European Refining – Part 1
Historical Perspective and Assessment

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How European refining became a zombie sector

Introduction

Europe’s refining industry has been under stress for an astonishing four decades. Today, the European product market is awash in product from Russia, the US, and the Middle East, and the refining sector is characterised by overcapacity, underutilization, thin margins, and shifting ownership. In a series of three articles, Opportune LLP (“Opportune”), a leading international energy consulting firm, explores the complex dynamics of the European market and the long-term outlook for the refining industry in Europe. In this first article of the series, Opportune analyses the forces affecting the current European market, and how it got to where it is now. The second article will focus on M&A in a European context, including what is for sale, if there are any buyers, and whether there are opportunities. The third article will investigate alternatives to M&A and the rise of asset-backed trading models.

The European refining sector has been unprofitable or marginally profitable for decades with only a few exceptions that include the so-called “golden age” of refining between 2004 and 2008. Global trends, such as a surplus in primary distillation capacity and declining oil demand, started developing in the 1970s and have been persistent issues ever since. This led international oil companies ("IOC") to abandon their original integrated model and slowly decrease exposure to underperforming downstream operations.

Capacity cuts, plant shutdowns, and conversions to storage facilities have historically played a minor role in equilibrating the market lagging behind the contraction in oil demand. In the last few years, the rationalization process has accelerated, largely because of the financial crisis, with c. 2.4 million bpd of capacity retired. This reduction is too little, too late, and significant additional capacity should close to address the market imbalances.

Opportune believes that structural constraints in terms of strong labour unions, stringent environmental laws, insulated inland markets, and prohibitive shutdown costs will inhibit mass-market closures. Expect the European Union and regional governments to intervene by providing financial incentives to convert refining plants and support a reindustrialization process of sites unrelated to the oil and gas sector.

However, we consider there is still potential for the refining sector in Europe for companies with the vision to integrate trading, logistics, and processing; especially those that serve local and regional markets, exploit market distortions, seek operational excellence, and can be creative in using refinery assets. But first, how did we come to this point?

History of refining in Europe

The refining industry in Europe has a long history. It has evolved with the dynamics of changing crude oil supply and the shifting energy needs of its markets. Since the late 1970s, however, the industry has experienced far-reaching changes, which have challenged refiners to keep up.
The early days

European refineries initially developed as public utilities to supply oil products to local communities and fuel oil to power plants. Following strong refined product demand growth in the 1960s, refining capacities ramped up to meet the needs of Europe's fast-growing economies.

However, the second oil price shock of 1979-80 changed all that. The sudden increase in price led to a dramatic decrease in consumption, which created the capacity overhang still seen today. Additionally, significant structural changes affected the industry for decades to come:

- Natural gas from Russia disrupted demand for gas oil used in home heating;
- Development of nuclear power decreased demand for fuel oil used in power generation;
- Tax incentives shifted motor fuel consumption from less efficient petrol engines to more effective diesel engines;
- Middle Eastern producers constructed export refineries to capture more of the value chain.

Structure of the European refining market

European refineries have been historically reliant on crude oil from Russia/CIS (35%), the North Sea (32%), the Middle East (18%), and North and West Africa (15%).
Refineries in Europe have been built to process specific crudes (Brent, Urals, or Middle Eastern) with few plants able to process a broad variety of grades or with the flexibility to exploit market distortions. Decreases in North Sea production, for example, require Northwest European refineries to source crude supplies from farther afield, incurring increased logistical challenges and costs.

Northern and Southern European refineries are exposed to different competitive forces:

- Southern European refineries tend to compete directly with the large exporting refineries of the Middle East; while
- Northern Europe refineries compete with one another and with the refining centers around the Atlantic Basin.

In Europe, there are very few product pipelines and the most of the products move via truck, train, and barge with high transportation costs insulating a refinery’s local market from competition and creating potentially attractive inland market premiums. Some refineries are essential to the regional supply chain.

IOCIs historically played a large role in the European refining sector. This role gradually diminished because of poor margins, the large surplus in primary distillation capacity that developed after the 1970s, and the lack of growth in OECD refined product demand. IOCIs then abandoned their original integrated model, started shifting their business portfolio upstream and decreased their exposure to underperforming downstream operations by reducing refinery capacity and shutting down loss-making assets.

**The market has been slow to equilibrate**

Capacity overhang is a persistent problem of the European refining sector. Refining capacity has been resilient through the years, with capacity cuts and plant shutdowns lagging behind the contraction in oil demand. Despite much speculation among industry players about the inevitability of capacity rationalisation, in the last decades, the market did not equilibrate:

- Since 1992, the number of refining plants decreased from 137 to 97 in 2015 (-29%); while
- Refining capacity decreased from 15.4 mbpd to 14.5 mbpd equivalent, a mere 6% change;
- At the same time, refining utilization remained almost constant at 12.1 mbpd.
A variety of factors precluded market forces from following their natural course, keeping this capacity alive against its will:

- Some refiners, rather than shutting down or converting into storage terminals, have made expensive investments to boost middle distillate production, which was in high demand until the European market became flooded with diesel from the US, Russia, and the Middle East;
- Some countries still view refineries as strategic national assets that are vital to guaranteeing fuel reserves. Fuel security is high in the policy agenda of many government and regulators;
- Strong labour unions, particularly in Southern Europe, regularly opposed to the closure of refineries and/or their transformation into storage terminals because closure would curtail employment and adversely affect local communities;
- High environmental liabilities have made it prohibitively expensive to close refining plants in Europe; operating at breakeven cash margins has been a more attractive option than closure;
- Many refineries were fully depreciated decades ago and were able to recover in the good years, the losses accumulated during the down cycles;
- The structure of the European refining sector consists of several local markets insulated from competition. This supports the economics of refiners that benefit from inland premiums for their products.

**Rationalization Process**

The 2008 financial crisis and market downturn of 2009-2014 accelerated the process of rationalization of the European refining sector with c. 2,350 kbdp of capacity retired. Of this, 1,050 kbdp has been converted in oil storage terminals, logistic hubs for oil products, or biodiesel plants while 1,300 kbdp has been entirely or partially closed.
Many of the retired refineries had catalytic cracking and reforming capacity, but were lacking fuel oil conversion capacity and, consequently, were limited in their ability to run a wide range of crudes. Large and complex refineries, better positioned in the European competitive environment, have accomplished excellent financial results in 2015.

In historical terms, the 2009-2014 rationalization was limited. This period of rationalization was largely driven by the financial crisis, the attendant decrease in demand, and overleveraging of some companies. It is a common view that 1.5 – 2.0 mbpd of refining capacity (more than 10 plants) still needs to close to bring the market back into equilibrium. Of course, closing this gap may prove difficult.

**Outlook for European refining**

The outlook remains guarded. A confluence of weak refined product demand, shifts in product mix, and the advent of very large-scale sophisticated refineries in the Middle East and Asia have created strong headwinds for European refining.

**Decline in oil demand**

Europe is experiencing a decline in refined product demand. The 2008 financial crisis acted as a catalyst for a sharp fall-off in demand (from 2008 to 2012 oil product demand contracted at a compound annual growth rate ("CAGR") of -3%). Since 2012, European demand has largely stabilized at around 14 mbpd approaching an apparent base level needed to carry out transportation activities in the European economy.
The largest percentage losses for European demand have been in residual fuel and gasoline. Transport fuel demand, especially for jet fuel and diesel, has levelled off since 2013.

**Incremental refining capacity outgrows incremental demand**

The growing gap between global incremental refining capacity and incremental oil demand will keep refining margins under pressure. Lower than normal utilization rates will be necessary to avoid product oversupply.
Structural problems for European refiners

European refiners have been struggling compared to their global peers due to structural problems and increasing competition from highly sophisticated refineries in Asia and the Middle East:

- Europe continues to be long on gasoline (exports c. 1 mbpd; 1/3 of the output) and short of diesel importing to meet the shortfall (c. 1.3 mbpd; 1/5 of consumption). In the last few years, investments have been focused on increasing diesel production but sophisticated refineries in other regions have started to flood the market with middle distillates leveraging on their competitive advantages vs. European plants
  - Modern and large-scale refineries in the Middle East have economies of scale and lower operating costs;
  - Russian refineries have been upgraded and started exporting significant volumes of European-grade diesel (10ppm sulphur);
  - Complex refineries in the US have access to cheaper energy and shale oil feedstocks.
- Low distillate output remains a challenge for Europe mainly because of the heavier crude mix and the lower demand for fuel oil and bitumen. European refineries have limited fuel oil upgrading capacity (although important hydrocracking capacity has been added in recent years);
- Higher utility input costs, including those for natural gas and electricity (highest single opex item for refineries), continue to burden European refineries;
- The European Commission set a target of a minimum biofuel energy content of 10% of motor fuels by 2020. This is adding another threat to an already challenged oil product demand with a gradual erosion of the refineries’ market share;
- Refineries face stricter environmental regulations and the ambition to reduce greenhouse gas emissions.

Rapid growth in distillation and conversion capacity in the Middle East and Asia poses the threat of a perpetual global oversupply of refining capacity. In this scenario, the relatively lower complexity of the European refining system suffers from lower utilization and margins while trying to compete against newer, larger, and more sophisticated refineries. In summary, the European market remains the most vulnerable to overcapacity given the twin issues of lacklustre demand and high costs.

Refining margins evolution

European refining margins, set by the global flow of refined products, are influenced by global events. During the period of 2004 - 2008, a period sometimes referred to as the “golden age of refining” because of relatively strong demand growth and tight global refining capacity, European margins were strong. The financial crisis of 2008 abruptly ended strong margins as worldwide refined product demand rapidly declined. After the financial crisis, demand slowly recovered and margins improved again until new capacity came online creating excess supply.
In 2015, positive market conditions created momentum for European refining margins through a combination of factors:

- Low crude oil price;
- Strong global demand for gasoline, in particular in the US (driven by the economic recovery and maintenance of refining plants) and in Asia;
- Solid global demand for naphtha, a feedstock in plastic manufacturing;
- Strong USD/EUR exchange rate.

The year 2015 also marked a reversal of fortune of the two main transportation fuels in Europe, gasoline and diesel:

- For years, diesel had been the fuel of choice in Europe and refiners aimed to maximize its production while reducing gasoline output;
- In 2015, the world faced an excess supply of diesel. Refiners lowered hydrocracker runs and started using lighter crude oil grades with higher yields of gasoline and naphtha;
- Gasoline cracks reached record levels while middle distillates cracks languished.

Refining margins rebounded in 2015 from historical lows in early 2014, and even NWE hydroskimming margins were positive for the most of the year. For the first time in many years, the refining businesses of integrated oil majors (e.g. Shell, Total, BP, ENI) outperformed their upstream divisions.

The unexpected increase in refining margins saved several European refineries from closure. However, the relief was short lived and refining margins deteriorated once again in 2016, with an expectation of continued pressure. Low oil prices spurred record demand growth for motor fuels, which refineries worldwide produced in high quantities. However, high production and a yield switch toward gasoline have flooded the world’s storage tanks and undercut profits. The IEA estimates that by 2021, half of Europe’s gasoline length will have no market in the Atlantic basin, while middle distillates imports will grow by 600 kbpd. Only a reversal in European dieselization will improve
diesel/gasoline balances. In summary, 2015 refining margins were unsustainable: refining overcapacity and increasing diesel imports to Europe are structural challenges that need addressing. This means that poorly positioned refineries need to evaluate alternatives and eventually consider closure or transformation into storage terminals and/or biofuels plants. By 2Q 2016, the integrated oil majors saw refining margins crashing by as much as half from the previous year.

Some refiners reacted to the severe market conditions by implementing restructuring plans and transforming or upgrading their plants in order to compete in the European market by producing more low-sulfur products and biofuels:

- Total is investing in upgrades the Donges (France), Antwerp (Belgium) and Leuna (Germany) refineries;
- Tupras started a new 80,000 bpd coker, an 80,000 bpd hydrocracker, and other upgrading units at its Izmit refinery;
- ExxonMobil is investing in its Antwerp (Belgium) refinery and will expand its Rotterdam hydrocracker.

The implementation of new conversion units would increase the production of diesel fractions, put additional pressure on existing plants, and increase competition within the region. Other companies are putting investments to increase complexity and conversion on hold. The delay is to allow them to see first how the market will evolve and to analyze the specific situations of their assets, depending on configuration and location.

**Can European refining survive?**

European refining is now universally considered a low margin business, and Total, Shell, BP, and ENI are all planning to sell, close or cut their European refining capacity.

The smaller and less complex refineries are most at risk of closure, especially the coastal plants more exposed to competition from imports. Larger, more complex refineries and inland plants with good access to niche markets remain better placed.
Market conditions confront refiners with a complex set of challenges, and not all of them are well equipped to survive.

Opportune believes there is still potential for the sector, but this will largely depend on bold decisions that operators need to take with a matter of urgency:

- Optimizing plant efficiency and operational excellence to reduce costs and improve margins;
- Integration (possibly with petrochemicals) and specialization to serve local markets;
- Crude and product slate flexibility to benefit from prevailing market conditions and price distortions;
- Revamping opportunities (e.g. taking advantage of increased demand in Africa).

Current trends in the crude oil and product markets are challenging the traditional model of European refineries while creating opportunities for sophisticated traders ready to take advantage of refiners’ exposure to product cracks and logistical capabilities.