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SPECIAL REPORT

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ABOUT THE REPORT

Pakistan's energy shortages have a disruptive effect on daily life, and protests and demonstrations against such shortages often turn violent. There is a risk that energy shortages could erode peace and stability in the country. Following an invitation from USIP, the authors have worked jointly to achieve a balanced analysis, reflecting official viewpoints and donor perspectives on the nature of Pakistan's energy crisis and what can be done to address it.

ABOUT THE AUTHORS

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Rashid Aziz and Munawar Baseer Ahmad

Pakistan's Power Crisis The Way Forward

Summary

- Pakistan is currently facing a severe and multifaceted energy crisis. Electricity shortages exceeded 7,000 megawatts in 2011; the gas shortfall is 2 billion cubic feet per day. The energy shortages are estimated to cost around 2 percent of GDP annually. This shortfall is the result of the failure, over successive governments' tenures, to invest enough to expand power system capacity. Low and declining investment and savings rates (including in power) reflect macroeconomic weaknesses.
- Successive governments have set tariffs on electric utilities below cost recovery levels. The difference is paid as subsidy, which is unaffordable and diverts resources from other priorities. With utilities unable to cover their costs of production, investment has lagged.
- The efficiency of Pakistan's utilities—both in producing electricity and collecting dues—varies considerably. Some companies compare with the best in South Asia. Others do not achieve half those performance levels. Supply costs thus remain higher than warranted.
- The current government plans to address the financial constraint and has raised tariffs. Further increases are required but will prove politically challenging. The record on past governments' efforts in the sector is mixed. Utility managers are not held accountable for their companies' performances, and there is continued interference in the utilities' affairs. Prosecution of power theft remains weak.
- The 2013 power policy includes an ambitious agenda to increase generation, raise tariffs, and improve efficiency. Private expertise, finances, and management will be mobilized. Some donors support the government's efforts. Experiences in other countries, especially India, may provide lessons for Pakistan.
- The reform agenda faces opposition, but the government must stick to it. Contributions from all stakeholders—consumers, investors, financiers and donors, media, and civil society—are essential if the challenges are to be overcome.

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Introduction

Pakistan is experiencing an acute energy crisis. Partly due to chronic losses and underinvestment, electricity supply from utilities is well short of demand. The deficit has exceeded 7,000 megawatts (MW),¹ or about one-third of peak demand, during extreme periods.² The country also faces a growing shortage of natural gas, its largest primary fuel source after biofuels, used mainly by the poor, who lack reliable access to electricity or other energy sources. Fluctuations in the global price of oil have substantially increased power generation costs and strained budgets. The government's policy to maintain power tariffs below the cost of supply, as determined by the National Electric Power Regulatory Authority (NEPRA), requires large subsidies from the budget. Delays in disbursing these subsidies are contributing to persistent intersectoral debts that have imperilled the creditworthiness of public and private generation companies, including the Water and Power Development Authority (WAPDA), fuel suppliers, refineries, and domestic oil and gas producers.

Collectively, the shortages impose large costs on the economy as a whole—estimated at about 2 percent of gross domestic product (GDP) annually³—through lower output, exports, and employment. Consumers have started using alternate power sources. Industrial and commercial entities install their own generators. Households use back-up generators or battery-powered units, often at significantly higher costs. Small and medium-sized industrial and commercial enterprises and poor households often cannot afford these high-cost alternatives and go without power.

The electricity shortage has severe social and political effects. Protests and demonstrations against long hours of scheduled and unscheduled power outages—that is, load-shedding—are regular phenomena and often lead to destruction of public property. In 2013, the Pakistan Muslim League-Nawaz party swept into power in nationwide elections partly due to pledges to tackle the energy problems that its predecessors had failed to address. But its first year in office saw only partial progress in addressing the deep structural issues facing the energy system.

Multiple factors, compounded across multiple governments, have contributed to Pakistan's current energy crisis. There is a physical shortage: Supply has not increased with demand. There is a financial shortfall, as the utilities' total resources, including revenues from consumers and subsidies from the government, do not cover the cost of supply. Finally, there is a governance crisis, as the government has been unable to impose commercial discipline, particularly on government-owned utilities and institutions, and their performance continues to be below the levels achieved in other countries.

The challenges are interrelated. The shortfall in generation stems largely from a cumulative failure to achieve the investment levels needed to expand and maintain power generation on pace with the growing demand. This lack of investment, along with the lack of consensus on, for example, a number of hydropower projects, has prevented the energy sector from developing new, cheaper, domestically available fuel sources, such as coal or hydroelectric power, forcing continued reliance on imported fuel oil and dwindling natural gas reserves. The shortfall in investment is partly due to macroeconomic conditions. Pakistan's domestic savings and investment rates have fallen from a mid-2000s peak, and international donor support for investments in Pakistan's power sector declined in the face of political turmoil, inconsistent adherence to investment contracts, and worsening security.⁴ Reversing the savings and investment declines is a high priority for Pakistan, and all stakeholders—the government and policymakers, utilities, project developers and financiers (including donor agencies), and, most important, consumers—need to contribute toward addressing these challenges. Pakistan needs to arrest its growth in consumption and invest in the future.

But the power sector also faces problems inherent in its financing and governance structure. By setting electricity tariffs below the costs of supply, the government must provide large subsidies from its budget to power producers, distribution companies, and consumers. The government nominally justifies the subsidies as a means of protecting the lowest-income segments of society, but high-income consumers receive the greatest benefit. Despite government efforts to gradually realign consumer prices with actual costs, the subsidy burden was the fourth-biggest federal expense in the most recent fiscal year budget, after debt repayments, defense, and the federal Public Sector Development Program.⁵ Efforts to raise tariffs to cover costs are politically contentious and run into opposition across several sectors of society. Industrial and commercial users highlight the need for cheap electricity, ostensibly to remain competitive. The media propagates the view that Pakistani consumers pay more for electricity than they would in neighboring countries, without verifying this fact. Private consumers routinely protest curtailments in supply but do not recognize that supply can only increase with additional financial resources—and that by not paying the full cost of supply from the grid, they pay much higher prices for electricity when they use generators or battery-powered units, or go without power.

Finally, the utilities have not been able to improve their performance consistently, and some distribution companies show poor rates of billing recovery from consumers, including government agencies. As a result, the cost of power is high and vulnerable to movements in international oil prices, the system experiences substantial technical and financial inefficiencies, and the government appears unable to impose any accountability on the utilities.

Power companies regularly complain of late or partial dues and subsidies payments from the government, but distribution companies' poor rates of bill collection exacerbate the financial shortfalls facing the sector. Weaknesses in management and in the regulatory framework, and the implicit guarantee of government bailout for the largely state-controlled distribution companies, have meant that transmission and collection losses have not been reduced as quickly as in some other developing countries or utilities. Attempts to enforce commercial discipline and accountability on public sector utilities and to require management to improve their companies' performance—through standards imposed by the regulator or contractual obligations—have also not been very successful. Policy actions that were expected to complement reforms first introduced in the 1990s, such as moving from a negotiated and guaranteed price of power to competitive bidding for private generation projects, were not carried out. As a result, improvements in operational efficiency and costs that could have been achieved through greater reliance on market forces and competition have not materialized.

While the main aim of the 2013 policy to enhance generation capacity is being achieved, it will likely take as much as a decade to create the new capacity needed to overcome the shortfall in supply. Continued external support to finance these investments will be needed, requiring regular dialogue with donors and partners. Beyond creating new power plants, however, government policy must tackle deeper structural reforms. It should introduce competition in power supply and support improved performance and commercial management of utilities. Maximizing the benefits from private participation, or power company privatization, will require the government to reorient its approach to privatization, from pure sales of assets toward partnerships aimed at improving technical and operational performance, investing in expanding the utilities' capacity and drawing upon private sector managerial and commercial strengths to achieve these goals.

Despite government efforts to gradually realign consumer prices with actual costs, the subsidy burden was the fourth-biggest federal expense in the most recent fiscal year budget.

Box 1: The Power Sector Structure in Brief

Organizationally, Pakistan's power sector acquires fuels from a variety of domestic or imported sources and comprises a mix of state-owned generation companies (gencos) and privately-owned independent power producers, a transmission company (the National Transmission and Despatch Company [NTDC]) that manages the national-wide transmission network, and regional distribution companies, referred to as discos. All of these are state-owned except for Karachi's K-Electric, which also owns and maintains some generation and transmission capacity. The Pakistan Electric Power Company (PEPCO) was established in 1998 with the mandate to manage government-owned gencos, NTDC, and discos. WAPDA, from which PEPCO was spun off, is authorized to construct and operate hydroelectric generation projects. The discos purchase power primarily from NTDC, which in turn purchases electricity from all power generators, including WAPDA.

There has to be more widespread acceptance of the true cost of electricity, and all consumers must pay this cost. If Pakistan is to make good on its development potential and offer opportunities and economic growth to its millions of young and underemployed citizens, Pakistani policymakers, consumers, investors, academia, media, civil society, and utilities—despite competing security and political priorities—must place the energy crisis at the top of their agendas.

Scope and Causes of the Crisis

Physical Supply Shortfalls

Pakistan's primary energy resources include traditional fuels, such as firewood, crop residues, and animal waste, and commercial fuels, such as coal, oil, natural gas, and hydropower. As of 2012, traditional fuels accounted for 34.9 percent of Pakistan's total energy supply, while natural gas comprised 31.7 percent and oil 24.8 percent. Coal, nuclear power, and hydropower accounted for the remainder.⁶ Pakistan's power sector generates electricity from primary fuels and serves as a secondary energy source for household consumers, industry, commerce, and other sectors of the economy. Fuel oil accounted for 35.9 percent of Pakistan's electricity in 2013; hydropower, 31.1 percent; natural gas plants, 28.2 percent; and nuclear plants, 4.7 percent.⁷

Oil's share of electricity generation has grown since the 1990s, while the share of hydroelectric sources has largely remained stagnant. Hydroelectric power plants generate electricity at around 20 to 25 percent of the cost of generation from other fuels⁸ but entail significant upfront capital costs compared to oil or coal. Consequently, while hydropower is the cheapest source of electricity for Pakistan, mobilizing the funds required for such projects constitutes a major challenge. Successive Pakistani governments have sought donor support for the Diamer Basha dam and other facilities for more than a decade, with little success. The cost involved, between US\$14 billion and US\$15 billion, is large, and undertaking two large hydropower projects at the same time—Pakistan has already begun building the Dasu Hydropower Project with World Bank support—will entail a sharp increase in investments. This may not be compatible with the government's efforts to ensure macroeconomic stability. A key objective of these efforts, also supported by International Monetary Fund (IMF) programs⁹ since 2008, has been to maintain a prudent monetary policy and curtail inflation, in part by aligning the rate of growth of aggregate demand with projected increases in output and GDP. The investment requirements of two large hydropower projects will exceed US\$2 billion annually, especially in peak construction years. This level of additional investment may imply a sharper and larger increase in aggregate demand than warranted, given the projected GDP growth rate, and could exacerbate inflationary pressures.

The current shortage of electricity arose in the first place, however, because essentially Pakistan did not invest adequate resources to expand the system's capacity and meet the growth in demand for power for more than a decade. Pakistan's overall investment rate is well below that of its peers. The decline in the national savings rate means that the country cannot overcome declines in foreign investment by building up an asset base through its own resources.¹⁰ At the same time, Pakistan's reputation as a destination for foreign investment has eroded over time, partly due to security concerns and partly because the power sector cannot cover all its costs from tariff revenues. Since power production and supply require large capital outlays, the sector is disproportionately affected by a slowdown in investments. This is Pakistan's key dilemma. While its needs for capital are large and growing, the declines in savings and investments in the power sector reflect broader, worrying macroeconomic trends.

Out of a sample of seven similar countries, Pakistan was the only country investing less as a percentage of GDP today than it was twenty-five years ago.¹¹ Even at its peak in 2005–06, Pakistan's investment rate did not reach 20 percent of GDP. By comparison, all the other countries in the group maintained investment levels of more than 20 percent of GDP, particularly since 2005. As successive Pakistani governments did not sufficiently prioritize investments in power generation, transmission, or distribution, the sector's share of total public investment fell from 51 percent in the mid-1990s to 26 percent by 2010.¹² At a time when Pakistan needed to build the power sector's asset base to cater to the needs of a growing economy, it did not do so and will face the consequences for many years to come.

The decline in investments is also partly a result of a change in policy. Starting in the mid-1980s, Pakistan required that WAPDA—which, prior to the spinoff of the gencos, NTDC, and distribution companies into independent companies, was responsible for power generation, transmission, and distribution all over the country, except Karachi—finance 40 percent of its investment program from internal sources.¹³ Tariffs were adjusted annually so WAPDA could meet this requirement. The policy protected WAPDA's financial situation and ensured that WAPDA allocated adequate resources for investments to continually expand the power system. When the government and the World Bank discontinued this policy, the utilities faced less (or no) compulsion to earmark funds for investment, with obvious results. Capacity has not grown in line with demand. No large hydropower project has been initiated for nearly thirty years, and transmission and distribution systems direly need repair, rehabilitation, and augmentation.

In addition to the decline in domestic resources available to support power sector growth, Pakistan has seen an exodus of foreign investors. Almost all the companies that financed generation projects during previous private sector-led development efforts in the 1990s have sold off their shareholdings. The only exception is Uch Power, a private generation company whose owners have invested in a second plant. The dozen or so oil and gas companies that actively explored for and produced gas in Pakistan have also divested their ownerships to locals or other foreign groups.

Demand Growth

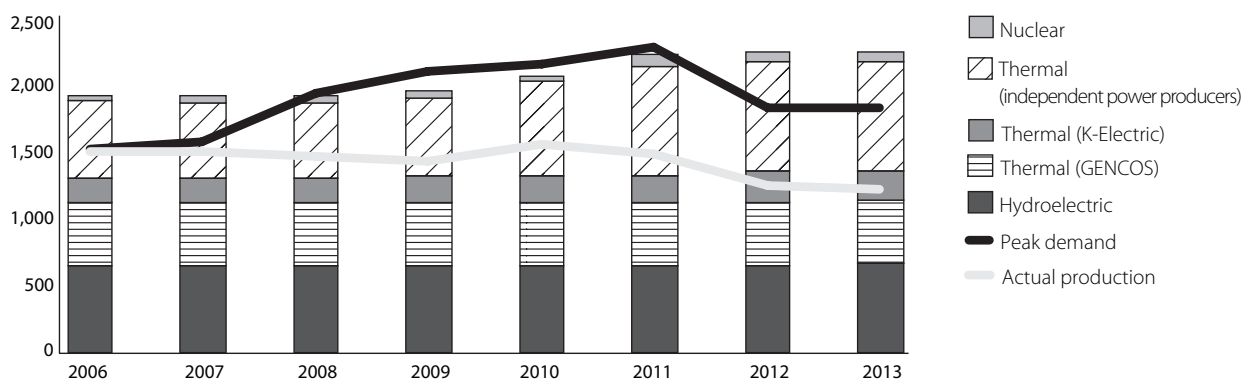
As of June 2013, the Pakistani electricity system had an installed capacity of 22,812 MW, generated by a mix of state-owned and private power producers. Under its new 2013 power policy, the government has announced plans to develop at least 16,545 MW in additional generation capacity by 2018, primarily through the construction of new coal power plants intended to take advantage of Pakistan's sizeable but largely unutilized domestic resources—including hydropower and coal.¹⁴ A major disconnect remains between existing installed capacity and actual generation, however. Fuel and financing shortages, physical plant maintenance needs, and other problems with generation meant supply peaked at only around 14,000 MW, or roughly 60 percent of installed capacity, in July 2013.¹⁵

The current shortage of electricity arose because essentially Pakistan did not invest adequate resources to expand the system's capacity and meet the growth in demand for power for more than a decade.

Electricity demand, meanwhile, has continued to grow. By the mid-2000s, Pakistan's economy had started growing rapidly, as GDP and income per capita rose by 8–9 percent annually from 2005 to 2008. Between 2004 and 2008, commercial energy consumption increased by about 8.4 percent annually, with the largest increase recorded in natural gas use, at 11.8 percent annually. The highest annual rates of increase in energy use were in the industrial and commercial sectors, at 12.5 percent and 11.3 percent, respectively. Annual energy consumption in residential and agriculture sectors expanded by 5.7 percent. The rate of annual increase in electricity consumption was about 7 percent. Electricity use expanded by 7.4 percent and 5.1 percent annually in the residential and industrial sectors, 11.6 percent in commercial activities, and 7.1 percent in agriculture.

By contrast, over the next five years, annual energy consumption expanded by only 0.4 percent. This slowdown was primarily due to supply constraints. Total annual energy use in the industrial and agriculture sectors declined by 3.2 percent and 3.9 percent, respectively. Residential sector consumption of energy continued to grow, by nearly 5 percent each year, despite the slowdown in supply. The annual increase in electricity use during the past five years was also nominal, only 0.9 percent. This slower growth was observed in all sectors. Residential and industrial electricity consumption increased by only 1.5 percent annually, and the agriculture sector's use of electricity declined by about 2 percent. By 2013, the residential sector accounted for 47 percent of total electricity use (compared to 46 percent in 2008), industry for 29.1 percent (28.2 percent in 2008), and the agriculture sector's share dropped to 10 percent (11.5 percent in 2008).

Figure 1: Power Generation: Peak Demand and Actual Production (Megawatts by fuel/Source)



Source: Authors' computations (peak demand, actual production), Energy Yearbook 2013 (generation by fuel)

Demand for energy, including electricity, expanded in line with the increase in incomes, but power utilities, the government, and the private sector failed to invest to meet this growing demand. Between 2006 and 2013, installed power generation capacity rose by only 3,000 MW—less than 2 percent per year—and power supply stagnated at 95–98 terawatt-hours (TWh).¹⁶ The current gap between power demand and supply emerged in 2007. Starting from about 3,000 MW, the gap has grown over time and exceeded 7,000 MW in 2011, as demand continues to increase while supply has remained more or less stagnant.

International Donor Support

Declining investments in the power sector could have been offset by international donors. However, for more than a decade donors were generally reluctant to commit to any projects in the power sector. The Asian Development Bank (ADB) and the World Bank did not finance

any power projects in Pakistan between 1995 and 2006. The first World Bank loan after the Ghazi Barotha project (approved in 1995) was approved in 2008. The United States also did not support any new power projects due to its own legislative constraints, which barred the U.S. government from providing any assistance to Pakistan. The Japanese and German governments were the only foreign donors that continued to approve new projects during that decade.

Sometimes donors insisted that the unbundling of WAPDA needed to be completed before they could consider any new lending to the power sector. At other times policy reforms—to increase tariffs to overcome the sector’s financial shortfall—were made pre-requisites for new investment projects. In some cases simple processing steps were repeated many times, essentially to avoid submitting new projects for approval.¹⁷ Donors of the Diamer Basha project have reportedly asked for additional work to bring environmental and social assessment (ESA) reports, including resettlement plans (RPs), up to internationally accepted and bankable standards.

Donor reluctance to finance large hydropower projects until additional work on ESAs is completed is surprising, because Pakistan has prepared and implemented ESAs, RPs, and compensation programs that were well received by donors, contractors, advocacy groups, and those affected. In the mid-1990s, the ADB, the World Bank, the Japanese government, and other donors found the ESA studies for Pakistan’s Ghazi Barotha hydropower project to be acceptable, even as the ADB and the World Bank were actively withdrawing from large hydropower projects all over the world. The World Bank cancelled the Narmada hydropower project in India and refused to fund the Arun project in Nepal only months before it approved funds for Ghazi Barotha.

Recently Pakistan completed the Mangla Raising Project, which increased the water storage capacity at the Mangla facility and enhanced power generation by 200 MW. WAPDA prepared the RP and compensation scheme for this project and implemented it after the government approved the RP. The World Bank viewed it favorably, as it included extensive consultations with and inputs by those affected, and all stakeholders appeared to have accepted the compensation package.

It is thus difficult to understand the donors’ stance on ESA and RP studies WAPDA prepared for the Diamer Basha project. The current impasse could be because WAPDA’s and the government’s technical and managerial resources are not being adequately utilized. Or donor requirements have become more stringent, and WAPDA is now unable to meet their preconditions.¹⁸

Donor programs and priorities should not be used as an excuse for procedural and institutional constraints within Pakistan that hinder the power system’s development. The country must start financing its investment needs from its own savings and stop relying on outside financing for such projects. However, in Pakistan’s case, donor willingness to finance a project provides a strong signal to other financiers, contractors, and suppliers about the likelihood that the project will be completed. All parties take donor reluctance to fund a project as a signal that the project carries higher risk.

Financing Troubles

The lack of investment in electricity generation and distribution was a major factor in the current power shortfall. A shortage of operating capital or credit to ensure regular fuel supply has sometimes resulted in failures to make full use of existing capacity, and new generation capacity has failed to come on line. A compounding factor in the investment and supply gaps is the sector’s heavy reliance on government subsidies to bridge the gap between available financial resources and the cost of supply. Over the past decade, successive governments maintained electricity tariffs at lower levels than NEPRA determined and provided

the difference as tariff differential subsidies. These have burdened government budgets at a cost of up to 2 percent of GDP annually over the past five years, and their oft-delayed or irregular payment has contributed to chronic circular debts¹⁹ among fuel suppliers, power producers, and distribution companies.

Addressing the sector's financial constraints also requires that WAPDA's financial position be protected. WAPDA provides cheap electricity, which the country desperately needs, and enabling WAPDA to invest more in hydropower projects would reduce the average cost of generation. However, the opposite outcome is often pursued. Payment to WAPDA is curtailed more than payments to independent power producers. Its cash balance is used as a cushion when the government decides to inject funds into the sector, and WAPDA has at times been asked to write off its receivables. These actions are indefensible.

WAPDA's financial situation can be protected by pursuing two actions. First, its tariffs need to be adequate to ensure a 16 percent rate of return for WAPDA, and second, WAPDA should be paid more or less automatically in full and on time for the power it supplies to the grid by establishing letters of credit and escrow accounts. Such payments should not be left to the discretion of utility managers or the government. The World Bank's analysis in the project appraisal document for the Tarbela IV hydropower project shows that if NEPRA enhances WAPDA's rate of return from the current 14 percent to 16 percent, WAPDA would generate net profits of US\$500 million in 2020 and US\$2.5 billion in 2030. WAPDA's total investment (in construction work in progress) was projected to be slightly less than US\$2.5 billion in 2030. The current tariff formula, therefore, appears to provide adequate resources to WAPDA to finance its investment plan. The only constraint on WAPDA's finances is cash flow, because it is not paid fully or on time or has had to write off some of its receivables in the past.

WAPDA's cash balance is not a bonus that the utility does not deserve. That cash is required for financing part of the cost of new hydropower projects, and WAPDA should be allowed to build healthy cash balances every year.

Governance Challenges

NEPRA's and the government's efforts to require performance improvements in the power sector have not been very successful. The government as well as political and other interest groups continue to interfere in key aspects of the distribution companies' operations, including hiring and disconnecting defaulting consumers. At the same time, the utilities continue to absolve themselves from any responsibility for these failures by pointing out that their managements' authority is curtailed. As a result, burdened with poor operational and technical performance, Pakistan's power sector has not seen improvements in key performance indicators—reduced losses and theft, efficiency in public sector generation plants—as quickly as other countries and utilities have.

Mismanagement and Inefficiencies

Pakistan's utilities, particularly the public sector distribution companies, have not significantly improved their operational and commercial performance over time. The power sector's technical and nontechnical losses declined marginally, from about 24 percent in the 1990s to around 22 percent today. By contrast, utilities in other countries demonstrated much more spectacular results. India halved its losses in North Delhi, Andhra Pradesh, and Gujarat between 2006 and 2011. Many South American utilities that were privatized in the 1980s and 1990s showed similar improvements. Some of Pakistan's distribution companies have managed to reduce their losses to below 15 percent and now collect more than 95 percent of the billed amount—below levels that China or East Asia have achieved but comparable with better-performing

distributors elsewhere in South Asia. However, these improvements mask important variations. While five distribution companies show loss levels below 20 percent, others continue to have losses of more than 35 percent. In Hyderabad, Sukkur, Quetta, and Peshawar, collection rates have fallen from about 80 percent a few years back to below 60 percent in some cases today. These companies account for about 30 percent of total power sales, but for a much larger share—up to 50 percent in some years—of the companies' power purchases.

Public-sector generation companies also show signs of poor efficiency, generating less electricity per unit of fuel than private power plants. Efficient plants use about 8,500 btu to generate one kilowatt-hour (kWh) of electricity. Some of Pakistan's plants require 14,000 to 15,000 btu per kWh.²⁰ The government and NEPRA recognize the need to address these inefficiencies but have been unable to impose commercial discipline and accountability on the utilities. As a result, while NEPRA's tariff determinations include performance improvement targets for all distribution companies, there are no consequences for the companies' management when these targets are not met. Ultimately the government ends up paying for these additional losses when it clears off the circular debt.

As mentioned earlier, K-Electric is the only distribution company²¹ that has been privatized so far. Its experience suggests what possible gains in efficiency and challenges can emerge from the privatization experience. In 2005, the private sector acquired a controlling stake in K-Electric along with management of the company. Initially, this transaction was widely criticised in Pakistan, probably for the wrong reasons. The owners needed time to prepare and implement the company's turnaround, involving substantial new generation capacity, a detailed diagnostic, investments to upgrade distribution networks, and an update of managerial and other systems. Meanwhile, the public and other stakeholders attributed the substantial power shortages in Karachi during the next few years to the new management. The private sector owners needed to take responsibility for some of these failures, partly because their technical partner was Siemens from Germany, which had extensive experience in manufacturing power system equipment but not in managing or operating a distribution company. Nevertheless, based on its experience in manufacturing and operating power generation equipment, the company started work on expanding its power generation capacity.

By around 2010, a new party took control of the private sector share of K-Electric. That party sought an implementation agreement with the government, under which the government would ensure the payment of electricity bills by all federal and provincial ministries, departments, and agencies. In securing this agreement, the new owners were safeguarding the company from circumstances beyond their control. The government approved this proposal. In the past five years, the company has made its generating capacity sufficient to cover electricity demand, and there is no shortage of power in Karachi, except during extreme events, such as breakdowns in supply from the NTDC grid. The company has focused its load-shedding on areas with high losses and theft, partly to mobilize law-abiding citizens to exert pressure on vested interests who may be complicit in such theft.

However, overall impressions about K-Electric's privatization remain negative. Public opinion holds that performance improvements are company obligations, but lapses in meeting supply requirements are drastic failures. This perception can be corrected if management prepares public awareness campaigns that highlight its achievements, recognize remaining challenges, and mobilize public support to overcome those challenges.

Regulatory Environment

That successive governments have set tariffs at levels lower than those determined by NEPRA constitutes another key governance challenge. When NEPRA was set up through an act of parliament in 1998, it was empowered to regulate all aspects of the power sector,

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including the setting of tariff rates distribution companies charged to consumers. In line with other international regulators, NEPRA determines tariff rates based largely on a rate of return methodology, guaranteeing utilities a fixed return (normally 14 percent) on their assets.²² This rate guarantees utilities a profit but does not necessarily ensure that the utilities will make available or earmark finances for new investment needs. Also, for NEPRA tariff rates to be enacted, they must be formally notified by the government through the official gazette, which has allowed successive governments discretion as to whether or not to pass these tariffs on to consumers in practice or to set them at a different level. Between 2003 and 2008, the government did not adjust consumer tariffs, even as supply costs rose sharply, in line with spikes in international oil prices to \$150 per barrel as of June 2008. Tariffs were adjusted regularly after then, but those changes only kept pace with increases in the cost of supply, and the 2003–08 shortfall remained outstanding. The government subsequently raised tariffs from less than Rs 5.50 per kWh in 2009 to Rs 9 per kWh by 2012.

Since distribution companies are entitled to earn revenues in accordance with NEPRA-determined tariffs, as mentioned before, the government makes up the shortfall between the posted and regulatory rates through subsidies. This burden is huge, amounting to more than Rs 1.5 trillion (US\$15 billion at current exchange rates) between 2008 and 2013, around 2 percent of annual GDP.²³ Moreover, the subsidy level is unpredictable, with actual payments often three to four times higher²⁴ than the budgeted amounts. This drain on the budget constrains the government's ability to finance other priorities. Government fiscal crunches have also prevented the payment of larger-than-expected subsidy bills in a timely fashion. Beyond the subsidy burden, the disconnect between NEPRA-mandated and government-notified tariffs also prevents effective monitoring of the distribution companies' financial situation, as they can (and often do) attribute their failure to comply with performance standards to their inability to charge the tariffs to consumers.

Market Structure and Competition

Successive governments did not carry out plans to follow up the 1994 private power policy with the solicitation of new private thermal generation projects on the basis of competition on the price of power. The privately generated price of power therefore continues to be negotiated between the government and sponsors. This results in three anomalies. First, it absolves new projects from the responsibility to be competitive with other proposals. Second, it means NEPRA's role in determining all power tariffs is circumvented. Third, the negotiations culminate in contracts between the government and the sponsors, the details of which are not made public—on the plea that the contracts are confidential and private agreements between the parties. Civil society therefore continues to criticize such contracts for their lack of transparency and accompanying risk of collusion. The lack of competition in selecting new projects prevents the country from reducing power generation costs, which utilities across the world have achieved.²⁵

Reform Efforts and Priorities

Successive governments have adopted policies to promote the development of the power sector. The most comprehensive was the Strategic Plan for the Privatization of the Pakistan Power Sector, adopted in 1994. It called for reorganizing the power sector into autonomous companies responsible for generation, transmission, and distribution; separating WAPDA's hydropower functions from those companies; setting up an independent regulatory body; and privatizing thermal generation and distribution assets in a phased manner. Also in 1994, the government announced a policy to attract private investment in power generation. While the government

had initiated discussions as early as 1986 with private sponsors to set up privately owned and operated power generation facilities, the policy combined the incentives, consents, and processing procedures into one document.

By mid-1998, the reorganization and unbundling of WAPDA had been completed, and three gencos, NTDC, and eight distribution companies were incorporated as independent companies. The government set up PEPCO as a management company to oversee the functioning of the systems and to prepare the gencos and distribution companies for privatization. NEPRA was established through an act approved by Parliament in late 1998. In parallel, 36 percent of the shares of the Kot Addu Power Company—established as a subsidiary of WAPDA—were sold to the private sector. A management agreement between WAPDA, which retained the remaining shares, and the new owners enabled the private sector to take over the management and operation of Kot Addu's plant.

Concurrently, the government announced its Private Power Policy, aimed at attracting the private sector into power generation.²⁶ It offered attractive up-front tariffs to entice private investment, along with a premium for all generation projects that were commissioned by the end of 1997, and expedited the processing of those projects. The resulting inflow of private investment enabled generation capacity to grow by about 8 percent annually between 1990 and 2005. Installed capacity rose from 7,700 MW to 19,300 MW and production from 37.7 TWh to 93.8 TWh.²⁷

Unfortunately, academic papers, articles and editorials in the press, and discussions and debates regarding the privatization policy settled on the common theme that the power supplied by Independent Power Producers (IPPs) is expensive, the amounts paid to IPPs are proportionately much larger than their share of electricity supply—so the IPPs are a burden on consumers, the government, and the utilities. The policy was also criticized for focusing on fuel oil; of the additional generation capacity installed between 1994 and 2004, more than two-thirds required fuel oil to function. As international oil prices were low through much of the 1990s, it was seen as a low-cost solution at the time, but the sharp increase in oil prices in the 2000s led to skyrocketing costs of power generation. The lack of diversity in fuel choices under the 1994 policy left Pakistan's power generation vulnerable.

The 2013 Power Policy

In July 2013, shortly after taking office, the new Pakistan Muslim League-Nawaz government released its own power policy.²⁸ It was well received among Pakistan's donor partners, including the IMF. Following the IMF's approval of its \$6.6 billion extended fund facility in September 2013, the government of Japan, ADB, and the World Bank prepared projects and programs to support the implementation of energy sector reforms, including the withdrawal of tariff differential subsidies over a three-year period.²⁹

The 2013 power policy aims to achieve several goals by the end of 2017. It seeks to eliminate the supply-demand gap by investing in new power generation capacity; reduce the cost of generation from the current US\$0.12/kWh to below US\$0.10; reducing distribution and transmission losses from 23 to 25 percent today to below 16 percent; and increase the collection of bills issued to consumers, from about 85 percent today to 95 percent. Over the past year and a half, the government has pursued a mix of supply- and demand-side measures to implement the policy. It announced a slate of ambitious projects to add more than 16,000 MW of new generation capacity by 2018. To address the sector's financial constraints, the government raised tariffs for commercial and industrial users by about 44 percent in August 2013 and for residential consumers by about 32 percent in October 2013. The policy also calls to improve the efficiency of the utilities and reduce the cost of power, in part by privatizing the distribution

Projects to add new generating capacity include the construction of the 6,600 MW coal-fired Gaddani Power Park; a 1,000 MW solar power complex in southern Punjab; and 1,410 MW of new generation capacity at Tarbela.

companies. These efforts, part of a broader package of proposed privatizations of state-owned enterprises, have moved slowly in part because the divestiture of public enterprises requires substantial preparation. The privatization program also faces opposition in political circles and resistance from vested interest groups within the utilities.

Supply Increases

Government implementation of the power policy has been most visible in its projects to add new generating capacity. These include the construction of the 6,600 MW coal-fired Gaddani Power Park, undertaken with financing from China and investors from the Middle East and due to be completed by 2018; a 1,000 MW solar power complex in southern Punjab; and 1,410 MW of new generation capacity at Tarbela. The government has also announced plans to add up to 8,000 MW of additional nuclear generating capacity by 2030, again with China's support, but it has released few public details of that program.

If realized in full, the government's slate of new generation projects will boost Pakistan's total installed capacity by nearly two-thirds above its existing levels. While more than 70 percent of this new capacity will be in the form of coal-fueled plants,³⁰ the planned generation additions are based on a mix of fuel sources and technologies. This diversity can reduce the sector's vulnerability to unforeseen events, though the final selection of projects must include rigorous analysis to confirm that the projects are cost-effective investments for Pakistan. Ultimately, however, the government's supply-side measures are unlikely to completely eliminate power shortages by 2018. Coal-based generation projects involve preparation and implementation periods of five to seven years, and hydropower projects require even more time. A more realistic estimate of how long it will take to install the required capacity is therefore eight to ten years.

Tariff Adjustments and Regulatory Reforms

In the short term, the government's power policy calls to eliminate intrasectoral circular debts. In pursuit of this goal, the government paid off accumulated dues to generators and fuel suppliers from the federal budget during fiscal year 2012–13. The measure was intended to bring power generators operating short of full capacity for lack of operating capital back on line. The government also raised electricity and natural gas tariffs, except on the poorest quintile of consumers, and made efforts to divert gas reserves to power generation. Over the medium to long term, the government will promote investments in low-cost and domestic sources of power—hydro and coal—to reduce generation costs and, as a consequence, eliminate the need for periodic large increases in tariffs.

Improved Operating Performance

For state-owned electricity generation and distribution companies, the policy aims to improve performance and reduce losses through a number of measures. It seeks to enhance transparency through automation, greater use of optimization plans in generation and transmission, and the strengthening of NEPRA's capacity and regulations. It would introduce performance contracts to monitor and reward (or penalize) utilities based on performance and upgrade manpower and managements via merit-based recruitments. Finally, it seeks to strengthen the legal framework and build up investigative and prosecution capacity to more strictly penalize electricity thieves and defaulting consumers.

The proposed actions are fairly standard operating characteristics of power systems, and NTDC has the capacity and extensive experience to implement them, though it may need to supplement its skills and acquire the latest planning models and software. Smart meters and

automation can also help enhance collections and reduce losses. Some distribution companies have implemented smart metering on a pilot scale and achieved good results, and they are eager to roll out the programs to a wider set of consumers. The only area of uncertainty is in the proposal to use performance contracts for improving the utilities' performance and to strengthen NEPRA's monitoring systems and capacity. The government executed performance contracts with all distribution companies in 2009–10 but discontinued this exercise without a stated reason, and no report on whether the distribution companies achieved the goals and targets in the contracts has been published.

Improving the legal framework to penalize theft and crack down on losses is an even more serious challenge. Since taking office, the government has repeatedly stated its intent to introduce legislation in parliament to enhance penalties for theft and to comprehensively upgrade the Electricity Act, but those actions have not been completed.

Competition and Privatization

While new generation projects can help alleviate the physical shortfall once completed, most have been negotiated directly and have not been subject to the competition that could ensure that the projects provide electricity at the lowest cost. Two mechanisms are proposed in the government's policy to address this: First, up-front tariffs will be offered as ceiling prices for new generation projects—including renewables—and NEPRA will conduct or oversee a competitive bidding process to achieve maximum discounts from the tariffs. Second, a market for power will be established. Initially, generators will be allowed to sell electricity directly to large customers. Ultimately, the system will evolve into a power exchange on which all customers can choose the generator they wish and generators can sell power directly to all consumers.

The objectives are very welcome, as they will enable Pakistan to lower electricity prices. Concurrently, the government will be able to reduce its contingent liabilities. It will not need to guarantee that NTDC will purchase the electricity produced by the new projects or by IPPs, or the price at which the new projects and IPPs will sell power to NTDC. Initially, the new investors and sponsors will agree to seek their own customers without a government guarantee for only part of the electricity they produce, and the government will need to continue to guarantee that NTDC or the Central Power Purchasing Agency (CPPA)³¹ will purchase the rest. Over time, the share of production from new plants covered by guarantees can be reduced, and sponsors should take over the responsibility for developing a customer base for the power they produce. This transition, from the commercial risks of new projects and IPPs being covered by government guarantees to those risks being taken directly by project sponsors, is essential if the full benefits of establishing a power market are to be achieved. However, these policy aims may face resistance from project sponsors, who clearly cannot be averse to the government covering some of their commercial risks.

Beyond the efficiency measures proposed for state-owned utilities, the policy calls to privatize existing distribution companies and implement new projects, either through full private ownership or through public-private partnerships. Privatization can help overcome many of the constraints—limited financial resources, low managerial capacity, poor human resource management, and low technical and operational skills—that the publicly-owned utilities face. Previous governments have repeatedly proposed privatization measures, but as noted above, K-Electric is the only distribution company yet to undergo such a process. Such efforts have faced political and legal backlashes, and the current government's privatization initiatives have thus far been limited to divestments from financial institutions.

Two points must be considered while privatizing the utilities: the goals to be achieved through privatization and the specific criteria to use when selling those assets. The government wants the new owners to take full responsibility for the assets—that is, operate the

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company, handle all financial and other obligations, and expand supply in line with rising demand. This objective cannot really be achieved if investors are asked to bid for a utility's shares, with the shares going to whoever offers the highest price. The process should instead require bidders to submit development plans for the asset, which the Privatization Commission should evaluate for completeness, the sponsors' capacity to deliver on commitments, and the adequacy of financial resources for expansion. If the shares simply go to the highest bidder—as has been the norm for all privatizations in the past—the country will end up paying more for electricity, and bidders inevitably will build the high share prices into the cost of the services they offer.

Learning from the Experience of Neighbors

Despite the difference in size between India and Pakistan—many Indian states have power grids on par with Pakistan's national system³²—India's power sector offers lessons for Pakistani policymakers to consider.³³ The Indian system has expanded rapidly in the past five years, with rates of supply and consumption growth now reaching double digits. However, in the early years of the last decade and again in 2008–10, power supply shortages constrained Indian economic growth. As in Pakistan, most Indian utilities still cannot finance all their costs from their own revenues and rely on both federal and state subsidies for 10–12 percent of their total financial resources.³⁴ However, Indian domestic savings are sufficiently large—the savings rate in India has remained above 20 percent for the past two decades³⁵—to finance investment and operating costs in other priority sectors, in contrast to Pakistan, which cannot easily afford a similar subsidy program because its savings rate has been below 15 percent and declining over the same period.

Despite the Indian power sector's inability to fully finance all expenditures from its own resources, it continues to attract substantial private investment. Its 1990s policies offered generous incentives, including sovereign guarantees, for private investment in generation. These saw limited success, particularly as investors had to obtain multiple approvals and clearances for their projects.³⁶ Over time, sovereign guarantees were replaced by competitive bidding and opening of the market for private power. This has allowed investors to dispose of a portion of their output on the merchant power market.

Two major reform measures from the Indian government have enabled the country to attract large investments. The first is the 2003 Electricity Act, which established a power market where utilities and power traders can acquire or dispose of electricity. The second reform was the introduction of availability-based tariffs and a provision for unscheduled interchanges, initially for publicly-owned generating plants. These measures allow generation companies to dispose their surplus power on the exchange at prices that are fairly high (and therefore attractive).³⁷ When project developers know that they are not at the mercy of distribution company management for their payments, and have other avenues for disposing of their output, their aversion to investing in a particular market can be significantly reduced and perhaps entirely eliminated.

The overall effect of the reforms has been significant. Indian power generation capacity tripled between 1991 and 2012, reaching 214,000 MW. Over this period, the private sector's share of power sector investments rose from around 3 percent to 29 percent.³⁸ Investments involving private sector participation amounted to about US\$100 billion between 2005 and 2011. State utilities also invested heavily; between 2009 and 2012, those utilities' net fixed assets increased from Rs 2.3 trillion to Rs 3.3 trillion, and capital work in progress rose from Rs 960 billion to Rs 1.13 trillion.³⁹ The 2003 Electricity Act's move from negotiated prices (with guaranteed returns for investors) to competitive bidding for new generation capacity⁴⁰

also reduced the cost of generation. Despite perhaps less impressive improvements in distribution, the rate of access to electricity rose from 59 percent of the population in 2000 to 74 percent by 2010.

Public-private joint ventures in electricity distribution were initiated first in Orissa, but had limited effects. Learning from Orissa’s experience, the privatization of distribution in North Delhi achieved much greater success. In parallel, the Electricity Act of 2003 established the concept of distribution franchises for privatizing distribution. Under this model, the franchisee took over certain functions—metering, billing, revenue collection, and capital expenditure—while the state utility retained the legal responsibility for power supply. The Bhiwandi franchise operation, begun in 2006–07 in Maharashtra, realized considerable efficiencies and reduction in losses, as seen in the chart below.⁴¹ The franchise route is therefore being explored and taken forward in Bihar, Madhya Pradesh, Maharashtra, and Uttar Pradesh.

Table 1. Bhiwandi Distribution Franchise Performance

Parameters	2006–07	2010–11
Aggregate technical and commercial losses (percent)	58	18.5
Number of transformers	2,254	2,611
Transformer failure rate (percent)	42	3
Metering (percent of customers)	23	98
Collection efficiency (percent)	58	99
Customers	174,000	235,000

The Way Forward

The shortage of electric power and other primary fuels has imposed large costs on the Pakistani economy. Sufficient finances for the large investments needed to match electricity demand and supply cannot be mobilized without actions on the macroeconomic front to increase domestic and national savings and improve the incentives for domestic and foreign investment. The experience of other countries that have gone through supply shortages and high costs of power can provide lessons for Pakistan—though privatization programs should be seen as an opportunity for reform, not just a means of achieving high asset returns.

The multiple challenges confronting the power and energy sector can be addressed only with the active participation of all stakeholders. Energy consumers need to be made aware of, and accept, the true cost of energy. Industrial and commercial users need to be told that relying on cheap electricity and gas is not a realistic option. Civil society needs to recognize that protests and destruction of public property can only harm itself. The media and academic circles should stop sensationalizing the shortages of electricity and focus on discussions, analyses, and solutions. Finally, the so-called rich and powerful must stop interfering in the utilities’ efforts to curtail theft and nonpayment.

As Pakistan struggles to address its power crisis, it must keep the following priorities and realities in mind:

- Increasing the physical power supply can only be achieved over the long term, and all efforts should be made to avoid unrealistic expectations that it can be done within five years. Projects to develop new generation capacity cannot turn into high-cost sources of supply, as has occurred with past efforts to shift generation to imported fuel oil. This risk can be reduced by subjecting those projects to least-cost criteria and competitive pressure. Some investment incentives may initially be needed. But achieving cost reductions over time requires that these be limited to only the first set of projects.

Investors, project sponsors, and financiers need to play their part as well. They must consider investment opportunities based solely on their financial merits, gradually take responsibility for seeking their own customers and fuel suppliers, and compete for new projects based solely on the prices for the electricity they produce.

- Ensuring the financial sustainability of the sector requires addressing the lack of new investments and the arrears utilities face, which limits their ability to use and build upon existing investments. As the government agreed under the IMF's Extended Fund Facility loan program, electricity tariffs will need to be raised to account for the full cost of supply, with targeted subsidy exceptions to help the lowest income quintile. Tariffs must be adjusted promptly to reflect changes in costs. In turn, power consumers need to recognize that access to electricity entails an obligation to pay—on time and in full—for the electricity they consume. Until consumers pay the full cost of power, the power shortage cannot be eliminated.
- Improving operating performance requires upgrading state-owned utilities' managerial capacity and skills, rebuilding their planning and strategic analysis capacity, and achieving higher performance standards. Performance contracts, benchmarks, and incentive bonuses may all be necessary to achieve such standards. More generally, improved performance also requires legal reforms that strengthen utilities' ability to prosecute theft and nonpayment of dues. Distribution companies must build their capacity to trace malpractices and pursue claims through the judicial system. However, these efforts will not yield much success until all segments of society stand against power theft. The police and judicial system have to promptly handle complaints and cases involving power theft or other misuse of electricity. Not registering such cases, or allowing them to linger on, will defeat government and utility efforts to curtail theft and corruption.
- Private capital, managerial, and technical expertise must be mobilized to develop the power system. Past efforts to privatize the utilities have focused only on maximizing the government's take. But performance can only be turned around through comprehensive plans to replace and modernize assets, attract the best human and managerial resources, implement modern managerial practices, and reduce discretion and misuse of authority. The government should try to make the best use of private sector involvement in power by ensuring that bidders compete for assets based on their plans for revitalizing them.

Performance can only be turned around through comprehensive plans to replace and modernize assets, attract the best human and managerial resources, implement modern managerial practices, and reduce discretion and misuse of authority.

Notes

1. The shortfall was at its highest level in 2011, at 7,726 MW on October 1. See National Transmission and Despatch Company (NTDC), "Daily Operational Energy Data," Islamabad, available at www.ntdc.com.pk/does.php (accessed April 15, 2015). These data are updated regularly; the government also provides it to the IMF and other donor missions.
2. The shortfall represents the difference between a computed peak demand for power (based on various factors, such as weather conditions for the next day) and generating capacity available for meeting consumer demand. As the computation is specific to the following day, it should ideally not be used for projections or to compare with the estimated shortfall at other time periods.
3. See Government of Pakistan, "Pakistan Economic Survey 2009-10," Ministry of Finance, Islamabad, 183, available at www.finance.gov.pk/survey_0910.html (accessed April 15, 2015).
4. See Government of Pakistan, "Pakistan Economic Survey 2013-14," Ministry of Finance, Islamabad, chapter 1, available at www.finance.gov.pk/survey_1314.html (accessed April 15, 2015). Table 1.6 and Figure 6 depict the decline in investment, from over 19 percent of GDP in 2005-06 to less than 14 percent of GDP in 2013-14; and in national savings, from 15.2 percent of GDP in 2005-06 to below 13 percent by 2013-14.
5. See, for example, Government of Pakistan, "Federal Budget: Budget in Brief, 2013-14," Finance Division, Islamabad, available at www.finance.gov.pk/budget/Budget_in_Brief_2013_14.pdf (accessed April 15, 2015).
6. International Energy Agency (IEA), "Share of Total Primary Energy Supply in 2012: Pakistan," Paris, available at www.iea.org/stats/WebGraphs/PAKISTAN4.pdf (accessed April 15, 2015).
7. IEA "Pakistan: Electricity and Heat for 2012," Paris, available at www.iea.org/statistics/statisticssearch/report/?&country=PAKISTAN&year=2012&product=ElectricityandHeat (accessed April 15, 2015).
8. See, for example, World Bank, *Pakistan-Dasu Hydropower Stage I Project (DHP-1)* (Washington, DC: World Bank, 2014), available at documents.worldbank.org/curated/en/2014/05/19551979/pakistan-dasu-hydropower-stage-project-dhp-1 (accessed April 15, 2015). Annex 6-A provides details of the cost of electricity from ongoing hydropower project or those under construction in the public sector (between USc 2.49 and 4.45/kWh) and the corresponding cost of generation from the cheapest alternative, a combined cycle gas turbine (around USc 10.5/kWh).
9. Reducing the inflation rate to 6 percent (or lower) per year has generally been an end-of-program target of these programs.
10. Ministry of Finance, "Economic Survey 2013-14," Table 1.6 and Figure 6.
11. The other countries are Bangladesh, Brazil, China, India, Indonesia, and the Philippines. These countries were selected based on their success in quickly overcoming power supply shortages (Brazil, China, Indonesia, and the Philippines), similarities with Pakistan in their operating environment (Bangladesh and India), and achievement of quick gains in efficiency and performance (China and several states in India).
12. Rashid Aziz, "Building an Efficient Energy Sector," Pakistan Policy Note 1, World Bank, June 2013, 2, available at www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/07/17/000442464_20130717121249/Rendered/PDF/795580BRIOSASE0Box0377381B00PUBLIC0.pdf (accessed April 15, 2015).
13. See World Bank, *Pakistan - Second Energy Sector Loan (ESL) Project* (Washington, DC: World Bank, 1989), available at documents.worldbank.org/curated/en/1989/06/737409/pakistan-second-energy-sector-loan-esl-project (accessed April 15, 2015). Paragraph 57 of this report provides details of the agreement reached on 40 percent internal cash generation by WAPDA.
14. Ministry of Finance, "Economic Survey 2013-14," 222-23.
15. *Ibid.*, 222.
16. See Hydrocarbon Development Institute of Pakistan, *Pakistan Energy Yearbook*, various issues, available at hdip.com.pk/contents/Yearbook-2013-Available/31.html (accessed April 15, 2015).
17. A good example is the World Bank support for NTDC's investment program. In 2004, the government requested that the bank finance some power projects, including a 220 kV grid station at Kassowal for NTDC. ESAs, which the bank required for this grid station, needed to be revised and redrafted many times. In parallel, NTDC obtained funds from local banks for a 500 kV grid station at Sahiwal. By the end of 2008, the 500 kV Sahiwal grid station had been commissioned; by contrast, NTDC had not even initiated tendering for Kassowal project. While one could claim that such rigor applies to all World Bank projects, that a much larger project was completed in the time it took to complete one donor's procedures for just the appraisal of a project also points to a need for some realism in those procedures.
18. The World Bank recently approved funding for the Dasu hydropower project. Preparatory work for that was carried out by WAPDA's consultants. So WAPDA is demonstrating its ability to prepare hydropower projects up to donor requirements and standards. This raises a question as to why those requirements are not being met for Diamer Basha.
19. See Ministry of Finance, "Economic Survey 2009-10," 186, which provides the first official assessment of the circular debt problem. For a more recent analysis, see Planning Commission of Pakistan, *The Causes and Impacts of Power Sector Circular Debt in Pakistan* (Islamabad: Planning Commission of Pakistan and U.S. Agency for International Development, 2013).
20. National Electric Power Regulatory Authority (NEPRA), *State of Industry Report* (Islamabad: NEPRA, 2013).
21. It should be noted that K-Electric (formerly KESC) is not technically a distribution company, as it also owns and manages transmission and distribution assets. However, as it provides lessons about the experience of private sector management of distribution assets, it is covered here as a case of distribution privatization.
22. See NEPRA, "National Electric Power Regulatory Authority (Tariff Standards and Procedure) Rules, 1998," Islamabad, December 23, 1998, available at [www.nepa.org.pk/Legislation/Rules/NEPRA%20\(Tariff%20Standards%20and%20Procedure\)%20Rules%201998%20along%20with%20all%20amendments.pdf](http://www.nepa.org.pk/Legislation/Rules/NEPRA%20(Tariff%20Standards%20and%20Procedure)%20Rules%201998%20along%20with%20all%20amendments.pdf) (accessed April 15, 2015).
23. This amount could have financed 4,500-5,000 MW of hydropower capacity, e.g., the Diamer Basha project.
24. Authors' computations, based on budget documents.
25. India's success in reducing costs through competitive bidding is documented in Sheoli Pargal and Sudeshna Ghosh Banerjee, *More Power to India: The Challenge of Electricity Distribution* (Washington, DC: World Bank, 2014).
26. Government of Pakistan, "Policy Framework and Package of Incentives for Private Sector Power Generation Projects in Pakistan," Islamabad, March 1994, available at www.ppib.gov.pk/Power%20Policy%201994.pdf (accessed April 15, 2015).

27. See Hydrocarbon Development Institute of Pakistan, *Pakistan Energy Yearbook* (various issues) for details on generation capacity and power generation.
28. See Government of Pakistan, Ministry of Water and Power, available at www.mowp.gov.pk/gop/index.php?q=aHR0cDovLzE5Mi4xNjguNzAuMTM2L21vd3Av (accessed April 15, 2015).
29. International Monetary Fund, "IMF Executive Board Approves 3-Year, US\$6.64 Billion Extended Arrangement for Pakistan," press release no. 13/322, September 4, 2013, available at www.imf.org/external/np/sec/pr/2013/pr13322.htm (accessed April 15, 2015).
30. Ministry of Finance, "Economic Survey 2013-14," 223.
31. Presently, CPPA is a department of NTDC and handles the functions of sale and purchase of power from all generators. The government is in the process of splitting off this power trade function of NTDC and establishing CPPA as an autonomous entity—that is, a company under the 1984 Companies Ordinance—that will conduct the power purchase function as an agent of the distribution companies. In future, therefore, contracts for power sale by generators and purchase by the distribution companies will be signed between the generator and CPPA.
32. For example, during 2011–12 total sale of power to consumers of the four distribution companies in Andhra Pradesh was around 73,000 gigawatt-hours (gWh), about 54,000 gWh for the four distribution companies in Gujarat, about 38,000 for the five distribution companies in Uttar Pradesh, and around 80,000 for one distribution company in Maharashtra. See Power Finance Corporation report on Performance of State Power Utilities for 2009-10 to 2011-12.
33. This section draws upon the analysis, conclusions, and recommendations in Pargal and Banerjee, *More Power to India*.
34. Government of India, Power Finance Corporation, "The Performance of State Power Utilities for the Years 2009–10 to 2011–12," Government of India, New Delhi, 2013.
35. Authors' computations.
36. See Pargal and Banerjee, *More Power to India*.
37. For example, the rate of unscheduled interchanges established by the Central Electricity Regulatory Commission in 2007 was Rs 7.5 per kWh (US cents 18.75 per kWh).
38. See Pargal and Banerjee, *More Power to India*.
39. See Power Finance Corporation, "Performance of State Power Utilities."
40. Complementary actions to reduce the cost of solar and other renewables included "reverse auctions," as opposed to reliance on feed-in tariffs only.
41. See Pargal and Banerjee, *More Power to India*.

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