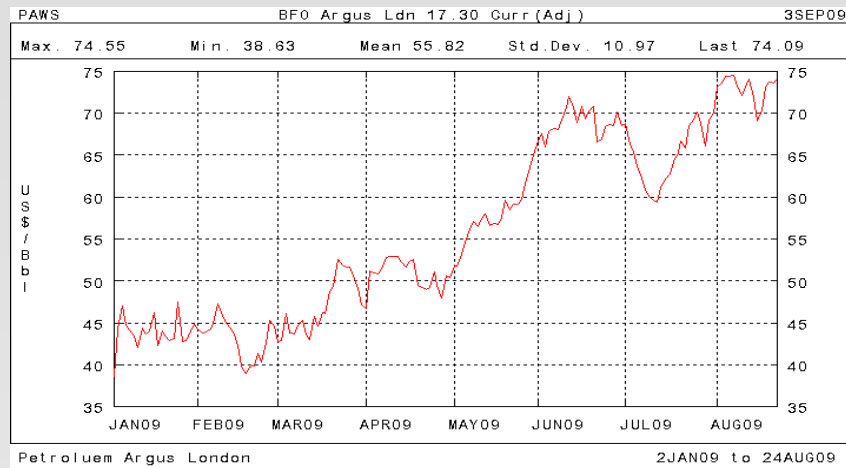

Global Overview of the World LPG Market 2009

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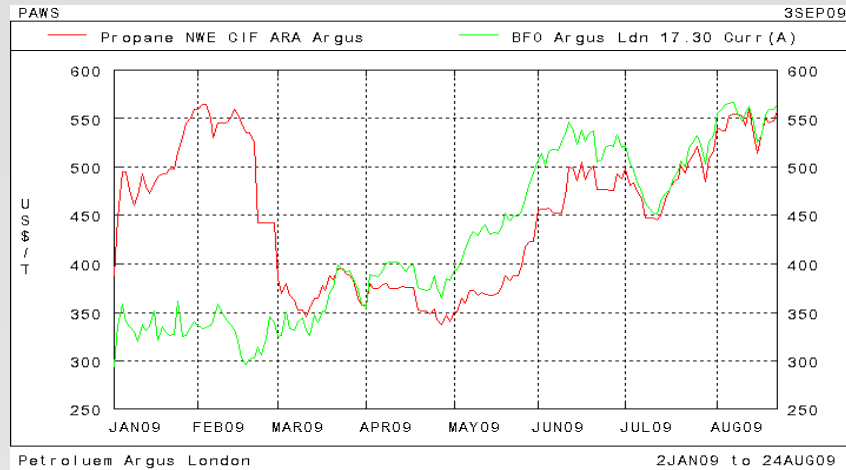


Recovery in crude prices



- Oil prices have recovered from less than \$40/bl to nearly \$75/bl
- Tight crude markets have forced refinery run cuts
- This has raised product prices
- The inability to sell incremental diesel at commercial prices has kept refinery runs down
- This has kept up the price of gasoline which has not experienced the same demand collapse

Strong winter



- **LPG prices were at a high in February because of severe winter weather**
- **This was a relief to many sellers of LPG**
- **Prices then fell to below \$350/t**
- **The summer price recovery has been on the back of petrochemical demand**
- **High crude prices means high naphtha prices so LPG is an attractive feedstock**

Petchem demand

European petrochemical propane demand soars

European petrochemical companies' appetite for propane depends on its relative price to other feedstocks, especially naphtha — and this summer the price has been right. A surge in petrochemical demand for propane is the result.

Propane's discount to naphtha has been trading at record levels since May in the European markets, encouraging strong demand for cheap feedstock from Europe's petrochemical sector. But the approach of winter demand could force the propane market to price itself out of the petrochemical pool.

Benchmark large cargo propane levels on a cif Amsterdam-Rotterdam-Antwerp (ARA) basis are trading at discounts of \$65/t to cif northwest European naphtha — up by \$75/t compared with discounts of \$140/t at the end of May (see graph).

Cif ARA propane is now trading at 87pc of naphtha — a level still low enough to encourage demand from the petrochemical sector — but considerably higher compared with 80pc of naphtha in May and 84pc in June.

The rise in price follows a spate of unprecedented buying interest from the petrochemical sector in July and August. Petrochemical buyers in August alone have taken at least 300,000 t of propane as cracker feedstock, and their appetite still shows little sign of waning.

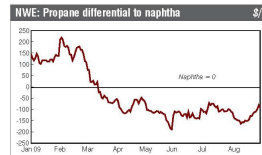
"Propane at \$65/t below naphtha is interesting and will likely remain interesting for the foreseeable future for petrochemicals," a global petrochemical producer says. "We would still be cracking propane at current prices, albeit a lot less. The same is true going forward, because of the contango in propane-naphtha spreads," a leading European petrochemical producer says.

Buying spate

European demand from traders and distributors in August and September has been encouraged by the contango structure of the market's forward curve, with forward prices higher than prompt — another factor behind propane's recovery. European cif ARA swaps in September are trading at discounts of close to \$40/t compared with swaps during the peak winter demand month of January.

"The current propane cracking rate for petrochemical producers is too high — the propane market has to price itself out of the petrochemical pool," a European trader says. "You cannot keep this rate and have winter demand at the same time, and keep propane at \$65/t below naphtha — propane has to appreciate," he says. At current September and October prices, propane still makes economic sense for petrochemical buyers, but with added winter demand, propane in October has "another \$20-30/t upside", the trader says.

"I think you have to be supportive of the propane-naphtha spread going into the winter. If we get any cold weather, this spread will perform. But right now, with the front locking rela-



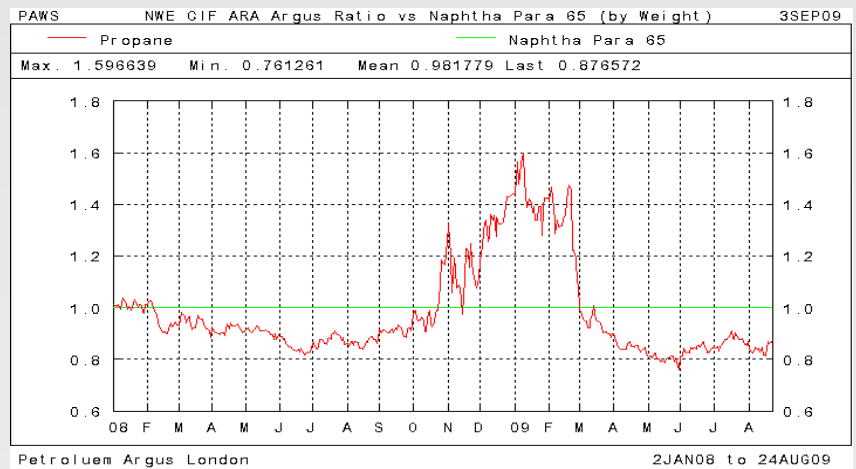
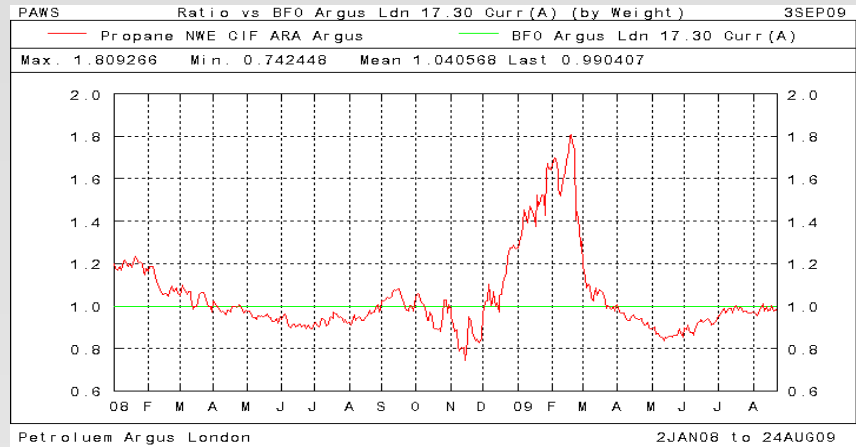
tively heavy [on propane] and the market being in contango, you are incentivised to store propane," another trader says.

Propane cracking economics are dictated by price, but demand as a feedstock is not finite. Ethylene crackers produce the petrochemical industry's most important raw materials — olefins. The main olefin products are ethylene and propylene — used extensively in the plastics industry. Most European crackers are geared towards naphtha as it provides a greater yield of these co-products. "It is the heavier products of the steam cracker that are performing best at the moment, and therefore there is a yield advantage for naphtha," a European petrochemical producer says.

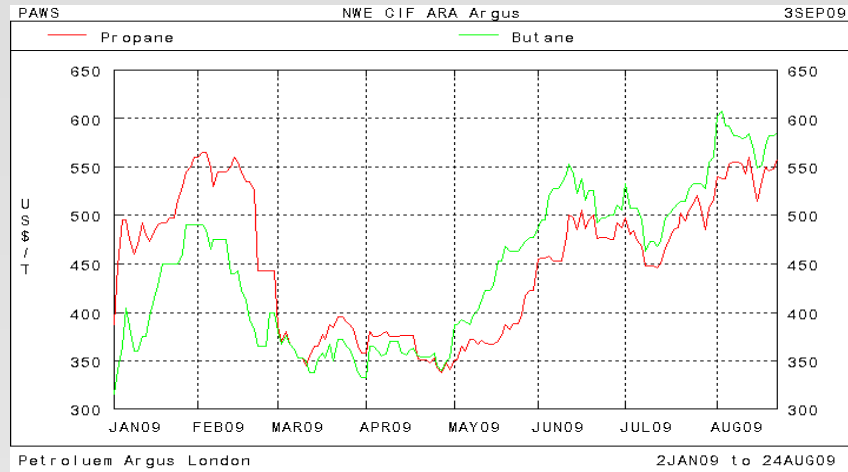
Light hydrocarbon feedstocks ethane, propane and butane yield similar amounts of ethylene to naphtha, but less propylene and butadiene. And European propylene in particular is in short supply. Shell was forced to declare force majeure on all propylene and acetylene contract deliveries for August and September in the middle of August, following technical problems at its 900,000 t/yr ethylene cracker at Moerdijk in the Netherlands. The cracker produces 500,000 t/yr of propylene. Supply constraints were similarly compounded by one of Shell's propylene suppliers declaring force majeure on propylene.

Ethylene supply is similarly tight, with production at 10-year lows because of the global fall in demand for goods manufactured from ethylene and used extensively in the car, construction and plastics industries. Ethylene production in the first quarter fell to 4.479m t — down by 20pc compared with the same period in 2008 (LPGW, 3 June, p10).

But cracker shutdowns and the ensuing sharp reduction in ethylene output has forced up ethylene prices for September. An increase in the European September ethylene contract to \$875/t (\$1.25/t) — up by \$80/t compare with August — has led to concern among ethylene suppliers.



Gasoline demand



- Gasoline demand has resulted in butane taking a premium to propane
- This reverses the winter situation when butane was at a discount

Argus LPG World — Markets 5 August 2009

US butane benefits from alkylate demand

Refining demand for butane and isobutane on the US Gulf coast remains robust, despite a drop in butane prices, as margins for alkylate used in gasoline blending remain attractive.

Non-LDH butane prices at Mont Belvieu eased in July after robust gains in June, when prices surged by 11.2pc month-on-month to reach highs of over 100¢/USG by 26 June. Butane was driven higher as a bullish crude oil market and greater demand for isobutane prompted buyers to lock in volumes.

"Isobutane demand has really been strong. Prices really shot up in June," Houston-based Purvin & Gertz managing consultant Ron Gest says. "If isobutane is going up, then people will be buying normal butane to convert it into isobutane."

Steady demand

Underlying demand for butane and isobutane as a blendstock is expected to remain steady for the rest of the summer, given attractive margins for alkylate. Alkylate is a premium gasoline blending stock because it has exceptional anti-knock properties and is clean burning. Butane's value relative to alkylate fell from 54pc on 1 July to 49pc by 23 July, according to Argus price data. Isobutane's value relative to alkylate fell from 64pc on 1 July to 55pc on 23 July.

Even as butane and isobutane rose in June, natural gas liquids' relative value to gasoline remained relatively low, ending June at 57.6pc. Butane's value to gasoline blendstock Robo remained at 52.79pc at the close of trading on 23 July, after prices reversed course amid uncertainty over the direction of crude oil prices.

Traders at Mont Belvieu use butane as a speculative trade based on its relationship with crude oil prices — as steady buying interest for butane by petrochemical and isomerisation plants creates a relatively liquid and tradeable front-month market. "If you believe crude is going to keep going up, traders see buying butane as the closest thing to a sure bet," a market participant says.

Butane prices reversed course during the first full week of July, reflecting a loss of momentum in crude prices. Butane prices fell by 18.25¢ in only four trading sessions to reach 91¢/USG on 8 July, and then carried on falling throughout the month. The same traders who used butane to "bet" on rising crude are among the first to "sell like crazy and get out from under it", a trader says.

Europe beckons for US butane sellers

Northwest European butane prices are trading at record highs compared with the US, leaving US supply increasingly attractive for Europe's butane buyers.

Supply shortages in the North Sea following a heavy spate of exports from Europe to the US and Asia have pushed benchmark large cargo cif Amsterdam-Rotterdam/Antwerp (ARA) prices to a record high of \$120/t above the US and \$10/t above Asia (see graph). "Too much butane was exported earlier in the spring and early summer out of Europe, which made the market tight by the end of July," a petrochemical butane buyer says.

Saudi Aramco's higher monthly Contract Price (CP) in July and August compared with the benchmark Argus North Sea Index sent Mediterranean buyers looking to pick up cheaper cargoes from northwest Europe. This in turn contributed to the North Sea's supply shortages. "These appear to be less exports from Karsto, Braefoot Bay and Mongstad and increased demand to Turkey and Morocco," a European trader says.

Maintenance at the North Sea's Mongstad terminal, just north of Bergen in Norway, has also undermined North Sea supply. The terminal was forced to close for most of June because of jetty problems. Mongstad is operated by the North Sea's largest producer, Norway's state-controlled Statoil, and produces up to 1.4mm t/yr of both propane and butane.

Despite the widening gap between European and US prices, efforts to bring in cheap butane supply from the US have been frustrated by shipping logistics, because of European petrochemical demand for competitively priced US propane supply. A sailing time of two weeks from the US east coast to northwest Europe, and at least three weeks from the US Gulf, has left traders cautious about fixing cargoes in August. "Get the timing wrong and you could lose a fortune," a European broker says.

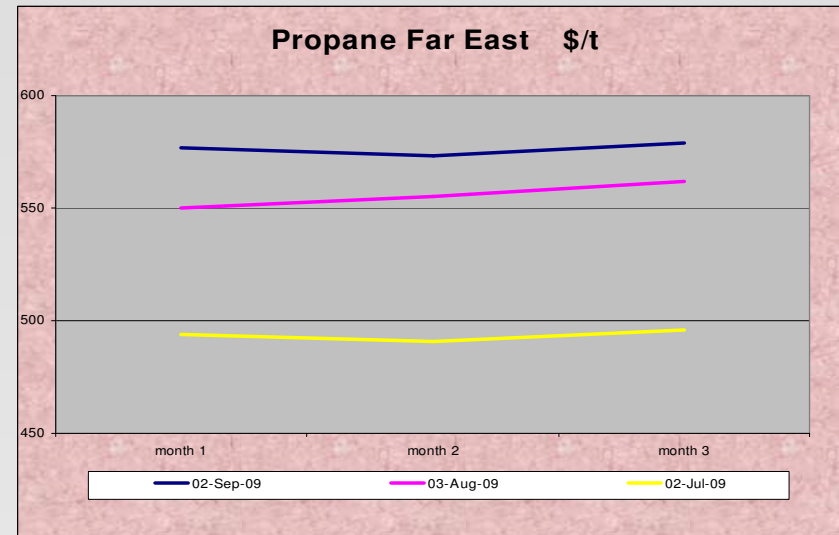
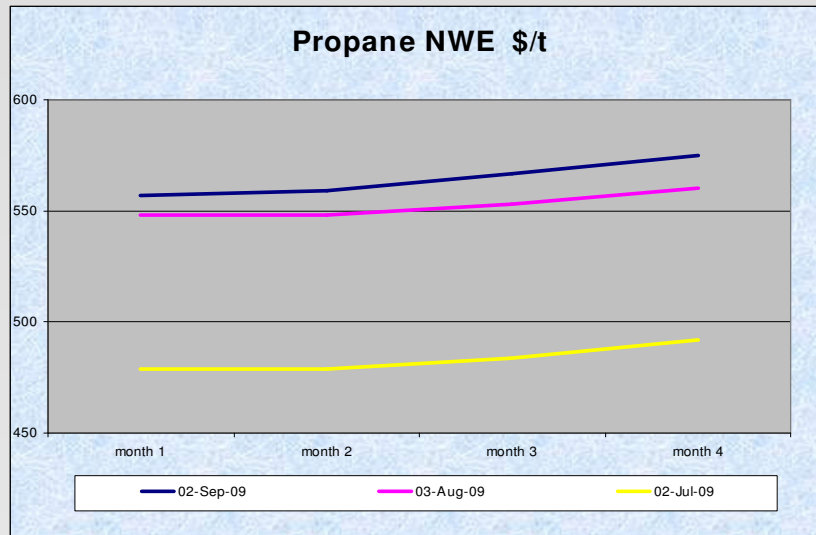
The supply tightness has also been caused by European refiners importing rather than exporting butane for gasoline.

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Autogas demand

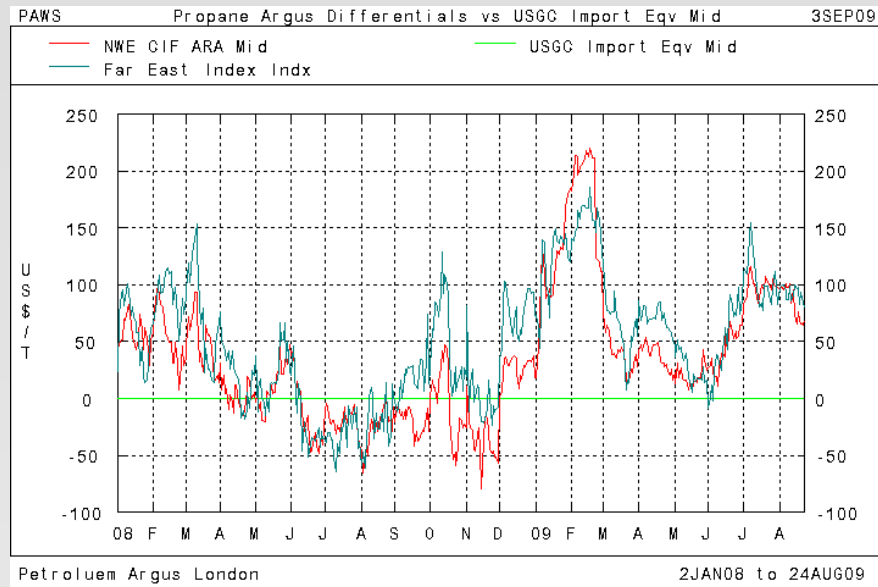
- **Autogas demand is dependent upon taxation policies**
- **Poland has raised taxes on autogas and the demand has declined**
- **Germany has guaranteed lower taxes on autogas compared with gasoline and demand is rising**
- **The UK has agreed on lower taxes on autogas and demand is rising from a low base**
- **Turkey has not applied higher taxes on autogas and demand remains high**

Contango in market



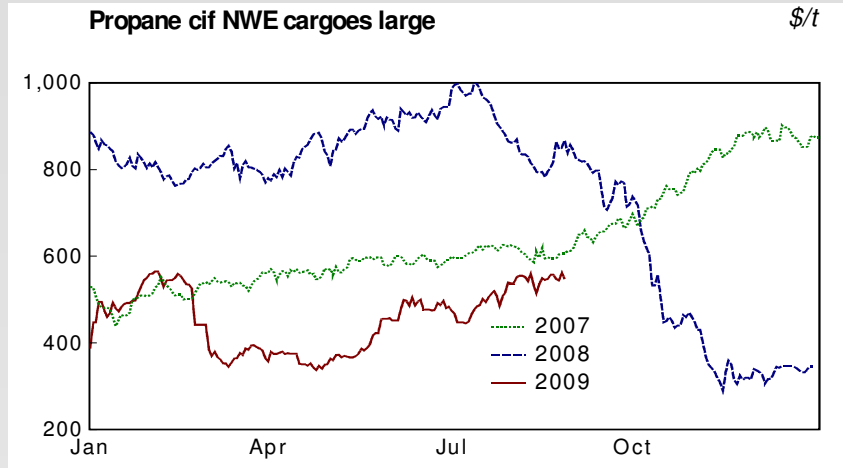
- **Market contango indicates good availability of supply**
- **It provides an opportunity for traders to buy now and sell into the future period**
- **The east Asia market looks more tight than northwest Europe**
- **This is leading to high levels of swap trading in Asia**

Global flows



- The strength is in Europe and Asia
- Supply is flowing out of the US where storage costs are exceptionally cheap

Traditional winter



- A winter like fourth quarter 2007?
- Or a winter like fourth quarter 2009?

Prognosis

- **Crude is fluctuating at a resistance level**
- **The crude contango is causing the see-saw motion in price**
- **The future of Chinese crude demand is uncertain**
- **The gasoline season is ending**
- **Gasoil stocks at record levels**
- **This will mitigate against any winter heating oil price effect**
- **The LPG price contango shows the market is well supplied**
- **LPG supplies will increase with natural gas output and especially LNG output**
- **US propane inventories are high**
- **Natural gas prices in the US are at historic lows compared with oil prices**
- **This brings down the price of US LPG**