



INFRASTRUCTURE DEVELOPMENT OF DOWNSTREAM OIL INDUSTRY

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ABOUT THE AUTHOR



Syed Zavar Haider is an eminent professional of the downstream oil industry. He has recently joined Oil Companies Advisory Council (OCAC) as CEO. With over 32 years of diversified local and overseas experience of having worked in leading national and multinational companies, he has previously served in important positions in Pak-Arab Refinery Limited, OCAC and ExxonMobil. For the past 10 years, he had been working as a General Manager of Pak-Arab Refinery Limited.

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ABSTRACT

Since problems in downstream sector are directly affecting common man consuming the energy products, it is critically important to pay attention to the challenges and problems faced by downstream oil industry in Pakistan. After highlighting the issues related to indigenous production of petroleum products, insufficient capacity, and demand-supply gap, the monograph includes important recommendation with regard to infrastructure development in the sector. In particular, the rationale behind competing fuels has been provided to encourage a policy change supporting use of diesel, petrol, CNG and LPG in motor vehicles.

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Introduction

Keeping in consideration the important roles of refining, distributing and selling the petroleum products, the downstream sector has direct association with consumers of oil and gas industry. Henceforth, the challenges faced by this sector are more discernible to common man. Since downstream sectors covers multiple important activities, the challenges it faces are broader in range comprising issues related to crude supply through indigenous production, refining, supply chain distribution, marketing and retailing of petroleum products. The key challenges to downstream sector of Pakistan are highlighted herein, followed by bulleted recommendations for improvement in infrastructure development.

Challenges to Downstream Sector

1. Lack of Indigenous Production

A brief overview of the production and consumption in the energy sector can give insight to a major issue in the downstream sector: lack of indigenous production. A large percentage of Pakistan's energy supply is through imported petroleum products from Saudi Arabia, UAE, and other gulf countries. In fiscal year 2017-18, the consumption of petroleum products for both energy and non-energy sector was close to 25.7 million ton, which is roughly equivalent to 525 thousand barrels per day (bpd). Of this, close to 500,000 bpd (24.7 million ton) was provided through imports. In comparison, the local production of indigenous crude oil in the same fiscal year was around 80,000 bpd, which amounts to only 15% of total consumption.

From economic perspective, the petroleum products sales is roughly around Rs. 2.3 trillion or 22 billion USD (with exchange rate of Rs. 105 per dollar). This amounts to 8-9% of our documented economy. During the last year, the country's total import bill was 12.4 billion dollar when exchange rate against-Pakistani rupee was 105. However, after adding cost of consumption, product processing, and petroleum product at same rate, our previous year's import bill will jump to 16 billion dollar at current exchange rate which is about 140 rupees a dollar. In addition to high economic cost, this heavy dependence on oil imports exposes the country to the vagaries of geopolitical situations, integrity of supply chain, and foreign exchange fluctuations. Therefore, we desperately need to pursue local production of oil and gas through enhancing and expanding the function of upstream sector.

2. Insufficient Refining Capacity

The refining capacity at local level is insufficient to fulfill our demand, ultimately burdening our economy with heavy import bills of refined petroleum products. In Fiscal year 2017-18, local refining was approximately 282,000 bpd only, which was around 54% of our needs. Consequently slightly more than 50 percent of our need were met through imported refined petroleum products.

Figure 1 provides the typical product mix of a refinery in fiscal year 2016-17 and 2017-18. As can be noted, not much difference has been made in the two years, with production percentage of diesel is 40-45%, 30 percent furnace oil, about 10 percent of jet fuel and kerosene, and about 20 percent motor gasoline. Efficient oil refineries which produce less furnace oil and fulfill our needs are necessary to sustain our total consumption.

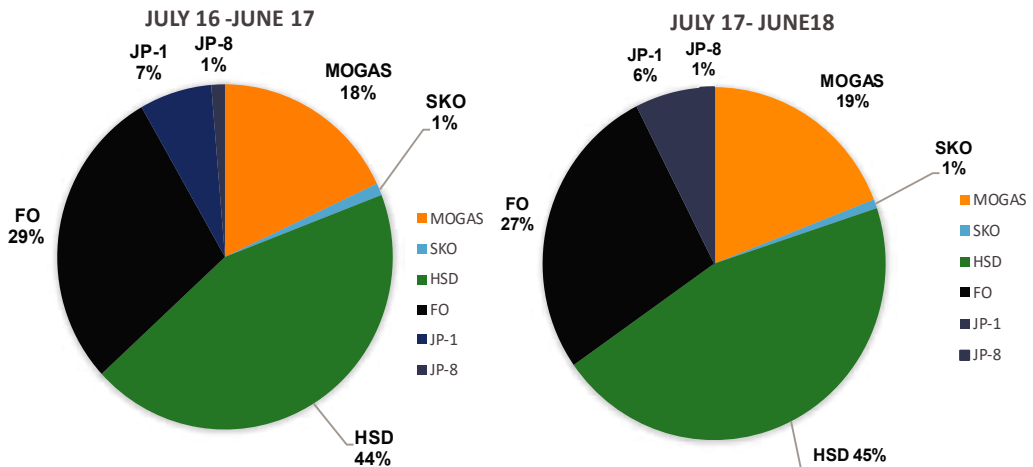


Figure 1: Typical Product Mix of Local Refineries in Pakistan

3. Demand Supply Gap

Based on projected GDP growth of 5%, various studies have estimated the demand of petroleum products in the country to be around 50 MT/Annum or 1 million bpd by 2030, which is twice the present consumption already impacting heavily on foreign exchange, downstream industry, and port infrastructure. The rise in demand of gasoline is in particular related to the rise of gasoline consuming vehicles on road. Furthermore, CPEC is expected to bring additional traffic of Trucks/Containers Carriers in the country which will also increase Diesel requirement.

It is estimated that during last 5 years the average growth of motor gasoline is about 17 percent which is double of our demand of motor gasoline. Simultaneously, high speed diesel consumption is growing at 6 percent. Only these two products are constituting 65 percent of our total energy needs, as evident from figures below:

Motor Gasoline Sales (2017-18)	≈	7.4 Million MT (29%)	} 64%
High Speed Diesel Sales (2017-18)	≈	9.1 Million MT (35%)	
Other Products (2017-18)	≈	9.2 Million MT (36%)	
Total Sales	≈	25.7 Million MT (100%)	

Recommendations for Downstream Infrastructure Development

1. Competing Fuels for Transportation Sector

Currently, Pakistan has total four oil piers: three at Karachi Port while one at Port Qasim running at their full pace but have limited capacity to cater national needs. The one at the three at Kemaari Port is quite old which requires immediate repair. Therefore, we need to rationalize the competing fuels in motor vehicles because we have to have a policy where are we are going to position diesel, petrol, CNG and LPG alongside each other. The product positioning is necessary keeping in view their past and future growth, available infrastructure, and its impact on foreign exchange.

2. Mass-Transit Public Transportation System

Mass transit public system in intra-city and intercity is a necessary required to reduce consumption of motor gasoline. In particular, railway has to be improved so to encourage travelling through train in place of cars and buses. Also, for inter-city transport metro buses and subways projects needs to be initiated. Policy makers should also keep in view the future of electric vehicles in Pakistan. As electric and hybrid cars have already been introduced in Europe, the forces of globalization will soon bring them to the road of Pakistan. Hence, a master-level planning is required for transportation, with active engagement of all relevant ministries like Ports, Shipping, Energy and Production. All commitments in Hydrocarbons, should also incorporate some role of Electric/Hybrid cars in future.

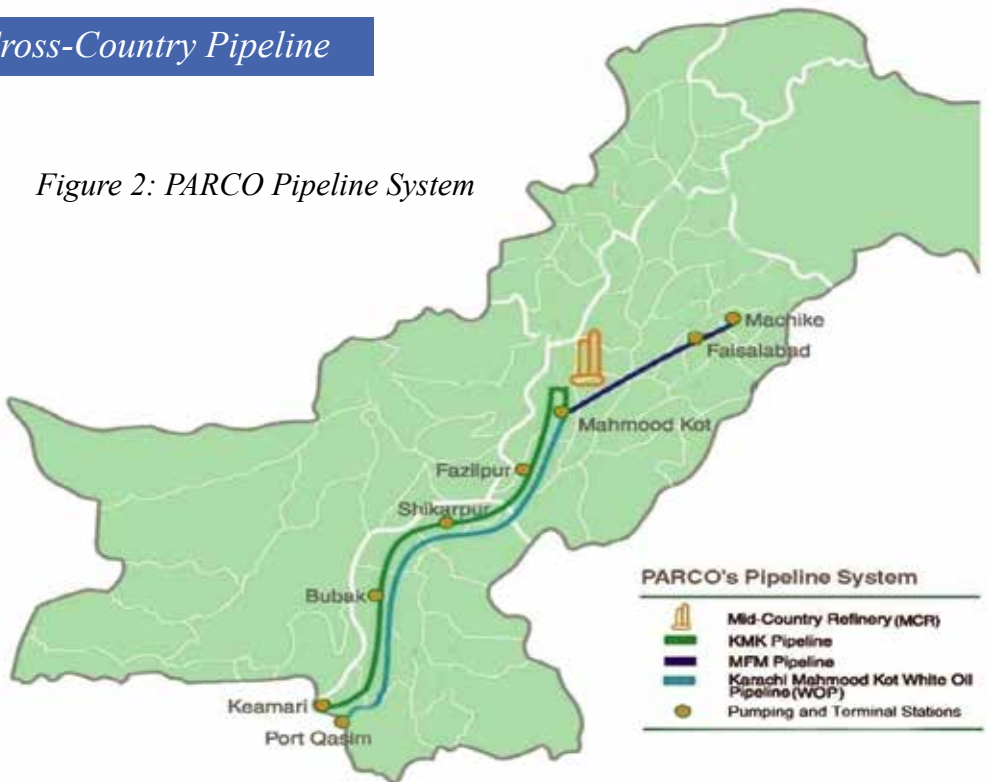
3. Improving Ports Infrastructure

In 2017-18, three oil piers at KPT handled closed to 14 million tons through 284 vessels of crude oil and petroleum products. On the other hand, during the same period, Port Qasim handled 8 million tons with about 149 vessels and the average size of the tanker was 55 thousand tons. While BYCO refinery solely handled about 2.7 million with 42 vessels, the average size of the vessel is 64 thousand tons. Due to the issue of not having the enough number of ports, it is recommended to reduce the number of vessels, and for that, to increase the size of the vessels. However, it may not materialize due to draft constraints. Therefore, our port infrastructure needs to be improved so we can get bigger vessels because it results in saving in freights. The solution to this problem lies with deeper draft and permission to build storages at Keamari by OMCs/refineries, so as to receive bigger vessels to improve Oil Pier efficiency.

Night Navigation at Port Qasim/FOTCO is also required to improve Port utilization. Another important recommendation with regard to improvement in port infrastructure is to plan another Oil Jetty at PQA. This additional oil jetty is needed to handle motor gasoline volumes being shifted from Keamari after completion of WOP Multi Product Project in mid-2019.

4. Cross-Country Pipeline

Figure 2: PARCO Pipeline System



To improve transportation of petroleum products, there is urgent need of cross country pipelines. It has been proved that the product movement through the pipelines is the safest, most environmental -friendly and most economical option. Pipelines also contribute to reducing wear & tear of the roads/bridges, congestion and traffic hazard on the road⁸. At present, PARCO has a network of 2000 km of pipeline with three main Cross Country Oil Pipelines:

- ◆ The White Oil Pipeline (WOP) running from the Port Qasim to Mahmood Kot which carries diesel and in mid-2019 it will also be going to carry petrol also.
- ◆ The Korangi – MahmoodKot (KMK) pipeline that carries crude oil from Keamari to Korangi and Korangi to MahmoodKot where a refinery is located.
- ◆ The MahmoodKot-Faisalabad (MFM) pipeline transporting HSD

Another pipeline named Machike –Tarrujabba Pipeline (near Peshawar) is already under consideration. Yet we need more oil pipelines to ensure smooth operations and energy security.

In addition to cross-country pipelines, Pakistan also needs to build cross border pipeline like Iran Pakistan Gas Pipeline (IPI) and Turkmenistan, Afghanistan, Pakistan Pipeline (TAPI). While these named pipelines are planned to transport gas only, we can build a simultaneous system to transport crude oil pipeline to augment energy security and relief the pressure from the ports of Karachi.

5. Improving Storage Capacity

Additional tankages at the Ports (KPT & FOTCO) are required for optimization of Oil Pier capacities, reduce queuing/waiting of the vessels and ensure supply chain continuity. Additional Tankages are required in the up country to make available petroleum products throughout the country at all times to account for operational exigencies relating to vessels arrivals at the Ports, movement of the product through roads & pipelines, weather conditions, geopolitical situation in the region.

Conclusion

For a comprehensive energy security policy that answers all challenges to downstream oil sector, it is imperative to rationalize the role of competing fuels. In addition, refineries should be considered as the strategic assets of the country and their smooth running should be ensured through uplifting the share of all petroleum products in the refinery mix. A balanced energy mix from refinery is critical to maintain the supply chain integrity in the country. Also, investments in New Refineries should be done to reduce the Product Deficit in the country. However, attracting such an investment can be challenging for two reasons: first, developing new refineries is a capital intensive investment that requires billions of dollars and second, the rate of return in a refinery project is usually lower than other infrastructural projects related to automotive or fertilizer industry. To deal with this problem, the government needs to offer certain incentives for investment on refineries.

Currently, the country needs 2-3 refineries and the cost of a 200 thousand or 250 thousand barrels refinery is about 6-7 billion dollar per refinery. If we want to have energy security in Oil and downstream sector we need investment about 23 billion dollars so that we have the infrastructure which would have refineries, pipelines and storages to handle the current growth. This is a huge challenge which needs to be deliberated upon in the future.

Notes

¹ Oil Companies Advisory Council

² Oil Companies Advisory Council

³ Oil Companies Advisory Council

⁴ Oil Companies Advisory Council

⁵ Oil Companies Advisory Council

⁶ The average size of the vessel was 48 thousand tons

⁷ Ambissi Ambituuni, Jaime M. Amezaga, and David Werner. "Risk assessment of petroleum product transportation by road: A framework for regulatory improvement." *Safety Science* 79 (2015): 324-335.

⁸ Oil Companies Advisory Council



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