



Technical Assistance Report

Project Number: 42051
February 2008

Islamic Republic of Pakistan: Preparing the Sustainable Energy Efficiency Development Program

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 8 January 2008)

Currency Unit	–	Pakistan rupee/s (PRe/PRs)
Pre1.00	=	\$0.0163
\$1.00	=	PRs61.24

ABBREVIATIONS

ADB	–	Asian Development Bank
DMC	–	developing member country
EA	–	executing agency
GDP	–	gross domestic product
MW	–	megawatt
RRP	–	report and recommendation of the president
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	Targeted intervention
Sector	–	Energy
Subsector	–	Energy sector development
Theme	–	Sustainable economic growth, environmental sustainability, capacity development
Subtheme	–	Promoting economic efficiency and enabling markets; cleaner production, control of industrial pollution; institutional development

NOTE

In this report, "\$" refers to US dollars.

Vice President	L. Jin, Operations 1
Director General	J. Miranda, Central and West Asia Department (CWRD)
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I. INTRODUCTION

1. As part of its Energy Efficiency Initiative,¹ the Asian Development Bank (ADB) in close cooperation with the relevant stakeholders in Pakistan assessed² the country's energy efficiency framework. The findings suggest that Pakistan will achieve considerable economic and social benefits by improving the existing energy efficiency policy and practices and adopting new ones. These findings were presented to the Government of Pakistan in November 2007. The Government requested that ADB provide assistance in (i) creating an enabling policy and business environment for energy efficiency, and (ii) providing immediate financing of priority projects. The ADB Fact-Finding Mission visited Pakistan from 21 to 26 November 2007 and reached an understanding with the Government concerning the objective, scope, costs, financing, and implementation arrangements for this project preparatory technical assistance (TA).³ The TA will support the Government in developing a comprehensive energy efficiency investment program for Pakistan. The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. The Pakistan economy has grown at an unprecedented rate in the past 5 years. Coupled with the rapid population growth, this economic expansion is causing energy demand to increase sharply as Pakistan continues to industrialize and standards of living improve. The Government's Medium Term Development Framework 2005–2010 sets out a challenging program to achieve 8% annual growth in gross domestic product (GDP). To meet this target, energy consumption is forecast to grow at an average rate of 12% per annum, more than double the rate between 2000 and 2006. This will increasingly strain Pakistan's primary energy supply sources. Rising oil consumption and flat domestic production once again will trigger a rapid increase in oil imports, while declining domestic natural gas reserves—in the absence of substantial new discoveries—will require the country to import gas for the first time in its history, through both pipelines and liquefied natural gas shipments. Electricity consumption, projected to grow an average of 8% per annum until 2015 (although recent experience suggests much higher demand growth), will similarly require large power generation capacity additions. Higher energy demand and imports will also require massive investments in associated port terminals, storage facilities, refining capacity, pipeline and transmission networks, and surface fuel transport infrastructure.

3. During 2001–2006, primary energy supply increased 5.4% per year. Meanwhile, consumption of electricity rose at an average annual rate of 6.8%, natural gas by 10.4%, liquefied petroleum gas by 17.6%, and coal by 22.8%. Electricity use, in particular, is growing robustly across all sectors—industry, agriculture, domestic, and commercial—recording a 10.2% overall jump in 2005–2006, while generation increases lagged at 9.3% during the same period. Thus, the country faced serious peak electricity supply shortfalls of 1,500–2,000 megawatts (MW) during the summers of 2006 and 2007, necessitating significant forced outages (or load shedding) that curtailed economic activity and delivery of social services. System-wide transmission and distribution losses remain high at 24.8% of dispatched power. Despite

¹ ADB. 2006. *Report of the Energy Efficiency Initiative*. Manila. "Energy efficiency is defined as economic investments in energy generation, delivery and end-use equipment, facilities, buildings, and infrastructure that deliver higher useful energy outputs or services. Energy efficiency results in (i) lower consumption of energy, measured as energy input per unit of delivered output or service, and (ii) reduced emissions of greenhouse gases."

² ADB. 2007. *Implementing Energy Efficiency in Pakistan*. Manila. The report was prepared under ADB. 2006. *Technical Assistance for Supporting the Inception of the Energy Efficiency Initiative in Developing Member Countries*. Manila.

³ The TA first appeared in *ADB Business Opportunities* on 22 January 2008.

government efforts to electrify all villages, about 45% of the population still does not have access to grid-supplied electricity. A crisis in the energy sector has been looming for the past 2 years.

4. The Government is working to resolve the energy crisis and to keep up with growing energy demand. The Government's integrated power system development strategy aims to expand the system focusing on large investments in the power generation, transmission, and distribution subsectors. It also focuses on the development of an integrated energy model.

5. However, the Government lacks a comprehensive energy efficiency development road map and investment program. Past attempts failed to incorporate energy efficiency and energy conservation⁴ into policy, regulatory, institutional, and market frameworks. International experience indicates that the effective implementation and incorporation of energy efficiency into the policy mainstream requires concerted, long-term action and commitment. The Government must lead this commitment, which should be tuned to market realities across all economic sectors to help achieve the desired shifts in energy use practices, higher productivity, and benefits to social groups.

6. Pakistan's current and projected energy requirements, development needs, and resource shortages require immediate attention to improve the efficiency of energy supply and use across all economic sectors, where there is much room for improvement. Former efforts in this respect have demonstrated the need for a more vigorous, systematic, and long-term multi-stakeholder approach, marked by strong Government leadership and with optimal leveraging of external financiers and market players. The proper design, scope, and timing of such an initiative would have a significant impact on the viability and competitiveness of the large energy consuming infrastructure and capital accretion slated to take place in Pakistan's expanding economy over the coming decades. In addition, a sustained transition to a more energy-efficient economy will provide the country with numerous additional economic, financial, environmental, and social benefits that will expedite development.

7. A successful long-term national energy efficiency initiative requires (i) the integration of energy efficiency in all levels of national planning and public development spending; (ii) a comprehensive policy and regulatory framework; (iii) energy price and utility rate-setting reforms and incentives; (iv) a strong equipment standards, certification, and testing regime; (v) complementary alternative and renewable energy programs; and (vi) easy, widespread access to energy efficiency information, financing, products, and services by all categories and levels of energy market players and end users.

8. The energy efficiency assessment conducted under ADB's Energy Efficiency Initiative determined that Pakistan has a large and untapped energy efficiency market. It identifies several energy efficiency improvement opportunities in gas distribution (supply side) and in the government and residential sectors (demand side) that can be tapped into. These opportunities may be explored without extensive precursor preparations, detailed policy design, or framework

⁴ In Pakistan, the term "energy conservation" is sometimes used interchangeably with the term "energy efficiency". The definition of energy efficiency in this report covers many diverse and distinct market segments on the supply side and the demand side, all targeting the creation of a low-carbon, sustainable energy future. Market segments include supply-side efficiency in generation, transmission, and distribution; grid-connected and off-grid renewable energy; industrial energy efficiency, including changes in production technology; building end-use efficiency in commercial, governmental, and residential sectors; municipal infrastructure (street lighting, water, waste, and sewage); transport efficiency, including urban mass transit; biofuel use to substitute for fossil fuels; irrigation; and equipment and appliance standards. As such, for the purpose of clarity, the term energy efficiency is used.

development, achieving immediate energy savings and deferring additional supply requirements. Further refinement and expansion of such options could result in a portfolio of immediate, bankable energy efficiency investment options for Pakistan, which the Government and ADB may consider.

9. The Government and domestic consumers consume more than 60% of Pakistan's energy. The public sector is the most inefficient consumer, and the Government is looking for more efficient utilization and conservation measures. The Government is eager to procure and adopt energy efficient technology in its operations, including the use of efficient lighting and heating and cooling systems in existing and new buildings, and introduction of energy-efficient building codes.

10. The domestic sector currently uses 45% of the power supply. The most effective way to expedite the use of efficient compact fluorescent lamps by domestic consumers is to inject a large volume of such lamps into the market at a low price. This approach has been successful in several countries, where it has immediately reduced customers' monthly power bills. Preliminary analysis suggests that the introduction of 15 million high-quality compact fluorescent lamps into Pakistan's domestic market would save customers \$78 million over the lifetime of those bulbs (approximately 2 years). This money could be used more productively in the economy. In addition, 880 MW of power demand would be avoided. The cost of such additional new generation capacity would be \$1.15 billion (at \$1.3 million per MW).

11. Pakistan's gas distribution system is aging and is suffering from high technical losses (25–30% in some areas compared to industry standard 5%) that could be eliminated by replacing medium- and low-pressure pipes with more efficient, corrosion-free pipes. Natural gas accounted for half (43 billion cubic meters) of Pakistan's primary energy supply in 2006. A more efficient gas distribution system would result in significant national savings (up to \$580 million per year) and increased use of cleaner fuel by more domestic, industrial, and commercial consumers.

12. The Government is committed to acquiring and implementing a phased strategy for undertaking a systematic, broad-based national energy efficiency program. As a long-term development partner in the energy sector, ADB has been requested by the Government to provide support in (i) developing and implementing an integrated energy efficiency program and (ii) financing priority investment projects.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

13. Improved energy efficiency represents a least-cost development strategy for Pakistan with substantial benefits to the economy. Establishing a dynamic energy efficiency policy and business environment, while financing priority investment projects, is an essential component of Pakistan's energy policy and energy security strategy. The TA will enable the Government to develop and implement a comprehensive energy efficiency sector development program.

14. Efficient energy use in all sectors of the Pakistan economy will slow the overall rate of increase of energy demand to more manageable levels and reduce potential shortages. Improved energy efficiency will also (i) reduce large financial outlays required to develop additional energy supplies in the future; (ii) help minimize uneconomical standby capacity

required to cater to peak loads; (iii) reduce subsidy requirements; and (iv) defer transmission and distribution system expansion needs, thereby saving public funds and increasing returns on energy infrastructure investments.

B. Methodology and Key Activities

15. The TA will design a suitable program proposal that supports government efforts to establish an enabling policy and business environment for energy efficiency, and to provide immediate financing of priority projects. Key activities will include (i) an in-depth assessment of the energy efficiency market and the economy; (ii) an awareness-building program for energy efficiency through short-term policy and regulatory improvement recommendations, as well as targeted public relations programs; (iii) strategy and action guidelines for initiating a sustainable long-term national energy efficiency program; (iv) a road map for implementing the national energy efficiency program with corresponding investment plans; and (v) design of bankable investment projects.

16. The energy efficiency market assessment will comprise a detailed analysis of market potential and barriers; program design; resource (institutional, technical, manpower, material, and financial) evaluation; and effective organizational needs assessment for undertaking phased, prioritized energy efficiency and conservation interventions in all macroeconomic sectors and involving all stakeholder organizations as well as individual end-user interests (including those of the energy-poor and marginalized population segments).

17. The TA will develop recommendations for removing the institutional bottlenecks that have prevented government-sponsored energy efficiency and conservation programs and support mechanisms from more effectively nurturing a nascent energy efficiency industry and consumer culture.

18. After assessing the energy efficiency market, the TA will identify the potential commercial and economic drivers for energy efficiency. These will be further developed and implemented under the proposed loan by facilitating and promoting the local energy efficiency market and removing impediments and disincentives for corporate and end-user energy efficiency investments. A suitable public and private funding mechanism for financing energy efficiency projects will be devised and recommended. An appropriate transaction structure then will be developed for priority projects that, in the first phase, will require public-sector financing. The identified and proposed investment projects will be evaluated for technical, economic, and financial viability in accordance with ADB guidelines and national and ADB safeguard policies.

C. Cost and Financing

19. The TA is estimated to cost the equivalent of \$700,000. The Government has requested ADB to finance \$600,000 equivalent. The TA will be financed on a grant basis by the Technical Assistance Special Fund. The Government will finance the remainder of the local currency costs, equivalent to \$100,000, through in-kind contributions of the executing agencies. These will include office accommodation and facilities, local communication, counterpart staff, data, and other information needed for the TA. Detailed cost estimates are in Appendix 3. The Government has been advised that ADB's approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

20. The Planning Commission of Pakistan, the federal agency mandated to develop and implement major national programs and projects, will be the Executing Agency. The Planning Commission works under the overall direction of the Policy Board, which is chaired by the Prime Minister and comprises the deputy chairman and nine members of the Planning Commission, and 10 federal ministers. Various government and nongovernment agencies, institutions, and energy utilities and companies relevant to energy policy, legislation, planning, management, and implementation will be involved in the development of the energy efficiency program. The Planning Commission will support the implementation of the TA by allocating the required staff resources, appointing counterpart staff, and providing proper office facilities for the TA implementation team.

21. The TA will require about 14 person-months of international consulting services and 25 person-months of national consulting services. The outline terms of reference for the consultants are in Appendix 4. The TA will be carried out over 8 months beginning in March 2008. Tripartite workshops will be held after the submission of the inception, interim, and draft final reports. The consultants will prepare status reports for their specific work, highlighting any issues that could become critical for the timely completion of the TA. The consultants will arrange for other workshops and on-the-job training for Planning Commission staff as necessary. The international consultants will have practical knowledge and expertise in energy efficiency and demand-side issues, energy efficiency project management, project and energy economics, financial analysis and financial management, and energy-system planning. ADB will engage a consulting firm or consortium of firms in accordance with its *Guidelines on the Use of Consultants* (2007, as amended from time to time). Consultants will be recruited using the quality- and cost-based selection procedures, and simplified technical proposals will be requested. Equipment to be financed under the TA will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time).

IV. THE PRESIDENT'S DECISION

22. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$600,000 on a grant basis to the Government of Pakistan for preparing the Sustainable Energy Efficiency Development Program, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Creation of a dynamic energy efficiency policy and business environment, an essential component of Pakistan's least-cost energy development strategy</p>	<p>A national energy efficiency program approved by March 2009</p> <p>Priority energy efficiency investments made by 2010</p>	<p>Government decisions</p> <p>Annual national statistics</p> <p>Energy utility reports</p>	<p>Assumptions</p> <p>The program is implemented efficiently and effectively</p> <p>Program is approved and financing is available</p>
<p>Outcome</p> <p>Agreement on the sustainable energy efficiency development program design</p>	<p>Loan and program agreements signed by December 2008</p>	<p>Asian Development Bank (ADB) Board of Directors approval</p> <p>Loan and project agreements</p>	<p>Assumption</p> <p>Stakeholders agree and support the program design</p>
<p>Outputs</p> <p>The Government enabled to develop and implement a comprehensive energy efficiency program</p>	<p>In-depth assessment of energy efficiency market and economy completed by July 2008</p> <p>Short-term policy and regulatory improvement recommendations and targeted public relations programs developed by August 2008</p> <p>Strategy and action plans for initiating a long-term national energy efficiency program developed by September 2008</p> <p>Road map for implementing the national energy efficiency program with corresponding investment plans prepared by September 2008</p> <p>Priority investment projects identified and prepared by October 2008</p>	<p>Technical assistance implementation progress reports</p> <p>Consultations with Executing Agency</p>	<p>Assumption</p> <p>Government remains committed to reforms</p> <p>Risk</p> <p>Delays in project preparation and approvals</p>
<p>Activities with Milestones</p> <p>1.1 Technical assessment completed by July 2008</p> <p>1.2 Financial and economic analysis completed by July 2008</p> <p>1.3 Financial management assessment completed August 2008</p> <p>1.4 Social safeguard assessment reports completed August 2008</p> <p>1.5 Project feasibility report completed October 2008</p>			<p>Inputs</p> <p>ADB: \$600,000</p> <p>Government: \$100,000 equivalent</p>

INITIAL POVERTY AND SOCIAL ANALYSIS

Country/Project Title: Pakistan: Preparing the Sustainable Energy Efficiency Development Program

Lending/Financing Modality: Sector Development Program Department/ Division: Central and West Asia Department, Infrastructure Division

I. POVERTY ISSUES

A. Linkages to the National Poverty Reduction Strategy and Country Partnership Strategy

1. Based on the country poverty assessment, the country partnership strategy and the sector analysis, describe how the project would directly or indirectly contribute to poverty reduction and how it is linked to the poverty reduction strategy of the partner country.

The Government of Pakistan is committed to using economic development to reduce poverty. One way to tackle poverty by enhancing economic growth is through sustainable energy supply and access. This constitutes a national goal because of the energy sector's influence on achieving other development goals. Pakistan's economic growth is negatively impacted by the energy sector crisis. Despite recent efforts to increase capacity and supply, the entire energy system suffers from inefficient operations. Improved energy efficiency is a key component of the least-cost development and poverty-reduction strategy.

B. Targeting Classification

1. Select the targeting classification of the project:

General Intervention Individual or Household (TI-H); Geographic (TI-G); Non-Income MDGs (TI-M1, M2, etc.)

2. Explain the basis for the targeting classification:

The Government is committed to acquiring and implementing a phased strategy for undertaking a systematic, broad-based national energy efficiency program. This would allow for a revival and enhancement of existing energy efficiency capability in the country in the short and medium terms in a sustainable manner, while consolidating and expanding them in the medium to long term. Such a phased approach would call for a series of sequential and/or overlapping actions that could ultimately be mutually reinforcing and will require policy and investment support.

C. Poverty Analysis

1. If the project is classified as TI-H, or if it is policy-based, what type of poverty impact analysis is needed?

2. What resources are allocated in the project preparatory technical assistance (PPTA)/due diligence?

The project preparatory technical assistance (PPTA) team will be filled with appropriate skills and expertise to examine the overall social and economic policy aspects of the proposed energy efficiency program.

3. If GI, is there any opportunity for pro-poor design (e.g. social inclusion subcomponents, cross subsidy, pro-poor governance, and pro-poor growth)?

The proposed intervention will incorporate required social safety and protection measures that will be designed in accordance with the public needs. The program will be comprehensive and will require appropriate tariff reforms. Efficient energy use in all sectors of the Pakistani economy will help reduce the overall rate of increase of energy demand to more manageable levels and reduce potential shortages. Energy efficiency can reduce the large financial outlays required for developing additional energy supplies in future. It can also help minimize uneconomical standby capacity required to cater to peak loads, reduce subsidy requirements, and defer transmission system expansion needs, thereby saving public funds and increasing returns on energy infrastructure investments that could, in return, be directed towards social programs.

II. SOCIAL DEVELOPMENT ISSUES

A. Initial Social Analysis

Based on existing information:

1. Who are the potential primary beneficiaries of the project? How do the poor and the socially excluded benefit from the project?

The poor are disproportionately burdened by the unreliable and insufficient supply of energy resulting from inefficient use of energy resources. Compared to non-poor households, they are (i) less able to resort to alternative sources of power, and (ii) less diversified in income sources. The loss of an income source has a greater impact on a poor household. On the other hand, access to a reliable power supply can attract commercial and micro-industrial activities, which in turn may enable the poor to diversify income sources through the increased availability of employment opportunities.

2. What are the potential needs of beneficiaries in relation to the proposed project?

Access to power supply is also expected to improve households' living standards and give them new opportunities to generate income. Positive impacts are also expected in health, especially for women, following the shift from fuel to on-grid sources of electricity. Finally, a more reliable and secure supply of energy can drastically improve the quality of sanitation; health care; and other social services, particularly education.

3. What are the potential constraints in accessing the proposed benefits and services, and how will the project address them?

Although electrification and electricity consumption are not meant to be considered outcomes, they are considered fundamental inputs for poverty reduction and economic growth. Consumption patterns are skewed in terms of non-poor and poor consumers, as electricity consumption by the poor tends to be determined by affordability of appliances. Despite these patterns, the high connection ratios across most provinces suggest that capital investments in the power sector are inclusive of the poor in two ways: (i) directly as consumers and (ii) indirectly through the creation of off-farm employment opportunities in the private sector and economic growth.

B. Consultation and Participation

1. Indicate the potential initial stakeholders.

Various government and nongovernment agencies, institutions, and companies relevant to energy policy, legislation, planning, management, and implementation will be involved in the development of the energy efficiency program.

2. What type of consultation and participation (C&P) is required during the PPTA or project processing (e.g. workshops, community mobilization, involvement of nongovernment organizations and community-based organizations, etc.)?

Initial consultations with these stakeholders have been conducted under the Phase II of ADB's Energy Efficiency Initiative. The TA will conduct further consultation based on the findings from the above consultations.

3. What level of participation is envisaged for project design?

Information sharing Consultation Collaborative decision making Empowerment⁷

4. Will a C&P plan be prepared? Yes No Please explain.

Public awareness-building is a critical part of the energy efficiency program, thus consultations with stakeholder will be done at each stages of the design as well as implementation of the proposed program.

C. Gender and Development

1. What are the key gender issues in the sector/subsector that are likely to be relevant to this project/program?

Given the particular social and economic condition of women in the Pakistani society, gender will be carefully taken into account in undertaking participatory activities. Findings will be included in the project design.

2. Does the proposed project/program have the potential to promote gender equality and/or women's empowerment by improving women's access to and use of opportunities, services, resources, assets, and participation in decision-making? Yes No Please explain.

The proposed program targets the entire population, and will increase the access and quality of energy services which will result in higher personal savings from lower energy bills.

3. Could the proposed project have an adverse impact on women and/or girls or to widen gender inequality?

Yes No Please explain

No adverse impacts are expected from the proposed program.

III. SOCIAL SAFEGUARD ISSUES AND OTHER SOCIAL RISKS			
Issue	Nature of Social Issue	Significant/Limited/ No Impact/Not Known	Plan or Other Action Required
Involuntary Resettlement	The proposed program will not result in resettlement of persons or properties.	No Impact	<input type="checkbox"/> Full Plan <input type="checkbox"/> Short Plan <input type="checkbox"/> Resettlement Framework <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Indigenous Peoples	Certain positive impacts are expected, such as increased quality and access of energy services and resulting savings and improved employment opportunities.	No Impact	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input type="checkbox"/> Indigenous Peoples Framework <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Labor <input checked="" type="checkbox"/> Employment Opportunities <input type="checkbox"/> Labor Retrenchment <input type="checkbox"/> Core Labor Standards	Increased employment opportunities are expected due to increased access to energy.	No Impact	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Affordability	44% of the population still does not have permanent access to grid-supplied electricity. There is high willingness amongst the population to pay for these services.	No Impact	<input type="checkbox"/> Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Other Risks and/or Vulnerabilities <input type="checkbox"/> HIV/AIDS <input type="checkbox"/> Human Trafficking <input type="checkbox"/> Others (conflict, political instability, etc.), please specify	Not applicable	No Impact	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
IV. PPTA/DUE DILIGENCE RESOURCE REQUIREMENT			
<p>1. Do the TOR for the PPTA (or other due diligence) include poverty, social and gender analysis and the relevant specialist/s? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, please explain why.</p> <p>2. Are resources (consultants, survey budget, and workshop) allocated for conducting poverty, social and/or gender analysis, and C&P during the PPTA/due diligence? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, please explain why.</p>			

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank Financing ^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	350.00
ii. National Consultants	100.00
b. International and Local Travel	60.00
c. Reports and Communications	15.00
2. Equipment ^b	10.00
3. Training, Seminars, and Workshops	15.00
4. Surveys	15.00
5. Miscellaneous Administration and Support Costs	10.00
7. Contingencies	25.00
Subtotal (A)	600.00
B. Government Financing	
1. Office Accommodation	25.00
2. Transport	10.00
3. Remuneration and Per Diem of Counterpart Staff	50.00
4. Others	15.00
Subtotal (B)	100.00
Total	700.00

^a Financed by the Asian Development Bank's technical assistance funding program.

^b Equipment to be procured will include the following: desktop computer with standard office software, printer, scanner, photocopier, and facsimile machine.

^c Includes office facilities and local communication.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Background

1. The Government of Pakistan is developing a comprehensive energy efficiency strategy through incorporating energy efficiency¹ and energy conservation² into mainstream policy, regulatory, institutional, and market frameworks. The Asian Development Bank (ADB) is providing a technical assistance (TA) to the Government to design a suitable sector development program proposal that supports the Government efforts to (i) establish an enabling policy and business environment for energy efficiency and (ii) provide immediate financing of priority projects.

2. In close cooperation with the relevant stakeholders in energy efficiency and under the guidance of the Energy Wing of the Planning Commission of Pakistan (the Executing Agency [EA]), the TA will aim to (i) develop coherent strategy and action guidelines for initiating a sustainable long-term national energy efficiency program; (ii) design activities leading to the development of a full-scale, national energy efficiency program; and (iii) achieve immediate energy efficiency improvements by implementing no- or low-cost actions, fiscal measures, and policy directions, and by removing obvious anomalies and impediments in this respect to the extent possible.

B. Inputs

3. An international firm will be engaged for this TA. The consulting firm will organize a multidisciplinary team of experts composed of international and domestic consultants to perform the TA assignment. The consulting firm will be responsible for the quality and timely delivery of the entire assignment to meet the stated objective and output requirements. It is expected that this assignment would require 14 person-months of international consultants' input and 25 person-months of domestic consultants' input. The terms of reference of the consulting firm is described below pertaining to each component of the TA.

C. Terms of Reference

1. General

4. The consulting firm will conduct and prepare (i) an in-depth energy efficiency market and economic assessment; (ii) awareness building for energy efficiency through short-term policy and regulatory improvement recommendations, as well as developing targeted public relations programs; (iii) strategy and action guidelines for initiating a sustainable, long-term national energy-

¹ ADB. 2006. *Report of the Energy Efficiency Initiative*. Manila. "Energy efficiency is defined as economic investments in energy generation, delivery and end-use equipment, facilities, buildings, and infrastructure that deliver higher useful energy outputs or services (e.g., lighting, heating, refrigeration, pumped water). Energy efficiency results in (i) lower consumption of energy, measured as energy input per unit of delivered output or service, and (ii) reduced emissions of greenhouse gases."

² In Pakistan, the term "energy conservation" is sometimes used interchangeably with the term "energy efficiency". The definition of energy efficiency in this terms of reference covers many diverse and distinct market segments, both on the supply side and the demand side, all targeting the creation of a low-carbon, sustainable energy future. Market segments include: supply-side efficiency in generation, transmission, and distribution; grid-connected and off-grid renewable energy; industrial energy efficiency, including changes in production technology; building end-use efficiency in the commercial, governmental, and residential sectors; municipal infrastructure (street lighting, water, waste, and sewage); transport efficiency, including urban mass transit; biofuel use to substitute for fossil fuels; irrigation (e.g., efficient pumps, foot valves and piping); and equipment and appliance standards. As such, for the purpose of clarity, the term energy efficiency is used.

efficiency program; (iv) a road map for implementing the national energy efficiency program with corresponding investment plans; and (v) identification and design of bankable investment projects.

a. Energy Efficiency Market Assessment

5. The energy efficiency market assessment will consist of a detailed analysis of market potential and barriers, program design, resource (institutional, technical, manpower, material, and financial) evaluation, and effective organizational needs assessment for undertaking phased, prioritized energy efficiency and conservation interventions in all macroeconomic sectors and involving all stakeholder organizations as well as individual end-user interests (including those of the energy-poor and marginalized population segments). The consulting firm will conduct the market and economic assessment in accordance with a methodology agreed with the EA and ADB. The consultant will be required to conduct baseline data surveys. All survey-related data and materials will be turned over to ADB after completion.

b. Short-Term Policy Recommendations and Awareness-Building

6. The consulting firm will further develop recommendations for removing the institutional bottlenecks to government-sponsored energy efficiency and conservation programs and support mechanisms playing a more effective role in nurturing a nascent energy efficiency industry and consumer culture.

7. The consulting firm will help the Government to identify and rectify existing policy and regulatory anomalies or provisions impeding energy efficiency and energy conservation implementation. These anomalies may include import duties and sales taxes on energy efficiency equipment (e.g. compact fluorescent lamps, light emitting diodes, high-pressure sodium and metal halide lighting, variable speed drives, cogeneration systems, power factor correction capacitors, compressed natural gas conversion kits, computerized engine diagnostic and tune-up equipment, energy control and management devices, thermal insulation materials, and renewable energy equipment, etc.) and possible surcharges on trade in inefficient items (e.g. incandescent lamps, used and reconditioned vehicles and machinery, etc.).

8. The consulting firm will assist the Government in building leadership and commitment by initiating mandatory public-sector energy efficiency practices in acquiring, constructing, and using new assets where possible (e.g. roof insulation, compact fluorescent lamp replacement, vehicle fleet tune-up and conversion, thermostat set points, etc.) with appropriate budgetary allocations for estimated annual compliance costs.

c. Energy Efficiency Program Development Guidelines

9. The Government is looking to develop and implement a phased strategy for undertaking a systematic, broad-based national energy efficiency program. This would allow for a revival and enhancement of existing energy efficiency capability in the country in the short and medium terms in a sustainable manner, while consolidating and expanding them in the medium to long term. Such a phased approach would call for a series of sequential and/or overlapping actions that could ultimately be mutually reinforcing and will require unwavering support from the Government and the donor community.

10. Based on past national and international experience, the consulting firm will prepare a set of comprehensive guidelines for the Government to develop the national energy efficiency program. The guidelines will recommend methods and approaches to undertake the following:

(i) conduct an economic and comparative benefit-cost analysis of key energy efficiency investments in major energy-consuming sectors (industry, buildings, transportation, agriculture, commercial, and residential); (ii) prioritize focus areas, and develop realizable quantitative implementation targets and schedules; (iii) define verifiable energy efficiency indicators and performance monitoring methods; (iv) study energy pricing reforms to highlight tariff and price distortions and disincentives for energy efficiency; and (v) evaluate and refine appropriate tax/subsidy, tariffs, structures, and price-based incentives and penalties (time-of-day tariffs, power factor penalties, smart subsidies, system benefit charges, rate-basing, shared savings, road use charges, etc.) for inducing improved energy supply and use practices.

d. Roadmap and Investment Plan for Energy Efficiency Development

11. As part of the Government's commitment to a national energy efficiency program, the Government is looking to adopt a roadmap for implementing the energy efficiency program. After the in-depth assessment of the energy efficiency market, the consulting firm will identify the potential commercial and economic drivers for energy efficiency, which will be further developed and implemented under the energy efficiency program. The consulting firm will develop an investment plan corresponding to the roadmap and devise suitable options and mechanisms for financing energy efficiency projects in Pakistan.

e. Investment Project Proposal

12. Given the estimated large potential for energy efficiency improvements in Pakistan, several opportunities exist that can be readily tapped into—without the need for extensive precursor preparations, detailed policy design, or framework development—for achieving immediate payback in terms of energy savings and deferred additional supply requirements. Further refinement and expansion of such options could result in a portfolio of immediate, bankable energy efficiency investment options for Pakistan that may be considered by the Government, ADB, and other financing agencies.

13. Some of these options have been identified in the report *Implementing Energy Efficiency in Pakistan*³ completed under ADB's Energy Efficiency Initiative Phase II. The consulting firm will further investigate these investment project opportunities and assist the Government in developing specific project proposals for ADB public-sector financing. The consulting firm will (i) recommend an appropriate transaction structure and specific funds flow and disbursement mechanism for the investment project; (ii) evaluate the executing and implementation agency's capacity for managing the fund based on such fund flow and disbursement mechanism; (iii) conduct a financial management assessment of the executing/implementing agencies; and (iv) evaluate the identified projects for technical, economic, and financial viability in accordance with ADB guidelines and national and ADB safeguard policies.

2. Energy-Efficiency Specialist and Team Leader (5 person-months international)

14. The energy efficiency specialist and team leader will be responsible for the overall administration of the TA assignment, providing the required support the EA, and reporting to the ADB project officer. The consultant will provide technical and management expertise in the application of energy efficiency practices and technologies in development of the national energy efficiency program. The energy efficiency specialist and team leader is required to have a minimum

³ ADB. 2007. *Implementing Energy Efficiency in Pakistan*. Manila. The report was prepared under ADB. 2006. *Technical Assistance for Supporting the Inception of the Energy Efficiency Initiative in Developing Member Countries*. Manila.

of 15 years' experience in energy sector projects, at least 7 years of which were dedicated to the field of energy efficiency. The energy efficiency specialist and team leader should have previous working experience in the Asia and Pacific region, particularly within the developing member countries (DMCs) of ADB. The consultant must also have demonstrated experience in energy efficiency issues, whether in the area of policy intervention or market transformation, and in the design and monitoring of energy efficiency projects. The tasks of the energy efficiency specialist and team leader will include, but will not be limited to

- (i) assisting the Government in evaluating energy efficiency investment conditions and conducting the energy efficiency market assessment;
- (ii) reviewing the national policy and regulatory frameworks in Pakistan (energy efficiency and energy conservation laws, decrees, ordinances, regulations, standards, specifications, and utility demand-side management practices) and, where applicable, policy and regulatory framework at the provincial level;
- (iii) reviewing energy efficiency stakeholder assessments (role of government agencies, regulators, certification bodies, generators, transmission and distribution companies, financial institutions, consultants, designers, specifiers, contractors, suppliers, and energy service companies in the development and implementation of energy efficiency projects);
- (iv) conducting a review of existing energy efficiency technologies;
- (v) preparing feasibility reports for investment projects to be funded under ADB public-sector financing;
- (vi) coordinating all TA activities related to the selection, engagement, and supervision of international and national consultants; reviewing, overseeing, and ensuring the quality of their outputs under the assignment;
- (vii) developing data requirements for the national consultants;
- (viii) preparing required reports containing findings, recommendations, and all other outputs of this consulting assignment according to schedule to be determined at the start of the assignment; and
- (ix) assisting in preparation of relevant sections of the report and recommendation of the president (RRP).

3. Energy Efficiency Finance Specialists (3.5 person-months international and 8 person-months national)

15. The energy efficiency finance specialists will devise a suitable financing mechanism (public sector) for energy efficiency improvement projects identified by the team, and assess the financial viability of proposed investment projects in accordance with ADB's financial analysis and financial management policies and guidelines. The international consultant should have a minimum of 10 years of experience in financial management and analysis of energy projects, at least 5 years of which were dedicated to the field of energy efficiency. The consultant should have previous working experience in the Asia and Pacific region, particularly within the DMCs of ADB. More importantly, the consultant must have demonstrated experience in energy efficiency issues and in the design of financial instruments with the objective of accelerating the implementation of energy efficiency projects in country or regional markets. The tasks of the energy efficiency finance specialists will include, but will not be limited to

- (i) gathering information on various energy efficiency financing models at the project-lending and the local financial institution levels with the objective of capturing model strengths, weaknesses, and lessons learned;

- (ii) evaluating financial barriers toward financing energy efficiency projects, including demonstrating the specifics of such operations;
- (iii) reviewing the experience of the past and ongoing programs with financial support to energy efficiency projects; draw lessons of success and difficulties of those programs;
- (iv) assessing the capacity of local financial institutions with respect to providing funding to energy efficiency projects; assessing their perception of risks and their capability to appraise energy efficiency projects;
- (v) estimating the market potential for financing in energy efficiency projects taking into account the results of (i), (ii), (iii), and (iv) above;
- (vi) suggesting a plan to upgrade capability for local financial institutions with respect to risk mitigation and project appraisal;
- (vii) preparing guidelines to fill the need for appropriate financing for energy efficiency projects; assessing the capability of local financial institutions;
- (viii) conducting stakeholder consultations with potential borrowers from industry, owners of commercial buildings, utilities, municipalities, and local financial institutions (discussions will focus on the potential demand for financing and, and the most efficient means way if designing its structure and operations);
- (ix) determining requirements for supporting such financing mechanisms and developing governance and reporting structure;
- (x) conducting financial analysis of projects in accordance with ADB's guidelines for *Financial Management and Analysis of Projects (2005)*;
- (xi) performing financial impact analyses of the projects to determine their financial rates of return, identifying all risks to project revenue and costs, and conducting relevant sensitivity analyses;
- (xii) preparing, together with the engineer, an entire project cost estimate, separating foreign exchange and local currency, including physical and price contingencies, interest during construction, commitment fees, and other financing charges;
- (xiii) reviewing the most current audited and/or unaudited financial statements of proposed project entities to assess financial performance;
- (xiv) reviewing recent audited project accounts of proposed project entities to determine proper accounting and cost control;
- (xv) assessing proposed project entities' financial management capabilities, including a review of earlier ADB and other lender studies if available, and a review of available prior diagnostic studies on Pakistan's accounting and auditing practices; and
- (xvi) preparing required reports containing findings, recommendations, and all other outputs of this consulting assignment, including assisting in preparation of relevant sections of the RRP and appendix to the RRP. These reports will briefly summarize past historical and projected financial performance, which will include 10-year *pro forma* financial statements (balance sheet, income statement, statement of cash flows) for proposed project entities.

4. Energy Efficiency Engineers and Project-Design Specialists (2 person-months international and 7 person-months national)

16. The energy efficiency engineer and project-design specialists will be responsible for all technical aspects under the TA activities. The consultants will provide required technical expertise in the application of energy efficiency technologies and practices (i.e. the supply side of the power sector, various end-use sectors, and the transport sector) in the design of the national energy efficiency program and in the design of the investment projects. The international consultant should have a minimum of 12 years' experience in energy sector projects, at least 7 years of which were

dedicated to the field of energy efficiency. Previous working experience in the Asia and Pacific region, particularly within the DMCs of ADB is preferred. More importantly, the consultants must have demonstrated experience in energy efficiency issues and in the design and monitoring of energy efficiency projects. The tasks of the energy efficiency engineer and project-design specialists will include, but will not be limited to

- (i) reviewing the proposed investment projects and assisting the EA to prioritize them;
- (ii) determining whether the proposed projects provide cost-effective solutions;
- (iii) preparing the engineering designs and technical specifications of all projects proposed for ADB funding, in accordance with relevant technical standards;
- (iv) preparing a bill of quantities for all materials specified in the engineering design, and calculate detailed cost estimates for each contract package (break down into foreign exchange and local currency);
- (v) preparing feasibility studies on identified investment projects and verifying completeness of information (i.e. energy savings assessment, project cost estimates, economic and financial internal rate of returns, project implementation schedule, identification of implementation risks and mitigation, etc.);
- (vi) preparing project implementation and procurement arrangements, including contract packaging in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time);
- (vii) assessing capacities of the entities to implement a project; proposing measures for capacity building in the case of inadequate capacity; and preparing terms of reference for project implementation consulting services; and
- (viii) preparing a report summarizing the outputs of each task and assisting in preparing relevant sections of the RRP.

5. Energy Economists (2 person-months international and 6 person-months national)

17. The energy economists will assess the macroeconomic rationale for the national energy efficiency program and evaluate the economic viability of proposed investment projects in accordance with ADB's economic analysis guidelines. The international consultant should have a minimum of 12 years' experience in energy economics and analysis of energy projects, at least 5 years of which were dedicated to the field of energy efficiency. The international consultant should have previous working experience in the Asia and Pacific region, particularly within the DMCs of ADB. The consultants must have experience in demonstrating the economic justifications for energy efficiency investment projects. The tasks of the energy economists will include, but will not be limited to

- (i) assisting the Government to evaluate energy efficiency investment conditions and conduct the energy efficiency market and economic assessment;
- (ii) reviewing the national policy and regulatory frameworks in Pakistan (energy efficiency and energy conservation laws, decrees, ordinances, regulations, standards, specifications, and utility demand-side management practices) and, where applicable, policy and regulatory frameworks at the provincial level;
- (iii) reviewing energy efficiency stakeholder assessments;
- (iv) conducting economic and comparative cost-benefit analysis of key energy efficiency investments in major energy-consuming sectors (industry, buildings, transportation, agriculture, commercial, and residential), prioritizing focus areas, developing realizable quantitative implementation targets and schedules, and defining verifiable energy efficiency indicators and performance monitoring methods;

- (v) conducting an economic evaluation the project by comparing with- and without-project cases under different growth scenarios and calculating the economic internal rate of return, taking into account economic costs and benefits in accordance with ADB's *Guidelines for the Economic Analysis of Projects* (1997) and *Financial Management and Analysis of Projects* (2005);
- (vi) identifying all risks to project revenue and costs, and conducting relevant sensitivity analyses;
- (vii) analyzing the economic subsidies involved in the current tariff structure and the extent of cross-subsidization between major consumer groups and regions; and reviewing the appropriateness of the existing lifeline tariff block;
- (viii) identifying stakeholders and conducting a distributional analysis of net project benefits in accordance with ADB's *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis for Projects* (2001); and
- (ix) assisting in preparing required reports and sections of the RRP.

6. Legal Specialists (1 person-month international and 2 person-months national)

18. The legal specialists will assess the relevant legal aspects in developing a national energy efficiency program. The international consultant should have a minimum of 12 years' experience in legal practice, at least 5 years of which were dedicated to the field of energy and/or energy efficiency. The international consultant should have previous working experience in the Asia and Pacific region, particularly within the DMCs of ADB. The consultants will review all relevant policy documents and regulations, and provide the team with the legal expertise it requires. The detailed terms of reference will be prepared by the consulting firm and agreed by the EA and ADB during the TA implementation.

7. Safeguards Specialists (0.5 person month international and 2 person-months national)

19. As required, the consulting firm will provide the necessary social and environmental safeguards expertise in preparing the project proposal. The detailed terms of reference for the safeguards specialists will be developed by the consulting firm and agreed by the EA and ADB during the TA implementation. The consulting firm will prepare the relevant safeguards sections of the RRP, and other relevant documents as necessary, in accordance with all relevant policies, handbooks, and guidelines of ADB and in particular with ADB's *Involuntary Resettlement Policy* (1995), *Policy on Indigenous Peoples* (1998), *Handbook on Resettlement: A Guide to Good Practice* (1998), and *Environment Policy* (2002).

8. Reporting and Workshop Requirements

20. The consulting firm will prepare inception, interim, draft final report, and final reports. Workshops among EA, ADB, and the consultants will be held after the submission of the inception, interim, and draft final reports. Other stakeholders will be invited to attend as needed. The consultants will also prepare status reports for their specific scopes of work that highlight any issues that could become critical for the timely completion of the TA and that require attention from EA and/or ADB. The consultants will arrange for other workshops and on-the-job training for EA staff as necessary.