

What is next for petroleum downstream?

New business models are critical in a sector in which the supply of energy for mobility is changing



Petroleum downstream has been adapting to increasing competition and challenging regulations, and is suffering from lower returns than the upstream segment. Industry challenges will intensify, and new energy sources for mobility will impact the entire fuel value chain. Downstream players need to rethink their business models and innovate to protect their share of the mobility market.

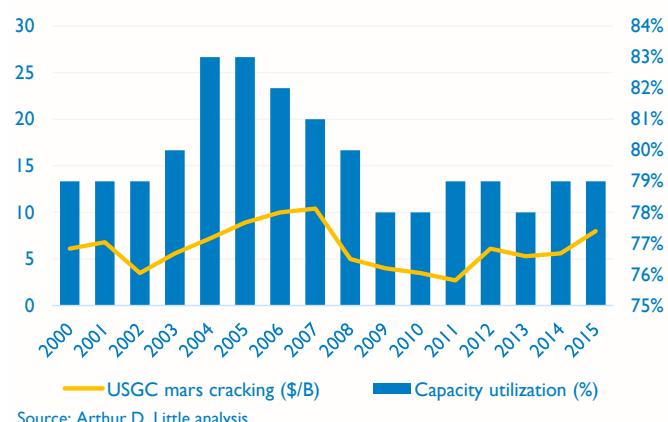
Recent sector trends

Oil downstream has a long history of adapting to fuel-demand evolution by investing in transforming industrial installations, deploying new technologies and expanding service offerings to wholesalers and consumers. Refining and marketing have traditionally been the natural path for crude-oil producers towards vertical integration, aimed at capturing the full margin along the industry's entire value chain. In the past, international brands invested heavily to expand and renovate retail networks, securing outlets for their refinery production and looking for opportunities to grow their non-fuel business.

For decades now, oil downstream has rendered lower returns than upstream, which has made integrated players lose interest in the segment. This fact, combined with intensified competition, tougher regulations, stronger bargaining power of dealers and mounting threats of environmental liabilities, has compelled major oil companies to divest some of their existing downstream operations and refrain from incremental investment in this segment.

On the other hand, a significant portion of the existing refining capacity worldwide is owned by national oil companies, and most of the foreseen capacity additions are expected to come from them. Despite the challenging business environment, national oil companies typically have different drivers and motivations to invest in refining, such as domestic energy supply security and promotion of industrialization, as well as employment in their host countries.

Refining margin vs. Capacity utilization



Source: Arthur D. Little analysis

After a century of domination of refined products as the major energy source for mobility, different sources have recently emerged around the concept of the electric vehicles and are rapidly penetrating the transportation market. New participants in the business of battery-charging stations are gaining market share at the expense of traditional oil downstream players.

Downstream's increasing challenges

Regional capacity mismatch. Growth in crude-oil output is increasingly coming from remote locations farther away from fuel-demand-growth regions. The quality of new crude-oil streams does not always suit the configuration of local or regional refineries. Consequently, crude oil- and product-transit time has been increasing for over two decades, and this trend

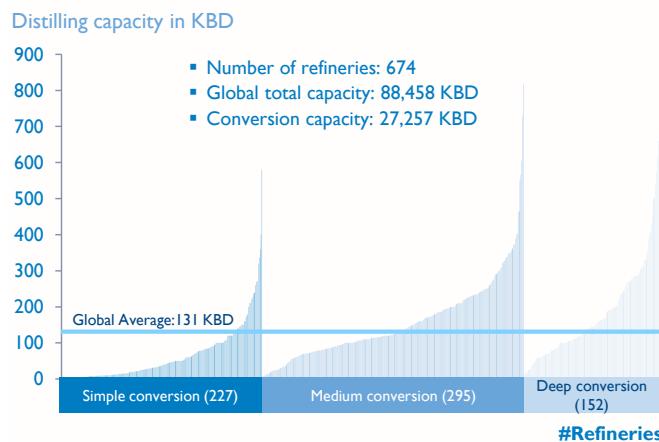
is expected to continue. The impact of higher supply costs and broader exposure to international price variations cannot always be transferred to refined product prices.

Margin volatility and market rigidity. Relatively small variations in global or regional refining capacity utilization can have a significant impact on refining gross margins. Refiners focused on supplying domestic markets are not always able to adjust their prices to international levels due to political and regulatory pressures.

Diminishing feedstock quality and stricter product specifications. On the feedstock side, average worldwide produced crude oil is getting heavier and its sulfur content is increasing. On the demand side, diesel is the fastest-growing fuel, while fuel-oil consumption is under increasing environmental pressures, with stricter restrictions on use in marine transportation. Fuel-quality specs in most countries are becoming tougher, especially on sulfur content, driven by environmental pressures on engine emissions. Some refinery-product qualities have been virtually swept away from developed markets, making it harder for refiners to find a commercial destination for them.

Increasing capital-investment requirements. Refiners are forced to invest continuously in upgrading their facilities just to stay in business. Refinery assets are aging, available crude-oil diets and product-demand patterns change over time, and regulations on product specs are evolving. Often, such investments allow refiners to improve or maintain their competitive position, but financial returns are, in most cases, below expected levels. Construction costs inflation and significant delays, and cost over-runs during EPC complicate the picture, making it harder for downstream capital-expenditure plans to compete with more promising upstream opportunities.

World refining conversion capacity



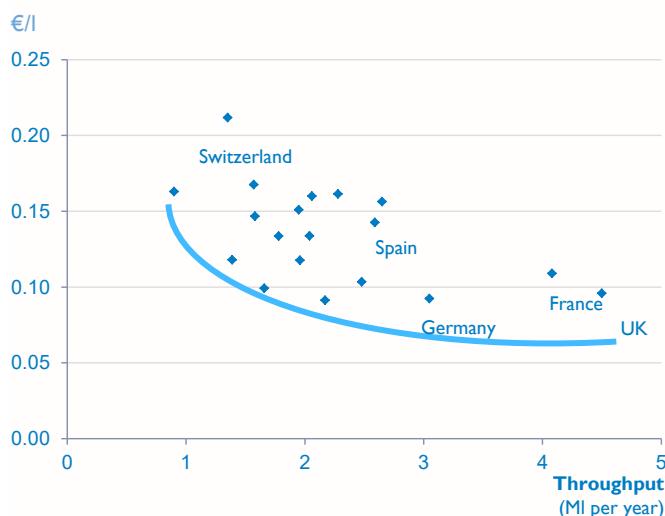
Vulnerable or unviable refineries. World refining capacity combines facilities of heterogeneous scales and configurations, with a significant percentage of them not reaching a competitive

scale or lacking the deep conversion configuration needed to match the product-demand mix. As cities developed, hundreds of refining units ended up surrounded by dense urban areas, and now they either lack space to grow or are impeded by environmental regulations to do so. Excessive manpower costs in countries with rigid labor regimes and high energy costs in many places threaten the economic viability of a significant number of refineries around the world. Sooner or later many of these will be forced to shut down.

Difficulty to replicate successful models. Very large-scale refining complexes, including integrated petrochemical units, will continue to be the most competitive assets in the industry, provided that they can get access to low-cost energy sources and are well positioned to supply large and growing markets. Niche refineries with location or transportation shields, or those protected by preferential duties or that benefit from fiscal incentives, are also likely to succeed. However, many of these refinery models are legacies of the past, and it is becoming increasingly difficult to justify investment in new grassroots refineries.

Erosion of margins in fuel distribution. Fuel distribution is largely seen as a low ROCE segment, and petrol retailers are now focusing on increasing the non-fuel contribution of their business. Market share of independent retailers has been growing since the end of the last century, further deteriorating the historical margins of this segment. Moreover, LPG and compressed natural gas are also increasing their market share in the retail channel, and refiners' ability to capture the wholesale distribution margin is becoming more limited.

Fuel retail margins by country vs. site throughput



Challenging retail economics. In the context of demand-pattern changes, increasing vehicle autonomy, growing price transparency and more aggressive competition from alternative-mobility energy sources, the optimal number of retail sites to supply a given market is no longer related to the market's areal

extension or the number of vehicles in circulation. The strong relationship between fuel-retail margin and a number of sites continues, and in any regulated or oligopolistic market the margin level defines the number of retail points for that market. Also, rising real estate values in urban centers are modifying the relative value and opportunity cost of petrol stations in a company's network.

What to do next?

In light of this challenging business context, not only will oil downstream players need to excel in the execution of their operational and commercial strategies, but they will also be forced to innovate and transform their business models in order to survive.

Focus on excellence

Downstream companies around the globe are already making significant efforts to maintain and improve their competitive positions and ensure acceptable returns for their capital. Some of the initiatives that need to be continued and reinforced are:

Feedstock-supply optimization. Securing a cost-efficient long-term crude-oil supply that captures logistics synergies is an essential success factor for refiners. Minimizing price-exposure periods (i.e., pricing at own terminal vs. FOB) is a critical aspect of an efficient supply strategy.

Hedging to protect working-capital value. Many refining companies are very vulnerable to strong fluctuations in fuel prices while maintaining significant inventories of crude oil and intermediary products feedstock. To mitigate the downside of decreasing fuel prices, crude-price coverages are increasingly available and used by players to limit this exposure.

Physical upstream integration as a strategic edge. The downstream sector will continue to undergo traditional cycles that are typical of capital-intensive industries, and are relatively independent of upstream segment cycles. But in some regions and markets, physical upstream integration can provide downstream players with price-risk coverage other than potentially securing an optimum crude slate for their refining operations. Integration also provides options to process or market own crude depending on market conditions.

Ongoing efficiency improvement in industrial facilities. Refining is a business in which there are often opportunities to produce an extra barrel or yield a higher-value product mix. Companies should keep making efforts to improve margins at the industrial level by focusing on aspects such as product-quality giveaway, energy efficiency of units and equipment, optimization of plant turnarounds, and application of technologies for advanced control and monitoring.

Customizing non-fuel offerings. Retailers must work harder than ever to attract customers. Diversified levels of service mean the proper services for each individual or group out of a diverse customer base. There is no model that suits all markets, regions or types of stations, but in most markets there is room to increase the share of convenience stores in the total retail food-service business. However, customer behaviors regarding food service vary a lot from one market to another.

Business-Model transformation

Despite their strong efforts to improve competitive position, improve efficiency and deploy value-oriented initiatives, the subsistence of downstream players is still threatened. For these reasons it is imperative that these players start to rethink their business models, redesign their portfolios and fight harder than ever to maintain their current market share of the mobility market. Some potential themes to explore include:

New portfolio strategies. Downstream companies need to review their international portfolios, reshaping their asset bases to adapt to new market scenarios and trends. Some portfolio decisions need to consider refinery closures in mature markets and addition of new refining capacity and/or upgrading of industrial plants in emerging markets. Timing and location of product-quality upgrades will be key for defending margins. Other critical portfolio decisions include reshaping of distribution and retail operations in aspects such as network models and ownership.

Secure positions through the entire petroleum value chain to get "optionality" for trading operations. International commerce and trading will continue to grow fast, but typical arbitrage opportunities are now limited by greater market transparency. International downstream players could, however, enhance their trading operations by owning or leasing processing capacity, infrastructure, storage, shipping, distribution and retail positions. These positions allow traders to exercise options such as processing or not, or holding inventories for later sales depending on market "arbitrage" opportunities through the value chain.

Innovate to protect mobility market share. Downstream oil players are in a privileged position to continue to be the main energy suppliers of the mobility/transportation sector. Major downstream oil players have been reluctant to take a strong position in other energy sources, such as biofuels, which are perceived as competition due to their traditional fuel offerings. It is time to recognize that sooner or later, refined products will lose a significant market share of energy supply to the mobility sector and start taking an active role in developing solutions for that sector. Downstream players will need to take an active role in the supply of alternative-energy sources for mobility. Another paradigm to overcome is the idea that retail transactions are circumscribed to the fuel-retail sites. It is becoming clear that

emerging energy sources for mobility suppliers will offer a variety of locations for filling/charging vehicles.

Move from “fuel” to “energy-station” model to capture penetration of competitive mobility energy sources and move out of currently typical outlets. This transition will take time, however; in some markets there is already growing demand for electric cars, and electricity “supercharge” would be an attractive service downstream oil companies could provide – not necessarily within the fuel-station boundary. Another related opportunity is the commercialization of hydrogen gas for powering hydrogen fuel cell vehicles.

Insight for the executives

- Downstream oil industries will face increasing challenges in terms of industrial configuration and efficiency, alternative energy sources competition and customer purchasing-behavior sophistication.
- Profits and return on capital employed in downstream oil will continue to be uneven across different markets and players around the world.
- More than ever, customizing types and levels of service in the wholesale and retail channels would help secure market share for those players that can anticipate sector and customer trends. Any strategy should include multidisciplinary partners and alliances for both traditional and non-traditional offerings.
- The energy-source mix of the mobility sector will change dramatically. Penetration of cleaner energies will happen faster in developed countries than in emerging economies or countries with refined-product surpluses.
- Refining and distribution portfolio decisions need to consider when, where and to what extent these trends will impact the traditional downstream business, and the best way to build a position in the value chain of other energy sources, such as electricity brokerage.
- Retail strategies should consider serving the market with an enlarged menu of energy products to defend the share of the mobility market and leverage the value of non-energy transactions.
- Anticipating the need for transformation and finding the proper balance between focus on current performance and preparing for the future are more important than ever for oil downstream players.

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