



WB Support to India's Energy Sector Development



SECTION A

India's Development Challenges and Government Priorities



INDIA'S DEVELOPMENT NEEDS ARE MASSIVE AND CHALLENGES IN THE POWER SECTOR SIGNIFICANT ...

456 million living at \$1.25 a day (in 2005, U.S. dollars at PPP).

Increase Access

- At least 400 million without electricity access (vs. 20 million in China in 2008)
- Two-thirds of households rely on biomass for cooking

Improve Efficiency & Governance of Distribution Sector

- 40% AT&C losses; reducing to 15% => \$4.4b addl revenues per year
- Low cost recovery from tariff (82% for FY2007)

Expand & Diversify Power Generation

- Current installed capacity of 145 GW (vs. China's 800 GW)
- Biggest bottleneck to industrial growth and new investment:
 - 60% of firms rely on captive power (vs. 21% in China)
 - Peak Deficit at 16.6%, Energy Deficit at 9.9%,
 - Econ. Cost of Shortages estimated at 7% of GDP

Growing CO2 Emissions

- Power sector represents 50% of India's CO2 emissions (0.5 bt/yr -> 2.3 bt/yr by 2031) 53 % installed capacity and 70-80 % generation from coal-fired plants



GOVT OF INDIA PRIORITIES

(As laid out in 11th Plan and
2008 National Action Plan on Climate Change)

EXPAND GENERATION

- Add about 80,000 MW capacity in 11th Plan
 - including increasing installed hydro capacity by 46% by 2012 (addl. 15 GW)
- Energy Efficiency
 - Rehabilitate and modernize about 27,000 MW of old coal-fired power plants
 - Increase share of supercritical to 20% of new installations in 11th Plan
 - Demand Side Management
- Increase Renewables (SMH, Wind, Biomass) to 10% of installed capacity by 2012 (from current 4%)
- Increase Solar share in energy mix to 20,000 MW by 2020 with 50% CSP

IMPROVE QUALITY OF SUPPLY AND SERVICE

- Expand inter-regional transmission from 10,000 MW to 37,000 MW by 2012
- Upgrade & expand distribution networks & MIS (target 15 % ATC losses)

EXPAND ACCESS TO REACH ALL BY 2012

- With Conventional & Renewable Energy Sources in On/Off-Grid Approaches
- Through Utility, Franchisee, or other Business Models

COMPLY WITH ENVIRONMENTAL AND SOCIAL SAFEGUARDS



SECTION B

The Bank's Energy Program in India

- **Portfolio & Pipeline**



BANK ENGAGEMENT: FOCUS ON INFRASTRUCTURE & INSTITUTIONAL DEVELOPMENT

Clean Power Generation

- Hydropower projects with 2 public sector companies on 2 river basins (SJVN on Satluj basin (Himachal Pradesh) & THDC (Alaknanda basin) , Uttarakhand)

Energy Efficiency

- Coal-fired plant rehabilitation with Gencos in 3 States (w/GEF);
- Transmission & Distribution in State of Haryana

Efficient energy markets & inter-regional power transfer

- Powergrid & Haryana Transco ; Maharashtra Transco

Utility governance and quality of electricity distribution services - selected states (including rural areas)

- West Bengal, Maharashtra Discom ; Haryana Transco and Discom

Solar Power (Thermal and PV applications – in association with IFC):

- Support National Solar Mission under NAPCC
- Promote Concentrating Solar Power (CSP) deployment by helping remove existing regulatory and investment barriers

Other RE Development

- Distributed generation (1-3 MW) for improved rural access and services (RE-based and private sector led);



ENERGY LENDING PORTFOLIO + PIPELINE

Project Name	Board Approval	Revised Closing Date	Age (yrs)	Comm Amt.	Total Disb.	Percent Disb*
Power System Development III	19-Jan-06	31-Jul-11	3.9	400.0	382.4	95.6%
Rampur Hydropower Project	13-Sep-07	31-Mar-13	2.2	400.0	93.6	23.4%
Power System Development IV	18-Mar-08	31-Jul-14	1.7	1,000.0	475.5	47.6%
Coal-Fired Generation Rehabilitation	18-Jun-09	30-Nov-14	0.5	180.0	-	0.0%
Haryana Power System Imp.	4-Aug-09	31-Dec-14	0.3	330.0	0.8	0.3%
Power System Development V	22-Sep-09	30-Jun-15	0.2	1,000.0	-	0.0%
India - Chiller Energy Efficiency - MP	9-Jun-09	30-Jun-14	0.5	1.0	-	0.0%
Chiller Effcgy-GEF	30-Jun-09	-	0.4	6.3	-	0.0%
IIFCL	22-Sep-09	30-Sep-15	0.2	1,195.0	3.0	0.3%
PROPOSED (FIRM)						
Vishnugad-Pipalkoti Hydro (444 MW)	Sep 2010			600.0		
Luhri Hydro (700 MW)	Dec 2011			700.0		
SME Energy Efficiency Project (GEF)	Apr-2010			12.0		
Sustainable Urban Transport (IBRD/GEF)	Dec-2009			175.0		



WORLD BANK PROGRAM... CLEANER POWER GENERATION

Hydropower

- Increase in hydropower capacity of about 1,500 MW (on-line after 2012)
- Raise development & operational practices to international 'good practice' benchmarks in two states and two river basins
- Projects:
 - SJVNL: Rampur (412 MW, FY08) & Luhri (700 MW, FY12)
 - THDC: Vishnugad-Pipalkoti (444 MW, FY11)
 - Himachal Sustainable Development DPL (?)

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Other RE Development

- Distributed generation (1-3 MW) for improved rural access and services (RE-based and private sector led);
- Support for RE scale up to 10% of generation by 2012



WORLD BANK INDIA PROGRAM...

ENERGY EFFICIENCY

National
Thermal
R&M
Program
Coordination
with KfW,
USAID Eco-
Asia, ADB

Thermal Power Rehabilitation

- Rehabilitate 640 MW of coal-based thermal power plants to improve their reliability, plant load factor, and fuel efficiency
- IBRD Loan cum GEF grant to state power generation utilities: West Bengal Power Development Corporation Limited (Bandel Unit-5), Maharashtra State Power Generation Co (Koradi Unit-6), Haryana – HPGCL (Panipat Units 3&4)]
- National R&M Program [under development – targeting about 20,000 MW]

Electricity Transmission & Distribution:

- Energy Efficiency/loss reduction is key element of T&D engagement; Utility reform critical for effective demand-side management

Demand-Side Measures (with GEF support):

- Chiller Efficiency; Energy Efficiency in SMEs
- Bureau of Energy Efficiency; Agriculture Pump Sets



WORLD BANK INDIA PROGRAM... NATIONAL & REGIONAL MARKETS

**POWERGRID
(National)**

**National
Electricity Fund
(to support State
Transcos)**

**Coordination
with ADB, KfW
and JICA**

❖ **National & Regional Electricity Markets**

- **Expand transmission capacity both at the national and state levels – to facilitate efficient energy markets, inter-regional power transfer (from 12,000 MW to 37,000 MW by 2012)**
- **Build institutional capacity of state transmission utilities**
- **IBRD Loans to:**
 - **POWERGRID – Model for effective institutional development**
 - **Maharashtra – Sub-National Financing (with IFC)**
 - **Haryana Transo –**
 - **Potential National Electricity Fund (for state transcos)**



WORLD BANK PROGRAM... STATE DISTRIBUTION

**Improving
Distribution
Viability**

**Coordination with
ADB, KfW and
JICA**

❖ **State Distribution Engagement**

- **Improve quality and efficiency of electricity distribution services**
- **Improve level of public confidence in energy and financial management (corporate governance) systems of target utilities**
- **Improve regulatory effectiveness and focus on consumer participation in regulatory process**
- **IBRD loans to Haryana and TA grant to West Bengal, with objectives to develop principles and guidelines to support National Programs like APDRP and RGGVY**



ANALYTICAL PROGRAM – FOCUS ON THE ‘HOW TO’ OF IMPROVING SERVICE DELIVERY AND ENSURE LOW CARBON GROWTH

Org. Transform. & Governance

- West Bengal Power Department and Utilities
- Maharashtra Transmission Company
- Haryana Transmission Company
- Haryana Distribution Company

Regulatory Effectiveness

- Capacity Building of Haryana Regulator
- Partnership with Central Electricity Regulatory Commission
- **Support to capacity building institutions in regulation (CUTS)**

Service Delivery Models

- Framework for Distributed Generation
- Managing Distribution Franchisees
- Improved Electricity Access to Slum Dwellers (Mumbai)

Clean Energy and Energy Efficiency

- Low Carbon Development Study
- River Basin Optimization Study in HP, Uttarakhand
- Investment Climate Assessment in Renewables
- Regulatory Options for EE Rehabilitation Projects
- EE-focused Operations & Maintenance Practices
- Deployment of Concentrating Solar Power in India

In addition, supporting cross cutting reforms through DPLs in AP, HP, Bihar, UP; with power sector as one of main pillars of DPLs



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