

## SECTOR ASSESSMENT (SUMMARY): ENERGY

### A. Sector Performance, Problems, and Opportunities

1. A reliable and sustainable energy sector is essential to Pakistan's economic growth and well-being.<sup>1</sup> About one-third of the population lacks access to grid electricity, which lessens opportunities for inclusive growth. In 2013 and 2014, frequent load shedding led to civil strife and factory closures. Load shedding in urban areas reportedly was reduced from 12 hours in 2013 to 6 hours in 2015, while load shedding in the industrial sector was reduced from 12 to 4 hours over the same period.<sup>2</sup> Major factors contributing to Pakistan's energy problems are (i) the gap between end-user and cost-recovery tariffs, (ii) limited private sector participation resulting from concerns about electricity payments, and (iii) lack of transparency. Additionally, climate change impacts threaten energy security, and are anticipated to have long-term implications for current and future energy production.

2. **Sector performance and private sector participation.** In fiscal year (FY) 2016, electricity distribution and transmission losses fell to 17.8% (from 18.6% in FY2015) and collection increased to 94.4% (from 89.0% in FY2015). However, these levels are still insufficient compared with the National Electric Power Regulatory Authority (NEPRA) targets for losses (13.2%) and collection (100.0%) (footnote 2). Public companies dominate the energy sector. Improvement in collections was partially a result of various measures taken by distribution companies (DISCOs), such as revenue-based load shedding and mobile metering. Nevertheless, neither these measures nor a decline in oil prices could offset the increase of the electricity subsector's payables (circular debt), which were primarily caused by the gap between the tariffs determined by NEPRA and the tariff levels needed to recover costs. At the end of FY2016, arrears amounted to PRs321 billion, an increase of PRs7 billion over a year earlier. However, by 31 December 2016, overdue payments totaled PRs374 billion. The sharp increase reflected higher capacity charges resulting from the settlement of a legacy dispute initiated in 2005. The shortage of funds makes the subsector vulnerable to such unexpected events.

3. Pakistan's natural gas reserves are diminishing and development of hydropower generation is slow, resulting in greater reliance on imported fuel oil for electricity generation.<sup>3</sup> The total installed generation capacity is 24,731 megawatts (MW). From January 2016 to March 2017, 2,027 MW of new generation capacity was added, of which 927 MW (46%) come from renewable energy sources (wind, solar, and biomass), 760 MW from gas, and 340 MW from nuclear. The remaining demand–supply gap is expected to be covered from power plants financed under the China–Pakistan Economic Corridor (CPEC).<sup>4</sup> CPEC-listed projects are expected to bring an additional 10,100 MW of generation capacity, with most of the power plants starting commercial operations before the end of 2019.<sup>5</sup> More projects with an additional capacity of 5,820 MW are under consideration. CPEC also hopes to expand the transmission capacity.

4. Industrial and large-volume retail customers, including power generation operators, subsidize gas prices for fertilizer producers and retail customers with lower consumption

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<sup>1</sup> Asian Development Bank (ADB). 2015. *Country Partnership Strategy: Pakistan, 2015–2019*. Manila.

<sup>2</sup> National Electric Power Regulatory Authority (NEPRA). 2015. *State of Industry Report, 2014*. Islamabad.

<sup>3</sup> Hydropower's share in the electricity generation mix declined from 72% in 1980 to 33% in 2015. The share of gas in the thermal generation fuel mix fell from 56% in 2006 to 45% in 2015, while heavy fuel oil increased from 42% to 55% during the same period.

<sup>4</sup> <http://cpec.gov.pk/energy>.

<sup>5</sup> Out of this amount, around 2,700 MW is expected to come from renewable energy sources.

volumes. This cross-subsidization leads to uneconomic allocation and wastage of scarce resources. Gas distribution losses totaled 11.5%, exceeding by far the 4.5% that the Oil and Gas Regulatory Authority (OGRA) allows. Gas tariffs for consumers are set on the basis of the average cost of gas production in the country, regulated transmission and distribution expenditures, and a return on assets for the two state-owned gas DISCOs.

5. The prices of petroleum products in Pakistan are market-based and linked to price fluctuations on the international market. However, except for fuel oil and high-speed diesel, petroleum product prices are determined by OGRA based on a fixed formula agreed between the government and marketing companies. Refineries are allowed to fix their ex-factory prices on the basis of import parity prices under a revenue protection regime. In 2011, the government deregulated the prices of motor fuels and jet fuels. As a result, refineries and oil marketing companies fix the prices of these products. The oil marketing companies are allowed to charge a distribution margin of 3.5% and a dealer's commission of 4.0% to protect their returns. The government controls the prices of these products through adjustments in the petroleum development levy charged in the end-user prices.

6. **Accountability and transparency.** The transparency of operations and settlements in the electricity subsector has gradually improved. In 2015, the Central Power Purchasing Agency was separated from the National Transmission and Despatch Company to provide a transparent settlement system and to build a competitive electricity pricing platform. Now called Central Power Purchasing Agency Guarantee Limited, the agency discloses market settlement data on its website, and NEPRA is working on improving public awareness of the sector data. Better access to energy sector data will foster demand for information and a culture of transparency, and lead to the monitoring of sector developments by stakeholders.

7. **Sector structure and reforms.** Reforms have been ongoing in Pakistan since 1992, but the pace has been slow and the expected efficiencies have yet to fully materialize. The reforms include the unbundling and corporatization of the Water and Power Development Authority (WAPDA) into 10 regional DISCOs, 4 government-owned thermal power generation companies, and a transmission company, the National Transmission and Despatch Company. The hydropower plants were retained by WAPDA as WAPDA Hydroelectric. All are fully owned by the government. K-Electric Limited (formally known as Karachi Electric Supply Company), which is responsible for power generation and distribution in the Karachi area, is listed on the stock exchanges and is privately owned. Privately owned independent power producers generate 54% of the country's power (footnote 2). NEPRA was established to determine tariffs, issue licenses, and regulate and ensure the long-term sustainability of the sector. The Ministry of Water and Power sets sector policies and notifies the tariffs.

8. The fuel sector is dominated by public sector companies—two gas transmission and distribution companies, a gas import company, two exploration companies, and one oil marketing company. Restructuring of the gas transmission and distribution companies has begun and will result in the establishment of one countrywide transmission company and four provincial DISCOs by the end of FY2018. The Ministry of Petroleum and Natural Resources provides the policy framework and administrative oversight. OGRA was set up 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. OGRA's primary role is to set prices and issue operating licenses. Total domestic gas production equals 4,000 million cubic feet per day. The private sector has developed a liquefied natural gas terminal for regasification at Port Qasim, which has a maximum capacity of 600 million cubic feet per day. Another liquefied natural gas terminal of the same capacity is expected to start operation by August 2017. Two more are under various stages of development.

9. **Tariffs, pricing, and subsidies.** The government does not charge electricity customers the full cost of service, and subsidizes DISCOs for the difference between the customer tariff and the tariff determined by NEPRA. The government has paid over PRs1 trillion in tariff differential subsidies since 2008. In FY2014, subsidies amounted to 1.15% of GDP—a substantial drop from 1.8% in 2013. In FY2015 and FY2016, the subsidies were further reduced to PRs221 billion (0.8% of GDP) and PRs171 billion (0.7% of GDP).<sup>6</sup> The government estimates FY2017 electricity subsidies to be PRs118 billion, or about 0.4% of GDP. The difference between the customer tariff and the cost-recovery tariff, and the delay in determining and applying the cost-recovery tariff caused substantial payment arrears to generators.

10. **Energy efficiency.** In 2015, energy efficiency guidelines and labeling were developed for three types of energy-intensive appliances. In July 2016, Parliament adopted the National Energy Efficiency and Conservation Bill. This resulted in the establishment of the National Energy Efficiency and Conservation Authority (NEECA), which is responsible for developing mandatory energy efficiency labeling and recommending standards; carrying out energy audits; and prohibiting manufacture, sale, or import of non-energy-efficient equipment.

11. **Climate change.** Pakistan is vulnerable to the negative impacts of climate change. During 1995–2015, landslides and erosion resulted in the siltation of water reservoirs. Changes in rainfall patterns and glacial melt have also reduced hydropower generation capacity. Although Pakistan’s greenhouse gas emissions are low by global standards, carbon emissions grew from 182.73 million tons in 1990 to 355.27 million tons in 2013.<sup>7</sup> The significant increase in greenhouse gas emissions, particularly carbon dioxide, is mainly attributed to the burning of fossil fuels for electricity, transport, and manufacturing.

## B. Government’s Sector Strategy

12. Pakistan completed its rapid assessment and gap analysis in 2013. Its Vision 2025,<sup>8</sup> Power Generation Policy, 2015,<sup>9</sup> National Power Policy, 2013,<sup>10</sup> and Sustainable Energy For All<sup>11</sup> aim at ensuring uninterrupted access to affordable and clean energy for all sections of the population. In the short term, the government, through the National Power Policy, intends to establish (i) efficiency through a system-wide merit order (e.g., in fuel allocation, dispatch, payments, and the energy mix); (ii) transparency through the provision of seamless access to information via public websites; and (iii) accountability by (a) hiring professionals based on competency, (b) signing performance contracts, and (c) adopting a zero-tolerance approach to corruption and poor performance. Competition will be based on infrastructure development, upfront tariffs, competitive bidding, and key-client management. Since its inception, NEPRA has made significant progress in providing investors the opportunity to create a competitive market and improve the efficiency of energy enterprises. Sustainability will be achieved through the use of low-cost energy, fair treatment of stakeholders, rationalization of tariffs, and demand management via pricing and regulatory instruments. The emphasis in the medium term will be on the implementation of low-cost gas pipeline, coal and, regasified liquefied natural gas projects. The long-term focus is on the completion of large hydropower projects, and the retirement of

<sup>6</sup> Government of Pakistan, Ministry of Finance. 2015. *Federal Budget 2015–2016: Budget in Brief*. Islamabad.

<sup>7</sup> The values are 182.73 million tons in 1990 and 355.37 million tons in 2013, including land use change and forestry. World Resources Institute. CAIT Climate Data Explorer. <http://cait2.wri.org/Country>.

<sup>8</sup> Government of Pakistan. 2014. *Pakistan Vision 2025: One Nation – One Vision*. Islamabad.

<sup>9</sup> Government of Pakistan, Ministry of Water and Power. 2015. *Power Generation Policy, 2015*. Islamabad.

<sup>10</sup> Government of Pakistan, Ministry of Water and Power. 2013. *National Power Policy, 2013*. Islamabad.

<sup>11</sup> Sustainable Energy For All is a joint initiative by the Ministry of Planning, Development and Reform and the United Nations Development Program.

high-cost energy plants and contracts—ensuring more affordable electricity generation.

13. Under the Petroleum Exploration and Production Policy, 2012, the government enhanced the wellhead pricing terms for natural gas producers. The response from local companies has been positive, but the response from foreign companies remains subdued. A tight gas policy for exploration and production was announced in May 2011. The policy gives a 40% premium over the respective price for each zone under the 2009 policy. Under the 18th Constitutional Amendment, 2010, provinces were awarded greater authority in the approval process for oil and gas enterprises, which has delayed exploration in some cases. The Petroleum Rules, 2013 were modified to disburse the royalty share directly to the provinces instead of channeling it through the federal government, a long-standing provincial grievance.

### **C. ADB Sector Experience and Assistance Program**

14. The Asian Development Bank (ADB) has approved six multitranche financing facilities (MFFs) to finance energy efficiency, transmission, distribution, and renewable energy projects in Pakistan. In addition to the MFFs, ADB approved the Jamshoro Power Generation Project to finance a 660-megawatt supercritical coal-fired power plant. ADB also approved its first results-based lending program in Pakistan for increasing access to energy to the vulnerable and poor communities by using renewable energy resources. As the sector's largest development partner, ADB holds regular policy dialogues, and provides periodic sector assessments to the International Monetary Fund country reviews on request. The government and donors developed a framework for resolving the energy crisis through the Energy Sector Task Force of Friends of Democratic Pakistan in 2010, which formed the foundation for the National Power Policy, 2013. ADB approved the Sustainable Energy Sector Reform Program<sup>12</sup> in April 2014, and the second program<sup>13</sup> in November 2015, to support the reforms set out in the policy.

15. In 2013, the government requested ADB assistance to support the implementation of its national climate change policy, in particular the mitigation of climate change through a variety of control technologies, such as the installation of emission analyzers and controls for the construction of new coal-fired power plants, assessment of the potential for carbon capture and sequestration, and the adoption of a waste recycling system.<sup>14</sup>

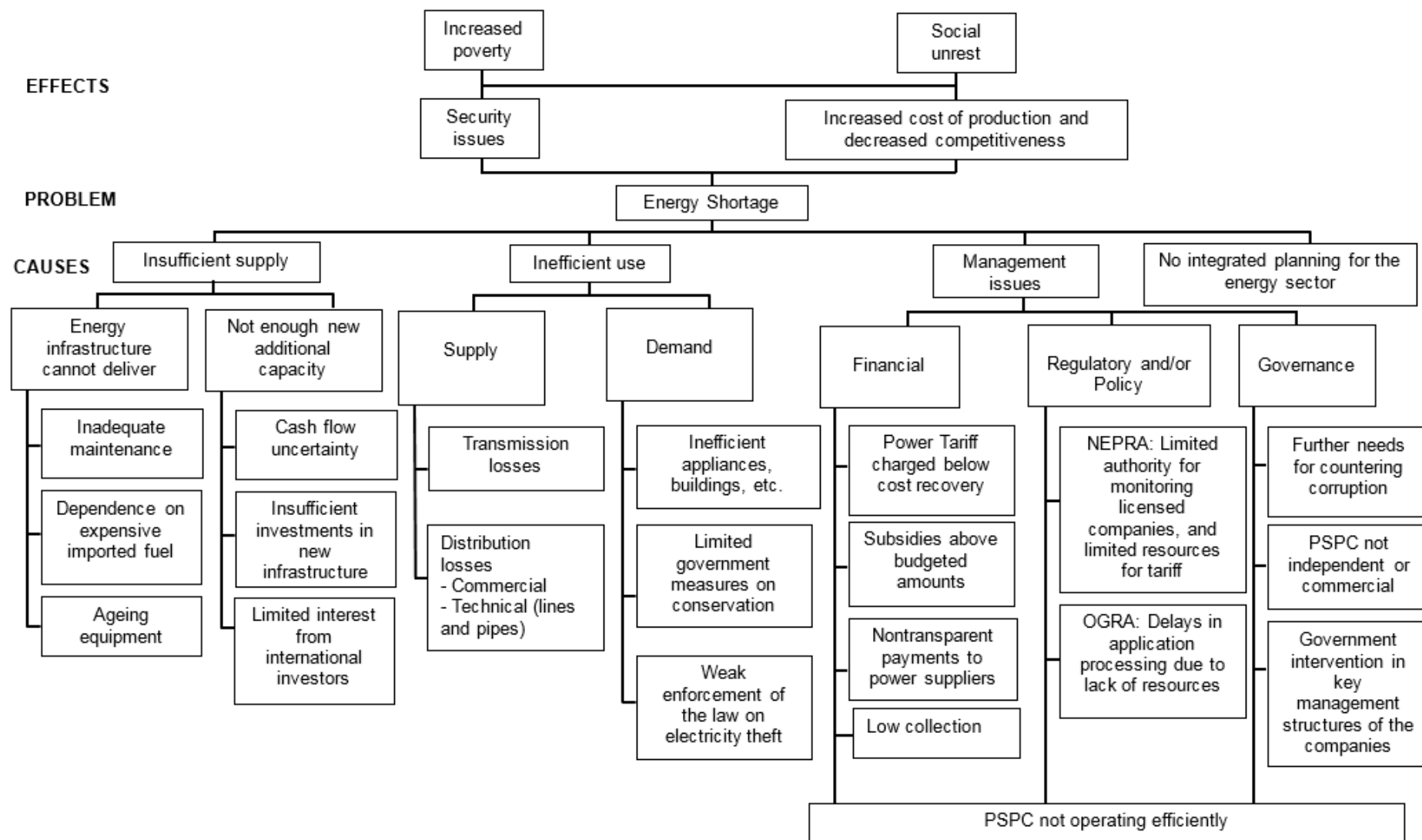
16. ADB's energy sector operations will focus on reforms, energy efficiency, and increasing access to sustainable and affordable energy supply. Through the Sustainable Energy Sector Reform Program, ADB will support reforms to establish an enabling environment for private sector participation. Investments will be made in the transmission and distribution networks to reduce technical losses and theft. Through private and public sector operations, ADB will work to leverage its interventions to bring much-needed funds for developing these projects. ADB will continue to work with the government to increase gas supply through policy support and imports via the Turkmenistan–Afghanistan–Pakistan–India gas pipeline project. As Secretariat for the proposed Turkmenistan–Afghanistan–Pakistan (TAP) Power Interconnection Project, ADB will continue to help achieve phased import of Turkmen electricity to Pakistan through Afghanistan. ADB has been requested by the government to develop the next 10-year plan for the transformation of the current system into smart grid operations.

<sup>12</sup> ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Government of Pakistan for the Sustainable Energy Sector Reform Program*. Manila.

<sup>13</sup> ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Policy-Based Loans to the Islamic Republic of Pakistan for the Sustainable Energy Sector Reform Program, Subprogram 2*. Manila.

<sup>14</sup> In February 2013, Pakistan launched its first National Climate Change Policy, which underscores the need to develop low-carbon technologies to reduce carbon intensity in agriculture, transport, and industry.

### Problem Tree for the Energy Sector



NEPRA = National Electric Power Regulatory Authority; OGRA = Oil and Gas Regulatory Authority; PSPC = public sector power company.