Learning Lessons

Electricity Sector

Asian Development Bank
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Learning lessons from evaluation is part of good corporate governance. To ensure that it invests responsibly, the Asian Development Bank (ADB) continually reviews its operations to assess their effectiveness, learn from experience, and improve the development of future policies, strategies, programs, and projects. Learning lessons from evaluation contributes to achieving development effectiveness of ADB operations by providing feedback on performance.

This online edition of Learning Lessons: Electricity Sector complements ADB’s Guidance Note: Electricity Sector Risk Assessment. A joint knowledge product of ADB’s Governance and Energy Communities of Practice, the Guidance Note offers a framework for mapping governance risks to inform the future preparation of country partnership strategies. Such a framework covers institutional aspects (policy, legal framework, and regulation); organizational aspects (planning, financial management, procurement, and human resources); and sector operations. While the Guidance Note has identified entry points for mapping risks to development effectiveness in the sector, lessons from evaluation can augment ongoing efforts for mitigating risks (inclusive of governance and non-governance risks), and enhance the development effectiveness of ADB assistance. These lessons are largely drawn from actual independent evaluations, self-evaluations (project and program completion reports), and the Evaluation Information System of ADB. Some published lessons from the experience of other development partners are also added. All lessons are illustrative and are not meant to be interpreted as recommendations. Users of this paper are advised to review these lessons carefully in the context of the conditions and operating environments where they actually encounter them to broaden their understanding of these experiences, and to utilize them in current and future challenges in the sector, as applicable. The challenges and solutions cannot be generalized as they differ from one scenario to another, given the country and sector contexts.

This knowledge product is a result of collaboration among individuals from communities of practice and departments in ADB, to promote learning lessons from evaluations. A team from the Independent Evaluation Department (IED) and the Public Management, Governance, and Participation Division (RSGP) of the Regional and Sustainable Development Department initiated the learning series. The team comprised Njoman Bestari (advisor), Jocelyn Tubadeza (evaluation specialist, operations coordination), Sergio Villena (research associate, consultant), and Mike Diza (associate knowledge management administrator) from IED; and Sandra Nicoll (director), Jessica Ludwig-Maaroof (public management specialist), and Brenda Katon (governance specialist, consultant) from RSGP ADB’s energy and governance practice leaders
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Abbreviations

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<tr>
<th>Abbreviation</th>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>DMC</td>
<td>developing member country</td>
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<td>GACAP II</td>
<td>Second Governance and Anticorruption Action Plan</td>
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<td>PPA</td>
<td>power purchase agreement</td>
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<td>PRC</td>
<td>People’s Republic of China</td>
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<td>PV</td>
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<td>TA</td>
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Background

The long-term strategic framework (2008–2020), also known as *Strategy 2020*, of the Asian Development Bank (ADB) identifies infrastructure as a core area of operations. Electricity is part of ADB’s infrastructure operations. These operations generally seek to build physical assets and improve the delivery of services. In particular, they aim to develop the infrastructure management capacity of developing member countries (DMCs), promote institutional reforms, and support logistical systems to increase investment and trade.

ADB’s *Guidance Note: Electricity Sector Risk Assessment* (ADB 2009a) points out that the electricity sector is vulnerable to governance risks due to the magnitude of its capital investments, potential for regulatory capture, capacity weaknesses of sector entities, and opportunities for discretionary decision making and rent seeking by stakeholders, among others. This guidance note seeks to heighten the recognition of risks that can reduce the benefits and, hence, development effectiveness from operations in the electricity sector. Risks are classified within the frameworks of the following:

(i) Institutional features (policy, legal framework, and regulation);
(ii) Organizational aspects (planning, financial management, procurement, and human resources); and
(iii) Operations through the following:
   • *Generation*—the transformation into electricity of energy sources, such as fossil fuels, flowing water, wind, or sunlight;
   • *Transmission*—the transport of electricity to load centers through transmission lines;
   • *Distribution*—the use of a network to connect and provide electricity to customers; and
   • *Electricity supply or customer interface*—includes commercial transactions to recover the value of service from customers.

The *Guidance Note: Electricity Sector Risk Assessment* (ADB 2009a) is intended for ADB staff involved in commissioning, undertaking, and/or reviewing governance risk assessments as required under ADB’s *Second Governance and Anticorruption Action Plan (GACAP II).* It aims to explain the key features of the electricity sector and identify entry points for mapping governance risks.

Taking off from the guidance note, this paper reviews the key lessons over the last 10 years drawn from more than 60 reports, including independent evaluations and self-evaluations (mainly program and project completion reports) of ADB assistance in the electricity or power sector. It complements the guidance note by covering a broad spectrum of lessons—both governance and non-governance—and by sharing risk mitigation measures based on ADB’s experience in the electricity sector. The analysis of a wide array of lessons helps provide an expanded perspective of risks that can reduce development effectiveness at the sector, program, and project levels.
These lessons are not prescriptive. When viewed properly from a contextual perspective, however, they can help deepen understanding of ADB’s sector experience and provide inputs into the design and delivery of future country partnership strategies, programs, and projects. References are provided at the end of this paper to enable the reader to obtain further details on specific operating environments, evolving sector approaches, and context-specific measures for risk mitigation.

This paper may not have covered all relevant risks and lessons as this had been mainly based on existing completion reports of programs and projects, electricity sector-related evaluation reports, and some technical assistance (TA) completion reports of ADB. Available lessons from ADB reports relate to electricity reforms, fossil fuel-dependent electrification, and to a lesser extent, renewable electricity (e.g., hydropower and solar photovoltaics). This paper, however, attempted to augment these lessons by drawing from the experience of other development partners. Again, the lessons are not exhaustive. New lessons and risks will certainly emerge, given the increasing shift to clean and renewable energy development to reduce greenhouse gas emissions, improve energy security, and ease the demand for dwindling fossil fuels. Structural issues, nonetheless, will continue to be important from a sustainability perspective, mainly in relation to policy, legal, and institutional frameworks; financial viability; and private sector participation, among others.
Key Lessons and Contextual Sector Risks: The ADB Experience

Institutional Risks

Policy

Sustained policy dialogues with key stakeholders reduce the risk of halfhearted support for improvements in the electricity sector. Improvements in this sector call for a shared and sustained commitment from the government, the executing agencies, and other key stakeholders. Sustained dialogue is crucial for steering the policy focus, deepening the understanding of the rationale for sector improvements, and building consensus-driven actions. It is vital for mitigating risks from noncompliance with policy agreements, and can be a valuable tool in setting directions, promoting operational efficiency and financial viability, and promoting good practices in power utility operations. During country programming and project processing missions, it is important to reconcile ADB’s sector and lending policies with government policies. In the case of sector reforms, two other factors could bring success to a policy dialogue—an opportunity created by a crisis that compels the conduct of a dialogue and the presence of a champion who could push for reforms in the DMC. It is well known that sector reform is a process that takes time, particularly in countries with weak governance and poor investment climates.

Three reports on India, for example, highlighted some benefits from policy dialogue. Sustained dialogue paved the way for developing sector road maps and building consensus for the expected outcomes of sector assistance. It also prompted the government to address the issue of dues from state electricity boards, and helped bring in a regulatory regime to deal with tariff policies for different consumer categories. The implementation of tariff policies in various regions (e.g., northern, northeastern, eastern, western, and southern) subsequently enabled the national transmission utility to operate the regional grids with improved system stability and reliability.

A weak institutional framework impedes implementation of social and environmental mitigation measures. Stress on natural land and water systems that arises from hydropower projects makes environmental and social mitigation measures imperative. Support for improving the institutional frameworks of ADB’s member countries is necessary to help ensure that environmental and social costs in electricity systems remain reasonable. The experience of three hydropower projects highlighted the need for supportive frameworks, given difficulties encountered in implementing social and environmental mitigation measures.

The lack of capacity for decentralized operations hampers policies on diversifying electricity sources, including renewable electricity. Local governments in some countries are
now in charge of managing renewable electricity resources (e.g., microhydropower, geothermal, and solar systems). Decentralized electricity generation can help augment power supply. In many cases, however, local governments may not have the technical expertise and financing capacity for renewable electricity development. Dealing effectively with other ministries, local organizations, and private companies may also be a problem. Risks from deficient expertise, nontransparent operations, and corruption can occur, particularly in the absence of efforts to upgrade human capacity (technical, financial, procurement, management, and other skills); improve business processes; and promote transparency and accountability. The lack of strong decentralized institutions continues to be a challenge in many DMCs.

Laws

Legal and political processes in certain DMCs hamper the enactment of electricity laws to support sector improvements. When proposing laws that are vital to move sector improvements forward, it is essential to factor in legal and political constraints, and to involve stakeholders to reinforce the acceptance of these improvements. The legislative branch may have characteristics that render decision making a time-consuming process. In one country, for example, enacting the bill for the transfer of transmission franchise to the private sector had been difficult. DMCs may also find it difficult to enact laws if they perceive loan conditionalities as interference from external entities. However, where appropriate electricity reform laws are enacted and enforced, possibilities open up for further deregulating the power sector, diversifying the sources of generation capacity, opening access to transmission and distribution networks, and establishing a transparent regulatory environment for the power sector, as in the case of the Madhya Pradesh Power Sector Development Program.

Regulation

The lack of financial and management autonomy of the regulator undermines independent regulation. Independent regulation of the power sector helps ensure its viability, promotes the efficient use of capital, and protects consumers from monopoly pricing and operations from politicized tariffs. It is vital for implementing electricity reforms and easing a smooth transition to commercial operations. A newly created power sector regulator that lacks the capacity to perform effectively its function will require technical assistance for capacity development, complemented by information sharing on good regulatory practices. Regulation also needs complementary improvements in governance. Transparency in a regulator’s processes, for example, provides confidence in the fairness and predictability of application of regulations, and promotes better understanding of the issues.

Politicized regulation creates an imbalance between the needs of customers (affordable tariffs and reliable electricity services) and the industry (need for investors to earn a return and to sustain, if not expand, electricity operations). This imbalance can undermine the electricity sector’s viability. Reasonable tariffs and cost recovery are central concerns in the sector. While it is important to consider the country’s strategic development context, it is equally important to assess the affordability of electricity to customers and the willingness to pay for reliable services. Decisions based mainly on political considerations can lead to financial losses for the power utility and ultimately to an unreliable supply of electricity to customers, particularly when tariffs are insufficient to maintain viable operations. Consequently, reduced benefits to both power suppliers and customers can occur. Regulatory capture by industry, on the other hand, can lead to unreasonably high tariffs and, in turn, hurt economic growth. The
experience of India shows that balancing the needs of customers and the industry can be done through the concurrent development of expertise and regulators’ independence, transparency, consumer advocacy, a commercially oriented electricity sector, and a strong service focus.\textsuperscript{15}

**Partnerships and Networks**

**Lack of interaction and support from stakeholders and alliance networks weakens restructuring efforts.** The complexity of electricity sector restructuring efforts requires a realistic understanding of the political economy of reform. If there is resistance to change, it is crucial to increase public awareness and build constituencies for the reform agenda. Strategic measures are needed to articulate public interest and to address the concerns of those who oppose such reforms. Informed consultations with various stakeholders are essential due to risks from political and institutional uncertainties. To mitigate such risks, close consultations among ADB, development partners, the government, the executing agencies, electricity suppliers, consumers, and other stakeholders must be held at various stages to discuss the issues, agree on a coherent strategy for reform, and secure commitment to reforms.\textsuperscript{16}

**Perseverance in sustaining partnerships for electricity sector reforms helps steer the direction of reforms.** Sustained partnerships allow sector reforms to be on track, if not restore them to the original path. Although there have been problems with power sector reforms in Bangladesh, Pakistan, and the Philippines, ADB has persevered with its support for the reform efforts.\textsuperscript{17} In Indonesia, ADB refrained from further lending when the government was unable to act on tariff-related obligations, but demonstrated readiness to resume support after the government took corrective action.\textsuperscript{18} A long-term perspective is required for sector reforms.\textsuperscript{19}

**Poor coordination of interventions leads to inefficient uses of scarce resources.** Two project completion reports indicated that closer coordination with development partners would have ensured that project objectives were met and resources used more efficiently. For example, regular meetings could have been a mechanism for fostering greater coordination, particularly for projects with different funding sources,\textsuperscript{20} and reducing the risk of duplication.

The experience of a power distribution project in one country highlighted the lack of coordination between agencies engaged in rehabilitating the electricity distribution network and in urban planning, which led to serious delays and numerous revisions of technical specifications and cost estimates.\textsuperscript{21} Local authorities required changes in transmission line routes due to changes in urban plans, despite having issued a construction authorization and despite near completion of pole foundations. Harmonizing urban planning with the rehabilitation of the electricity distribution network could have helped reduce the risk. The experience also highlights the lesson that close interaction with government agencies and stakeholders in planning and implementation is vital.

**Lack of government capacity for entering into partnerships with the private sector in supplying electricity hinders achievement of sector objectives.** Developing countries may be unable to meet their electricity needs from public resources alone, prompting them to look for financial and technical resources through partnerships with the private sector. When public–private partnerships are well designed and tailored to DMC circumstances, they can help mobilize financial resources and technical expertise that contribute to reliable electricity services. Such partnerships, however, require supportive policy, legal, and regulatory frameworks.\textsuperscript{22}
For public–private partnerships, the Theun–Hinboun Hydropower Project experience in the Lao People’s Democratic Republic suggested several key ingredients. These are (i) thorough technical and economic valuation of a suitable site, (ii) choosing a group of developers that has the necessary financial and technical experience, (iii) negotiating for a power purchase agreement (PPA) that is advantageous to all parties involved, and (iv) willingness to learn from mistakes and take responsibility for mitigating them.23

Appropriate institutional arrangements and multiparty agreements boost cross-border electricity trade and interconnections. A project experience in the Greater Mekong Subregion noted that the key to successful cooperation in cross-border trade and interconnections among member countries is to set up institutional arrangements with strong government ownership (e.g., the Electric Power Forum and the Regional Power Trade Coordination Committee). This is in addition to the establishment of an appropriate policy framework for power trading in the region via multiparty agreements (e.g., intergovernmental agreement and Regional Power Trade Operating Agreement).24

Organizational Risks

Planning

Overoptimistic modeling of demand for electricity leads to an oversupply of generation capacity. PPAs that are based on overly optimistic forecasts can leave governments with contractual obligations for unneeded capacity. Hence, demand forecasts must be realistic to prevent capacity oversupply. Overly optimistic forecasts can stem from the use of inappropriate assumptions and methodologies.25 On hindsight, it is easier to decide if a forecast was overambitious. However, the assumptions used are often similar to economic growth forecasts. Unfortunately, long-term economic growth forecasts may not be available, and electricity modelers can make the mistake of extending the short- and medium-term forecasts into long-term forecasts.

Failure to prepare risk management plans undermines achievement of expected sector outcomes. In electricity trading, considerable risks exist due to the volatility of the market. These include regulatory and prudential risks at the market level; and financial, operational, and counterparty risks at the corporate level. An energy policy review (ADB 2007d) noted that risk management plans were absent in all the sector restructuring plans covered by the review.26

When a market has many small participants (e.g., electricity cooperatives in the Philippines), the transaction costs and the requirements for risk management may go beyond the financial capabilities of the participants. For countries that pay spot prices for fuel, lack of measures to mitigate risks from fuel management (e.g., hedging supplies and managing stockpiles) can increase their vulnerability. In two countries, for example, utilities rapidly experienced net negative cash flows due to soaring fuel prices, which was worsened by their inability to pass on fully the price increases to consumers. In India, collective trading through holding companies had helped reallocate the risks between the distribution companies. Small energy consumers, such as the Pacific Islands, may not be able buy in bulk and to hedge price volatility risks.27

Where sector unbundling is involved, failure to assess and mitigate risks relating to the financial viability of successor companies and their capacity to implement projects can derail sector
reforms. In private sector projects, legal risks can be substantial. The enforceability of even well drafted legal agreements can be difficult when contractual legal experience is limited. Thus, building human capacity to assess and manage risks is crucial.

**Sector Management**

**Inappropriate approaches to sector management hamper the performance of the electricity sector.** Sector management approaches need careful thought. Privatization—the transfer of assets or service delivery from the public sector to the private sector—has been promoted to improve sector efficiency and the delivery of services to customers. It is expected to diversify ownership, lower the risk of mismanagement of power companies, and bring in new or additional capital for sector expansion. Earlier efforts to privatize the entire electricity sector, however, had been stalled in several countries (e.g., Indonesia, the Republic of Korea, the Philippines, Singapore, and Thailand) or had been resisted (e.g., India and Sri Lanka). Nonetheless, privatization of some segments of sector operations continues to be relevant for some countries. Rural electrification, however, may not be attractive to private investors without public sector support because it may not be commercially profitable in the short or medium term.

Alternative approaches to sector management—such as commercialization and corporatization—can also help improve managerial and operational performance, as shown by the Power Grid Company of Bangladesh and the Dhaka Electric Supply Company Limited. Commercialization refers to the wide range of activities necessary to bring a generation, transmission, or distribution company in line with profitable operations (e.g., forming a professional management team, hiring or developing staff with the appropriate skills for the job, improving cost recovery, setting up metering systems, installing management information systems, and keeping financial records in line with international accounting standards). Corporatization refers to the transformation of government agencies into autonomous state-owned companies and parastatals that adopt business management practices, and subjecting them to the same high accounting and auditing standards as private companies, including an independent external audit. Managerial autonomy, improved corporate governance, and a performance-based orientation can significantly change performance even if there is no change in utility ownership.

**Financial Management**

**Weak accounting systems hamper the provision of adequate and timely financial information.** Reports on three countries cited problems relating to accounting systems. These included the lack of conformity of financial statements with international financial reporting standards, poor quality of financial data and absence of proper stock and fixed asset records that make the transition to a modern accounting system complex, and weak commitment to the use of computerized systems. The transition from a manual system to a computerized, state-of-the-art accounting system requires a major shift, and underscores the need for a realistic time frame to establish and implement the new system. Before installing the new accounting system, the client should ensure that, once operational, it could replace the system currently in use. The full commitment of management and staff is crucial to the adoption and continuing use of the new system.

**Inadequate financial management capacity (computerized planning, monitoring, and reporting) of staff in sector utilities impairs decision making.** Deficiencies in financial
management capacity are often due to difficulties in recruiting and retaining qualified accountants on public sector pay scales. In computerized operations, accounting knowledge and skilled information technology support are needed in customizing the software to meet the organization’s financial management needs over time. As electricity utilities grow, there is no alternative but to computerize the accounts and related activities for informed decision making. Technical assistance to complement human resource strategies would be required.

Inadequate revenue streams hinder compliance with loan covenants and imperil the financial viability of electricity operations. Insufficient revenues, worsening system losses, and a progressive deterioration of the financial performance of electricity utilities can threaten viable operations. These can undermine new investments, power plant maintenance, and reliability of electricity supply. One project performance evaluation report pointed out that reducing aggregate commercial and technical losses calls for a combination of measures that include (i) improving metering, billing, and bill collection; (ii) reducing the overloading of distribution feeders and using bundled conductors to prevent electricity pilferage; and (iii) governance-related actions such as discouraging electricity theft by taking legal action against pilferers.

In financing the costs of power sector restructuring, a continuing fiscal deficit can erode the government’s ability to finance such costs, the settlements of which are critical to restoring the power sector’s financial sustainability. The government’s fiscal deficit can impede an early absorption of the power utility’s stranded debt (unpaid financial obligation incurred before power sector restructuring that has not been liquidated by proceeds from the sale and privatization of the power utility’s assets). This underscores the need for future power operations to recognize the complexities of debt resolution of state-owned enterprises at a time of high and unsustainable fiscal deficits.

Procurement

The presence of competent procurement professionals bolsters sound procurement planning and timely procurement. Strengthening the executing agency’s procurement capacity can be done in several ways. These include (i) conducting a procurement capacity assessment at the outset; (ii) establishing proper implementation arrangements from the beginning (e.g., delegate the resident mission to monitor and support the executing agency); and (iii) planning appropriate measures to support the executing agency during implementation, such as providing technical assistance to fill in capacity gaps and use procurement specialist’s input, when necessary, through missions and customized training activities. Timely support from ADB’s resident mission can expedite the procurement process. For example, the Madhya Pradesh Power Sector Development Program in India benefited from the assistance extended by the resident mission, which facilitated the adoption of international procurement practices by the executing agency. Assistance from an experienced procurement agency to the executing agency also boosts timely procurement, based on two project completion reports on the People’s Republic of China.

Deficient procurement planning procedures lead to subsequent project implementation delays. To reduce the risks of late project start-up and implementation delays, bid documents can be prepared during the project preparation stage. Contracting procedures must ensure adequate time for planning and reviewing contracts, given country-specific situations. In remote landlocked countries, for example, international competitive bidding for rural electrification can
face problems due to (i) the country’s isolation and/or (ii) bidders’ lack of familiarity with the country, which can lead to a poor bidding response. Large packages for international competitive bidding that consist of disparate items may have to be divided into smaller sizes of more closely associated items, if these are more suitable to the country’s situation. For procurement of major equipment items, equipment warranties can be required for a minimum of 12 months, along with guaranteed availability of spare parts for a reasonable number of years after delivery. Thus, appropriate formulation of procurement contract packages is essential.

**Noncompetitive and nontransparent bidding raises procurement costs.** Unsolicited bids (or bids that are submitted by prospective suppliers of goods and services even without a prior identification and advertisement of requirements by the target client) are often associated with high-cost contracts, which are sometimes tainted with allegations of favoritism and corruption. Nontransparent bidding can lead to bid manipulation in favor of entities that are willing to provide kickbacks and side payments to officials. Major corruption risks in the power sector can occur during bidding. To reduce opportunities for corruption in countries with a poor record of prosecution of corruption cases, a possible option is to adopt the “keep it simple and transparent” principle, particularly for tendering and bidding. This will help reduce the time required and the number of people and layers of bureaucracy involved. In a hydropower project in the People’s Republic of China (PRC), the competitive bidding process for the procurement of equipment and materials was a key factor in reducing costs.

**Lack of capacity to evaluate procurement bids prolongs bid evaluation.** To mitigate procurement risks from flawed evaluation of normal procurement bids, one option is to assign a procurement specialist with sector-specific experience or advise the executing agency to hire an experienced consultant to prepare and evaluate bid documents. This can substantially improve the quality of bid documents and reduce the time needed to review and finalize bid evaluation reports.

**Adequate contract administration helps ensure the quality of procured goods and services.** Procurement results are determined not only by the rules that govern procurement but also by contract administration. Contract administration encompasses dealings between the contract manager and the contractor from the time the contract is awarded until the work has been completed and accepted, payment has been made, and disputes have been resolved. In the People’s Republic of China, for example, properly administered procurement processes ensured the quality of construction and equipment supply. Civil works, likewise, were completed according to contract specifications and quality requirements.

**Inadequate procurement expertise and knowledge of applicable procedures and regulations lead to a lengthy procurement process and prolonged project implementation.** Proper administration of the entire procurement process is important. In line with this, executing agencies need to understand procurement processes through training and briefings. Deploying procurement specialists who can assist executing agencies is also useful, particularly in the case of agencies that are not familiar with procurement guidelines. It can help ensure timely and smooth procurement and, when properly executed, transfer valuable procurement expertise to executing agencies.

If a power project is funded by several funding organizations, each may have a different set of procurement rules and procedures. This can result in a longer learning period and delayed
project implementation. Hence, procurement training is necessary for executing agencies whose projects are funded by several organizations. Development partners also need to be proactive in coordinating and harmonizing the rules and procedures to reduce the burden on the client DMC.

Information System

Lack of capacity for implementing and upgrading information systems hampers opportunities for sound decision making. A functioning information system is important for informed decision making on network expansion, maintenance, rehabilitation, and related activities. A country that lacks self-financing capacity and has cumbersome procurement procedures may require a series of projects and phased financing to take care of information system maintenance and upgrading. Information systems development and improvement, however, are part of a continuing process that requires periodic improvements to hardware and software, and should not be totally dependent on external funding.\textsuperscript{47}

Sector Operations

Generation

The capacity to generate sufficient power and to maintain power generation plants reduces the unreliability of electricity supply. For efficient and reliable operations, competence is essential in the design, construction, and operation of power generation plants. A hydropower project in the PRC, for example, highlighted the importance of extensive experience in constructing hydropower plants, along with the use of appropriate systems for quality control. Meanwhile, a power project in Bangladesh underscored the importance of competent operation and maintenance of power facilities.\textsuperscript{48}

Transmission

Poor quality checks lead to the use of faulty transmission equipment and impair service delivery. In the commissioning of equipment, rigorous checks are needed to mitigate risks from faulty equipment, impaired technical operating performance, and poor service delivery. A power project in one country, for example, noted the need for quarterly inspections of the transmission line as part of the maintenance program and for determining the causes of power outages.\textsuperscript{49}

Distribution

Lack of affordable financing schemes for electricity connection undermines equitable access to electricity. For some rural households, the cost of electricity connection may be beyond their capacity to pay. Affordable schemes need to be worked out to reduce up-front costs and help rural households to be connected to electricity. One rural electrification project underscored the need for suitable mechanisms to help poor rural households obtain electricity connection.\textsuperscript{50}

Lack of expertise in operating and maintaining new distribution facilities and equipment hampers reliable power system operations. Difficulties encountered in operating new distribution facilities and equipment can be mitigated through training, seminars, and actual
implementation works to ensure reliable power system operations. To maintain system efficiency, the timing and scale of upgrading the distribution systems is fundamental. To minimize distribution losses, identifying and redesigning the system network should be a full-time operating function within the institutional structure. A geographic information system-based network can help map circuits and provide information on asset management, outage management, and smart grid, among others.

Supply or Customer Interface

Defective or tampered electric meters and collusion with power utility staff in misreporting power consumption provide opportunities for corruption. Metering is the tool for measuring electricity consumption by customers. A sector assistance program evaluation for the energy sector noted that corruption in the retail supply revolved around metering and billing. Opportunities for engaging in corrupt practices stem from meter tampering to make the meter run slowly, incorrect recording of meter readings to escape higher billing rates, lower billing than the actual meter reading in collusion with the billing staff, and continuing to supply power to certain customers although power supply was disconnected on record for nonpayment of bills. In return, customers provide illegal side payments to power utility staff. To deal with these situations, the use of prepaid meters, selection of a suitable meter location, and telemetering (e.g., transmitting the readings of instruments to a remote location through wires, radio waves, or other means) are possible solutions.

Program and/or Project-Level Risks

Planning and Design

Lack of meaningful consultations with key stakeholders and weak project ownership impair project outcomes. Projects should be designed with the active involvement of the executing agencies, clientele, and other stakeholders to deepen understanding of the rationale for the project, mobilize support, and strengthen project ownership. Apart from meaningful and informed consultations, an explicit recognition of political economy issues and consensus-driven efforts during project design are crucial to mitigate risks from public opposition and from subsequent project delays.

Inappropriate choice of modality and phasing of electricity sector reforms lead to unrealistic implementation schedules and overambitious milestones. Suitable lending modalities are essential to the achievement of sector reforms. A cluster approach, for example, allows reform actions to be prioritized and sequenced in phases. Program loans for policy-based lending need to be disbursed fast, but the implementation of stipulated policies on structural changes calls for a longer time frame. On hindsight, one policy-based program loan for a power project emphasized that in the first phase, the program could have concentrated on establishing a sound policy, legal, and regulatory framework for introducing new competitive markets, followed by laying the ground for the transfer of assets, privatization, and absorption of debt in subsequent phases.

The political, legal, and economic environment can influence the strategy and time frame for implementing power sector reforms aimed at competition. Sector restructuring is often a slow and difficult process. It is also linked to international practices. Coordinated actions
on policy, legislative, and regulatory measures can take time. The executing agency may not have full control over actions leading to legislative changes. Inefficiencies of government-owned corporations can erode the government’s ability to finance the costs of restructuring power entities. Moreover, due diligence is needed in programs involving a transition from a monopolistic, government-owned, and regulated market structure to a competitive structure. Essential activities prior to the introduction of competition include an in-depth study of the implications of different restructuring options and preparation of the sector to operate in a market environment. Introducing an independent regulator at an early stage is fundamental to the restructuring process.

In the case of PPAs, recommendations to include international commercial practices may be more appropriate in an open and mature electricity market. In the PRC, for example, both the seller and purchaser of power are state-owned enterprises. Higher authorities set contract standards. Thus, institutional constraints should be recognized at the outset.

Unrealistic and/or inappropriate project designs due to weak project preparatory analyses and poor assessment of the country context hinder project implementation. Adequate project planning, along with due regard for country-specific conditions, are vital to the smooth and timely execution of a project. In some countries, the practice of creating a separate entity for project implementation and operation should be anticipated during appraisal. This can help avoid lengthy deliberations and subsequent modifications of loan and project documents. In a country with unfavorable climatic conditions, such as Mongolia, the project design for major construction activities should consider the harsh winter and relatively short summer that pose a unique set of challenges, and the limited number of contractors and consultants experienced in working under such climatic conditions. Logistics issues should also be considered because the country is landlocked. To avoid delays, special arrangements to reduce the processing time for tax and customs-related requirements must be addressed at the project design stage.

In rural electrification, the provision of house wiring kits must be tailored to the country context. Free house wiring kits for the poor may not work in certain countries because many beneficiaries do not like to be identified as poor and in need of charity. Thus, more socially acceptable mechanisms must be considered during project planning to help disadvantaged households to install their internal house wiring, which is a prerequisite for supplying electricity.

In photovoltaic lighting systems, the project design must be able to incorporate several concerns such that the (i) appropriate beneficiaries are targeted, (ii) installation activities are recorded and monitored to ensure that the systems are correctly installed and operational, and (iii) processes are designed to ensure that systems are properly maintained over time. Further support is needed to develop solar power and to build up technology awareness.

Failure to plan and resolve issues on land acquisition, resettlement, and right-of-way during project design delays project implementation. Rapid urbanization and expansion of city limits, which are associated with increases in the price of land, can lead to unforeseen compensation and resettlement problems. Land acquisition for new substations, transmission lines, and other power facilities can become difficult because of disagreement on the official price and perceived market price of the land. The expectation by affected people that their agricultural land would be reclassified as residential land in the near future—due to rapid urbanization—can be another reason for their disagreement to the market price. Such disagreements can significantly
delay project implementation. A resettlement and compensation plan is now part of ADB’s involuntary resettlement safeguards, which can help mitigate project risks due to the physical and economic displacement of people.

Land acquisition and right-of-way issues are likely to be encountered more frequently as community members become more aware of their rights. Central and state government organizations must look into the availability of land for power infrastructure projects and obtain statutory clearances in advance. Problems on land acquisition encountered by the executing agency and the contractor can impede the contractor’s ability to make headway with its activities. Implementation delays could be mitigated with forward planning and inclusion of a resettlement specialist to provide advice on right-of-way issues. Integrating the draft land acquisition and resettlement plan into the loan process procedure can help, specifically by requiring the completion of said plan before the fact-finding mission and its endorsement by ADB before loan negotiations take place.

A power project in the Philippines underscored the following as essential to resettlement:

(i) preparation of a comprehensive resettlement plan by a team of multidisciplinary experts,
(ii) a separate environmental impact assessment for the resettlement site,
(iii) a feasibility study of livelihood programs,
(iv) engagement of a full-time community organization and relations officer to assist project-affected families in their adjustments, and
(v) participation of project-affected families in the design and implementation of livelihood programs.

Resettlement must be based on a time-bound action plan. It must have a legal basis and must be informed by an assessment of the pre-project socioeconomic situation. It must also be fully communicated to all project-affected families.

**Numerous loan conditions distract the focus of sector reforms and lead to nonachievement of key objectives.** Some sector reform programs have as many as 60 policy actions, making the program action-oriented rather than objective-oriented. A program completion report proposed that program loans should be designed with fewer conditions, following the cluster approach. A cluster approach is one that allows the phasing of actions over a longer time frame, and flexibility to changing circumstances.

**Unrealistic project cost estimates lead to inefficient uses of scarce resources.** Feasibility cost estimates must be carefully reviewed to arrive at reasonable estimates and contingency costs. Nonetheless, actual costs can differ from cost estimates at project appraisal despite efforts to enhance project preparedness during loan processing. Keeping cost variations to a minimum can contribute to improving efficiency in allocating ADB’s scarce resources to borrowing countries. Factors that account for cost variations include

(i) an inaccurate estimate of the base cost;
(ii) unexpected exchange rate fluctuations;
(iii) a substantial change in local inflation;
(iv) unforeseen changes in project scope, financing arrangements, and prices of procured goods, equipment, and services;
(v) improper assessment of risks and contingencies; and
(vi) implementation delays.

Project cost estimation can be improved in several ways, as follows:
(i) more rigorous consideration of inflation and currency depreciation factors;
(ii) more thorough regard for sector and country experience with cost variations;
(iii) careful verification of the demand for the proposed components;
(iv) comparison of the cost estimate with the latest bidding prices of similar projects; and
(v) more realistic estimate of civil works components and operation and maintenance components.73

**Inability to raise the required counterpart funds hampers timely implementation of projects.** Counterpart fund arrangements must be carefully scrutinized at the outset to prevent serious delays in implementation.74 A firm commitment from the country, supported by actual budget appropriations, must be secured prior to project implementation.

**Lack of expertise in assessing project-level risks and in designing risk mitigation measures during project preparation leads to implementation delays and cost overruns.** Inadequate resources for due diligence and underestimation of risks during project preparation can undermine project achievements. For example, if an electric utility has human resource capacity constraints, project design should identify risk mitigation measures such as the engagement of an experienced project manager, oversight of project implementation activities, and appropriate reporting arrangements.75

**Management and Implementation**

**Lack of commitment to the project and weak capacity of project implementers impede achievement of project objectives.** The experience of several electricity projects pointed out that aside from a well-suited design, the following are the keys to a project’s success: (i) preparedness of the executing agency; (ii) a strong sense of project ownership; and (iii) committed, well-trained, and efficient implementation staff.76 The recruitment of international and domestic experts can help ensure adherence to quality standards required for projects with high investment costs. In Viet Nam, for example, experts introduced improved design standards that were picked up quickly by the utilities technical group.77

Where the executing agency is a first-time recipient of ADB assistance, risks arise from inherent delays in project implementation. To mitigate these, capacity development in project management must be carried out at the outset based on an assessment of human capacities. Comprehensive training in ADB procedures, guidelines, and project administration at the start of and during project implementation is necessary.

On environmental and social mitigation, a stream of capacity development interventions is necessary to improve impact identification and management capabilities of executing agencies.
Such interventions should lead to (i) certifying only those well-prepared environmental and social studies, (ii) ensuring that the findings from stakeholder consultations are considered in the environmental and social risk mitigation plan, (iii) allocating sufficient budget to manage risks, and (iv) providing inputs into the negotiation of concession agreements.78

**Lack of a proactive project management hinders timely implementation.** Where project management is generally reactive, delayed implementation is likely to occur. Two reports cited that the non-anticipatory and slow decision-making style of the executing agencies led to serious delays.79 Such delays could have been mitigated if emerging problems were effectively anticipated, there was forward planning, competent project directors were deployed, and experiences in similar projects were shared.

**The involvement of a competent resident mission in project management hastens timely and effective implementation of programs and projects.** Opportunities for involving the resident mission need to be identified and assessed. In the PRC, for example, the delegation of the Gansu Clean Energy Development Project to the resident mission helped improve communications between ADB and the executing agency.80 Consequently, implementation issues were resolved more quickly and efficiently. The resident mission also provided clear guidance and action plans for resolving key issues in financial management, environment and resettlement monitoring, benefit monitoring, and reporting. In Bangladesh, the increased involvement of competent and senior national officers from the resident mission made a significant impact on the performance of ADB in delivering sector assistance.81 They were responsible for guiding project implementation, monitoring progress, and conducting day-to-day dialogue with key decision makers.

**Poor coordination of subprojects leads to inefficient use of resources.** Where subprojects fall under separate departments, as in the case of sector loans, it is essential to have timely coordination, close interaction, and clear communication during project implementation to achieve optimal use of resources.82

**Monitoring and Evaluation**

**Lack of baseline data hampers subsequent assessments of project outcomes and impacts.** The collection of reliable baseline data is a prerequisite for a realistic assessment of project results. Both the executing agency and ADB need to establish adequate benchmark information on conditions in project areas and to compare pre-project and post-project conditions.83

**Inadequate mechanisms for reviewing loan covenants hinder realistic compliance.** Some of ADB’s loan covenants were overly ambitious as to the speed of implementation of reforms.84 Moreover, compliance with financial covenants can pose problems. The experience of two power projects indicated that the executing agencies saw their asset base and business scope reduced significantly. Yet, the original loan covenants remained in place, leading to an unrealistic assessment of compliance with the loan covenants.85 Programs call for a review by the project team of the time frame for compliance with loan covenants to ensure that they remain practical and relevant during implementation.

**Weak monitoring and evaluation systems impede informed decision making, tracking of project results, and compliance with environmental and social safeguards.** Appropriate
monitoring and evaluation systems must be incorporated into projects. They must be supported by a budget and by appropriate indicators to track project progress and measure achievements.

A report on the Theun–Hinboun Hydropower Project in the Lao People’s Democratic Republic noted that a qualified and adequately staffed social and environmental monitoring unit must be in place prior to and during implementation to monitor project results and take appropriate mitigation measures. Project staff from the executing agencies, moreover, should obtain data for the preparation of project completion reports. This will ensure that needed information is available and that the institutional memory of staff members responsible for project implementation is effectively harnessed.

Sustainability

Continuing country ownership and commitment beyond project completion reinforce the sustainability of investments. When country ownership and commitment are strong, project sustainability is higher. In Bhutan, the absence of sector policy reversals has attested to the commitment of senior policy makers to institutional reforms, along with gradual but regular tariff adjustments to ensure the financial sustainability of the electricity sector. In addition, executing agencies showed a high degree of ownership in identifying the need for technical assistance, in defining the scope of technical assistance projects, and in implementing these projects.

Lack of conscious efforts to develop domestic capacity in project design, implementation, and evaluation undermines project sustainability. Sustainability is at risk if project management is heavily dependent on external expertise in project design, implementation, and evaluation. As a long-term goal, the government, sector entities, and ADB should give priority to building and strengthening domestic capacities.

Non-implementation of ecological management and of continuing environmental and social mitigation measures impairs sustainability of power projects. Mitigation measures do not end when the power plant begins operation and the project loan closes. It is essential to (i) assess and prepare mitigation measures for downstream impacts, (ii) secure financing of the social and environmental mitigation measures, and (iii) implement realistic mitigation measures even after project completion.
Illustrative Risk Mitigation Measures: A Summary

The table below summarizes risk mitigation measures from ADB reports that cover governance and non-governance aspects. Most of these measures pertain to sector reforms, independent sector regulation, and electricity expansion. These are presented mainly for illustrative purposes. Thus, they are neither prescriptive nor comprehensive. Variations in the country and sector contexts imply that risk mitigation can differ from one situation to another and that mitigation measures must be carefully tailored to the situation.

### Illustrative Risk Mitigation Measures

<table>
<thead>
<tr>
<th>Examples of Risk-Based Lessons</th>
<th>Examples of Risk Mitigation Measures</th>
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</thead>
<tbody>
<tr>
<td><strong>Institutional</strong></td>
<td>• Provide technical assistance for upgrading institutional capacities</td>
</tr>
<tr>
<td>The lack of capacity for decentralized operations hampers policies on diversifying electricity sources, including renewable electricity.</td>
<td>• Improve business processes</td>
</tr>
<tr>
<td></td>
<td>• Implement transparent and accountable operations</td>
</tr>
<tr>
<td><strong>Politicized regulation creates an imbalance between the needs of customers (affordable tariffs and reliable electricity services) and the industry (need for investors to earn a return and to sustain, if not expand, electricity operations).</strong></td>
<td>• Establish an independent sector regulator</td>
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<td></td>
<td>• Provide technical assistance for developing the capacity of the power sector regulator</td>
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<td>• Initiate consumer advocacy</td>
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<td></td>
<td>• Strengthen commercial orientation and service focus of power utilities</td>
</tr>
<tr>
<td><strong>Lack of interaction and support from stakeholders and alliance networks weakens sector restructuring efforts.</strong></td>
<td>• Hold informed stakeholder consultations</td>
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<td>• Launch public information campaign on the sector reform agenda</td>
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<tr>
<td></td>
<td>• Build and develop constituencies</td>
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<td></td>
<td>• Secure strong commitment to sector reforms</td>
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</table>
### Examples of Risk-Based Lessons

<table>
<thead>
<tr>
<th>Lack of government capacity for entering into partnerships with the private sector in supplying electricity hampers achievement of sector objectives.</th>
<th>Develop supportive policy, legal, and regulatory frameworks</th>
</tr>
</thead>
</table>
| Poor coordination of sector interventions leads to inefficient use of scarce resources.                                                                                                                | Hold meetings and discussions to foster coordination among development partners  
Sustain close interaction among planning agencies, executing agencies, and other stakeholders |

#### Organizational

<table>
<thead>
<tr>
<th>Inadequate financial management capacity (computerized planning, monitoring, and reporting) of staff in sector utilities impairs decision making.</th>
<th>Provide technical and financial assistance for strengthening financial management capacity, computerization, and other related aspects</th>
</tr>
</thead>
</table>
| Inadequate procurement expertise and knowledge of applicable procedures and regulations lead to a lengthy procurement process and prolonged project implementation.                                   | Conduct procurement training  
Deploy procurement specialists to assist executing agencies |

#### Sector Operations

| Poor quality checks lead to the use of faulty transmission equipment and impair service delivery.                                                                                                         | Conduct rigorous checks to mitigate risks from faulty equipment and impaired technical operating performance  
Implement regular inspection of the transmission line as part of the maintenance program |
<table>
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<tr>
<th>Examples of Risk-Based Lessons</th>
<th>Examples of Risk Mitigation Measures</th>
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</table>
| Defective or tampered electric meters and collusion with power utility staff in misreporting power consumption provide opportunities for corruption. | • Use prepaid meters  
• Implement telemetering  
• Institute punishment for corrupt behavior                                                                 |
| Program and/or Project Level                                                                 |                                                                                                      |
| Inappropriate choice of modality and phasing of electricity sector reforms lead to unrealistic implementation schedules and overambitious milestones. | • Conduct an in-depth study of sector reforms and formulate different options  
• Adopt the cluster approach to allow reform actions to be prioritized and sequenced in phases |
| Failure to plan and resolve issues on land acquisition, resettlement, and right-of-way during project design delays project implementation. | • Confirm land availability for power infrastructure projects  
• Have a resettlement and compensation plan  
• Secure statutory clearances in advance  
• Include a resettlement specialist to advise on right-of-way issues |
| Lack of meaningful consultations with key stakeholders and weak project ownership impair project outcomes. | • Conduct informed stakeholder consultations on the project  
• Initiate a political economy assessment  
• Launch an information campaign  
• Engage in building consensus among stakeholders to mitigate risks from public opposition to the project |
| Unrealistic project cost estimates lead to inefficient use of scarce resources.                  | • Rigorously consider inflation and currency depreciation factors  
• Conduct an analysis of sector and country experience with cost variations  
• Carefully verify the demand for the proposed project components  
• Compare cost estimates with the latest bidding prices of similar projects  
• Have a more realistic estimate of civil works components and of the operation and maintenance components |
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<tr>
<th>Examples of Risk-Based Lessons</th>
<th>Examples of Risk Mitigation Measures</th>
</tr>
</thead>
</table>
| Lack of commitment to the project and weak capacity of project implementers impede achievement of project objectives | • Recruit international and domestic experts for specific needs  
• Provide technical assistance for developing the capacity of project management  
• Ensure the recruitment of committed, well-trained, and efficient implementation staff |
| Weak monitoring and evaluation systems impede informed decision making, tracking of project results, and compliance with environmental and social safeguards. | • Develop the capacity for monitoring and evaluation through technical assistance  
• Ensure the conduct of reliable and timely data collection |
| Non-implementation of ecological management and of continuing environmental and social mitigation measures impairs the sustainability of power projects. | • Provide a dedicated fund for continuing mitigation measures after project completion (e.g., for hydropower projects) |

Source: ADB project reports and evaluation studies. Various years. Manila.
Learning from the Experience of Other Development Partners

Electricity reforms. Valuable lessons can be drawn from the experience of other development partners that are active in the electricity sector, such as the World Bank Group (e.g., World Bank, International Finance Corporation, and Multilateral Investment Guarantee Agency) and the European Bank for Reconstruction and Development. Both groups are involved in Asia, the latter specifically in Central Asia. Appendix Tables A.1 and A.2 call attention to the complexity of electricity sector reforms. These arise from the multiple dimensions associated with reform—political, social, legal, regulatory, and techno-economic—and the intricacies inherent in consensus building and sustaining stakeholder commitment. Consequently, preset solutions are not appropriate. The timing of reforms appears crucial because political and economic turmoil can impede efforts to carry the reforms forward. The sequencing of reforms requires a careful consideration of both strategic and tactical measures, given starting conditions. Strategic measures, for example, relate to appropriate power market structures, trading arrangements, and regulation while tactical measures pertain to the number of stages, timing of tariff increases, and power utility improvements, among others. Some examples of measures to mitigate risks to development effectiveness are (i) a clear and consensus-driven sector road map that is supported by stakeholders, (ii) due diligence in the design and implementation of program reforms, (iii) an independent sector regulation, and (iv) institutional capacity development.

Renewable electricity. Appendix Table A.3 shares some lessons associated with renewable electricity. For example, the lack of an enabling policy and regulatory environment deters the private sector and other investors from taking risks and putting in investments. Renewable electricity development, moreover, can be impeded by a lack of access to investment financing that allows long-term amortization of high capital costs to generate electricity at a competitive price. Substantial up-front costs, lack of consumer receptiveness, and inadequate social and environmental safeguards are additional risks that can compromise renewable electricity development. It is important to discuss with private developers, technology suppliers, and entrepreneurs to obtain a perspective of evolving market needs. What works in one country at one time may not be what is needed elsewhere at another time.

Given the enormity of the challenge and the magnitude of resource requirements, it is crucial to find a range of low-cost ways of sustainably providing renewable electricity services, and realistic ways of building the necessary infrastructure and human capacity. Pivotal to these are informed policy choices; building strong partnerships among multilateral and bilateral agencies, governments, the private sector, and civil society organizations; strengthening sector governance; and exercising due diligence in strategic planning, implementation, and evaluation.
Risks that can threaten ADB’s development effectiveness in the electricity sector are diverse. Such risks can emanate from

(i) weak institutional frameworks that influence sector performance;

(ii) non-independent sector regulation that can hamper efficiency, cost recovery, and sector viability;

(iii) human capacity weaknesses (in consensus-driven sector improvements, sector planning and management, financial management, and procurement) that can undermine sector operations;

(iv) corruption (in procurement and sector operations);

(v) shortfalls in project planning, management, monitoring, and evaluation; and

(vi) weak project ownership and commitment, and inadequate social and environmental safeguards, which can compromise effectiveness and sustainability of sector investments.

Various lessons draw attention to the need for risk mitigation. In this light, it is essential to understand carefully the country and sector contexts, the risk environment, the arrangements that foster and mitigate these risks, and the interactions among stakeholders and alliance networks. Where capacity constraints and systemic weaknesses occur in tandem, the risks are likely to be complex. Risk mitigation based on the experience of ADB and other development partners can provide valuable entry points. Care, however, is needed in mapping risks, assessing major risks, and tailoring practical risk mitigation measures to specific situations.
The Way Forward

What began on the part of ADB as interventions in electricity expansion and power sector reforms have increasingly shifted to investments in renewable and clean electricity. These have been largely driven by the imperatives of reducing vulnerability to dwindling fossil fuels, facilitating a transition to a low-carbon economy, and improving energy security. With this shift in focus come attendant challenges.

Financing to manage the investment requirements will continue to be a major challenge. In many cases, however, addressing structural aspects will be central to achieving a sustainable future for renewable electricity. Support for renewable electricity, for example, through enabling policy, legal, and regulatory frameworks will be needed, along with appropriate electricity transmission and distribution systems to deliver electricity efficiently from generation facilities to customers. Renewable electricity will demand concerted action on various fronts. Advancements and innovations in renewable electricity cannot thrive without informed choices and enabling environments, strategic planning and implementation, and transparent decision making. Commercialization of renewable electricity technologies, in particular, will call for creative and innovative ways of increasing their affordability and accessibility to customers.

Effective organizations, moreover, are needed to boost the promotion and adoption of renewable electricity. Pivotal to this are stepping up a program for policy and technical research, developing efficient ways to store electricity, and accelerating knowledge sharing on good practices. Also important are designing and implementing appropriate programs and projects; improving risk mitigation; strengthening financial, technical, and managerial capacities; and implementing good governance practices that lead to transparency, participation, predictability, and accountability. These can be done by leveraging financial resources and technical assistance to develop and implement programs and projects and to upgrade the existing expertise and resource database for renewable electricity.

ADB’s role in assisting developing member countries in the transfer and deployment of renewable electricity technologies will be valuable. As demand for fossil fuels outstrips environmentally and economically sustainable supplies, securing a sustainable electricity supply will be imperative. Meeting electricity demand by balancing variable power sources (solar and wind) and providing support from constant power sources is crucial. With the increased viability of new and renewable sources of energy and the option for off-grid, community-based electricity supply, ADB can seek out renewable electricity projects for financing. Facilitating wider deployment of renewable electricity technologies will call for raising awareness, promoting incentives to encourage their use, and promoting financing packages that share risks and lower costs. Sustaining policy dialogue, strengthening multilevel partnerships, and promoting informed choices will help spur coherent and concerted action toward an accelerated shift to renewable electricity.
This appendix presents published lessons from the experience of other development partners, such as the World Bank Group (e.g., World Bank, International Finance Corporation, and Multilateral Investment Guarantee Agency) and the European Bank for Reconstruction and Development. Tables A.1 and A.2 present the reforms in the electricity sector while Table A.3 highlights the lessons from renewable electricity. The subsequent tables also present information on risk mitigation measures whenever these are available or applicable. In many cases, however, published lessons do not necessarily integrate risk mitigation measures into the discussion.

Table A.1 World Bank Group—Lessons from Electricity Sector Reforms

<table>
<thead>
<tr>
<th>Area</th>
<th>Lesson</th>
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<tbody>
<tr>
<td>Political nature of reform</td>
<td>Power market reform is inherently a political process.</td>
</tr>
<tr>
<td></td>
<td>It is extremely difficult to carry out structural reforms, and attract and sustain private investors during conditions of economic and political turmoil.</td>
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<tr>
<td></td>
<td>In a viable reform process, political will is usually a critical factor that supports necessary policies such as an increase in electricity prices.</td>
</tr>
<tr>
<td>Regulation</td>
<td>Policies that introduce competition among power generation utilities without reforming distribution and retail consumer services impair the effectiveness of the overall sector reforms.</td>
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<td>Risk mitigation: Carefully plan the sequence of reforms, taking full consideration of starting conditions.</td>
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<td></td>
<td>It is unrealistic to expect that a new regulatory system will be fully functioning and credible as soon as it is formally created. Hence, the development of regulatory capacities is important.</td>
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<td>Risk mitigation: Provide technical and financial assistance for developing the capacity of the sector regulator.</td>
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<td>Area</td>
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<tr>
<td>Public regulation works better under a transparent, formal regulatory process. Informal oversight with noncommercial objectives typically imposed on state-owned utilities is not as effective.</td>
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<tr>
<td>A regulatory agency needs to have a legal status to maintain its autonomy from political and market influences, and to have the authority to set parameters and monitor the implementation of contracts. Autonomy, transparency, and accountability are vital for regulatory credibility, which is necessary for attracting long-term investment. Risk mitigation: (i) support independent regulation for the sector; (ii) have an independent, nongovernment expert panel to conduct price reviews to shield regulatory decisions from political interference; and (iii) strengthen sector governance.</td>
<td></td>
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<tr>
<td>State-owned utilities can operate at high standards of efficiency and management performance if governed by effective commercial principles. This becomes possible because their commercialization is premised on achieving commercial standards in management practices, in financial performance, and in the pricing of their products and services.</td>
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<tr>
<td>A transfer of power utility ownership from the state to the private sector is insufficient for achieving expected benefits. Risk mitigation: Put in place the necessary legal, regulatory, and other changes to support private sector participation.</td>
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<tr>
<td>Political risk guarantees allow private investors to raise funds from the capital market, which are needed for efficiency improvements. The public sector will remain the main source of investment for segments of the power market kept under state ownership as a matter of policy. The public sector will remain an important source of investment for the power sector when country and sector risks deter private investors. Public investment may also be needed for new power supply capacity in segments of the power market that are suited to competitive pressures, but where conditions are currently unattractive to private capital.</td>
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<tr>
<td>The roles of private participants in the power sector need to match their capacity to take on investment risks under specific country conditions.</td>
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<td>Area</td>
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<tr>
<td>Procurement</td>
<td>For greater benefit, it is critical to select independent power producers using transparent and competitive processes. Initial contracts with independent power producers were concluded under non-transparent processes that attracted allegations of corruption. Risk mitigation: Enforce transparent and competitive procurement practices.</td>
</tr>
<tr>
<td></td>
<td>Varying configurations and specifications proposed by bidders and the lack of capacity to evaluate tenders hamper bid evaluation.</td>
</tr>
<tr>
<td></td>
<td>Risk mitigation: (i) develop procurement capacity, (ii) deploy procurement specialists, and (iii) adopt modular or standardized system packages.</td>
</tr>
<tr>
<td></td>
<td>Inadequate on-site supervision and lack of quality assurance controls can impair optimal use of procured resources.</td>
</tr>
<tr>
<td>Strategic elements of power market reform</td>
<td>Power market reform has many dimensions—political, social, legal, and techno-economic. Preset solutions are not appropriate.</td>
</tr>
<tr>
<td></td>
<td>Power market reform must be adapted to starting conditions.</td>
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<tr>
<td></td>
<td>Power market reform is a process, not an event.</td>
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<tr>
<td>Implementing power market reform</td>
<td>Overall, reform implementation has been constrained by lack of country commitment, macroeconomic and political crises, and lack of experience among reform practitioners in political economy.</td>
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<td>Reforming the power sector is a long-term process that carries political risks for governments.</td>
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<td></td>
<td>In countries with privatized power sectors, governments need to establish conditions that lead to the broadest scope for competition. Otherwise, the sharing of efficiency gains can become inequitable.</td>
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<td></td>
<td>Sequencing of power market reform raises both strategic and tactical concerns. Strategic issues include the design of the new power market structure, the arrangements for wholesale power trading, the roles of public and private participants, and the attendant reforms to the market regulation. Tactical issues include the number of reform stages, the timing of tariff increases relative to service improvements, the order of privatizing the distribution and generation entities, and the extent of improving power utilities before they are turned over to the private sector.</td>
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</tbody>
</table>
### Area | Lesson
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**Risk mitigation:**

(i) Government needs to incorporate its strategic and tactical decisions in an explicit policy for reforming its power sector. This must be the first step of the reform process to ensure that all parties understand the reform. Consultations to generate consensus for supporting the reform must also be undertaken, and a road map for implementing the reform must be developed.

(ii) The road map needs to be adapted during reform implementation in response to (a) unexpected developments (e.g., strong and persistent opposition of the power utility’s labor force, political interference in tariff setting, and absence of financial discipline at the level of the power utility); (b) difficulties in recovering the costs of operational efficiency (typically large technical and commercial losses) under tariff orders, both for losses incurred in the year covered by the order and for unrecovered losses in previous years; (c) unexpected severe disruptions to the power supply, such as a drought in a predominantly hydropower system; and (d) a change of government that threatens to hold up key stages of the reform or even requires substantial changes to significant elements.

In some cases, the sustainability of the reform is threatened by political and other factors. Political manipulation of tariffs is a major threat.

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<tbody>
<tr>
<td>Political nature of reform</td>
<td>Sensitivity to the political realities surrounding sector reforms and tariffs is important. Risk mitigation: (i) conduct broad-based consultations; (ii) prioritize and set realistic goals, given the country’s state of transition; and (iii) implement reforms carefully.</td>
</tr>
<tr>
<td></td>
<td>Multilateral development banks can influence governments in making difficult political decisions about commercialization and privatization of state-owned power utilities. Influence through policy dialogue, however, may be weak when policy objectives run counter to the personal interests of key government officials. There is a need to temper expectations in such cases.</td>
</tr>
<tr>
<td>Regulation</td>
<td>Lack of attention to deficiencies in the regulatory framework and to political risks exposes electricity projects to financial risks that are difficult to manage. The risks are particularly high in retail electricity supply, where political interests and social concerns tend to override economic and commercial considerations. Risk mitigation: Conduct a thorough assessment of whether or not it is opportune to support business initiatives in an unfavorable political and regulatory environment.</td>
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<tr>
<td></td>
<td>Transition to a market economy may be achieved by phasing in tariff increases into a socially acceptable tariff structure.</td>
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<tr>
<td></td>
<td>Regulatory reform is the key to securing power tariff increases and private sector participation.</td>
</tr>
<tr>
<td>Procurement</td>
<td>Procurement consultants with broad and relevant experience are needed to write and evaluate tenders, vet supplier capabilities, cautiously view bidders affiliated with politicians or executing agencies, draft enforceable covenants, and train local staff.</td>
</tr>
<tr>
<td>Project design and implementation</td>
<td>A key strategy is to divide large and complex projects into stages, require specific objectives to be accomplished before further loans are disbursed, and support goal achievement with graduated technical assistance.</td>
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<td></td>
<td>In assessing a power project, it is important to study it from an energy system perspective encompassing power load balance, pattern of energy usage, cross subsidies, future demand, and competing sources of power supply.</td>
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</tbody>
</table>
To promote transition to a market economy and to reduce risks, it is essential to coordinate with development partners, nongovernment organizations, and other stakeholder groups. In conflict resolutions, it is important to provide a voice to executing agencies and client governments. Sharing information and monitoring costs, especially in countries where economic decisions are distorted by nepotism and cronyism, is likewise vital.

Large and controversial projects, such as hydropower dams, affect many stakeholders. Care must be taken to inform and involve local communities, nongovernment organizations, and other stakeholder groups when designing and implementing projects.

**Risk mitigation:** (i) formulate a strategy and execute a public information campaign, (ii) put in place a body for certifying environmental management systems, (iii) support environmental objectives with binding agreements on sanctions, (iv) set reasonable objectives in energy efficiency projects, and (v) mobilize grants for addressing climate change.

Technical assistance can extend a project’s coverage to address transition and other issues, or plan for a large project. Where attitudes and practices need to be changed, allocate financial resources and time to build public awareness of the problem within the affected community and secure a commitment to rectify the problem.

**Risk mitigation:** Clarify the sequence of and conditions for future development assistance.

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<tr>
<th>Category</th>
<th>Lesson</th>
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<tbody>
<tr>
<td>Renewable energy in general</td>
<td>Governments must be market enablers. The lack of an enabling policy and regulatory environment deters the private sector and other investors from taking risks and putting in investments.</td>
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<td>Risk mitigation: (i) support informed policy choices; (ii) provide a supportive institutional environment for renewable electricity, and (iii) implement good governance practices that lead to transparent, participatory, and accountable decision making and that reduce transaction cost.</td>
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<td>Lack of engagement with private sector interests—including private developers, technology suppliers, and entrepreneurs—blurs perspectives on market needs. What works in one country at one time may not be what is needed elsewhere or at another time.</td>
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<td>Weak coordination at both the local and global levels and among multilateral and bilateral agencies, governments, nongovernment organizations, the private sector, and community groups leads to duplication of projects and programs and inefficient use of scarce resources.</td>
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<td>Lack of access to long-term investment financing and inadequate instruments for risk mitigation and credit enhancement hamper the development of renewable electricity.</td>
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<td>Risk mitigation: (i) increase access to financing that allows amortization of high capital costs over the long-term to generate power at a competitive price, and (ii) identify alternative schemes to help reduce financial risks.</td>
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<td>Lack of credible information on issues such as wind, hydrological, and geothermal resources hampers planning and implementation.</td>
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<td>Risk mitigation: (i) improve the resource database, and (ii) promote information exchange and disseminate knowledge products.</td>
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<td>Capital investments must be linked closely to committing resources and building capacities to maintain facilities and provide reliable services over the long term. Too often, the provision of maintenance and repair is overlooked or the challenge is underestimated.</td>
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<td>Given the enormity of the challenge and the huge resources needed, it is necessary to find low-cost ways of sustainably providing renewable electricity services and more rapid ways of building the infrastructure and human capacity.</td>
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<td>Inadequate processes to engage and build partnerships with communities and other stakeholders undermine sustained commitment to action by all partners.</td>
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<td>Solar photovoltaic (PV)</td>
<td>Project designs must remain flexible and adaptable to address issues of affordability and other constraints. Where solar PV is least cost, market and willingness-to-pay studies must be conducted to confirm that consumers will indeed demand these systems before PV financing programs are established. Risk mitigation against non-affordability: (i) extend the eligibility of PV system sizes to smaller, more affordable systems, such as solar lanterns, where applicable; (ii) introduce loan guarantee facilities; (iii) provide capacity development support to entrepreneurs and microfinance institutions; and (iv) provide financial schemes to lower initial costs and improve access to financing.</td>
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<td>Quality must not be compromised. Quality of systems and ability to obtain spare parts and repair services must be an integral part of any PV electricity program. Risk mitigation: Consult qualified PV specialists who are aware of current good practices and who are not linked to potential suppliers to avoid conflict of interest.</td>
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<td>PV system operations can be problematic if maintenance and repair services are not provided and systems become inoperative. Some projects have not given careful attention to technical and institutional requirements, including post-project maintenance and recurrent funding. Risk mitigation: (i) secure funding for battery replacements and other recurrent costs, (ii) establish system ownership and responsibilities, (iii) put in place professional capacities for supervision, and (iv) install a reporting and tracking system to provide the data to monitor the maintenance services, track system performance, and anticipate problems.</td>
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<td>Hydropower</td>
<td>Hydropower must be developed cautiously in the context of broader development goals, including (i) responsible environmental management, (ii) poverty reduction and social development, (iii) integrated water and energy development, and (iv) institutional development. Good environmental, social, and institutional practices must be promoted. Hydropower schemes often have consequences on hydrological cycles and aquatic ecosystems. Private participation can help bring in additional skills in financial management, procurement, and project management. In hydropower projects, however, the inherent complexities (e.g., up-front costs, long project development period, and environmental and social impacts) compromise development, along with weak policy and regulatory environments. Risk mitigation: (i) build suitable public–private partnerships, (ii) provide an enabling environment for such partnerships, and (iii) enforce social and environmental safeguards. The extent of private sector participation and appropriate structure for public–private partnerships will depend on site- and country-specific circumstances. It will also depend on the type of project. Many small and medium run-of-river projects that have limited financial risk, low environmental consequences, and no resettlement complications are deemed bankable by the private sector. Infrastructure design based on poor hydrological data compromises performance and decreases water management benefits that the infrastructure ought to generate. Risk mitigation: Provide a reliable database to guide informed decision making. Wind power Large wind projects call for a commitment to open public consultation to avoid conflict over natural resources or disagreements over aesthetics. Risk mitigation: Conduct informed consultations with stakeholders and put in place functioning conflict resolution mechanisms. In offshore wind projects, investors may remain wary as long as parties bicker over who is responsible for the necessary grid upgrades. Risk mitigation: Clarify and enforce arrangements for grid upgrades.</td>
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### Category | Lesson
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Energy efficiency | An institutional framework for energy efficiency must consider several elements, as follows: (i) the country context; (ii) technical and management capacity; (iii) new legislation and rules to enable energy efficiency investment; (iv) level of integration between energy efficiency and other clean energy and clean development goals; (v) requirements for organizational autonomy, flexibility, and agility; and (vi) funding mechanisms.

| Lack of coordination and cooperation among governments at every level, the international community, the private sector, and civil society impedes efforts to improve energy efficiency. |

| Inability to find innovative ways to get appropriate technologies into the hands of consumers and gain consumer acceptance hampers support for energy efficiency. |

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References


References


Learning Lessons: Electricity Sector

This online edition of *Learning Lessons* illustrates how lessons from evaluation can augment ongoing efforts for mitigating risks (inclusive of governance and non-governance risks) and enhance the development effectiveness of ADB assistance in the electricity sector. All lessons are illustrative and are not meant to be interpreted as recommendations. The challenges and solutions cannot be generalized as they differ from one scenario to another, given the country and sector contexts.

About the Asian Development Bank

ADB’s vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region’s many successes, it remains home to two-thirds of the world’s poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.