
Transition in the European Refining Sector: Strategies to meet present and future industry challenges from a Central European perspective

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The European refining industry faces a multiplicity of challenges. New legislation and growing global competition are squeezing margins. Operational and organisational efficiency will hold the key to success and survival for European refiners. Vertical integration with upstream operations and retail markets, as well as on-site horizontal integration between refineries and petrochemical plants are routes to greater resilience.

Current and future European legislative Framework

The current European legislative framework is driven by the 20-20-20 targets,

i.e. a 20 percent reduction in greenhouse gases, a 20 percent renewable share, and a 20 percent increase in energy efficiency. These targets are reflected in the main directives relevant to energy-intensive industries such as refining, namely the:

- *Emissions Trading System Directive (ETS)*
- *Renewable Energy Directive (RED)*
- *Energy Efficiency Directive (EED)*

The Emissions Trading System is designed to reduce carbon emissions by creating an allowance market. The number of allowances is being progressively

lowered under Phase III of the scheme, which runs until 2020, in order to meet the 20 percent target. A benchmark system for the free allocation of CO₂ certificates was introduced for oil refining in 2013. The benchmark is set by the best 10 percent of the refineries; certificates that are not allocated must be purchased on the open market unless this is obviated by carbon saving investments. The purpose of the free allocations is to avoid forcing refining to relocate to regions with less stringent carbon legislation, resulting in the import of carbon-intensive oil products into Europe.

Under the RED, the transport sector

is required to attain a 10 percent renewable share by 2020. In the case of road transport fuels this is to be achieved by blending fossil fuels with biofuels, but technical limitations and shortages of sustainable biomass make this a challenging objective. Proposed amendments to the RED would make compliance still harder to achieve. The RED would include a cap on conventional biofuels and an indirect land use change (ILUC) factor to address the sustainability of biomass. The former amendment would also have a major impact on the chances of hitting the *Fuel Quality Directive (FQD)* carbon reduction targets.

The EED goal is to increase end-use efficiency by 1.5 percent per year. Those responsible for meeting it are the energy suppliers. The derogations granted to EU Member States in transposing the EED will erode market harmonisation.

Another directive aimed directly at the oil industry is the *Fuel Quality Directive (FQD)*. Following the 2009 amendments, the FQD now incorporates a carbon reduction target of 6 percent of fossil road fuels (base year 2010), with compliance to be achieved by blending biofuels. In addition, recent Commission proposals seek to achieve upstream emission reductions counting towards the 6 percent goal by distinguishing between conventional and unconventional crude sources through differential carbon intensity default values. In the absence of a political decision the Commission is currently performing an impact assessment on several carbon intensity differentiation methodologies, from crude-by-crude to EU averaging values. New proposals are expected to be unveiled during the summer.

Further legislation in the pipeline includes the *ETS Backloading and Clean Power for Transport* packages. The former would further shrink the number of CO₂ allowances so as to increase the cost of carbon, thereby stimulating carbon saving investment. The aim is to promote road transport decarbonisation by facilitating the development of electricity, compressed natural gas (CNG), liquefied natural gas (LNG), and – in the longer run – hydrogen infrastructure.

Besides the aforementioned legislation, oil demand is likely to be affected by other legislation including an *Energy Tax Directive (ETD)*, and *ETS in Aviation* and carbon targets for vehicles (including a 95

g/km target for cars).

Finally, the refining industry must also cope with a battery of clean production legislation including the *Industrial Emissions Directive (IED)*.

The Energy Roadmap 2050 plots the long-term perspective. This focuses on further improvements in energy efficiency, and decarbonisation of the economy by between 80 percent and 95 percent depending on the scenario adopted by the Commission. Working towards the decarbonisation target implies making electricity, generated mainly from renewables, the predominant energy form. The consequence would be a massive decline in oil demand. The outcome of the roadmap would be a primary energy share for oil of around 15 percent in 2050, compared to over one-third today.

The EU 20-20-20 targets, and the Energy Roadmap 2050 and Transport Roadmap, have set the scene for the current debate on *Europe's objectives for 2030*. A green paper was recently published on the subject.

Increased global Competition and its Triggers

The EU is a mature oil market with a fully developed capital base. Many of Europe's refineries are relatively small. Declining oil demand due to increased end-use efficiency and other factors will lead to low capacity utilisation, as seen in Southern Europe last year. Imports from the Middle East, the Indian subcontinent and North America are also piling on the pressure on Europe's refining industry. The export refineries have competitive advantages in terms of energy and feedstock costs, or economies of scale, or both. Fierce competition is expected over the next few decades, and numerous refinery closures would be likely even in the absence of the European legislative roadmap.

At the same time changes in the tax regimes of crude-exporting countries such as Russia are set to cause shifts in the composition of oil imports into Europe from crude towards refined products. Russian refineries are responding by expanding their conversion capacities – again adding to the difficulties of EU refiners. The petroleum exporters' move into refining and petrochemicals is a global trend.

Within Europe, energy costs recently reached almost 60 percent of total OPEX,

and we expect further increases. This makes energy efficiency vital for the refining industry, but even if major gains are achieved Europe is unlikely to be able to hold its own on energy costs against the rest of the world, apart from Asia. Meanwhile plans to develop European shale gas and oil reserves have run into strong opposition which is likely to push them back far into the future.

The availability of exports to Europe, especially from energy and feedstock advantaged refineries, is having a major impact on refining margins, which are currently insufficient to fund investment in new or revamped capacity. Moreover, the narrowing heavy–light crude spread bodes ill for refining and marketing margins, and for investment in secondary processing capacity.

Recent trends in product sales and plant closures point to testing times ahead for the refining industry. Since the start of 2011 some 9 percent of European refining capacity has been closed down or mothballed.

Slower growth in the BRIC countries may also mean that the EU refining industry faces stronger headwinds. Products may be rerouted from these markets to other regions including Europe.

Implications for European Energy Supply Security

In the mature EU market existing legislation is already causing the substitution of oil by other primary energy sources.

- Natural gas is widely regarded as an enabler to the carbon free economy. The European roadmaps and alternative fuel package reflect this approach. If the European shale plays are eventually exploited the potential cost advantage of natural gas can accelerate the increase in its primary energy share.
- Coal is recovering because the combination of high oil prices and relatively low carbon costs has made it more attractive as an industrial energy source. The decarbonisation targets appear to be counterproductive. For instance, in Germany coal use grew last year.
- The renewable energy share is expected to rise, with wind, solar, and

hydro generation growing particularly fast. Renewable electricity is still dearer than power from fossil-fuelled thermal stations, but renewables are either mandated or subsidised.

Oil based energy forms are gradually disappearing from almost all end-use sectors except transport. Liquid energy forms will continue to play a major role in transport due to their high energy density and ease of use.

Heavy goods vehicles and aircraft are likely to remain mainly fuelled by oil for some time to come as hybridisation, electrification and natural gas still face significant technical obstacles.

This does not mean that all the liquid transport fuels needed will be refined in Europe. Large quantities of automotive diesel are already being drawn into Europe from Russia and the US Gulf Coast. The European refining industry is unable to meet the demand for diesel, and

investment in new capacity in a contracting overall petroleum product market is unlikely to be an attractive proposition. Instead, swelling fuel imports will probably lead to still more refinery closures.

Europe will be forced to look for answers to the problem of dwindling refining capacity that address supply security and industrial competitiveness concerns at acceptable social and economic cost.

Liquid fuels and the refining industry are mainstays of European economic growth because of their role as sources of energy, petrochemical feedstock, process innovations, and employment.

Getting Things done to Survive

Put simply, the passport to survival in our industry is being better than the rest – but this has many sides.

Efficiency in everything is crucial to sustainable success in the refining business. Efficiencies leveraged by operational or organisational improvements can bring

performance leadership, notably by pruning feedstock inputs and processing losses. Plant-wide optimisation, viewing the entire refinery as a single system, and investment decisions taken in the light of cost-benefit analyses of all sites will be essential. Organisational structures will need to be based on treating multiple sites as part of a single refinery network, permitting quick decisions drawing on the expertise of the entire operation.

Besides increased flexibility as a result of horizontal integration, vertical integration will be a key success factor. This means integrating the entire value chain from the wellhead to the consumer, opening the way for performance leadership.

A well run refining business can also be a platform for petrochemical integration, yielding high value added products – but only where this makes economic sense. A mix of horizontal and vertical integration is probably the best route to a resilient overall refining system. ■