SECTOR OVERVIEW

A. Sector Structure and Policies

1. **Exploration and production.** The petroleum sector is governed by the Ministry of Petroleum and Natural Resources (MPNR) of the Government of Pakistan, which is organized into four policy wings: petroleum concessions, oil, gas, and minerals. The directorate general of petroleum concessions functions as the regulatory authority for all upstream exploration and production activities in Pakistan, whereas the directorate general of gas is responsible for formulating policies regarding natural gas, liquefied petroleum gas (LPG), liquefied natural gas (LNG), compressed natural gas (CNG), allocating gas from new finds to gas utility companies, reviewing and executing gas price agreements with producers and gas sales agreements between producers and government-nominated buyers.[1] The current pricing and incentive regime for petroleum exploration and production has been defined under the Petroleum Exploration and Production Policy 2012 (Petroleum Policy).[2] Exploration and production concessions are granted primarily through a competitive bidding process. Both domestic and international companies are operating in exploration and production in Pakistan.[3]

2. **Transmission and distribution.** Pakistan's midstream and downstream oil and gas sector is regulated by the Oil and Gas Regulatory Authority (OGRA), which is mandated to foster competition, increase private investment and ownership in the midstream and downstream petroleum industry, protect the public interest while respecting individual rights, and provide effective and efficient regulations.[4] In March 2002, the regulatory functions of natural gas were transferred to OGRA, which reports to the Cabinet Division—ensuring independence from the MNPR.[5] OGRA is also responsible for regulating activities relating to the LPG and CNG sectors.

3. Pakistan has a well-developed and integrated infrastructure for the transmission and distribution of natural gas. Its natural gas pipeline system is about 145,633 kilometers (km) long, of which 134,489 km are distribution pipelines and 11,144 km are high-pressure transmission lines (footnote 5). Transmission and distribution of natural gas in the northern and central regions of Pakistan is undertaken by Sui Northern Gas Pipelines Limited (SNGPL)[6] while Sui Southern Gas Company Limited (SSGC) covers the southern region of Pakistan where the project is located (footnote 6).

4. OGRA posts natural gas wellhead pricing and end user pricing on its website to ensure transparency. Prices vary by consumer segment (i.e., domestic, industry, power, or fertilizer). Given the agrarian nature of Pakistan's economy, fertilizer production units have been provided gas at subsidized rates. Domestic consumers are also provided gas at subsidized rates. Gas end user tariffs range from PRs67.6 per million British thermal units (MMBtu) or $0.7 per

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[1] Government of Pakistan. Ministry of Petroleum and Natural Resources. http://www.mpnr.gov.pk

[2] Government of Pakistan. Ministry of Petroleum and Natural Resources. Petroleum Policy 2012. http://www.mpnr.gov.pk/gop/index.php?q=aHR0cDovLzE5Mi4xNjguNzAuMTM2L21wbnIvZnJtRGV0YWlscy5hc3B4P2lkPTImYW1wO29wdD1wb2xpY2llcw%3D%3D (accessed 01 December 2014)

[3] Pakistan Petroleum Exploration & Production Companies Association. http://www.ppepca.com/members.html

[4] The midstream sector involves the transportation, storage, and wholesale marketing of crude or refined petroleum products. The downstream sector involves the refining and marketing of petroleum products.

[5] Oil and Gas Regulatory Authority. 2014. *State of Regulated Petroleum Industry 2012-3*. Islamabad.

[6] A public limited state-owned enterprise listed in Pakistan.

MMBtu[7] (for feedstock at a fertilizer factory) to about PRs500–PRs600 per MMBtu or $5.0–$6.0 per MMBtu for power projects.[8]

B. Sector Challenges

5. **Demand and supply.** The main source of primary energy in Pakistan continues to be natural gas (48.2%), followed by oil (32.5%) and hydroelectricity (11.0%) (footnote 8). Natural gas plays a crucial role in meeting the nation's energy requirements. The major consumers of gas are the power sector (28.6%), domestic use (cooking and heating, 23.0%), industry (21.6%), and fertilizer production (14.8%). Table 1 provides the breakdown of primary sources of energy.

Table 1: Primary Energy Supplies by Source

Source	FY2009	FY2010	FY2011	FY2012	FY2013
Oil (toe)	20,103,060	19,806,314	20,674,840	19,958,483	20,968,730
(%)	32.1	31.4	32.0	30.8	32.5
Gas (toe)	30,255,885	30,808,523	30,683,357	32,033,074	31,144,006
(%)	48.4	48.8	47.6	49.5	48.2
LPG (toe)	401,705	395,583	339,633	321,214	309,524
(%)	0.6	0.6	0.5	0.5	0.5
Coal (toe)	4,732,823	4,621,639	4,350,868	4,285,400	3,863,081
(%)	7.6	7.3	6.7	6.6	6.0
Hydroelectricity (toe)	6,631,841	6,705,533	7,593,074	6,806,704	7,126,623
(%)	10.6	10.6	11.8	10.5	11.0
Nuclear Electricity (toe)	386,165	690,821	816,370	1,256,791	1,086,848
(%)	0.6	1.1	1.3	1.9	1.7
Imported Electricity (toe)	54,266	59,537	64,093	65,515	89,542
(%)	0.1	0.1	0.1	0.1	0.1
Total (toe)	**62,565,745**	**63,087,950**	**64,522,235**	**64,727,181**	**64,588,354**
(%)	(0.6)	0.8	2.3	0.3	(0.2)

( ) = negative, LPG = liquefied petroleum gas, toe = ton of oil equivalent.
Source: Hydrocarbon Development Institute of Pakistan. 2014. *Pakistan Energy Yearbook 2013*. Islamabad.

6. Pakistan is experiencing the worst gas shortages in its history. Domestic gas production has not kept pace with demand, as gas fields have been depleted. Since FY2012, gas extraction has decreased at an average rate of 2.3% per annum to just under 1.5 trillion cubic feet by FY2014.[9] The supply–demand gap peaks during winter, when gas consumption for domestic heating increases. In FY2013, demand for natural gas was estimated to be 5,938 million cubic feet per day (MMCFD) against supply of 3,748 MMCFD—a deficit of 2,190 MMCFD. This shortfall has forced gas utility companies to implement gas load shedding, especially during winter (footnote 5).

7. As table 2 below shows, from FY2015 to FY2028, gas demand is projected to increase to 8,212 MMCFD, while domestic gas production will decline to 1,676 MMCFD, resulting in a significant shortfall of about 6,536 MMCFD by FY2028—unless the gap is reduced through an increase in supply from indigenous sources, LNG import, and completion of the Turkmenistan–

[7] An exchange rate of $1 = PRs100.59 has been used in this document.
[8] Hydrocarbon Development Institute of Pakistan. 2014. *Pakistan Energy Year Book 2013*. Islamabad.
[9] Government of Pakistan, Ministry of Finance. 2014. *Pakistan Economic Survey 2013-14*. Islamabad.

Afghanistan–Pakistan–India (TAPI) pipeline project supported by the Asian Development Bank (ADB) and the Iran–Pakistan pipeline project (footnote 5).

Table 2: Demand–Supply Scenario

(MMCFD)

FY	2013(A)	2014	2015	2017	2021	2022	2023	2025	2026	2027	2028
Anticipated Domestic Supply[a]	3,748	3,932	4,014	4,040	3,361	3,147	3,002	2,048	1,905	1,767	1,676
LNG Supply			200	400	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Iran–Pakistan Pipeline			263	750	750	750	750	750	750	750	750
TAPI pipeline				500	1,325	1,325	1,325	1,325	1,325	1,325	1,325
Total Supply	**3,748**	**3,932**	**4,477**	**5,690**	**6,436**	**6,222**	**6,077**	**5,123**	**4,980**	**4,842**	**4,751**
Total Demand	**5,938**	**6,053**	**6,172**	**6,529**	**7,080**	**7,223**	**7,387**	**7,646**	**7,822**	**8,017**	**8,212**
Gap without Iran–Pakistan, TAPI, LNG	2,190	2,121	2,158	2,489	3,719	4,076	4,385	5,598	5,917	6,250	6,536
Gap with Iran–Pakistan, TAPI, LNG	2,190	2,121	1,695	839	644	1,001	1,310	2,523	2,842	3,175	3,461

A = actual, LNG = liquefied natural gas, MMCFD = million cubic feet per day, TAPI = Turkmenistan–Afghanistan–Pakistan–India.

[a] Anticipated domestic supply assumes some exploratory gas fields will come into production and thereafter depict a declining trend.

Source: Oil and Gas Regulatory Authority. 2014. *State of Regulated Petroleum Industry 2012-3*. Islamabad.

8. Gas shortage has resulted in many economic problems. Non availability of gas has led to the consumption of imported and more expensive furnace oil and/or high speed diesel (HSD) by power plants—resulting in an increased generation cost that cannot be fully borne by consumers and must be subsidized by the government. This pressure on the government's limited cash resources and fiscal deficit has resulted in delayed payments (often by 3–6 months) to power generators and daily load shedding (6–8 hours in urban areas and 10–16 hours in rural areas). Of the 62,852 gigawatt-hours (GWh) that were generated from thermal sources in FY2013, 35,774 GWh (56.92%) were generated utilizing furnace oil and HSD whereas 27,038 GWh (43.02%) were generated using natural gas and 40 GWh (0.06%) using coal.[10]

9. In addition, the curtailment of gas to the fertilizer industry has lowered the capacity utilization of plants and increased the price of fertilizer and the volume of urea imports—adversely impacting foreign exchange reserves and agricultural prices. The textile industry, whose exports account for the majority of the country's foreign exchange earnings, has been severely impacted—resulting in missed orders and massive layoffs—compounding the problems of an already fragile economy.

C. Government's Strategy for Energy Security

10. To meet shortages in gas supply, the government is implementing a multipronged strategy that includes (i) increasing domestic gas exploration and production—through policy incentives, including additional financial incentives for gas extracted from unconventional sources, such as policies for the exploration, production, and pricing of tight gas and marginal and or stranded gas fields (footnote 1); (ii) importing piped natural gas from neighboring

[10] National Electric Power Regulatory Authority. 2014. *State of Industry Report 2013.* Islamabad.

countries—the TAPI and Iran–Pakistan pipeline projects; and (iii) importing LNG on a fast-track basis, including this project.

11. The Iran–Pakistan pipeline project envisions gas import of about 750 MMCFD, but the project has been delayed by financing constraints and the geopolitical situation in the region. An intergovernmental agreement and gas pipeline framework agreement has been signed for the TAPI project, and a gas sales and purchase agreement is under negotiation. With a combined cost of over $10 billion, the TAPI project is being coordinated by ADB's Central and West Asia Department and first gas flow is targeted during 2017–2020. Pakistan's share of total supply from the pipeline is likely to be 1,325 MMCFD. The TAPI project is also dependent on the stability of the political and security situation in Afghanistan. Hence, the incumbent government has assigned high priority to import LNG.

D. Liquefied Natural Gas – Global Scenario

12. Based on new capacity developments, total LNG supply is expected to grow by an average of 6.4% per year, doubling production levels from 245 million tons per year in 2014 to 484 million tons per year in 2025.[11] On the demand side, the use of floating storage and regasification units (FSRUs) and floating storage units (FSUs) is playing an important role in opening up new markets for LNG, as this has enabled countries to import LNG quickly by incurring lower up-front capital costs. Since 2009, 13 countries have become LNG importers, seven of which have used FSRUs and two of which have used FSUs (footnote 11). LNG prices are largely based on the prices in the markets into which it is delivered, but LNG prices in all markets (Asia, Europe, the Middle East, the United States and Canada, and Latin America) have been at a discount to the price of Brent crude oil. Driven by the Japan Crude Cocktail index, LNG prices in Asia ($10.9–$11.3/MMBtu in 2014) have been higher than in Europe ($6.5–$9.7/MMBtu) and North America ($3.2–$4.0/MMBtu) (footnote 11). With Brent crude oil hovering at $60 per barrel and not expected to increase in the short to medium term, LNG prices are expected to remain soft over the same period (footnote 11). The prospects of new buyers, such as Pakistan, entering the market to secure medium- to short-term LNG supplies have been improved by the enhancement in the production capacity of LNG, an increased proportion of sales through spot and short-term trading, technological enhancements in the industry, and a reduction in LNG prices.

E. ADB Sector Interventions

13. ADB holds regular policy dialogue on energy sector reforms, planning, and implementation; and provides periodic sector assessments to country reviews of the International Monetary Fund (IMF). Ongoing reforms follow recommendations made in the Friends of Democratic Pakistan Energy Task Force Report, which ADB co-chaired with the government, and include recommendations related to (i) strengthening energy sector governance, (ii) rationalizing pricing and energy subsidies, (iii) developing energy finance capability, (iv) mainstreaming energy efficiency into energy policy, and (iv) fast-track investment projects for energy security.[12]

[11] Mott MacDonald. 2014. *Elengy Terminal Project Technical Due Diligence –Final Report*. London.
[12] Friends of Democratic Pakistan Energy Sector Task Force. 2010. *Integrated Energy Sector Recovery Report and Plan.* Islamabad.

14. ADB has been actively involved in Pakistan's gas sector. Intervention in the gas sector was part of the Energy Sector Restructuring Program.[13] One of the key areas of the program was related to enhancing reform in the natural gas and petroleum sector, including the introduction of market-based gas prices to commercially viable sectors and industries. ADB concurrently provided technical assistance to promote institutional capacity development and restructure the gas sector.[14] The technical assistance was related to sector reform, with the aim of commercializing operations, restructuring and privatizing gas sector companies to make them more efficient, and establishing a regulatory framework that would allow private investors to enter the field. OGRA was established as part of these reforms, and the government also approved a restructuring plan for the gas companies, i.e. SSGC and SNGPL.[15]

F. International Monetary Fund's Extended Fund Facility

15. As part of the extended fund facility, the government committed to undertake broad-based reforms in various sectors, including the energy sector. Energy sector reforms included (i) importing LNG, with the aim of finalizing the evaluation and award of an import contract by the end of December 2013, and receiving the first LNG imports by late 2014; (ii) accelerating the development of domestic natural gas and limiting expansion of gas distribution networks for domestic consumption; (iii) increasing supply by 7% by the end of December 2013 through new investment in existing fields; (iv) improving producer incentives under the Petroleum Policy; (v) continuing priority ranking of the power sector to second (after households) and continuing to divert excess gas supply to the most efficient power plants; (vi) introducing a new gas levy by the end of December 2013; (vii) capacity building of OGRA and the MNPR; (viii) fully reflecting the cost of new gas fields in the base tariff on a semiannual basis; (ix) directing SSGC and SNGPL to reduce technical and commercial losses and instituting managerial and administrative reforms to improve their operational efficiency; and (x) gradually rationalizing gas prices to encourage new investment, promote efficiency in gas use, and ensure that the gas sector will not produce a fiscal cost.[16] This project is being pursued by the government in support of these objectives, including the introduction of gas prices to reflect market prices and thereby reduce economic distortions in the market.

16. In the fourth and fifth reviews of the extended fund facility program which were conducted simultaneously, the IMF reported that the program is broadly on track.[17] Gas sector reforms are progressing to alleviate supply shortages and better allocate scarce domestic gas. Construction is nearing completion on the first LNG terminal, which will increase total supply, with the first LNG imports expected by early 2015. The government (i) is committed to full pass-through of the cost of imported LNG to the end user as it comes online; (ii) will complete the conversion of existing domestic gas concessions to new ones under the Petroleum Policy—which will permit higher producer prices for additional production—by the end of February 2015; (iii) will award an additional 10–15 blocks during FY2014 and FY2015 to increase exploration to help tackle gas shortages; and (iv) is committed to notifying new gas prices by January 2015 (postponed from August 2014).

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[13] ADB. 2000. *Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Islamic Republic of Pakistan for the Energy Sector Restructuring Program*. Manila.

[14] ADB. 2001. *Technical Assistance to Pakistan for Restructuring the Gas Sector. Manila* (TA 3711-PAK).

[15] ADB. 2014. *Program Performance Evaluation Report: Energy Sector Restructuring Program in Pakistan.* Manila (Loans 1807, 1808, and 1809).

[16] IMF. 2013. *Country Report No. 13/287* (September). Washington, DC; Letter of Intent, Memorandum of Economic and Financial, Policies, and Technical Memorandum of Understanding – Pakistan with IMF, December 2013.

[17] IMF. 2014. *Country Report No. 14/357*(December). Washington, DC.