Refining and trading: Getting integrated

*GTForum* takes a look at the trend towards greater integration between the refining and trading operations of oil companies

One of the emerging trends in the downstream sector is a shift towards greater integration between refinery operations and trading activities. This appears to be driven by the combination of persistently low margins and high volatility, which often mean that intraday swings in oil product prices can exceed refiners’ margins.

As for the benefits of such a strategy, “some super-efficient export refiners are still being able to average US$5–8/bbl margins through flexibility in operations and dynamic pricing in their trading operations,” said Viren Doshi, senior vice-president, Booz & Co., in his presentation at the ARTC 15th Annual Meeting in Bangkok.

“In the old days, people used to go around the refinery for a monthly plan and, since then, people have moved to a weekly plan. A number of refineries in western Europe are almost adjusting the plan on a daily basis,” Doshi told GTForum.

However, Eric Petela, director, business consulting, AspenTech, a supplier of process industry optimisation software, doesn’t see refiners shifting to daily planning, “simply because there are too many activities that last more than a day”.

“It is no longer good enough to be buying or selling to meet the needs of the refinery. Supply traders and marketing personnel are being asked to use their knowledge of the market and make good trading decisions. Cargoes can be bought and either delivered to the refinery or sold in the open market as opportunities present themselves. In a similar way, products marketing can sell more – or different – products than the refinery can produce, and source what they need from the market,” says Greg Leck, vice-president, global business development, of Triple Point Technology (TPT), one of the companies offering software packages that can help refiners shift towards a more trading-orientated approach.

Similarly, Petela says one area that is becoming increasingly important for refiners is the shift from a “supply-push” model, in which a refinery manager is focused on maximising output, to a “demand-pull” model, which starts with an analysis of the end-user market and is then used to determine which products should be made, in what quantities and where they should be dispatched. Much of the change in his view has been driven by the shift away from high volume, which made maximising output a key concern.

In his presentation at the ARTC, Doshi made the analogy between rail and sail, with the former representing the static plan-led direct approach, and sail representing the more flexible approach where, to get to the same end-game, you may have to make a few turns. He was making the case Rather than being driven by supply concerns, some refiners are emphasising a “sail-like” demand-orientated approach
that, in the case of the former, strategic decisions are made initially and, once determined, the path is fixed; while in the case of the latter, strategic decisions are made constantly. In the case of rail, he said success comes from stage-gated decision-making and efficient execution, while in the case of sail, "success comes from building optionality, being flexible and making smart moves, one after another, depending on the situation as it evolves."

One approach, which Petela says is growing in popularity, is that of collaborative demand forecasting, which allows a company’s sales force to feed in their predictions for demand while they are out in the field. Doshi says that Booz & Co. has "...supported oil companies to become much more dynamic in their integrated margin management processes. This includes refineries. The biggest challenges relate to changing the old paradigm that refineries just do what they are told by supply at the lowest cost and highest reliability. While this is important, refinery people know best the flexibilities they can offer to supply/marketing – if only they were given a better sense of the incentives. Sharing price incentive data with refineries has enabled the refiners to increase their flexibility in swinging their kit to what mattered the most. In one case, the refiners had not realised that marketers were unable to meet all of their needs for high-octane gasoline and that the incentive for moving 95 octane to 98 octane meant so much in terms of the additional income for the integrated business."

The trading-orientated approach is not for everyone, as witnessed by the rise of supply-offtake agreements between refiners and banks, which effectively transfer the trading activities to the banks (see Alexander Osipovich, Refiners seek innovative tools for risk management, http://www.gtforum.com/2158145). One of the key factors behind this trend is the rising cost of inventory. "With the huge crude oil price right now and the corresponding oil product price, refineries are carrying huge amounts of inventory and that represents a massive amount of working capital at a time when the margin on the products is very small," Petela says.

However, Petela makes the point that software packages exist that allow refiners to have greater visibility, knowledge and prediction of their inventory and that those working towards a more precise picture of demand have an advantage in this area. "If you know what your demand is much more precisely, that enables you to manage your inventory much better than you would have done in the past. These things hold together," he says.

Doshi makes the point that the amount of volatility refineries are exposed to varies extensively between regions, with landlocked areas such as the west coast of the US and some refineries in Germany experiencing significant volatility. In the case of the west coast, "depending on the supply/demand balance or the availability of different products, you can see some major swings on a daily basis. You can have one product on import parity and it could turn to export parity very quickly and then the refiners have to very quickly adjust, otherwise they’ll be losing money or making money. The differences between export parity and import parity can be very dramatic," Doshi says.

As far as landlocked German refineries are concerned, Doshi says they are “very closely tied to the marketers and micro-market trading where the volatility on one day is higher than even in Rotterdam. The swings are not incremental little swings between FOB high and FOB low, the swings are between CIF high and FOB low and it can be anywhere within that range in the inland market.”

Doshi says the shift towards a more trading-orientated approach has been most prevalent in “north-west Europe, the Mediterranean and the US Gulf coast where they have had to be more flexible to survive low margins and to leverage high price volatility in their markets. All large oil companies such as Total, BP, Shell and Exxon have moved towards integrated optimisation to greater or lesser extent. However, it has been mostly the independent refiners who have been pacesetting in this area. They have had to in order to survive with their less complex refineries.”

The two most important factors, optionality and volatility, are frequently at odds with one another, Doshi says, in that refineries in areas with high volatility often lack optionality and vice versa. A refinery’s complexity is also a key factor in determining its success with a trading-orientated approach.

"If you have a very simple refinery, there’s clearly a limit to what flexibility you may have to vary the product mix and it also affects the crude prices you can buy. So, the opportunities you have to do something different are drastically reduced, compared with a complex refinery,” Petela says.

The interest from refiners in trading hasn’t been entirely one way, as witnessed by Gunvor Group’s bid for Petroplus’ Antwerp refinery in March 2012, and Klesch’s purchase of the 4.5Mta Heide refinery from Shell in 2010. GTForum approached both companies for comment on the subject of refining/trading integration, but no response was forthcoming from Klesch and a Gunvor Group spokesperson told GTForum that the company was not giving any interviews currently. From the perspective of a trader, “refineries are a bet on long-term crack spreads. However, commodity traders can execute their crude and product trades more profitably if they are asset-backed trades rather than just paper-based. Most traders have physical crude cargoes go through 40 to 60 paper trades before most cargoes go into physical settlement for the refinery,” Doshi says.

One of the simplest ways of unlocking value from high volatility is to continuously monitor the prices of electricity, gas and fuel oil for refinery fuel and to introduce a system that will seamlessly adjust the refinery’s use of these different fuels in response to price movements, Doshi says.

One of the innovations that makes trading integration easier for refiners is the development of software packages, which, according to Leck, “now have the ability to process refinery plans and create forecasted demand and production information that the supply and marketing groups can act upon. This needs to be a seamless process so changes in the plan are immediately visible to the trading group.”

Leck says that TPT’s customers have specifically called for the ability to track their gross refinery margins versus the crude/products spread and for greater use of performance benchmarking – “being able to measure the performance of supply trading or products marketing against predefined market benchmark standards”. Leck also told GTForum that
Refining

One advantage of a greater emphasis on demand in the planning process is greater awareness of inventory levels, an issue that has grown in importance, given the shift towards higher prices for crude and oil products.

refineries are looking for software packages that can optimise the entire supply and trading chain.

“For example, the ability to evaluate a mix of crudes from various cargoes and decide which ones would maximise yields on products produced at the same time can help minimise costs and maximise refinery margins,” Leck says.

Petela says one of the main requests coming from customers of refinery software packages is for greater use of visualisation, given expectations around intuitiveness, due in part to the rise of the X-Box generation and faster rotation of staff between positions.

He also says one area of increasing interest is the use of software packages to help refiners select plans and schedules with high levels of resilience, as simple optimisation models do not take account of the impact of volatility. Such systems allow refiners to make a trade-off between the optimal economic plan and the most resilient plan. This, if used correctly, can “identify where hedging makes more sense, where you have uncertainty that you cannot avoid, but it is critical that you operate in that uncertain area”, Petela says.

For many refiners, Leck says the main problems that have to be overcome when using a commodity management package for the first time as part of a more trading-orientated approach include the need to put the proper oversight and controls in place to monitor the “trading activity”, a possible increase in counterparty risk “as the organisation begins to conduct business with a broader set of clients”, and the need for additional oversight generated by greater use of derivatives contracts.

Doshi says one factor that might cause issues for refiners seeking to adopt a more trading-orientated approach is the impact of the recent “obsession with Solomon and cost reduction”, which may have affected the capability of operators to adjust to sweeping changes. “I think there’s a whole issue of pride in the front line,” Doshi says.

Breaking down the “silo mentality” is one of the most important barriers, says Petela.

“An anecdotal message we say to refiners is that traditionally refinery planning is done at headquarters by planners. They would then send it to the refinery, the refinery scheduler would take one look at it, say there’s no way we can do that, throw it in the bin and carry on doing what he did in the past. That sort of situation is an extreme, but it can happen,” Petela says.

“We’ve put a lot of emphasis into integrating our planning and scheduling tools, such that not only do they share the same economic and mathematical model of the refinery, but the output is easier, more seamless and also promotes communication between the planners and the schedulers, so that in the extreme situation, planners and schedulers are not only starting to sit down together, but some planners are actually becoming planner/schedulers and are doing both jobs,” he adds.

Another key issue identified by Petela is that of personnel, rotation and a lack of resources. “Typically, these days, very few refiners have people in positions who are looking in the longer term at what they should be doing, how they should be looking to improve and what new tools they should be using. A much greater proportion of personnel these days are just doing the day-to-day fire-fighting and operation.”

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