



Gas and Petroleum Market Structure and Pricing

Edited by
Afia Malik



PIDE
Monograph
Series

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS
ISLAMABAD

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Afia Malik, Amna Urooj, Uzma Zia, Saba Anwar, and Saud Ahmad Khan

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CHAPTER 1

Energy Market Structure Oil and Gas

Afia Malik, Amna Urooj, Uzma Zia, Saba Anwar,
and Saud Ahmad Khan

Energy Market Structure Oil and Gas

1. INTRODUCTION

Oil and gas play a prominent role in the energy matrix of Pakistan. In FY2019, oil and gas account for 61 percent of final energy supplies and 63 percent of final energy consumed (Chart 1 and Chart 2). With limited oil resources and declining gas reserves, dependence on imports is increasing.

The supply chain of both petroleum and gas consists of a number of activities connected with the flow of goods and services from the raw material stage till the final product reaches the consumer. It involves the interactions of independent companies; various structures are typically involved in the supply chain (Figure 1). An important variable in the constitution of the chain is the financial as well as contractual obligations of these companies and of course responsibilities of the regulator to monitor those obligations. The problem at any point may have its impact at the final consumer end.

This report provides an overview of the oil and gas market structure.

Fig. 1. Oil and Gas Supply Chain

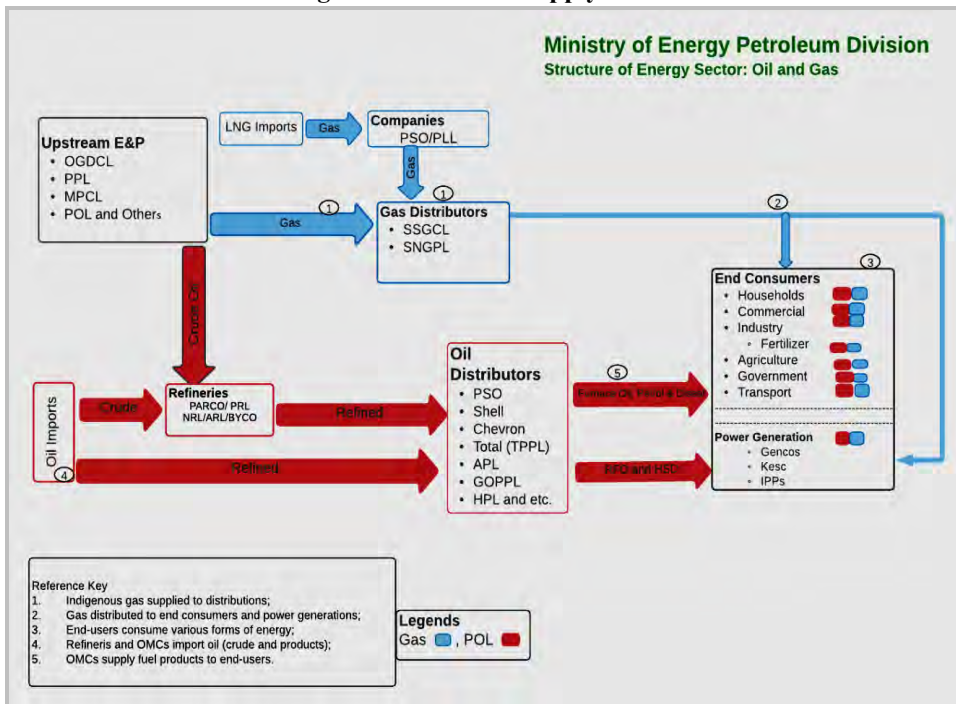
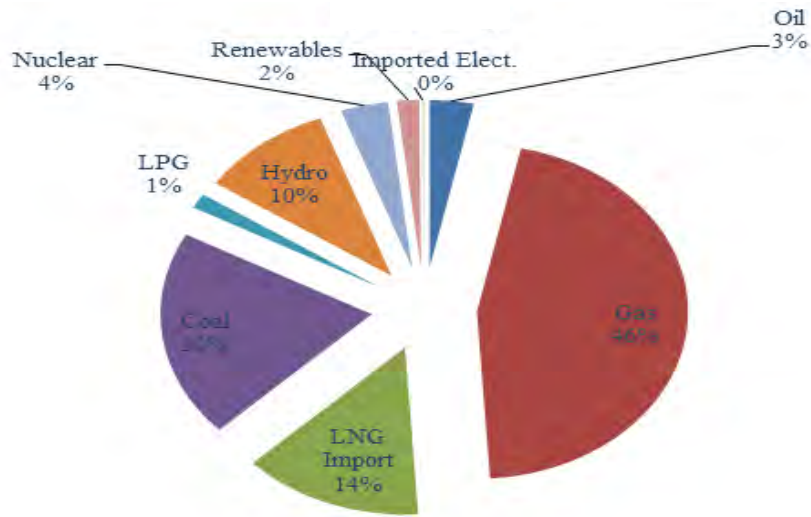
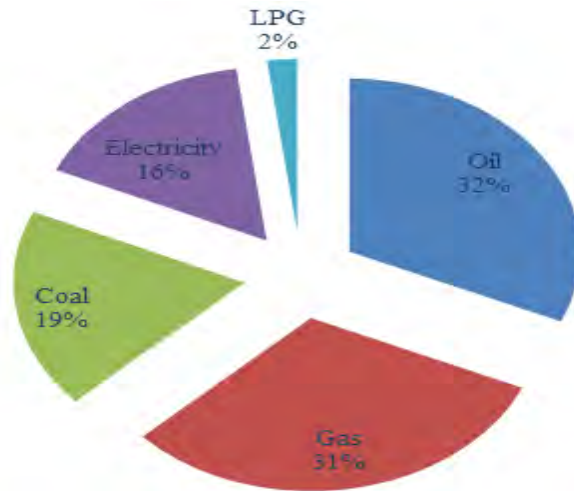


Chart 1. % Share in Energy Supplies (FY 2019)**Chart 2. % Share in Energy Consumed (FY 2019)**

Source: Pakistan Energy Yearbook, 2020.

2. OIL MARKET STRUCTURE AND SUPPLY CHAIN

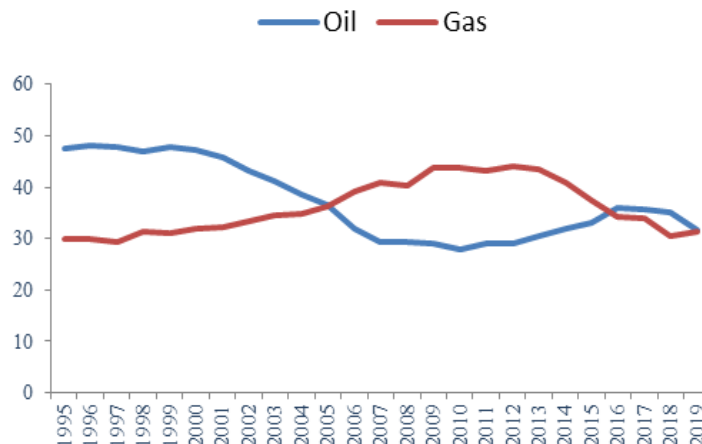
Until 1999, the government had tight control over the petroleum sector in Pakistan. All the decisions were made solely by the government and were often based on political as opposed to economic considerations. Since 2000, the government has initiated an ambitious pro-market reform programme in the sector.

As a developing country, Pakistan's energy requirements are growing gradually over time, from 7 Million TOE in FY1972 to 55 Million TOE in FY2019. Over the years, the country has seen a change in its energy mix from the dominance of oil in the 1990s to

the dominance of gas until FY2015. With the depletion of natural gas resources, the trend again upturned in FY2016, and oil consumption exceeds gas consumption (Chart 3).

Due to the massive domestic demand for oil, a large quantity of crude oil is imported every year. Demand for refined petroleum products greatly exceeds domestic oil refining capacity, so nearly half of the Pakistani imports are refined products.

Chart 3. % Share in Total Energy Consumed



Source: Pakistan Energy Yearbook (Various Years).

2.1. Petroleum Supply Chain

Petroleum supply chain infrastructure in Pakistan starts from port facilities at Karachi. Crude oil, white-oil products, Low Sulphur Furnace Oil (LSFO) are received at the Karachi port, while LPG and High Sulphur Furnace Oil (HSFO) are received at the Fauji Oil Terminal at Port Qasim. In FY 2019, the total import of (black and white oil) in Pakistan was 18.6 Million TOE. The port facilities are connected to the tankage/storage facilities of the refineries and oil marketing companies (OMCs).

Similarly, oil explored and produced (E & P) locally is transferred from E & P companies (Chart 4) to refineries, and from refineries to oil marketing companies, and from oil marketing companies to thermal power plants and other petroleum consumers (individuals, industries).

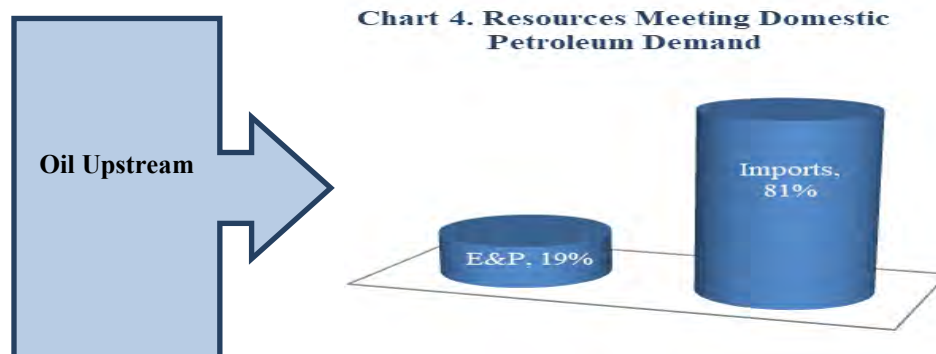
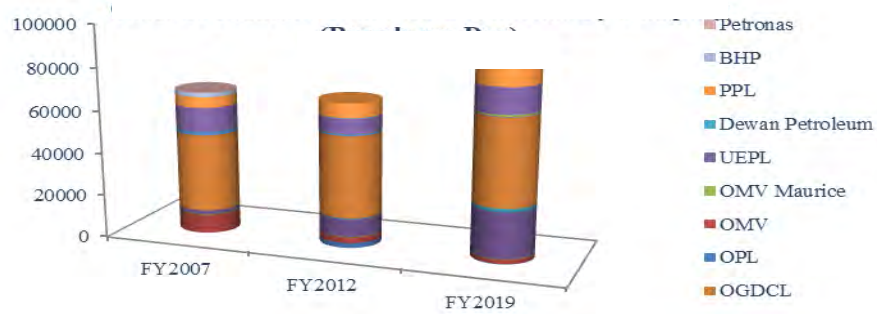


Chart 5. Domestic Crude Oil Production By Company (Barrels per Day)

Source: Pakistan Energy Yearbook (Various Years).

Pakistan has oil reserves of around 568.5 million barrels as on June 2019 (Table 1). The major part of produced oil comes from the reserves located in the southern half of the country, where the three largest oil producing fields are located (in the Southern Indus Basin). In addition, some producing fields are located in the middle and upper Indus Basins. After late 1980s, Pakistan did not find many new oil fields. However, from FY2013 to FY 2015 83 oil and gas discoveries have been made. These added 631 million cubic feet per day of gas and 27,359 barrels per day of crude oil to the total reserves of Pakistan (Hussain et al. 2019).

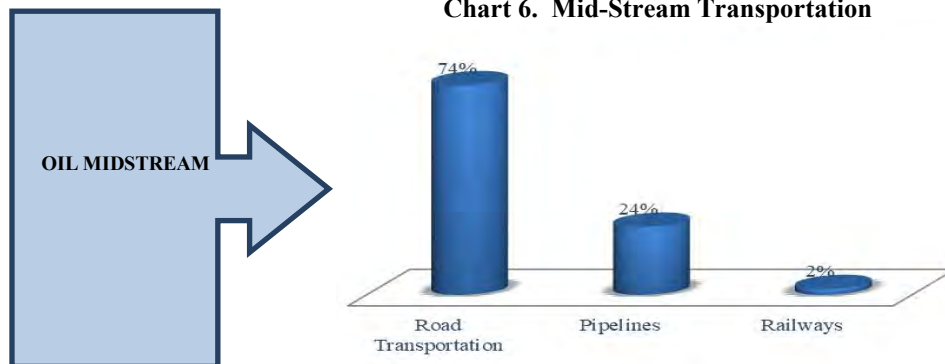
Table 1

Crude Oil Reserves (Million Barrels) as on June 30, 2019

Original Recoverable Reserves	Cumulative Production	Balance Recoverable Reserves
1498.773	930.327	568.446

Source: Pakistan Energy Yearbook (2020).

There are almost twelve companies involved in crude oil production. Among these twelve, Oil and Gas Development Company Limited (OGDCL) has the highest share almost 45 percent as 40356 barrels per day is produced during 2019. Hungarian Oil and Gas Company (MOL) and United Energy Pakistan (UEP) contributed 24 percent and 13 percent respectively; while the contribution of Pakistan Petroleum Limited (PPL) was 12 percent (Chart 5). Rest is shared by other companies.

Chart 6. Mid-Stream Transportation

Source: OGRA State of Industry Report, 2018-19.

Chart 7. Oil Depots in Pakistan (FY 2019)

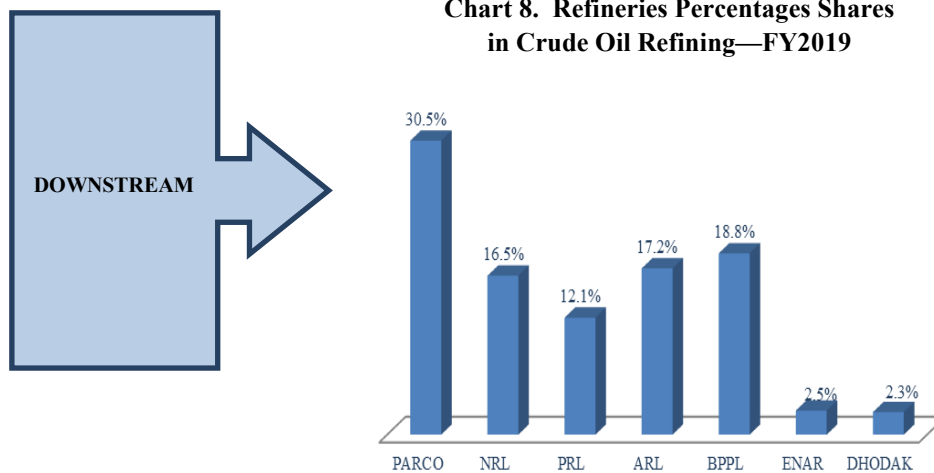
Source: OGRA State of Industry Report, 2018-19.

In the midstream—the bulk of 19.22 Million Tonnes of petroleum products required by Pakistan’s market is transported by road, oil pipelines and railways (Chart 6). Refineries, Oil Marketing Companies (OMCs) and large consumers own terminals and storage facilities to receive and store crude oil and petroleum products throughout Pakistan. The key installations/terminals are the primary supply points for transportation of petroleum products to regional depots. There are 22 depots spread throughout the country (Chart 7). The total storage capacity of the installations and depots, however, amounts to only 21 to 23 days of consumption equivalent, which may well be insufficient during a supply crisis.

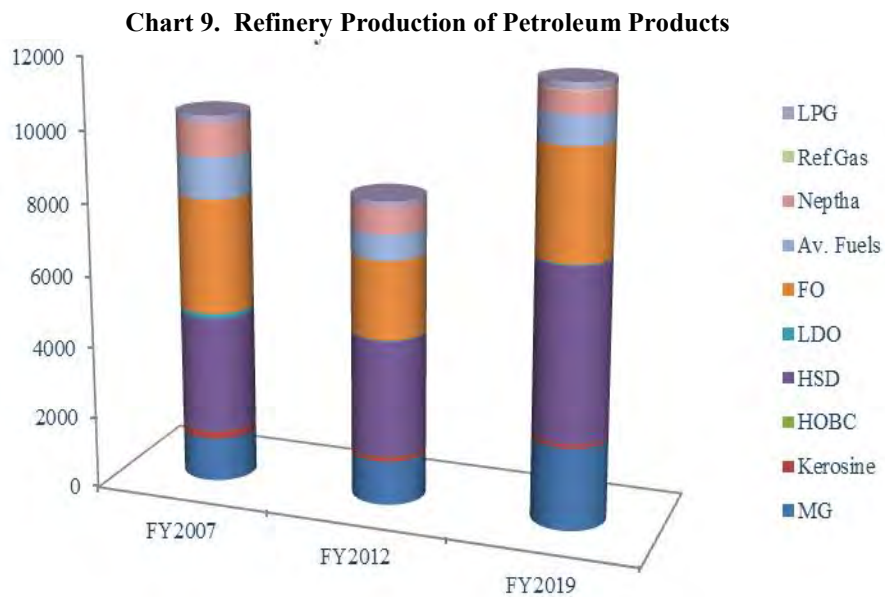
Box 1. Strategic Oil Stocks

Strategic oil stocks are the main defence governments have to protect their economies from oil price shocks and other security concerns. Strategic stocks are not exactly intended to guard against high prices; their main objective is to ensure availability in the event of a physical disruption in supply. Pakistan’s strategic oil storage capacity is insufficient to ensure its energy security. Further, there is no distinction between oil marketing companies (OMCs) commercial inventories and strategic stocks, which is necessary to make a difference between its various needs and ensure supply during any unforeseen event.

The OMCs (i.e. PSO, SPL and TPPL) hold equity partnerships in the White Oil Pipeline (WOP), which provides the strategic infrastructure to transport petroleum products from Karachi to the Up-Country locations. WOP has a transportation capacity of 12 million tonnes/annum.



Source: OGRA State of Industry Report 2018-19.



Source: Pakistan Energy Yearbook (Various Years).

In the downstream oil sector, there are seven refineries—Pak-Arab Refinery Limited (PARCO), National Refinery Limited (NRL), Byco Petroleum Pakistan Limited (BPPL), Pakistan Refinery Limited (PRL), Attock Refinery Limited (ARL), ENAR and DHODAK (Chart 8). These refineries have a total capacity of 19.37 million tons per annum. In FY2019, refineries produce 12.40 million tonnes. PARCO was the major contributor in POL production with 30.50 percent share followed by BPPL with 18.80 percent, ARL and NRL with 17.23 percent and 16.48 percent share respectively during FY 2019.

Box 2 Oil Refinery

Features

- Demand for Petroleum Products: 19.22 MT; Refining Capacity, 62% of country's demand (11.86 MT).
- Import of Petroleum Products: 38% (7.36MT).
- Crude Oil Requirement for Refineries: 400,000 Barrels/per day out of which 22% is supplied by Local E&P and 78% is imported.

Challenges

- Volatility in margins because of fluctuating crude oil prices.
- Unfavourable changes in pricing regime—removal of deemed duty.
- Circular debt in power sector affects financial flows.
- Exchange rate depreciation.
- OMCs procuring substantially from local refineries are likely to have limited impact on profitability in the current macroeconomic situation as compared to those relying on imports.

Source: Pakistan Energy Yearbook (2020) and PACRA (2019).

Table 2

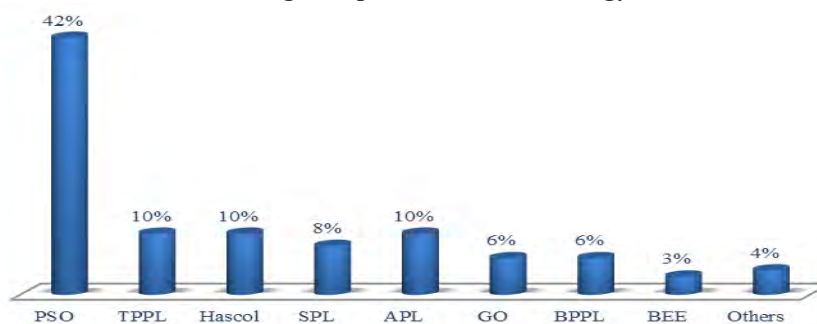
Business Risk-Refining Capacity (Million Tonnes) and Utilisation (%)

Refinery	2016		2017		2018		2019	
	Capacity	Utilisation	Capacity	Utilisation	Capacity	Utilisation	Capacity	Utilisation
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	2.10	81	2.10	76	2.10	81	2.1	76

Source: Pakistan Energy Yearbook (2020).

In the downstream, there are twenty-eight Oil Marketing Companies (OMCs) operating in Pakistan and fifty-nine have been granted licenses by OGRA. However, the top five companies' holds 80 percent of market share in FY2019. In FY 2019, the market share of Pakistan State Oil (PSO) was at the top (41.8 percent of the total energy Supply); followed by Attock Petroleum Limited (APL) with 10.5 percent, Total Parco Pakistan Limited (TPPL) 10.1 percent, Hascol 10.1 percent and Shell Pakistan Limited (SPL) 8 percent (Chart 10).

Chart 10. Oil Marketing Companies' Share in Energy Products 2018-19



Source: OGRA, State of Industry Report, 2018-19.

Table 3

Share of OMCs in White and Black Oil

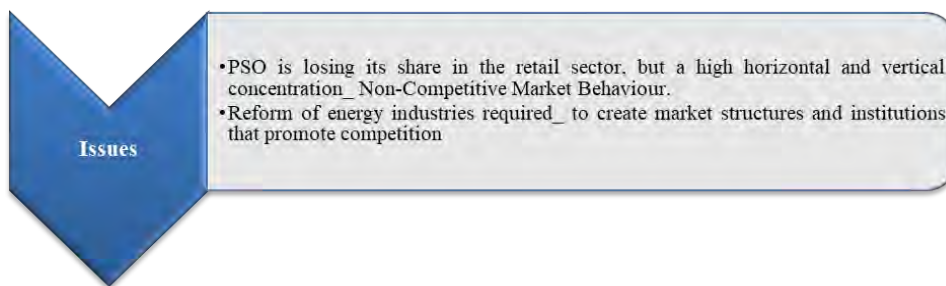
	White Oil	Black Oil
PSO	41%	52%
PARCO	12%	8%
ARL	10%	13%
HASCOL	10%	12%
SPL	10%	–
Others	10%	16%

Source: PACRA (2019).

MG (Petrol), diesel and HOBC are sold through retail outlets. OMCs hold nearly 1.0 million tons of storage capacity, with PSO having nearly 68 percent of this capacity. Most of the OMC storage is for finished products, of which nearly half is for HSD. So when supply chain involves so many agents/ structures its effective management, monitoring and regulation at every level become necessary to avoid a crisis. PSO leads the way in White Oil (MG, HSD, LDO and Jet Fuel) as well as Black Oil (FO, lubes & Greases) (Table 3). Although the share of PSO is declining over the years, still it is the market leader (Figure 2).

Pakistan has more than 8600 retail outlets. PSO has the largest share of more than 40 percent, followed by TPPL (10.2 percent) and SPL (10.1 percent). In FY2019, adjusting for FO (as it is not sold in retail outlets) PSO also leads in revenue earned per pump (Rs 349 Million), followed by ARL (Rs 293 Million) and SPL (Rs 258 Million) (PACRA, 2019).

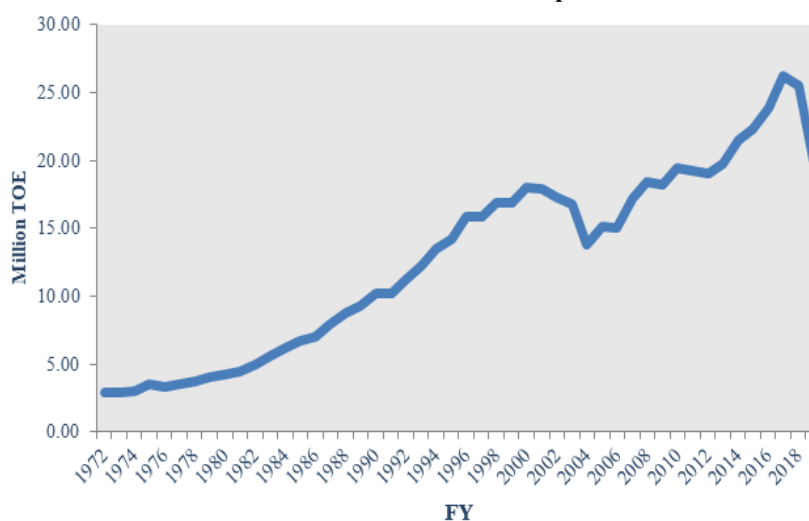
Fig. 2. Oil Market Leader—PSO



2.2. Petroleum Demand

The Consumption of petroleum products in the country during FY2019 was 19.2 Million TOE. The consumption of petroleum products increased sharply during the 1980s and 1990s at about 6 percent per annum. Between FY2001 and FY 2006, growth slowed, in fact, became negative because of fuel switching (Chart 3). But in FY2007 with a decline in gas resources and increased demand for furnace oil in the power sector, total demand for petroleum products increased. The demand for petroleum products increased at the annual growth of 4 percent between FY2007 and FY2017. Since FY2018, with a decrease in demand for furnace oil in the power sector, overall petroleum demand is declining (Chart 11).

Chart 11. Petroleum Consumption



Source: Pakistan Energy Yearbook (Various Years).

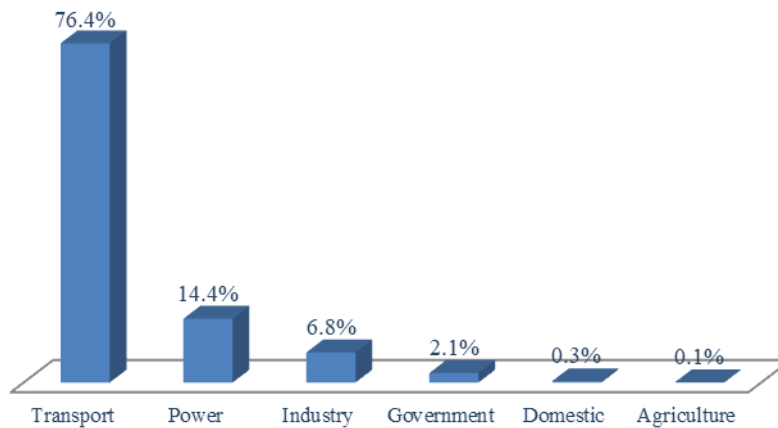
As in FY 2019, transport is the major user of the petroleum products which accounts for about 76 percent followed by power generation which uses about 14 percent and industrial sector which has a share of 7 percent while remaining is shared by the residential, agriculture and other government sectors (Chart 12). Motor gasoline (MG) and high speed diesel (HSD) are the two main petroleum products consumed in Pakistan (Chart 13).

The demand for MG is increasing continuously and so is its local production and imports (Chart 14 and Chart 15). However, stagnant industrial activity affects the consumption of HSD in industry and transport in FY2019 and its imports also declined in FY2019 (Chart 14 and Chart 16). Additionally, illegal traffic of HSD (from Iranian border) is a challenge for OMCs because of its cheap price. Local production of petrol is also increasing (Chart 14).

In the power sector replacement of LNG and coal has decreased the demand for furnace oil (FO) (Chart 14 and Chart 17). The government of Pakistan (GOP) restricts the import of FO in December 2017, to save foreign exchange reserves.

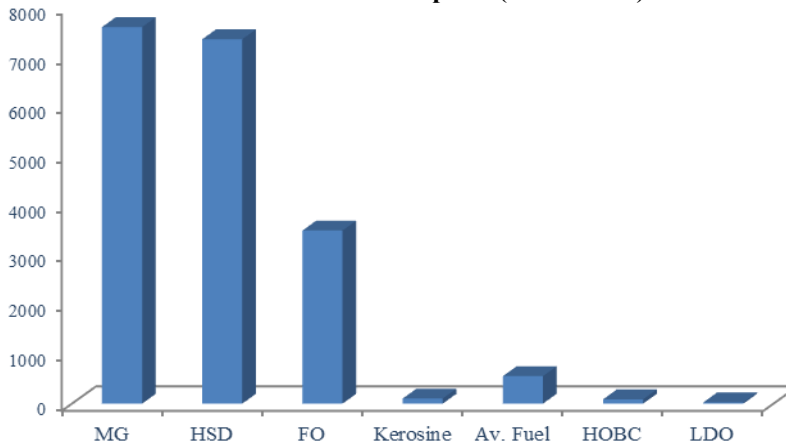
Pakistan is a net importer of crude oil. For petroleum products, Pakistan remained the net importer until FY2018. Since, FY 2017, import of petroleum products is declining. In FY2017, import of petroleum products was 15.1 Million, which declined to 13.3 Million tonnes in FY2018 and then to 8.8 Million tonnes in FY2019.

Chart 12. Sectoral Consumption of Petroleum FY 2019



Source: Pakistan Energy Yearbook, 2020.

Chart 13. Product Wise Consumption (000 Tonnes) FY 2019



Source: Pakistan Energy Yearbook, 2020.

Chart 14. Total Petroleum Consumption & Main Products Consumed



Chart 15. MG Consumption (Million Tonnes)

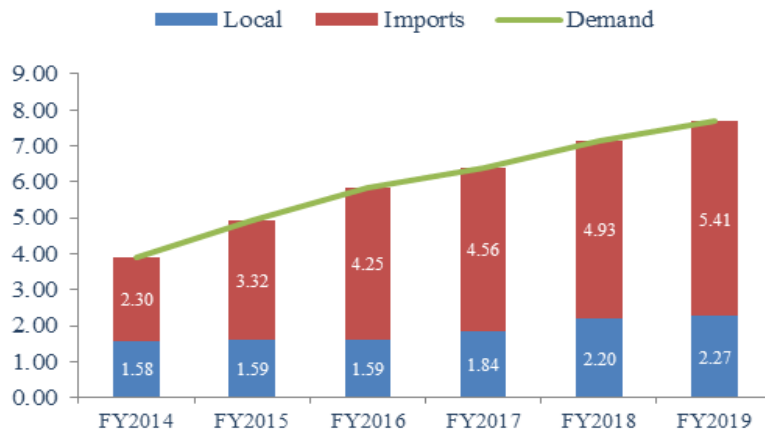


Chart 16. HSD Consumption (Million Tonnes)

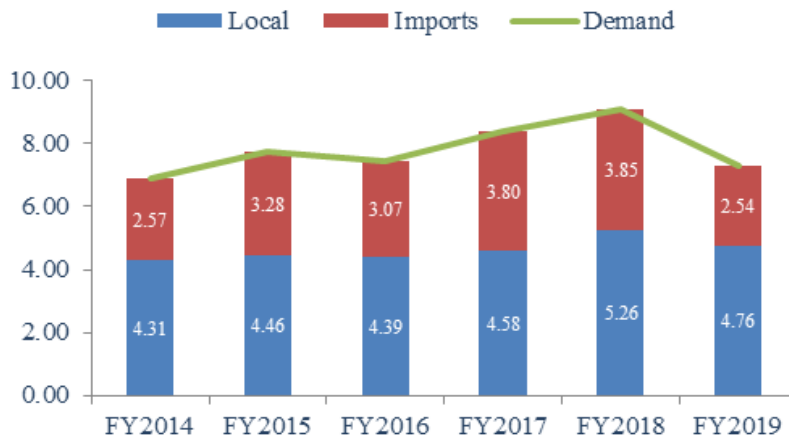
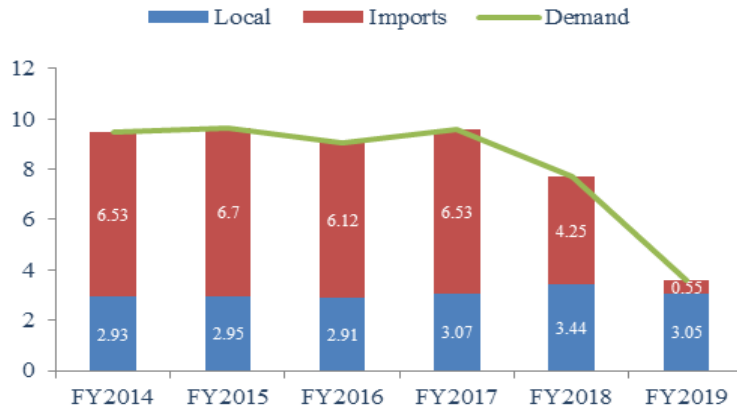


Chart 17. FO Consumption (Million Tonnes)



Source: Pakistan Energy Yearbook (Various Years).

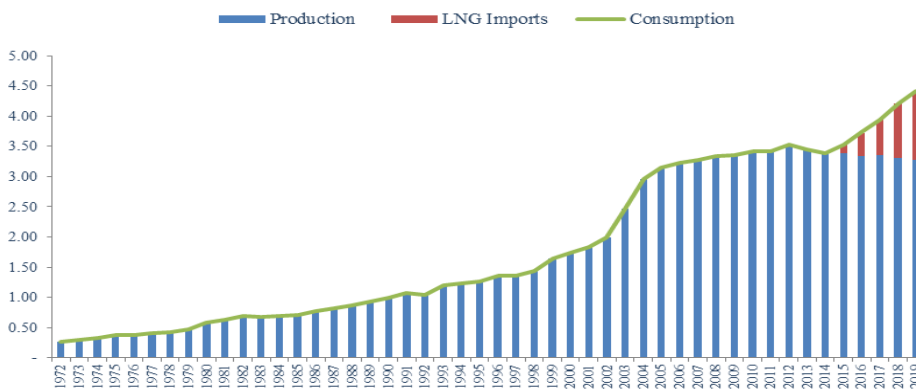
3. GAS MARKET STRUCTURE AND SUPPLY CHAIN

Natural gas is the most important indigenous fossil fuel, accounting for 35 percent of commercial energy supplies and about 31 percent of commercial energy use in Pakistan (Chart 1 and Chart 2). Pakistan is the 19th largest consumer of natural gas in the world, with the established natural gas industry. Out of the total 4.42 Billion Cubic feet/Day consumed in FY2019, 75 percent is produced domestically (Chart 18).

Over the last two decades, gas consumption has increased substantially (4.8 percent per annum). In comparison, Pakistan’s gas production is almost stagnant at about 4 Bcf/D. Since FY 2015 we are importing liquefied natural gas (LNG).

In Pakistan, first natural gas discovery was made in 1952. Pakistan Petroleum Limited (PPL) was established in 1950. Their first project was the drilling in Balochistan, which results in the discovery of the largest gas field in Sui (Hussain et al. 2019). In 1952, gas reserves of more than 10 trillion cubic feet were found in Sui (Gomes, 2013). This discovery leads to the development of a huge network of gas transmission and distribution in the country.

**Chart 18. Gas Consumption, Production and LNG Imports
Billion Cubic Feet per Day**

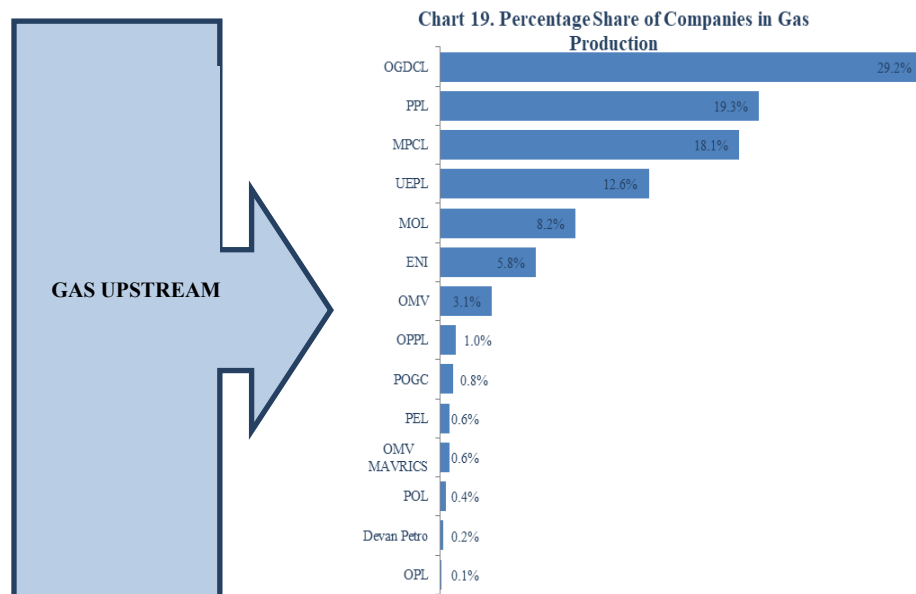


Source: BP Statistical Database, 2020.

3.1. Gas Supply Chain

The supply chain of natural gas just like oil starts from the gas fields, but it is relatively simple as compared to the oil supply chain. Gas explored and produced is transferred to two main gas utilities Sui Northern Gas Pipeline Limited (SNGPL) and Sui Southern Gas Company Limited (SSGCL) via pipelines for further distribution to the end-consumers.

In comparison, the supply chain of imported LNG starts at the Port Qasim Karachi. The LNG imported is re-gasified at the plants installed at the port. The re-gasified LNG is then transferred via pipelines to the two utilities for further transmission.



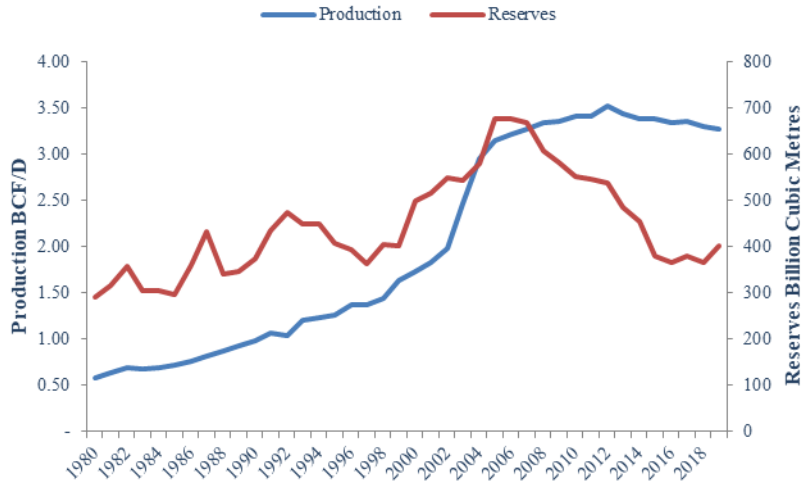
Source: Pakistan Energy Yearbook (2020).

In the upstream, there are 15 gas exploration and production companies working in 55 gas fields, spread throughout the country. The major gas fields of the country include Sui, Uch, Qadirpur, Sawan, Zamzama, Badin, Bhit, Kandhkot, Mari and Manzalai.

The upstream gas sector is led by three state-owned companies (majority shares owned by the state). In FY2019, Oil and Gas Development Cooperation Limited (OGDCL) has the largest share in total gas production (29 percent). OGDCL was followed by Pakistan Petroleum Limited (PPL) with a share of 19 percent and Mari Petroleum Company Limited (MPCL) with a share of 18 percent (Chart 19). Among all the E&P companies, Mari petroleum has the highest well success rate in Pakistan (69.23 percent). In comparison, for other companies, the average success rate is 30.1 percent (Minhas, 2020).

Overall, with no new major gas discoveries in recent years, gas production after reaching a peak in FY2012 has started decreasing. With no significant addition, gas proven reserves are also on the decline (Chart 20). Basin studies have suggested huge gas potential in the country; roughly 10 times the gas proved reserves (Sattar, 2020).

Chart 20. Gas Proven Reserves and Production



Source: BP Statistical Database, 2020.

In FY 2019, around 25 percent of the country’s gas supplies were met through the imported RLNG. Two state-owned companies, that is, Pakistan State Oil (PSO) and Pakistan LNG Limited (PLL) are authorized by the GOP to import LNG. PSO has signed a long term contract (span of 15 years) with Qatar. PLL has relatively short-term contracts with Gunvor and Shell.

LNG imported by PSO is re-gasified at the Engro Elengy Terminal Limited (EETL) at Port Qasim, Karachi at a tolling tariff. EETL has the peak capacity of up to 690MMCFD for re-gasification. Similarly, PLL has hired the capacity of PGP Consortium Limited (PGPCL) for re-gasification of LNG at Port Qasim, Karachi. PGPCL has a peak re-gasification capacity of 750 MMCFD (OGRA, 2020).

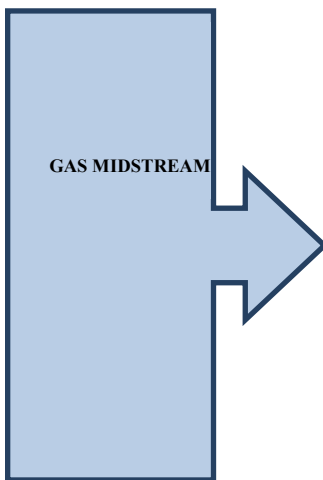
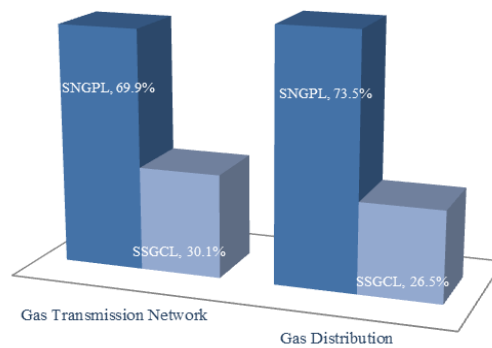


Chart 21. Percentage Share of Companies in Gas Transmission and Distribution



Source: OGRA State of Industry Report, 2018-19.

The midstream gas sector is dominated by two monopolies, SNGPL and SSGCL. The two are state-owned companies (majority share owned by the state). As mentioned earlier, the responsibility for gas transportation, marketing and distribution lies with these two companies. In addition to these utilities, some independent pipelines from Mari and Uch are supplying gas to nearby power and fertilizer plants (Ali, 2020).

Right after the huge gas discovery in Sui, the GOP started developing gas transmission and distribution network. The transmission networks are now spread across the four provinces. Almost all urban areas in these provinces have the access to gas distribution network. SNGPL supplies gas to Punjab and KPK, whereas, SSGCL supplies gas to Sindh and Balochistan.

The sustained growth in gas production in the early years made authorities complacent, and they start giving connections to everyone; as the demand was quite below supplies. Gas tariff methodology also encouraged capital investments in the expansion of transmission and distribution (T & D) network.

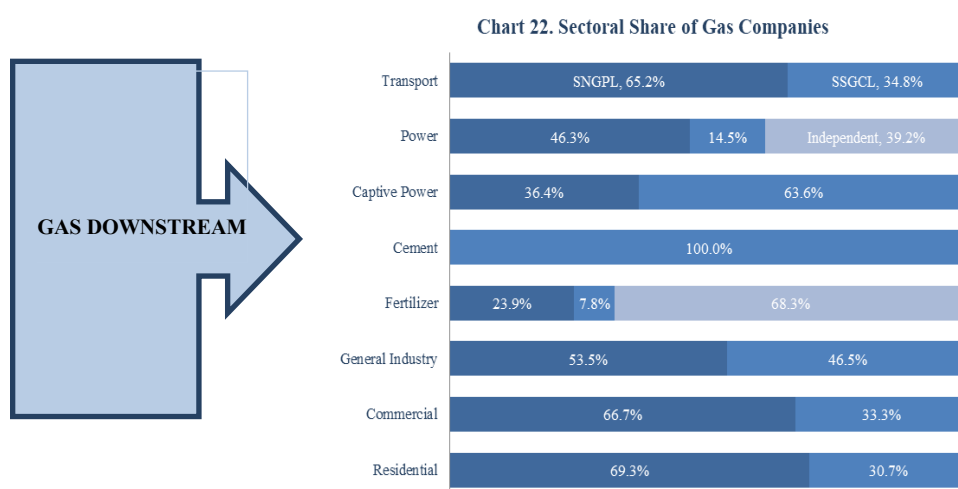
The gas exploration and production activities slowed down after early discoveries. Consequently, the gas produced indigenously became insufficient in FY2006 and onwards. But the expansion in T & D network continued at the same pace. From FY2007 to FY2019 gas distribution network in Pakistan expanded at the rate of about 6 percent per annum (Table 4). Extension of the T & D infrastructure enabled gas utilities to continue providing gas to an increasing number of consumers (Figure 3).

Table 4

Transmission and Distribution Network (Km)

	nāTni amarT		nantcair tarT	
	LPGNS	LLGSS	LPGNS	LLGSS
2007	6142	3290	36919	23448
2019	9399	4054	130157	46872

Source: Pakistan Energy Yearbook (2012) and OGRA State of Industry Report, 2018-19.



Source: OGRA State of Industry Report, 2018-19.

3.2. Gas Demand

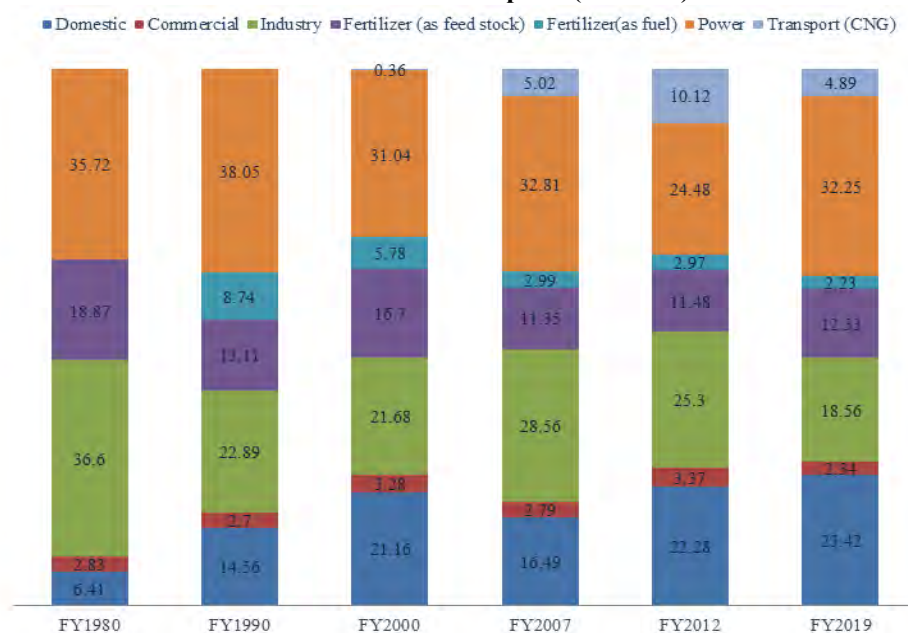
The consumption of natural gas in FY2019 was 31.2 Billion TOE. The demand for gas increased fairly rapidly in the 1970s (8 percent per annum). There was moderate growth of around 5 percent per annum in the 1980s and onwards until FY2009.

Gas consumption slowed down in 2010 and onwards given the shortage in supplies. In 2013 constrained demand and supply gap was estimated as 2 BCF/D and unconstrained demand and supply gap was almost 4 BCF/D (GOP, 2020). In FY2019, the constrained demand-supply gap, despite the import of LNG was about 2 BCF/D. This shortage necessitated gas load management across the country.

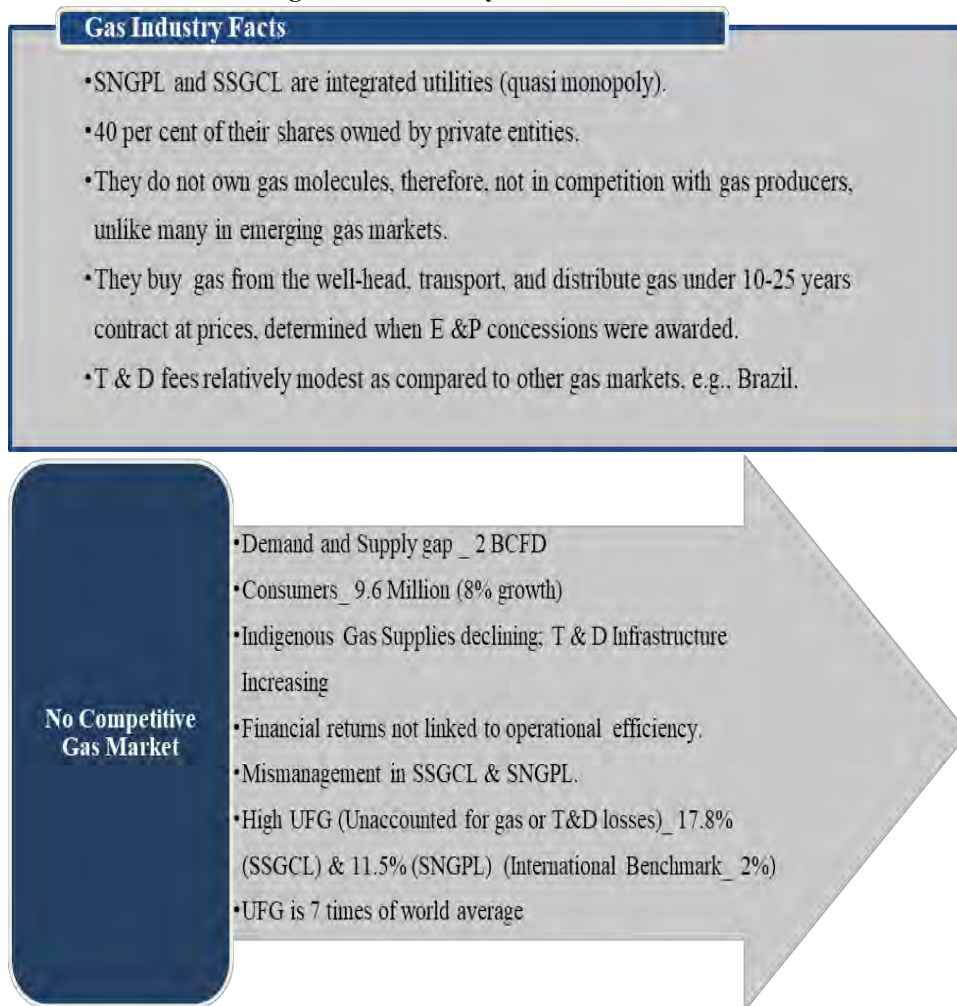
In FY2019, the power sector was leading as a gas consumer with a share of 32 percent, followed by domestic consumption of 23 percent. Over the years domestic consumption has increased tremendously at the expense of all other sectors (Chart 23). Not only relatively very low tariffs for domestic consumers (gas pricing policy), GOP gas priority policies have also played a significant role in increasing the share of domestic consumers. In addition, gas and electricity price differential encouraged more gas consumption in Pakistan (Sattar, 2020).

Moreover, the gas is used quite ineffectually in Pakistan. Pakistan is energy intense country, with huge potential for energy conservation (Malik, 2020). In most of the countries (especially in the developed countries) single source of energy is provided at the domestic level. But in Pakistan, both power and gas are provided at the domestic level. Providing two types of infrastructure at the domestic level is not only costly, also encourages inefficiencies in the supply chain. Just like power sector T & D losses, there is a significant problem of unaccounted for gas (UFG) in the gas sector (Figure 3).

Chart 23. Gas Consumption (% Share)



Source: Pakistan Energy Yearbook (various years).

Fig. 3. Gas Industry—Facts and Issues

Source: PIDE (2020), Minhas (2020) and OGRA (2020).

3.3. LPG Supply and Demand

In FY2019, total market demand for LPG was around 1061447 MT/ Annum. It is mainly supplied by 72 field plants (605025 MT/ Annum) followed by refineries (Attock, Byco, PARCO, PR and NR), which supplied 191060 MT/ Annum. Around 265362 MT/ Annum of LPG were imported in FY2019 (Chart 24).

Mainly LPG is consumed in the domestic sector and industries like textile, ceramic, steel, glass, edible oil, beverage and chemical (Chart 25). LPG is primarily meant to supply for the domestic fuel requirement especially in natural gas starved areas/ sectors and in peak shaving times in the urban territories. It is largely consumed in the most populous province Punjab (Chart 26).

Over the years LPG consumption has increased at the rate of about 4 percent per annum since FY2007. The share of industry has increased over the years (Chart 27).

Chart 24. Percentage Share of LPG Supplies by Source FY2019

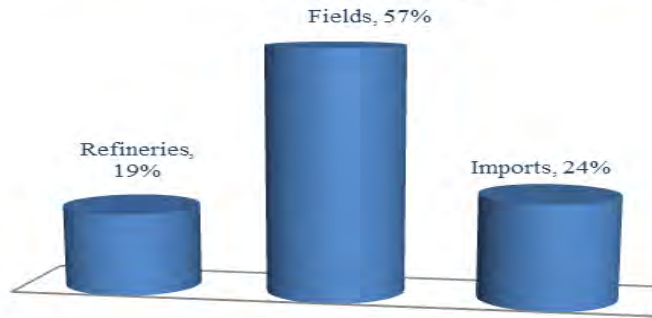


Chart 25. Sector-wise Consumption of LPG FY2019

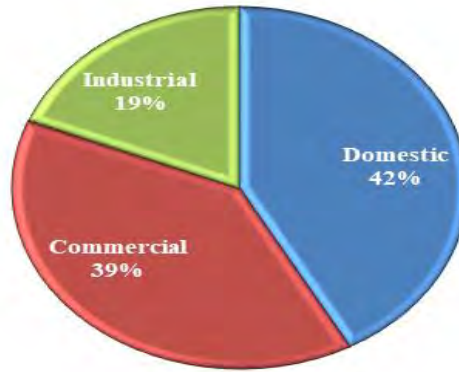


Chart 26. Province wise LPG Consumption FY2019

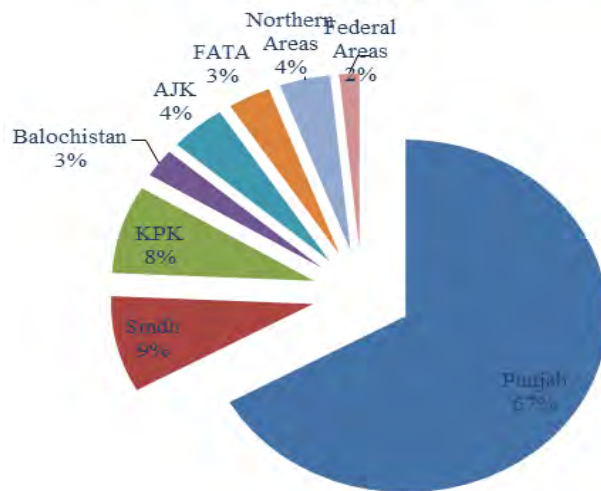
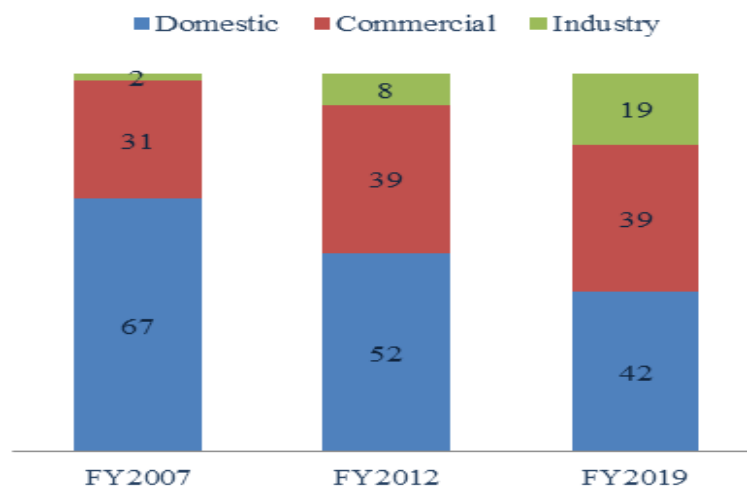


Chart 27. Sector-wise Consumption (%)



Source: OGRA State of Industry Report, 2018-19.

There are 12 LPG producers, 190 LPG marketing companies, having more than 5,500 authorized distributors (FY 2018-19). Each LPG marketing company has several ‘Authorized Distributors’—authorized by OGRA to sell on behalf of the company.

Box 3. LPG Marketing

- Free Competition
- Highly fragmented industry with players having diluted market shares

4. REGULATIONS AND POLICIES IN OIL AND GAS SECTOR

The Ministry of Energy, Petroleum Division (MEPD) under Regulations of Mines Act, Petroleum Policies and relevant Rules governs E&P activities in Pakistan. MEPD is a primary regulator.

Directorate General of Oil (DG Oil) regulates the crude oil sales to refineries and the sale of refined products such as diesel, petrol, kerosene oil, etc. by the oil marketing companies such as PSO, Shell, Total Parco, etc. Directorate General of Gas (DG Gas) regulates the gas sales to Sui Northern Gas Pipelines Company Limited (SNGPL) and Sui Southern Gas Company Limited (SSGC).

Oil and Gas Regulatory Authority (OGRA) regulates midstream and downstream activities in the oil and gas sector. Some of the regulatory and policy features are outlined in Box 4 and Box 5.



Box 4.

- MEPSD allocates gas from gas fields and imports after approval from ECC.
- First right to buy crude/ condensate from the upstream E&P is with the GOP.
- GOP nominates a refinery.
- The GOP has the first right to purchase all gas produced in the country (directly or indirectly) through govt.-controlled companies (SNGPL, SSGCL). SSGCL and SNGPL overregulated.
- LPG (locally produced) can be sold to LPG distribution companies, which are licensed by the Government.
- Selling price (crude oil, condensate & gas) is stated in the relevant contract with Government—it is linked to the international crude oil price.



Box 5

- Under the 1948 Regulations of Mines and Oil Fields & Mineral Development Act, the GOP has regularly issued uninterrupted petroleum policies, starting from 1991.
- The main modification in policies relates to prices, return on investments and fiscal incentives.

Latest 2012 (amended 2020)

- Aimed at attracting private investors (local & international).
- Granting of Petroleum Exploration Licences for entering into petroleum concession agreement (PCA) or production sharing agreement (PSA) concerning onshore and offshore blocks offered through competitive bidding.
- Granting of licence for PCA or PSA without competitive bidding to *Strategic Partner Companies* (govt. to govt. basis).
- 2018 gas allocation policy: domestic and commercial sectors (1st priority) followed by power and zero-rated industry (2nd priority); general industry, fertilizer and captive power (3rd priority); cement and its captive power (4th priority); and CNG (5th priority).

5. CHALLENGES AND OPPORTUNITIES IN OIL AND GAS UPSTREAM

Basin studies suggest the total oil resource potential of 27 Billion Barrels and total gas resource potential of 282 trillion cubic feet (Abbasi, 2018). The issue lies with the government, they lack commitment. Not only the well-head prices, but too much government interference is creating hurdles in upstream exploration and production activities (Sattar, 2020).

Fig. 4. .Challenges and opportunities in the Upstream

Challenges

- High taxes_ withdrawal of many tax exemptions and new taxes at the import stage_ SROs.
- Government's role/ rules in SOCs hinders growth.
- SOCs hesitate in investing in new technologies_ fear of bureaucracy and NAB.
- PEPRA rules focus on the cheapest source, quality of the product not taken into account.
- Circular debt in power sector_ consequent tighter cash flow affects companies' liquidity and ability to invest in technology & development of wells.
- Political instability.
- Discontinuation of oil and gas drilling activities_ COVID -19.
- Security Protocols_ difficulty in O& G drilling activities in Balochistan & KPK.
- Long civil trials with no clear outcome are discouraging_ small companies facing litigations relating to the interpretation of contract terms and taxes.
- High cost of doing business.
- Discriminatory share of certain companies_ preference to western investors.
- High administrative costs_ several audit proceedings and long bureaucratic procedures are discouraging.

Opportunities

- Concessionary import duty of 5% for the E & P industry for items not manufactured in Pakistan_ SRO 678(1)/2004.
- Public-private partnerships_ foreign companies are allowed to work with public limited E &P companies (OGDCL, PPL, MPCL and POL).
- Chinese investors have 'price' advantage over Western competitors in various bidding processes.
- Improved security situation on Western borders_ attracted investments in mega projects, CPEC.
- Geological surveys confirm vast potential reserves with potential estimated at 300 TCF versus the 54 TCF discovered so far. Baluchistan has large areas still unexplored, especially in the frontier.

Companies also exploiting; they bid for blocks but do not start work on them. Government has clauses in the contract that can penalize or take back blocks but has never really enforced these and not taken one back in decades.

The attitude of companies in the upstream sector explains regulatory weaknesses in the oil and gas sector.

6. KEY TAKEAWAYS

Despite increasing focus towards renewables, oil and gas will remain significant for energy matrix of Pakistan. Pakistan has huge oil and gas resources (yet to be discovered). For the exploitation of these resources, we need strong regulatory infrastructure in place. One regulatory authority throughout the supply chain can deal issues more effectively.

Despite private participation, state dominance is prevalent in both oil and gas sector. Too much government interference in the company activities is creating hurdles in company's/ industry's growth.

Free market is the only solution—with equal opportunities for all participants.

A progressive and market-based exploration policy with minimum state interference is required to minimise our dependence on LNG imports.

Improvement in energy productivity—decoupling of energy and economy is indispensable for Pakistan. We need a clearer and targeted approach to increase energy productivity in all the sectors.

To minimise gas leakages in the supply chain, an effective regulatory apparatus must be in place. In addition, investments in the maintenance of distribution infrastructure are required to minimise leakages.

For improving management of gas companies, unbundling of gas companies between 'pipeline' and 'retail' business, and outsourcing 'retail' side could be an option. Empower gas companies through professional boards. These companies must have a business model based on profits from operational efficiency and no more guaranteed rate of return on assets.

There is a need for market based pricing to curtail misuse. Every consumer should be charged the actual cost of service irrespective of sector or geographical area in the oil and gas sectors.

There is no need for two parallel energy systems for various consumer categories. Gas resources are depleting and gas is not cheap anymore. It should be consumed where it can add value. Allocation of gas should be from growth perspective and not based on political priorities.

In the oil sector, there is an urgent need to expand our strategic stock capacity.

REFERENCES

- Ali, A. (2020). The dynamics of energy in Pakistan. Research on Economy and Politics (REAP).
- Arshad, A. (2018). Hydrocarbon exploration and licensing policy—Way forward to self-sufficiency in oil and gas. Policy brief, Centre for Research and Security Studies, <https://crss.pk/wp-content/uploads/2018/10/Hydrocarbon-Exploration-and-Licensing-Policy-.pdf>
- Gomes, I. (2013). Natural gas in Pakistan and Bangladesh: Current issues and trends. The Oxford Institute for Energy Studies, University of Oxford.
- Hussain, I, Quersh, A. A. and Nadeem, H. (2019). A brief history of exploration. *DAWN*, May 5th.
- Malik (2020). Energy productivity for sustainable development. PIDE Blog, July 02.

- Minhas, N. (2020). Pakistan energy mix: Overview of gas sector (upstream). <https://www.globalvillagespace.com/pakistan-energy-mix-overview-of-gas-sector-upstream/>
- OGRA (2020). Annul report. Oil and Gas Regulatory Authority, Pakistan.
- OGRA (Various Years). State of industry report. Oil and Gas Regulatory Authority, Pakistan.
- PACRA (2019). http://www.pacra.com.pk/uploads/doc_report/OMC_sector_Study_November_2019_1573733618.pdf.
- PACRA (2019). https://pacra.com.pk/uploads/doc_report/Sector%20Report_LPG_Mar19.pdf
- Pakistan Energy Yearbook (Various Years). Hydrocarbon Development Institute of Pakistan.
- PIDE (2020). The gas system in Pakistan. *PIDE Webinar*, October 24, 2020.
- Raftaar (2016). Gas report. (Report No. R1502), Consortium of Development Policy Research (CDPR), <https://cdpr.org.pk/wp-content/uploads/2020/03/Gas-Report-merged-final.pdf>
- Sattar, S. (2020). Gas sector. Presentation at the *PIDE Energy Webinar on The Gas System in Pakistan*, October 24, 2020.
- Sherpao, B. A. (2016). Country report of Pakistan. *JICA Training on Energy Policy*. <https://eneken.icej.or.jp/data/6883.pdf>.

CHAPTER 2

Natural Gas Prices in Pakistan

Afia Malik and Hafsa Hina

Natural Gas Prices in Pakistan

1. INTRODUCTION

Natural gas is the most important indigenous fossil fuel, accounting for 35 percent of commercial energy supplies and about 31 percent of commercial energy use in Pakistan (in FY2019). Pakistan is the 19th largest consumer of natural gas in the world. In addition to electricity generation; it is used in the industry, in particular in fertilizer production; for domestic heating and cooking needs; and as compressed natural gas (CNG) in the transport sector.

The consumption of natural gas has increased from only 0.28 Bcf/D in 1971 to 4.42Bcf/D in 2019. Only in the last two decades, gas consumption has increased at the rate of 4.8 percent. This increase does not include the unmet demand of about 2 BCF/D. In comparison, Pakistan’s gas production is almost stagnant at about 4 Bcf/D. Since, FY 2015 we are importing regasified liquefied natural gas (RLNG).

The intensified use of natural gas is the result of gas policy framework—*Gas pricing policy and policy to expand gas transmission and distribution network*.

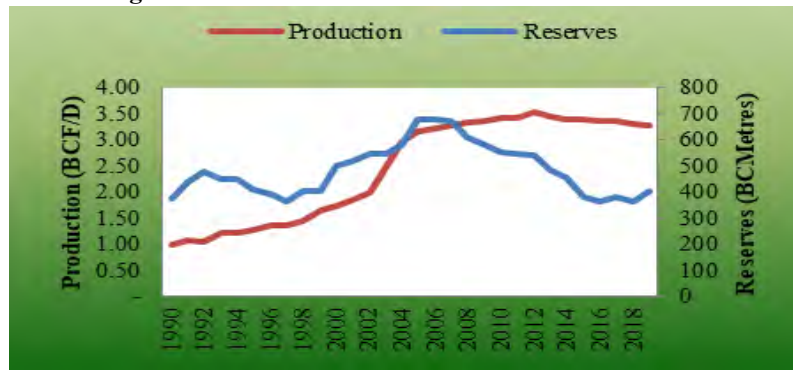
- With constraints on gas availability, prices have increased only modestly for some sectors / slabs.
- The transmission and distribution monopolies—SNGPL and SSGC have continued to connect new consumers.

Fig. 1. Natural Gas Consumption, Production and RLNG Imports (Bcf/D)



Source: BP Statistical Database, 2020.

Fig. 2. Natural Gas Proved Reserves and Production

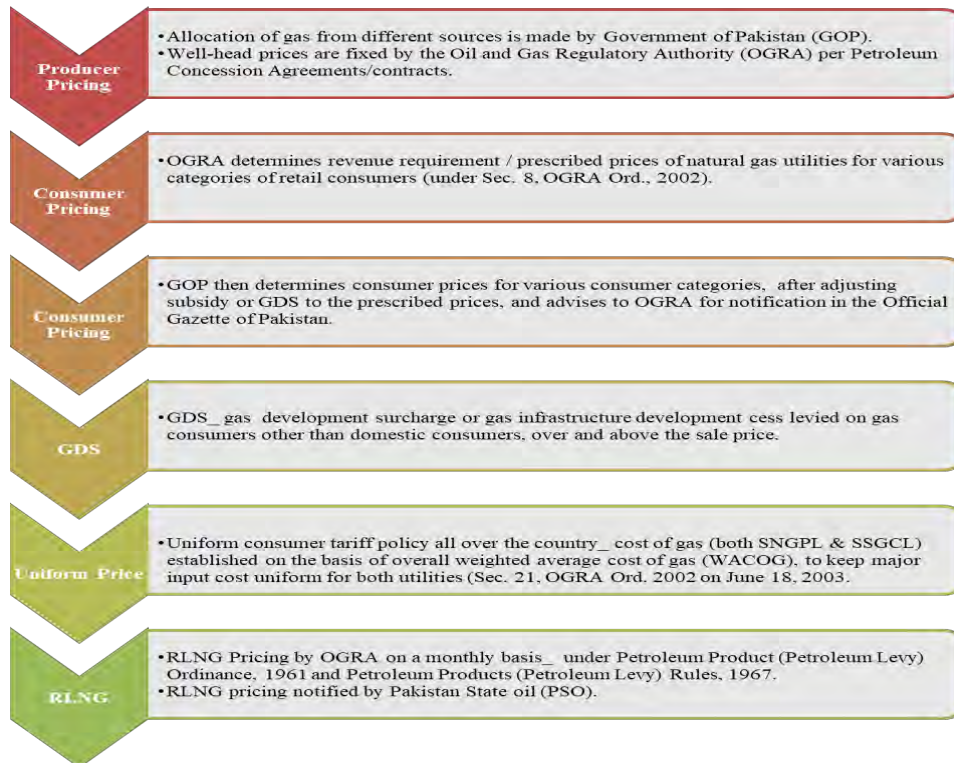


Source: BP Statistical Database, 2020.

(annual increase of 5.6 percent since FY 2007) and transmission and distribution network expanded (annual increase of about 6 percent since FY 2007) leading to a widening gap between supply and demand, to be filled through expensive RLNG imports.

The focus in this brief is on natural gas price mechanism and policy.

2. PRICING AND REGULATORY REGIME



3. GAS PRICE SETTING FRAMEWORK IN PAKISTAN

The economic price of natural gas, as is the case with other commodities, is determined through the aggregate demand and supply. But in Pakistan, being a monopoly, its prices are regulated in the domestic markets. Even at the exploratory stage, prices are determined upfront and there is no price competition.

Consumer price determination is based on cost plus methodology. Its various components are illustrated in Figure 3. The policy and current process for setting gas prices pass through two stages. In the first stage producers prices are determined. Then based on these prices consumer prices are determined using cost plus methodology.

In comparison so many other gas price methodologies are available in the literature (Figure 4). In most of the developed countries with well-developed gas markets, full value pricing is used.

Fig. 3. Consumer Gas Price Determination—Cost plus Methodology



3.1a. Producer Gas Prices

- The cost of gas (that is producer gas price)—bulk of the revenue requirement is indexed to the international prices of crude oil (in the form of S-curve, specifying floor and ceiling according to the Gas Pricing Agreements between GOP and gas producers.
- Any change in cost of gas, a pass-through amount, evaluated by OGRA.
- There are separate prices for each of the 55 gas fields.
- Pakistan's current weighted average wellhead gas prices are around US\$3.50/MMBtu, 10 percent higher than those in India (US\$3.23/MMBtu) and almost double than those in Bangladesh (varied between US\$ 1.6 and US\$2.8/MMBtu).¹

¹<https://www.thehindubusinessline.com/markets/commodities/indias-gas-pricing-policy-reduces-incentives-for-producers-to-raise-supply-iea/article30549794.ece>

Box 1: Evolution of Well-head Gas Pricing

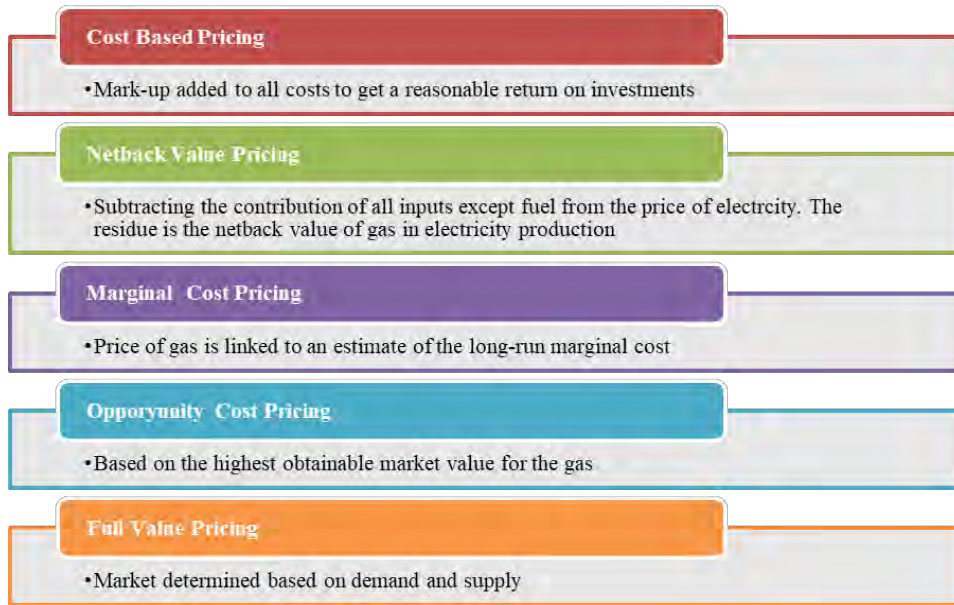
- Until mid-1980s—cost-plus approach was used for determining the gas producer price for each concession.
- Mid-1980s onward—gas producer price is linked to an international benchmark price in the form of an S-curve, specifying floor and ceiling. There are separate prices for each of the 55 gas fields.
- In the beginning, the benchmark was 66 percent of the Cost, Insurance and Freight (CIF) price of fuel oil, with discounts (which were negotiated between the producer and the government) for the geological and other conditions of the area.
- In the early 1990s, GOP eliminated discounts—determine producer price, 66 percent of the landed cost of fuel oil. This allowed some firms to settle gas sale agreements with SNGPL and SSGC at almost 100 percent of the world market price of oil. Response from exploration industry was positive.
- In the late 1990s, first the GOP the gas price to a percent of the international price of crude oil. Later, formula modified—producers allowed sharing the benefits of windfall increases in international prices with the government. This formula worked well as long as international oil prices were approximately US\$ 12 to 15 per barrel. With rise in oil prices 2005 onwards, the gas explorers saw US\$ 35 per barrel as a ceiling price and could not gain from the oil and gas price boom in global markets.
- Under the 2012 Petroleum Policy, the government has updated the ceiling to US\$ 100 per barrel, from US\$ 35 per barrel. Therefore, the actual price of oil (and not the ceiling price of US\$ 35 per barrel) will become the reference for determining the gas producer price.

Source: Ali (2020), Minhas (2020) & Raftaar (2016).

3.1b. Consumer Gas Prices

- SNGPL & SSGCL are allowed 17.43 percent return on the value of their fixed assets before corporate income taxes, interest and other charges on debt and after excluding interest, dividends and other non-operating income and before incorporating the effects of efficiency benchmarks prescribed by OGRA—for meeting financial charges, taxation and a return to their shareholders.
- Any deficit or surplus is recoverable from or payable to the government as a differential margin or gas development surcharge.
- OGRA has set a benchmark for unaccounted for gas (UFG) of 5percent, but it allows up to 7.5 percent, with a variable margin of 2.5 percent.
- Actual losses more than these 17.8 percent in SSGCL and 11.86 percent in SNGPL.

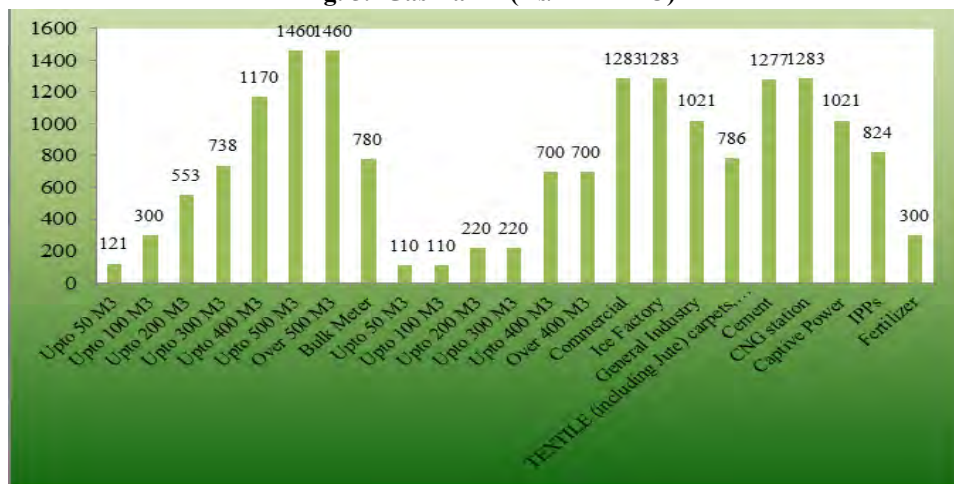
Fig. 4. Consumer Gas Price Methodologies



Source: Akinpelu and Iwayemi (2010) and Raftaar (2016).

- End-consumer price is bundled and do not distinguish different elements such as transmission and distribution charges and cost of gas. The gas price schedule as of July 01, 2019 is illustrated in Figure 5.
- End user price comprise two elements, flat rate per volume applied to each category (Figure 5) and a fixed minimum charge (Figure 5). In January, 2019 fixed minimum rate ranged from Rs 172.58 per MMBTU to Rs 43278.61 per MMBTU.

Fig. 5. Gas Tariff (Rs/ MMBTU)



Source: OGRA (2020).

Fig. 6. Minimum Charges (Rs/ MMBTU)



Source: OGRA (2020).

3.2. Gas Price Trends

Based on the available data, we noticed, maximum growth in the ice factory (12.4percent), CNG (12 percent), captive power (12 percent), and IPPs (11.4 percent). Similarly, some of the fertilizer plants have also grown significantly (12.4 percent).

In general, the gas price increase since FY2002 corresponds largely with producer prices, which are linked to crude oil prices. When oil prices started rising in FY2004, gas prices also rose. However, when oil prices fall from FY2015 to FY2017, the rate of increase in gas consumer prices has been much lower. The exemplary growth in prices, FY2015 onwards in some of the sectors can be attributed to high cost RLNG going to these sectors.

Exceptions to this general trend include: the first four domestic consumers slabs and special commercial slabs.

Fig. 7. Domestic Consumer Gas Price Rs/MMBTU

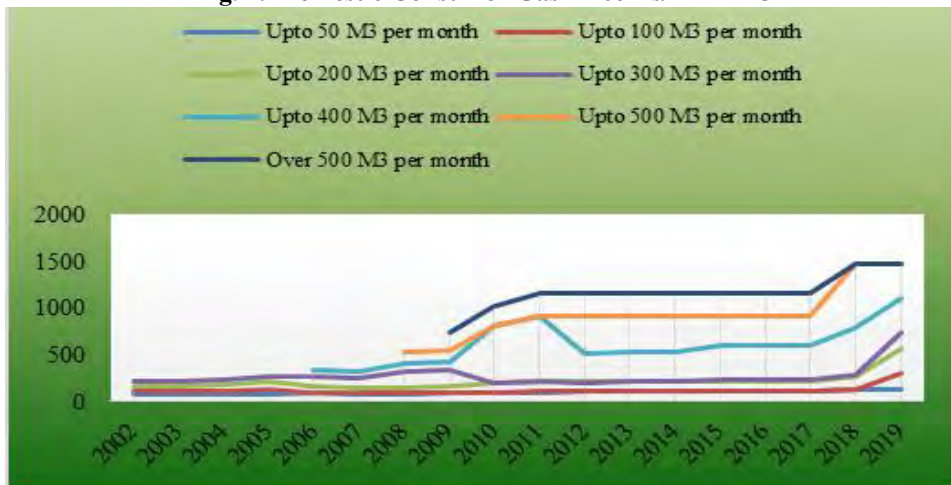


Fig. 8. Gas Prices in Industry and Power Rs/MMBTU



Fig. 9. Special Commercial Roti Tandoor Gas Price Rs/MMBTU

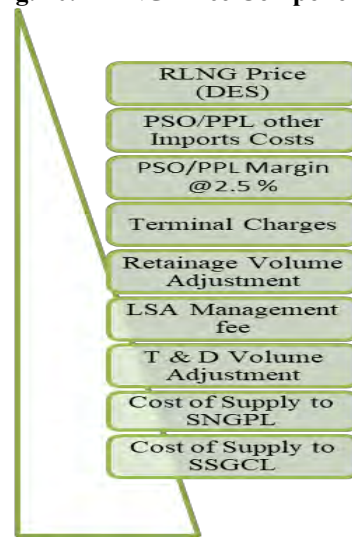


Source: OGRA (2020) & Pakistan Energy Yearbook (2020).

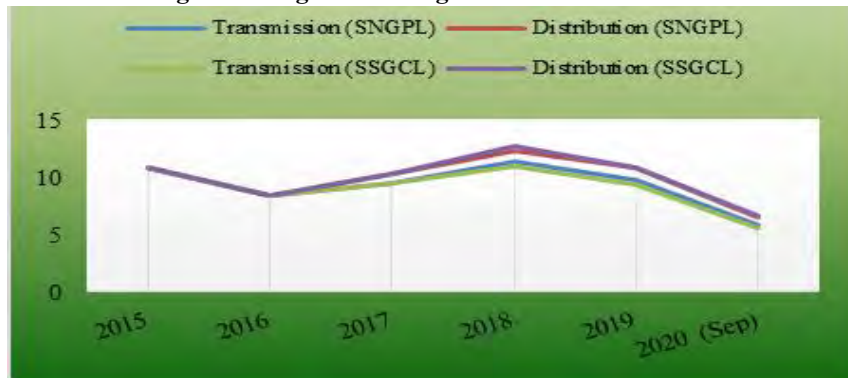
3.3. RLNG Pricing Strategy

Two state-owned companies are allowed to import LNG, i.e., Pakistan State Oil (PSO) and Pakistan LNG Limited (PLL). PSO has signed a Government to Government contract with Qatar Gas for a period of 15 years at the rate of about 13.35 percent of Brent crude. PLL has shorter-term LNG contracts with Gunvor and Shell. PLL is importing LNG at relatively low rates. Last LNG import prices by PLL were US\$ 2.20 /MMBtu (5.74 percent of Brent crude) (Ali, 2020).

RLNG price is determined in US\$, it is the weighted average it includes items as shown in Figure 9.

Fig. 10. RLNG Price Components

Source: OGRA (2020).

Fig. 11. Weighted Average RLNG US\$/MMBTU**Box 2: Dual Pricing Regime in the Country:**

- (i) For indigenous gas
- (ii) For RLNG

Cost of indigenous gas is lower than RLNG because of long-term contract with Qatar.

Average price of indigenous gas is US\$ 4.5 MMBtu

Weighted average price of RLNG is US\$ 6.5 /MMBtu

RLNG price excluding Qatar gas is less than US\$ 4/ MMBtu.

Source: Ali (2020a).

4. GAS PRICING ISSUES

4.1. Cross-Subsidisation

There is a huge cross-subsidy for certain consumer groups/ slabs. The price charged to these groups is much below costs; whereas, other consumer categories are charged a much higher price than the cost. For instance, tariffs for domestic consumers (first three slabs) and special commercial (first four slabs) are well below those for all other sectors and industry, power plants, or other commercial users. Household consumers have a share of around 50 percent. Similarly, tariffs for the gas used by fertiliser plants (feedstock) are also quite lower than for all other consumer types (Figure 4). For ENGRO and Fatima fertilizers, the gas tariff is even lower than the lifeline gas consumers, that is, US\$ 0.70/ MMBTU (Rs 114/ MMBtu) (OGRA, 2020).

Although gas tariffs for fertiliser plants, particularly for gas used as feedstock has increased many folds since 2002, still they are highly subsidised. For instance, in the SNGPL system, Pak American Fertilizer and FFC Jordon Fertilizer both recorded a growth of 12.4percent; nevertheless the gas is supplied to them at Rs 300/MMBtu.

The main objective behind subsidised gas supply to fertilizer manufacturers is food security and protection to small farmers. But evidence suggests fertilizer prices are not always below the imported fertilizer costs; and local fertiliser manufacturers are making hefty profits (Raftaar, 2016).

Similarly, so many domestic tariff slabs are exemplary. It is difficult to find any country with so many slabs. Even the neighbouring countries like India and Bangladesh; there is one gas tariff slab in the domestic sector. In India, the domestic/household gas tariff is US \$10/ MMBTU, excluding the value-added tax (VAT). Compared to this, the highest gas tariff slab for the domestic sector in Pakistan is US\$8.28, excluding taxes. In European countries, the domestic gas tariff is high, varying between US\$16 (in the UK) and US\$25 (in Italy) including VAT and other levies. Among the industrialised world, one of the lowest domestic tariffs is in the United States (US\$12/ MMBTU) but much higher than Pakistan (cited from Ali, 2020b).

Prices for Compressed Natural Gas (CNG) have increased substantially in the last couple of years. CNG is a substitute for motor gasoline (petrol); its absolute price increase is immaterial, if not linked to the market price of motor gasoline. CNG prices have always remained lower than of motor gasoline. In a way, the gas pricing policy is subsidising CNG consumers. To supply gas used as CNG at a lower price is not necessary, given the gas shortages in the country.

4.2. Cost Price Differential

As we can see in Figure 11 and Figure 12, the average sale price per unit is lower than the average cost per unit, in particular for SNGPL (recent data for SSGCL is not available). Delaying the revision of consumer prices is creating a deficit in the sector. There was no significant increase in consumer prices from 2015 to 2018 (Figure 6 to Figure 8). Gas sector deficit is increasing on account of the differential in the consumer prices and the determined revenue requirements (ICAP, 2020). According to one recent estimate, this deficit has reached Rs 350 billion (Umar and Sattar, 2020).

Low gas tariffs have caused an increase in the inefficient demand for gas. About one-third of gas consumed is imported RLNG. The cost of RLNG is much higher than the indigenous gas, because of a long-term contract as well as because of add-ons to imported gas. RLNG is mainly supplied to Punjab (indigenous gas and imported RLNG are in the ratio of 50:50 for Punjab). This is also creating a political economy issue². Sometimes, utilities are forced to supply expensive RLNG to subsidised domestic consumers, creating further cost price differential.

Natural gas prices in the global market come down drastically in summers of 2020, but we could not take advantage because of the long-term contracts in the gas system—about 40 percent of total RLNG in the total supplies is coming from the long-term contract with Qatar (Ali, 2020a).

In the coming years, the demand for gas is not going to change. With low exploratory efforts, our reliance on LNG imports will continue. The decline in the spot market was only seasonal. The recent trend suggests it is going to be very high in winters. Instead of turning totally towards the spot market, there is a need to re-visit the long-term contracts, as many other countries are doing and negotiate 25percent of the contracted volume that is going to be available in the next few years (PIDE, 2020).

Fig. 12. SSGCL Average Sale Price Cost Differential



Source: SSGCL Annual Reports (Various Years).

Fig. 13. SNGPL Average Sale Price Cost Differential (excluding Sales Tax)



Source: SNGPL Annual reports (Various Years).

²Seminar on “Natural Gas Supply: Gas Sector Issues (Upstream and Downstream)” organised by the Petroleum Division, Ministry of Energy, September 09, 2020.

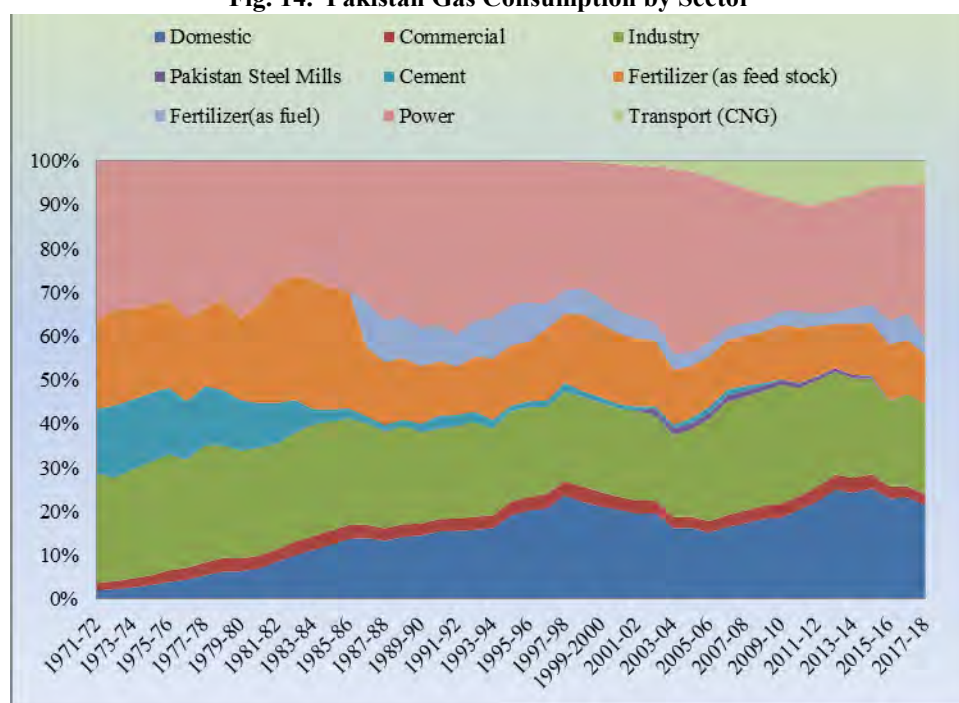
4.3. Gas Prioritisation and Pricing

Although 78 percent of the household have no access to natural gas in Pakistan, natural gas has been the fastest-growing source of household energy consumption. Domestic consumption is the second largest after power sector gas consumption (Figure 14).

Supplying gas to households requires large investments. Keeping in mind, per capita energy consumption, the cost of gas supply to households is much higher than the cost of supply to industry or power sector. But in our gas prioritisation policies, this has not been reflected. The reduced supply of gas to power or high tariffs for the power sector sometimes aggravates the power shortage and increased power generation costs, having a significant adverse effect on the economy.

Despite the forecast of rising demand-supply gap, back in FY2006 when international oil prices were rising, CNG was promoted to replace motor gasoline by keeping its prices substantially lower than motor gasoline. It was a government policy of maintaining a substantial difference in the price of petrol and CNG, to promote CNG industry in the country, despite the declining resources of natural gas. Although CNG is at number five in gas allocation policy of 2018, still the price of CNG is lower than petrol.

Fig. 14. Pakistan Gas Consumption by Sector



5. NATURAL GAS PRICING STRATEGY ACROSS COUNTRIES

The table below provides an overview of gas markets in selected few countries, including both developed and emerging markets.

Countries/Region	Salient Features
North America	Liberalised gas market; gas pricing is highly competitive_ based on supply/demand balances; and spot and futures markets are developed.
UK	Deregulated gas sector; gas pricing competitive, based on demand/ supply balances.
Northeast Asia	Long term contracting because of their dependence on imports; pricing is more rigid, gas prices closely follow the tendency of oil markets.
India	Well-head prices_ formula revised bi-annually. It is the weighted average of four global benchmarks (Henry Hub, Alberta Gas, NBP and Russian Gas). Consumers_ multiple pricing regimes (Administered Pricing Mechanism, Non-administered Pricing Mechanism and LNG pricing). For bulk of gas supplies prices are controlled. Power and fertilizer relatively subsidized as compared to other sectors. No uniform pricing policy across States_ North Eastern states getting gas at relatively cheaper prices as compared to other parts of the country.
China	In 2013, shift from “cost-plus” to “market netback” in certain provinces for non-residential consumers. Natural gas price is linked to and competes with alternative energy prices; gas pricing is not determined by the government only but linked to energy market supply & demand. Lower prices for households_ significant difference between residential and non-residential consumers.
Thailand	Multiple Pricing: Natural gas divided into two pools. Pool1 – domestic gas supplied to petrochemicals to produce LPG supplied to households, transport and industry. Pool 2- weighted average of domestic gas, imported gas from neighbouring countries and LNG. It is mainly supplied to the power sector. In the absence of effective market competition, gas prices regulated at each stage (Government or Regulatory authority). Petrochemicals rely on Netback Value pricing. Price of gas is determined on the basis of underlying costs, Pool1 price lower than Pool 2 because of the increasing share of LNG in Pool2. LPG is produced through Pool 1 gas, still LPG price varies across various consumer categories. Transparency issue in gas supply contracts.
Bangladesh	Well-head prices indexed to HSFO Singapore with semi-annual price adjustments. Cost plus methodology; subsidies for power, fertilizer and metered domestic consumers. Prices for power sector one of the lowest in the world. Two types of domestic tariffs_ rate per metred consumption and monthly fixed rate in accordance with the appliances in use.
Turkey	Cost based pricing since 2008; natural gas pricing updated monthly based on oil price and exchange rate movements; subsidies to residential and industrial consumers, compensated by high tariffs in Bo-BOT power plants.
Malaysia	Before the 1997 Asian crisis, gas prices for power plants and industrial customers were based on Marine Fuel Oil (MFO) international prices, enough to compensate for the cost of supply. Since 1998, government controlled prices.

Source: Davoust (2008), (ERIA 2019), Aolin and Qing (2015), Nikonboriak (2014), Gomes (2020), Rzayeva (2014) and JICA (2016).

6. KEY TAKEAWAYS

- Uniform pricing policy in the country is creating distortions in the system; as transmission and distribution costs are different for different geographical areas.
- Cross-subsidy across sectors—in particular for the domestic consumers and fertilizer plants (feedstock).
- Tariff setting methodology is encouraging capital investments in the expansion of network and not the maintenance of existing infrastructure. The performance of both the utilities (SNGPL and SSGCL) remained dismal in terms of maintaining the existing T & D network. Result is high unaccounted for gas (UFGs) in the system.
- Gas tariffs not used efficiently as demand management tool.
- Market based pricing system is the solution—tariff must be set on a cost-of-service basis for reliable and sustainable gas sector.
- Well-head prices should be based on the basic principle of demand and supply. Convergence of piped indigenous gas and RLNG is required to attract new players in the market.
- Gas subsidies should be re-evaluated as a means of providing social protection. There are alternative policy instruments, like direct cash transfers for energy use.

REFERENCES

- Akinpelu, L. & Iwayemi, A. (2010). Appropriate gas price determination in the emerging Nigerian gas market. (SPE-136959-MS), Society of Petroleum Engineers, Nigeria Annual International Conference and Exhibition, July 31 to August 07, Nigeria. <https://www.onepetro.org/conference-paper/SPE-136959-MS>
- Ali, A. (2020a). WACOG: A solution? Part I, *Business Recorder*, October 08, <https://www.brecorder.com/news/40024515>
- Ali, A. (2020b). The dynamics of energy in Pakistan. Research on Economy and Politics (REAP).
- Aolin, H. and Qing D. (2015). On natural gas pricing reform in China. *Natural Gas Industry B* 2, 372-382. [http:// dx.doi.org/10.1016/j.njib.2015.09.012](http://dx.doi.org/10.1016/j.njib.2015.09.012)
- Davoust, R. (2008). Gas price formation, structure & dynamics. https://inis.iaea.org/collection/NCLCollectionStore/_Public/42/050/42050176.pdf
- Gomes, I. (2013). Natural gas in Pakistan and Bangladesh: Current issues and trends. (OIES Paper 77). The Oxford Institute for Energy Studies, University of Oxford.
- Gomes, I. (2020) The dilemma of gas importing and exporting countries. (OIES Paper 161). The Oxford Institute for Energy Studies, University of Oxford.
- ICAP (2020). Oil & gas sector—Exploration, production & distribution: Surviving the crisis & entering the new normal. Post Webinar Paper, Institute of Chartered Accountants of Pakistan.
- JICA (2016). Energy cost and tariff balance. Power and Energy Sector Master Plan, Bangladesh. https://openjicareport.jica.go.jp/pdf/12269759_03.pdf
- Minhas, N. (2020). Pakistan energy mix: Overview of gas sector (upstream). <https://www.globalvillagespace.com/pakistan-energy-mix-overview-of-gas-sector-upstream/>

- Nikomborirak, D. (2014). Gas price reform: Are we on the right track? *TDRI Quarterly Review*, 29(3).
- PIDE (2020). The gas system in Pakistan. *PIDE Webinar*, October 24, 2020.
- Raftaar (2016). Gas report. (Report R1502). Consortium of Development Policy Research (CDPR). <https://cdpr.org.pk/wp-content/uploads/2020/03/Gas-Report-merged-final.pdf>
- Rzayeva, G. (2014). Natural gas in the Turkish domestic energy market: Policies and challenges. (OIES Paper NG 82). The Oxford Institute for Energy Studies, University of Oxford.
- Umar, S. and Sattar, S. (2020). Consumer's dilemma and the gas sector crisis in Pakistan. *Business Recorder*, October 12, <https://www.brecorder.com/news/40025380>
- Yuying, L. (2013). A comparison of natural gas pricing mechanisms of the end-user markets in USA, Japan, Australia and China. China-Australia Natural Gas Technology Partnership Fund. https://www.jtsi.wa.gov.au/docs/default-source/default-document-library/comparison-of-natural-gas-pricing-mechanisms-of-the-end-user-markets.pdf?sfvrsn=f9886f1c_2

CHAPTER 3
Petroleum Pricing in Pakistan
Hafsa Hina and Afia Malik

Petroleum Pricing in Pakistan

1. INTRODUCTION

The petroleum pricing is significant for a fuel economy like Pakistan. Where, the dependence on oil is not expected to decline in near future but increase; as the country's infrastructure continues to rely on petroleum-based products. In Pakistan, oil is the largest source of energy consumed. In FY2019, despite the decline in oil consumption, it fulfils 32 percent of our total energy demand.

The petroleum industry is also a major contributor to government revenues. In FY 2019, petroleum taxes contribute about 51 percent to total tax revenues. Additionally, Pakistan is hooked on imports for 81 percent of its oil requirements. The petroleum pricing is also a sensitive issue from a consumer's perspective, given low per capita income in the country (US\$ 1284.7).

This report provides an overview of petroleum pricing in Pakistan.

2. PETROLEUM PRODUCT PRICING IN PAKISTAN

2.1. Chronology of Petroleum Pricing Deregulation

The government used to have tight control over the petroleum sector in Pakistan. All the decisions were made solely by the government and were often based on political as opposed to economic considerations. Petroleum prices were also under tight government regulation (Malik, 2007).

In 2000, the government initiated pro-market reforms in the petroleum sector to limit the role of the government for policy making only. The government also changed the guaranteed return formula of the refineries to an Import Parity Price (IPP) formula. Prior to these reforms, refineries were working under a fixed return formula where the return was capped in the range of 10 to 40 percent of their equity. Thus, the government was liable to meet any loss in the profitability of the refineries (Ansari, 2004).

In 2001, the government authorised the Oil Companies Advisory Committee (OCAC) to review, fix and announce the prices of petroleum products on fortnightly basis in accordance with the approved pricing formula, as a part of deregulation policy. Therefore, between July 1, 2001, and April 1, 2006, OCAC reviewed and announced the ex-depot prices of motor spirit (gasoline), kerosene, and light diesel oil fortnightly in accordance with the approved formula.

In 2002, the Oil and Gas Regulatory Authority (OGRA) was established to perform pricing and regulatory responsibilities as an independent agency. Later in 2006, the function of price fixation was transferred to OGRA.

Government of Pakistan (GOP) delegated the powers to OGRA to fix petroleum prices via Cabinet's decision No. 41/03/2006 as per Government's prescribed formula, under Section 6(2)(r) (relating to powers and functions of OGRA) and Section 21(2)(b) (regarding policy guidelines) of Oil and Gas Regulatory Authority Ordinance, 2002 (OGRA, 2019).

In 2011, the GOP further deregulated the prices of petroleum products of Motor Gasoline (MS), High Octane Blending Component (HOBC), Light Diesel Oil (LDO), JP1, JP4 and JP8. As a result, refineries and OMCs fix and announce the ex-refinery prices and ex-depot prices of the same. Later in September 2012, the GOP deregulated ex-refinery price of High Speed Diesel (HSD); whereas, ex-depot price of HSD has already been deregulated since September 2001.

2.2. Government Approved Fuel Pricing

Price Build-up formula consists of:

- (i) Ex-refinery import parity price/PSO weighted average cost of purchases.
- (ii) Federal Excise duty—as per FBR rates.
- (iii) Inland Freight Equalization Margin (IFEM).
- (iv) Distribution Margin.
- (v) Dealer's Margin.
- (vi) Petroleum Levy or surcharge (fixed and notified by Ministry of Energy, Petroleum Division).
- (vii) Sales tax (fixed and notified by FBR)—7 percent.

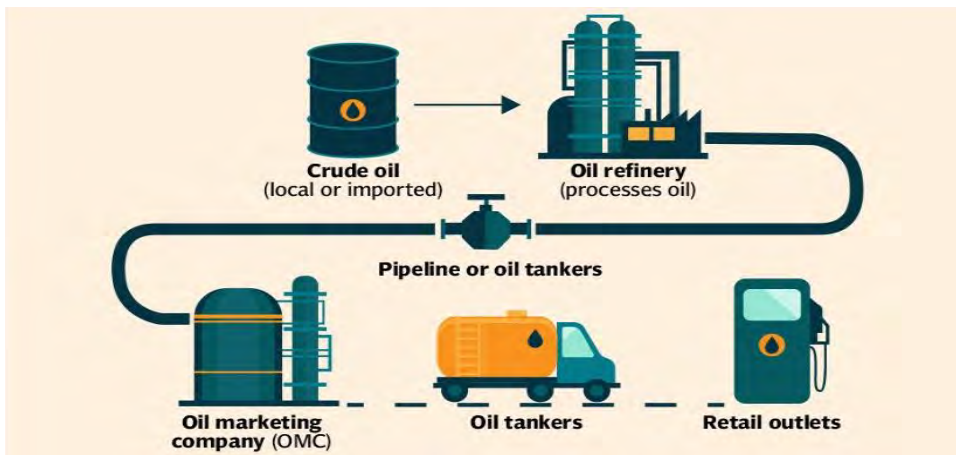


Figure 1 to Figure 6 demonstrates the price build-up for various petroleum products, that is, the share of various components in the final price of fuel. Major portion is of ex-refinery price in all the petroleum products, followed by sales tax and petroleum levy surcharge; exception is E-10 gasoline where petroleum levy is more than 20 percent in final fixed price (Figure 2).

Fig. 1. Kerosene Price Build-up 2020 (Sep)

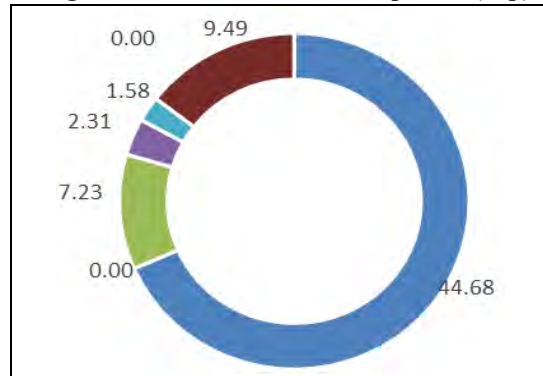


Fig. 2. E-10 Gasoline Price Build-up 2020 (Sep)

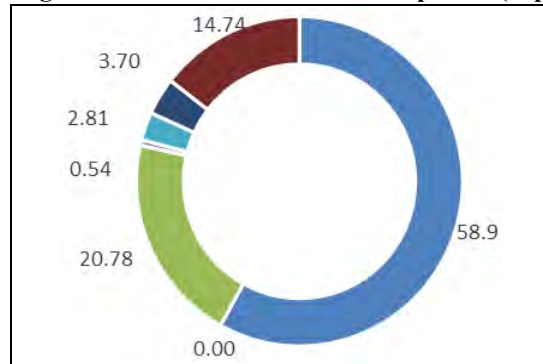


Fig. 3. MG Price Build-up 2019 (June)

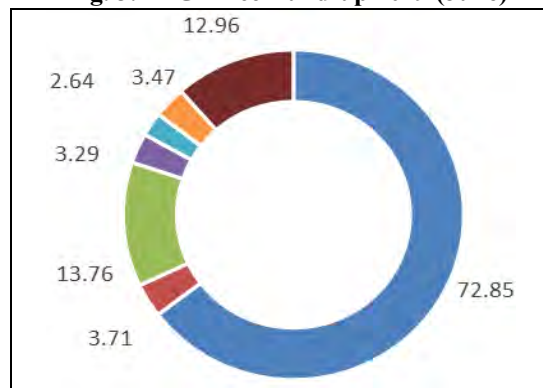


Fig. 4. HSD Price Build-up 2019 (June)

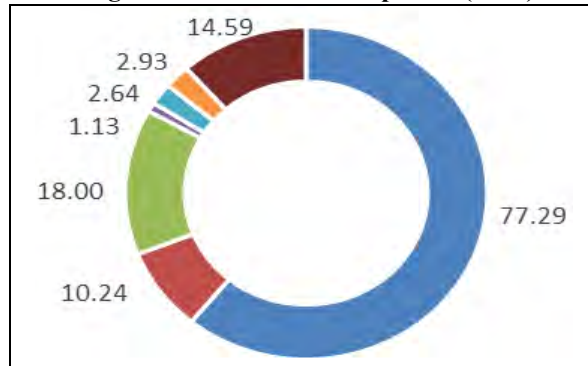


Fig. 5. LDO Price Build-up (2019 June)

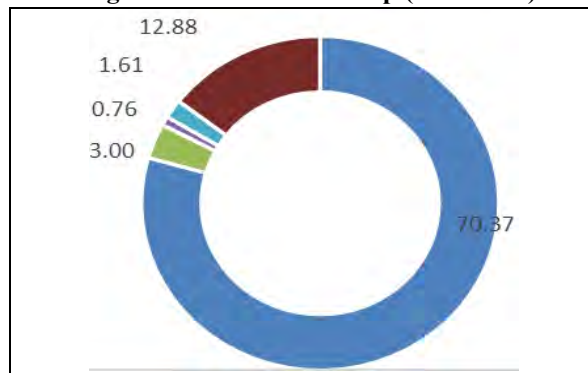
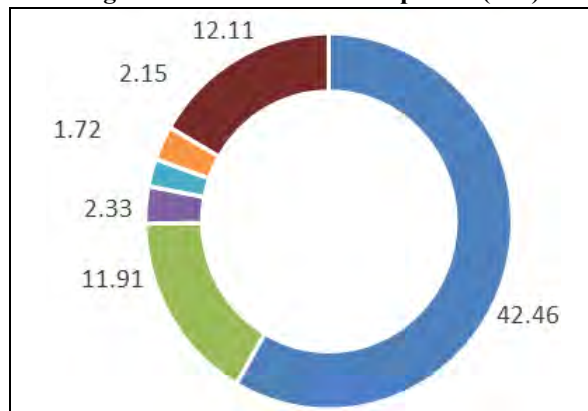


Fig. 6. HOBC Price Build-up 2016 (Oct)

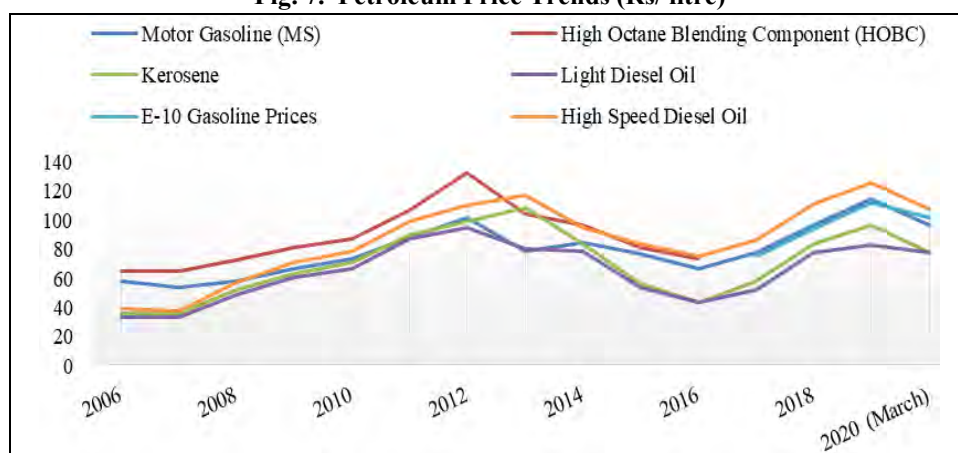


- Ex-refinery / Import Parity Price (IPP)
- Excise Duty
- Petroleum Levy
- Inland Freight Margin (IFEM)
- Oil marketing company (OMC) Margin
- Dealer Margin
- Development Surcharge
- Sales Tax

Figure 7 illustrates the fuel price trends over the years. Since, 2008, all petroleum products are following a similar pattern. Petroleum prices were capped in FY2007, later they increased. The GOP was paying subsidy on LDO, Kerosene and HSD to keep prices low prior to FY2008. Later the subsidy was removed gradually. The difference between subsidised products and HOBC and MG can easily be seen in Figure 7.

It is important to highlight that about 70 percent of HSD consumed in FY 2019 was locally produced. Similarly, the demand for LDO and Kerosene is satisfied through local refineries.

Fig. 7. Petroleum Price Trends (Rs/ litre)



Source: OGRA, 2020 and Pakistan Energy Yearbook, 2020.

2.2.1. Ex-Refinery Price

Ex-Refinery price of all petroleum products—MS, HSD, LSD, JP1, JP4 and JP8 cannot be more than the PSO average actual import prices of the previous month excluding PSO import incidentals. For ex-refinery formula of HSD & MS, PSO actual import incidentals excluding ocean losses are adopted.

It is the price at which all refineries sell their finished products. In case of non-availability of PSO import prices, the refineries fix their ex-refinery price as per existing Import Parity Pricing formula. It is calculated by the Oil Companies Advisory Council (OCAC). Import Parity Price is determined after taking an average of past 30-days international prices as published in the Platt's Oil gram (a source of pricing benchmark in the physical energy markets). All other allowed expenses of refineries (including handling, bank & ocean charges, marine insurance, wharf age and surcharges as well as its factory overheads) are then adjusted to this average (Moiz, 2019).

2.2.2. Inland Freight Equalisation Margin (IFEM)

Since 2008, the responsibility of management/ computation of IFEM are with OGRA. The IFEM is charged on all petroleum products to maintain uniform rates at 22 depots spread throughout the country; irrespective of difference in transportation costs. Although IFEM is meant for uniformity but it is used for various disbursements to the sector, creating distortions. The price of HOBC is exempted from IFEM charges since 2011.

All the country's petroleum imports or indigenous supplies are concentrated in the South (Keamari in Karachi), while the demand for petrol is everywhere. If the freight costs or transportation charges from Karachi to any part of the country were to be part of the pricing structure, then there would have been different prices of gasoline or diesel.

Secondary transportation cost from depot to retail outlets is deregulated and the dealers have been allowed to recover it from the retail consumer by including it in the pump/retail price. Furthermore, secondary freight in special areas (Chitral, Gilgit Baltistan, AJK and some parts of Balochistan) is also picked up through IFEM mechanism to provide relief to the consumers of special areas.

Box 1: IFEM includes:

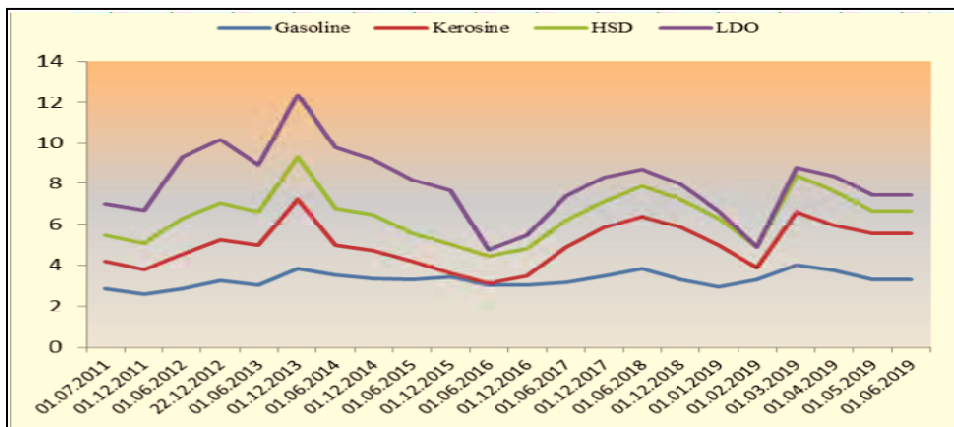
- Costs involved in the transportation of petroleum products to 22 storage depots.
- Adjustments of extra margins earned by OMCs. Extra Margin is part of ex-depot price of HSD & MS, applicable to all OMCs except Pakistan State Oil Company Limited (PSO).
- PARCO Price Differential Claim (PDC), difference between the OGRA announced ex-refinery price and the PARCO Import Parity Price (IPP), allowed under PARCO Implementation Agreement and Petroleum Policy 1994.
- ARL is allowed to recover the crude transportation claim of Adhi and Dhumal fields from the IFEM.
- HSD price differential surplus by refineries, except PARCO, ARL & NRL.
- Adjustment of MS RON 92 penalty/differential from local refineries not producing MS RON 92 grade.

Source: OGRA, 2020.

When we look at the price build up formula for petroleum products in the last few years, we found IFEM has been changing over time (every month) for all the products, sometimes moving up and sometimes moving down (Figure 8).

Despite government move towards market liberalisation, competition level on the supply side of the oil industry is almost insignificant. It is the lack of proper incentives not giving space to competition and efficient operation of companies. As a result, no benefits of market reforms have so far trickled down to consumers. Regulatory benefits are going mainly to industry (through protected profits). There is a need for a level playing field to enable competition.

Fig. 8. Inland Freight Equalisation Margin (Rs/ litre)



2.2.3. Distribution Margin

It is the Oil Marketing Companies (OMCs) margin per litre upon sales of petroleum products petrol and diesel both to industrial and retail distributors. It is charged on all fuels_ gasoline, HSD, LDO and kerosene.

2.2.4. Dealer's Commission

From retail perspective, the OMCs are eligible to sell their volumes coming from storage depots to the nearest retailers or petrol pumps at price, with the addition of franchise fee and non-fuel retail charges (for facilities like tuck shop, car wash, oil & tyre change).

After market based reforms in early 2000, the margins of oil marketing companies were capped at 3.5 percent of the retail price of the petroleum product; whereas, dealer's commission was capped at 4 percent (Malik, 2007). Later in 2014, the margins of OMCs and dealer's commission on gasoline and HSD are revised annually based on the Consumer Price Index (CPI) for doing their business.

Ex-depot price is mainly dependent on the international price crude oil (more than 70 percent for both MG and HSD); whereas distribution and dealer margin are both fixed revenue streams for the businesses. The OMC margins are fixed in terms of Pakistani Rupees for gasoline and HSD. The margin related to furnace oil remains linked with the imported price.

Fig. 9. Share in MG Price (Rs/ Litre)

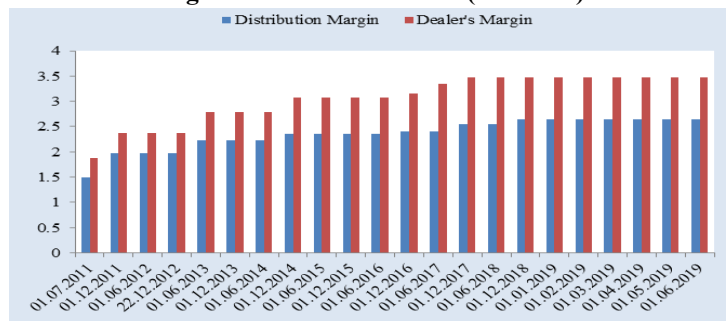
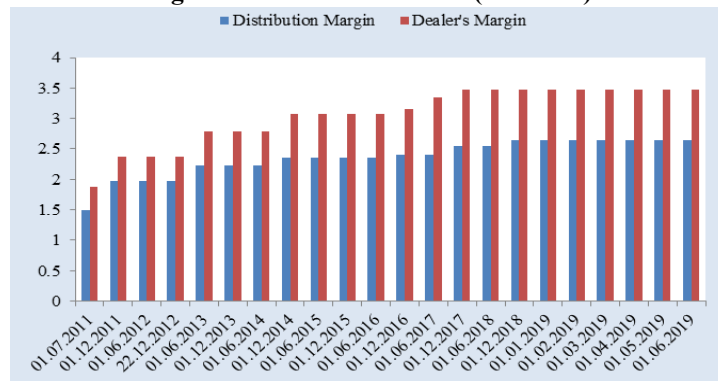


Fig. 10. Share in HSD Price (Rs/ Litre)



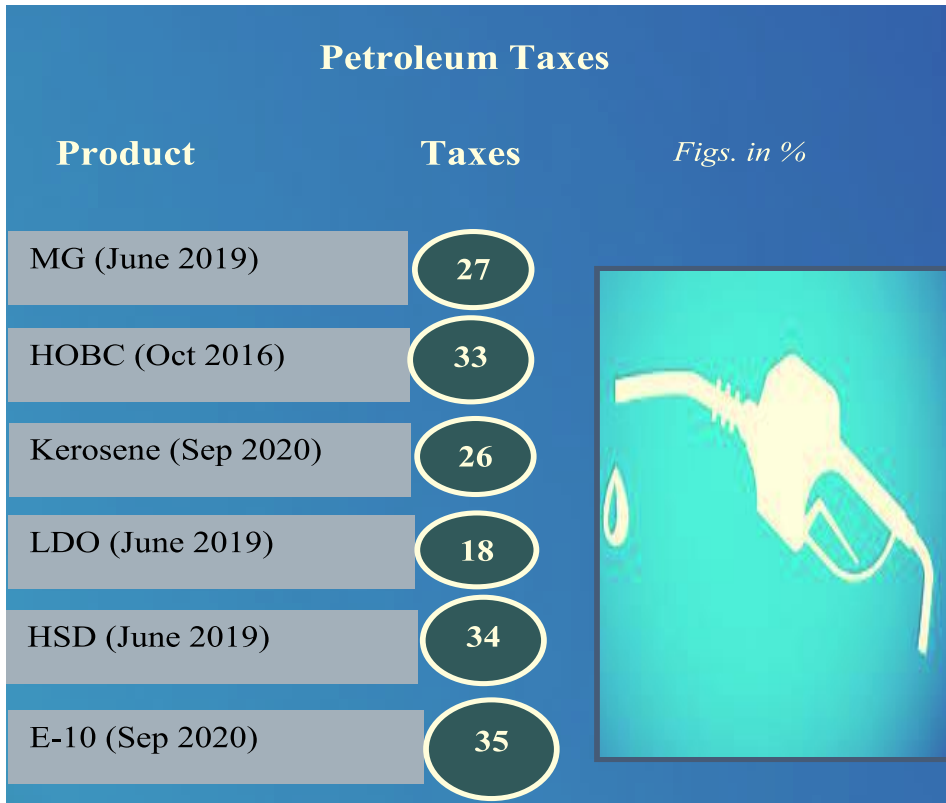
2.2.5. Petroleum Taxes

Fuel taxes have important revenue implications for Pakistan. Oil sector accounts for a significant share of government revenues. Taxes on petroleum products are the largest source of indirect revenues in Pakistan. Petroleum product prices are higher than the import parity price because of these taxes. Petroleum products contributed Rs 1551 billion to government revenues in the form of indirect taxes (federal excise duty, custom duty, petroleum levy and sales tax) in FY2019. It was 35 percent of total tax revenues in the year. In FY2006, this share was only 15 percent.

In the final fixed sales price of MG (June 2019), federal excise duty, sales tax and fixed development surcharge account for about 27 percent. Similarly, in the final sales price of HSD taxes (sales tax, FED and petroleum development levy) accounts for 34 percent.

The share of petroleum development levy/ surcharge in FY 2019 was 14 percent and 12 percent for HSD and MG. From the business perspective, taking such high amount in the form of taxes is discouraging; when there is hardly any development taking place (Moiz, 2019). There is need to eliminate 7.5 percent deemed duty charged by refineries on HSD, as refineries are not upgrading their plants.

On one hand the GOP is charging such hefty amount from consumers in the form of taxes. Yet, on the other hand, the government has often used petroleum development levy to keep the end user price in check, given the fluctuations in the international price of oil (elaborated in the next section).



2.3. Price Capping and Oil Pass Through

Despite deregulation in the oil sector, some elements of regulation have still remained its part. To protect the consumer from the impact of high oil prices internationally government often capped the domestic sale prices of petroleum products.

Box 2: The Pass-through of International Prices

The pass-through from international to domestic retail fuel prices is defined as the ratio of absolute changes in the after domestic taxes retail price of fuel to the local currency price of the relevant fuel import product. World prices are converted into local currency therefore; the pass-through ratios reflect both exchange rate and price changes. The formula is

$$\text{Pass through} = \frac{(P_t^d - P_{t-1}^d)}{(P_t^w - P_{t-1}^w)}$$

Where P^d and P^w are the domestic and world fuel prices, and t and $t-1$ refer to current and previous period. In case of increase in international price government decreases tax rates to limit the impact of international prices.

Pass through Values

	Increase in International Price	Decrease in International Price	
Increase in tax	>1	<1	<ul style="list-style-type: none"> • Overburden the consumer • Does not protect the consumers • Aimed to correct fiscal deficit
Decrease in tax	<1	>1	<ul style="list-style-type: none"> • Protect the consumer • May have some political interest
No change in Tax	=1	=1	<ul style="list-style-type: none"> • Complete pass through

2.3.1. Kerosene- International Oil Price Pass Through

From July 2011 to September 2020, about 23 out of 56 times increase in import prices for Kerosene are more than fully passed on to the consumer. In complete sample 51 out of 105 times change in international oil price are more than fully passed on to the consumer and only 33 out of 105 times government protect the consumer from increase in international oil prices by reducing taxes.

Table 1

Kerosene International Price Increase and Decrease

International Price Increase	Count	International Price Decrease	Count	Total
Number of Periods	56	Number of Periods	49	105
Increase in taxes/ Pass through >1	23	Increase in taxes/ Pass through <1	28	51
Decrease in taxes/ Pass through <1	33	Decrease in taxes/ Pass through >1	21	54
Same tax/ complete pass through =1	0	Same tax/ complete pass through =1	0	

Fig. 11a. Pass Through in Case of Decrease in International Price

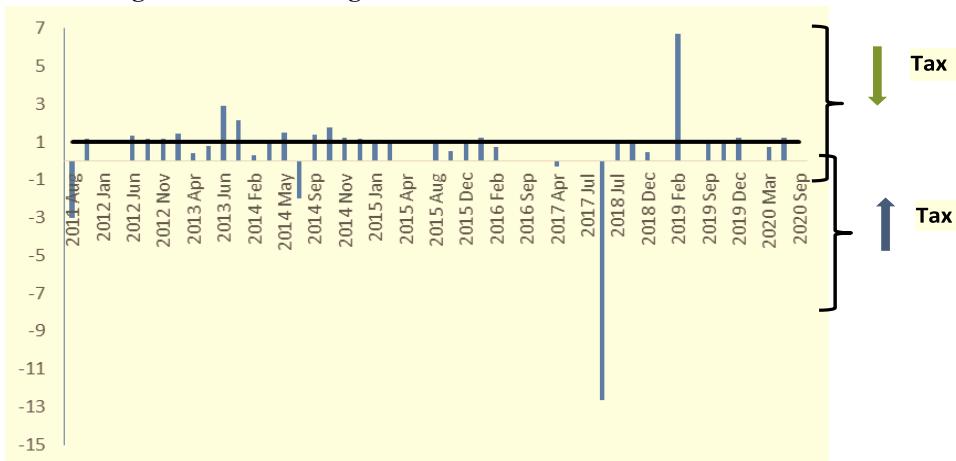
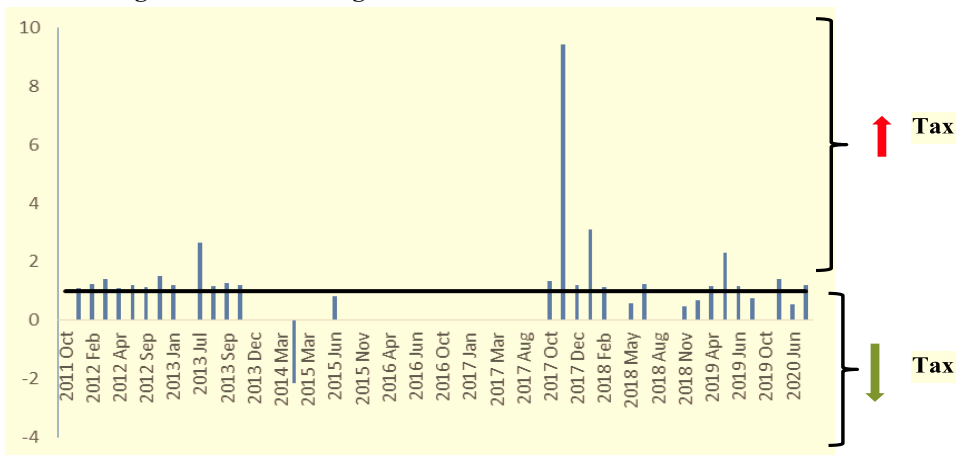


Fig. 11b. Pass Through in Case of Increase in International Price



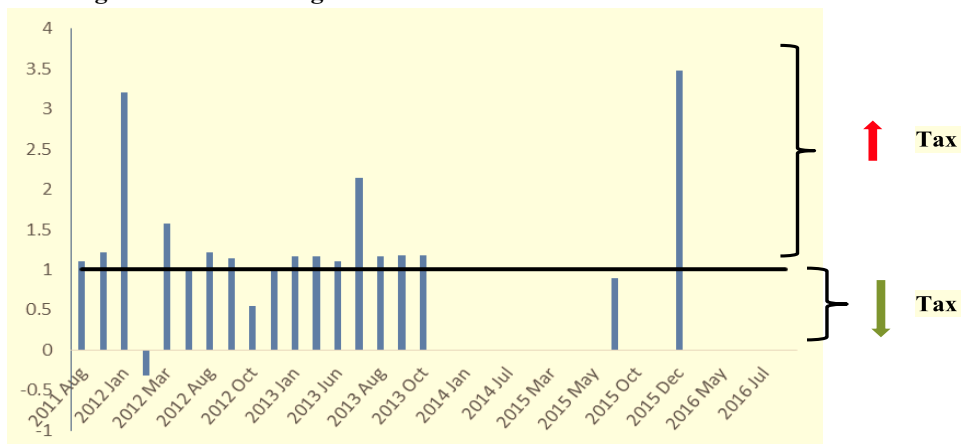
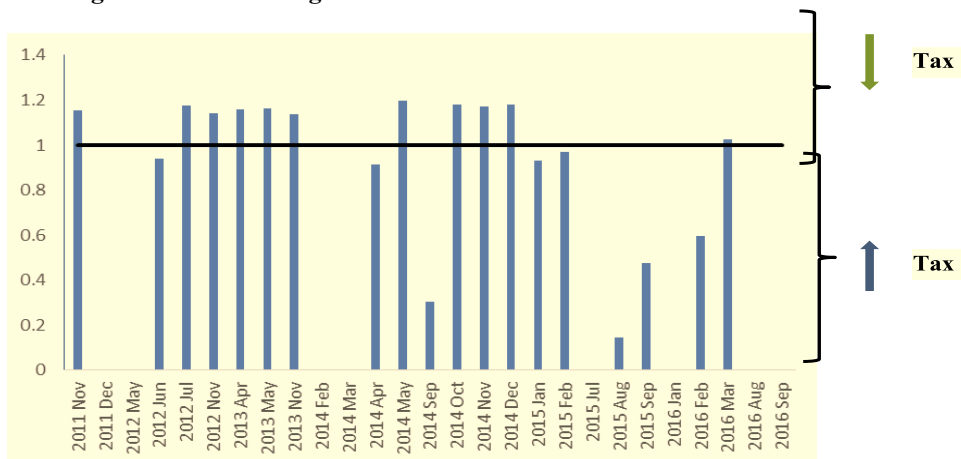
2.3.2. HOBC- International Oil Price Pass Through

From July 2011 to October 2020, about 16 out of 34 times increase in import prices for HOBC are more than fully passed on to the consumers. In complete sample 32 out of 61 times change in international oil price are more than fully passed on to the consumer and only 18 out of 61 times government protect the consumer from increase in international oil prices by reducing taxes.

Table 2

HOBC International Price Increase/ Decrease

HOBC International Price Decreases	Count	HOBC International Price Increase	Count	Total
Number of Periods	27	Number of Periods	34	61
Increase in taxes/ Pass through <1	16	Increase in taxes/ Pass through >1	16	32
Decrease in taxes/ Pass through >1	11	Decrease in taxes/ Pass through <1	18	29
Same tax/ complete pass through =1	0	Same tax/ complete pass through =1	0	0

Fig. 12a. Pass Through in Case of Increase in International HOBC Price**Fig. 12b. Pass Through in Case of Decrease in International HOBC Price**

2.3.3. Gasoline—International Oil Price Pass Through

From July 2011 to July 2019, about 23 out of 45 times increase in import prices for gasoline are more than fully passed on. In complete sample 51 out of 86 times change in international oil price are more than fully passed on to the consumer and only 13 out of 86 times government protect the consumer from increase in international oil prices by reducing taxes.

Table 3

<i>Gasoline International Oil Price Increase/ Decrease</i>				
Gasoline International Price Decreases	Count	Gasoline International Price Increase	Count	Total
Number of Periods	41	Number of Periods	45	86
Increase in taxes/ Pass through <1	28	Increase in taxes/ Pass through >1	23	51
Decrease in taxes/ Pass through >1	13	Decrease in taxes/ Pass through <1	29	42
Same tax/ complete pass through =1	0	Same tax/ complete pass through =1	0	0

Fig. 13a. Pass Through in Case of Increase in International Gasoline Price

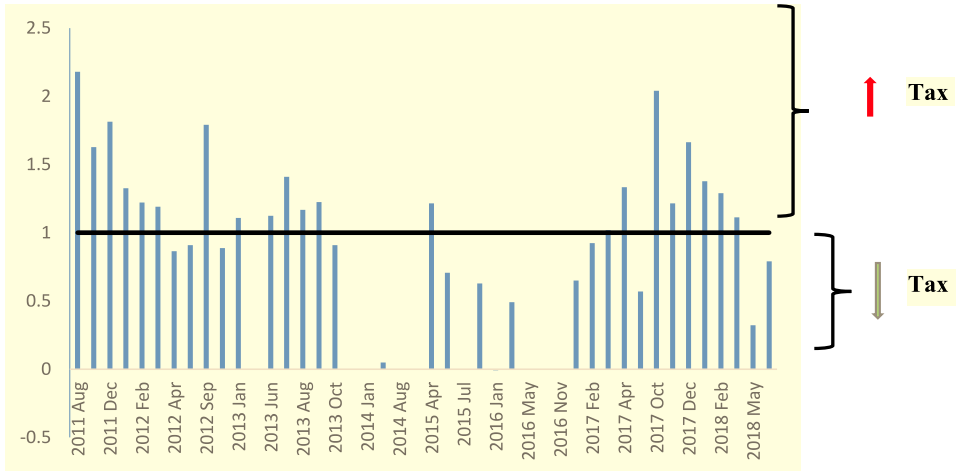
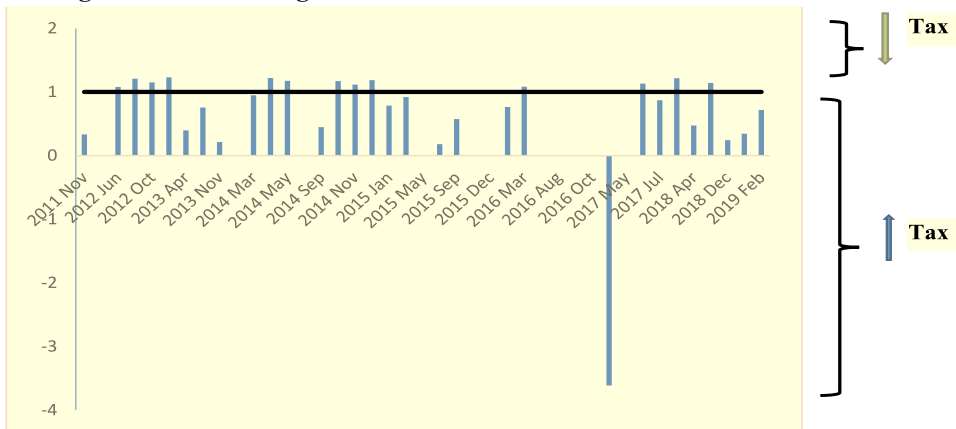


Fig. 13b. Pass Through in Case of Decrease in International Gasoline Price



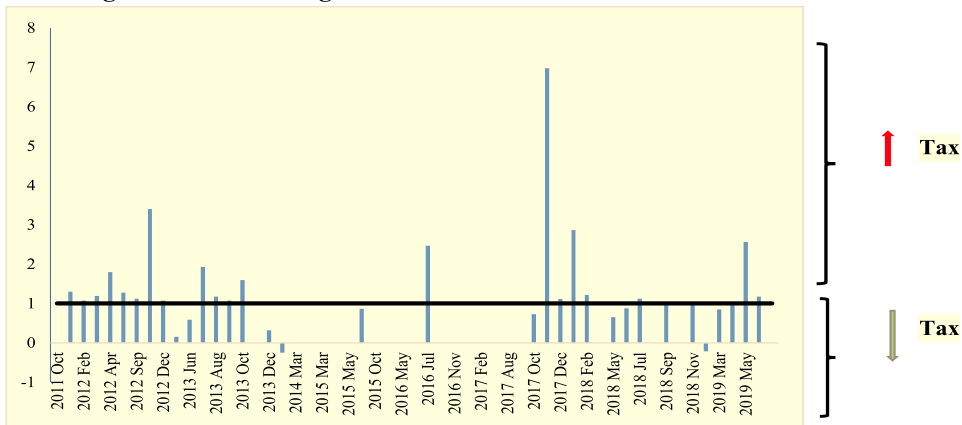
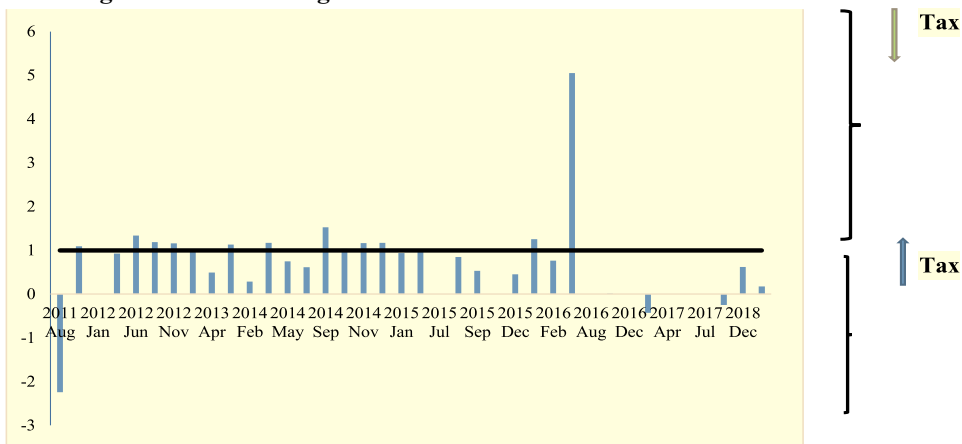
2.3.4. Light Diesel—International Oil Price Pass Through

From July 2011 to June 2019, about 21 out of 54 times increase in import prices for light diesel are more than fully passed on to the consumers. In complete sample 33 out of 92 times change in international oil price are more than fully passed on to the consumer and only 25 out of 92 times government protect the consumer from increase in international oil prices by reducing taxes.

Table 4

LDO International Price Increase/ Decrease

LDO International Price Decreases	Count	LDO International Price Increase	Count	Total
Number of Periods	38	Number of Periods	54	92
Increase in taxes/ Pass through <1	12	Increase in taxes/ Pass through >1	21	33
Decrease in taxes/ Pass through >1	25	Decrease in taxes/ Pass through <1	33	58
Same tax/ complete pass through =1	1	Same tax/ complete pass through =1	0	0

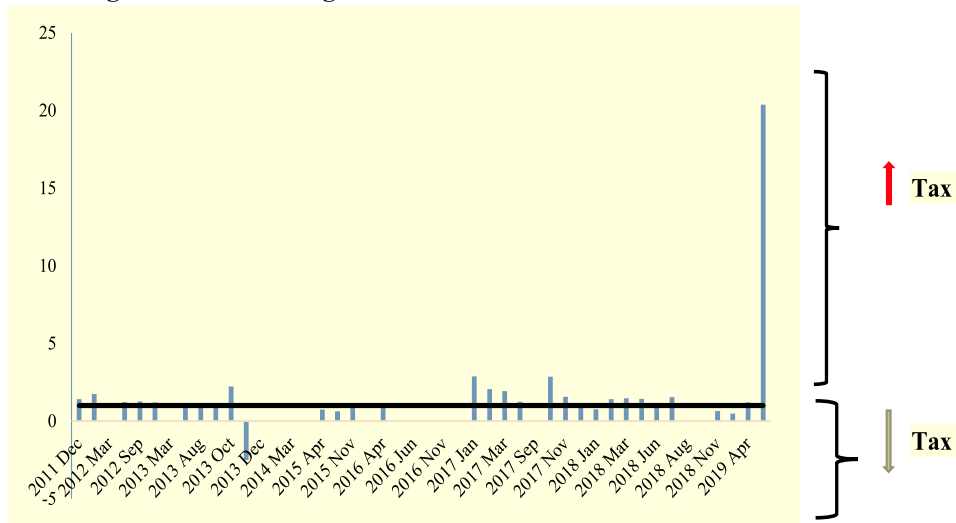
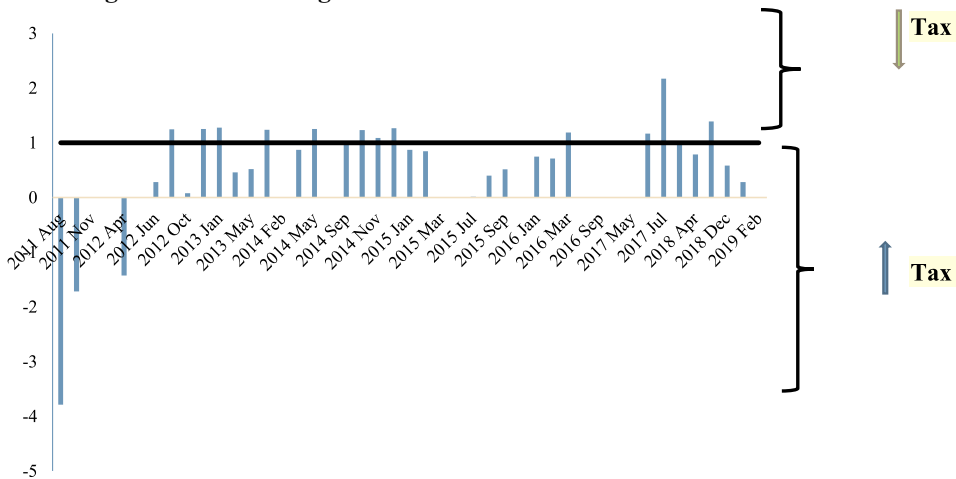
Fig. 14a. Pass Through in Case of Increase in International LDO Price**Fig. 14b. Pass Through in Case of Decrease in International LDO Price**

2.3.5. High Speed Diesel—International Oil Price Pass Through

From July 2011 to June 2019, about 21 out of 46 times increase in import prices for high speed diesel oil are more than fully passed on the consumers. In complete sample 33 out of 91 times change in international oil prices are more than fully passed on to the consumer and only 32 out of 92 times government protect the consumer from increase in international oil prices by reducing taxes.

Table 5

<i>HSD International Price Increase/ Decrease</i>				
High Speed Diesel International Price Decreases	Count	High Speed Diesel Oil International Price Increase	Count	Total
Number of Periods	45	Number of Periods	46	91
Increase in taxes/ Pass through <1	12	Increase in taxes/ Pass through >1	21	33
Decrease in taxes/ Pass through >1	32	Decrease in taxes/ Pass through <1	25	57
Same tax/ complete pass through =1	1	Same tax/ complete pass through =1	0	0

Fig. 15a. Pass Through in Case of Increase in International HSD Price**Fig. 15b: Pass Through in Case of Decrease in International HSD Price**

Pakistan over the years has followed a cautious policy for the pass-through of the decline in international oil prices. It made more decrease in domestic oil prices compared with a number of other regional countries, yet also retain some of the 'potential consumer surplus' with itself. Not only government made tax revenues, this policy rather helped in demand management also (SBP, 2016).

3. OIL PRICE MECHANISM ACROSS COUNTRIES

In many oil importing countries, petroleum prices are determined according to world crude oil prices and exchange rate movements. However, the government intervention in the energy market varies across countries depending upon the characteristics of energy market.

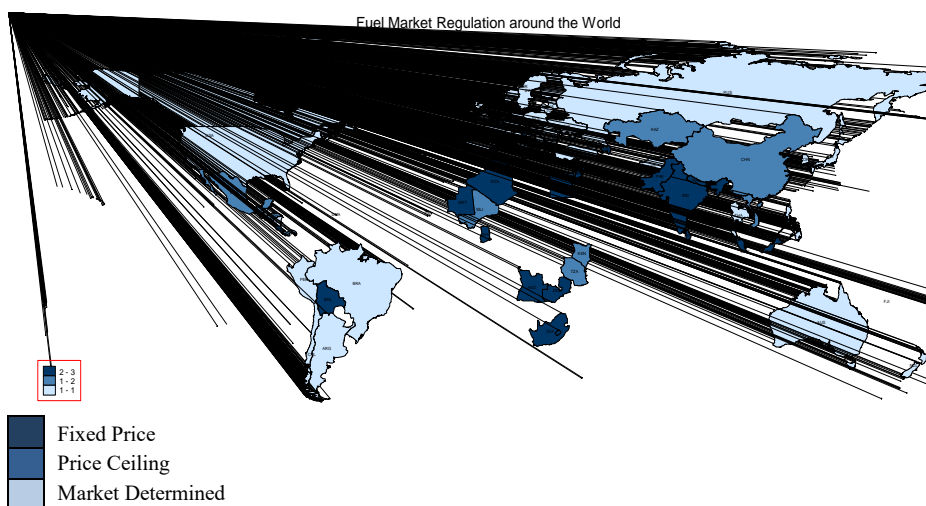
Box 3: Methods—Retail Fuel Price Determination

Market-determined retail fuel prices. State intervention is limited. Fuel retailers set their selling prices freely without major restrictions. Therefore, the fuel prices at different stations and in different regions of the country could vary.

Price ceiling. Fuel retailers are free to determine their selling prices as long as they do not exceed the specified ceiling set by the government to protect consumers from sudden upward increase in prices.

Fixed price. The most extreme form of price control is when the government or another authorized institution fixes the retail fuel prices.

Following map classifies fuel market regulation in 90 countries depending on which of the three main retail fuel pricing methods they apply.



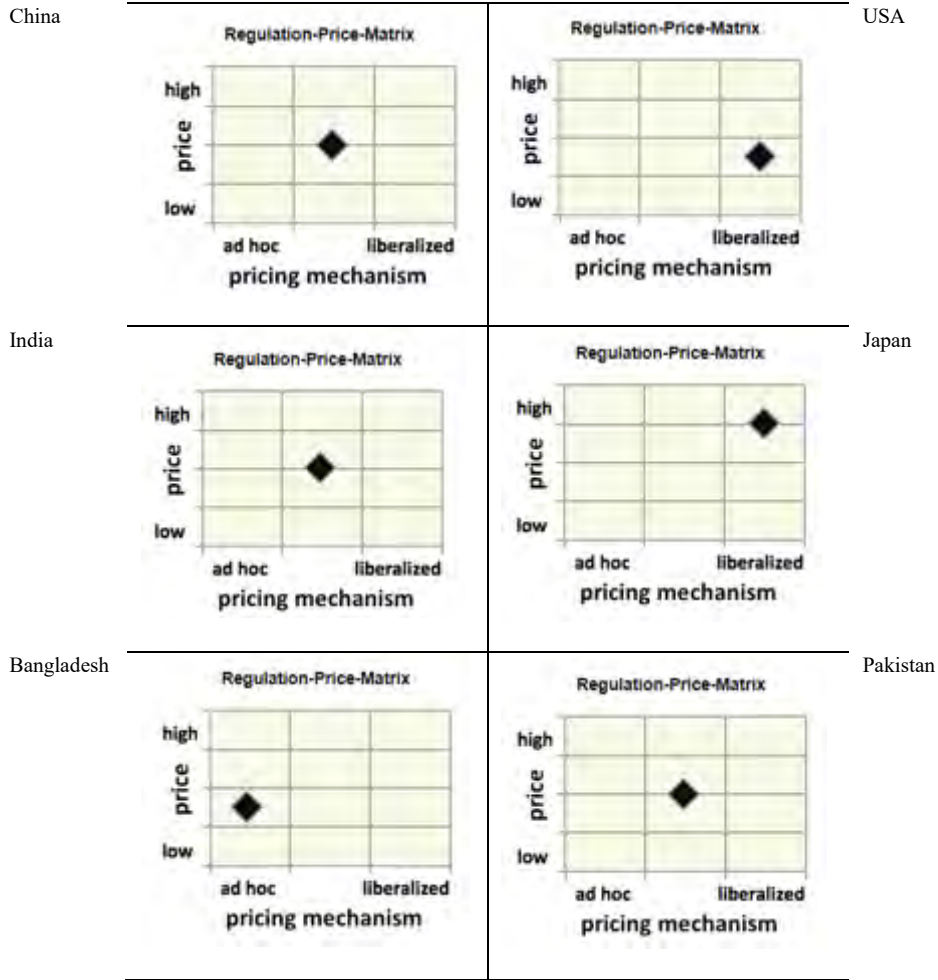
Source: Data for map is taken from www.globalpetrolprices.com

In 60 percent of the reviewed countries fuel markets are liberalised and the retail fuel prices are market-determined. Except for few (like Afghanistan, Uganda, and Kyrgyzstan), these are highly developed countries—USA, Japan, Australia, New Zealand and most European countries.

Pakistan is among the remaining 40 percent, where government is involved in the retail fuel pricing with a price ceiling or a fixed price. Apart from developing countries, some of the developed countries (like for example, Belgium, Luxembourg, and Malta) also falls in this category.

3.1. Regulation Price Matrix in Selected Countries

The following regulation price matrix also explains that in Pakistan despite being liberalised, some sort of government check is in place unlike developed countries like USA and Japan; but similar to India and China.



However, in terms of transparency Pakistan is better than countries like India and china (Table 6a and Table 6b).

Table 6a

Country	<i>Transparency of Price Composition</i>		
	No information available	Only partial information / available or poor / unclear / hard to find information	Full information available
China	√		
USA			√
India		√	
Japan			√
Bangladesh	√		
Pakistan			√

Table 6b

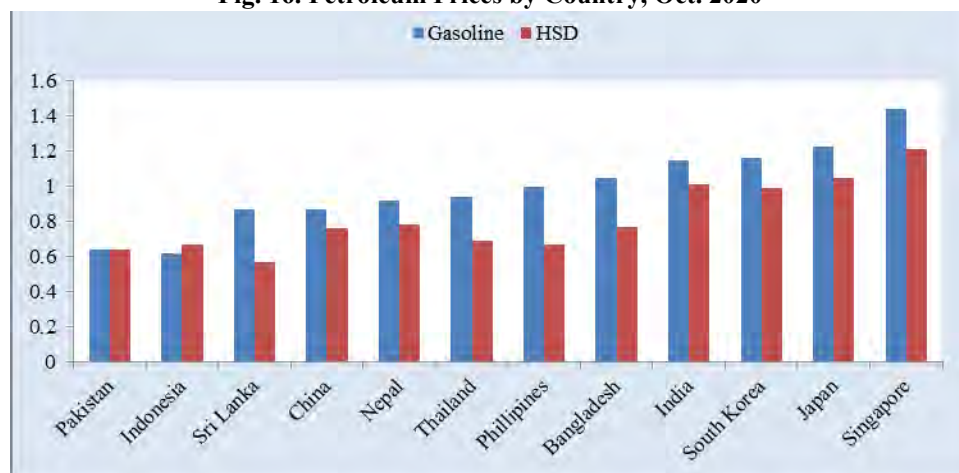
Country	Transparency of Price Mechanism/ Monitoring		
	No information available	Only partial information / available or poor / unclear / hard to find information	Full information available
China	√		
USA			√
India		√	
Japan			√
Bangladesh	√		
Pakistan			√

Source: www.energypedia.com.

3.2. International Price Comparison

It is obvious in Figure 16, that petroleum prices despite the increase (Figure 7) and despite taxation (Section 2.2.4) are still lower in the region.

Fig. 16. Petroleum Prices by Country, Oct. 2020



Source: www.globalpetrolprices.com

4. KEY TAKEAWAYS

- Fuel price mechanism has transformed significantly in the last two decades.
- Despite liberalisation some sort of government regulation is still in place to keep prices affordable for the consumers.
- The dependence on fuel taxation as a source of government revenue has increased over the years.
- Given Pakistan's significant dependence on imports, there is a need for market based mechanism for the determination of prices. Ex-refinery prices should be

based on international practices—OGRA may set an upper limit based on the weighted average of the import prices of all OMCs.

- Petroleum pricing should be based on cost of service. This demands abolishment of IFEM for each consumer category.

REFERENCES

- Ansari, M. (2004). Unexplored country: Pakistan's oil and gas sector. BLUE.CHIP, *The Business Peoples Magazine*.
- Kiani, K (2020). Petroleum prices likely to be deregulated. *DAWN*, June 8th, 2020. <https://www.dawn.com/news/1561992/petrol-pricing-likely-to-be-deregulated>
- Malik, A. (2007). How Pakistan is coping with high oil prices? *The Pakistan Development Review*, 46(4), 551–575.
- Moiz, R. (2019). Oil price build-up. *Business Recorder*, August 1st, 2019. <https://fp.brecorder.com/2019/08/20190801501914/>
- OGRA (2020) Annul report. Oil and Gas Regulatory Authority, Pakistan.
- Pakistan Energy Yearbook* (Various Years). Hydrocarbon Development Institute of Pakistan.
- SBP (2016) Annual report, State Bank of Pakistan.