Renewable Energy Polices Pakistan and India A Comprehensive Study

THE INDIAN EXPERIENCE

The Evolution

- FIRST PHASE -1981 TO 1994
- SECOND PHASE -1994 TO 1998
- THIRD PHASE -1998 TO 2003
- FOURTH PHASE -2003 TO 2006
- FIFTH PHASE -POST 2006

Growth Over the years- Commendable

- **Phase I (1981-1994) : 294 MW**
- **Phase II (1994-1998) : 1022 MW**
- **Phase III (1998-2003) : 2638 MW**
- **Phase IV (2003-2006) : 4126 MW**
- **(2006-2008) : 9,645 MW**

First Phase

- The rationale behind promotion of renewable energy in the Indian context:
  - Supplement the existing conventional sources of energy for the purpose of attaining energy security
  - Meet the energy needs of rural India
- Institutional set up
  - CASE was set up in 1981
  - DNES was set up in 1982
  - Ministry of Non-Conventional Energy Sources was created in 1992

- Focus on promotion of alternative sources of energy like biogas, efficient cooking system, bagasse based co-generation, wind and small hydro power.
- Creation of awareness and a favorable environment for growth of renewable energy.
- Promotional efforts were mainly through a subsidy regime.

Second Phase

- Guidelines issued by MNES for promoting grid connected renewable power.
- Tariffs fixed for power purchased from different renewable sources -related aspects like wheeling, banking, grid connected power were also taken care of.
- Tariff fixation on the basis of avoided cost of conventional electricity.
- Guidelines adopted by almost all States

Third Phase

- In 1998, the Electricity Regulatory Commission Act came into force.
- It had an enabling provision for setting up Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERC's) in all States.
- Its aim was to
  - Rationalize electricity tariffs.
  - Ensure transparent policies for subsidies.
  - Ensure Purchase of power.
- This act did not provide for any explicit obligation on part of the regulators to promote renewable energy.

Fourth Phase

- Electricity Act 2003 came into force on 10th June, 2003;-
  - Provided a liberal framework for power development by ensuring a competitive environment
  - Facilitated in unbundling of power sector
  - This was the first major statute which explicitly provided for promotion of non-conventional energy sources.

- Certain specific provisions which aim at facilitating the growth of renewable power are :-
  - For optimal utilization of all resources including renewable, the Central Govt. shall prepare from time to time a National Electricity Policy and Tariff Policy.
  - Central Govt. shall prepare a National Policy for stand-alone systems for rural areas including those based on renewable sources of energy.
  - For rural electrification and local distribution in rural areas, a separate policy would be prepared.
  - The appropriate commission shall specify the terms and conditions for determination of tariff and it shall be guided by:-
  - The promotion of co-generation and generation of electricity from renewable sources of energy.

- **Sec 86 (1) (e)**

  The state commission shall :
- Promote co-generation and generation of electricity from renewable sources by providing suitable measures for connectivity with the grid; sale of electricity to any person; and also specify for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee.

Electricity Policy, 2005

- Electricity Policy was notified on 12thFebruary, 2005.
- The purpose of this policy is to lay down specific guidelines for accelerated development of power sector.
- Regarding NCES, the policy says:
  - Being environmental friendly they have to be promoted
  - Efforts have to be made to reduce their capital costs and this can be done by promoting competition within such projects

- The percentage of renewable power to be purchased by a distribution licensee should be fixed by State Electricity Regulatory Commissions (SERC's) at the earliest.

- Progressively this share should increase.

Tariff Policy, 2006

- Notified on 6thJanuary, 2006.
- The main objective of tariff policy is to:
  - Ensure availability of electricity to consumers at reasonable and competitive rates
  - Ensure financial viability of the sector
  - Promote consistency in regulatory practices
- As regards to non-conventional energy sources, the policy says:
- Appropriate commissions are supposed to fix a minimum percentage for purchase of energy from renewable sources after taking into account the availability of such resources and its impact on retail tariffs.

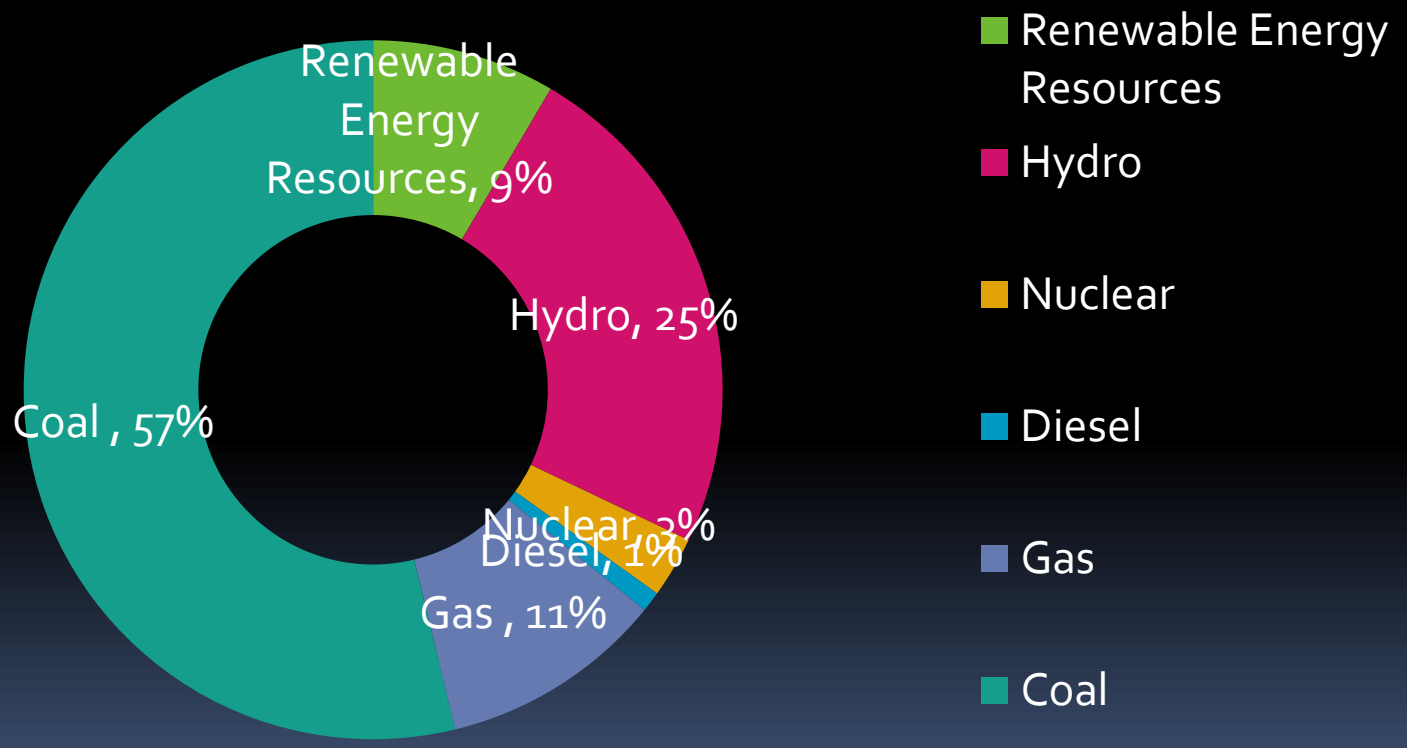
- Procurement by distribution companies shall be done at preferential tariffs because it will take some time before they become competitive.

- Such procurement for future requirements shall be done through competitive bidding.

Introduction- Indian Power Sector

- Power generation capacity has increased from just 1.4 GW in 1947 to over 150 GW in 2009.
- The current generation mix in India is dominated by coal (78.5 GW), large hydropower (36.9 GW) and gas (16.4 GW). Renewable sources rank fourth with an installed capacity of around 13.2 GW.
- AS per IEA by 2020, 327 GW of power generation capacity will be needed, implying an addition of 16 GW per year.

Electricity Generation Capacity in India



Renewable Energy in India

- Installed Capacity of 13.2 GW account for (excluding Large Hydro) 9% of overall capacity.

RENEWABLE ENERGY CAPACITY ADDITIONS DURING 10TH/11TH FIVE YEAR PLAN

Technology	Target 2003 – 2007(MW)	Actual 2003 – 2007(MW)	Target 2008 – 2012
Windpower	2,200	5,426	10,500
Small Hydro (< 25 MW)	550	537	1,400
Biomass Power / Cogeneration	725	759	1,700
Biomass Gasifier	37	26	-
Solar PV	2	1	-
Waste to Energy Programme	70	47	400
TOTAL	3,584	6,795	14,000

Source: MNRE

Renewable Energy Potential

Overall potential of 90,000 MW including

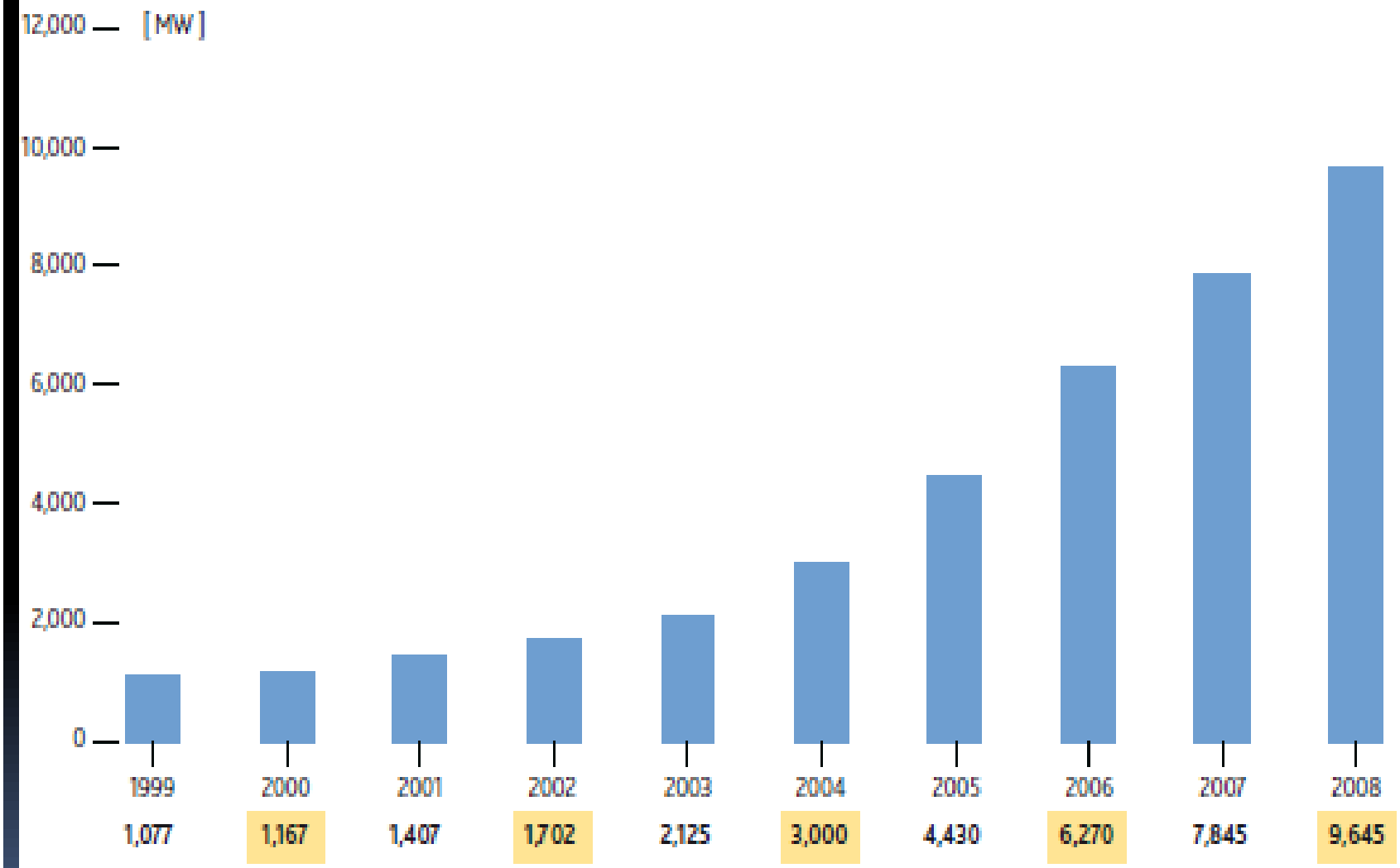
- Wind Power, 48,561 MW
- Small Hydro Power, 14,294 MW
- Biomass, 26,367 MW

Wind Energy Potential

WIND ENERGY POTENTIAL IN INDIA ACCORDING TO C-WET

State	Potential (MW)
Andhra Pradesh	8,968
Gujarat	10,645
Karnataka	11,531
Kerala	1,171
Madhya Pradesh	1,019
Maharashtra	4,584
Orissa	255
Rajasthan	4,858
Tamil Nadu	5,530
TOTAL	48,561

TEN YEAR GROWTH OF INDIAN WIND MARKET (CUMULATIVE CAPACITY IN MW) – 1999-2008



Source: IWTMA

The Policy Environment

- Currently the country doesn’t have a national renewable energy policy.

- For renewable energy promotion exists only one section in the 2003 electricity act i.e section (86(1)e).

The 2003 Electricity Act

- This act restructured the Indian electricity industry.
- In Indian states established State Regulatory Commissions (SERCs) in charge of setting electricity tariffs.
- Required the SERCs to set Renewable Portfolio Standards for electricity production in their state.

RE Policy Overview

- These policy initiatives encourage domestic private as well as FDI investments.

- **Fiscal incentives**
  - Industrial clearances are not required for setting-up an RE industry
  - No clearance is required from Central Electricity Authority for generation projects up to Rs 1 billion.
  - A five-year tax holiday is allowed for RE power generation projects.
  - A 100% depreciation in the first year. Accelerated 80% depreciation on specified projects
  - Soft loans are available through IREDA for RE equipment manufacturing
  - Financial support is available to RE industries for R&D projects in association with technical institutions
  - Import of power projects are allowed
  - Customs duty concession is available for RE spares and equipment
  - Excise duty on a number of capital goods in the RE sector has been reduced or exempted.
  - A 50% subsidy on energy projects based on urban waste.

- **Foreign Direct Investments**
  - Foreign investors can enter into a JV with an Indian partner for financial and/or technical collaboration
  - Proposals for up to 100 per cent foreign equity participation in a JV qualify for automatic approval
  - Government encourages foreign investors to set up projects on Build, Own and Operate (BOO) basis

Policies for wind power

Fiscal and financial incentives:

- Concession on import duty on specified wind turbine parts
- 80% accelerated depreciation over one or two years
- 10 year income tax holiday for wind power generation projects
- Excise duty relief on certain components
- Some states have also announced special tariffs, ranging from Rs 3-4 per kWh, with national average of around Rs 3.50 per kWh
- Wheeling, banking and third party sales, buy-back facility by states
- Guarantee market through a specified renewable portfolio standard in some states, as decided by the state electricity regulator by way of power purchase agreements
- Reduced wheeling charges as compared to conventional energy

- Land policies:
  - The Ministry of Environment and Forests has issued guidelines for diversion of forest lands for non-forest purposes, particularly to enable wind generation
  - Clearance of leasing and forest land for up to a period of 30 years for wind developers.

- Financial assistance:
  - Setting up of the Indian Renewable Energy Development Agency (IREDA), the premier finance agency of the Government of India to provide soft loans for renewable energy projects, particularly for demonstration and private sector projects

Wind resource assessment:

- The government set up the Centre for Wind Energy Technology (C-WET) to map wind energy potentials.
- The C-WET has set up more than 1,000 wind monitoring and wind mapping centers across 25 states.
- Wind mapping at 50 meters (C-WET) and 60-80 meters height (private companies).

National Feed in Tariff

- In June 2008, the MNRE announced a national generation-based incentive scheme for grid connected wind power projects under 49 MW, providing an incentive of 0.5 rupees per KWh (0.7 Euro cents) in addition to the existing state incentives.

Small Hydro power

- Fiscal and financial incentives
  - Wheeling, banking, Third party sale, Buy-back facility by states
  - Capital subsidies and sales tax incentives in certain states
  - Detailed project report preparation at discounted price
  - Capital grant for setting up projects in North Eastern states
  - Financial support for renovation, modernization and capacity up-rating of old SHP stations
  - Financial support for development/upgradation of water mills
  - Soft loans from IREDA for setting up of SHP projects upto 25 MW capacity

Biomass power

- Enactment of favorable policy regimes at the state as well as the Central levels
  - Buy-back/Wheeling/Banking of generated electricity
  - Incentives in the form of sales tax exemptions, equity and grants, etc.
  -
  - Interest subsidy for commercial biomass power projects up to 3% interest subsidy for biomass/bagasse cogeneration (commercial projects)
  - Capital subsidy for cogeneration projects in Joint Venture model/IPP mode in cooperative/public sector sugar mills
  - Financial assistance under the National Biomass Resource Assessment Program (NBRAP)

Energy From Waste

- Easy allotment of land, supply of garbage and facilities for evacuation, sale and purchase of power to encourage setting up of waste-to-energy projects.
- Commercial Projects: Financial assistance as interest subsidy for reducing rates of interest.
- Demonstration Project: Financial assistance on capital cost of the project.
- Power Generation at Sewage Treatment Plants: Financial assistance on incremental cost for generation of power from biogas.

- No specific conditions for JV formation
- 100% EOU to set up a manufacturing plant
- Technology transfer for the manufacture of silicon solar cells and PV systems
- MNES financial incentives for solar PV grid connected power projects
- IREDA financial package for solar photovoltaic (power generation systems)
- MNES Financial Incentives for Solar Photovoltaic Systems

Biogas

- Central subsidy to users
- Remuneration to SEWs
- Dealership support to Fair Price Shops
- Organizational and infrastructure support to implementing agencies
- Technical and training support
- Special incentives are available for turnkey entrepreneurs in rural areas
- Loans from commercial and cooperative banks for setting up of biogas plants under Agricultural Priority Area
- Automatic refinancing by NABARD

An overview of STATE POLICIES

Renewable Portfolio Standards and financial incentives

- In the absence of a national renewable energy policy, ten out of the 29 Indian States have now implemented quotas for a renewable energy share of up to 10% and have introduced preferential tariffs for electricity produced from renewable sources.

- In addition, several states have implemented fiscal and financial incentives for renewable energy generation, preferential grid connection and transportation charges and electricity tax exemptions.

- Introduced feed-in-tariffs for wind generation which are higher than that for conventional electricity.

- A number of states have announced policy packages including banking, third party sale and buy-back. Most states have declared buyback rates with some escalation for each subsequent year.

  - Some states are providing concessions or exemption in state sales tax. These rates vary widely from state to state and between different technologies.
  - Fourteen states have so far announced policies for the purchase and support of electrical energy generated from various RE sources.
  - Maharashtra has set up a “green energy fund” for promoting renewable projects.
  - Eleven state regulators have under the National Tariff Policy 2006 passed orders for a minimum off take of renewable power by distribution licensees (called RPOs; renewable energy purchase obligations).

A BRIEF COMPARISON OF WIND ENERGY POLICIES IN KEY STATES

States	Tariff rates per kWh	Annual tariff escalation	Wheeling or transmission charges	Capital Incentives	Specified Renewable Portfolio Standards for wind
Tamil Nadu	Rs. 3.39	NIL (Fixed for 5 years)	5% of tariff paid	National policies	10% (2008-2009) 13% (2009-2010) 14% (2010-2011)
Gujarat	Rs. 3.37	NIL	4% of tariff paid	Has an exclusive policy in addition to the national policies	2% (2008-09)
Rajasthan	Rs. 4.28-4.50	Rs. 0.02 every year for 10 years	10% of tariff paid	National policies	5% (2008-09)
Karnataka	Rs.3.40	NIL	2% of tariff paid	National policies	2% (2008-09)
Madhya Pradesh	Rs. 4.03	Variable increase up to 20 years and then reduces	2% of tariff paid	National policies	5% (2008-09) and 6% from 2009-2011
West Bengal	Rs.4.00	NIL	Rs. 0.30 per kWh	National policies	8% (2008-09)
Kerala	Rs. 3.14	Fixed for 20 years	NIL	National policies	5% (2008-09)
Maharashtra	Rs. 3.50	Rs. 0.15 per annum for 15 years	7% of tariff paid	National Policies	6% for all RES (2008-09)
Andhra Pradesh	Rs. 3.50	NIL	5% of tariff paid	National Policies	5% (2008-09)
Harayana	NIL	n/a	NIL	National policies	3% (2008-2009)

Loop holes in the system

- **Multiplicity of Agencies**
- **Skewed Incentive Structure**
- **Poor Implementation Capacity**

THE PAKISTANI EXPERIENCE

Renewable

- 6th year plan (1983-88) an outlay of 962 million was made for renewable energy.
- In the 7th year plan (1988-93) solar ,wind and mini hydel amounted to 5 MW .
- In eighth five year plan (1993-98) Pakistan National Conservation strategy (PNCS) came into existence.
- In 2001, PCRET operating under MOST financed 255 micro hydel projects supported by government grants.
- By 2006, community level micro & mini hydel units have been installed

Renewable Energy policies Developed by AEDB in November 2006.

- Short Term (Projects achieving financial closure by June 30, 2008)
- Medium Term (Projects achieving financial closure during period July 1, 2008 to June 30, 2012)
- Long Term (Projects achieving financial closure after June 30, 2012)

Short term

This phase is marked with liberal risk cover and attractive power purchase tariffs so as to enable a reasonable generation capacity to be installed.

Medium term

In this phase, Medium term policy framework would be developed 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.

Long term

By this phase 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.

Short term RE Power generation policy

The policy for the short term (up to June 30, 2008)

- ***Public Sector***

  The public sector would undertake projects situated in far flung areas or those projects that wouldn't be profitable to the private sector in the foreseeable future.

- ***Private sector***

  The private sector will be encouraged to undertake commercially viable renewable energy-based power generation projects.

Avenues For Private Sector Participation

- Independent power projects (IPPs) based on new plants (for sale of power to the grid only)

  a. Solicited

  b. Unsolicited

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

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

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

  a. Solicited

  b. Unsolicited.

General Incentives for RE Power Generations

Guaranteed Market: Mandatory Purchase of Electricity

It is mandatory for the power distribution utilities to buy all the electricity offered to them by the RE project as per the voltages specified.

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.

Specific Incentives for Grid-Connected RE IPPs

RE Resource Variability Risk

- In the case of grid-connected RE IPPs, the risk of variability in wind speeds and water flows (for Wind power and small hydropower projects) shall be borne by the power purchaser.

- Benchmark electricity production levels would be determined for each project location. And The IPP shall be ensured revenues corresponding to this benchmark level, 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.

- ***Production Incentives***

  For all power produced above than the benchmark level, a production bonus payment shall be made to the IPP

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 annual carbon revenues realized subsequently shall be divided in the following manner:

1. an up-front, nominal deduction shall be made for the administrative costs
2. 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
3. the remaining revenues shall be divided in equal proportion between the IPP and the power purchaser.

- 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).

Security Package

- The power purchaser shall enter into a specific Power Purchase Agreement (PPA) with the RE power producer. And Gop would guarantee this obligation.

- 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.

- The GoP would also facilitate the acquisition of CDM certified emissions reductions units (CERs).

Facilities for Captive and Grid Spillover Projects

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), and at times withdraw electricity from the utility to supplement its own production for local use, In such cases, the net electricity;

- If units supplied by the producer minus units received by the producer, is 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

- And if 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).

Facilities for Off-grid and dispersed RE power Generation

- During the short term (2006-08), the emphasis is on the design, demonstration, and testing of dispersed off-grid, community, embedded, and standalone RE systems.

- Shall be greatly deregulated and simplified.

- For such projects, AEDB/Provincial/AJK Agency approval, or Environmental Protection Agency (EPA) NOCs shall not be required.

Financial and Fiscal Incentives

Fiscal Incentives

- 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).
- Exemption from income tax, including turnover rate tax and withholding tax on imports.
- 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.
- Non-Muslims and non-residents shall be exempted from payment of Zakat on dividends paid by the company.

Financial Incentives

- Permission for power generation companies to issue corporate registered bonds.
- Permission to issue shares at discounted prices to enable venture capitalists to be provided higher rates of return proportionate to the risk.
- 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.
- Non-residents allowed to purchase securities issued by Pakistani companies without the State Bank of Pakistan's permission, subject to prescribed rules and regulations.
- 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.

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

There are two categories of proposals for RE based IPP power projects welcomed by AEDB and designated provincial/AJK agencies.

- Unsolicited proposals (for Raw site)
- Solicited proposals (for preselected sites)

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:

- Sign the Implementation Agreement (IA) and a Certified Emission Reduction Agreement (CERA), with the AEDB
- Achieve financial close (as defined in the IA or PPA)
- Achieve construction start (as defined in the IA or PPA)
- Execute and commission the project according to major milestone established in the LoS.

Security Package and Risk Cover

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

- GoP guarantee on payment obligations of public sector entities
- Provide protection against specific ‘political’ risks and changes in the tax and duty regime.
- Ensure convertibility of Pakistani Rupees into US Dollars at the prevailing exchange rate and the remit ability of foreign exchange to cover necessary payments related to the project, including debt servicing, payment of dividends, and repatriation of equity.
- Specific risk cover against RE resource
- Suitable indexation of tariff components to cover the risk of exchange rate variations and inflation, etc.

Corporate, Fee, and Contractual Arrangements

- ***Enterprise Structure and Licensing Requirements***

  Each IPP (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 and obtain a generation license from NEPRA. This requirement is not applicable for IPPs (captive or dedicated plants with or without grid spillover provision and standalone captive or isolated local distribution).

- ***Lock-in Period***

  The 'Main Sponsor' (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).

- ***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.

- ***Nature of Equipment***

  Grid connected RE IPPs, will be required to use new equipment.

Determination of Tariff for Grid-Connected RE IPPs

Tariff Options

- Competitive bidding (solicited proposals)
- Negotiations (unsolicited proposals)
- Up-front tariff-setting

Tariff through Competitive Bidding on Solicited Proposals

- This would entail determination of tariff on the basis of competition and the bidding process may be structured along either of the following two options:
- Bidders may be required to submit their competitive proposals for the tariff
- A benchmark tariff may be offered up-front, and bidders invited to quote a discount on the benchmark price.

Negotiated Tariff for Unsolicited Proposals and Up-front Tariff

In order to determine this tariff following parameters would 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.

Financial Parameters

- Debt: Equity Ratio
- Internal Rate of Return/Return on Equity
- Interest on Loans
- Capital Cost
- O&M Cost
- Other Incentives

The End