

ENSURING ENERGY SECURITY

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Background

Pakistan faces a multitude of challenges, with all of them directly impacting the citizens of the country - the pressures from IMF, the volatile prices of energy in the international marketplace, and the depleting indigenous natural resources. All these factors impact the prices of commodities that are consumed by the common man, who is hard put to meet the financial challenges resulting therefrom.

Recent crises in availability of essential commodities (sugar, wheat, cooking oil) at affordable prices, the June 2020 petrol crisis, the gas crisis, ongoing LNG availability crisis - all these provide an opportunity not only to learn from them, but also to chart a course that will avoid repetition of past mistakes and lead to a stable and sustainable future.

A scrutiny of the daily discourse on the media confirms that while challenges are recognized, yet focus seems to be on discussing them more than targeting actions that will resolve them in the current and expected international scenarios in future. Paralysis through analysis is, unfortunately, what is happening instead of finding the correct solutions.

The continued and sustained supply of Petroleum Oil Liquids (POL) is important even during business-as-usual (peace-time) in order to keep the engines of the economy operating smoothly. This, however, becomes even more critical when the situation at the borders dictates that we ensure the supplies mainly for our Armed Forces - Army, Navy and Air Force.

POL is the key area that needs to be focused on with the single objective of maximum use of indigenous resources and minimum imports of energy.

Another area of concern is that Pakistan sees too many road accidents caused by the pathetic condition of vehicular population. Unlike the developed countries, which are being emulated in terms of increasingly stringent specification standards for Petrol and HSD, Pakistan does not have annual inspections before the renewal of registration. In the UK, for example, no vehicle is allowed on the roads if it has not passed and met stringent vehicular condition standards. The most critical vehicular parts are (a) the Tyres; (b) the Brakes and (c) the Lights.

Proposals in this chapter if recognized and implemented, will help address all these challenges meaningfully.

1. THE COUNTRY SCENARIO

Pakistan's Indigenous sources of Energy are:

- ⇒ Oil
- ⇒ Gas
- ⇒ Hydel
- ⇒ Coal
- ⇒ Nuclear
- ⇒ Renewable (Solar, Wind)

Pakistan's Primary Energy Supplies during 2019-20 were

Oil	22.6%	<i>Down from 25.7% a year before</i>
Gas	33.1%	<i>Down from 35.0% a year before</i>
LNG Import	10.3%	<i>Down from 10.6% a year before</i>
Hydro Electricity	9.9%	<i>Up from 7.8% a year before</i>
Coal	18.2%	<i>Up from 15.4% a year before</i>
Nuclear Electricity	1.3%	<i>Up from 1.37% a year before</i>
LPG	1.3%	<i>Up from 1.1% a year before</i>
Renewable (Solar, Wind)	1.2%	<i>Down from 1.3% a year before</i>
Imported Electricity	0.1%	<i>Up from 0.1% a year before</i>

**Source: Pakistan Energy Yearbook, 2020
Hydrocarbon Development Institute
Pakistan (HDIP)**

In terms of Tons Oil Equivalent (TOE), supplies shrunk from 83,811,284 to 80,616,727 a year ago.

Gas has witnessed a NEGATIVE Annual Compound Growth Rate (ACGR) of - 2.3%, i.e. minus 2.3 % over the last 6 years.

As on June 30, 2019

Original Recoverable Natural Gas (NG) Reserves

62.01 Trillion Cubic Feet (TCF)

Cumulative Production

41.09 TCF

Balance Recoverable Reserves

20.91 TCF

In other words Pakistan has already used up ~ 66% of Natural Gas Reserves.

Power Sector accounts for

~ 61% of NG Use

General Industry

~ 5%

Fertilizer

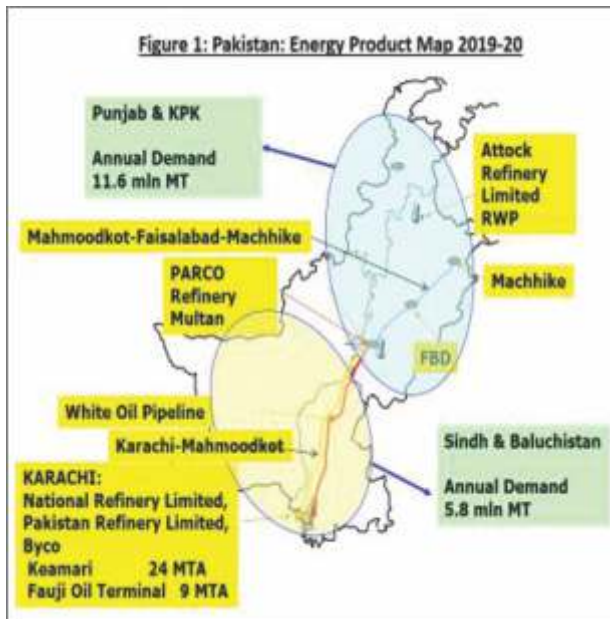
~ 34%

In other words, NG is a fast depleting resource and there are many takers!

A number of projects and investors are being touted in all the areas of Energy Supplies but most of them are either on the drawing board or have long gestation periods, made more uncertain for the Investor because of lack of clarity or Government Policy. The additional energy resources arising out of these projects cannot be a quick-fix for our problems as they would come to fruition 3-4 years minimum from inception.

There is also the need to understand the Downstream Oil Sector.

Figure 1 depicts Pakistan's Energy Map 2019-20



Pakistan's annual Refined Product demand was around 17.4 Million Tons in 2019-2020. Demand dropped by

almost 30% of the 25.5 Million Tons seen in 2017-18. Primary factor: The Covid-19 Pandemic and its global impact translating itself to the Pakistan Market.

The local Refining Sector too was very badly hit: as against a Refining Capacity of 19 Million Tons, the local Refineries' throughput was only 10 Million Tons. This capacity utilization of less than 60% since 2017-18 resulted in local Refined Product availability dropping by 30% as compared to 2017-18. The main reason for this (in addition to the overall Covid 19 impact) was the non-use of locally produced Furnace Oil. This caused the local Refineries to operate at below or around 60% of their nameplate capacity.

In addition to the impact of Covid-19, therefore, what impacted the local Refiners most, and continues to do so even more today, is the non-use of local Furnace Oil due to government's continued dependence and preference for Imported LNG.

Pakistan Refinery Limited (PRL) has become the third one to announce its closure following Byco Petroleum Pakistan Limited (BPPL) and National

Refinery Limited (NRL), due to non-lifting of their furnace oil production by the power producers and the OMCS, primarily PSO.

Instead of using local Furnace Oil, decision-makers prefer to import at roughly Rs.50,000 per Ton higher cost as compared to the local Furnace Oil. Is the Import Lobby ruling the roost at a time when Pakistan must reduce dependence on imports? In 2017-18, our local Refineries produced their highest volume of 3,261,123 Metric Tons of Furnace Oil. This translates to almost 9,300 Tons per Stream Day (Stream Day is the number of days a Refinery is on-stream throughout a Calendar Year, net of shutdown for planned maintenance). The figure of 9,500 is based on 350 Stream Days.

PSO has recently imported a 70,000 Ton Tanker of Furnace Oil. It has eaten up almost 7 days' equivalent of local refineries' Furnace Oil production. Why was this over-import necessary?

2. PROBLEM DEFINITION

Energy sector face the following challenges:

2.1 Pakistan is not self-sufficient in Product availability

Pakistan imports almost 40% of its Gasoline and 50% of HSD requirements

2.2 Refining Capacity is not 100% utilized

Capacity utilization falls short by 30-40%

2.3 Reduced Lifting of Furnace Oil the main reason for lower Refinery Throughput

This impacts local availability of Petrol, HSD and Jet Fuel

Jet Fuel (JP-8 for the Armed Forces) must be available locally

2.4 Lower Refinery capacity has a direct impact on Local Crude Processing

Local Associated Gas availability from Fields especially in the case of ARL has a direct impact on Gas availability as well as threatens closure of Crude Oilfields

2.5 The impact of these factors is summarized below:

	2017-18				NOV '21	SHORTFALL
FO				PER MONTH		
ARL	411,526	13%	ARL	34,294	29,341	-14%
BPPL	927,434	28%	BPPL	77,286	37,657	-51%
NRL	419,261	13%	NRL	34,938	34,759	-1%
PARCO	992,674	30%	PARCO	82,723	79,985	-3%
PRL	510,228	16%	PRL	42,519	7,109	-83%
	3,261,123			271,760	188,851	-31%

	2017-18				NOV '21	SHORTFALL
PETROL				PER MONTH		
ARL	684,380	29%	ARL	57,032	53,473	-6%
BPPL	249,244	11%	BPPL	20,770	30,964	49%
NRL	227,783	10%	NRL	18,982	14,424	-24%
PARCO	947,219	40%	PARCO	78,935	95,157	21%
PRL	240,996	10%	PRL	20,083	7,126	-65%
	2,349,622			195,802	201,144	3%

	2017-18				NOV '21	SHORTFALL
HSD				PER MONTH		
ARL	727,638	13%	ARL	60,637	48,123	-21%
BPPL	1,152,350	21%	BPPL	96,029	46,521	-52%
NRL	938,492	17%	NRL	78,208	48,747	-38%
PARCO	1,952,042	36%	PARCO	162,670	167,588	3%
PRL	695,606	13%	PRL	57,967	18,666	-68%
	5,466,128			455,511	329,645	-28%

SOURCES

**PAKISTAN ENERGY YEARBOOK 2020 HDIP
PRODUCT REVIEW MEETING DEC 2021**

**FOR ANNUAL PRODUCTION
FOR NOVEMBER PRODUCTIONS**

As the foregoing analysis clearly shows, the low or non-lifting of Furnace Oil production from the Local Refineries has a direct impact on the local production of Petrol and HSD:

Petrol Production lower by
65% for PRL and 24% for NRL

HSD Production lower by
Lower for all Refineries except
PARCO (overall 28%)

In terms of Financial Impact, at today's Prices of Brent touching almost 78 USD per Barrel, impacting import price of Petrol and Diesel respectively and this has the following FEX impact:

ADDITIONAL VOLUMES IMPACTED AND COST SAVINGS

Add'nal Annual Petrol Production: 4.24 Million Tons X USD/Ton Landed Cost 868 = 3.7 Billion USD

Add'nal Annual HSD Production: 2.99 Million Tons X USD/Ton Landed Cost 800 = 2.4 Billion USD

Less Add'nal Crude Cost of 7.8 Million Tons X USD/Ton Landed Cost 662 = 5.1 Billion USD

Net Savings of USD 1 Billion

3. CONCLUSIONS AND RECOMMENDATIONS:

1. Maximize use of local resources in

national Energy Mix

2. The path to this lies in operating existing Refineries to their fullest possible potential instead of the current ~ 60%. A Refinery's safety is compromised below 60%
3. Local Furnace Oil must be fully utilized in order to maximize local Refinery throughput. It must be removed from the merit-order calculations and must remain a must-use Product round-the-year. This will keep local Refineries operating at their maximum optimal capacity, thereby maximizing local Petrol, HSD and Jet Fuels availability, minimizing imports of the same. For this the Oil Marketing Companies (OMCs) must play their due role. Over-import in November 2021 caused Furnace Oil storages to reach overflow levels. The Independent Power Producers are carrying only 20% of their capacity in Furnace Oil instead of the minimum mandated stock level of 80%. This is totally unacceptable. Latest

import by PSO cost Rs.50,000 per MTon more than the local Furnace Oil price. This differential alone translates to a Rs 3 Billion Loss on this single import only.

Having listed the factors impacting our energy security, the solution is simple:

1. Use local Furnace Oil to the maximum for Power Production
2. It will free up Gas for provision to Domestic and Export-oriented Industry

It will help reduce imports of the very expensive RLNG whose price has shot through the roof with no respite in sight

4. FOR THE FUTURE WELL-BEING:

4.1 Dedicate two of the Oil Piers at Keamari to Oil Only. This had already been discussed by the Industry with Chairman KPT in October 2018 but needs to be implemented post-haste

4.2 The present Byco SPM also needs to be better utilized

to shift some of the volume from Keamari to the SPM and reduce the load on KPT. Due to the drastic fall /ban in Furnace Oil imports, a second jetty at Port Qasim may not be required

4.3 Ensure and fast-track Keamari-Port Qasim Connectivity Project

4.4 Expedite Strategic Storages Strategic Storages are permanent petroleum reserves held for non-commercial reasons. These safeguard against:

External blockades (e.g. in times of war)

Internal impediments to product movement (e.g. floods, other disasters)

Oil Industry Disruptions (e.g. Refinery Outages, pipeline break down)

Strategic Reserves are separate from Commercial Stocks, but these can be

utilized by Oil Industry in times of need.

Based on a Pakistan Study conducted few years back, 45 Days Strategic stock requirement for the country had been proposed by the authorities. It was also proposed that these storages should be built across the country.

- Locations to be determined from strategic and defense point of view with proximity to demand centers
- However, development will entail:
 - Infrastructure development costs
 - Additional bi-annual

costs of logistics will be incurred to recycle reserves (Product quality of stocks is susceptible after 6 months)

The same study recommended that a Policy in this regard be prepared

The fact remains that there is still No defined National Policy on Strategic Storages for Pakistan

It is proposed that a Working Group be constituted earliest with Ministry of Defense (MOD) and Ministry Of Energy Petroleum Division (MOEPD) as members to evaluate detailed options for strategic storage for Pakistan and develop future course of action, with

all stakeholders (Industry, Defense, Ports & Shipping) participating. MOD to take the lead role and MOEPD providing the technical support

5. SAFETY RECOMMENDATION

If Pakistan wants to save the lives of thousands of people dying due to road accidents across the Country, and especially the motorcyclist, it is proposed that Maintenance of Transport (MOT) Policy in coordination with, and cooperation of, the Traffic Police be developed covering the following factors:

- a. $\frac{3}{4}$ year Inspection to check for defects in
 - Tyres (replace if treads are gone thin)
 - Brakes
 - Lights
 - Tie-Rods and axle
- b. Removal of defects before the vehicle is

allowed back on the road

- c. Incentive scheme for those coming for these Inspections (free oil change and the like)
- d. Separate dedicated lanes for Motorcyclists who must be fined if they venture into main lanes
- e. The Original Equipment Manufacturers (OEMs) that manufacture spare parts for vehicles must be part of this scheme

These recommendations may sound far-fetched to achieve but where there's a will, there's a way.

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