

## SUMMARY SECTOR ASSESSMENT: ENERGY<sup>1</sup>

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

1. A reliable and sustainable energy sector is essential to the economic growth and well-being of Pakistan. About one-third of the population lacks access to grid electricity, which lessens opportunities for inclusive growth. Frequent, load shedding led to civil strife and factory closures in 2013 and 2014. The duration of load shedding in urban areas has reportedly been reduced from 12 hours in 2013 to 6 hours in 2015, while load shedding in the industrial sector has been reduced from 12 to 4 hours over the same period. The major factors that contribute 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. The shortcomings in Pakistan's power sector are mirrored in provinces, particularly in Punjab, which consumes about 68% of Pakistan's total generated electricity and gas. Khyber Pakhtunkhwa province (KPP), which is mostly rural and mountainous, lacks access to the national grid, and suffers severe load shedding due to high distribution losses. In some districts of KPP, electricity penetration levels are below 20%. In Kohistan district, which has a population density of 63 people per square kilometer, just 2.9% of the population has access to electricity; in Shangla district, with 274 people per square kilometer, 15% have access to electricity.

3. **Sector performance and private sector participation.** In fiscal year (FY) 2015, July 2014 to June 2015, electricity distribution and transmission losses reached 18.6% and collection amounted to 89.0% of total billing, compared with the National Electric Power Regulatory Authority (NEPRA) targets for losses (13.2%) and collection (100.0%).<sup>2</sup> Some progress has been made in reducing losses, but the poor performance of the public sector companies and increasing costs further accumulated unpaid electricity generation bills. This amount increased to PRs209 billion in FY2015, but is projected to decrease in FY2016. The power generated using imported fuel oil increased to 60.5% in FY2014 (from 55.9% in FY2013), which increased the cost of electricity; the government subsidies lessen the impact on the customers and in 2013 injected \$3.8 billion in equity to clear the losses and save the power system.<sup>3</sup> Use of energy resources is less than optimal, because of inefficiencies in industrial processes and equipment, household and commercial appliances, and buildings.<sup>4</sup> Concerns about payments to power suppliers, unclear investment policies and guidelines, and lack of transparent payment practices serve to curtail private participation in the energy sector. With the enactment of the 18<sup>th</sup> Amendment in 2010, the provinces are fully empowered to develop and compete for private sector investment for power projects since 2010.

4. **Accountability and transparency.** Lack of transparency in the operation and payment mechanisms has made it difficult to hold public sector companies accountable for their performance. The Central Power Purchasing Agency was separated from the National Transmission and Despatch Company in 2015 to provide a transparent settlement system and to build a competitive electricity pricing platform. 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. The Central Power Purchasing Agency discloses market

<sup>1</sup> ADB. 2015. *Country Partnership Strategy: Pakistan, 2015–2019*. Manila.

<sup>2</sup> NEPRA. 2015. *State of Industry Report, 2014*. Islamabad.

<sup>3</sup> The impact of reliance on imported fuel has declined because of low oil prices.

<sup>4</sup> The National Energy Efficiency and Conservation Act, 2015 was recently passed by Parliament to provide for the establishment of institutions, mechanisms and procedures to promote the efficient use and conservation of energy.

settlement data on its website, and NEPRA is working to improve public awareness of the sector data.

5. **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 distribution companies, 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 generated 53% of the country's power in FY2016 (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 paid by electricity customers.

6. The 2010 amendment to Pakistan's Constitution (para. 3), empowered each province to formulate the policy framework for the development of public and private sector power generation. This has led to the formation of dedicated provincial departments and empowered public sector companies specialized in renewables to foster and execute power projects through public, private and public-private partnership modes using indigenous power resources.

7. **Tariffs, pricing, and subsidies.** The government does not charge electricity customers the full cost of service, and subsidizes distribution companies 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 PRs309 billion (1.15% of GDP), a substantial drop from over 2% in 2013. In FY2015, it was further reduced to 0.8% of GDP. The difference between the customer tariff and the cost-recovery tariff, and the delay in determining and applying the cost-recovery tariff have caused (i) payment arrears to fuel suppliers and independent power producers, (ii) efficiency losses resulting from insufficient funds for maintenance and augmentation of system capacity, and (iii) concerns regarding the creditworthiness of private investors and their financiers. For FY2016, Peshawar Electric Supply Company (responsible for distribution in KPP) incurred losses of 33.81%, against NEPRA's target allowable losses of 26%, resulting in a tariff differential subsidy of about PRs13 billion (the total tariff differential subsidy for all 10 distribution companies was PRs66 billion). The development of hydro plants in KPP (which has a potential of 20,000 MW through run-of-river plants) will help reduce losses and increase access to energy in remote mountain villages. Punjab is relatively well connected to the national grid, with electricity access in the rural areas of around 80%, but there is a huge potential for development of renewable (and especially solar) energy, which will lessen the burden on the national grid.

8. Pakistan's natural gas reserves are diminishing, while development of hydropower generation is slow. This is resulting in greater reliance on imported fuel oil for electricity generation,<sup>5</sup> which has increased power generation costs and worsened the power shortage, with the demand-supply gap reaching one-third of demand in 2014.

9. **Climate change.** Pakistan is vulnerable to the negative impacts of climate change. During 1995–2015, landslides and erosion resulted in the siltation of existing water reservoirs.

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<sup>5</sup> Hydropower's share declined from 72% in 1980 to 32% in 2012. The share of gas in the thermal generation fuel mix fell from 56% in 2006 to 44% in 2011, while heavy fuel oil increased from 42% to 54% over the same period.

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 341.65 million tons in 2012.<sup>6</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. Sector Strategy**

10. Pakistan completed its rapid assessment and gap analysis in 2013. Pakistan's Vision 2025,<sup>7</sup> National Power Policy 2013<sup>8</sup> and Sustainable Energy For All,<sup>9</sup> have targeted (i) 100% access to energy by 2030; and (ii) accelerated deployment of renewable energy power generation, to achieve a minimum deployment of 9,700 megawatts of renewable power capacity by 2030. The Ministry of Planning, Development and Reforms is coordinating with the federal and provincial stakeholders to realize the outlined targets and to achieve tangible results.

11. The government has developed its sector strategy with an action plan to support the current and future energy needs under the National Power Policy, which supports development of hydropower projects and encourages development of renewables. Despite strong efforts at both federal and provincial level to create an investor-friendly environment, mobilization of international capital resources has been challenging, particularly for projects initiated by the provincial governments. In recognition of this, the government announced the Power Generation Policy 2015<sup>10</sup> to (i) bestow power and authority to the provincial governments to function as a facilitator for promoting private sector investors in generation projects; (ii) simplify investment decision-making by local and federal authorities, and identify zones of responsibilities in processing and implementation of generation projects; and (iii) extend the federal government's support to back up the payment obligations of the federal power purchaser and other political or project-related risks to provincial government-initiated projects, when these conform with requirements.

12. The provincial governments have formalized their own policies in alignment with these federal policies. The KPP provincial government announced the KPP Hydropower Policy (2016),<sup>11</sup> which defines Pakhtunkhwa Energy Development Organization as single facilitator for all hydropower projects investors in the province, and aims to develop projects through private and public sector involvement. The government of Punjab also revised Punjab Power Policy 2006<sup>12</sup> providing policy framework to the development of power generation in both public and private sectors. In line with the provincial government policy, the energy department of Punjab has a vision of fully tapping the province's energy potential, which includes hydropower, solar, biomass and coal.

13. Nearly 39% of Pakistanis live in multidimensional poverty, with disparities across regions and provinces. KPP has the second highest multidimensional poverty incidence (49%) and

<sup>6</sup> World Resources Institute. *Climate Analysis Tool 2.0*. <http://cait2.wri.org/wri/Country>.

<sup>7</sup> Government of Pakistan. 2014. *Pakistan Vision 2025: One Nation – One Vision*. Islamabad.

<sup>8</sup> Government of Pakistan, Ministry of Water and Power. 2013. *National Power Policy 2013*. Islamabad.

<sup>9</sup> Sustainable Energy For All is a joint initiative by the Ministry of Planning, Development and Reform and the United Nations Development Programme.

<sup>10</sup> Government of Pakistan, Ministry of Water and Power. 2015. *Power Generation Policy, 2015*. Islamabad. <http://www.ppib.gov.pk/Power%20Policy%202015.pdf>

<sup>11</sup> Government of Khyber Pakhtunkhwa Province, Energy and Power Department. 2016. *KPP Hydropower Policy, 2016*. Peshawar. [www.pedo.pk/Policy/KPP%20Hydel%20Power%20Policy-2016.pdf](http://www.pedo.pk/Policy/KPP%20Hydel%20Power%20Policy-2016.pdf)

<sup>12</sup> Government of Punjab Province, Energy Department. 2006. *Punjab Power Policy, 2006*. Lahore [http://energy.punjab.gov.pk/\\_downloads/Punjab\\_Power\\_Generation\\_Policy\\_2006.pdf](http://energy.punjab.gov.pk/_downloads/Punjab_Power_Generation_Policy_2006.pdf)

Punjab has the lowest (31%). According to the KPP's Integrated Development Strategy (2014–2018),<sup>13</sup> the percentage of people living below the poverty line in KPP is estimated to be 39%, much higher than the national average of 29.5%. In KPP, districts selected for connecting off-grid communities have the highest poverty incidence, with Kohistan at 96%. The relevant design features of the results-based lending program that will contribute to social and poverty impacts include (i) connection of off-grid households (usually poor and vulnerable groups) in remote areas to micro-hydropower plants, (ii) social mobilization and awareness-raising in the targeted communities to ensure inclusion of poor and vulnerable groups in program benefits, (iii) provision of solar energy to schools and primary health care facilities used mainly by the poor, and (iv) skill development programs for poor and vulnerable women.

### C. Sector Experience and Assistance

14. The Asian Development Bank (ADB) has approved five multitranche financing facilities (MFFs) to finance energy efficiency, transmission, distribution, and renewable energy projects. Each MFF includes an Asian Development Fund loan that supports capacity development and performance improvement. In addition to the MFFs, ADB approved the Jamshoro Power Generation Project to finance a 660-megawatt supercritical coal-fired power plant. As the largest development partner working in the sector, 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>14</sup> in April 2014 and the second program<sup>15</sup> in November 2015 to support the reforms set out in the policy. The reforms are ongoing and next tranche is expected in 2017.

15. In 2013, Government of Pakistan requested ADB's assistance to support the implementation of its national climate change policy,<sup>16</sup> 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. ADB is also assisting the government in the development of renewable energy sources.

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 network to improve system efficiency. ADB will continue to assist the government in promoting the development of renewable energy sources. 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.

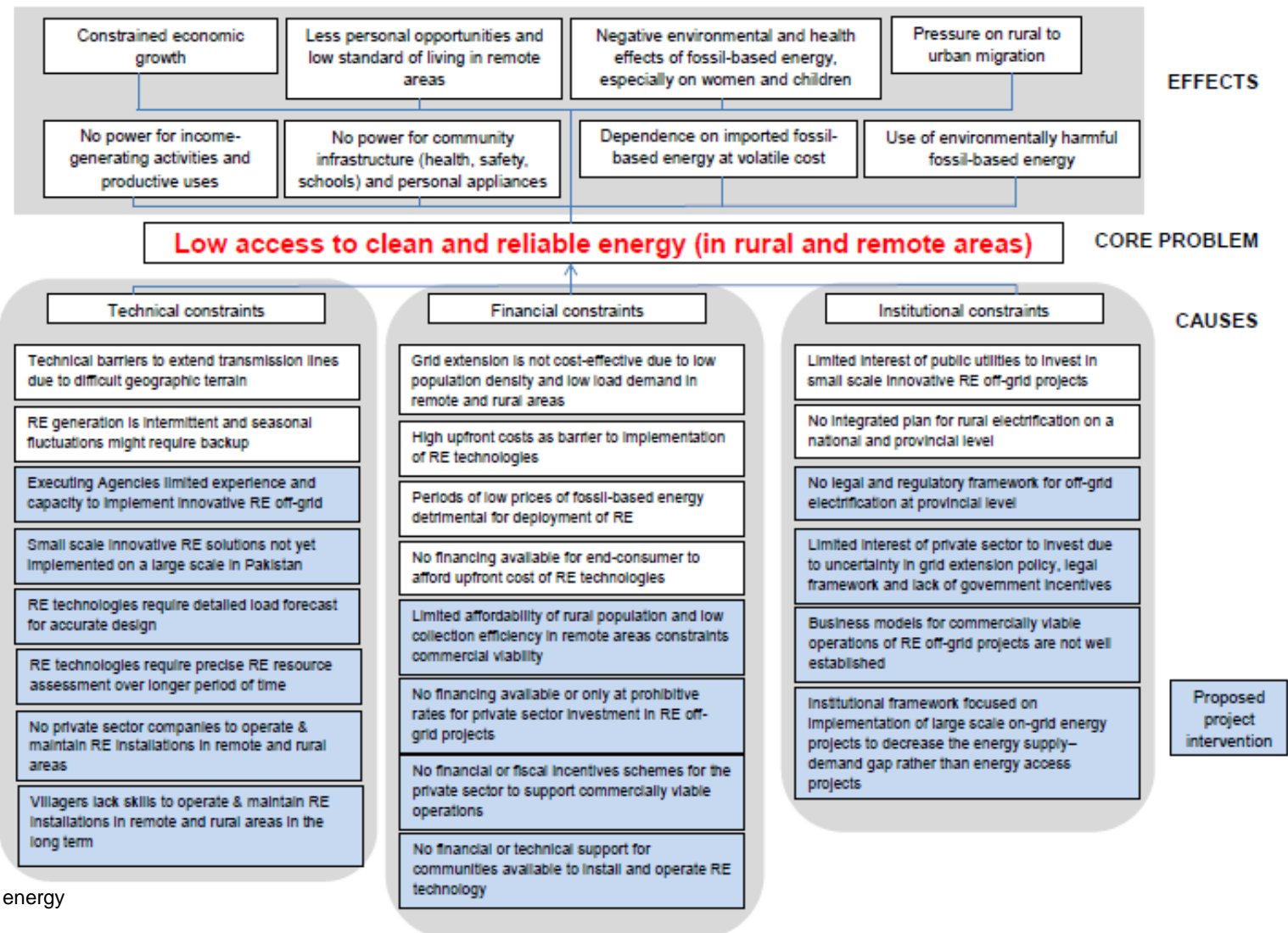
<sup>13</sup> Government of Khyber Pakhtunkwa province. 2016. *KPP's Integrated Development Strategy (2014–2018)*. Peshawar. <http://lgkp.gov.pk/wp-content/uploads/2014/08/Integrated-Development-Strategy.pdf>

<sup>14</sup> ADB. 2014. 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 1. Manila.

<sup>15</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>16</sup> In February 2013, Pakistan launched the Government of Pakistan, Ministry of Climate Change. 2012. *National Climate Change Policy*. Islamabad.

## Problem Tree for the Energy Sector



### Sector Results Framework (Energy, 2015–2019)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contribution	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
Reliable and affordable energy services through the development of indigenous energy resources (hydropower, renewable energy, coal, and gas) and strengthening transmission and distribution networks.	<p>Access to energy increased Baseline: 68.6% of the population (2011) Target: 75% (2018)</p> <p>Load-shedding reduced Baseline: 5000 MW (2013) Target: 0 (2018)</p>	Increased efficiency, both technical and financial, of the power and natural gas systems.	<p>6,035 km (500 kV and 220 kV) of transmission lines installed by 2018 from 14,135 km (2013)</p> <p>8,735 km (132 kV) transmission line added by 2018, from 27,890 km (2013)</p> <p>70,888 km (11 kV) distribution lines installed by 2018 from 37,203 km (2013)</p> <p>Average electricity cost reduced, from \$0.12 (2013) to \$0.10 per kWh (2018)</p> <p>Collections increased, from 85% (2013) to 95% (2018)</p> <p>Power distribution and transmission losses reduced from 23% (2013) to 16% (2018)</p>	<p><b>Planned key activity areas</b> Clean energy including hydropower Electric power transmission and distribution and energy efficiency Policy reforms</p> <p><b>Pipeline projects with estimated amounts</b></p> <ul style="list-style-type: none"> <li>• Sustainable Energy Reform Program II, III, IV (\$500 million)</li> <li>• MFF Power Distribution Enhancement IP II, T1 (\$220 million)</li> <li>• MFF Power Distribution Enhancement IP II, T2 (\$100 million)</li> <li>• MFF Power Transmission Enhancement IP II, T1, 2 (\$200 million)</li> <li>• MFF National Grid Connectivity/Hydro, T1 (\$100 million)</li> <li>• MFF National Grid Connectivity/Hydro, T2 (\$150 million)*</li> <li>• MFF Power Distribution Enhancement IP II, T3 (\$200 million)*</li> </ul> <p><b>Ongoing projects with approved amounts</b></p> <ul style="list-style-type: none"> <li>• MFF tranches for Renewable Energy, Power Distribution, Power Transmission and Energy Efficiency (\$1,380 million)</li> <li>• Jamshoro Power Generation Project (\$900 million)</li> </ul>	<p><b>Planned key activity areas</b> Hydropower and other power generation Energy efficiency and strengthening transmission and distribution</p> <p>Enhanced enabling environment for private sector investment into energy sector with reforms of policy and regulations</p> <p><b>Pipeline projects</b> 600 MW of hydro and other power installed and/or upgraded</p> <p>1,300 km of transmission lines installed</p> <p><b>Ongoing projects</b> 5 small hydro power being installed</p> <p>1,634 km (500 kv and 220 kv) of transmission lines being installed and/or upgraded</p> <p>1,577 km of distribution and transmission lines being installed and/or upgraded</p> <p>30 million fluorescent lamps are distributed</p> <p>600 MW supercritical coal-fired power generation unit constructed.</p>

ADB = Asian Development Bank, IP = Investment Program, km = kilometer, kV = kilovolt, kWh = kilowatt-hour, MFF = multitranche financing facility, MW = megawatt, T = tranche, V = volt.  
Source: Asian Development Bank.