IMPORT SUBSTITUTION OPPORTUNITIES

INVESTING IN REFINERIES

The Federation of Pakistan Chambers of Commerce & Industry

Policy Advisory Board

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The authors are grateful to Cnergyico (BYCO), and National refinery limited (NRL) for their valuable feedback and support in the preparation of the report.

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CAGR	Compound Annual Growth Rate
EBS	Export Bonus Scheme
EBV	Export Bonus Voucher
FO	Furnace Oil
GDP	Gross Domestic Product
HSD	High Speed Diesel
IEA	International Energy Agency
IFEM	In-Freight Equalization Margin
IS	Import Substitution
LPG	Liquid Petroleum Gas
MMT	Million Metric Tons
MS	Motor Spirit
MVA	Manufacturing Value Added
OCAC	Oil Companies Advisory Council
OGRA	Oil & Gas Regulatory Authority
OPEC	Organization of the Petroleum Exporting Countries
USMCA	US-Mexico Canada Agreement

Executive Summary

Protectionism and anti-globalization sentiments have picked momentum in the post Brexit and US-China trade war era. The disruption in the global supply chain in the recent pandemic has led countries to rethink within region and consider inward-looking trade policies.

Pakistan is facing consistent balance of payment difficulties for the past many decades coupled with an increasing trade deficit and currency depreciation. Pakistan's tariff structure relative to the economic growth, manufacturing, industry, and agriculture value-added for the past four decades (1980-2020) has been analyzed in the report. Policy instruments used for tariff liberalization cushioned trade deficit. In the year 1999, Pakistan's weighted average tariff was 43 percent, which declined to 17.5 percent in 2005. The graphical analysis in enclosure explains that tariff liberalization has had a detrimental effect on economic growth and key economic sectors while Pakistan's trade deficit tends to increase with tariff liberalization.

The reports highlight the opportunities for import substitution in key sectors to inhibit the pace of dollar outflow. We have selected sectors that constitute a significant share of our imports, already have domestic production but are unable to meet domestic demand. The report also purposes an import substitution and export promotion model for industrialization in Pakistan.

Around 18.3 USD billion imports were targeted for evaluating import substitution opportunities and have considered petroleum, steel and iron scrap, raw cotton, and oilseeds in our series of reports. A combined savings of USD 10.5 billion can be achieved by adopting sector-wise import substitution policies.

The current report highlights import substitution opportunities by investing in refineries in Pakistan. Higher international oil prices have increased the value of imports thereby increasing deficit in the balance of payment to unsustainable levels. Oil bill may continue to grow in value unless international oil prices recede in the near future.

In the current balance of payment crisis, it has become difficult to manage the ballooning trade deficit and outflow of dollars. In the current fiscal year, 2021-22 import value of crude oil and refined petroleum products import increased by USD 9.4 billion as compared to the same period in 2020-2021. Crude oil imports increased by USD 2.5 billion while refined petroleum products increased by USD 6.9 billion confirming that crude and refined petroleum products have been one of the major causes of dollar outflow. In spite of having refining facilities in the country, we are importing refined products due to limited capacity at a cost of foreign exchange. Surprisingly, the high refining margin benefit has not been shared.

Study reveals that Pakistan's five major oil refining facilities have a combined capacity of 19.4 million MT, however, due to low utilization rates refined production has remained low. Per OCAC, during FY 2020-21, utilization rates remained at 60 percent despite increased imports of refined products to meet country fuel demand.. This is because, most of the refineries are based on old hydro-skimming technology and are designed to produce 30 percent of furnace oil and major reason for the decrease in utilization rate due to alternate fuels now part of the energy mix of the country. Up-gradation to hydrocracking technology will improve utilization rates and increase production of motor spirit (MS) and high-speed diesel (HSD). Therefore to an extent higher imports in refined products can be reduced by investment to enhance utilization rate and with an increase in refining capacity in the country by installing new refinery of larger capacity.

With an increase in the utilization rate of 75 percent for existing refineries combined with the induction of a new refinery with an additional annual capacity of 5Mtons, savings of around USD 3.7 billion could be achieved in three years' time from financial close.

Investment in technologically advanced new cracking facility or combined with the refinery can provide further opportunities in petrochemicals. Pakistan imports around 1.2 million tons of olefin and aromatics for different industries.

Petrochemicals cost around USD 2 billion in annual imports. These imports can be substituted through the adoption of hydrocracking technology by the refinery sector which can then produce petrochemicals for the local industries and for export markets.

At the current annual capacity of 19 million tons with a utilization rate of 70 percent refineries can process 14.2 million tons of crude oil and can produce non-energy products of 2 million tons at a yield of 14 percent. This yield is based on an average for the last 5 years of the refinery industry. Production of 2 million tons can yield olefin and aromatics of 0.66 million tons which can help reduce import dependency and save around USD 1 billion in import bill. Up-gradation and induction of new technology with investment of USD4-5 billion could save foreign exchange of USD 4.7 billion in three years and create a major impact on the economy of Pakistan. Refineries have to date not upgraded despite deemed duty and extension in deregulation dates since mid 2000.

The report also highlights the strategies to be adopted for import substitution and proposes efficiency-based protection that aims to increase market competitiveness and establishes a level playing field for refineries with incentives based on their efficiency and productivity.

For the short term and 1st phase of import substitution, we propose de-regulation of fuel prices by 2025; fixation of IFEM and dealer margins abolishment resulting in same market pricing in a Province; OMCs to maintain 40 days of storage in each Province with severe penalty for non compliance custom duty on crude as well as on refined products, PDL and Sales Tax would continue to be prerogative of GOP; tax holiday to be tagged with increased in utilization rates; deemed duty/tariff protection should remain 7.5% for MS and HSD till 2025 and utilized only for up-gradation. Deemed duty should be applicable on production/utilization rate of 50% or more of name plate capacity, and it should be abolished in 2025 or upon completion of up-gradation, whichever is earlier

For the medium/long term we propose incentivizing investment in new refineries, existing ones to increase their capacity including utilization rates and encouraging production of petrochemicals; private and/or government-to-government collaboration should be facilitated for investing in refinery facility; a tax-free zone for refineries be allowed. For domestic consumption, sales tax,duty, PDL etc be applied, while for exports non be applicable,; refineries be mandated to develop regional markets; export rebates/tax incentives should be given on exports of petrochemicals and refined products but be based on performance; government should also contribute to reduction of transportation cost of petroleum products by channelizing through railways, Private sector collaborate to build pipelines to also reduce cost of transportation along the value chain.

1. Introduction

Protectionism and anti-globalization sentiments have gained momentum in the world ever since the global financial crisis, the rise of the US and China trade war, Brexit, and the recent US-Mexico Canada (USMCA) agreement[1]. The disruption in the global supply chain in the recent pandemic has led countries to rethink more on regionalism and inward-looking trade policies. Besides this modern form of import substitution (IS), the idea was much popular in the post-world war era[2] when countries suffered from the shortage of foreign exchange and low availability of manufactured goods exports from industrialized countries. Thus, developing countries followed the dual policy objective of building their national industries and protecting national sovereignty. Developing countries such as East Asia, South East Asia, and Latin American economies adopted IS policies in the 1950s and 1960s with varying experiences. However, IS was soon lifted from the world with the emergence of the *Washington consensus* that favored trade and financial liberalization and a free-market economy.

Certain policy instruments have been devised to implement IS such as; tariff and non-tariff measures, quantitative restrictions, tax breaks, subsidies, and government loans. Other long-term measures include investment in education, infrastructure, and research for industries. Proponents of IS-based industrialization believe in the notion of *"learning by doing"* while those in favor of trade liberalization consider it a tool for *Technological and knowledge transfer*. Raul Prebisch (1950) presented the import substitution theory based on countries that export primary (raw) products and import manufactured final goods. His study showed that developing countries' terms of trade will always be worsening if they keep on exporting raw materials in exchange for value-added goods. Productivity enhancement in primary products will only benefit those, producing final goods. Prebisch also emphasized the role of government in protecting the infant industries.

Rodrik (2016), highlights some of the reasons for premature de-industrialization experienced by developing countries in their transition from tariff protection to liberalization. Firstly, without building their manufacturing firms to have a comparative advantage in the world market they opened them to foreign competition. Thus, developing countries became a net importer of goods for which an import substitution process was initiated, reversing the process. Secondly, relative prices of manufactured goods declined because of developed countries' comparative advantage and relocation of manufacturing bases to other locations. Only those countries survived these low prices that were at a better stage of comparative advantage in their production.

1.1. Rise and Fall of Import Substitution in Pakistan

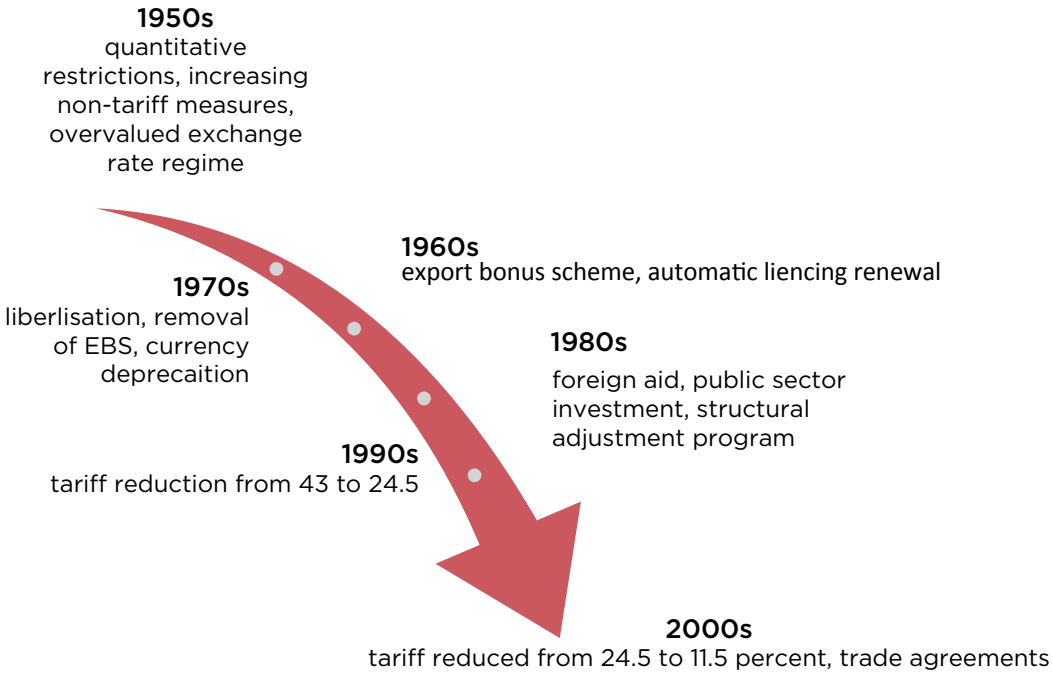
Pakistan adopted an import substitution policy in the 1950s by employing quantitative restrictions, increasing non-tariff measures, and by applying overvalued exchange rate regime. The basic objective was to promote industrialization and reduce the burden on the balance of payment. In the 1960s, Pakistan adopted an export growth strategy along with

[1]USMCA agreement aims to empower North Americans by increasing their reliance on their domestic industry instead of relying on other regions of the world. Only 10% of goods traded are allowed to be outsourced from other regions. Secondly, increasing labor wages to the level of the US as to restrict US companies' movement and maintaining the level playing field for all member parties.

[2]Most of the developed countries were colonizers with a strong industrial base, they used their colonies to extract raw material and made them dependent on their exports of final manufactured goods. This not only built colonizers' industrial base but also deteriorated the potential of their colonies' industrial structure. In the post-world war era, most of the developing countries adopted import substitution to promote industrialization and to protect their national sovereignty.

import substitution by initiating an export bonus scheme (EBS) for exporters. The policy favored a multiple exchange rate regime with controlled imports while incentivizing exporters through EBS, as they were allowed to import consumer goods, raw materials, and capital goods subsidized by *Export Bonus Vouchers* (EBV)[3]. Automatic renewal of import licensing[4] for raw material and consumer goods import was also a step towards trade liberalization. In the 1960s share of the manufacturing value-added contribution in the GDP and manufactured exports increased. The private sector and businesses were supported. Later in the 1970's trade liberalization, policies were applied by eliminating the EBS and promoting currency depreciation. Nationalization and public sector investment in large-scale manufacturing surged in this era. Cement, oil refineries, fertilizers, and other heavy industries were nationalized.

In the 1980s, public sector investment, foreign aid, tariff reduction, and structural adjustment program further added the trade liberalization measures. In the 1990s, Pakistan significantly reduced its maximum tariff rate to 45 percent from 225 (1986-87). While Pakistan's weighted average tariff was cut down to 16.5 percent in 2002.



In the subsequent sub-section, we have analyzed Pakistan's tariff structure relative to the economic growth, manufacturing, and industry value added for the past four decades.

1.2. Pakistan's Economic Growth and Tariff Liberalization (1980-2020)

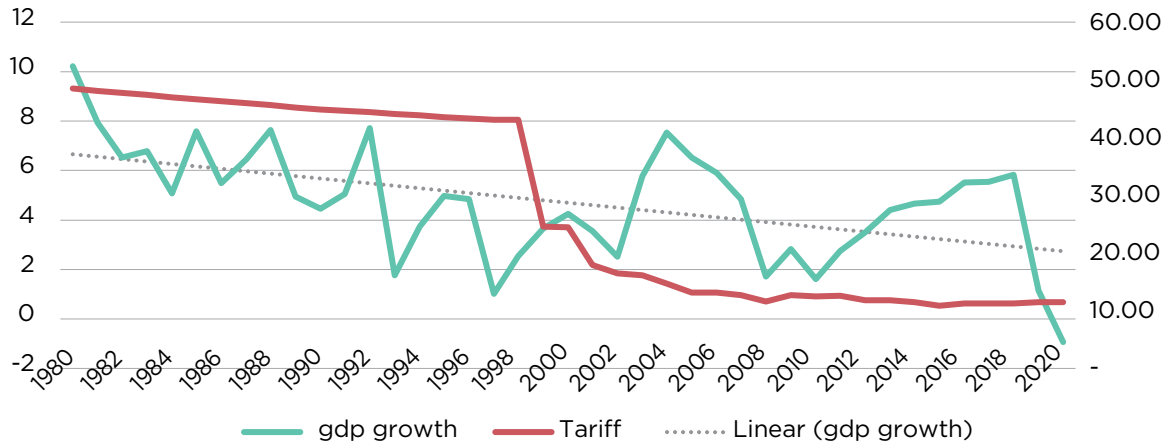
Pakistan's economic growth experienced fluctuating trend since the 1980s. A structural adjustment program was initiated in the 1988s that aimed to increase economic growth through trade liberalization. The figure explains the negative trend of Pakistan's economic growth as the weighted average tariff tends to decrease, indicating trade liberalization has a detrimental effect on economic growth. Pakistan's economic growth follows fluctuating trends since the 1980s. From 1980 to the 90s, Pakistan's average economic growth was

[3]EBV was used to obtain foreign exchange that can be used for importing goods, business travels and opening/ running their foreign commercial offices. EBV was transferable and priced according to market conditions

[4]Under the import licensing scheme selected industries were on the list of automatic renewal. This was essentially based on their export performance

recorded as 6.3 percent which narrowed to 3.9 percent in the next decade (1991-2000). From 2001 to 2010, Pakistan's economy grew on average at the rate of 4.2 percent with a reduction of 3.2 percent in the next decade.

Figure 1.1: Pakistan's Economic Growth and Tariff Liberalization (1980-2020)

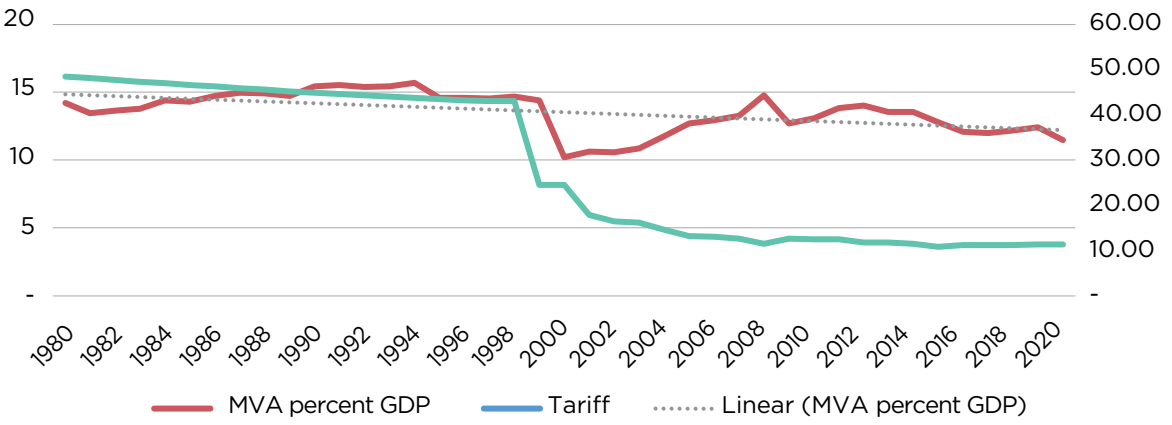


Source: World Bank, WITS database (2020) , Misc Sources

1.3. Pakistan's Manufacturing Value-added and Tariff Liberalization (1980-2020)

Pakistan's manufacturing value added (MVA) share in GDP is negatively affected by trade liberalization. In 1980, MVA's contribution to the GDP was 14 percent which declined to 11 percent in 2020. CAGR for the past four decades shows that each year MVA declined by 0.5 percent. Tariff structure in Pakistan was reduced rapidly in the 1990s while the manufacturing industry's pace to restructure was slow. Tariff was an important source of revenue generation for the government. Reduction in the tariffs, added an additional burden for the government thus no proper financial support was granted to the manufacturing sector. The interest rate was also kept high to ease the fiscal burden on the government which also reduced the credit availability for manufacturing firms. All these measures led to de-industrialization in Pakistan.

Figure 1.2: Pakistan's Manufacturing Value Added (% of the GDP) and Tariff Liberalization (1980-2020)

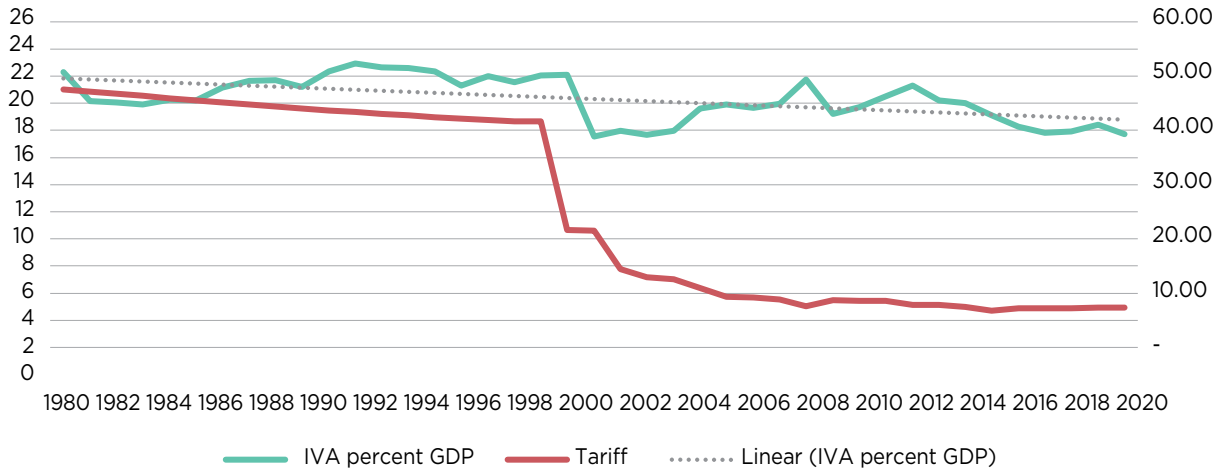


Source: World Bank, WITS database (2020), Misc Sources

1.4. Pakistan's Industry Value Added and Tariff Liberalization (1980-2020)

Industry value-added contribution to the GDP also declined amid rapid trade liberalization measures. In 1980, Pakistan's contribution to the industry stood at 22.3 percent while in 2020 industry value-added declined to 17.7 percent. During the last four decades, contribution to the GDP declined by a CAGR of 0.6 percent per year. The process of de-industrialization kicked off as trade liberalization gained momentum (see figure below: 1.3).

Figure 1.3: Pakistan's Industrial Value Added (% of the GDP) and Trade Liberalization (1980-2020)



Source: World Bank, WITS database (2020), Misc Sources

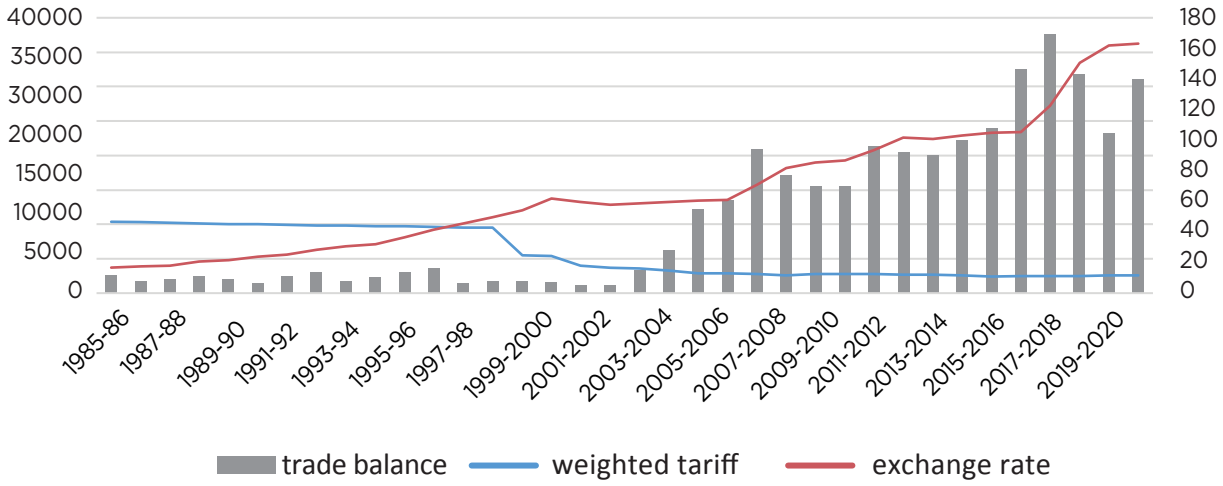
1.5. Pakistan Global Trade Scenario (1985-2021)

Pakistan's trade volume is increasing ever since 1985 but the negative trade balance is widening continuously since 2005. Policy instruments used for trade liberalization cushioned the increasing trade deficit (see figure: 1.4). In the year 1999, Pakistan's weighted average tariff was 43 percent which declined to 17.5 in 2005. Exchange rate devaluation also increased post-2006 (see figure: 1.5). For better market access and liberalization, Pakistan initiated various trade agreements post 2005. By implementing outward-looking policies such as tariff reduction, and exchange rate devaluation, growth in imports outpaced exports. A low tariff structure was conductive for imported inputs but exchange rate depreciation and market openness fuelled the cost of imported inputs for industries.

Figure 1.4: Pakistan Trade and Tariff Structure (1985-2021)

Source: Pakistan Bureau of Statistics (2020), Misc Sources

Figure 1.5: Pakistan Trade Balance, Exchange Rate, Weighted Tariff (1985-2021)



Source: Pakistan Bureau of Statistics (2020), Misc Sources

1.6. Comparative Analysis of Import and Tariff Structure of Pakistan and its Regional Competitors

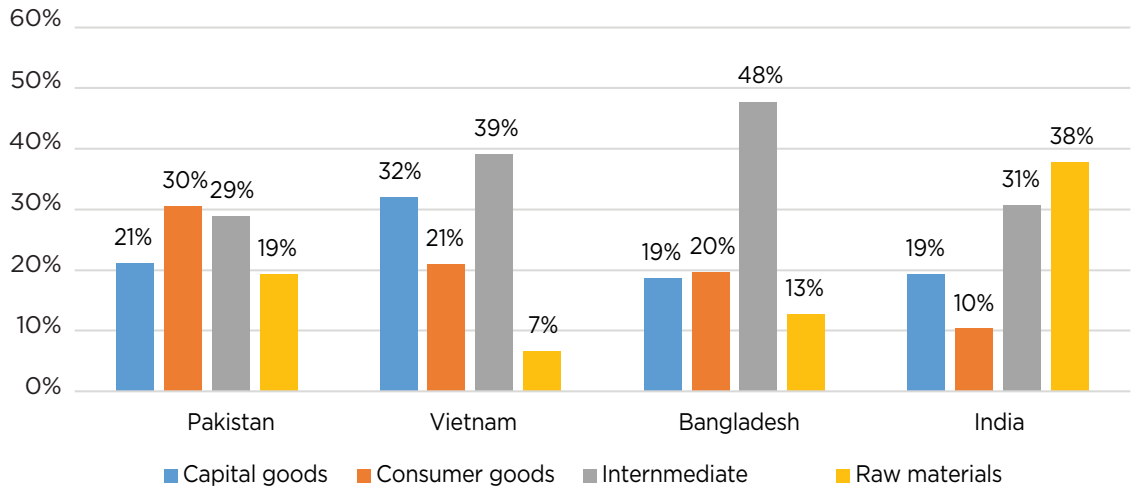
In the past five years, Pakistan's imports are mainly driven by consumer goods (30%) followed by intermediate (29%), capital (21%), and raw materials (19%). Accordingly, the tariff structure is defined as having more tariffs on consumer goods (13.1%) while less on capital, intermediate and raw material. However, this picture remains inconclusive if we overlook the import and tariff structures of other countries. India and Bangladesh in comparison to Pakistan, have less share of consumer goods in total imports. While Bangladesh's tariff on consumer goods is the highest, India has a tariff of 12.4% indicating the incentive for final goods produced in both countries.

For intermediate goods, both India and Bangladesh have a high share in imports than Pakistan however, they have imposed high tariffs to develop their backward linkages for a sustainable industrial base.

For capital goods, the import share of Pakistan, India, and Bangladesh are quite similar yet the tariff structure for capital goods in both countries is less restrictive than in Pakistan.

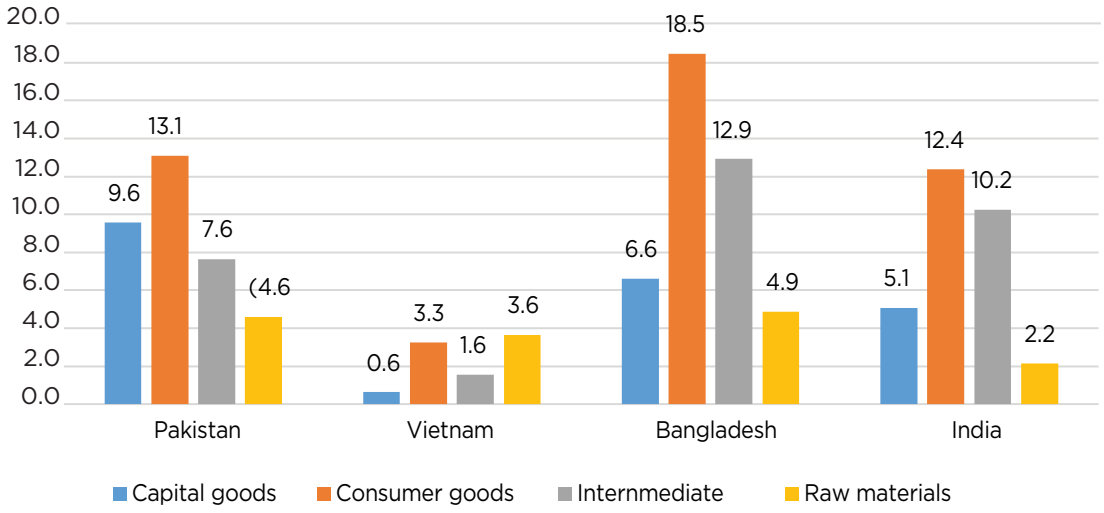
In nutshell, both countries have a high tariff on consumer goods (final goods) but their tariff on intermediate and raw materials is also high, indicating an inward policy to build their manufacturing base (see figure: 1.6 & 1.7).

Figure 1.6: Imports Structure of Regional Competitors



Source: WITS (2020)

Figure 1.7: Tariff Structure of Regional Competitors



Source: WITS (2020)

2. Import Substitution Opportunities in Pakistan-Selection of Key Sectors

Pakistan's major import basket is dominated by petroleum (crude & refined) products that make-up 20 percent of the total imports in Pakistan. Machinery (mechanical & electrical) has a share of 18 percent while agriculture and other chemicals have a share of 16.4 percent. The food and chemical group constitute 14.7 and 8.6 percent respectively (see table: 2.1)

For the current analysis of import substitution, we have selected sectors that constitute a significant share of our imports, and have domestic production but are unable to meet the domestic demand. We have considered petroleum, steel and iron scrap, raw cotton, and oilseeds for exploring import substitution opportunities.

Table 2.1: Pakistan Import Structure and Sector-Wise Share

SECTORS	2018-2019	share %	2019-2020	share %	2020-2021	share %
			Values in USD million			
TOTAL	**55,169.3**		**41,347.3**		**56,580.9**	
Petroleum group	**14,441.5**	**26.2**	**9,396.3**	**22.7**	**11,342.7**	**20.0**
Machinery group	8,947.7	16.2	8,478.8	20.5	10,166	18.0
Agricultural and other chemicals	8,758.7	15.9	6,868.5	16.6	9,292.6	16.4
Food group	**5,665.2**	**10.3**	**4,999.2**	**12.1**	**8,337.6**	**14.7**
Metal group	**4,984.4**	**9.0**	**3,752.6**	**9.1**	**4,890.4**	**8.6**
Textile group	**3,221.1**	**5.8**	**2,227.6**	**5.4**	**3,864.6**	**6.8**
Transport group	3,179.9	5.8	1,436.1	3.5	2,993	5.3
Miscellaneous group	1,025.1	1.9	746.4	1.8	1,216.2	2.1

Source: Pakistan Bureau of Statistics, PBS

The report aims to target major sectors that constitute 32 percent of our total imports in 2020-21. Around 18.3 USD billion are targeted to evaluate import substitution opportunities. The impact of import substitution can bring foreign exchange savings which could lead to stability and growth. By adopting sector-wise import substitution policies savings of USD 2.1 billion in iron and steel, USD 1.1 billion in cotton production, 0.5 billion in oilseeds, 1.9 USD billion in palm oil, USD 3.8 billion, and USD 1.1 billion through oil refineries can be materialized. (See table below)

Table 2.2: Import Substitution Combine Benefits

Products					
Iron and Steel	**Cotton**	**Oilseeds and Palm oil**	**Refinery**	**Petrochemicals**	**Total**
Current Imports USD billion (2020-21)					
3.8	1.4	3.1	8	2	18.3 (32%)
Imports saved (USD billion)					
2.1	1.1	2.4 (0.5+1.9)	3.8	1.3	10.5 (18.7%)
Time Span					
1	4	6-7	5-6	1	-

Source: Author's own calculation. Data is taken from PBS

Detail analysis of each sector in terms of its import substitution opportunity has been discussed in the next section of the report. The total impact of import substitution can be combined to generate USD 10.5 billion of foreign exchange savings which make up 18.7 percent of the total imports in 2020-21.

The benefit of import substitution can be further extended by analyzing its impact on the trade balance. We assume if Pakistan increases its exports by 10 percent while imports increased by 3 percent annually coupled with a gradual import substitution of USD 1 billion each year then it can drive the trade balance to reach a surplus in the 12th year.

Table 2.3: Expected Outcomes of Import Substitution and Export Growth

Years	Exports	Imports	Revised import	Trade Balance
Values in USD billion				
FY-20-21	25.3	56.38		
Year 1	27.83	58.07	57.07	-29.24
Year 2	30.61	59.81	58.81	-28.2
Year 3	33.67	61.61	60.61	-26.94
Year 4	37.04	63.46	62.46	-25.42
Year 5	40.75	65.36	64.36	-23.61
Year 6	44.82	67.32	66.32	-21.5
Year 7	49.3	69.34	68.34	-19.04
Year 8	54.23	71.42	70.42	-16.19
Year 9	59.66	73.56	72.56	-12.9
Year 10	65.62	75.77	74.77	-9.15
Year 11	72.18	78.04	77.04	-4.86
Year 12	79.4	80.38	79.38	0.02
Year 13	87.34	82.8	81.8	5.54

Source: Authors' calculations. Data for the analysis was taken from PBS

3. Import Substitution cum Export Promotion Model for Pakistan

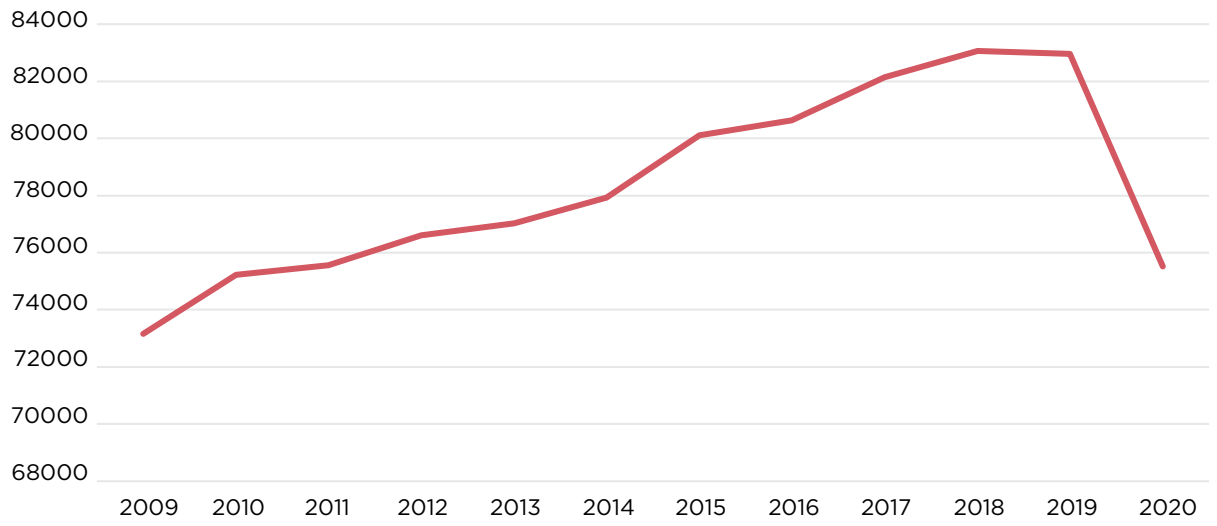
Pakistan needs import substitution cum export promotion strategies to build its manufacturing base. In the first phase, it is suggested to incentivize foreign firms for building their assembling plants with zero duty on raw and intermediate goods imports. In this phase firms investing will realize their full potential of market size with maximum profits. It is important to engage foreign firms in knowledge transfers by linking universities with foreign firms. *In the second phase*, Pakistan should increase tariffs on raw materials and intermediate goods to develop its own market; should increase competition by inviting more foreign players; must fix the localization rate and rebate taxes with an increasing rate of localization for high technological processes. *In the third phase*, Pakistan needs to incentivize these firms in form of export subsidies or duty-free raw materials to export final products. A joint collaboration between local and foreign manufacturers for building the Pakistani brand name should be encouraged.

In addition to this, the government needs to rethink its policy of tariff liberalization and exchange rate depreciation for manufacturing firms as in Pakistan most of the industries are dependent on foreign inputs. Even if tariff concessions are granted on inputs its benefits are eroded by currency depreciation as the cost of production remains uncertain while output prices are constant. Further to improve the competitiveness of industries, it is important to strengthen backward linkages between sectors that ultimately reduces the dependence of industries on foreign input. FDI and gross capital formation need a more policy conducive environment that builds more sustainable industrial sector growth and productivity in Pakistan.

4. Global Oil Refineries' Outlook

Global refined petroleum production stood at 75 million barrels per day (BPs statistical review 2021). Since 2014, refined products production is increasing however, global lockdown led to a decrease in demand. The refining industry responded quickly by temporarily taking capacity offline and slashing utilization rates. However, as the impact of Covid-19 subsided demand for distillation increased to a pre-pandemic level with improvement in utilization rates but it is still far from reaching the pre-pandemic utilization rates. Demand for refined products continued to rise with the ease of Covid-19 restrictions and re-opening of the economies across the globe.

Figure 4.1: Global Refinery Production



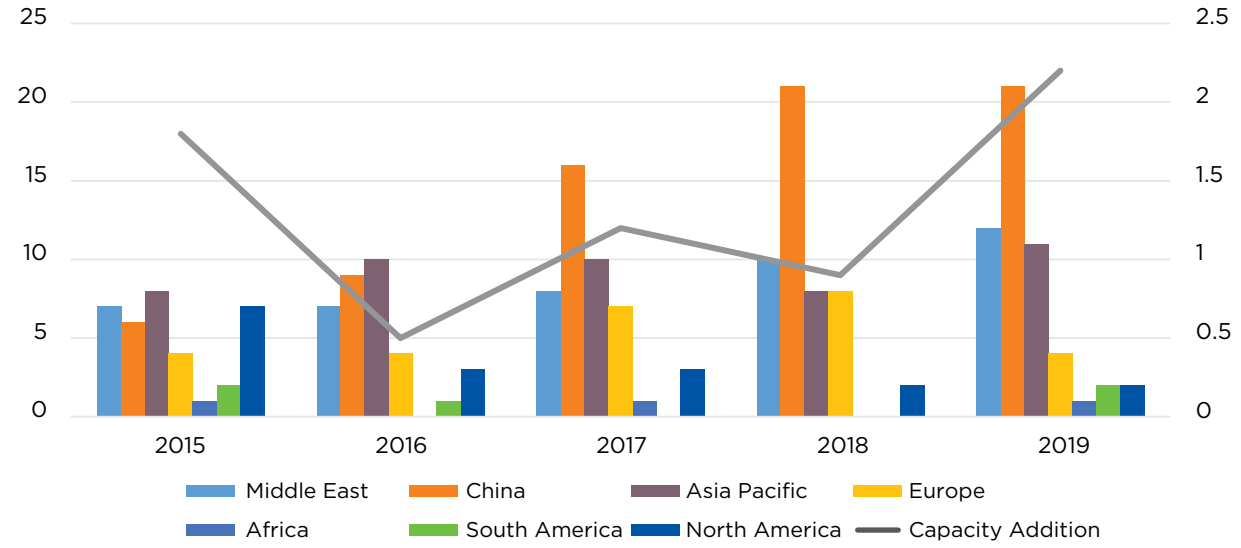
Source: BPs Statistical Review, 2021

World refineries' utilization capacity grew by 13.4 percent in the past decade with a utilization capacity of 82 percent[5]. China holds 18 percent share in the world refinery output with a rate of 13.8 million barrels per day in 2020. From 2009 to 2019, production grew by 6.1 percent. China's refining capacity is around 16.691 million barrels per day having a utilization rate of 83 percent. India holds a 6 percent share in the world refinery throughput with a rate of 4.5 million of barrels per day in 2020. India's oil refining grew by 4 percent from 2009 to 2019 with a capacity of around 5 million barrels per day transforming into a utilization rate of 90 percent in 2020 (BPs statistical review of world energy, 2020)

China has been the leading player in refinery investment in the world. In the past five years from 2015 to 2019. China's investment increased from USD 6 billion to USD 21 billion. The Middle East and the Asia Pacific investment increased from USD 7 billion to USD 12 billion and USD 8 billion to USD 11 billion in the last 5 years respectively.

[5]The data is taken from 2009-2019 from BP statistical review

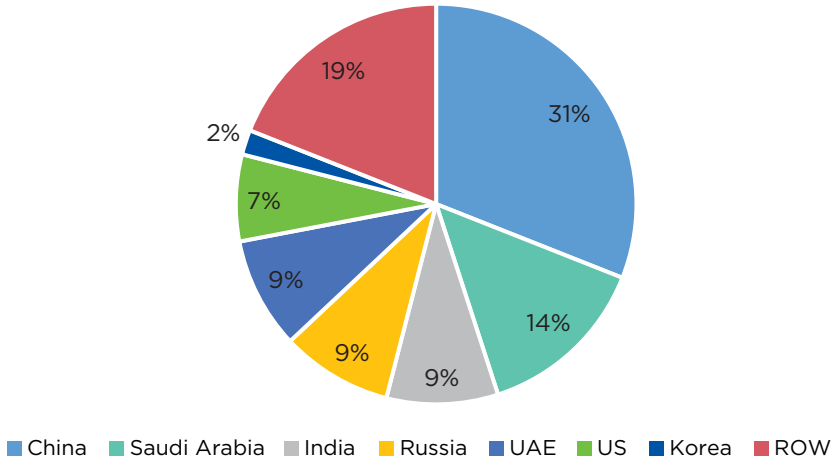
Figure 4.2: Investment in Oil Refineries (2015-2019)



Source: International Energy Agency, IEA

China is also leading in adding additional capacity with a share of 31 percent whereas Saudi Arabia has captured 14 percent of the shares in the refining capacity enhancement. Other leading countries are India, Russia, and UAE with shares of 9 percent each.

Figure 4.3: Share of Refining Capacity Addition (2013-2018)



Source: International Energy Agency, IEA

4.1. Pakistan Refineries Outlook

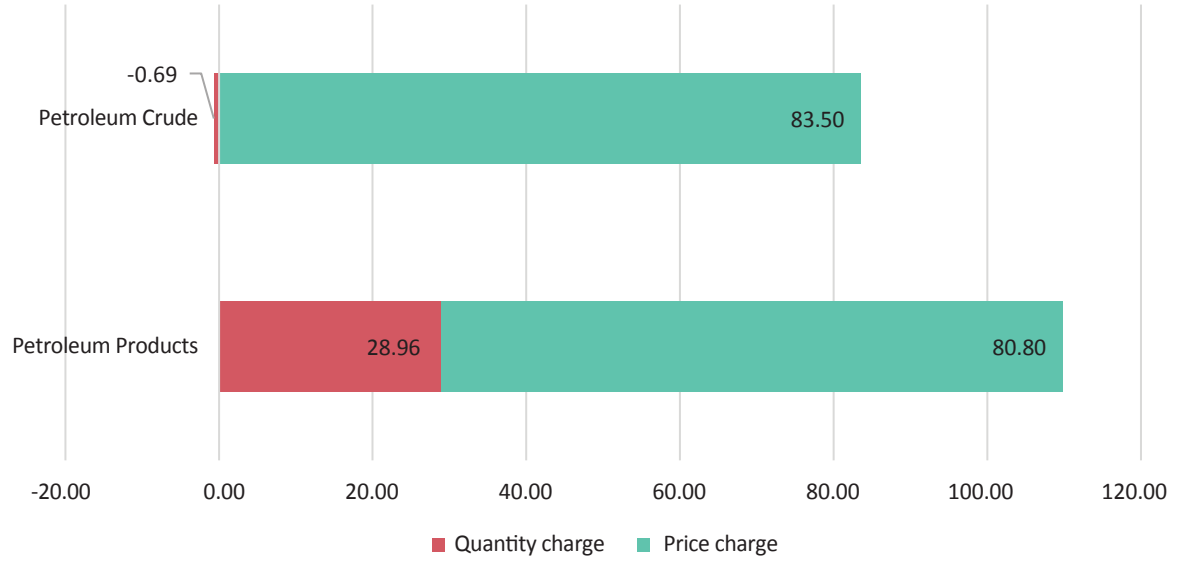
Pakistan has five major oil refining facilities with a combined capacity of 19.4 million MT[6], however, due to low utilization rates, crude production has remained low. During FY 2020-21, utilization rates remained at 60 percent which increased imports of refined products as per OCAC. All refineries are based on old hydro-skimming technology that produces 30 percent of the furnace oil which serves as a major reason for the decrease in utilization rates. Up-gradation of hydro-cracking technology will improve utilization rates and production of motor spirit (MS) and high-speed diesel (HSD).

4.2. Case for Import Substitution

Globally the rise in international oil prices is largely driven by demand but supplies remain stagnant. The mismatch has increased the global oil prices as Brent has risen to USD 87 per barrel in Jan 2022 from USD 52 per barrel at the start of 2021. Higher international oil prices have increased the value of imports and have increased the deficit in the balance of payment to unsustainable levels. Oil import value may continue to grow in value terms if international oil prices do not recede.

In the first half of the current fiscal year (July-Dec) import value of crude oil and refined petroleum products imports increased by USD 3.9 billion as compared to the same period of the previous year. Crude oil imports increased by USD 1 billion while refined petroleum products increased by USD 2.8 billion. Price and quantity percentage change reveal that the price effect has been the dominant cause of the surge in the import value of crude oil and petroleum products (See figure: 4.4). For crude oil, prices represent 83 percent change in the value while the quantity demanded for crude oil has decreased. For refined oil, 80 percent of the change in import value is driven by an increase in prices while quantity increased by 28 percent. This proves that refined petroleum products have been one of the major causes of dollar outflow. Despite having refining facilities in the country, we are importing expensive refined products at a cost of foreign exchange

Figure 4.4: Price and Quantity Change (percentage) (July-Dec 2021) VS (July-Dec 2020)



Source: Pakistan Bureau of Statistics, PBS

4.2.1. Import Dependency Ratio

The import dependency ratio (IDR)[7] of refined petroleum products reflects an increase in Pakistan's reliance on imports over the past 5 years (See table; 4.1). Within refined products, MS and HSD are dependent on imports by 77 percent and 45 percent respectively. Kerosene, Jet fuel (JP-1), and furnace oil (FO) import dependency has declined over the years as domestic refineries are able to satisfy domestic demand. It is important to mention, that FO demand from the power sector declined significantly in the year 2018-19 onwards.

Table 4.1: Import Dependency Ratio (Quantity in Metric Ton, MT)

Products	2016-17	2017-18	2018-19	2019-20	2020-21
MS	**74%**	**70%**	**71%**	**77%**	**77%**
Kerosene	0%	0%	0%	0%	0%
HSD	**51%**	**46%**	**40%**	**45%**	**45%**
Jp-1	14%	22%	22%	25%	10%
FO	53%	61%	27%	3%	27%
Total	**55%**	**55%**	**47%**	**53%**	**56%**

Source: OCAC

4.2.2. Import Elasticity

Import elasticity is another measure that highlights the inelastic nature of crude and refined oil demand in Pakistan (see table; 4.2). Changes in international prices don't affect the import demand for crude and refined petroleum products. Pakistan needs to invest in refineries that can restrict its increased reliance on refined oil imports and correct its balance of payment deficits.

Table 4.2: Import Elasticity of Crude Petroleum and Petroleum Products

Import Elasticity	2018-19	2019-20	2020-21
Petroleum group	-1.384	0.3610	-1.646

Source: Author's calculation. Data is taken from Pakistan bureau of statistics, PBS

[7]The formula used to calculate IDR is, $IDR = \frac{quantity\ of\ imports\ (MT)}{quantity\ of\ domestic\ production + quantity\ imported - quantity\ exported)}$

5. State of the Petroleum Industry

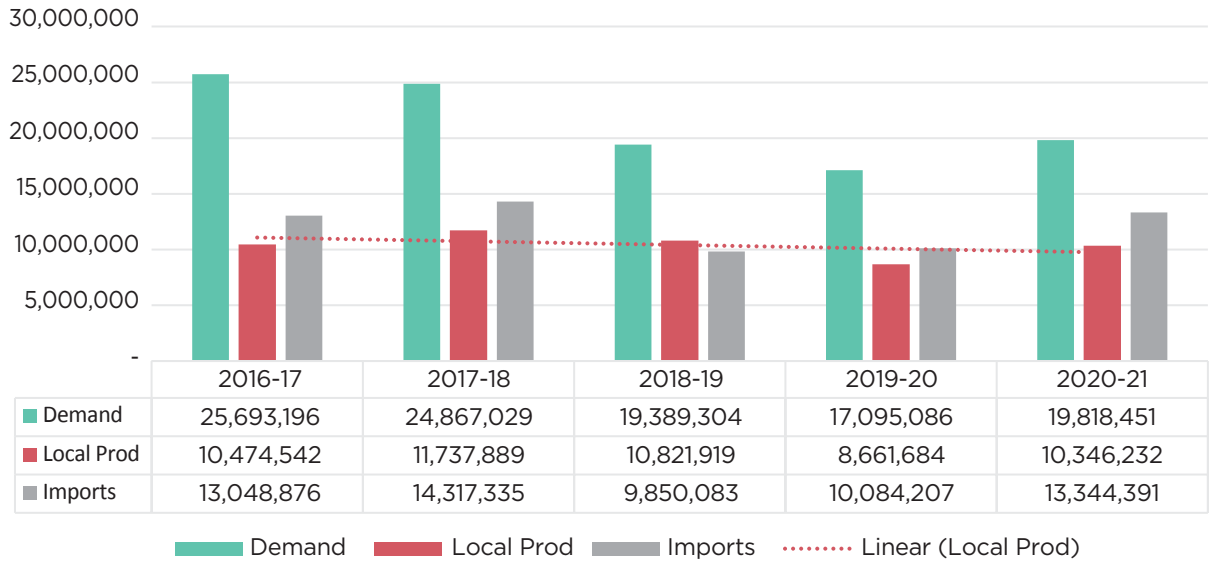
5.1. Petroleum Reserves, Production, Demand, and Import Scenario

According to OCAC, Pakistan's demand for crude oil and refined petroleum products follows fluctuating trend however, the average demand for the past five years stood at 21.3 MMT (million metric tons). The trend shows the consumption level in 2016-17 was around 25 MMT which declines to 19 MMT in 2018-19 and further declined to 17 MMT in 2019-20 (See figure:5.1). The decline was initially led by the overall contraction in the economic activity due to the fiscal austerity measures adopted by the newly elected government. In addition to this, a reduction in demand for furnace oil from the power sector coupled with lower demand from the industrial and transport sector also led to a decrease in the overall demand for petroleum products[8].

In 2019-20, the decrease in demand was due to the impact of the global pandemic. In 2020-21 consumption reached the pre-pandemic level of 20 MMT (See figure: 5.1).

Local refinery production in 2016-17 was 10 MMT which inclined to 12MMT in 2017-18 but declined to 9 MMT in 2018-19 due to the economic contraction in the country and change in the demand for furnace oil from the power sector. In 2020-21, local refinery production increased to the pre-pandemic level of 10MMT. Refined oil imports follow the same trend which was 13 MMT in 2016-17, increased to 14 MMT in 2017-18 but declined to 10 MMT in 2018-19. In 2020-21 imports reached the pre-pandemic level of 13 MMT (See figure: 5.1).

Figure 5.1: State of the Petroleum Industry (Values in MMT)



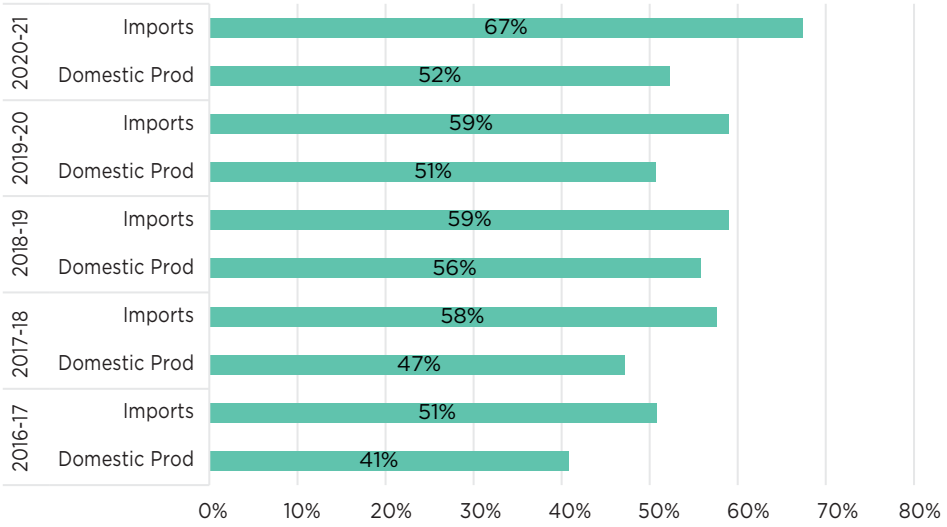
	2016-17	2017-18	2018-19	2019-20	2020-21
Demand	25,693,196	24,867,029	19,389,304	17,095,086	19,818,451
Local Prod	10,474,542	11,737,889	10,821,919	8,661,684	10,346,232
Imports	13,048,876	14,317,335	9,850,083	10,084,207	13,344,391

Source: OCAC

[8]State of the regulated petroleum industry 2018-19, oil and gas authority, OGRA

Total oil consumption is being satisfied through local refinery production and imports of refined oil. Imports of refined oil have remained above 50 percent in the last 5 years. In 2016-17, imports contribution was the lowest at 51 percent which continued to increase for next 5 years. Imports contributed to an average of about 59 percent from 2017-18 to 2019-20 but in 2020-21 the imports contribution increased to 67 percent. Local refinery production in 2016-17 was 41 percent which increased to 47 percent in 2017-18. On average local refinery production contributed 53 percent from 2018-19 to 2020-21.

Figure 5.2: Domestic Vs Import Share in Total Demand



5.2. Product-Wise Production and Imports of Refined Petroleum Products

Pakistan's domestic consumption of refined petroleum products is dependent on domestic production and imports. MS demand is primarily being met 70 percent by imports for the last 5 years whereas its domestic production meets 30 percent of domestic needs. Kerosene local production has remained significant to fulfill the local demand which reduced its dependency on imports. HSD local refined production contributed an average of 59 percent whereas imports contributed an average of 49 percent in the last 5 years to fulfill local consumption. Jp-1 local production has been fulfilling the local demand and has contributed more than 100 percent in the last 5 years. FO contribution in production in 2016-17 was around 31 percent but it gradually increased to 81 percent in 2018-19 and 94 percent in 2019-20 but fell to 79 percent in 2020-21. On average, its contribution to production remains to be 66% in the last 5 years (See table: 5.1).

Table 5.1: Share of Production and Imports in Domestic Consumption

	2017-18		2018-19		2019-20		2020-21	
Contribution	**Production**	**Imports**	**Production**	**Imports**	**Production**	**Imports**	**Production**	**Imports**
MS	30%	71%	30%	88%	27%	88%	30%	102%
Kerosene	98%	0%	107%	0%	96%	0%	132%	0%
HSD	58%	50%	64%	47%	57%	47%	60%	49%
Jp-1	94%	26%	100%	33%	102%	33%	130%	15%
FO	44%	57%	81%	2%	94%	2%	79%	22%
Total	**47%**	**58%**	**56%**	**59%**	**51%**	**59%**	**52%**	**67%**

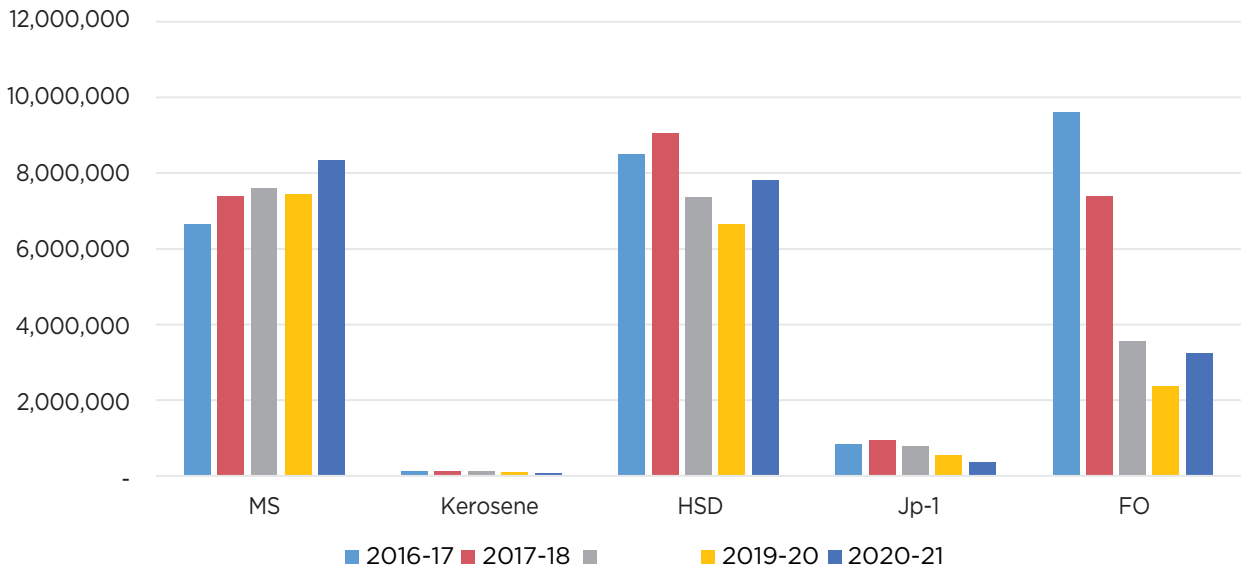
Source: OCAC

Furnace oil contribution increased due to a decrease in demand from the power sector. Over the years, power sector has maintained its dependency on furnace oil to generate electricity. Furnace oil contribution in 2016-17 was 32 percent of the total energy mix which remained in the range of 30 percent till 2018-19 but it started to decline from 2019-20 onwards. The main reason for the decline is the discontinuation of old power plants running on furnace oil and the conversion of new plants to RLNG. International environmental organizations have also been discouraging the use of furnace oil due to environmental degradation. Increased growth in HSD was due to the incentive given by the government to refineries in the form of protective deemed duty of 7.5 percent.

5.3. Product-Wise Consumption Analysis

To further understand the consumption pattern, product-wise trend explains the nature of the oil demand. The product-wise contribution to total consumption is shown in the figure below. MS and HSD contribute more than 60 percent. However, in 2019-20 and 2020-21, its contribution surged to 80 percent. Furnace oil contribution was 37 percent in 2016-17 which declined to 16 percent in 2020-21 due to the lack of demand from the power sector. Kerosene and JP-1 contribution remains to be less than 5 percent.

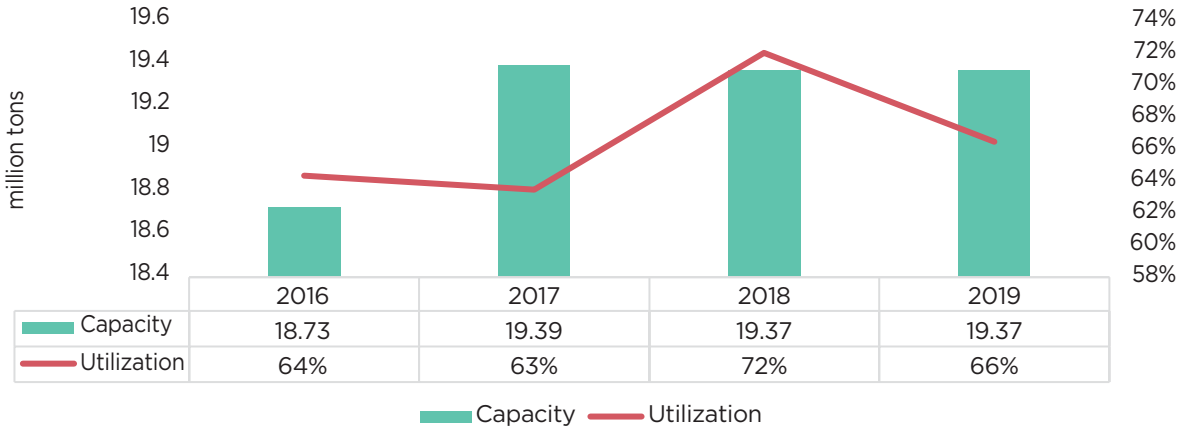
Figure 5.3: Consumption by Type of the Product (Values in MMT)



5.4. Refining Capacity and Utilization

Refinery capacity and utilization are assessed by six major petroleum refineries in Pakistan. Refinery utilization in 2016 was 18.73 million tons which increased to 19.37 million tons in 2019. However, capacity utilization remained at 66 percent on average for the last 4 years. Hence it can be observed that growth in capacity enhancement remained stagnated. Utilization was 64 percent in 2016 which improved to 72 percent in 2018 due to an increase in production of FO and HSD but again declined to 66 percent in 2019.

Figure 5.4: Refining Capacity and Utilization



Source: OCAC

5.5. Major Players in the Market

Pakistan has six major refineries that meet the domestic demand. The major players in the refining sector and their capacity and utilization rate from 2016 to 2019 are given in table 5.2. BYCO has the highest production capacity in million tons but its utilization rate is quite low. Its utilization in 2016 was 22 percent which increased to 38 percent in 2018 but again declined to 33 percent in 2019. PARCO continues to run at 100 percent capacity whereas other refineries' utilization rates lie between 75 percent to 97percent.

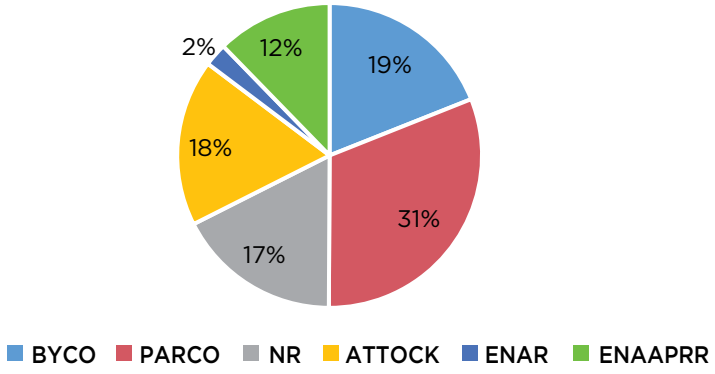
Table 5.2: Pakistan Refineries' Capacity and Utilization Rates

	2016		2017		2018		2019	
Refineries	**Capacity**	**Utilization**	**Capacity**	**Utilization**	**Capacity**	**Utilization**	**Capacity**	**Utilization**
Values in MT								
BYCO	**7.19**	**22%**	**7.19**	**18%**	**7.17**	**38%**	**7.17**	**33%**
PARCO	**4.5**	**100%**	**4.5**	**100%**	**4.5**	**100%**	**4.5**	**89%**
NR	**2.71**	**85%**	**2.83**	**85%**	**2.83**	**86%**	**2.83**	**81%**
ATTOCK	**1.96**	**86%**	**2.44**	**91%**	**2.44**	**93%**	**2.44**	**94%**
ENAR	**0.33**	**97%**	**0.33**	**88%**	**0.33**	**97%**	**0.33**	**97%**
PR	**2.1**	**81%**	**2.1**	**76%**	**2.1**	**81%**	**2.1**	**76%**

Source: Pakistan Energy Book (2020)

Within refineries, PARCO is leading with a market share of 31 percent, BYCO trailing with 19 percent share, Attock and NR contribute 18 percent and 17 percent respectively to meet the domestic demand.

Figure 5.5: Market Share of Major Petroleum Refineries

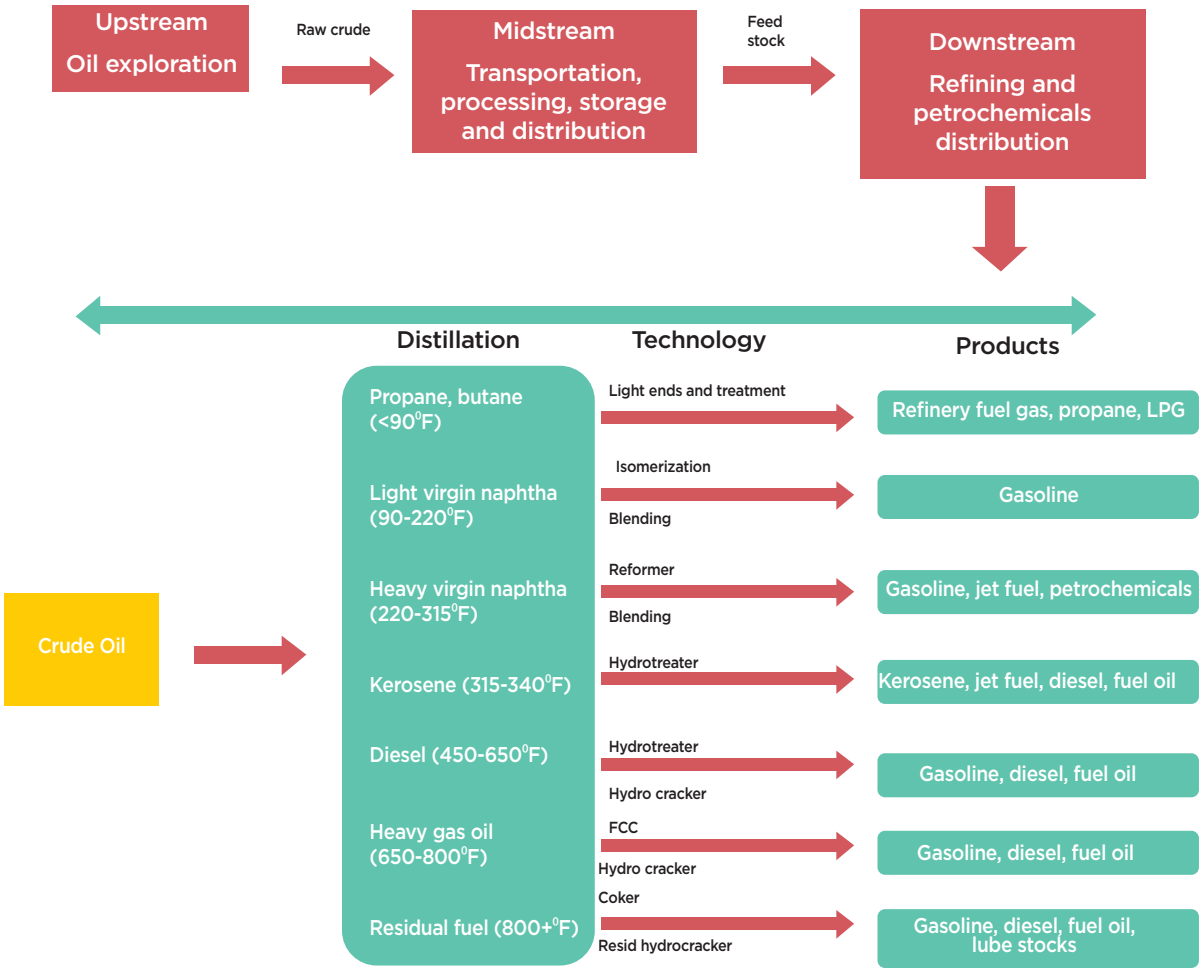


Source: OCAC

5.6. Value Chain of Petroleum Products

Value chain of petroleum products is depicted in the figure below;

Figure 5.6: Value Chain of Petroleum with New Technology



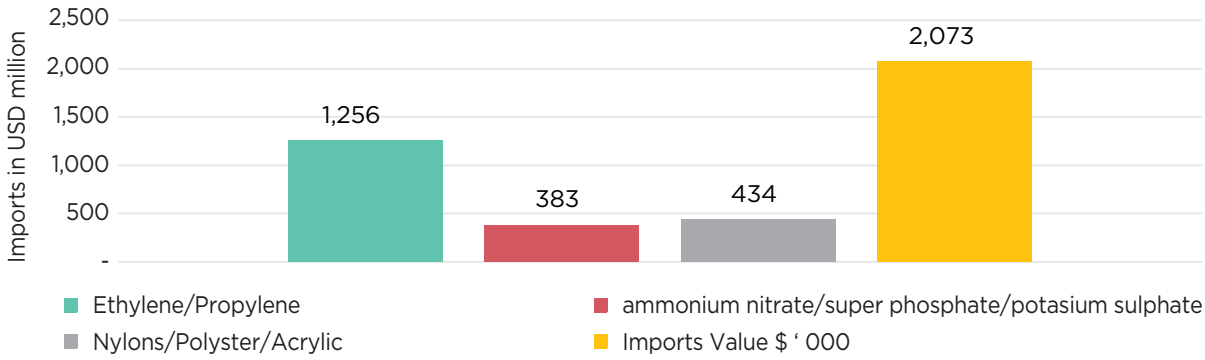
6. Petrochemicals

Petrochemicals are rapidly becoming the largest driver of global oil demand. According to IEA, by 2030, one-third of the oil demand will be driven by demand for petrochemicals and this demand is likely to increase by 2050. Raw material for petrochemicals is the feedstock that is created by refining crude oil to natural gas liquids and naphtha. Both these raw materials are then further refined to produce petrochemicals. Natural gas liquid is converted into ethane, propane, and butane. Ethane is first converted into ethylene using the cracking process while propane and butane can be cracked to make propylene and butylene. All these petrochemicals are the raw material of plastics, nylons, polyesters, pharmaceuticals, and fertilizers industries.

6.1. Case for Import Substitution in Petrochemicals

In Pakistan, most petrochemicals are used as raw materials for various industries. In the plastic manufacturing sector, ethylene and propylene are used which are 100 percent imported. In 2020, the imports of ethylene and propylene were around USD 1.2 billion. Other petrochemicals such as nylons and polyester cost around USD 434 million in imports in 2020 whereas ammonium nitrate and superphosphate cost around USD 383 million in imports in 2020. Nylons and Polyester are used as raw materials in the textile industry whereas ammonium nitrate and superphosphate are used in the fertilizer industry. These all are petrochemicals that can be produced through deep conversion refineries and installing hydrocrack technology which can generate high-value addition. The total imports of petrochemicals in 2020 were around USD 2 billion.[9]

Figure 6.1: Pakistan Imports of Petrochemicals (2020)



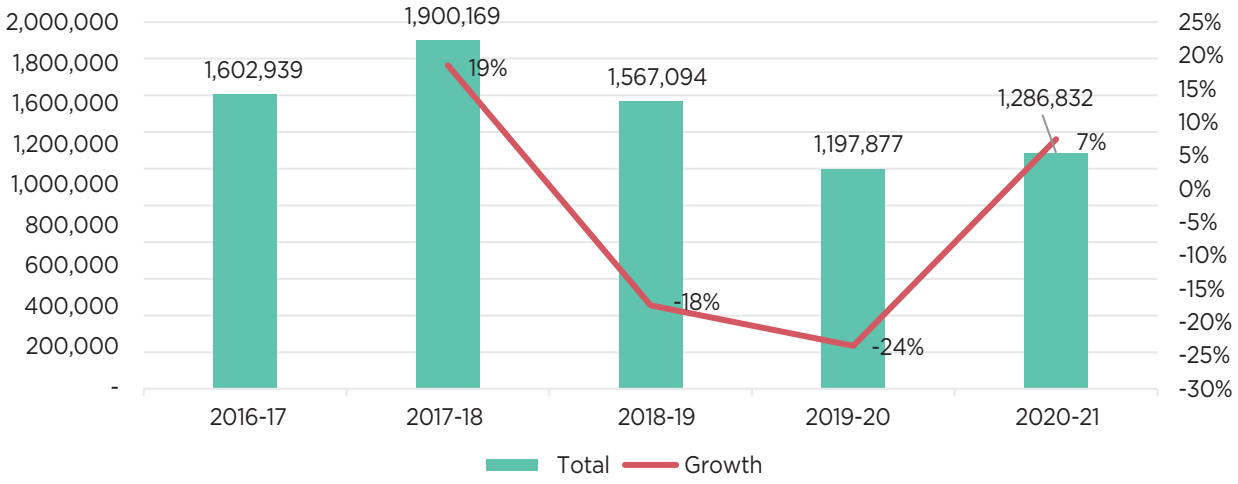
Source: PBS

6.2. Current Non-Energy Production, Consumption, and Import Scenario

Various non-energy products being produced by the refining sector such as naphtha, lubricant oil, liquid petroleum gas (LPG), asphalt, sulfur, and others make total non-energy products production of 1.2 MMT in 2019 (See figure: 6.2). The highest total production was recorded in 2017-18 with 1.9MMT which then declines to 1.5MMT in 2018-19 and 1.2MMT in 2019-20. However, the production went up by 7% from 2019-20 to 2020-21 to reach 1.3MMT. The production level is far from the peak reached in 2017-18. Non-energy products production provides an ample opportunity for exports as well.

[9]The data is used from trade map, ITC

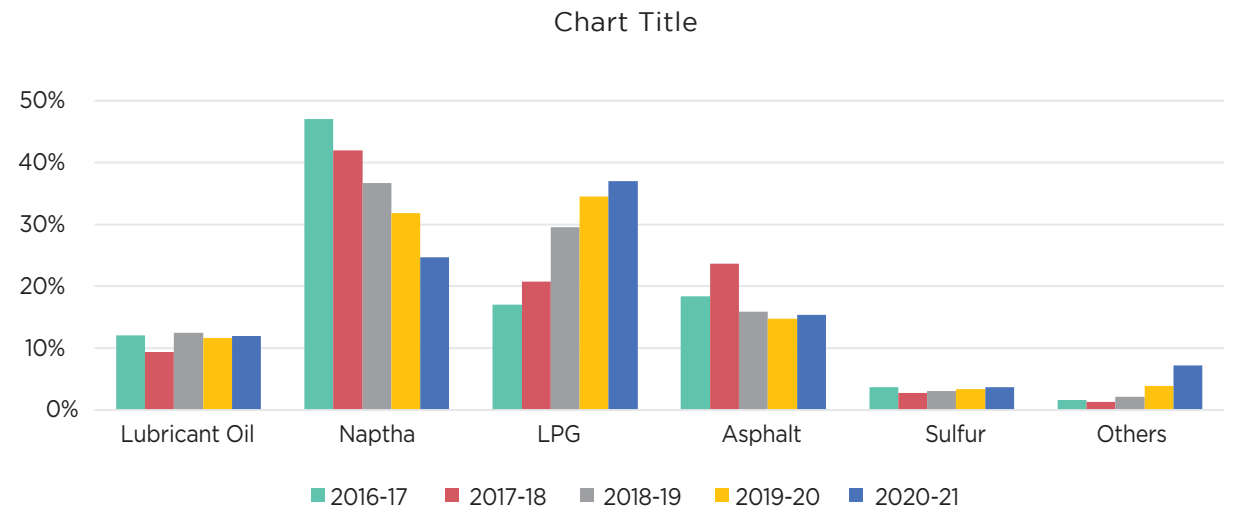
Figure 6.2: Petroleum by-Products Domestic Production (M.Tons)



Source: OCAC

Product-wise petroleum by-products contribution show LPG share is rising steadily over the years whereas the contribution of naphtha has been declining during the same years. Lubricant oil has maintained its contribution. Another product asphalt has managed to build its contribution over the years. The decline in naphtha is due to the conversion of plant technology to isomerization by refineries. Through this technology, naphtha can be further converted to petrol which has higher value and margins for refineries.

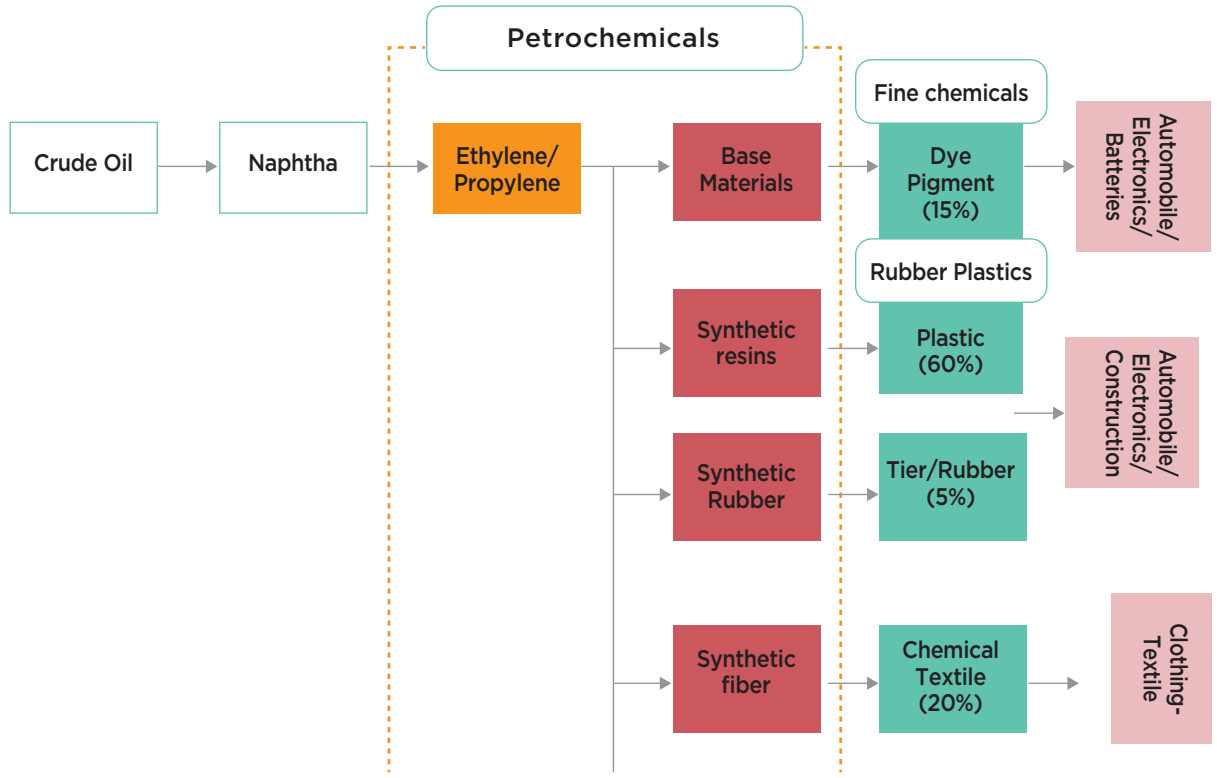
Figure 6.3: Product Wise Petroleum by-Products Contribution in Production



Source: OCAC

6.3. Value Chain of Petrochemicals (Crude to Chemicals)

Figure 6.4: Value Chain of Petrochemicals



7. Price Mechanism

In Pakistan, oil and gas regulatory authority (OGRA) is responsible for price-setting and regulation. The following flow chart explains the price-setting mechanism in general while product-wise price setting is highlighted in table 7.1

Figure 7.1: Price mechanism of petroleum products

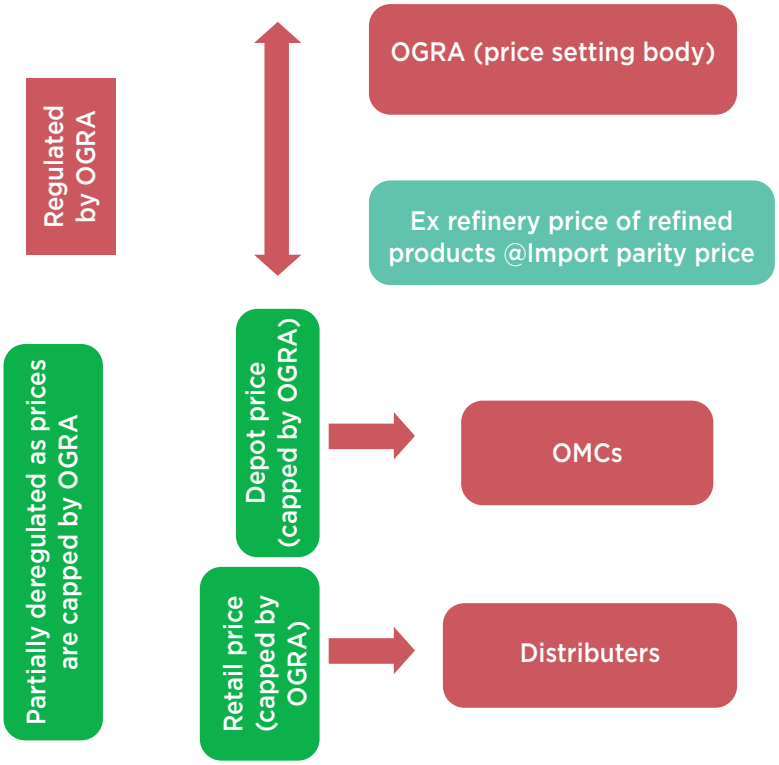


Table 7.1: Petroleum Product-Wise Price Setting Mechanism

Activity	Crude	MS	HOBC	Kerosene	J.P	LPG	Naphtha
Imports by private sector	Not allowed; refineries can import	surplus production: being an exporter	Allowed: Local production is lifted first	Allowed Local production is lifted first	Allowed Local production is lifted first	Allowed Little imports in reality	Surplus production
Import Parity Price IPP/Export Price	Determined by refinery/if exports than on competitive bidding	Determined by OGRA	Determined by OGRA	Determined by OGRA	Determined by OGRA	Saudi Aramco	Surplus product/if exports than on competitive bidding
Ex-Refinery price with protective duty	NA	Determined by OGRA	Determined by OGRA	Determined by OGRA	Determined by OGRA	Determined by LPG Producers committee	NA
Depot Price	NA	Determined by OGRA	Determined by OGRA	Determined by OGRA	Determined by OGRA	Deregulated Deregulated	NA
Retail Price	NA	Determined by OMCs	Determined by OMCs	Determined by OMCs	Determined by OMCs		NA

8. Expected Benefit of Import Substitution

We have calculated the expected benefit of import substitution by analyzing different scenarios based on capacity enhancement by including new refineries, increasing utilization levels, increasing the industry demand, and a surge in the future cost of crude oil and finished products.

Assumptions for Scenario 1

Keeping in view the estimates of six refineries for the past four years we have averaged the capacity and utilization rates. The following assumptions are considered;

Increase in average capacity of existing Pakistan refineries	**by 5 percent in the first year**
New refinery	Adding a new refinery in the fifth year with a capacity of 5 MMT/annual
Increase in domestic demand	5% (each year)
Increase in cost of crude oil prices	10%(each year)
Increase in cost of refined oil prices	10%(each year)

Base Year Scenario (2019)

The base year scenario considers crude oil and refined oil imports while cost per MMT is derived from the actual data for crude imports and finished POL imports. In 2019, the average crude oil import was 9.21 MMT having a value of USD 4 billion whereas finished product import was 12.97 MMT having a value of USD 6.4 billion. The cost of crude oil and finished product per MMT was USD 538 per MMT and USD 717.24 per MMT which is 33 percent more than the price of crude oil. The higher import of finished products caused the outflow of additional foreign exchange of USD 2.3 billion.

Scenario 1: Results

Keeping in view the above assumptions, if we increase the average refineries capacity to 20.34 MMT (5% of 2019), and their utilization rate to 70 percent, the cost of crude oil to USD 591/MMT, and increase the domestic demand to 26.25 MMT[10], then Pakistan can reduce industry demand deficit by 0.2 MMT in the first year. In the fifth year, when a new refinery is added with a capacity of 5 MMT annually it will increase the overall capacity to 25 MMT annually; which will reduce the industry deficit by 3.21 MMT. Despite an increase in crude oil and refined oil prices by 10 percent, Pakistan can save 3.7 billion USD from refined oil petroleum products in the fifth year. However, as domestic demand, crude oil prices, and refined oil prices tend to increase over the years, refined petroleum products import saving can only be achieved if the utilization rate and capacity of refineries is increased (see table: 8.1).

[10]Keeping in view the economic growth, we have assumed that demand will grow at the rate of 5 percent

Table 8.1: Expected Benefit of Import Substitution (Scenario 1)

Import Substitution and Savings						Crude Oil		Finished POL Imports		Savings of refined products
Scenario	Capacity MMT% (1)	Production MMT (2)	Utilization Rate 8% (3)	Industry Demand MMT @5% (4)	Deficit MMT (5)	Cost $/MMT @10% (6)	Domestic production USD Million (7)= (6)*(2)	Cost USD/MMT @10% (8)	Refined products USD Million (9)=(8)* (5)	USD Million (10)
Actual 2019	19.37	12.8	66%	25.00	12.22	538	4,052	717.24	6,402	(2,350)
Year 1	20.34	14.23	70%	26.25	12.02	591	8,416	788.96	10,433	(2,017)
Year 5	25.00	18.75	75%	27.56	8.81	651	12,199	867.86	8,413	3,786

Authors' calculation. Data is taken from OCAC

Assumptions for Scenario 2

Average capacity of Pakistan's refineries	constant
Increase in the utilization rate of refineries	8% (in each year)
Increase in domestic demand	5% (in each year)
Increase in cost of crude oil prices	10% (in each year)
Increase in cost of refined oil prices	10% (in each year)

Scenario 2: Results

If we keep the refineries' capacity constant at 19.37 MMT and increase the utilization rate of refineries by 8 percent after every two years, then Pakistan will initially increase its deficit to USD 2.4 billion in the first year while the deficit will be reduced in successive years as the utilization rate grows. In year 9, Pakistan will be in a position to save refined oil import bills given that refineries utilization rate is 93 percent (See table: 8.2) which is difficult to achieve as refineries in Pakistan are built on old technologies.

Table 8.2: Expected Benefit of Import Substitution (Scenario 2)

Import Substitution and Savings						Crude Oil		Finished POL Imports		Savings $
Scenario	Capacity MMT% (1)	Production MMT (2)	Utilization Rate 8% (3)	Industry Demand MMT @5% (4)	Deficit MMT (5)	Cost $/MMT @10% (6)	Domestic production USD Million (7)= (6)*(2)	Cost USD/MMT @10% (8)	Refined products USD Million (9)=(8)* (5)	Million (9)
Actual 2019	19.37	12.8	66%	25.00	12.22	538	4,052	717.24	6,402	(2,350)
Year 1	19.37	13.81	71%	26.00	12.19	591	8,166	788.96	10,582	(2,416)
Year 3	19.37	14.77	76%	27.04	12.27	651	9,611	867.86	11,710	(2,099)
Year 5	19.37	15.81	82%	28.12	12.31	716	11,313	954.65	12,931	(1,618)
Year 7	19.37	16.91	87%	29.25	12.33	787	13,315	1,050.11	14,245	(930)
Year 9	19.37	18.10	93%	30.42	12.32	866	15,672	1,155.12	15,652	(20)

Net Result

Considering all the above scenarios, Pakistan needs to increase its refineries capacity and utilization rate for better import substitution in refined petroleum products. As in the case, where capacity was kept constant, the utilization rate of 93 percent can reduce the difference of crude and refined petroleum products import bill from USD 2.3 billion to USD 20 million in the 9th year. In a case where capacity is enhanced by adding a new refinery, Pakistan will be able to save USD 3.7 billion on refined petroleum products. However, as demand is constantly increasing with prices, Pakistan needs to include new refineries as existing refineries are using old technology that can be upgraded to a certain level. Capacity enhancement, along with an increase in utilization rate can convert the deficit to savings in import bills.

8.1. Expected Increase in Petrochemicals Production

By installing steam cracking technology production of ethylene and propylene can be made possible. Through this technology different feedstock can be used for the production of petrochemicals. Naphtha, gas oil, and ethane are the most commonly used feedstock to produce olefins and aromatics. Pakistan imports around USD 1.2 million tons of olefin and aromatics for different industries. These petrochemicals cost around USD 2 billion in annual imports[11]. These imports can be saved through the adoption of hydrocracking technology by the refinery sector which can produce petrochemicals for the industries. At the enhanced annual capacity of 20.3 million tons with a utilization rate of 70 percent refineries can process 14.25 million tons of crude oil and can produce non-energy products of 2 million tons at a yield of 14 percent. This yield is an average for the last 5 years of the refinery industry. Production of 2 million tons can yield olefin and aromatics by 0.66 million tons. Under the OPEC conversion factor, 3.3 million tons of naphtha can produce 1 million tons of ethylene and 0.5 million tons of propylene. In percentage terms, it is estimated to be 50% of the naphtha and LPG produced. Hence, the historical average of naphtha and LPG is 66% of the total non-energy products, olefin, and aromatics will constitute around 0.66 million tons.

Table 8.3: Expected Benefit of Import Substitution - Petrochemicals

Scenarios	MTons Capacity (1)	Crude oil		Petro Chemicals Current Production (Naphtha/LPG)		Additional Production	Current Import		Revised Import		Savings
		Utilization (2)	Production (3)=(1)* (2)	Yield (4)	Production (5)=(3) *(4)	Propylene/ Ethylene/ Fibers* (6)=((3)*6 6%)*0.5	Tons MMT (7)	Value- $m (8)	Tons (9)= (7)-(6	Value- $m (10)= (6)* (1740**)	Value- $m (11)
Base year 2019	19.00	70%	13.30	14%	1.86	0.61	1.20	2074	0.59	1,019	1,055
Year 1	20.33	70%	14.23	14%	1.99	0.66	1.20	2074	0.54	944	1,130
Year 2	21.75	70%	15.23	14%	2.13	0.70	1.20		0.50	864	1,210
Year 3	23.28	70%	16.29	14%	2.28	0.75	1.20	2074	0.45	778	1,296
Year 4	24.91	70%	17.43	14%	2.44	0.81	1.20		0.39	687	1,387

* Conv-50% of Naphtha/LPG, **cost of USD 1740/ton is used on basis of import price of 2019

[11]PBS database

Petrochemicals demand is around 1.2 million tons as per PBS, therefore production of 0.66 million tones can reduce the import dependency can save around USD 1 billion on imports.

8.2. Export Potential in Petrochemicals

An increase in capacity would yield additional non-energy products which would surpass the local demand. At 50 million tons of capacity 1.74 million tons of petrochemicals could be produced which may create a surplus of 0.3 million tons. This surplus could have the potential for exports. Total international imports of ethylene, propylene, fibers, and phosphate fertilizers are around USD 122 billion as per ITC. Major importers are China, India, Bangladesh, Europe, Turkey, and Vietnam. Being our neighbors China and India can become major markets to extract the potential and earn good foreign exchange.

Table 8.4: Export Potential in Petrochemicals

Petrochemicals	World Imports 2019 $billion	Major Importers
Polymers of ethylene	74.1	China/Europe
Polymers of propylene	41.2	China/India/Europe
Fibres	6.36	China/Bangladesh/Turkey/Vietnam
Phos Fertilizer	0.4	India/Myanmar
Total	122.06	

Source: Trade map, ITC

9. Import Substitution Strategies (Short-Term, Medium-Term and Long-Term)

The table below summarizes the strategies for import substitution for the oil sector. Unlike the previous approaches Pakistan has been adopting, we propose efficiency and performance based support to the industry.

All the short-term to medium/long-term measures are to increase market competitiveness and create a level playing field for refineries based on their productivity.

The incentive structure is tied to the performance of the refineries and instead of tariff reductions, GOP should incentivize by providing tax benefit and land against equity to assist investment in new and existing refineries.

Medium Term	Long Term
Deregulation of retail price, Fixation of IFEM, and dealer margins should be abolished with open market pricing by OMCs. Customs duty on crude and refined products in form of deemed duty/tariff protection should remain 7.5% for MS and HSD to be eventually abolished. It should be applicable on the production of 50% or more of nameplate capacity and should be abolished in 2025. Installing hydrocracking technology to improve the utilization rate and reduction in the production of FO. Refineries should jointly work out to install a hydrocracking facility to enhance capacity and efficiency. State bank should introduce long-term financing facilities only for up-gradation. A hedging mechanism to minimize price risk spread Tax holidays should be tagged with increased utilization rates and investment in the petrochemical complex. PSO shares with banks to be un-freeze.	• Incentivizing new refineries as per their capacity, utilization rates, and ability to produce petrochemicals • Government to Government collaboration should be assisted for investment in refinery • Tax-free zone for refineries needs to be allocated. For domestic use sales tax, duty, PDL etc be applied while for exports, performance-based export rebates are considered with no customs duty. • Domestic refineries need to be allowed to develop regional markets • Tax incentives should be given on exports of petrochemicals or refined products • Government should contribute to the reduction of transportation cost of petroleum products by channelizing through railways. Private sector collaborate for building pipelines to reduce cost of transportation along the value chain.

10. Conclusion

An increase in the utilization rate of 75 percent for existing refineries combined with the induction of a new refinery with an additional annual capacity of 5 tons, savings of around USD 3.7 billion could be achieved in three years. Technological advancement in the form of new cracking facilities can provide further opportunities in petrochemicals. Pakistan imports around 1.2 million tons of olefin and aromatics for different industries. These petrochemicals cost around USD 2 billion in annual imports. These imports can be saved through the adoption of hydrocracking technology by the refinery sector which can produce petrochemicals for the industries. At the current annual capacity of 19 million tons with a utilization rate of 70 percent. Refineries can process 14.2 million tons of crude oil and can produce non-energy products of 2 million tons at a yield of 14 percent. This yield is an average for the last 5 years of the refinery industry. Production of 2 million tons can yield olefin and aromatics by 0.66 million tons which can reduce import dependency and can save around USD 1 billion on imports. Upgradation and induction of new technology could save foreign exchange of USD 4.7 billion worth in three years which could create a bigger impact on the whole of the economy. For the medium term and 1st phase of import substitution, we propose de-regulation of the prices; fixation of IFEM and dealer margins to be abolished; open market pricing; standardizing custom duty on crude as well as on refined products; tax holidays to be tagged with increased utilization rates; deemed duty/tariff protection should remain 7.5% for MS and HSD. It should be applicable on production of 50% or more, and it should be abolished once import dependency comes down to 40%; For long term we propose incentivizing new refineries as per their capacity, utilization rates, and ability to produce petrochemicals; government to government collaboration should be made in investing in refinery production; tax-free zone for refineries needs to be allocated. For domestic use sales tax can be applied, while for exports, export rebate can be granted; domestic refineries need to be allowed to develop regional markets; tax incentives should be given on exports of petrochemicals or refined products; government should contribute to the reduction of transportation cost of petroleum products by channelizing through railways, and pipelines. Reduce the cost of transportation along the value chain

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