Policy for Development of Renewable Energy for Power Generation

Employing Small Hydro, Wind, and Solar Technologies

Government of Pakistan

2006

Foreword

Pakistan is blessed with abundance of renewable energy potential but so far this potential has not been harnessed except for large hydroelectric projects. The Ministry of Water and Power has now prepared the first ever Renewable Energy Policy of Pakistan, which envisages mainstreaming of renewable energy in the development plans of the country. The policy comprises of three phases: short, medium and long term. The short term policy, which covers the period up to June 2008, lays down very liberal and attractive incentives to attract investment to put Pakistan on the renewable energy map of the world. Based on the experience gained under the short term, the policy for the next phases will be consolidated and elements of competition will be introduced.

Some salient features of this policy are:

i. It invites investment from the private sector for following categories of proposals:

   a. Independent power projects, or IPPs (for sale of power to the grid only)

   b. Captive cum grid spillover power projects. (i.e., for self-use and sale to utility)

   c. Captive power projects (i.e., for self or dedicated use)

   d. Isolated grid power projects (i.e., small, stand-alone)

ii. Except for Category (a) above, these projects will not require any LOI, LOS, or IA from the Government.

iii. Electricity purchase by NTDC/CPPA from qualifying renewable energy-based generation projects has been made mandatory.

iv. It permits an investor to generate electricity based on renewable resources at one location and receive an equivalent amount for own use elsewhere on the grid at the investor's own cost of generation plus transmission charges (wheeling).

v. It allows net metering and billing so that a producer can sell surplus electricity at one time and receive electricity from the grid at another time and settle accounts on net basis. This will directly benefit the economics of small scale, dispersed

generation and optimize capacity utilization of installed systems.

vi. It delicences and deregulates small scale power production through renewable resources (up to 5 MW for hydro and 1 MW for net metered sales) to reduce the transaction costs for such investments. This will be particularly beneficial for micro, mini and small hydro as well as solar-based electricity production.

vii. It lays down simplified and transparent principles of tariff determination.

viii. In insulates the investor from resource variability risk, which is allocated to the power purchaser.

ix. It facilitates projects to obtain carbon credits for avoided greenhouse gas emissions, helping improve financial returns and reducing per unit costs for the purchaser.

These guidelines are in line with the Government's open door policy for inviting private investment into the country. I hope that it will go a long way in strengthening and improving the power supply position of the country and help fuel rapid and environmentally sustainable economic growth.

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December, 2006

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1. Introduction

With a large population of over 150 million and a rapidly developing economy, Pakistan's energy needs are potentially huge. The country, historically a net energy importer, is confronting serious imminent energy shortages as its economy and population grow while global fossil fuel prices continue their upwards spiral. Thus, Pakistan needs to initiate a sustained, long-term transition towards greater use of renewable energy (RE)—an indigenous, clean, and abundant resource whose considerable potential the country has yet to tap meaningfully.

The Government of Pakistan (GoP) intends to pursue this objective of harnessing power from renewable resources with the full participation and collaboration of the private sector. This document sets out policies and strategies to exploit such resources and attract investments in electricity generation projects utilizing hydro (up to 50 MW capacity), wind, and solar power (of all capacities). For hydroelectricity (hydel) projects of capacity greater than 50 MW, the applicable policies are described in the GoP's *Policy for Power Generation Projects, 2002*. Additional policy guidelines shall be issued in the future concerning biomass conversion and other RE technologies, as well as for non-power RE applications, as the sector grows and technology advances take place.

2. Power Sector Institutions

The following institutions are of relevance in facilitating electricity generation, transmission, and distribution in Pakistan. The institutional and functional organization of Pakistan's power sector is depicted in **Exhibit 1**.

2.1 Ministry of Water and Power

The federal Ministry of Water and Power is the GoP's executive arm for all issues relating to electricity generation, transmission and distribution, pricing, regulation, and consumption in the country, and exercises this function through its various line agencies as well as relevant autonomous bodies. It also serves to coordinate and plan the nation's power sector, formulate policy and specific incentives, and liaise with provincial governments on all related issues.

2.2 National Electric Power Regulatory Authority

The National Electric Power Regulatory Authority (NEPRA) was established under an act of the Parliament (*Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997,* also known as the 'NEPRA Act') to function as an independent regulator and ensure

a transparent, competitive, commercially-oriented power market in Pakistan.

The Authority's main functions include, *inter alia*, issuing licenses for generation, transmission and distribution of electric power; establishing and enforcing standards to ensure quality, safety, and proper accounting of operation and supply of electric power to consumers; approving investment and power acquisition programmes of the utility companies; and determining tariffs for bulk generation and transmission and retail distribution of electric power.

2.3 Alternative Energy Development Board

The Alternative Energy Development Board (AEDB) was established as an autonomous body with the aim of promoting and facilitating the exploitation of renewable energy resources in Pakistan so as to achieve the GoP's RE deployment targets. The AEDB is tasked with implementing government policies and plans, developing projects, promoting local manufacturing, creating awareness and facilitating technology transfer, channelling international assistance, and coordinating all associated activities as the national facilitating agency for the development of renewable energy in the country. It has also been designated as a 'one-window' facility for processing RE power generation projects (of all capacity sizes except hydel projects larger than 50 MW; for hydel projects below 50 MW capacity, consultation with and concurrence of the provinces is mandatory).

2.4 Private Power Infrastructure Board

The Private Power and Infrastructure Board (PPIB), which includes representation from each of the four provinces of Pakistan and AJK, acts as a 'one-window' facilitator for conventional private sector power generation projects, including RE hydel projects of more than 50 MW capacity in the country.

2.5 Provincial and AJK Agencies

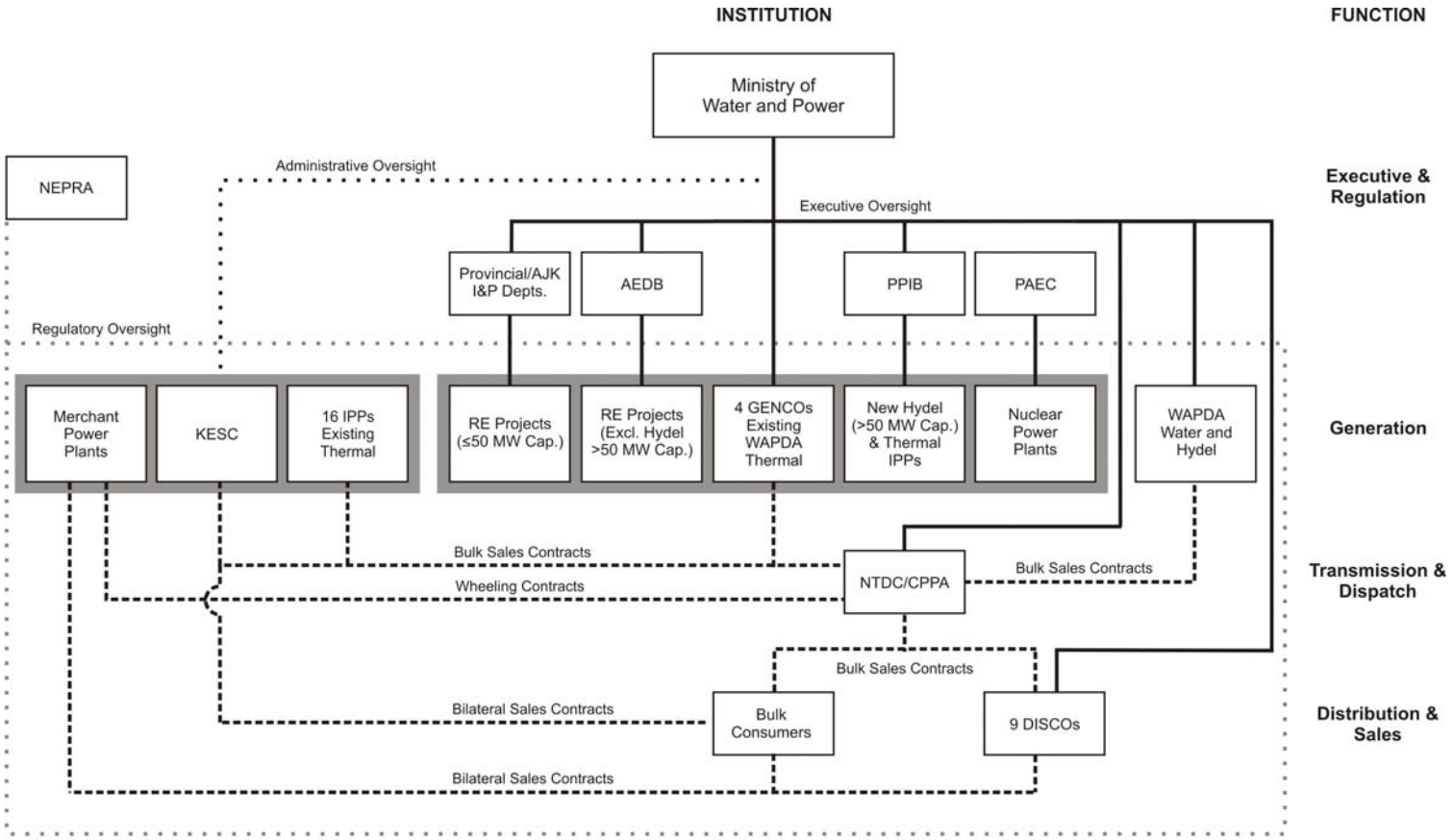
Provincial and Azad Jammu and Kashmir (AJK) governments support the implementation of renewable energy projects within their geographical jurisdiction, either on their own or in collaboration with the AEDB, such as by expediting and facilitating allocation of land use rights (e.g., for wind farms), permitting, creating awareness of RE use, and removing other impediments which may hinder progress in their development. Irrigation and Power (I&P) Departments exist in each of the four provinces and in AJK, whose prime function is to manage water resources for agriculture and small power generation units of less than

50 MW. In the Northwest Frontier Province (NWFP), the Sarhad Hydro Development Organization (SHYDO), and I&P Departments in the Punjab, Sindh and Balochistan, are the key institutions. In the Northern Areas, the concerned organization is the Water and Power Department, Northern Areas. Each of these departments have a Chief Engineer, Power Cell, who heads the department's technical management capacity with respect to provincial power projects.

2.6 Power Utilities

Electricity utilities in Pakistan comprise nine separately corporatized distribution companies (DISCOs: Lahore, Gujranwala, Faisalabad, Islamabad, Multan, Peshawar, Hyderabad, Quetta, and Tribal Areas) serving different regions of Pakistan and a private integrated company, the Karachi Electric Supply Corporation (KESC), serving the Karachi metropolitan area. In addition, there are four generation companies (GENCOs: Southern, Central, Northern, and Lakhra) and the Water and Power Development Authority (WAPDA) Hydel Wing. Control of power transmission and despatch is allocated to the National Transmission and Dispatch Company (NTDC).

Exhibit 1: Institutional Organization of Pakistan's Power Sector



Note: Provincial/AJK I&P Depts. also responsible for non-RE projects of ≤50 MW capacity. KESC is a vertically-integrated utility engaged in power generation and distribution.

3. Renewable Energy Resources in Pakistan

A brief summary of the available renewable energy potential in Pakistan is given in **Exhibit 2**, which also describes the current status of its development in the country.

Exhibit 2: Potential and Status of Renewable Energy in Pakistan

Resource	Potential	Status (2006)
Hydro	The total hydroelectric potential in the country has not been fully investigated, but conservatively estimated to be 45,000 MW. This consists of all sizes of hydropower plants, including storage-based and high-head schemes on mountainous streams in the north and low-head, run-of-the-river plants on rivers and canals in the southern plains.	Pakistan has an installed hydroelectric capacity of 5,928 MW of large (>250 MW), 437 MW of medium (>50 MW and <250 MW), and 253 MW of small to micro (<50 MW) plants, mostly in the northern parts of the country. This amounts to 6,608 MW of total capacity, or less than 15% of the identified potential.
Wind	Commercially exploitable wind resources exist in many parts, especially in southern Sindh and coastal Balochistan, with monthly average wind speeds exceeding 7-8 m/s at some sites along the Keti Bandar-Gharo corridor.	No commercial wind farms in operation. Some micro-wind turbines pilot tested for community use.
Solar: Photovoltaic (PV) and thermal	Much of Pakistan, especially Balochistan, Sindh, and southern Punjab, receives abundant solar irradiation on the order of over 2 MWh/m^2 and 3,000 hours of sunshine a year, which is at the highest end of global insolation averages.	Negligible use in niche applications. No significant marketing of rooftop PV or household and commercial thermal systems.
Biomass: Bagasse, rice husk, straw, dung, municipal solid waste, etc.	Pakistan's large agricultural and livestock sector produces copious amounts of biomass in the form of crop residues and animal waste, such as bagasse, rice husk, and dung,	Sugar mills in the country use bagasse for cogeneration purposes and have recently been allowed to sell surplus power to the grid up to a combined limit of 700 MW. No

	much of which is currently collected and used outside the commercial economy as unprocessed fuel for cooking and household heating. In addition, municipal solid waste produced by a large urban population is presently openly dumped, which could instead be disposed of in proper landfills or incinerated to produce useable methane gas or electricity.	other significant commercial biomass-based technology is presently employed for energy production/use in the country beyond experimental deployment of biogas digesters, improved cookstoves, and other small-scale end-use applications. Use of biogas digesters in rural households, after a promising start, has stagnated due to withdrawal of external subsidies.

4. Strategic Policy Objectives

The four key strategic objectives for developing Pakistan's renewable energy resources include:

4.1 Energy Security

Mainstreaming of renewable energy and greater use of indigenous resources can help diversify Pakistan's energy mix and reduce the country's dependence on any single source, particularly imported fossil fuels, thereby mitigating against supply disruptions and price fluctuation risks. Additional costs and risks relating to fuel stocking, transportation, and temporary substitute arrangements are also irrelevant for RE systems, except for backup purposes.

4.2 Economic Benefits

When properly assessed for their externalities, renewable energy options can become economically competitive with conventional supplies on a least-cost basis. This is particularly true for the more difficult, remote, and underdeveloped areas, where RE can also have the greatest impact and the avoided costs of conventional energy supplies can be significant. RE can thus supplement the pool of national energy supply options in Pakistan, expediting economic empowerment, improving productivity, and enhancing income-generating opportunities—especially for currently marginalized segments of the population. Decentralized RE systems can also help reduce energy distribution losses and result in system-wide and national efficiency gains (e.g., as measured by 'energy intensity', or energy use per unit of GDP). A growing renewable energy industry can

afford new prospects for employment and business opportunities amongst local manufacturers and service providers.

4.3 Social Equity

Pakistan's present low per-capita consumption of energy can be elevated through greater RE use. Issues relating to social equity—such as equal rights and access for all citizens to modern energy supplies, improved human development indicators, poverty alleviation amongst deprived sections of society, and reduced burden on rural women for biomass fuel collection and use—can also be addressed significantly through widespread renewable energy deployment. RE can thus facilitate social service delivery and help improve the well-being of the country's poorest, who presently have little or no access to modern energy services.

4.4 Environmental Protection

Local environmental and health impacts of unsustainable and inefficient traditional biomass fuels and fossil fuel-powered electricity generation can be largely circumvented through clean, renewable energy alternatives. Similarly, displaced greenhouse gas emissions carry significant global climate change benefits, towards which Pakistan has pledged action under the UN Framework Convention on Climate Change.

5. Policy Goals and Development Strategy

The specific goals of the renewable energy policy regime to be evolved in order to systematically meet these objectives, of which these guidelines are the first step, would be to:

i. Increase the deployment of renewable energy technologies (RETs) in Pakistan so that RE provides a higher targeted proportion of the national energy supply mix, i.e., a minimum of 9,700 MW by 2030 as per the Medium Term Development Framework (MTDF), and helps ensure universal access to electricity in all regions of the country.

ii. Provide additional power supplies to help meet increasing national demand.

iii. Introduce investment-friendly incentives, and facilitate renewable energy markets to attract private sector interest in RE projects, help nurture the nascent industry, and gradually lower RE costs and prices through competition in an increasingly deregulated power sector.

iv. Devise measures to support the private sector in mobilizing financing and enabling public sector investment in promotional, demonstrative, and trend setting RE projects.

v. Optimize impact of RE deployment in underdeveloped areas by integrating energy solutions with provision of other social infrastructure, e.g., educational and medical facilities, clean water supply and sanitation, roads and telecommunications, etc., so as to promote greater social welfare, productivity, trade, and economic well being amongst deprived communities.

vi. Help in broad institutional, technical, and operational capacity building relevant to the renewable energy sector.

vii. Facilitate the establishment of a domestic RET manufacturing base in the country that can help lower costs, improve service, create employment, and enhance local technical skills.

6. Scope of Policy

For the purposes of this policy statement, 'renewable energy' (or RE) includes the following technologies:

- Small hydro of 50 MW or less capacity[1]
- Solar photovoltaic (PV) and thermal energy for power generation
- Wind power generation.

Other RE power generation technologies—such as those based on municipal waste and landfill methane recovery, anaerobic or pyrolytic biomass gasification, cofiring or cogeneration utilizing agricultural crop residues, biofuels, wave, tidal, geothermal energy, and fuel cells—are also relevant to current and future renewable energy use in Pakistan. However, these are not dealt with in this document.

7. Road Map for Policy Development and Implementation

Renewable energy development in Pakistan is conceived under a phased, evolutionary approach constituting a strategic policy implementation roadmap. The initial short term phase will involve lenient policy measures and incentives in order to attract investment in this relatively new business area, remove existing barriers to project implementation, and 'hand-hold' reasonable-sized pioneering projects through to successful commercial

[1] Each country has its own definition of hydel plant sizes. For the purpose of this document, 'small hydro' is used to collectively refer to hydel capacity of less than 50 MW, consisting of 'micro' hydels (units of less than 150 kW installed capacity), 'mini' hydels (150 kW to 5 MW), and 'small' hydels (between 5 MW to 50 MW).

operation. As experience, business confidence, and domestic industry capacity grows, it is planned that the policy environment will graduate into a more competitive and deregulated RE market environment, with significantly expanded scale of activities envisioned in the medium and long terms.

7.1 Short Term

(Projects achieving financial closure by June 30, 2008)

The focus during this phase would be on RE options amenable to immediate commercial development, i.e., where commercially-proven technologies and resources are readily available, such as small hydro, wind, solar, and biomass-based power generation. This phase, which is embarked upon now, is marked with liberal risk cover and attractive power purchase tariffs so as to enable a reasonable generation capacity to be installed as 'first-of-kind' RE projects in the private sector that can serve as successful business and technology-assimilation demonstrators. Work on developing an appropriate regulatory framework, development, market and resource assessment, rural energy programme design, pilot testing of dispersed generation systems, capacity building, and development of RE financing and market facilitation measures, will also be undertaken during this period.

7.2 Medium Term

(Projects achieving financial closure during period July 1, 2008 to June 30, 2012)

Based on past international and short term domestic RE policy experience, a more comprehensive 'medium term' policy framework will be prepared for the systematic implementation of RE technologies and scaling up of capacity deployment. The framework would lay greater emphasis on competition within an RET application category (e.g., grid-connected wind farms) as well as the programmatic development of dispersed RE power generation market (e.g., solar home systems), and would contain more competitive terms and reduced subsidy and risk cover as compared to the very liberal incentives and guarantees being offered for the short term period.

7.3 Long Term

(Projects achieving financial closure after June 30, 2012)

RE will be fully mainstreamed and integrated within the nation's energy planning process. RE energy producers will be gradually exposed to full competition from alternative sources—initially from other RETs and then gradually from conventional sources as well—based on full-price,

avoided cost accounting. Third phase RE IPPs will thus ultimately operate under 'mandatory wholesale wheeling', with utilities free to choose between all available supply options competing against each other on an equal footing (i.e., without discriminatory biases, hidden subsidies, and discounted externalities) and with energy prices reflective of actual technology costs and benefits. RE use at the rural and urban household level will become widespread, served by an established local manufacturing and service base.

8. Short Term RE Power Generation Policy

The policy for the short term (up to June 30, 2008) shall be as follows:

Public Sector: A portfolio, consisting of projects situated in far flung areas or that are otherwise not likely to be profitable to the private sector in the foreseeable future, will be identified. These will essentially comprise of sites that are remote, inaccessible, or represent areas characterized by uneconomic levels of power demand, primarily in Balochistan, Sindh, NWFP, FATA, AJK, and the Northern Areas. Such projects would be undertaken through public sector financing and/or through community/NGO/donor participation (e.g., micro and mini hydroelectric projects in the Northern Areas and AJK and village electrification through solar and wind energy in Balochistan and Sindh).

Private Sector: The private sector will be encouraged to undertake commercially viable renewable energy-based power generation projects. For this purpose, incentives—in addition to those already being given to large hydel and thermal IPP projects—are being offered, as detailed in subsequent paragraphs below.

8.1 Avenues for Private Sector Participation

The private sector would be welcome to undertake projects falling in any of the following categories:

i. Independent power projects (IPPs) based on new plants (for sale of power to the grid only)
   a. Solicited
   b. Unsolicited

ii. Captive and grid spillover power projects (i.e., self-use and sale to utility)

iii. Captive power projects (i.e., for self or dedicated use)

iv. Isolated grid power projects (i.e., small, stand-alone)
   a. Solicited
   b. Unsolicited.

8.2 General Incentives for RE Power Generators

The provisions stated below shall be made available to all qualifying renewable energy-based power projects following under any of the categories defined in **Section 8.1** above.

8.2.1 Guaranteed Market: Mandatory Purchase of Electricity

It shall be mandatory for the power distribution utilities to buy all the electricity offered to them by RE projects established in accordance with the provisions given in **Section 8.2.2.**

8.2.2 Grid Connection, Off-take Voltage and Interface

Electricity shall be purchased from RE power producers at a voltage of 220 kV at the outgoing bus bar of the power station if the power station is located within 70 km of an existing 220 kV transmission line, or at 132 kV if it is within 50 km of an existing 132 kV transmission line, or at 11 kV if it is within 5 km of an existing 11 kV transmission line, or at 400 V if it is within 1 km of a 400 V distribution feeder. The minimum average power to be supplied in each case would be 1,250 kW/km, 250 kW/km, 100 kW/km, and 20 kW/km, respectively. The producer may also undertake to lay a new transmission line for connection with the main electricity grid. The power purchase tariff determination will be adjusted accordingly for each of these options.

8.2.3 Wheeling

RE power producers shall also be allowed to enter into direct (bilateral) sales contracts with end-use customers. Under this arrangement, they would be allowed to sell all or a part of the power generated by them to their direct customers, and the rest to the utility for general distribution. For direct sales, they shall be required to pay 'wheeling' charges for the use of the transmission and/or distribution grid network used to transport the power from the plant to the purchaser. In practical terms, the IPP shall inject electricity into the grid system at one point (subject to the provisions in **Section 8.2.2**) and would be entitled to receive the same amount at any other location (within the same distance from the grid as the distance of the plant from the system) upon payment of a corresponding wheeling charge, to be determined by NEPRA. This wheeling charge will reflect the cost of providing and maintaining the transmission interconnection, including the energy losses suffered *en route*, calculated on a utility-wide basis by NEPRA.

8.3 Specific Incentives for Grid-Connected RE IPPs

Specific incentives are provided under this policy to renewable energy-based independent power producers (IPPs) selling all generated

electricity (minus auxiliary consumption) to the grid. The underlying principle is that IPPs based on variable RE resources (such as wind and water flows) shall be made immune to factors which are beyond their control, and at the same time shall be rewarded if they perform better than reasonably expected.

8.3.1 RE Resource Variability Risk

In the case of grid-connected RE IPPs, the risk of variability in wind speeds (for wind power projects) and water flows (for small hydropower projects) shall be borne by the power purchaser in the manner described in the RET-specific polices given in **Annexure A**. 'Benchmark' electricity production levels based on mean availability of wind or water flow for the month shall be determined for each project location on the basis of independently monitored data. The IPP shall be ensured revenues corresponding to this benchmark level, including potential loss of corresponding carbon credits (see below), even if the resource availability temporarily falls below this benchmark, provided that the reduced electricity production is not due to fault of the IPP itself.

8.3.2 Production Incentives

For all power produced above than the benchmark level, a production bonus payment shall be made to the IPP, as detailed for wind and hydel generation in **Annexure A**.

8.3.3 Carbon Credits

All qualifying RE power projects (initially wind and small hydro IPPs) eligible for financing under the Clean Development Mechanism (CDM) shall be encouraged to register for Certified Emission Reduction (CER) credits with the CDM Executive Board, either collectively or individually. The Government shall also strive, in collaboration with international development agencies and to the extent possible, to facilitate project applications for such carbon credits in order to reduce the associated initial transaction costs for project sponsors. Importantly, as this policy creates significant incremental costs for the RE power purchaser (higher tariffs, resource availability risks, backup power provision, transmission and interconnection infrastructure, etc.), it is appropriate that any carbon credits thus obtained by RE IPPs be utilized to partly offset this burden so as to improve the economic competitiveness of RE-based grid power for both the rate payers and the producers.

The IPP shall therefore, at the time of submission of tariff petition to NEPRA, incorporate the CER-based revenue stream expected over the term of the project's Power Purchase Agreement (PPA), i.e., during and beyond the Kyoto Protocol's Initial Commitment Period (2008-2012), in

the project's financial analysis on terms specified by the regulator (e.g., anticipated emissions offset and price per equivalent tonne of CO_2 abated), whether opting for up-front tariff or negotiated tariff. A mechanism and legalized institutional arrangement shall be specified by the AEDB and approved by NEPRA, comprising of potential primary beneficiaries (i.e., power producers and purchasers) jointly managing and selling the CERs thus obtained in the international carbon market at an optimum price.

The annual carbon revenues realized subsequently shall be divided in the following manner: (a) an up-front, nominal deduction shall be made for the administrative costs of the joint CER management mechanism; (b) an amount not exceeding that required to bring the IPP's return on equity (ROE) to the level allowed by NEPRA shall be payable to the power purchaser; and (c) the remaining revenues shall be divided in equal proportion between the IPP (as a 'green credit' for enhancing the financial returns accruing to the project's investors) and the power purchaser (as 'green tariff' support for lowering the per unit price of clean RE power, thereby increasing its attractiveness for purchasers and consumers). Projects shall be required to sign a separate agreement binding them to the terms of such a carbon crediting mechanism, but shall not be penalized for failure to qualify for or obtain sufficient annual CER revenues to fully compensate the power purchaser under Item (b) above, provided they have complied with the terms of the aforementioned carbon credit agreement, as certified by NEPRA.

Under this arrangement, the carbon credit sharing mechanism will help further incentivize and facilitate investments in RE projects, increase the share of renewable energy in utilities' power purchase portfolios, and reduce the cost of renewable energy-based power for the end user—factors which should help enhance the eligibility of such projects for CDM approval.

8.3.4 Security Package

The power purchaser shall enter into a specific Power Purchase Agreement (PPA)[2], based on a standard model agreement, with the RE power producer. The Government of Pakistan shall also enter into an Implementation Agreement (IA) which will guarantee the payment obligation of the public sector power purchaser on account of power sales extending over the term of the PPA. The PPAs will be much simpler than those for thermal or large hydro IPPs, and shall be based on the purchase of all power generated at a per-kWh rate—i.e., there

[2] In some cases, this may be termed as the Energy Purchase Agreement (EPA).

will be no capacity charge, capacity testing, no risk, and no penalty conditions implied. The Government of Pakistan shall also undertake, as described in **Section 8.3.3** above, to facilitate the acquisition of CDM Certified Emissions Reduction units (CERs) by qualifying projects, and the sharing of associated revenues under a separate agreement and based on payment-on-delivery terms, subject to verification of the same, between the RE IPP (as a 'green' credit) and the RE power purchaser (as 'green tariff' support).

8.4 Facilities for Captive and Grid Spillover Projects

For other categories of RE power generators, e.g., captive and grid spillover power projects, wishing to sell surplus power to the utility grid the, the following facilities shall be made available. These will be further refined and expanded for the next policy phase beginning in 2008 based on initial experience gained in the short term.

8.4.1 Net Purchase and Sales

An RE power project of capacity greater than 1 MW set up for self (captive) or dedicated use may supply surplus electricity to the power utility (grid spillover), while at other times drawing electricity from the utility to supplement its own production for local use, subject to the provisions in **Section 8.2.2**. In such cases, the net electricity

a. supplied by the power producer to the utility in a month (i.e., units supplied by the producer minus units received by the producer, if greater than zero), shall be paid for by the utility at a tariff equal to the average energy cost per kWh for oil-based power generation (as determined by NEPRA for GENCOs/IPPs over the applicable quarter of the year) less 10%, or

b. supplied by the utility to the power producer in a month, (i.e., units received by the producer minus units supplied by the producer, if greater than zero), shall be paid for by the producer at the applicable retail tariff (e.g., industrial or commercial rates, depending upon the type of user connection).

Such *net purchase and sales*—or net billing —arrangements will involve measurement of the electricity received and supplied to the utility by the power producer using two separate sets of unidirectional meters.

8.4.2 Net Metering

An RE power project of capacity up to 1 MW set up for self (captive) or dedicated use may also supply surplus electricity to the power utility while at other times drawing electricity from the utility to supplement its

own production for local use subject to provision in **Section 8.2.2**. In such cases, the net electricity

a. supplied by the power producer to the utility in a month, i.e., units supplied by the producer minus units received by the producer, if greater than zero, or
b. supplied by the utility to the power producer in a month, i.e., units received by the producer minus units supplied by the producer, if greater than zero,

shall be paid for by the utility or the producer, respectively, at the applicable retail tariff (e.g., industrial, commercial, or residential rates).

Such *net metering* arrangements may involve separate sets of unidirectional meters for recording the electricity received and supplied to the utility by the power producer, or special bidirectional meters capable of instantaneously recording net power transfers. This facility would be particularly suitable for incentivizing dispersed small-scale RE generation, such as rooftop PV panels, helping optimize their utilization and payback rates and obviating the need for expensive on-site storage batteries.

8.4.3 Banking

For net billing purposes, a rolling account of energy units will be maintained on the pattern of a bank account (i.e., debit or credit basis). Such banking accounts of net energy units shall be maintained on a monthly basis and final balances will be reconciled at the end of the year at the rates given in **Section 8.4.1**. Under this arrangement, a producer may generate and supply power to the grid at one location and receive an equivalent number of units for self use (say, at a factory) at a different or physically distant location on the grid at a different time *without paying any wheeling charges,* but subject to the distance limits for power input and off take as noted in **Section 8.2.2**. Any additional (net) units consumed by the producer (beyond those supplied to the utility at the plant location) in a given month shall be billed by the utility at the retail tariff applicable to the type of electricity connection obtaining at the consumer's premises. Any excess (net) units supplied by the producer's plant in a given month shall be credited to the producer on a rolling monthly basis (i.e., deducted from the next month's consumption). Any accumulated energy unit credits accruing to the producer at the end of the year shall be paid for by the utility at a tariff equal to the average energy cost per kWh for oil-based power generation (as determined by NEPRA for GENCOs/IPPs over the preceding fiscal year) less 10%.

8.5 Facilities for Off-grid and Dispersed RE Power Generation

Off-grid power generation wholly for captive or dedicated use—or for supply to a local community through small, isolated distribution lines not connected to the utility grid—shall be greatly deregulated and simplified. For this purpose, new procedural arrangements shall be developed by the relevant AEDB/Provincial/AJK Agency, and these shall be reviewed and further refined for the medium term based on initial implementation results.

Small hydropower projects and associated distribution grids (of up to 11 kV) that are not connected to national or regional utility grids may be developed by private corporate entities, public agencies, NGOs and CBOs, or individuals at any suitable location, subject to prior approval by the local authority. For such projects, AEDB/Provincial/AJK Agency approval, or Environmental Protection Agency (EPA) NOCs shall not be required, provided minimum permitting requirements, as defined, are met. For these projects, the AEDB/Provincial/AJK Agency and EPA shall develop a simplified regime separately along the lines specified in **Annexure B.**

During the short term (2006-08), the emphasis shall also be on the design, demonstration, and testing of dispersed off-grid, community, embedded, and standalone RE systems, including their financing and marketing modalities and integration with other social and physical infrastructure development (e.g., poverty alleviation, rural electrification, etc.). Extensive, widespread funding and deployment will be targeted, based on such initial studies and field evaluation, for the medium term (2008-2012), with specific RET- and market-wise targets and financing arrangements to be in place starting at the onset of that period.

8.6 Financial and Fiscal Incentives

All renewable energy-based power projects will enjoy the following fiscal and financial incentives. These facilities shall be equally applicable to private, public-private, and public sector renewable energy power projects.

8.6.1 Fiscal Incentives

i. No customs duty or sale tax for machinery equipment and spares (including construction machinery, equipment, and specialized vehicles imported on temporary basis) meant for the initial installation or for balancing, modernization, maintenance, replacement, or expansion after commissioning of projects for power generation utilizing renewable energy resources

(specifically, small hydro, wind, and solar), subject to fulfilment of conditions under the relevant SRO.[3]

ii. Exemption from income tax, including turnover rate tax and withholding tax on imports.

iii. Repatriation of equity along with dividends freely allowed, subject to rules and regulations prescribed by the State Bank of Pakistan.

iv. Parties may raise local and foreign finance in accordance with regulations applicable to industry in general. GoP approval may be required in accordance with such regulations.

v. Non-Muslims and non-residents shall be exempted from payment of *Zakat* on dividends paid by the company.

8.6.2 Financial Incentives

i. Permission for power generation companies to issue corporate registered bonds.

ii. Permission to issue shares at discounted prices to enable venture capitalists to be provided higher rates of return proportionate to the risk.

iii. Permission for foreign banks to underwrite the issue of shares and bonds by private power companies (IPPs) to the extent allowed under the laws of Pakistan.

iv. Non-residents allowed to purchase securities issued by Pakistani companies without the State Bank of Pakistan's permission, subject to prescribed rules and regulations.

v. Independent` rating agencies available in Pakistan to facilitate investors in making informed decisions about the risk and profitability of the project company's bonds/TFCs.

8.7 Procedure for Setting Up RE IPPs for Sale of All Power to Grid

The following categories of proposals for RE-based IPP projects shall be welcomed by the AEDB and designated provincial/AJK agencies:[4]

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[3] As per SRO (1)/2005 issued by the Ministry of Finance, Revenue and Economic Affairs on June 6, 2005, specifying zero customs duty and sales tax on:

"Machinery, equipment and spares (including construction machinery, equipment and specialized vehicles imported on temporary basis) meant for initial installation, balancing, modernization, replacement or expansion of projects for power generation through nuclear and renewable energy sources like solar, wind, micro-hydel bio-energy, ocean, waste-to-energy and hydrogen cell, etc.

"Spares and maintenance parts required for the above project after commissioning."

i. Unsolicited proposals

ii. Solicited proposals

In the case of unsolicited proposals, a Letter of Intent (LoI) shall be issued to enable the sponsors to carry out a feasibility study and obtain tariff determination and a generation license from NEPRA. Thereafter, a Letter of Support (LoS) shall be issued to assist the sponsors in achieving financial closure for the project.

In the case of solicited proposals, bids shall be invited by AEDB/Provincial/AJK Agency from IPPs to participate in a competitive bidding process. After completion of evaluation of bids, an LoS shall be issued to the successful bidder to facilitate the project's financial close. The procedure will be structured in consultation with NEPRA. The tariff determined through competition will be regarded as final and will not be re-opened by NEPRA.

These processes are described in detail below:

8.7.1 Process for Unsolicited Proposals

Potential sponsors of RE-based IPP projects to be connected to the utility grid at a location of their choice ('raw site'), subject to the provisions in **Section 8.2.2**, may submit their proposals to the AEDB/Provincial/AJK Agency on an unsolicited basis. The schedule of activities leading to issuance of Letter of Intent (LoI) and/or Letter of Support (LoS) is given in **Exhibit 3** and is explained further in subsequent paragraphs.

8.7.1.1 Submission of Unsolicited Proposals

Any sponsor wishing to undertake a project at a raw site would be required to submit a detailed proposal to the AEDB/Provincial/AJK Agency, which must be in compliance with applicable policy guidelines and include, at a minimum, the following:

i. Statement of qualification of project sponsors, listing relevant corporate experience, personnel, and financial capacity

[4] As described earlier, a 'one-window' agency, functionally similar to the AEDB's project processing entity, will be set up by each of the provincial and AJK governments for facilitating RE projects in the country. For projects located in any of the four provinces (Sindh, Balochistan, Punjab and NWFP) or AJK, proposals may be submitted to the relevant provincial/AJK agency, or to the AEDB directly. For the Northern Areas, FATA, and the rest of the country, proposals should be submitted to the AEDB. In the remainder of this document, the term 'AEDB/Provincial/AJK Agency' shall be used as a short form to refer to this institutional arrangement.

ii. Project name and RET classification (i.e., wind, solar, small hydro, etc.)

iii. Project location (including geographical or GPS coordinates)

iv. Proposed net installed capacity (MW) and expected annual energy output (MWh)

v. Basic outline of plant and structures

vi. Summary implementation plan, committing milestones for project preparation, implementation and completion date.

vii. Estimated distance from the nearest 132 kV or 11 kV line or grid station.

Exhibit 3: Processing Schedule for Unsolicited Grid-Connected RE IPPs

	Activity	**Typical Allowance (Days)**
a.	Submission of proposal on raw site by sponsors	–
b.	Review of proposal and qualification of sponsors by AEDB/Provincial/AJK Agency	30
c.	Posting of Bank Guarantee by sponsors	15
d.	Issuance of Letter of Intent (LoI) by AEDB/Provincial/AJK Agency	7
e.	Initial time allowed to carry out feasibility study and term of the LoI	Based on schedule submitted by IPP, subject to maximum of 18 months.
f.	Tariff negotiations with power purchaser and approval of tariff by NEPRA (the time can be significantly reduced if up-front tariff is accepted by IPP)	90
g.	Submission of Performance Guarantee by sponsors upon approval of tariff by NEPRA	15
h.	Issuance of LoS by AEDB/Provincial/AJK Agency	7

Note: Indicated time allowance represents maximum processing period.

8.7.1.2 Evaluation of Unsolicited Proposals and Issuance of Letter of Intent

Proposals for unsolicited projects on raw sites[5] will be examined by a Project Committee appointed by the AEDB or Provincial/AJK governments. Proposals approved by the Committee will be processed by the AEDB/Provincial/AJK Agency for issuance of a Letter of Intent (LoI) against a Bank Guarantee (see **Exhibit 5**). This Bank Guarantee shall be valid for a period not less than six (6) months in excess of the validity of the LoI, following which the provisions of the agreements shall be applicable. LoIs for raw sites shall include relevant project milestones to enable the AEDB/Provincial/AJK Agency to monitor progress, and the sponsors shall commit to meeting the milestones stipulated therein.

8.7.1.3 Feasibility Study

The sponsors shall enjoy exclusive rights to carry out a feasibility study at a given site during the period of the LoI, as long as they continue to meet the milestones specified in the latter.

The feasibility study will be reviewed by a 'Panel of Experts' (POE) appointed by the AEDB/Provincial/AJK Agency. If at any time during the feasibility study period, the POE determines that the sponsors have failed to adhere to relevant milestones or rectify such deviation, or are not diligent, the AEDB/Provincial/AJK Agency may serve a notice to the IPP to rectify the situation, failing which it shall terminate the LoI and encash the Bank Guarantee. In such a case, the sponsors will have no claim for compensation against the any federal/provincial/AJK agency.

Feasibility studies undertaken by the public sector and donor agencies will be made available to all interested private entrepreneurs by the AEDB/Provincial/AJK Agency against a nominal administrative fee. The full cost of the feasibility study (up to a reasonable ceiling and as reflected on the books of the concerned agency as being the actual cost of the feasibility study), shall be indicated in the LoI and charged to the project developer at the time of issuance of the Letter of

[5] "Raw sites' are those sites that could be developed for power generation but for which feasibility studies do not exist. The LoI for raw sites will require sponsors to carryout a complete feasibility study to be monitored by a 'Panel of Experts' (POE) appointed by the AEDB/Provincial/AJK Agency.

Support (LoS), and shall be reimbursed to the agency which originally conducted the study, except in the case where such study was conducted under grant financing (e.g., donor funding, etc.). Wherever the GoP has obtained such a feasibility prepared by the public or private sector, preference would be given to the award of these projects through international competitive bidding (ICB).

For studies furnished to the private sector by the AEDB/Provincial/AJK Agency or any public sector organization, investors shall be responsible for verifying any or all aspects of the relevant feasibility study, and would be encouraged to carry out additional or alternative project appraisal of the site on their own for such purposes.

In case the feasibility has been completed by the public sector or private sponsor but the unsolicited proposal does not materialize for any reason whatsoever, and the AEDB/Provincial/AJK Agency wishes to invite bids using the same feasibility study, then the cost of feasibility study (up to a reasonable ceiling and as per proper audit) will be recovered from the successful subsequent bidder, if any, and be reimbursed to the public sector entity or sponsor who originally paid for, or conducted, the study.

8.7.1.4 Bank Guarantee and Validity Period of Letter of Intent

For issuance of the LoI, sponsors will be required to post a Bank Guarantee (see **Exhibit 5**) in favour of the AEDB/Provincial/AJK Agency based on the project's estimated installed capacity. This guarantee shall be valid for a period extending six calendar months beyond the original validity of the LoI. The initial validity of the LoI shall be up to 18 calendar months, depending on the size of the project and the schedule committed to by the IPP. A one-time extension to the LoI of up to a maximum period of 180 calendar days may be granted by the relevant AEDB/Provincial/AJK Agency if the Panel of Experts (POE) deems the sponsors' progress on the feasibility study to be otherwise satisfactory and its completion imminent. Submission of a Bank Guarantee valued at twice the original amount (i.e., US$ 1,000/MW) and valid for six calendar months beyond the extended LoI period will be mandatory to qualify for an LoI extension.

If during the currency of the LoI, a sponsor wishes to withdraw from the project, the extent to which the Bank Guarantee amount shall be encashed will be in proportion to the time

elapsed since the issuance of the LoI with respect to the total period of the LoI.

8.7.1.5 Request for Determination of Tariff

Upon completion, the feasibility study will be reviewed by the POE, and if approved, the project sponsors will be expected to apply to NEPRA for determination of bulk power purchase tariff and grant of generation license within a period not exceeding three calendar months from the date of said approval. Details of guidelines of determination of tariff are provided in **Annexure A.** In case the IPP opts to accept the up-front tariff, if already notified by NEPRA, the process of tariff determination would likely be significantly shorter.

8.7.1.6 Performance Guarantee and Letter of Support

Subsequent to determination of the bulk power purchase tariff by NEPRA, the project sponsor shall be required to post a Performance Guarantee based on project capacity in favour of the relevant AEDB/Provincial/AJK Agency, valid initially for a period of three months in excess of validity of the LoS. Upon submission of the Performance Guarantee, a Letter of Support (LoS) shall be issued to the project sponsor by the relevant AEDB/Provincial/AJK Agency to enable the project to achieve financial close. Until financial close is achieved, the LoS shall govern the project and supersede all other documents and agreements.

If the LoS is issued by the provincial/AJK government, the AEDB shall be officially notified of this. Similarly, if the LoS is issued by the AEDB in the provinces or AJK, the relevant provincial/AJK government shall be notified. The AEDB shall maintain a central registry of all approved RE IPPs in the country to ensure their proper coordination and facilitation at the federal level.

8.7.2 Process for Solicited Proposals

Proposals for grid-connected RE power generation projects at preselected sites may be solicited by the AEDB/Provincial/AJK Agency through public advertisement. These may include sites/projects for which feasibility studies have already been completed in the public sector, as well as 'raw sites' not yet fully investigated. Such projects will be processed according to the steps and schedule given in **Exhibit 4**.

Exhibit 4: Processing Schedule for Solicited Projects

	Activity	Typical Allowance (Days)
a.	Prequalification of bidders for specific projects at sites identified by the AEDB/Provincial/AJK Agency, which shall invite sponsors for registration and for collection of prequalification documents through public advertisement	30
b.	Submission of prequalification documents by sponsors to the AEDB/Provincial/AJK Agency	30
c.	Evaluation of prequalification documents and notification of prequalified bidders by the AEDB/Provincial/AJK Agency	15
d.	Requests for proposals (RFPs) from prequalified bidders issued by the AEDB/Provincial/AJK Agency and collection of bidding documents by prequalified bidders	30
e.	Submission of bids to the AEDB/Provincial/AJK Agency, together with bid bond and evaluation fee	90
f.	Evaluation of bids by the AEDB/Provincial/AJK Agency, including preliminary tariff determination, and notification of successful bidder	30
g.	Posting of Performance Guarantee by successful bidders	15
h.	Issuance of Letter of Support (LoS) by the AEDB/Provincial/AJK Agency after determination of final tariff by NEPRA	7
i.	Issuance of Generation License and Tariff Determination by NEPRA	15

Note: Indicated time allowance represents maximum processing period.

For **raw project sites**, the relevant RET, location, and other preliminary information will be made available to investors and Expressions of Interest (EoIs) invited. The bidder ranked highest in the prequalification process shall be awarded an LoI for the corresponding project. The rest of the process for proposal submission and evaluation shall be identical to that described previously for unsolicited proposals (and shown in Items ‘e’ to ‘h’ in **Exhibit 4**), leading to issuance of the LoS.

For **sites for which feasibility studies may have been completed** prior to bid solicitation, specific tender documents will be prepared and bids will be invited for the sale price of electricity (against NEPRA’s indicative tariff as a benchmark, using the same parametric formulation

to allow for a standardized comparison basis). The successful bidder shall be awarded an LoS to help achieve financial close. The schedule of activities leading to issuance of LoS are also given in **Exhibit 4**.

In order to further economize processing time, steps 'a', 'b' and 'c' in **Exhibit 4** may be eliminated and instead sponsors may be asked, through advertisement, to submit their proposals in two envelopes. The first envelope would be meant for evaluating the bidders' qualifications and the second envelope for the main commercial bid. In such a case, the commercial bids (second envelope) only of qualified bidders will be opened, and the maximum time allowance for activity 'e' may be increased to 100 days.

8.7.2.1 Request for Proposals

The RFP for solicited projects shall contain all project specifications, components, and requisite details necessary for the preparation of a proper technical and commercial bid. The documents will also explain the evaluation criteria to be employed in scoring the bids.

If necessary, a pre-bid conference may be held by the AEDB/Provincial/AJK Agency to facilitate exchange of information with qualified sponsors, giving equal and adequate opportunity to all prospective bidders to seek clarification on project requirements.

8.7.2.2 Bid Bond, Letter of Support, and Performance Guarantee

A Bid Bond based on the project's installed generation capacity shall be required from each bidder at the time of submission of bids. After selection of the successful bidder, the bid bonds of all bidders other than the sponsors of the successful bid shall be returned, and the successful bidder will be required to post a Performance Guarantee based on project capacity in favour of the relevant AEDB/Provincial/AJK Agency for issuance of a Letter of Support (LoS), and which shall be valid initially for a period of three months in excess of validity of the LoS. After submission of the Performance Guarantee by the successful bidder, the Bid Bond shall be returned and the LoS issued to enable the project to achieve financial close. Until financial close is achieved, the LoS shall govern the project and supersede all other documents and agreements.

If the LoS is issued by the provincial/AJK government, the AEDB shall be officially notified of this. Similarly, if the LoS is issued by the AEDB in the provinces or AJK, the relevant

provincial/AJK government shall be notified. The AEDB shall maintain a central registry of all approved RE IPPs in the country to ensure their proper coordination and facilitation at the federal level.

The Performance Guarantee will secure the successful bidder's obligations to execute the IA, PPA, and other relevant agreements and achieve financial closure within the specified time period. In addition, the sponsor may also be required to reimburse the cost of feasibility study utilized (if so indicated in the bidding documents). The Performance Guarantee shall be in the form of an irrevocable, direct-pay letter of credit, issued by a scheduled local or foreign bank acceptable to the Government of Pakistan, in favour of the relevant AEDB/Provincial/AJK Agency. The Performance Guarantee must always remain valid for a period not less than three months in excess of the then-prevailing financial close deadline. If the Performance Guarantee is not furnished within the specified period, the LoS shall a lapse automatically, and neither the sponsor nor the project company shall have any claim for compensation or damages against the Government of Pakistan/AJK or any of its components, organizations, provinces, or institutions on this account.

8.7.3 Process Subsequent to Issuance of LoS

After the issuance of the LoS to sponsors of unsolicited or solicited RE IPP projects, the sponsors will be expected to carry out the following activities:

i. Sign the Implementation Agreement (IA) and a Certified Emission Reduction Agreement (CERA), with the AEDB acting on behalf and with the permission of the GoP, and the Power Purchase Agreements (PPA) with the power purchaser.

ii. Achieve financial close (as defined in the IA or PPA)

iii. Achieve construction start (as defined in the IA or PPA)

iv. Execute and commission the project according to major milestones established in the LoS.

In case of default or departure from agreed milestones by project sponsors, the AEDB/Provincial/AJK Agency shall have the right to terminate the LoS and encash the sponsors' Performance Guarantee upon issuance of due notice assigning reasons for such action and after provision of sufficient opportunity for the redressal of such default. However, if the delay is caused by actions of the power purchaser or by

the government, then the IPP shall not be penalized. Upon financial close, the security agreements (IA and PPA) will supersede the LoS and all other documents and agreements. If the LoS expires, the IA and PPA and all other agreements with any governmental entity shall automatically terminate.

The investor, after receiving the LoS, will be required to submit to the relevant AEDB/Provincial/AJK Agency, on a format specified by the agency, a mutually acceptable implementation schedule with specific milestones for progress monitoring. The AEDB/Provincial/AJK Agency shall execute the project's Implementation Agreement (IA) on behalf of the Government of Pakistan, whereas the Power Purchase Agreement (PPA) will be executed between the IPP and the buyer upon GoP's formal approval.

8.8 Security Package and Risk Cover

The security package for grid-connected RE IPPs will comprise of the following:

i. Implementation Agreement (IA), Power Purchase Agreement (PPA), Certified Emissions Reduction Agreement (CERA), and Water Use Agreement (WUA), as applicable.

ii. GoP guarantee on payment obligations of public sector entities. If some or all of the utilities are restructured or privatized during the term of various agreements, appropriate safeguards shall be built in the privatization agreements so that the IPP contracts are wholly securitized over their respective full terms.

iii. Provide protection against specific 'political' risks.

iv. Provide protection against changes in the tax and duty regime.

v. Ensure convertibility of Pakistani Rupees into US Dollars at the prevailing exchange rate and the remitability of foreign exchange to cover necessary payments related to the project, including debt servicing, payment of dividends, and repatriation of equity.

vi. Specific risk cover against RE resource variability as detailed in **Annexure A**.

vii. Suitable indexation of tariff components to cover the risk of exchange rate variations and inflation, etc.

8.9 Corporate, Fee, and Contractual Arrangements

8.9.1 Fee Structure

Fees are to be paid by sponsors of grid-connected RE projects to the AEDB/Provincial/AJK Agency as indicated in **Exhibit 5** below. All fees are subject to revision from time to time.

Exhibit 5: Fee and Financial Charges for Grid-Connected RE IPPs

	Activity	Fee (US$)	Remarks
a.	Registration	100	The AEDB/Provincial/ AJK Govt. will provide an information package upon registration
b.	Prequalification Purchase of prequalification documents	500	
c.	Bidding Purchase of the RFP	1,000	The RFP by pre-qualified bidders shall also include the feasibility study, where relevant, and standard, IA, PPA, etc., as applicable
d.	Project facilitation and evaluation expenses for projects registered with the AEDB/Provincial/AJK Government:		
	≤ 5 MW	1,000	
	> 5 MW to 20 MW	5,000	
	> 20 MW to 50 MW	10,000	
	> 50 MW (i.e., wind, solar w/ AEDB)	20,000	

e.	Bank Guarantee for issuance of Letter of Intent (LoI) by AEDB/Provincial/ AJK Government:		
	Solicited projects	500/MW nameplate capacity or bid bond-specified	
	Unsolicited projects	500/MW nameplate capacity	
f.	Reimbursement of public sector feasibility study cost, if applicable	As determined by AEDB/ Provincial/AJK Government	Payable prior to issuance of LoS, based on actual costs incurred, up to maximum ceiling
	Reimbursement of private sector feasibility cost, if applicable	As per cost ascertained by AEDB from relevant accounts	
g.	Performance Guarantee for issuance of Letter of Support (LoS) by AEDB/ Provincial/AJK Government:		Payable upon approval of power purchase tariff by NEPRA
	Solicited projects	2,500/MW capacity	
	Unsolicited projects	2,500/MW capacity	
h.	Legal fees	Subject to a cap of US$ 100,000 for projects above 50 MW, US$ 50,000 for projects in the range of 6-50 MW, US$ 20,000 for projects in the range of 1-5 MW, and no charge for projects of capacity below 1 MW	

Note: Upon financial close, the IPP will provide a letter of credit to the power purchaser as performance guarantee as specified in the PPA (US$ 3/kW per month), subsequent to which the original Performance Guarantee furnished at the time of issuance of the LoS shall be released.

8.9.2 Enterprise Structure and Licensing Requirements

Each IPP setting up a plant meant only for supplying power to the utility grid will be required to form a company in accordance with the laws of Pakistan under the Companies Ordinance, 1984, for the specific purpose of power generation and obtain a generation license from NEPRA. However, producers who wish to establish plants which are not exclusively for sale to power utility (e.g., captive or dedicated plants with or without grid spillover provision) may not form such a special purpose company. Small producers of installed capacity less than or equal to 5 MW not connected to the grid (i.e., standalone captive or

isolated local distribution) shall not be required to form a special purpose company or obtain a generation licence from NEPRA, but would be required to register with the AEDB/Provincial/AJK Agency and obtain consent from the local administration as per prescribed procedure (see **Annexure B**).

8.9.3 Lock-in Period

The 'Main Sponsor' (defined as the individual or group holding at least 20% equity in the IPP project), together with other initial project shareholders, must hold 51% of the project equity for a period up to the project's Commercial Operations Date (COD).

8.9.4 Type of Contracts

RE IPP projects for sale of all power to the grid system may be implemented through either 'Build, Own, and Operate' (BOO) and 'Build, Own, Operate, and Transfer' (BOOT) contracts between the parties concerned, valid for a period of not less than 20 years.

For the other type of projects, no such contracts shall be required. Instead, for captive, dedicated, or grid spillover projects, or projects availing of 'net billing', 'wheeling' or 'banking' facilities, separate contractual arrangements will be required between the parties dealing with matters such as metering, maintenance of interconnection, system protection, and billing of net sales and purchase, wheeling, and banking charges/tariffs, etc.

8.9.5 Nature of Equipment

Projects which are meant for generating electricity for the sole purpose of supply to the utility (NTDC or DISCOs) grid system, i.e., grid connected RE IPPs, will be required to use new equipment. There shall be no such restriction on other producers.

8.10 Determination of Tariff for Grid-Connected RE IPPs

Guidelines for determination of tariff for RE power generation projects selling all electricity produced to the utility (NTDC or DISCOs) are given in **Annexure A**.

Annexure A: Guidelines for Determination of Tariff for Grid-Connected IPPs

The following guidelines are provided for the determination of bulk power purchase tariffs for RE IPPs based on wind and small hydros set up to sell all electricity produced to the utility under a Power Purchase Agreement (PPA).

A.1 Wind Risk

Wind risk is defined as the risk of variability of wind speed, and therefore of the effective energy output of the wind IPP. This risk shall be absorbed by the power purchaser. For judicious assessment or this risk, a 'Benchmark Wind Speed' based on monthly 'Mean of Means'[6] of wind sped will be determined from the available wind data. This will entail determining wind speed benchmarks from the data collected at a certain height above ground level (say, 30 meters) and its extrapolation by standard formulae to the turbine height of the proposed wind farm. Energy production corresponding to the benchmark wind shall be called 'Benchmark Energy Production' and the corresponding plant capacity shall be called 'Benchmark Capacity'.

In practice the actual energy production and capacity may vary from the benchmark levels due to:

i. Variation of wind from the benchmark (a factor beyond the control of the wind power generator).

ii. Availability of the plant for electricity generation (within the control of the wind power generator).

The principle to be adopted is that the wind IPP will be made immune to factors which are beyond its control (i.e., variability of wind speeds), but fully responsible for factors within its control (i.e., the availability of the plant), according to the matrix shown in **Exhibit 6** for the allocation of wind risk.

A.2 Wind Speed Monitoring

To enable monitoring of wind speeds independently for determination of wind availability during the IPPs' operation, monitoring masts will be set up by agencies selected and authorized by the AEDB with properly calibrated, automated wind speed recording sensors and dataloggers at the hub height of the IPPs' wind turbines. The monitoring masts shall be situated at locations where maximum wind is available (without the tempering effect of turbine wake, etc.).

[6] Monthly 'Mean of Means' is the average of mean monthly wind velocities for a given month over a number of years for which reliable data are available. At a minimum, this will be based on at least three year's data from the PMD wind monitoring mast nearest to the project location.

Exhibit 6: Wind Risk Allocation Matrix

	Wind Variation	Availability Status*	Risk Mitigation
a.	Actual wind speed less than the Benchmark Wind Speed	- Capacity of the wind IPP available is equal to the Benchmark Capacity level	- Wind IPP will be paid for energy generation corresponding to Benchmark Wind Speed (i.e., the power purchaser absorbs the loss)
		- Capacity of the wind IPP is not available wholly or partially (i.e., is less than Benchmark Capacity)	- Wind IPP is not paid to the extent that capacity is not available
b.	Actual wind speed more than the Benchmark Wind Speed	- Capacity of the wind IPP available is equal to the Benchmark Capacity level	- Wind IPP will be paid for energy generation corresponding to 'Benchmark Plus' (i.e., Benchmark Energy Production plus 10% of the value of energy generated above the benchmark; e.g., if the tariff is Rs p/kWh, then the production up to the Benchmark Energy Production level will be paid at the rate Rs p/kWh, and any additional production will be paid at the rate of 0.1 x Rs p/kWh) as a production bonus, so that both the power producer and purchaser share the benefit of increased production
		- Capacity of the wind IPP is not available wholly or partially (i.e., is less than Benchmark Capacity)	- Wind IPP is paid equal to the actual energy generated up to the Benchmark Energy Production level only
c.	Actual wind speed equal to the Benchmark Wind Speed	- Capacity of the wind IPP available is equal to the Benchmark Capacity level	- Wind IPP will be paid for energy generation corresponding to Benchmark Energy Production
		- Capacity of the wind IPP is not available wholly or partially (i.e., is less than Benchmark Capacity)	- Wind IPP will be paid equal to the actual energy generated up to the Benchmark Energy Production level only

* Plant availability status will be confirmed from the electronic record of each machine and the relationship of the energy generation with the variation from the Benchmark Wind Speed will be ascertained at the time of PPA.

A.3 Siting Issues for Wind Farms

Minimum separation distances between adjacent wind farms and obstruction or interference from other nearby terrain features, obstacles, or construction will be taken into account when approving project siting, so that project operators are not penalized for impacts on agreed-upon performance benchmarks and plant efficiency due to subsequent windward encroachments and other such external factors.

A.4 Hydrological Risk

Hydrological risk is defined as the risk of variability of water flow, and therefore of the effective energy output of the hydro IPP. This risk shall be absorbed by the power purchaser. For judicious assessment of this risk, 'Mean Flow/Month', based on monthly average water flow, will be determined from available hydrological data. This will entail determining mean water flows from the data collected at certain specified points upstream of the plant location. Energy production corresponding to the mean flow shall be called 'Mean Flow Energy Production' and the corresponding plant capacity shall be called 'Mean Flow Capacity'.

In practice the actual energy production and capacity may vary from the mean flow levels due to:

i. Variation of water flow from the mean flow/month (a factor beyond the control of hydroelectric power generator).

ii. Availability of the plant for electricity generation (within the control of hydroelectric power generator).

The principle to be adopted is that the hydroelectric generator (IPP) will be made immune to factors which are beyond its control (i.e., variability of water flow), but fully responsible for factors within its control (i.e., the availability of the plant). Accordingly, the matrix shown in **Exhibit 7** for the allocation of hydrological risk shall be followed.

A.5 Water Flow Monitoring

To enable monitoring of water flow independently, monitoring sensors will be set up by the relevant AEDB/Provincial/AJK Agency with properly calibrated, automated sensors and dataloggers. The monitoring sensors will be sited at the nearest location upstream of the plant site where total water flow passing through the plant turbines is available.

Exhibit 7: Hydrology Risk Allocation Matrix

	Hydro Variation	Availability Status*	Risk Mitigation
a.	Actual water flow/month less than the Mean Flow/Month	- Capacity of the hydroelectric IPP available is equal to the Mean flow Capacity level	- Hydroelectric IPP will be paid for energy generation corresponding to Mean Flow (i.e., the power purchaser absorbs the loss)
		- Capacity of the hydroelectric IPP is not available wholly or partially (i.e., is less than Mean Flow Capacity)	- Hydroelectric IPP is not paid to the extent that capacity is not available
b.	Actual water flow/month more than the Mean Flow/Month	- Capacity of the hydroelectric IPP available is equal to the Mean Flow Capacity level	- Hydroelectric IPP will be paid for energy generation corresponding to 'Mean Flow Plus' (i.e., Mean Flow Energy production plus 10% of the value of energy generated above the mean flow; e.g., if the tariff is Rs p/kWh, then the production up to the Mean Flow Energy Production level will be paid at the rate of Rs p/kWh, and any additional production will be paid at the rate of 0.1 x Rs p/kWh) as a production bonus, so that both the producer and purchaser share the benefit of increased production
		- Capacity of the hydroelectric IPP is not available wholly or partially (i.e., is less than Mean Flow Capacity)	- Hydroelectric IPP is paid equal to the actual energy generation up to the Mean Flow Energy Production level only
c.	Actual water flow/month equal to the Mean Flow/Month	- Hydroelectric IPP is available equal to the Mean Flow Capacity level	- Hydroelectric IPP will be paid for the energy generation corresponding to the Mean Flow Energy Production
		- Capacity of the hydroelectric IPP is not available wholly or partially (i.e., is less than Mean Flow Capacity)	- Hydroelectric IPP will be paid equal to the actual energy generation up to the Mean Flow Energy Production level only

* Plant availability status shall be confirmed from the electronic record of each machine and the relationship of the energy generation with the variation from Mean Flow/Month shall be ascertained at the time of the PPA.

A.6 Incorporation of a Company

Each hydroelectric IPP will be required to form a company in accordance with Pakistani law and the *Companies Ordinance, 1984* for the specific purpose of hydropower generation.

A.7 Tariff Options

The tariff for sale/purchase of electricity from the RE IPP may be arrived through:

i. Competitive bidding (solicited proposals)

ii. Negotiations (unsolicited proposals)

iii. Up-front tariff-setting.

A.7.1 Tariff through Competitive Bidding on Solicited Proposals

This would entail determination of tariff on the basis of competition in accordance with the *Policy for Power Generation Projects, 2002*.

The bidding process may be structured along either of the following two options:

i. Bidders may be required to submit their competitive proposals for the tariff

ii. A benchmark tariff may be offered up-front, and bidders invited to quote a discount on the benchmark price.

Once a tariff has been arrived at through competitive bidding based on either of the processes mentioned above, it shall not be subjected to further review by NEPRA. The bidding process will be structured and administered by the AEDB in consultation with the power purchaser, Ministry of Finance, PPIB, and NEPRA. The bidding documents (including various formulae, formats, etc.), along with evaluation criteria, will be also finalized by the AEDB in consultation with the same agencies, so as to define a common standard for the preparation and comparison of quotations. The lowest evaluated levelized tariff would be recommended by the relevant AEDB/Provincial/AJK agency to the government for acceptance.

A.7.2 Negotiated Tariff for Unsolicited Proposals and Up-front Tariff

Multiplicity of entities and states of negotiations will be avoided in the determination of power purchase tariffs for RE IPPs. If an IPP wishes to submit an unsolicited proposal and wants to settle tariff through negotiations, NEPRA will determine the tariff in consultation with the IPP, the power purchaser(s), and other stakeholders. Projects opting for up-front tariff

determined by NEPRA will not require any further negotiations, approvals, or clearances with respect to the purchase price of the electricity produced.

In the determination of an acceptable negotiated tariff for an IPP, the following parameters shall be taken into account:

Technical Parameters

The net energy available for sale will be determined after taking into account electrical efficiency, auxiliary loads, transformation efficiency, etc., and plant availability. In the case of wind farms, the additional factor to be accounted for is the wake effect of upwind turbines. Plant availability factor should be determined judiciously, taking into account suitable provisions for anticipated maintenance and forced outages.

Once a contract (PPA) has been entered into, the parameters adopted at the time of the agreement shall not be changed for the duration of the contract.

Financial Parameters

It is proposed that the following parameters, principles, and assumptions may be adopted for calculation of the up-front or indicative wind and hydroelectric IPP tariff:

i. Debt:Equity Ratio

- For the purposes of determination of tariff, equity equal to 20% of the total cost of the project would be the benchmark.

ii. Internal Rate of Return/Return on Equity

- Tariff should be determined allowing reasonable Internal Rate of Return (IRR) on equity investment. Certified emission reduction (CER) credits earned by qualifying projects under the Clean Development Mechanism (CDM) will be reflected in the project's revenue stream at a realistic prospective price and accounted for in the IRR calculation, as per NEPRA guidelines.
- IRR be calculated over the life of the Implementation Agreement (IA), starting from the date of construction start (i.e., start of payments to contractors).
- IRR should be equal to long-term interest rates based on auction of ten-year Pakistan Investment Bonds (PIBs) held during last six months, plus a premium of x %, to be determined by NEPRA.
- For BOOT projects, the investor's equity will be allowed to be redeemed after completion of debt servicing. The redemption in equity will be in equal instalments from the time debt servicing has been completed till the end of the concession period. The effect of exchange rate variations will be compensated for in determining

equity redemption. The projects will be transferred to the GoP at the end of concession period at a notional cost of Rs 1.

- For BOO projects, there will be no redemption of equity.

iii. Interest on Loans

For unsolicited proposals, tariff determination will be a two-step procedure. Initially, an indicative tariff will be estimated, taking into account expected financial returns and carbon revenues, at the time of award of LoS so as to enable an IPP to achieve financial close. At this stage, interest rate ceilings may also be indicated with incentive provided for the IPP to arrange better terms of financing. After financial closure, the tariff will be finally fixed such that the project's debt service cost component equals actual debt servicing plus the incentive. The same methodology applies to up-front tariff determination by NEPRA at the LoS stage (i.e., before financial close). For the fiscal year 2005-2006, a ceiling for rate of interest on local loans of 6-month KIBOR[7] plus 300 basis points for a ten-year loan plus two-year grace period has been agreed upon in recent negotiations with IPPs. For foreign loans, the ceiling rate may be taken as LIBOR[8] plus a suitable spread for ten-year loans with two-year grace period. IPPs will be given an incentive to arrange better terms of debt financing. If the IPP succeeds in arranging better terms by the time the project achieves financial close, the overall impact of reduction in debt servicing will be shared, in the case of competitively determined tariffs for solicited projects and negotiated tariffs for unsolicited projects, on a yearly basis in the following ratio:

Power Purchaser/Govt: IPP = 60:40

However, for projects opting for the up-front tariff, no such sharing will be required and the project sponsor shall be entitled to retain the full benefit of any concessional financing obtained below the prescribed interest ceiling. The benefit of carbon financing will also be exempt from this provision, as explained earlier, and shall be shared separately with the project sponsor in the form of 'green' credit payments (i.e., as defined in the CERA).

Wherever a floating interest rate regime is adopted, local loans may be indexed to changes in relevant benchmark interest rates, such as KIBOR, etc. Likewise, foreign loans may be indexed to changes in relevant benchmark interest rates, such as LIBOR, etc., and variation in Pakistan Rupee to the US Dollar. Loans will be arranged by IPPs without GoP guarantee.

[7] Karachi Interbank Offered Rate.

[8] London Interbank Offered Rate.

iv. Capital Cost

Estimation of an IPP's capital costs for unsolicited, negotiation-based proposals or up-front tariff determination is a challenging task. NEPRA should determine them after thoroughly assessing market, vendor, and IPP provided information.

v. O&M Cost

The operation and maintenance (O&M) cost comprises of fixed and variable components. NEPRA should access information from the same sources as for the capital costs to arrive at a judicious determination of O&M costs, both fixed and variable.

vi. Other Incentives

All fiscal and financial incentives provided to RE IPPs by the GoP, as given in the policy (see **Section 8.6**) shall be applicable.

A.8 Tariff Structure and Features

Bulk power purchase tariff for grid-connected RE IPPs will be denominated in Pakistan Rupees per kilowatt-hour (Rs/kWh). The tariff will be determined by NEPRA on the basis of the principles and parameters given above. The tariff will be based on an energy charge, and since it will be arrived at by providing for full cost recovery and appropriate return on equity (ROE)—inclusive of carbon credit revenue, along with full protection against wind and hydrology risks and additional bonus payments, as applicable and noted above—the tariff will enable the IPP to meet its revenue requirements. The tariff will not be broken down into capacity payments and energy payments because it is difficult for RE IPPs to guarantee capacity availability and also because the power purchaser will be fully covering the RE resource variability risks.

The energy-based tariff in Rs/kWh will be broken down into two components:

i. Non-escalable energy component

This will be based on non-escalable costs divided by the energy (kWh) sold. Non-escalabe costs comprise of:

- Debt service
- Return on equity (ROE).

ii. Escalable energy component

This component will be based on the following costs divided by the electricity (kWh) sold:

- Fixed O&M costs
- Variable O&M costs.

A.9 Water Use Charge

A water use charge will be payable by the generation company to the Provincial/AJK/Northern Areas government for the use of water resources by the power project to generate electricity. The water use charge will be fixed at Rs 0.15/kWh and shall be adjustable annually for inflation as per **Exhibit 8**.

A.10 Benchmark Currency Rate

The Benchmark Currency Rate, as a reference, will be the Interbank rate for US dollars (US$) prevailing 30 days before the required date of submission of bids. For unsolicited proposals or up-front tariff determination, it will be the interbank lending rate as on the date of signing of the Engineering-Procurement-Construction (EPC) contract by the IPP.

A.11 Indexation

Indexation of various components of tariff and adjustment for foreign exchange rates ('true up') will be automatic, based on predetermined formulae and reference parameters. IPPs will not have to approach NEPRA frequently for tariff indexation; only yearly submissions may be required. Various costs component shall be indexed as shown in **Exhibit 8**.

Exhibit 8: Indexation of RE IPP Tariff

Item	Index
Non-escalable Component	
Debt service	Floating interest rates
	Variation in exchange rate for US$ with respect to the benchmark currency rate for FEC
Return on equity (ROE)	Variation in exchange rate for US$ with respect to the benchmark currency rate for FEC of equity
Escalable Component	
Fixed O&M costs	Indexed with Wholesale Price Index (WPI) w.e.f. COD
Water use charge	Indexed with Wholesale Price Index (WPI) w.e.f. COD

FEC: Foreign exchange component.

A.12 Evaluation of RE IPP Tariffs

Based upon guidelines provided above, detailed power purchase tariff tables will be prepared by NEPRA. The tariff will be evaluated on the basis of the cost of energy production levelized over the life of the project, or at least 20

years, and the schedule shall be suitably front-loaded to cater to the project's debt servicing requirements.

A.13 Transparency and Visibility of Calculation of Tariff

NEPRA shall provide complete soft and hard copies of its assumptions, inputs and methodology used in the determination of RE IPP tariffs, along with the complete tariff computation and model, to the IPPs as well as the public domain. This would enable better understanding of tariff decisions by all concerned.

A.14 Transmission and Interconnection

It is proposed that the construction of transmission lines for evacuation of power from RE IPPs set up for connection to the utility grid should be the responsibility of the power purchaser, unless the IPP, of its own choice, undertakes to install such infrastructure on a mutually agreed upon transmission charge with the power purchaser subject to the provisions of **Section 8.2.2**.

A.15 Compliance with GoP Policies

NEPRA shall comply with the policies and guidelines of the Government of Pakistan as issued, modified, supplemented, and revised from time to time by the government.

Annexure B: Guidelines for Development of Small Off-grid RE Projects

B.1 Off-grid Small Hydro Projects

The general rules, procedures, fees, and power sales provisions defined for grid-connected RE projects in **Sections 8.7** to **8.10** and specific tariff guidelines for grid-connected small hydro projects defined in **Annexure A** will *not* apply to off-grid small hydro projects. The AEDB/Provincial/AJK Agency shall separately develop a simplified regime for such projects along the following lines:

i. Off-grid hydropower plants of installed capacity up to 5 MW may be established at any suitable location, subject to approval of site and water use rights by the concerned local agencies. Only those projects will be considered for approval that register with the designated local government representative in the prescribed manner.

ii. The plant's power sales agreement will be based on a bilateral contract between the project owner and the electricity consumer(s) or their collective representative, on terms, conditions, and rates, to be determined solely between the relevant parties to the contract. NEPRA, the utility, or any external government agency will not be involved in these negotiations, nor guarantee payments or contract compliance by the parties concerned.

iii. Community contribution to such schemes may be in the form of labour ('sweat equity'), land, cash, etc., which shall be fully reflected in the bilateral agreement arrived at before initiation of project development.

iv. The final project agreement and power sales contract, terms, and rates for the project shall be registered with the AEDB/Provincial/AJK by the local government representative when issuing approval to the project, so that all such schemes are properly registered. In case of disputes, the registered agreement, along with any subsequent amendments duly certified by the parties concerned, shall prevail.

v. The Government of Pakistan may provide, to qualifying registered off-grid small hydro projects, a one-time capital subsidy based on the plant's rated installed capacity. This grant may be disbursed by the relevant AEDB/Provincial/AJK Agency in instalments, subject to project milestones being met. Terms and conditions for the implementation and management of the grant fund and subsidy payments will be developed by the AEDB in consultation with the provincial and AJK governments.

vi. Regulatory consents and processing requirements for such plants shall be simplified to the extent possible so as to enable and expedite the development of off-grid projects and enable small communities and investors to participate fully in such schemes. Template application forms, contracts, agreements, and approval requests will be developed by the AEDB, in consultation with the provincial and AJK governments, in both English and Urdu. Completion and acceptance of these documents, through the designated local government representative, shall constitute the entire approval process required for initiating the project. A single, small registration and processing fee may be payable in Pakistan rupees for this purpose.

vii. The federal and provincial Environmental Protection Agencies (EPAs) shall also not require an Initial Environmental Examination (IEE) for off-grid projects of up to 5 MW capacity; however, a basic environmental compliance and impact checklist will be developed by the EPA and required to be completed by all projects as part of the registration process, primarily to ensure that water rights, flows, and community interests are not unduly infringed upon. For purposes of establishing plant ownership and the legal validity of associated agreements, the developer will also provide, during registration, verification of plant ownership and financing as well as site and water use rights, while the power purchaser shall also form a legally recognised entity (e.g., a CBO). The projects shall certify how proper design, engineering, construction and safety criteria will be addressed before construction approval is granted.

viii. The AEDB, Provincial/AJK governments, NGOs, and donor agencies may further facilitate, where possible, the identification, development, and operation of such schemes through technical, financial, and other institutional support to the developers and target communities, as well in the provision of concessional financing, grants, equipment, and carbon credits, where available either individually or through clustering arrangements.

ix. The additional cost of power distribution to the end-consumer, including household wiring, shall be the responsibility of the developer and/or communities involved, and should be reflected in the applicable power service charges.

B.2 Other Off-grid and Dispersed RE Power Applications

Similar policies shall be developed and implemented by July 2008 for other off-grid RET applications for community or isolated grid distribution, including wind, solar and biomass-based power generation based on pilot testing and prototype experience gained during the initial short term.

Abbreviations

AEDB	Alternative Energy Development Board
AJK	Azad Jammu and Kashmir
BOI	Board of Investment
BOO	Build, Own, and Operate
BOOT	Build, Own, Operate and Transfer
BPC	Bulk Purchase Consumer
CBO	Community-based Organization
CBR	Central Board of Revenue
CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
CERA	Certified Emissions Reduction Agreement
COD	Commercial Operations Date
CPP	Capacity Purchase Price
CPPA	Central Power Purchase Agency
CRPEA	Contracts Registrar and Central Power Exchange Administrator
DISCO	Distribution Company
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency, or Energy Purchase Agreement
EPP	Energy Purchase Price
ESSA	Environmental and Social Soundness Assessment
FATA	Federally Administered Tribal Areas
FSA	Fuel Supply Agreement
GDP	Gross Domestic Product
GENCO	Generation Company
GHG	Greenhouse Gas
GoP	Government of Pakistan
GW	Gigawatt
GWh	Gigawatt-hour
I&P Dept.	Irrigation and Power Department
IA	Implementation Agreement
IEE	Initial Environmental Examination

IPP	Independent Power Producer
IRR	Internal Rate of Return
JV	Joint Venture
KESC	Karachi Electric Supply Corporation
KIBOR	Karachi Interbank Offered Rate
kV	Kilovolt
kWh	Kilowatt-hour
LMM	Locally Manufactured Machinery
LoI	Letter of Intent
LoS	Letter of Support
MoWP	Ministry of Water and Power
MW	Megawatt
MWh	Megawatt-hour
NA	Northern Areas
NAPWD	Northern Areas Public Works Department
NEPRA	National Electric Power Regulatory Authority
NGO	Non-governmental Organization
NTDC	National Transmission and Dispatch Company
O&M	Operations and Maintenance
Pak EPA	Pakistan Environmental Protection Agency
PCRET	Pakistan Council for Renewable Energy Technologies
PIB	Pakistan Investment Bond
PMD	Pakistan Meteorological Department
POE	Panel of Experts
PPA	Power Purchase Agreement
PPIB	Private Power and Infrastructure Board
PQD	Prequalification Document
PV	Photovoltaic
RE	Renewable Energy
RET	Renewable Energy Technology
RFP	Request for Proposals
ROE	Return on Equity
ROW	Right-of-Way
RPS	Renewable Portfolio Standard
SECP	Securities and Exchange Commission of Pakistan
SHS	Solar Home System

SHYDO	Sarhad Hydro Development Organization
SOQ	Statement of Qualification
T&D	Power Transmission and Distribution
TNO	Transmission Network Operator
VAT	Value-Added Tax
WAPDA	Water and Power Development Authority
WMO	World Meteorological Organisation
WPI	Wholesale Price Index
WTE	Waste-to-Energy