Far East**
Propane vs Naphtha		-80	28
Butane vs Naphtha		-90	45
Propane vs Butane	-53	10	-17

Notes

(1) CP for lifting Arabian Gulf and Yanbu. Kuwait (KPC), ADNOC (Abu Dhabi) and QP (Qatar) have established similar FOB prices.

(2) Prices FOB Bethioua. Skikda prices for propane $5-7/t higher.

(3) Source: Oil Price Information Service (OPIS) +1 301 287 2645

(4) CP basis (resale cargoes).

(5) CFR Japan basis. Large -cargo spot sales CFR elsewhere East, with adjustments, may be used where they are market-representative and no sales CFR Japan have been noted.

Market Values

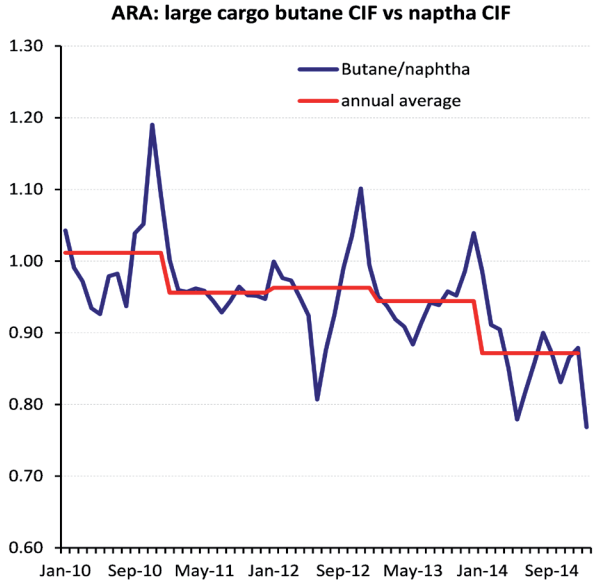
CIF ARA butane back on the ropes again

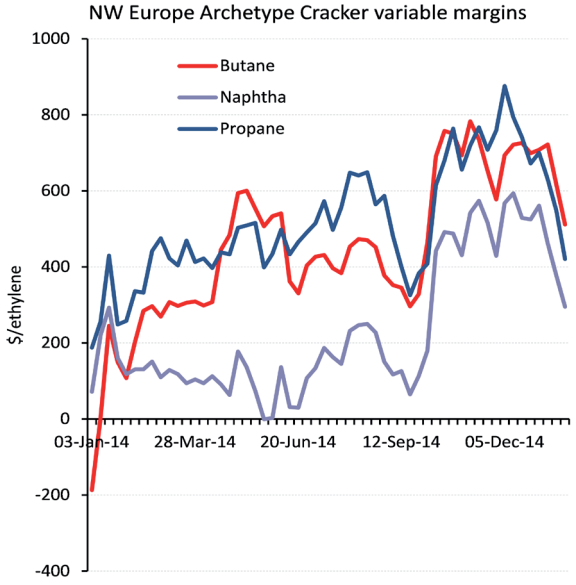
Large cargo butane prices in NW Europe have been particularly depressed through January. The butane/naphtha ratio started the month at 0.84 and fell to 0.7-0.75 in mid-month before recovering to just under 0.8 by end-month, with the monthly average coming in at 0.77. In comparison, the lowest monthly average seen across 2014 was 0.78 in May, just prior to the Ramadan spike in North African demand pulling up butane values around the Atlantic basin – and as this was already, at the time, the lowest monthly butane value versus naphtha seen since at least the start of this century, January this year has obviously been plumbing such historic depths once again. At the end of May last year, we surmised that "CIF ARA butane weakness seems structural" (*see LPGWM June 2014*), and notwithstanding the rebound in butane values versus naphtha that followed on from there through much of the rest of 2014, the same structural factors seem to be reasserting themselves with a vengeance once again.

The weakness of the NW European butane market in January appears to stem, as it did last May, from the amount of supply available into the area versus potential demand for the same. On top of an average 280,000 tons per month of supplies from North Sea gas separation plants and NW European refineries, there is an increasing amount emerging from Sibur's Ust-Luga export terminal in the Baltic (*see also NW Europe section this issue*). Reports indicate that through the fourth quarter of 2014 about 30,000 tons per month was exported from here, but through January and the first couple of days in February alone it looks as if NW European ports have imported perhaps as much as 58,000 tons of Sibur's Russian butane. On top of that, there were also understood to have been imports of around 20,000 tons from Algeria since the start of this year. Last year there were, on average, also about 15,000-20,000 tons per month into NWE from the US, however there looks to have been nothing like that over the past three months.

Historically, the NW European butane market has been structurally long, with this length worked off through regular exports to the Mediterranean and, in the past. to Asia and the Americas. These latter two markets have now been more or less lost to US product but, as of 2014, Poten estimates that perhaps 60,000 tons per month of NWE butane still went to the Med. However, even that market is now under threat from US exporters – who moved at least 60,000 tons per month, on average, into the same region through last year.

So, with export opportunities outside the region now more limited, more North Sea/refinery butane produced within NW Europe has had to seek out fresh demand on its own doorstep – even as additional supplies from Ust-Luga and elsewhere increase the challenge. The resulting low butane to naphtha ratios have however encouraged greater butane use in flexible steam crackers and in gasoline blending, with Poten's archetype NW European cracker analysis showed butane as a better feed than either propane or naphtha through January. Although gasoline and retail uses are the largest butane demand outlets by volume, steam cracking offers the greatest potential for actually *expanding* demand. But here, butane must compete with propane as well as naphtha and that may well require butane/naphtha ratios below 0.8.





Our NWE cracker model shows that across 2014, butane was the second-best such feed (behind propane) except for May. Adding that evidence to its margin superiority in January, it could indeed be argued that dropping the butane price to 0.77-0.78 versus naphtha is recommended if you want to clear a butane market overhang through steam-cracking. It also helps if the pro-nap spread isn't too wide itself meanwhile, as has indeed been the case through January. But nevertheless, butane and propane cracking margins were more or less at parity through the October to mid-November period last year, when the butane/naphtha ratio was in the 0.82-0.83 range.

SHIPPING

January VLGC (78,000 cbm) Rate Assessments	
TC Rate $'000/month	**Spot AG/Japan ($/t)**
1950	71-73

Time-Charter Rates

The average short-term monthly rates for a time charter are assessed as follows:

Short-term Charter-Hire Rate January 2015	
VLGC	
78,000 cbm	$1,950,000/month
Other FR	
57,000 cbm	$1,565,000/month
38,000 cbm	$1,050,000/month
24,000 cbm	$950,000/month
Semi-Ref	
20,000 cbm	$875,000/month

The charter hire rates above are based on standardized assumptions as to vessel performance (bunker consumption, steaming speed etc). See appendix for further notes.

Market developments

January naturally got off to a quiet start after the Christmas period but activity soon picked up as market players seemed somewhat caught out by a list of requirements that absorbed much of the length witnessed at the end of December. By mid-month another round of spot fixtures saw the market tighten significantly and the Baltic shot up accordingly, reaching a peak of $87.4/t by 26 January. After this initial rush, however, a period of slightly softer sentiment ensued as Indian charterers cooled off with their requirements and traders seemed to have their positions more or less covered well into February.

Trade in the East was solid throughout the month off the back of an improved product market which in turn worked to keep shipping markets firm. In the West, despite plenty of enquiries a degree of caution was exercised as a number of vessels on subjects were dropped and rumours of cargo cancellations persisted. By the end of the month spot rates in the East were in fact trading at a premium to the West although in such a delicately-poised market just one or two confirmed fixtures will be enough to swing the balance once more.

Finance

Following in the wake of similar financing deals by both Dorian LPG and Avance Gas, Navigator Gas has secured a $278 million loan to fund nine of their semi-ref 21,000 cbm vessels, to include those currently under construction as well as those that have already been delivered. The loan deal will be spread over a seven-year period and will also act to refinance an existing $120 million agreement made in 2013.

VLGC deliveries

Avance Gas has taken delivery of the VLGCs *Mistral* and *Monsoon* from the Jiagnan shipyard in China, the first of Avance's eight newbuild VLGCs to be delivered by Q3 2015. Soon after the official launch of the vessels Avance announced that the *Monsoon* had been fixed on a 60-to-90-day time charter deal beginning February. The *Mistral*, currently operating on the spot market and most recently fixed by Petredec for a Far East voyage, may also be placed on a similar time-charter deal in the near future, according to a recent company note.

In separate news, the *Gas Sapphire* and the *Jag Vidhi* have been officially delivered to their respective buyers following announcements of their sale in 2014 – see the August and December issues of *LPG in World Markets* for further information. The *Gas Sapphire* has been renamed the *Takao Gas* while the *Jag Vidhi* now goes by the name *Everrich 8*.

VLGC newbuild

KOTC is understood to be soliciting bids from shipyards, namely the Korean yards DSME and HHI, to construct two newbuild VLGCs for Q2 and Q3 2017 delivery. The earliest slots for delivery currently available are Q4 2016 after several slots for options vessels expired at the end of last year. It is thought that the tender process may run over the course of several months.

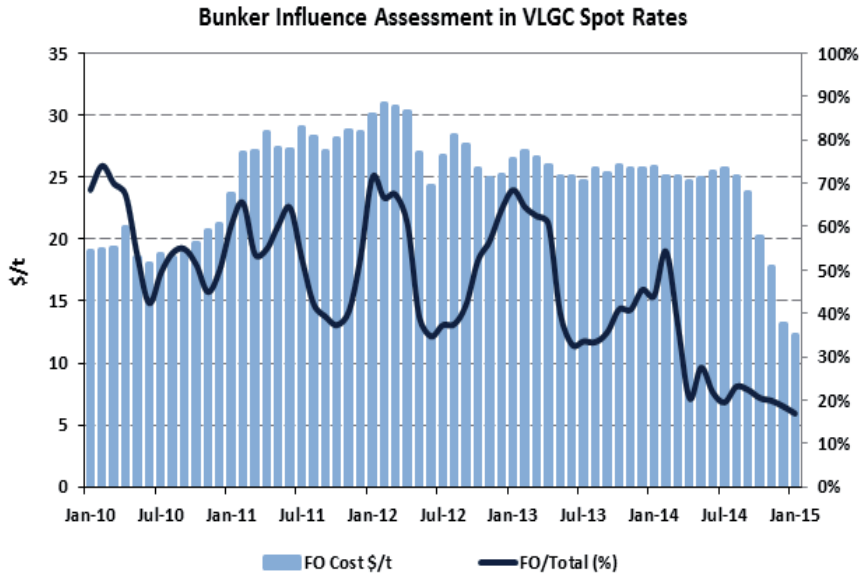
Sale and purchase

The 2003-built 82,000 cbm *Hellas Argosy* is understood to have been sold by Latsco to an unidentified Chinese buyer for a reported $66 million. The vessel was previously handled by Petredec before their time charter deal for the vessel lapsed at the end of 2014.

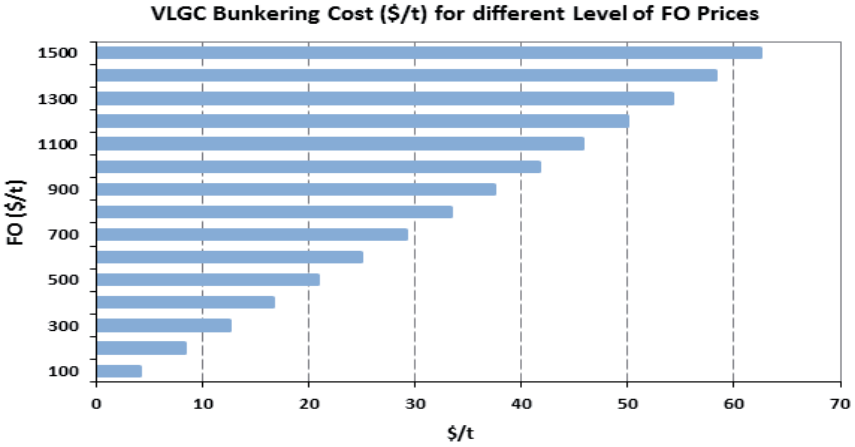
Lower bunker costs cushion falling VLGC rates

Bunkering costs are traditionally an important factor in shipping freight rates and become even more significant when the market is characterised by the sort of wide crude oil price swings witnessed over the last few months. Since last August we have seen the fuel oil (FO) price decrease by more than 50%, from over $600 per ton to under $300/t. What does this mean for VLGC freight rates?

In the chart below we illustrate the monthly average FO cost per ton of carried LPG for a notional Baltic Exchange rate VLGC voyage (assumptions: single voyage Ras Tanura to Chiba, modern VLGC with capacity of 46,200 tons and FO consumption at 52 tons per day), and also the resulting percentage of the monthly average Baltic Exchange freight rate which can be attributed to the FO cost per-ton of carried LPG per trip. As would be expected, since August the FO cost per ton per trip has decreased in tandem with the FO price itself by about 50%, from around $24 per carried ton to approximately $12. This difference of around $12/t in FO costs from August has offered an equivalent buffer for shipowners against the falling outright Baltic rate, which in the same time period has fallen by about $36/t, from $108/t to around $72/t. In turn, whereas the $12/t FO cost assessment in January accounts for 18.6% of the total freight rate, as can be seen from the chart this proportion is significantly lower than the range it sketched out through recent years – which is understandable given that through most of this period, up until around the start 2014, freight rates themselves were confined to a significantly lower overall range than that seen since last March.

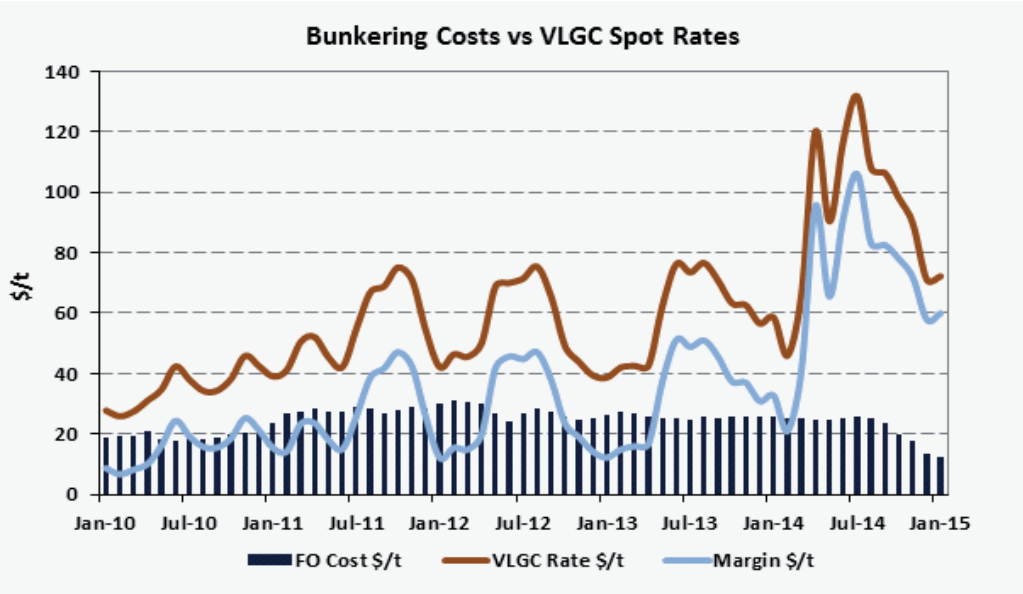


The FO cost per ton of LPG per voyage depends on the particular vessel's FO consumption rate, the length of the voyage and the FO price itself. For each vessel and voyage the exact cost calculation will be different, but for the purposes of this analysis and based on the Baltic rate-type assumptions above, we have created an FO cost matrix. According to these generic calculations, when the FO price is about $300/t, as in January 2015, then the bunkering cost element within the overall Baltic freight rate is about $12-13 per ton of carried LPG, and when the



outright bunker price is near $600/t, as through most of 2013 and 2014, this impact increases to about $25/t.

In the period 2010 to 2015 we have seen bunker prices swing between $350/t, seen lately, as compared to as much as $750/t in early 2012. Comparing month by month the bunker price impact on the VLGC monthly average Baltic freight rates, we can observe how much the fuel price affected the VLGC returns throughout the last five years. Spot margins minus bunker costs, even before the deduction of fleet operating and financing costs, were considered low during the period 2010-2013, but since the beginning of 2014 they have recovered and remained relatively high, especially during 2-3Q 2014 period. But if crude oil prices start to recover through this year, this will add further pressure to shipowners even as VLGC spot freights may decline meanwhile.



Shipping Freights
January 2015

	LPG Trade Route		Voyage Basis		Freight Assessment
	Import Area	Export Area	Ship-Size (thousand cbm)	R/T Time (days)	($/t)
Asia/Pacific	**EAST**				Actual
	Japan	Arabian Gulf	75-84	40-42	71-73
		Yanbu	75-84	45-47	83-85
	Korea	Arabian Gulf	75-84	38-40	68-70
	China (South)	Arabian Gulf	75-84	30-34*	64-66
	India	Arabian Gulf	20-84	10-15	52-58
	WEST				
	Med	Arabian Gulf	56-84	36-39**	85-87
	(Lavera/Spain)	Red Sea (Yanbu)	30-78	21-24**	56-58
		Algeria	24-60	7-9*	25-31
		North Sea	24-60	17-20*	39-49
	Japan (via COGH)	USGC	75-84	88-92	147-149
	NW Europe	USGC	75-84	29-31	55-57
	West Med	USGC	75-84	39-41	71-73
	Japan	WC Africa (1)	75-84	71-75	112-114
	NW Europe	WC Africa (1)	75-84	31-35	57-59
	West Med	WC Africa (1)	75-84	27-30	55-57

Notes

* Basis two-port discharge.

** Basis two port discharge for VLGCs.

(1) load port costs for charterers account

Shipping Fixtures
January-2015

Vessel	Size	Charterer	Route	Rate ($/t or Lump Sum)	Comment	Loading
VLGCs	('000 cbm)					
Aurora Leo	82.3	Geogas	USG - Caribs	Rate not reported	LPG Single Voyage	10-Jan
Iris Glory	83.0	BPCL	MAA - India 1/2 ports	LS $2,150,000	LPG Single Voyage	14-15 Jan
Kikyo	82.0	IOC	Yanbu - India options	LS $2,600,000	LPG Single Voyage	16-Jan
Gas Power	78.0	Statoil	AG - East options	$61/t	LPG Single Voyage	16-18 Jan
Berge Summit	78.0	Eneos	AG - East options	$61-62/t	LPG Single Voyage	18-19 Jan
Musanah	84.0	IOC	AG - India 1/2 ports	LS $2,050,000	LPG Single Voyage	21-22 Jan
Captain John/Corvette	82.2	IOC	Qatar - East options	LS $3,160,000	LPG Single Voyage	24-25 Jan
Providence	84.0	IOC	Ras Laffan - India 1/3 ports	LS $2,005,000	LPG Single Voyage	27-28 Jan
G. Symphony	83.0	BPCL	Ruwais - India 1/2 ports	LS $1,900,000	LPG Single Voyage	28-29 Jan
Avance	82.2	Total	Ruwais - East options	$60/t basis Ras Tanura/Chiba	LPG Single Voyage	29-30 Jan
Promise	84.0	BPCL	Ras Laffan - India 1/2 ports	LS $1,950,000	LPG Single Voyage	29-30 Jan
Thetis Glory	83.0	Petronas	Tanjong Sulong - China	$75/t basis Ras Tanura/Chiba	LPG Single Voyage	1-2 Feb
Lavender Passage	78.0	Petredec	Houston - Chiba	Rate not reported	LPG Single Voyage	2-Feb
G. Paragon	82.0	BP	Dampier - options	$76/t basis Ras Tanura/Chiba	LPG Single Voyage	3-5 Feb
Crystal Marine	80.1	Statoil	Panama STS - East options	$59/t basis Ras Tanura/Chiba	LPG Single Voyage	4-9 Feb
Aquamarine Progress	83.0	Statoil	Qatar - East options	$69/t	LPG Single Voyage	4-5 Feb
Ronald N	75.0	Geogas	USG - Balboa STS	$44pmt basis Houston - Balboa	LPG Single Voyage	4-5 Feb
Progress	82.0	KPC	MAA - East options	$69.5/t	LPG Single Voyage	6-Feb
Aurora Leo	82.3	Petredec	USG - options	$50-55/t basis USG/Flushing	LPG Single Voyage	6-10 Feb
Dorset	80.0	HPCL	Ras Laffan - India 1/2 ports	LS $2,850,000	LPG Single Voyage	7-8 Feb
G. Arete	82.0	PTT	AG - East options	$73/t basis Ras Tanura/Chiba	LPG Single Voyage	7-8 Feb
Captain Nicholas	82.3	Statoil	Kaarstoe - East	Rate not reported	LPG Single Voyage	8-10 Feb
British Courage	83.3	Total	Bonny - options	$95/t basis WAF/Chiba	LPG Single Voyage	10-12 Feb
Jag Vishnu	75.4	IOC	Qatar - India 1/2 ports	LS $2,950,000	LPG Single Voyage	10-11 Feb
Hellas Fos	82.0	KPC	MAA - East options	$88/t basis Ras Tanura/Chiba	LPG Single Voyage	10-Feb
Monsoon	83.0	Petredec	Balboa - Far East	$70-75/t	LPG Single Voyage	20-25 Feb
BW Oak	82.0	Total	Sanha - options	$80/t basis Ras Tanura/Chiba	LPG Single Voyage	22-Feb
Kodaijisan	82.3	Gunvor	Targa - NW Europe	$55/t basis Houston/Flushing	LPG Single Voyage	24-25 Feb
Aurora Taurus	82.2	Petredec	Panama STS - East options	$80/t basis Ras Tanura/Chiba	LPG Single Voyage	End Feb
Mistral	83.0	Petredec	USG - Far East	$135/t	LPG Single Voyage	10-15 Mar

Shipping Fixtures January-2015						
Vessel	**Size**	**Charterer**	**Route**	**Rate**	**Comment**	**Loading**
LGCs						
BW Helios	56.0	Shell	Houston - options	$112/t basis China	LPG Single Voyage	End Jan
MGCs						
IGLC Dicle	38.0	IOC	Ruwais - WC India	Rate not reported	LPG Single Voyage	17-18 Jan
IGLC Anka	38.0	BPCL	Ruwais - WC India	Rate not reported	LPG Single Voyage	22-23 Jan
Maharshi Mahatreya	35.0	IOC	Ras Tanura - WC India	$64/t	LPG Single Voyage	21-22 Jan
Berlian Ekutor	35.0	Mitsibushi	AG delivery	Rate not reported	TC 1 Year	Feb-Mar 15
Tilos	35.0	BPCL	AG delivery	$1,100,000 pcm	1 Year extension	Mar-15
Semi-Refs						
Mathraki	22.0	Sahara	USG - WAF	Rate not reported	LPG Single Voyage	Mid Jan
Navigator Mars	22.0	Vitol	USG - WAF	Rate not reported	LPG Single Voyage	9-11 Jan
Navigator Atlas	21.0	Stasco	Marcus Hook - options	Rate not reported	LPG Single Voyage	16-20 Feb
Navigator Saturn	21.0	Stasco	Marcus Hook - options	Rate not reported	LPG Single Voyage	1-5 Mar
Baltic Gas	20.5	Reliance	AG - India options	Rate not reported	LPG Single Voyage	5-10 Feb
Maple 3	20.5	Petredec	USG - Latam	Rate not reported	LPG Single Voyage	End Jan

TRADE BY REGION

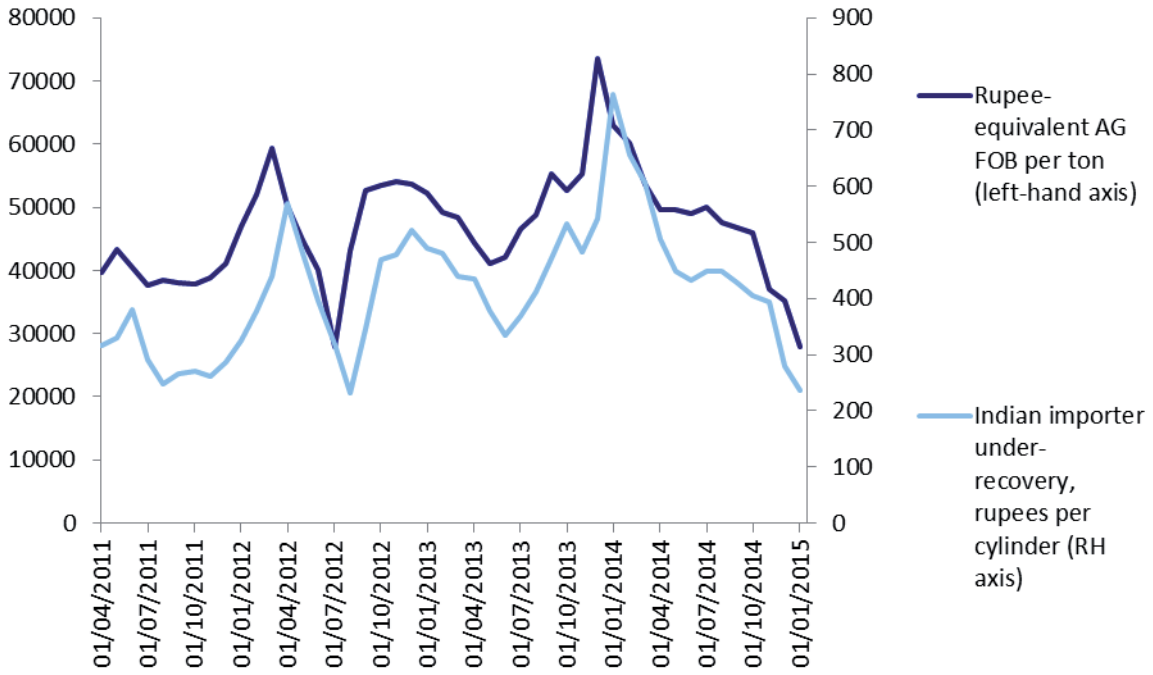
Middle East

Indian demand growth bolstered as subsidy costs plunge

While a slew of international LPG traders, both Western- and Far Eastern-based, have been declining to roll over term FOB lifting commitments with Arabian Gulf producers for 2015, Indian buyers have at the same time been stepping up such commitments while still giving every indication that their spot cargo appetite will meanwhile remain undiminished through coming months. For example, Saudi Aramco is seen to have increased its pre-agreed term sales to Indian offtakers from some 1.4 million tons for 2014 up to an anticipated 2.15 million tons for this current year (*see LPGWM last month*).

domestic retail price for LPG across India has remained the same meanwhile means that in relative terms, the state-controlled Indian marketing companies are now standing to lose a lot less on such sales than they have been across most of 2013-2014.

This can be seen on our chart, which plots monthly reported/anticipated "under-recovery" - the loss, in rupees, on end-user sale against cost of that sale - for Indian oil marketeers per 14.2 kilogram domestic cylinder against the rupee-equivalent monthly contract price for FOB liftings out of the AG (expressed



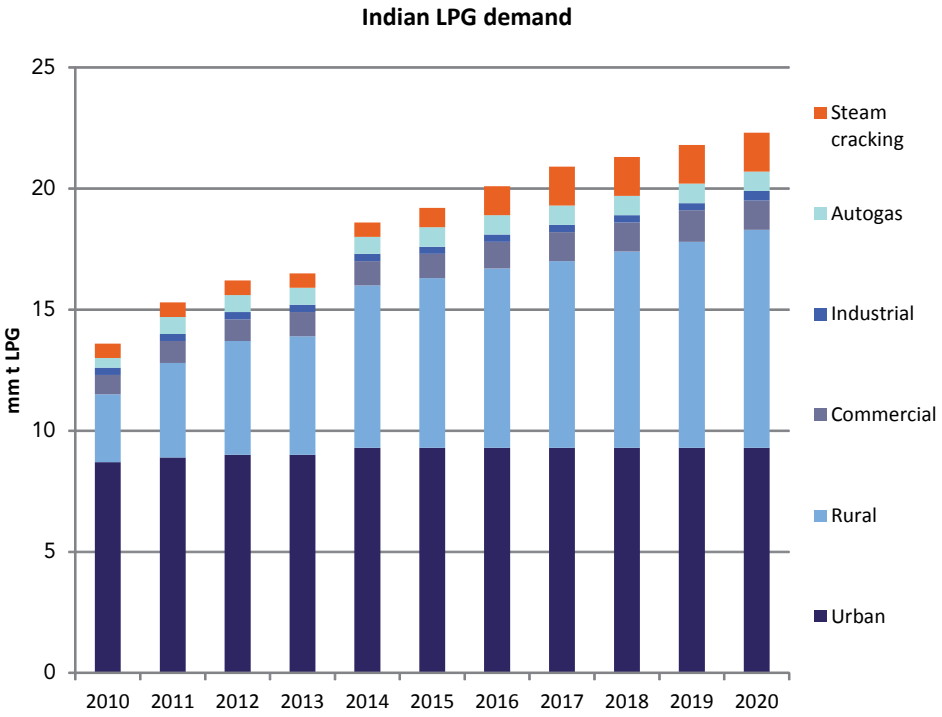
The logic behind this development is simple enough – while domestic retail appetite in India is always underpinned by the country's long-standing government subsidy regime intended to benefit economically disadvantaged households, the appetite for meeting this demand on the part of the state-owned oil marketeers actually responsible for shipping the product into the country can wax or wane with how much of a financial hit they can expect to take on selling on this product.

Some degree of loss on this front is practically unavoidable for them given prevailing government policy and their roles as tools in achieving that policy, however the recent plunge in absolute product pricing levels out of the Arabian Gulf even as the subsidised

as a blended 60/40 butane-propane mix, in line with Indian standards). As can be seen, and completely unsurprisingly, as the cost of import supply has come down so too has the loss per cylinder to be endured by the state importers/marketeers.

Right now the anticipated under-recovery for January, as reported by the Indian government's Petroleum Planning and Analysis Cell (PPAC), is the lowest it has been since at least April 2011. As such, despite long-running debate about such subsidies across the developing world, right now the state-run importing complex in India is feeling that all else being equal, it should be able to import more product for a given level of subsidy loss, and this is feeding through into term commitments with suppliers. We would anticipate a

knock-on effect on overall Indian consumption for 2015 as a result – a recent revision of our figures now sees rural retail consumption 300,000 tons higher this year than in 2014, at 7 million tons as opposed to 6.7 million tons last year. This sits, in turn, within our modelled total Indian demand increasing from 18.6 million tons in 2014 to 19.2 million tons in 2015 – on top of the rural consumption increase, we also add 100,000 tons to autogas consumption and 200,000 tons to steam-cracking demand for the current year.



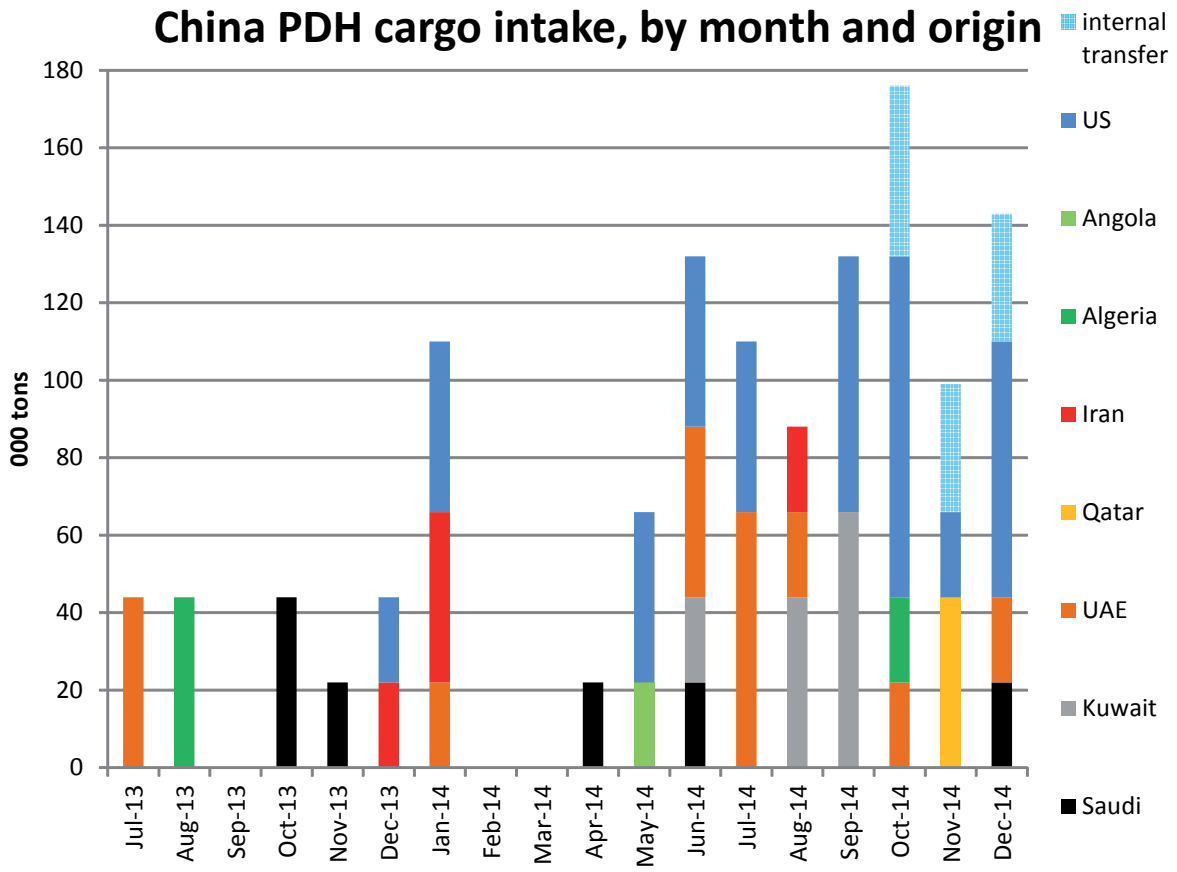
Asia/Pacific

Full-year 2014 China numbers emerge

Full-year figures now available for China show that it imported 7.1 million tons of LPG through 2014 (propane, butane and mixed) as opposed to 4.2 million tons in 2013. Net imports for the year – imports minus exports out of China – were meanwhile 5.7 million tons as opposed to 3 million tons a year earlier.

If we add this net import figure to domestic Chinese LPG output, we arrive at a figure for "implied" Chinese demand for the year. Of course, in an ideal world inventory figures and the stock-builds or drawdowns revealed therein would also play into such an implied demand figure to give a truer picture of actual end-user appetite for product at any given time of year, but in China the widespread absence of reliable and timely inventory data – not just for LPG, but also other products plus crude oil itself – means that our implied demand has to include stock movements alongside end-usage. With this proviso, implied Chinese demand for 2014 came in at some 32.3 million tons as opposed to 27.8 million tons in 2013.

We would like to take a closer look at how this implied Chinese demand has developed on a month-by-month basis over the past few years, from the start of 2009 onwards, to try to see if any consistent drivers can be identified. However, there is an issue with the gradual introduction of propane dehydrogenation (PDH) project demand for, specifically, propane imports from mid-2013 onwards, which means that we would not be comparing all of these years on a like-for-like basis if we just took the implied demand figures at face value – PDH plant commissioning brings on new elements of structural demand on a more or less set timetable regardless of how the wider Chinese market is responding to other factors such as domestic economic performance and international pricing. Accordingly, we can also strip out from our start-2009-to-end-2014 implied demand series those LPG imports which we identify as specifically linked to the current wave of PDH projects – moreover, it is also sensible to strip out this segment of demand because it can be modelled separately on the basis of presumed PDH project capacity per annum and implied propane throughput. Luckily, at this stage in the roll-out of the ongoing wave of Chinese PDH projects, we also feel we have a pretty accurate picture of cargo flow into these projects from mid-2013 up to end-2014. Our chart shows cargo

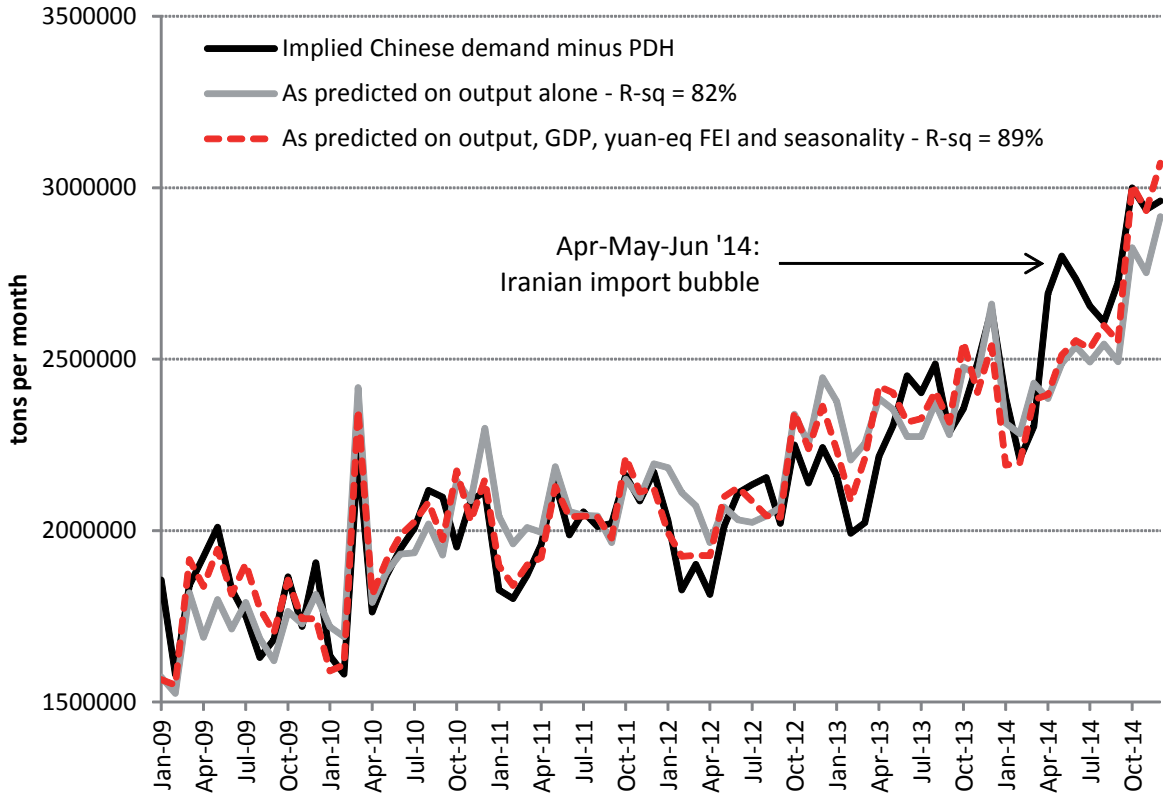


flow into Chinese PDH projects by month of arrival and origin – including also, under "internal transfers", a portion of demand which is met not by a project developer importing directly into a jetty but rather by trucked overland supply from another importer, the ultimate origin of these particular supplies therefore being hard to unpick from the same importer's wider portfolio even if, in quantitative terms, we are happy to ascribe these volumes to PDH-linked demand. Our analysis indicates that PDH project players have imported some 1.28 million tons of propane into China since these flows kicked off in 2013, and through 2014 this PDH-linked demand accounted for 1.08 million tons of imports. Although the Arabian Gulf is the largest regional source of supply for these projects, in terms of an individual country supplier the US is the largest by some way, accounting for just over 418,000 tons of the 2014 figure.

increased production. Recent years have of course seen a significant build-out in underlying Chinese refining capacity, which has had its corollary in domestic Chinese LPG production growing from some 2.3 million tons in 2012 through 2.5 million tons in 2013 to 2.7 million tons in 2014. Regressing monthly pre-PDH implied demand against production alone gives a so-called "R-squared" measure of fit of 82%, implying that this much of the variation in monthly demand can be in turn "explained", statistically-speaking, by variation in monthly output – and we show what this single-factor prediction looks like on the chart.

However, we feel we can go further than this in identifying several other factors which also appear to have a statistically-significant impact on shaping this implied pre-PDH demand series. The nominal Chinese GDP figure for the prevailing quarter seems to have

Modelling implied Chinese demand



Returning to the concept of implied demand, our second chart illustrates this series on a month-to-month basis from 2009 through 2014 with the PDH import numbers above duly stripped out. We find that, unsurprisingly, and as already widely commented on by several Chinese analysts, domestic LPG output itself is a major driver for growth in pre-PDH Chinese demand. If more is produced from the domestic Chinese refining complex then the local market will grow around this some influence, which is again unsurprising – if the economy at large and the wealth circulating within it are relatively larger or smaller for a given period, we might expect product demand to likewise swell or contract in tandem. Beyond this, the prevailing Far East Index butane price, converted into Chinese yuan at prevailing dollar exchange rates, is another factor – again, unsurprising to note that when this regional price for imports is cheaper, demand goes up, and

vice-versa. Finally we have constructed a seasonality index, an identical cycle for each year, which also stands as a useful proxy for what would seem to be an annual demand cycle in the real world. Combining all four factors – domestic output, domestic GDP, yuan-denominated FEI butane and the seasonality index – yields an R-squared measure for this model versus the actual real-world demand series of 89%. Our chart illustrates this too, and it is visibly a better fit against reality than the output-only prediction across much of the timeframe in question.

There is however one notable period when both the output-only and the four-factor model above both fail to capture a significant upward movement in implied pre-PDH demand, and this is across the April to June period of 2014, when Chinese imports shot up to then-unprecedented fresh monthly highs – leaving their impact in net imports and therefore the implied demand series as well. We have already commented on this phenomenon at length (*see for example LPGWM August 2014*), and reiterate our view that heavy discounting of Iranian supply versus prevailing international pricing was a big factor in driving this influx. As such, this is the kind of opaque and one-off factor which it is impossible for us to model and we are not too downcast that our model clearly falls short of reality at this point in time. It might seem something of a scoundrel's refuge to claim that in fact this is the exception that proves the rule, but we would note that our four-factor model subsequently did a nice job in calling the uptick in the non-PDH implied demand at the end of the year. Intuitively, one might have expected such a development even without a formal model to play with – nominal GDP for the period was up, whereas yuan-denominated international LPG prices were significantly down at the same time, and China remains a notoriously price-sensitive market. The question is whether, when low offered prices encourage such a demand pull, these prices are visible, as prevailing international prices were around year-end, or invisible, as was the case with the Iranian cargo surge around mid-2014.

Mediterranean/Africa

Mozambique to see first domestic production, plus increased import capacity meanwhile

South African-based integrated energy player Sasol says it should during the course of this month (February) take a Final Investment Decision (FID) on a roughly 20,000 tons per year LPG production unit adjacent to its existing gas and condensate processing facilities in Temane, central Mozambique. Following FID, Sasol expects to award an already-tendered Engineering, Procurement and Construction Management (EPCM) contract by the third quarter this year, after which the planned new liquids processing facilities – which will extract condensate as well as LPG from production across Sasol's onshore gas, condensate and light oil concessions around the onshore Pande and Temane fields – could be operational by late 2018.

Sasol says it is committed to delivering the new LPG facility "as a lever to assist in stabilising Mozambique's LPG supply" – certainly, it will not only be the first domestic source of LPG production in-country but will also, at its currently-planned size, offer an annual volume more or less equivalent to what some see as total annual Mozambican consumption right now. While reliable and up-to-date figures are hard to come by and estimates vary wildly, at least 20,000 tons and perhaps even a touch more per year does nevertheless seem in our opinion a good guesstimate for where the Mozambican LPG market is right now, with the overwhelming bulk of this consumed by retail customers as so-called "domestic" or "cooking" gas. Historically and currently, all of this market is dependent on imports – traditionally overland from South Africa, and more recently through seaborne supplies into the port of Matola, near the southern city of Maputo.

Against this background, the projected development of some 20,000 tons of domestic supply might seem to signal a very significant reduction in import requirements in the near future, but various players are nevertheless in the course of increasing Mozambican import capacity regardless. A lot of this has to do with what might be termed the "hinterland" view of southern African market potential – that import capacity being constructed around the coastal regions in not only Mozambique but also, for example, Namibia and South Africa itself, can be used to support demand in neighbouring states around the region, including land-locked territories such as Botswana, Swaziland, Zambia and Zimbabwe.

RIght now there are two seaborne LPG import complexes operating in Mozambique, one in the southern port of Matola, adjacent to the major population centre of Maputo, and the other further north up the coast at Beira, another major population centre.

At Matola/Maputo, the import handling facilities are linked to existing LPG storage facilities of roughly 3000 tons-equivalent, run by Mozambican state oil company affiliate Petromoc. While most of the capacity in this facility is seen as serving the existing Maputo cylinder market, 1000 tons of it is controlled by South African LPG player Oryx – with the intent that this is used to import LPG, at a rate of around 1000 tons a month, to trans-ship over the border into its own distribution network within South Africa (which, as we have previously reported at length, has its own issues with constrained seaborne LPG import capacity).

At Beira meanwhile there is roughly 2500 tons of pressurised sphere storage connected to import handling facilities, this capacity owned/operated by X-Storage, an affiliate of international trader Glencore. Glencore itself utilises all of this capacity, not to serve the local Mozambican market in the area but rather as a trans-shipment node for bulk LPG which it then exports into Zimbabwe, in fulfilment of a supply contract it holds there.

Another two separate storage facilities are meanwhile under development in Mozambique – again, one in Matola and one in Beira. In Matola, a consortium of Portuguese-based integrated oil player Galp and the Kuwait-based International Petroleum Group (IPG) are planning to construct two new spheres, each of 3000 cubic meters so therefore offering around 3000 tons of storage in total, and set to be connected to the same seaborne import handling infrastructure already serving the existing Petromoc installation. Under direction from Portuguese engineering manager Technoedif, the EPC phase on this project is about to kick off and the facility should be completed and operational within 18 months from now. Interestingly, while it will certainly seek to serve local demand this venture has also been conceived at least partly with a view to potential supply out of Mozambique and into the larger regional hinterland – the LPG storage spheres are part of a larger Galp/IPG hydrocarbon terminal project on the Matola site, within which space has been earmarked on an associated rail-loading gantry for, potentially, LPG load-out arms which could eventually fill rail-tankers destined for Swaziland.

In Beira, meanwhile, Petromoc itself is building out roughly 3000 tons of storage capacity in the form of mounded vessels, again to be connected to the existing seaborne import handling facilities there and expected to be completed, again, within the next 18 months or so.

NW Europe

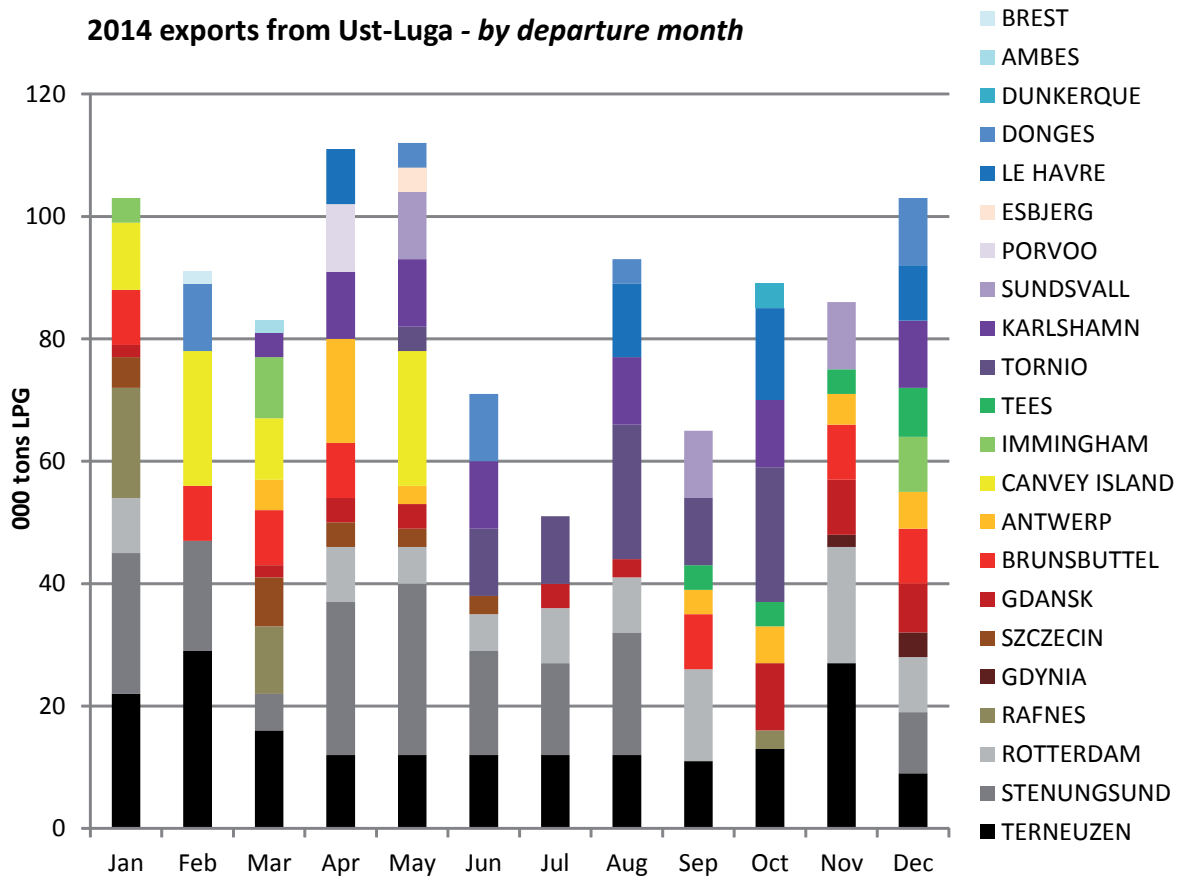
Just over a million tons of LPG exported from Sibur's Ust-Luga terminal through 2014

The end of 2014 has enabled us to calculate a full-year total for LPG exports from the Sibur terminal in Ust-Luga, Russia – we come in at around 1.07 million tons. Biasing this figure down versus some other third-party estimates of around 1.2 million tons is our very well-founded conviction that many Handy-sized vessels exporting n-butane from Ust-Luga are not leaving the terminal fully-loaded, but rather carrying perhaps 9,000-10,000 tons (if not, sometimes, significantly less) out of a possible 11,000-12,000-ton cargo which is then "topped up" to a fuller mixed butane cargo with isobutane from storage at Hamina in Finland before being shipped to disport destinations. If we are however less pedantic about exact port of origin and include a proxy for such Hamina top-ups in a larger "ex-Baltic Sibur LPG" number, we get to a number around 1.16 million tons instead.

Sibur currently employs a fleet of four Handy-sized carriers to deliver the bulk of its Ust-Luga product, specifically the *Sibur Tobol*, the *Sibur Voronezh* and two Navigator vessels, *Leo* and *Libra*. Between them these four vessels made 98 export runs out of Ust-Luga through 2014 – and we reckon that on 29 of these runs, a Handy part-loaded at Ust-Luga was then subsequently topped up at Hamina. As we can see no evidence of any product being *unloaded* at Hamina as opposed to being loaded, we do not include the Finnish port on our list of destinations for Ust-Luga product – which we have modelled in our chart, including only ex-Ust-Luga volumes without the Hamina top-ups. Alongside the Handy-sized vessels, Sibur has also employed a clutch of smaller tankers to service its trade, which through 2014 regularly included the *Gas Cerberus* and the *Gas Kaizen* plus occasional appearances by other small vessels from, for example, the Coral and Kosan fleets.

As can be seen, European petchem players have been eager consumers of Ust-Luga product, with the largest by-volume single destination being Terneuzen on around 187,000 tons delivered through the year, and Stenungsund coming in second at around 162,000 tons. Rotterdam, with deliveries into the Lyondell chemicals berth specifically, was the third-largest by-volume destination at around 91,000 tons. While an 80/20 mixed butane feed would certainly suit Lyondell's own MTBE operations there, given that the same berth infrastructure can also be used by Shell's Moerdijk cracker, we have refrained from any hard and fast judgment about whose system these volumes ended up in.

The fourth-largest by-volume destination was the



Tornio LPG import and storage terminal in Finland, which looks to have taken in around 81,000 tons. Sticking with the Scandinavian terminal theme, the fifth-largest by-volume destination is the Karlshamn terminal in Sweden, which took in around 70,000 tons. The next-largest by-volume destinations are then Canvey Island (around 65,000 tons), Brunsbuttel (63,000 tons), the Gaspol terminal in Gdansk (47,000 tons) and the Antwerp Gas Terminal (46,000 tons) – with all of this import infrastructure across Poland, Germany, Belgium and the UK effectively controlled by pan-European distributor SHV, it is easy to see how important Ust-Luga has become as a supply source for this particular LPG market player. In addition to the destinations above, a further 23,000 tons went into Immingham, where SHV-owned Calor controls cavern storage capacity in partnership with P66, and SHV subsidiary Primagaz also controls the maritime import terminals at Ambes and Brest in France, each of which also received 2,000 tons or so in single small tanker runs.

Rafnes also took in Ust-Luga product through 2014, but a lot less than Terneuzen or Stenungsund – around 32,000 tons, by our estimation – and it remains unclear meanwhile how much of the roughly 45,000 tons of LPG delivered into the Norgal terminal in Le Havre was destined for Total's petchem operations at Gonfreville and how much for the other parties holding capacity in that storage facility, retail players Antargaz and Vitogaz (Rubis). The Versalis cracker at Dunkerque, which took in an early test shipment from Ust-Luga in 2013, looks to have taken in a single small parcel of around 4000 tons in 2014, while in addition Donges was a third and quite significant French destination, accounting for around 41,000 tons. Apart from Gdansk, Szczecin (around 23,000 tons) and Gdynia (around 6,000 tons) also figured as Polish port destinations leveraging their proximity to Ust-Luga.

The stated export capacity for Sibur's first phase, currently-operational LPG export infrastructure at Ust-Luga is 1.5 million tons per year, however we understand that while fully-refrigerated butane has been loaded out since 2013, the facilities for propane refrigeration remain in test mode and are therefore not yet ready to load out at their planned maximum capacity/run-rate.

Americas

US butane values could be seeking new norms

In 2014 the USA exported about 14 million tons of LPG, of which 14% was butane and with this being, in turn, mostly n-butane. Such butane exports have been expected to grow significantly in the future, with Asia being targeted as the main demand centre for such flows. However, as international crude oil and LPG prices fell in Q4, the spot arbitrage window to Asia was closed. Recently (in the second half of January) this arb has re-opened as butane has spiked in Asia, but it is unclear how long Asian butane prices will hold up if crude oil prices remain low meanwhile.

In this situation, the price-setting mechanism for Mont Belvieu (MB) n-butane becomes all-important in assessing whether butane exports to Asia can be profitable. Will the MB n-butane price be mainly influenced by domestic US market factors, or will the potential netbacks on offer from exports to Asia exert a growing influence on price formation around the US Gulf Coast?

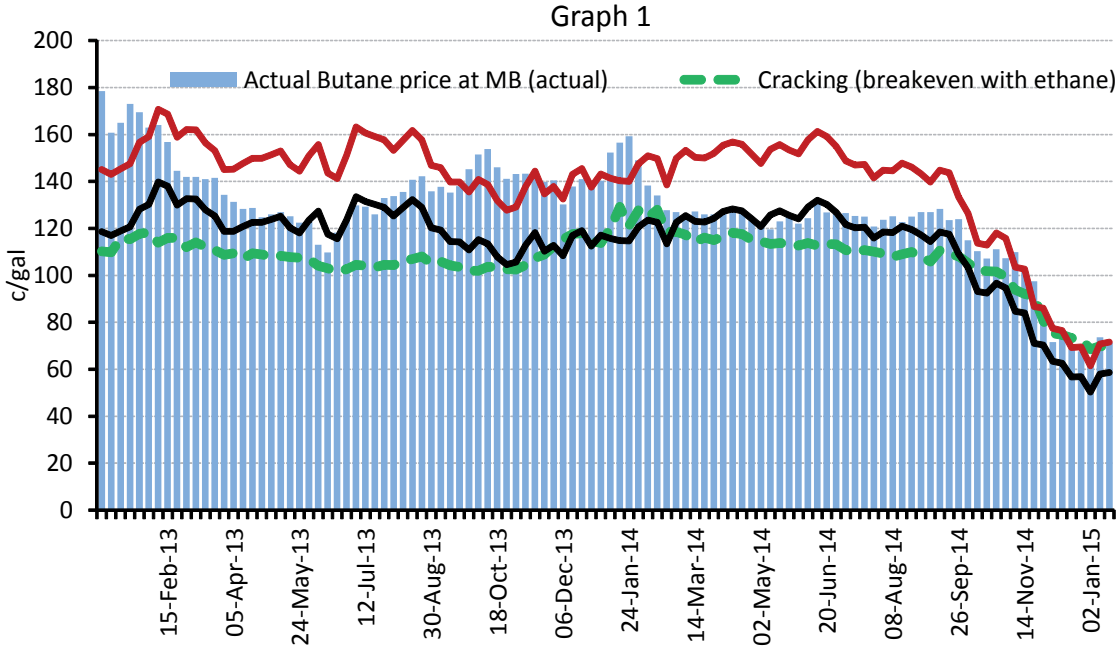
Historically, the US butane market was well-balanced, and even occasionally required imports. But as shale-based butane production has grown and domestic market demand from the gasoline complex has meanwhile flattened, the US butane market balance has weakened and prices have accordingly fallen.

Typically, MB n-butane spot prices show a cyclical trend, increasing during the higher demand months of winter mogas blending. As such, there has historically been a strong linkage between MB n-butane pricing and MB regular gasoline pricing, however across 2014 signs were emerging that US Gulf steam cracker economics might be an influence at times on butane, and at other times that netbacks from exports to the Mediterranean and Far East might have an impact.

The first chart shows the historical trend of MB n-butane (weekly spot averages in cents per gallon, as shown in the blue bars) versus two lines illustrating a band spanning 45%-55% of the MB regular gasoline price, which we determine as having more or less bracketed the butane price over the 2013-2014 timeframe. Until the beginning of December 2014, the actual n-butane price was frequently trending within this imputed high-low range, thereby showing a strong linkage against the regular gasoline price.

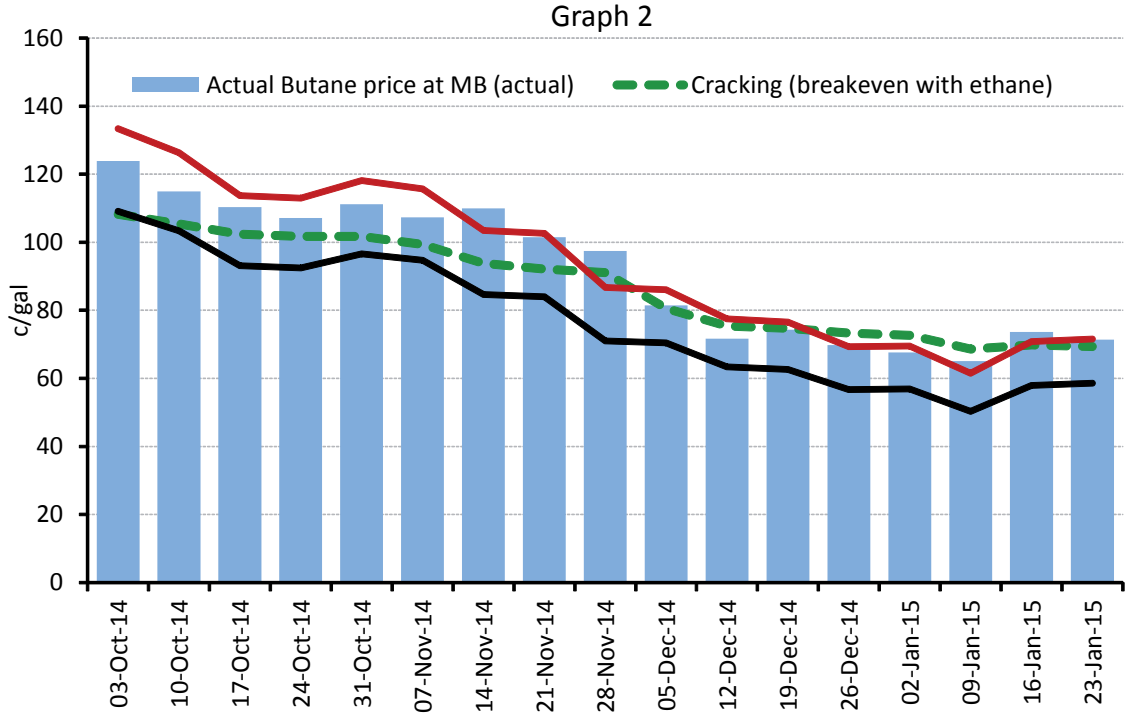
Across December 2014 and January 2015, however, another price factor – US Gulf olefin cracker economics – could also have been influencing the n-butane price. This is illustrated in the second chart, as the green dotted line converges with the actual n-butane price.

Graph 1



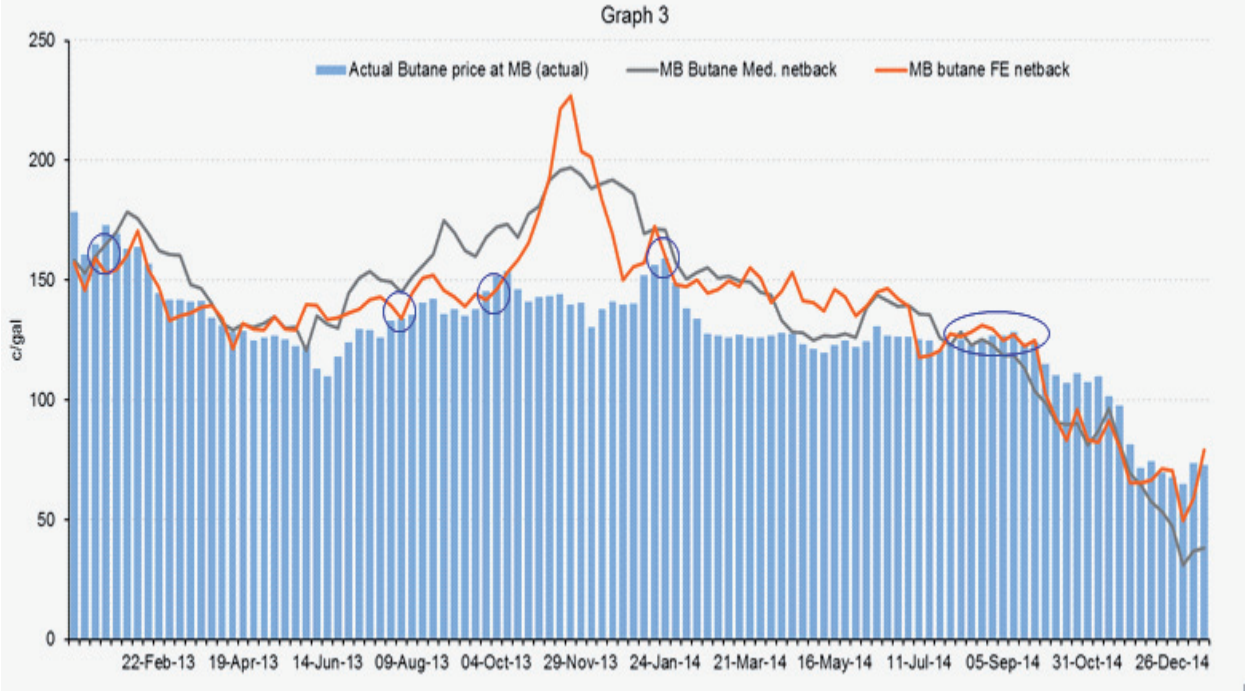
The green dotted line represents the breakeven value (c/gal) for USG olefin cracking for n-butane (against ethane) as feedstock. The breakeven value was derived by analysing USG olefin cracker margins with n-butane and ethane feedstock.

Graph 2



It should be noted that at this point in time the WTI crude oil price dipped below $65 per barrel, and has since dropped even further. It is possible that going forward, if WTI prices remain low then the mogas price may continue to have a heavy influence in setting the MB n-butane price.

Graph 3



APPENDIX

Notes for Shipping Rate Assessment:

Rate Assessments
Time-charter rate assessments are made for the following large gas carriers:
- the VLGC time-charter rate assessment reflects the newer MHI-built 78,000 cbm vessels.
- the 50's time-charter rate assessment reflects rates for the 1990's and later built 57,000 - 59,000 cbm vessels.

The rates also show new series for modern 35,000 - 40,000 cbm FR carriers and 15,000 - 20,000 cbm SR vessels.

Market Freights
The market freights shown use:
- actual voyage fixture or fixtures concluded during the month.
- or, where no fixtures have been reported, voyage freights are assessed from current market indications and from time-charter rate equivalents translated into voyage rates.

In each case, the freights shown are intended to reflect fixtures concluded during the month.

Contract Prices

FOB Contract Prices ($/t)						
	SAUDI ARABIA (SAUDI ARAMCO)		ALGERIA (SONATRACH)		NORTH SEA OPIS	
	Propane	Butane	Propane	Butane	Propane	Butane
2015						
Jan	425	470	340	380	338.5	348
2014						
Dec	550	570	440	515	465.5	518
Nov	610	600	545	535	544	544.5
Oct	735	765	675	715	668	684.5
Sep	745	785	655	730	662	730.5
Aug	780	800	705	770	714	773
Jul	820	840	750	810	758.5	788.5
Jun	835	835	755	730	753	708
May	810	825	720	730	727.5	724
Apr	770	845	755	805	752	797.5
Mar	855	870	740	820	743	811
Feb	970	970	805	870	820	839.5
Jan	1010	1020	910	1005	908	961

Spot Sales

Large Cargoes Spot Sales East January-2015						
Location	**Deal Date**	**Sale Basis**	**Product**	**Price** ($/t)		**Loading Dates**
				Fixed	**Floating**	
Middle East						
Middle East	5-9 Jan	FOB	C3 44,000 t		Jan CP flat	Mid Jan
Middle East	5-9 Jan	FOB	C3 44,000 t		Jan CP linked	H2 Jan
Middle East	12-16 Jan	FOB	C3/C4 22,000t/22,000t		March CP +$7-9/t	Mid Feb
Middle East	12-16 Jan		C3 44,000 t		Feb CP +$1-2/t	Beg Feb
Middle East	19-23 Jan	FOB	LPG 44,000 t		Feb CP flat	9-10 Feb
Middle East	19-23 Jan	FOB	C3/C4 33,000t/11,000t		March CP linked	Mid Feb

Large Cargoes Spot Sales East January-2015						
Location	**Deal Date**	**Sale Basis**	**Product**	**Price** ($/t)		**Delivery Dates**
				Fixed	**Floating**	
Asia/Pacific						
Asia/Pacific	5-9 Jan		C3 22,000 t	$455/t	FEI -$15/t	H1 Feb
Asia/Pacific	5-9 Jan		C3/C4 22,000t/22,000t		Jan CP/Feb CP linked	16-31 Jan
Asia/Pacific	5-9 Jan	DES	C3/C4 22,000t/22,000t		Feb CP +$40-50/t	6-10 Feb
Asia/Pacific	5-9 Jan	CFR	C3 22,000 t		Feb CP linked	1-15 Feb
Asia/Pacific	12-16 Jan	DES	C3/C4 22,000t/22,000t		Feb CP +$65-70/t	21-28 Feb
Asia/Pacific	12-16 Jan		LPG 15,000 t		FEI Linked	Beg Feb

Asia/Pacific	12-16 Jan	C3 22,000 t		Feb CP +$65/t	16-28 Feb
Asia/Pacific	19-23 Jan	C3 22,000 t		March CP +60s/t	1-15 Mar
Asia/Pacific	19-23 Jan	C3 11,000t/C4 11,000t		March CP +75/t	1-15 Mar
Asia/Pacific	19-23 Jan	C3 22,000 t		Feb FEI +$5/t	1-15 Mar
Asia/Pacific	19-23 Jan	C3 22,000 t		RNR	16-28 Feb
Asia/Pacific	26-30 Jan	C3 22,000 t	$540/t	Feb FEI flat	15-28 Feb

Prices shown are approximate, as reported in the market.

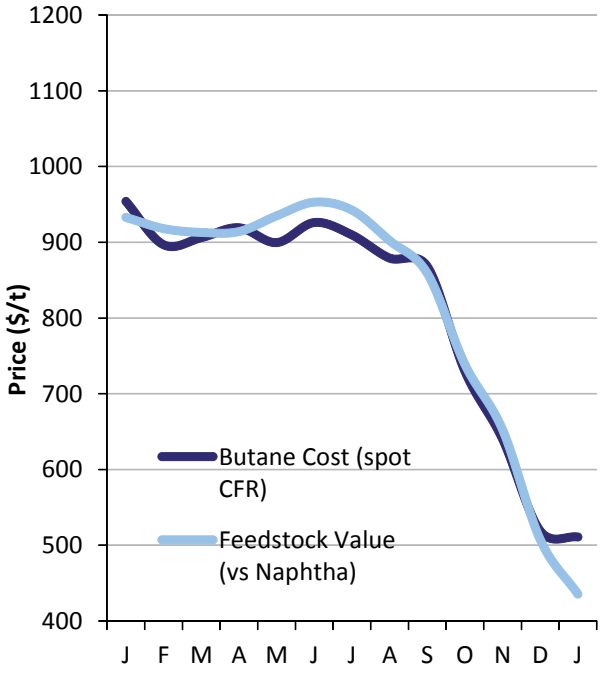
Spot Sales West January-2015						
Location	**Deal Date**	**Sale Basis**	**Product**	**Price** ($/t)		**Delivery Dates**
				Fixed	Floating	
NWE	Large Cargoes					
ARA	5-9 Jan		C3 20,500 t	$288/t	Jan CIF ARA swap flat	20-24 Jan
ARA	26-30 Jan		C3 20,500 t	$348/t	Feb CIF ARA swap +$4/t	13-17 Feb

Location	**Deal Date**	**Sale Basis**	**Product**	**Price** ($/t)		**Loading Dates**
Med						
Lavera	5-9 Jan	FOB	C4 2,500t	$455/t		10-12 Jan
Lavera	5-9 Jan	FOB	C4 4,000t	$353/t		14-20 Jan
Lavera	12-16 Jan	FOB	C4 3,800t	$394/t		20-22 Jan
Lavera	5-9 Jan	FOB	C4 4,000t	$376/t		14-16 Jan
Lavera	19-23 Jan	FOB	C4 2,700t	$471/t	Platts linked	1-3 Feb

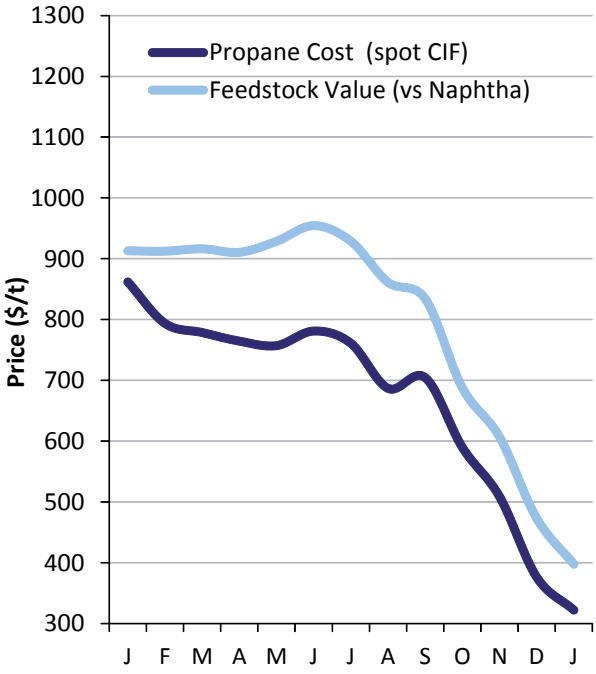
Notes: Prices shown are approximate, as reported in the market

LPG Values as Petrochemical Feedstock

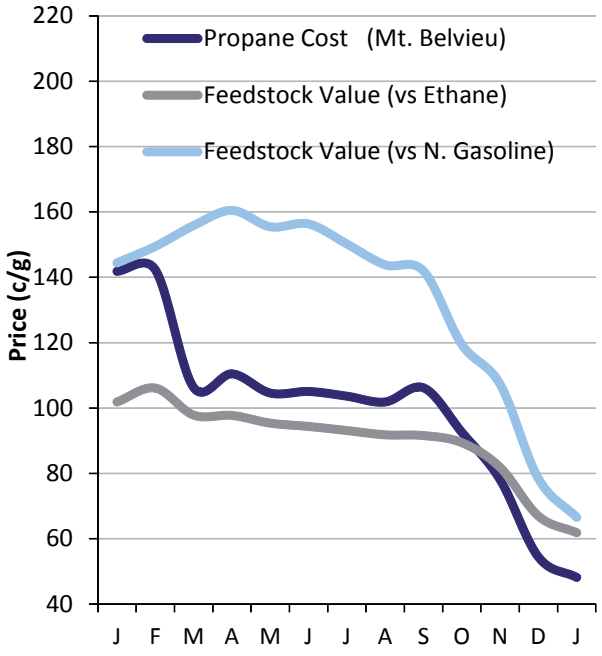
Japan: Butane vs Naphtha



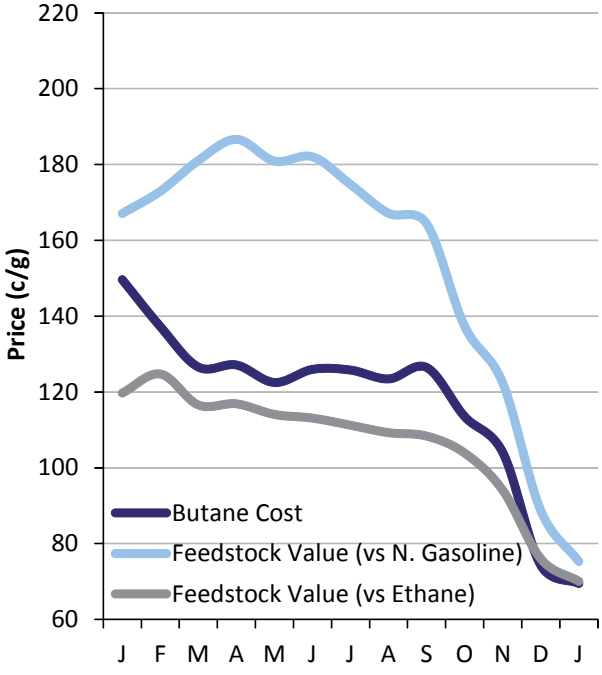
NW Europe Cracker Feedstock Economics: Propane vs Naphtha



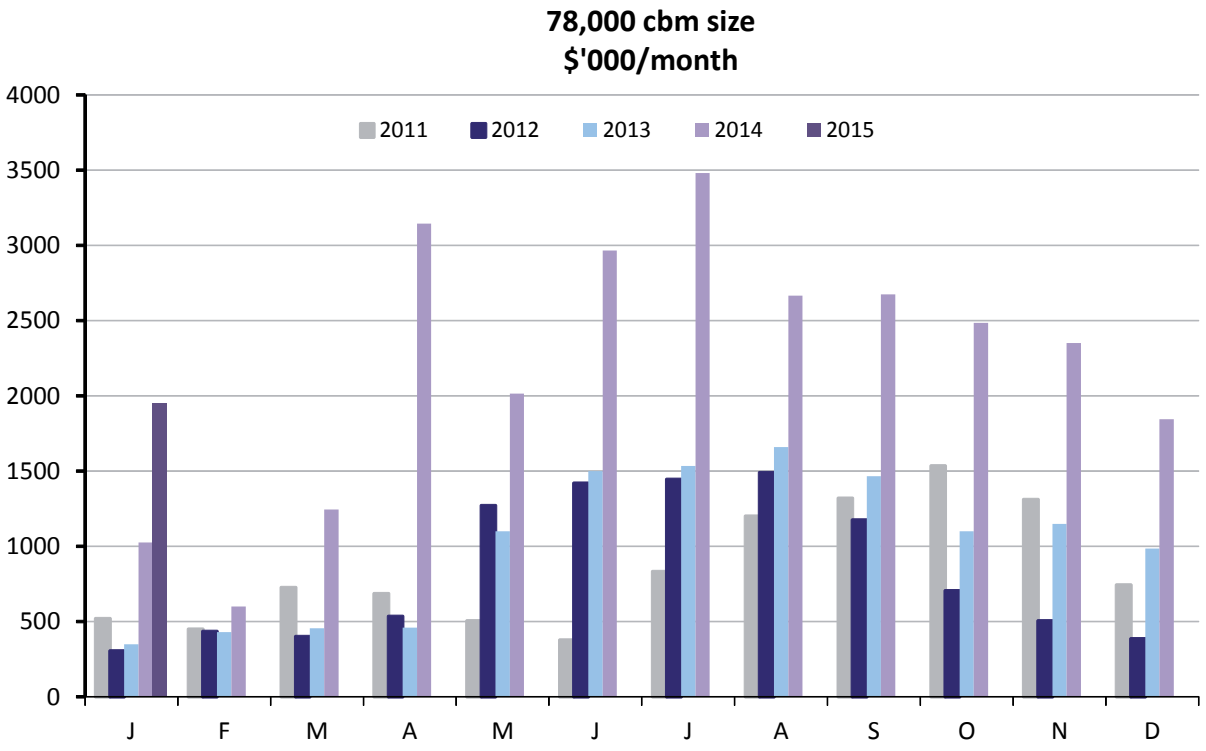
Mont Belvieu Cracker Feedstock Economics: Propane vs Alternatives

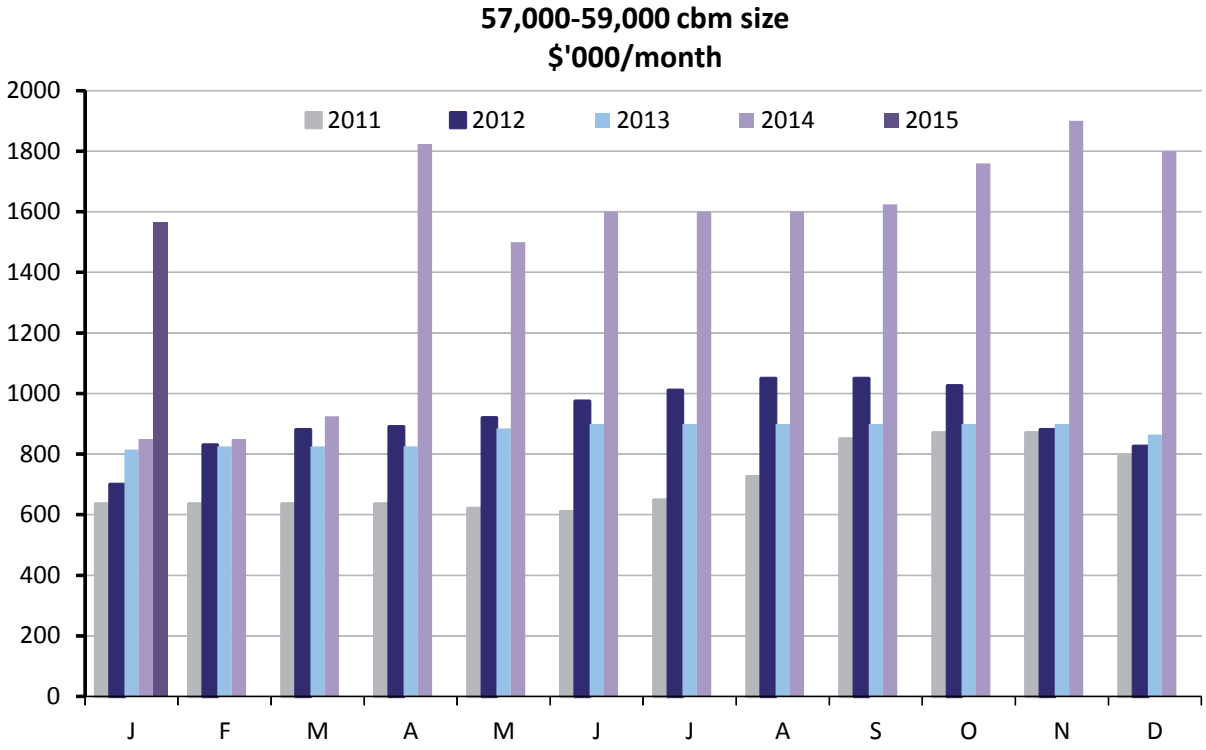


Mont Belvieu Cracker Feedstock Economics: Butane vs Alternatives

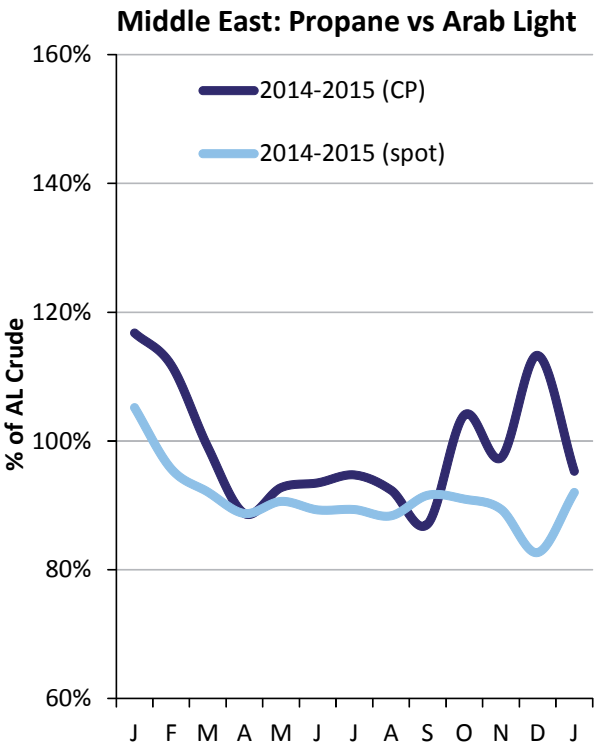


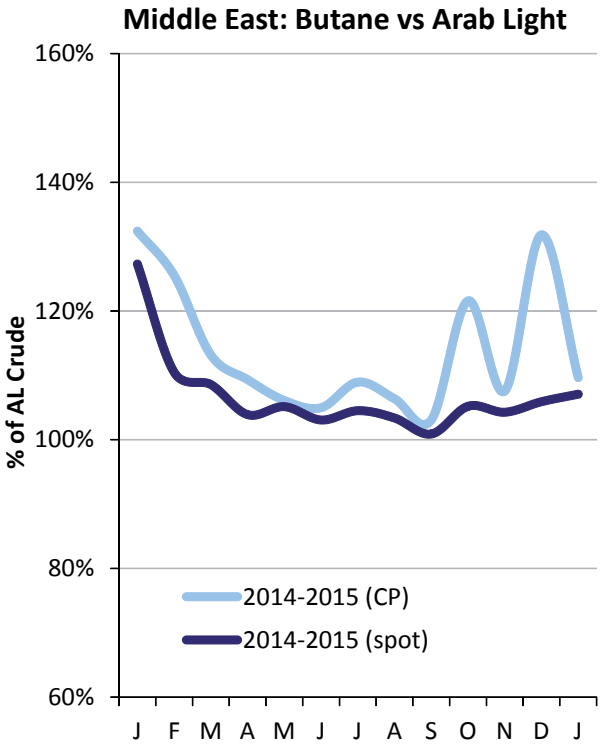
Market Charter-Hire Rates

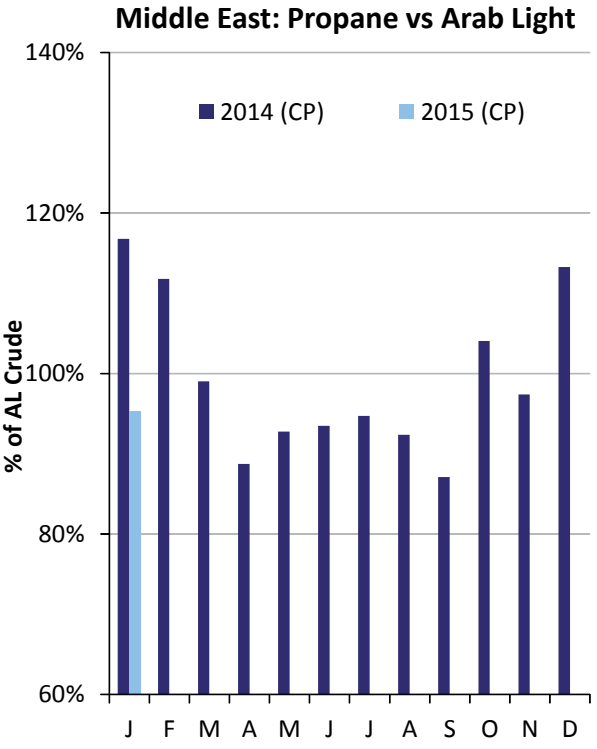


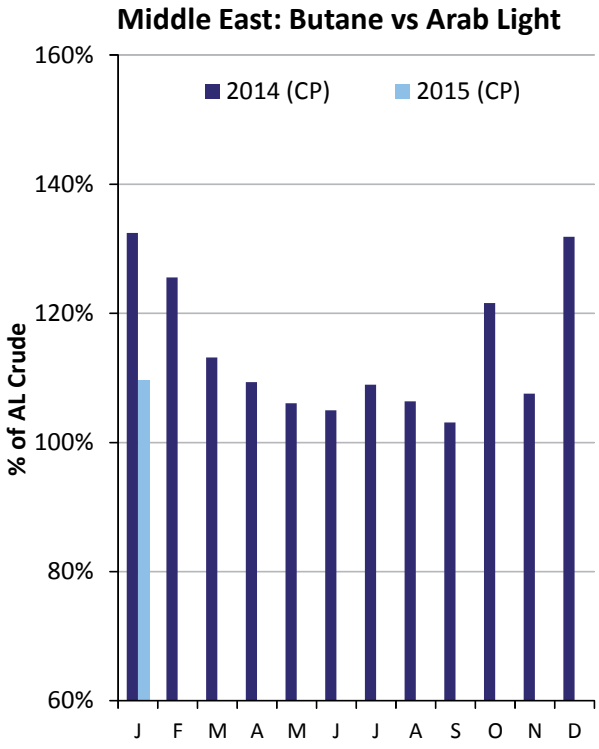


Middle East


Middle East: Propane vs Arab Light
160%
140%
120%
100%
80%
60%
% of AL Crude
2014-2015 (CP)
2014-2015 (spot)
J F M A M J J A S O N D J


Middle East: Butane vs Arab Light
160%
140%
120%
100%
80%
60%
% of AL Crude
2014-2015 (CP)
2014-2015 (spot)
J F M A M J J A S O N D J


Middle East: Propane vs Arab Light
140%
120%
100%
80%
60%
% of AL Crude
2014 (CP)
2015 (CP)
J F M A M J J A S O N D


Middle East: Butane vs Arab Light
160%
140%
120%
100%
80%
60%
% of AL Crude
2014 (CP)
2015 (CP)
J F M A M J J A S O N D

Asia/Pacific

Japan LPG Imports in 2014 ('000t)								
Import Origin	**H1 2014**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**H2 2014**
Saudi Arabia	737	85	129	140	130	86	102	672
Iran	-	-	-	-	-	-		0
Kuwait	766	108	93	23	132	102	154	612
Qatar	1,638	212	277	295	274	188	373	1,618
UAE (a)	1,497	158	241	295	139	248	83	1,163
Middle East	4,639	**563**	**740**	**752**	**676**	**624**	**712**	**4,066**
Australia (b)	449	153	22	45	41	50	98	409
USA	652	227	135	55	150	126	199	892
Other Areas	323	21	25	25	3	47	72	193
TOTAL (c)	6,062	**964**	**921**	**876**	**871**	**847**	**1,081**	**5,560**
Propane	4,893	695	735	641	627	693	847	4,238
Butane	1,169	269	186	235	244	154	198	1,286

Japan LPG Supply/Demand in 2014 ('000t)								
	H1 2014	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**H2 2014**
Import Supply	6,062	964	921	876	871	847	1,045	5,524
Domestic Supply	1,251	210	232	227	193	173	201	1,236
TOTAL SUPPLY	7,313	1,174	1,153	1,103	1,064	1,020	1,246	6,760
LESS DEMAND	7,206	1,048	905	935	1,071	1,090	1,404	6,453
Operable Inventory (d)	257	423	603	670	673	635	396	567

Notes

(a) Abu Dhabi, Dubai and Sharjah.

(b) Includes East Timor exports

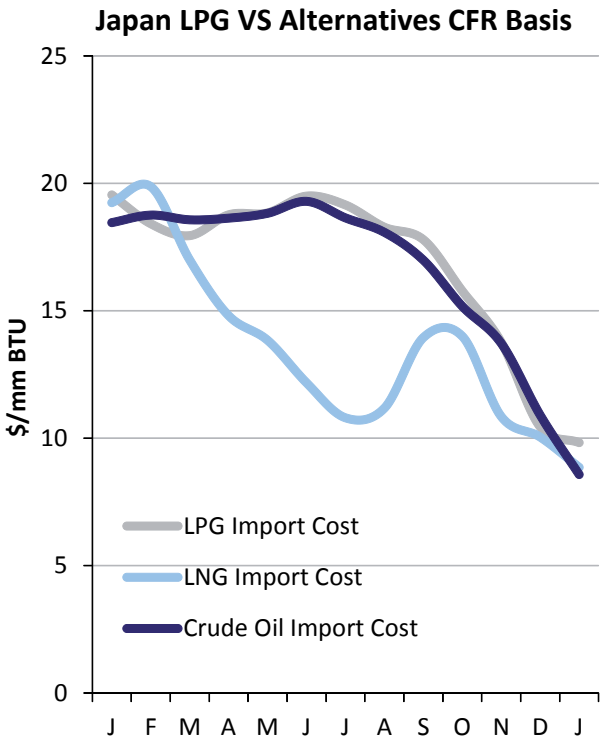
(c) Per Ministry of Finance

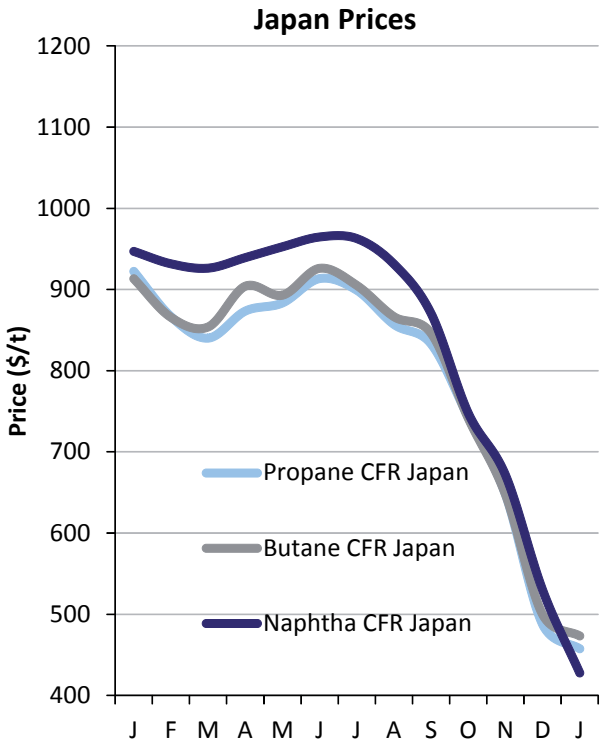
(d) Excludes strategic stockpile. Average

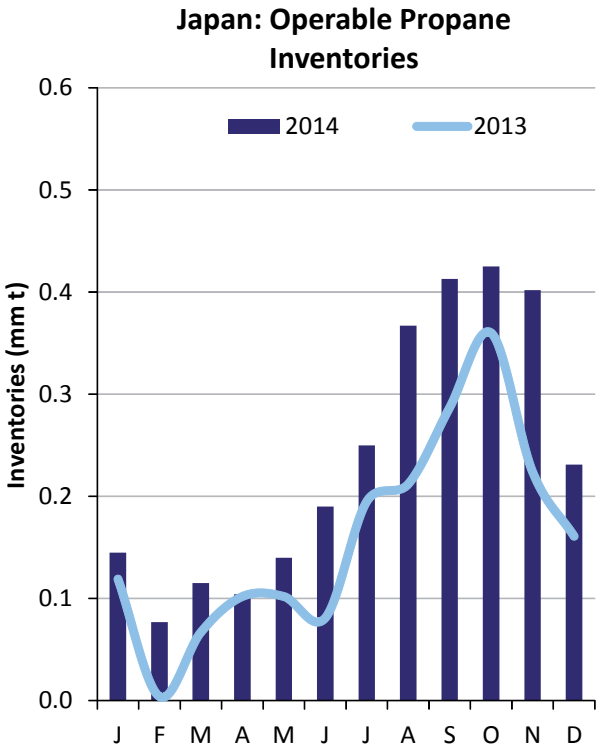
Japan LPG Import Costs			
LPG: Average Import Cost (CFR basis)			
	Yen/MT	$ per ton	Y/$ rate
November	85,280	733	116
December	77,260	647	119
January	68,660	580	118

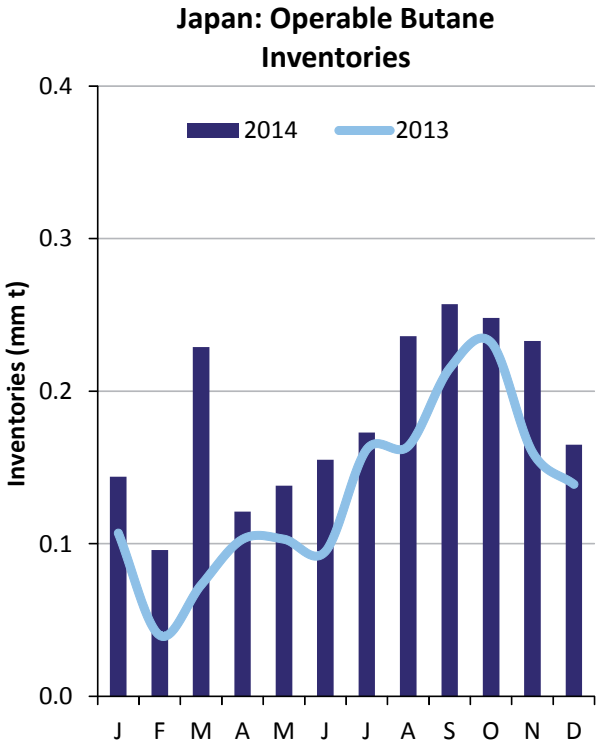
Butane vs Naphtha: CFR Cost			
	Naphtha	Butane	Premium
November	672	648	-24
December	530	500	-30
January	428	473	46

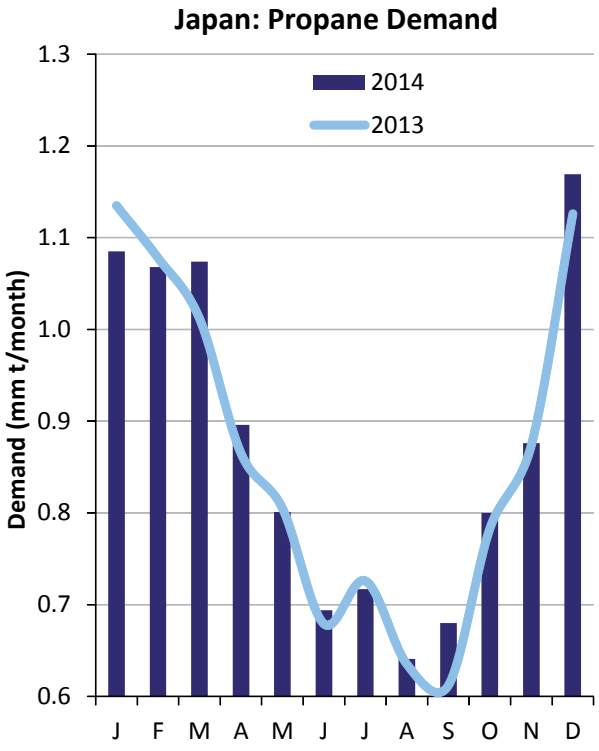
LPG Price Premium (on BTU basis)		
versus	Crude Oil	LNG
November	100%	127%
December	96%	104%
January	115%	111%

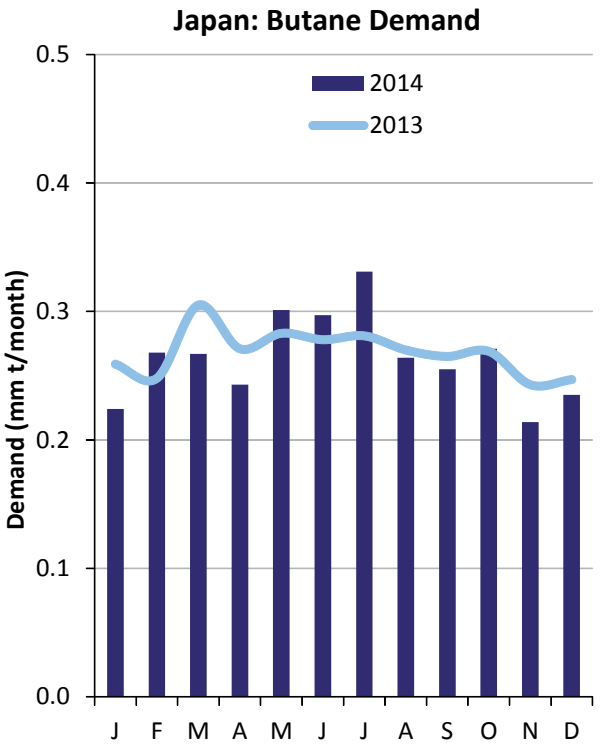





Japan: Operable Propane Inventories
2014
2013
Inventories (mm t)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
J F M A M J J A S O N D

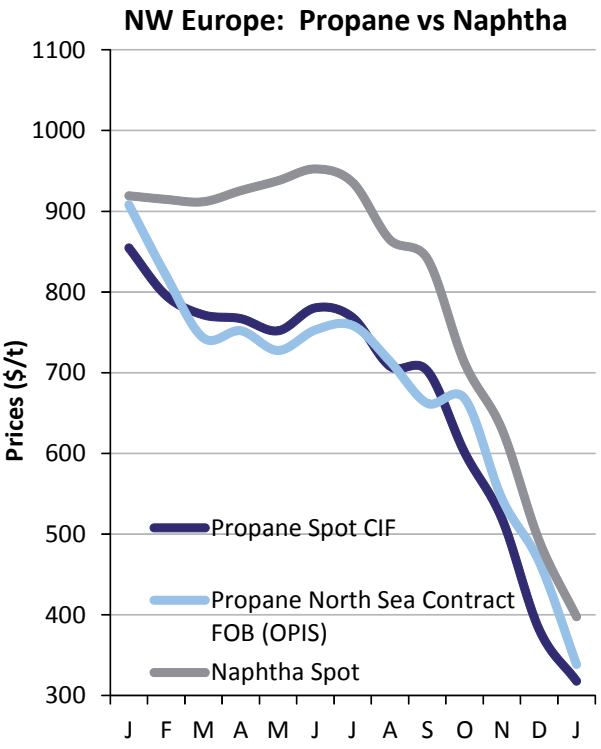

Japan: Operable Butane Inventories
2014
2013
Inventories (mm t)
0.4
0.3
0.2
0.1
0.0
J F M A M J J A S O N D

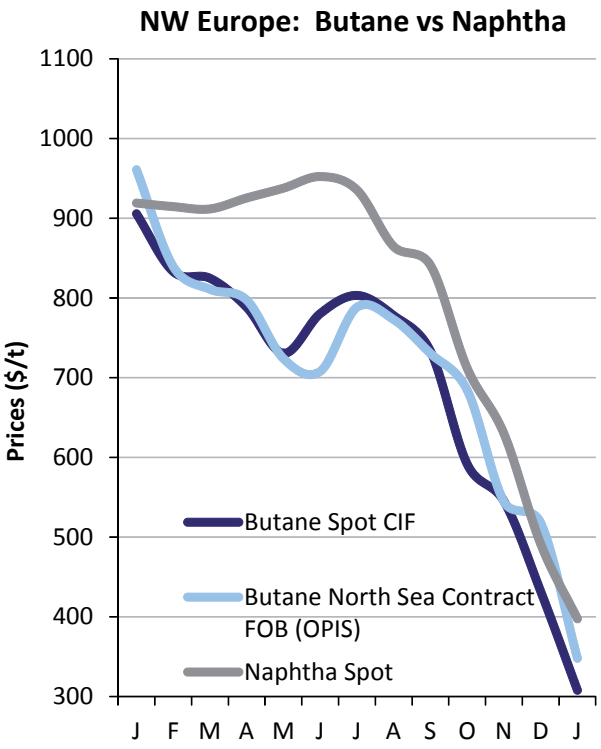

Japan: Propane Demand
2014
2013
Demand (mm t/month)
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
J F M A M J J A S O N D

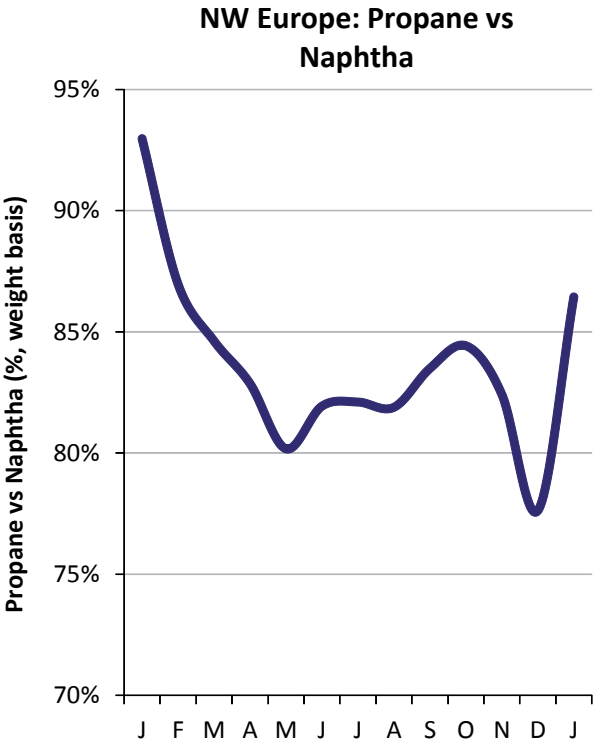

Japan: Butane Demand
2014
2013
Demand (mm t/month)
0.5
0.4
0.3
0.2
0.1
0.0
J F M A M J J A S O N D

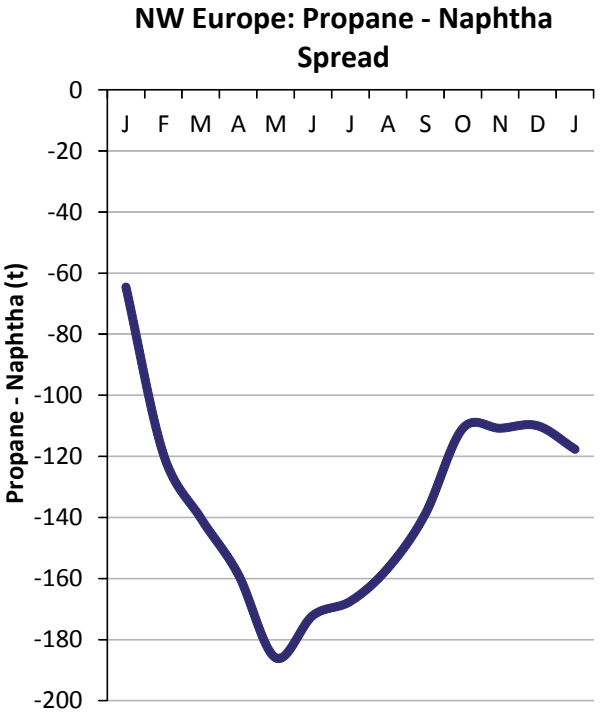
China LPG Imports in 2014 ('000t)								
	H1 2014	Jul	Aug	Sep	Oct	Nov	Dec	H2 2014
Import Destination								
South China	2,072	401	341	435	437	496	463	2,574
East China	852	165	140	179	180	204	190	1,058
North China	241	47	40	51	51	58	54	299
Total	3,164	613	521	665	668	758	707	3,932
Import Origin								
Nearby Sources (mainly pressure)								
Korea	88	0	0	0	0	0	0	1
Malaysia	15	0	21	22	21	2	6	72
elsewhere	42	11	14	15	1	17	14	72
Distant Sources (mainly refrig.)								
Australia	34	0	-	-	-	5	45	50
Middle East								
Iran	-	-	-	-	-	-	-	0
Kuwait	242	-	114	147	0	112	0	372
Qatar	327	44	0	46	0	65	92	247
Saudi Arabia	167	44	51	0	1	0	93	189
UAE	1,686	304	287	342	437	340	290	2,000
USA	222	135	34	70	137	67	92	535
West Africa	113	29	-	-	9	105	52	196
Elsewhere	230	45	-	23	61	47	23	199
SubTotal	3,164	613	521	665	668	758	707	3,932
less Exports								
to Vietnam	-167	-28	-24	-19	-16	-13	-23	-123
to Philippines	0	-55	-59	-47	-57	-59	-58	-335
elsewhere	-314	-52	-50	-53	-49	-43	-46	-292
SubTotal	-677	-135	-133	-119	-121	-116	-127	-750

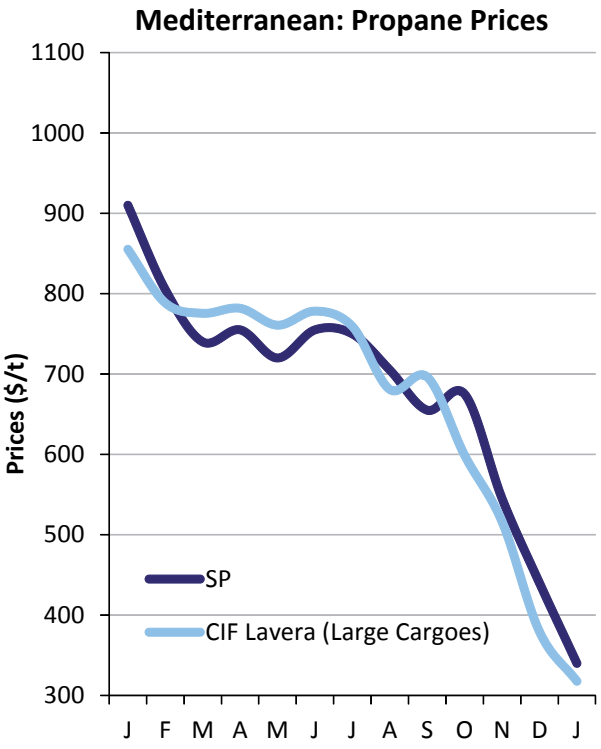
Europe

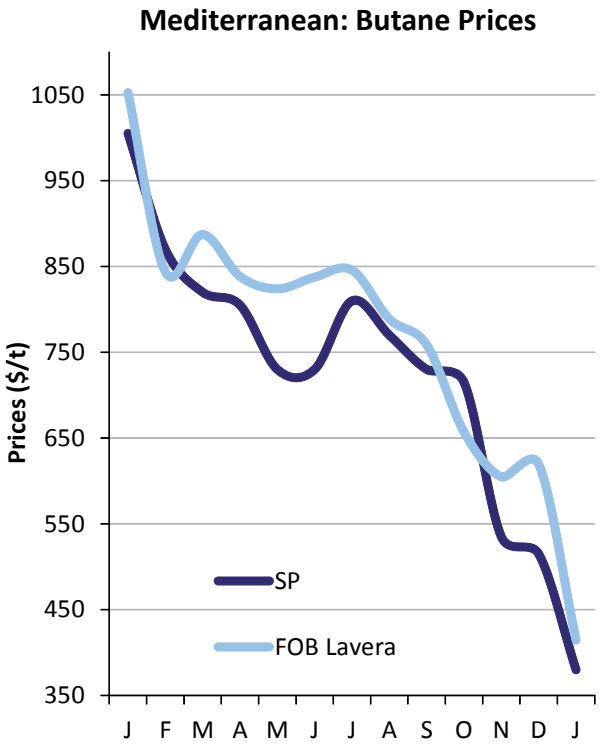

NW Europe: Propane vs Naphtha
Prices ($/t)
1100
1000
900
800
700
600
500
400
300
J F M A M J J A S O N D J
Propane Spot CIF
Propane North Sea Contract FOB (OPIS)
Naphtha Spot


NW Europe: Butane vs Naphtha
Prices ($/t)
1100
1000
900
800
700
600
500
400
300
J F M A M J J A S O N D J
Butane Spot CIF
Butane North Sea Contract FOB (OPIS)
Naphtha Spot


NW Europe: Propane vs Naphtha
Propane vs Naphtha (%, weight basis)
95%
90%
85%
80%
75%
70%
J F M A M J J A S O N D J

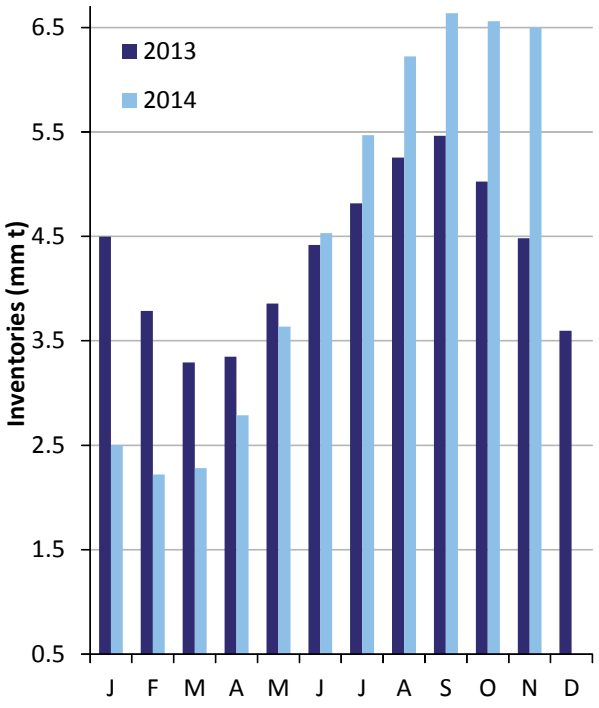

NW Europe: Propane - Naphtha Spread
Propane - Naphtha (t)
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
J F M A M J J A S O N D J


Mediterranean: Propane Prices
Prices ($/t)
1100
1000
900
800
700
600
500
400
300
J F M A M J J A S O N D J
SP
CIF Lavera (Large Cargoes)

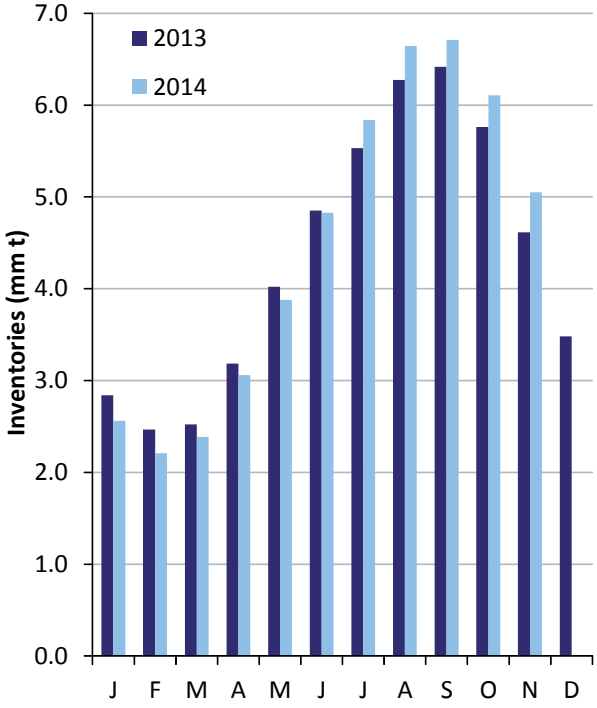

Mediterranean: Butane Prices
Prices ($/t)
1050
950
850
750
650
550
450
350
J F M A M J J A S O N D J
SP
FOB Lavera

USA

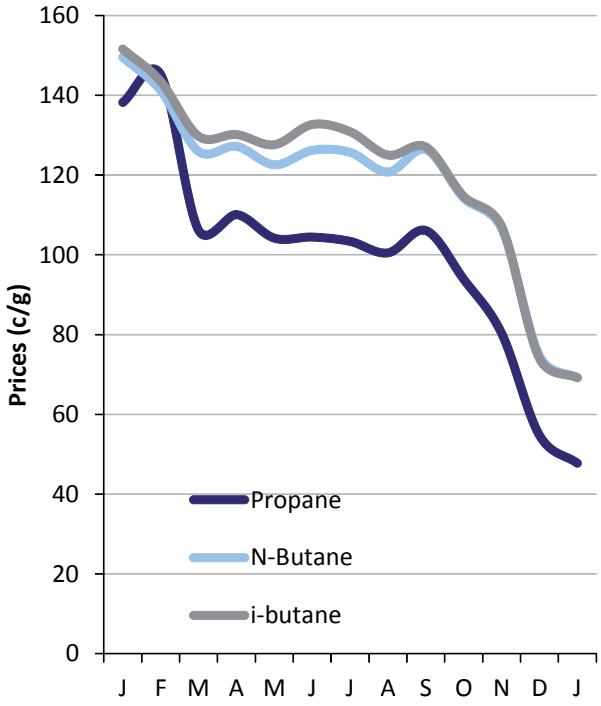
US Propane Inventories



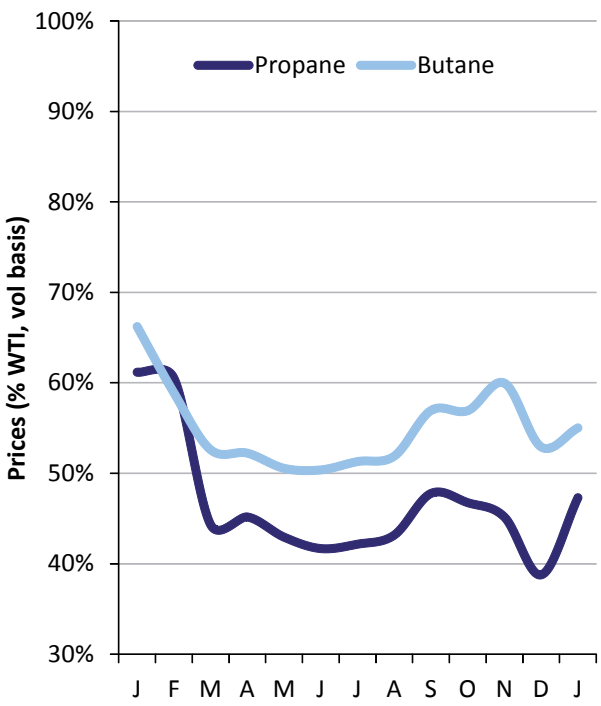
US Butane Inventories



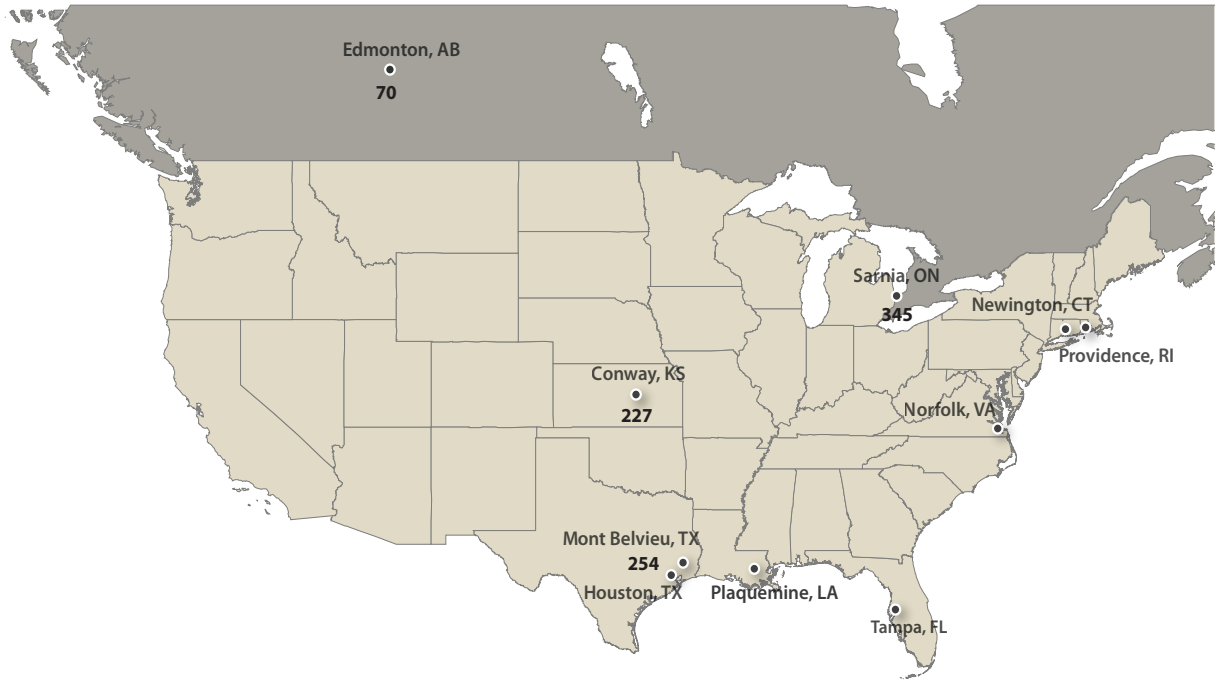
US Gulf: LPG Prices



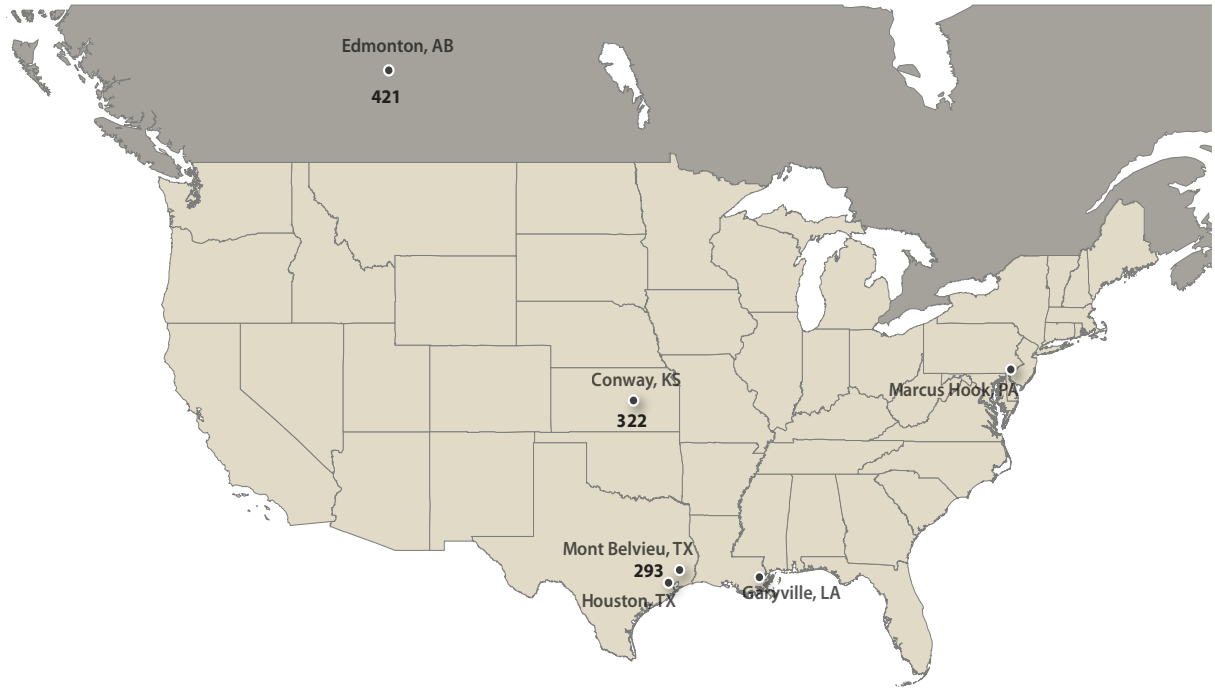
US Gulf: LPG Prices vs Crude



North America: LPG Prices by Location
January 2015



PROPANE
prices end-month ($/t)
521 gal/t



BUTANE
prices end-month ($/t)
452 gal/t

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