



# Alternative & Renewable Energy

## Current Status and Prospects

Presentation by  
Alternative Energy Development Board



# ALTERNATIVE ENERGY DEVELOPMENT BOARD (AEDB)

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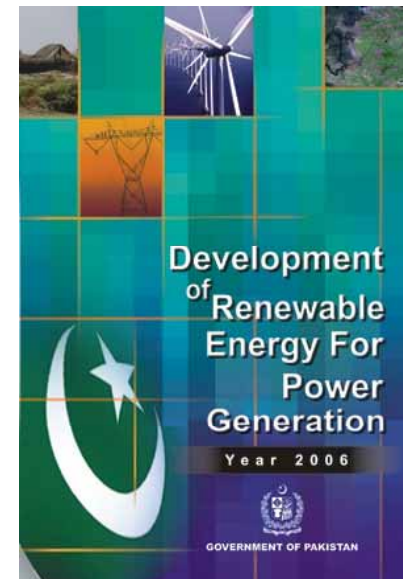


Autonomous body under the Act of Parliament 2010

- **One Window** for all Alternative Energy Investments in Pakistan.
- **Implement** policies, programs and projects through private sector in the field of Alternative Energy
- Assist and **facilitate** development and generation of Alternative Energy to achieve sustainable economic growth
- **Encourage** transfer of technology and develop indigenous manufacturing base for ARE Technology
- **Promote** provision of energy services that are based on Alternative energy resources
- **Setting up** ARE projects on its own or through joint venture or partnerships with public or private entities.

# RE POLICY

- Policy for Development of Renewable Energy for Power Generation 2006 (RE Policy 2006)
- Framework for Power Co-Generation 2013 (Bagasse/Biomass) was approved by ECC on March 06, 2013, and made part of the RE Policy 2006.





# SALIENT FEATURES (RE POLICY 2006)

- Attractive ROE (17%)
- Tax free revenues
- Duty free imports
- Guaranteed electricity purchase
- Protection against political risk and change in law
- Repatriation of revenues allowed
- Grid Spill Over Concept (Small Power Producers & Cogeneration)
- Net Metering (Under process in NEPRA)
- Wheeling Provisions (Under consideration in NEPRA)
- Banking of Electricity (Under process in NEPRA)

# BENEFITS OF ALTERNATIVE & RENEWABLE ENERGY



- **Relieves Grid Resources**
- **Energy Security - Focus on Domestic Resources**
- **Only Energy Option for many rural areas (off-grid)**
- **Reduced dependence on Imported Oil:**
  - Introducing 5% wind power into national grid can save \$ 0.8 billion oil imports and introducing 13% renewable power into national grid can save more than \$2 billion oil imports per year (In-house AEDB calculations based on 2011 prices)
- **Environment Friendly**
  - Carbon Credits
  - Utilization of waste land
  - Employment Creation and Poverty Alleviation

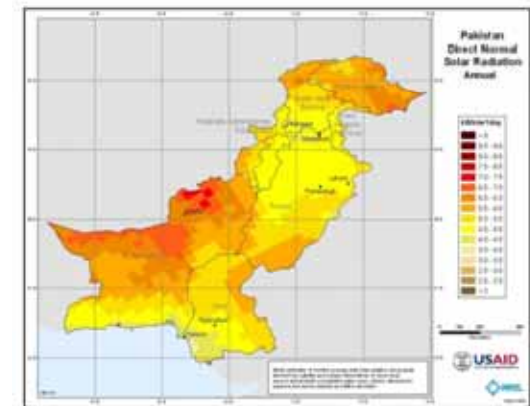
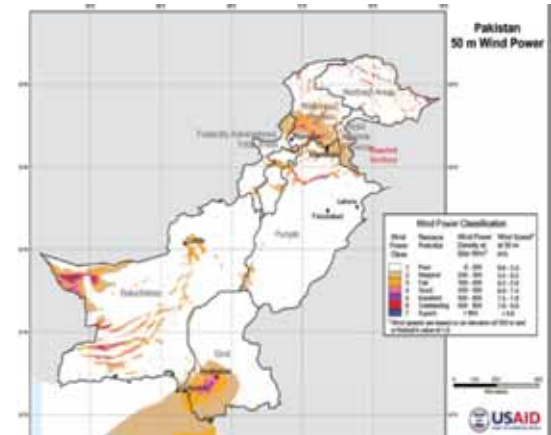
A vertical strip of six images is positioned on the left side of the slide. From top to bottom, the images are: 1) A close-up of a solar panel's surface reflecting a bright sun. 2) A fast-moving river with white water rapids. 3) A silhouette of a wind turbine against a sunset sky. 4) A lush green forest with sunlight filtering through the trees. 5) A view from inside a hydroelectric tunnel looking towards a bright opening. 6) A large array of solar panels under a clear sky.

# ALTERNATIVE & RENEWABLE ENERGY POTENTIAL

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- Wind: 2,000 MW in pipeline and abundant potential for development
- Solar: Extremely rich in solar resources
- Hydro
  - Small 3,000 MW (Approx.)
- Bagasse Cogen: 2,000 MW (Approx.)
- Waste to Energy: 1,000 MW (Approx.)
- Geothermal Studies underway
- Alternative Fuels Potential being determined



- Initial macro level resource maps for wind and solar developed by NREL (USA).
- Resource mapping and spatial planning of solar , wind and biomass energy resources has been initiated with the support of the World Bank and ESMAP’s Renewable Energy Resource Mapping Initiative.







# CURRENT STATUS

# AEDB CURRENT INITIATIVES

## WIND POWER

**34 IPPs** at various stages of development.

2013: **106 MW** [FFC and Zorlu (Turkey)] commissioned

2014: **150 MW**

2015: **380 MW**

2016: **500 MW**

2017: **789 MW**

**1925 MW**

**Expected by 2016: 1136 MW**

**Expected by 2017: \*1925 MW**

\*(Subject to National Grid Availability)

## SOLAR POWER

**On-grid: 24 IPPs** 792.99 MW  
Solar PV LOIs issued by  
AEDB

**Net Metering:**  
NEPRA finalizing framework.  
**3000 MW** domestic solar PV in  
3 years.

### Off-Grid:

- i. 4000 rural homes electrified (solar PV).
- ii. 7000 villages can be electrified subject to funding.
- iii. 64.5 MW solar PV panels imported.  
16715 solar water heaters  
1429 solar water pumps

# AEDB CURRENT INITIATIVES

## BIO-ENERGY

**34 MW** bagasse to power plants operational.

**15 Projects** (294 MW) in advanced stages.

**04 LOIs** (48 MW) issued to Biomass & Waste to Energy IPPs

**05 LOIs** (143 MW) issued under Co-Generation (Biomass/Bagasse)

**01 LOI** of 15 MW under process

**Potential: 1500-2000 MW** in 2-3 years.

## SMALL HYDRO ( $\leq 50$ MW)

**8 Projects** (80 MW) in public sector under various stages of development in Punjab & KP.

**Expected by 2016: 80 MW**

**Expected by 2018: 200 MW**



**FFCEL Wind Power Project**



**Zorlu Enerji Wind Power Project**



# AEDB CURRENT INITIATIVES

## Clean Development Mechanism (CDM)

- CDM is mechanism by virtue of which projects can earn revenue by selling the accrued Certified Emission Reduction (CER) certificates in the international carbon market.
- AEDB is encouraging project developers of ARE projects to pursue CDM.
- 06 wind power projects of 50 MW each have so far registered with CDM executive board for an aggregate 529,115 CERs.
- One solar power project of 50 MW has registered Program of Activates with the CDM Executive Board.

# Creating Enabling Environment

- National Grid Code for wind power projects has been amended. Grid Integration Plan 2010 -2015 for wind power projects developed by AEDB to support NTDC.
- Grid Code amendments for solar and distributed generation initiated by AEDB.
- Regional Environmental Study conducted by AEDB to support wind power projects. Guidelines for environmental assessment have also been developed.
- Trainings & capacity building of partner departments like NTDC, NEPRA, PMD, DISCOs, Provincial Government Departments, etc. have been arranged by AEDB.
- Standardized project agreements developed for wind and biomass power projects. Standard projects agreements for solar power projects being developed.
- Manufacturing for large wind turbines is also being encouraged. M/s DESCON manufacturing wind turbine towers. M/s CWE has also establishing a tower manufacturing facility.
- Issues related to financing of projects have been resolved and now leading financing agencies like IFC, ADB, OPIC, ECO Trade Bank etc. are offering financing to RE power projects in Pakistan.



# WAY FORWARD

# Way Forward



- Long term plan for wind energy development based on detailed resource mapping. Wind share to be increased from 5% to **10%** of the installed capacity.
- Development of solar on-grid power projects - approximately 1000-1500 MW is expected to be added to the National Grid by 2018 (subject to timely availability of tariff and grid network).
- If an attractive / incentivized policy is announced by NEPRA for **net-metering**, and assuming 5% of the 20 million consumers install 3kW solar systems, approx. 3000 MW of additional generation can be added to the system by 2018.
- Approx. 70 million people in Pakistan are without electricity. There are about 3 million households where grid connectivity is not feasible. Energization by solar technology as **an off-grid application** can bring social uplift.
- **Solar water pumps** can greatly reduce the burden on the grid and loss in tariff due to subsidy to agriculture tube wells.
- Development of small hydel projects on potential sites in northern areas.
- Exploitation of available potential of power generation from sugar mills. **1500 - 2000 MW** to be added from sugar mills by 2018.



**THANK YOU**

