Large Versus Small: Differentiated approaches to scaling up Wind Power and increasing access to energy for the Poor

PRESENTATION By:

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IS/ISO 9001 : 2000 Certified

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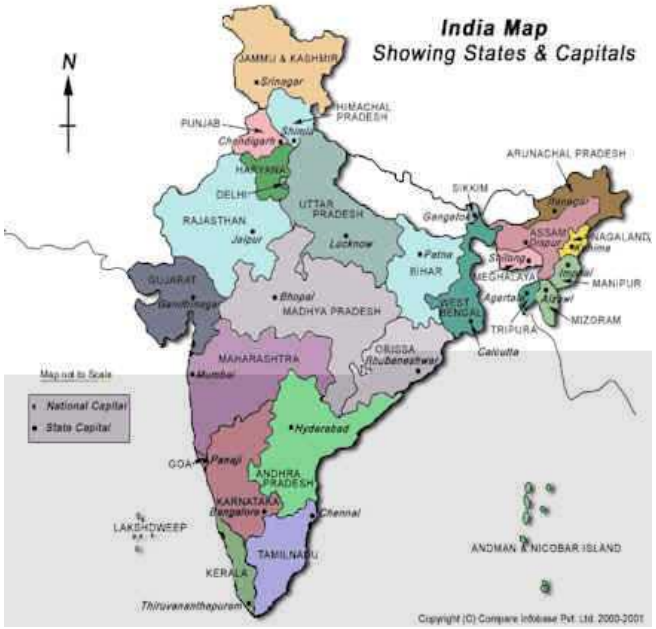
Indian Economy

- Fastest growing free market democracy
- 5th largest economy
- GDP growth @ 8%
- Infrastructure
  - 4th largest Rail network
  - 349 airports
  - 12 major ports & 87 minor ports
  - 545 Million Mobile connections
  - 6th largest power market
- IT & Engineering Superpower



Energy Statistics in India

- Power Capacity – 156 GW
  - Thermal - 100 GW
  - Hydro - 37 GW
  - Renewable - 15 GW
- Per Capita Consumption – 700 units
- RE Share in Generation – 4%
- Energy Reach – 60%
- Peak Deficit – 13%
- Energy Deficit – 11%

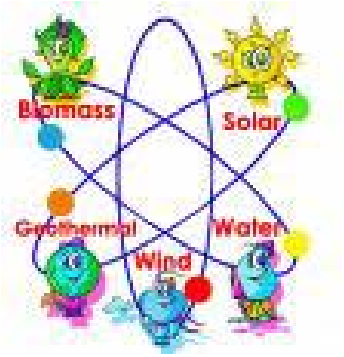
Indian RE Scenario

Sector	Total Potential (in GW)	Harnessed (in GW)
Wind	48	11
Small Hydro	15	2.6
Cogeneration	5	1.2
Biomass	17	0.8
Solar*	-	-

**1.3 GW Solar power to be harnessed till 2013, as per the solar mission*

Note: Grid connected capacity as on 31-Oct-2009

RE Development



- ✓ Conducive policy framework and regulatory initiatives
  - ➢States have set-up State Electricity Regulatory Commissions
  - ➢Preferential tariffs for renewables.
  - ➢Renewable Purchase Obligation's for states
  - ➢Introduction of Renewable Energy Certificates.
  - ➢National Solar Mission
  - ➢Generation Based Incentive for Wind
- ✓ Increase in Venture Capitalists and Private Equity investments
- ✓ 100% FDI allowed

IREDA

INCEPTION

Incorporated under the Companies Act on 11th March, 1987 to promote, develop and extend financial assistance for Renewable Energy and Energy Efficiency/ Conservation Projects.

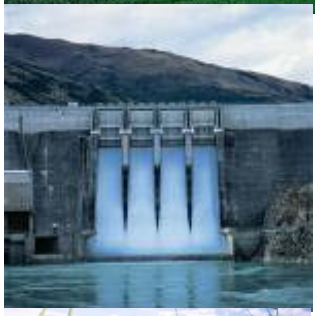
OBJECTIVE

Extend financial support to Renewable Energy, Energy Efficiency & Conservation projects

MOTTO

Energy For Ever

Operational Areas



Sectors being financed:

- Wind
- Small & Medium Hydro
- Biomass Power & Cogeneration
- Solar
- Waste to Energy
- EE & Conservation
- Bio Fuels/ Alternate Fuels

Other Activities

- Intermediary for providing financing facilities for various MNRE Schemes
- Implementing Agency for GBI scheme

Rural Electrification Program

Unelectrified villages in India - **593,732(*)**
Number electrified - **496,365(**)**

Aim

- Electrifying all villages and habitations
- Providing access to electricity to all rural households
- Providing electricity Connection to Below Poverty Line (BPL) families free of charge

Technological Options available

- Small hydro power plants.
- Biomass gasification systems in conjunction with 100% producer gas engines or with dual-fuel engines using non-edible vegetable oils.
- Non-edible vegetable oil based engines.
- Biogas engines
- Solar photovoltaic power plants.

(*)as of 2001 census

(**)Dec 31, 2009

Scheme for the programme on "Small Wind Energy and Hybrid Systems(SWES)" available

Large Vs Small Wind Applications

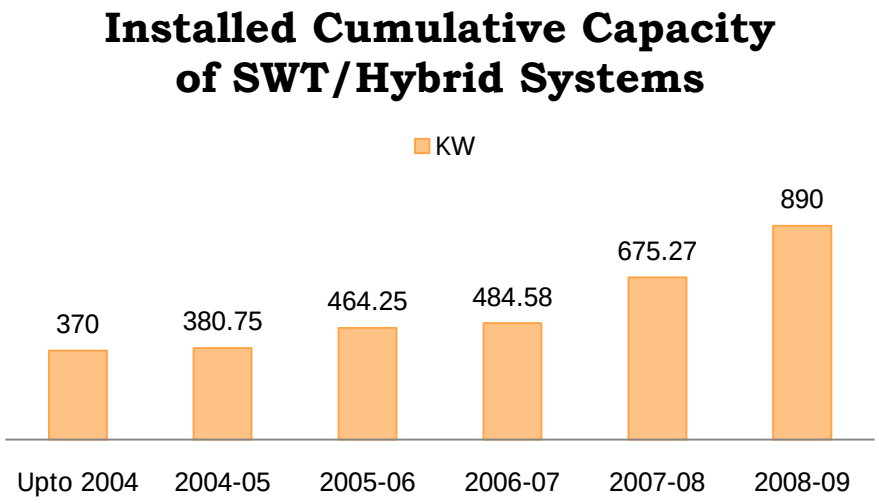
Large

- Sale to Grid
- Captive Usage For Industrial Application
- Third Party Sale

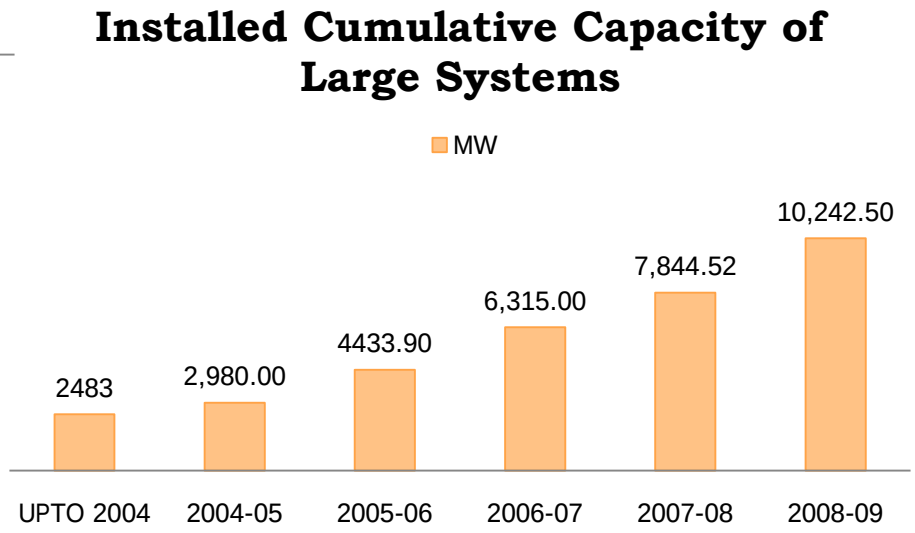
Small

- *Industries:* Office / factory buildings, Guest houses, residential quarters, Mobile phone towers, Off shore oil platforms
- *Local Bodies/ Institutions*: Office buildings, guest houses, tourist home, hostels, remote buildings in remote locations, street lighting etc.
- *Individuals*: Farm houses, gardens, campus lights

Large Vs Small Wind
Indian Scenario



- 13+ manufactures available with total available capacity of 4500 MW and proposed 5350 MW



- 20 manufactures and system integrators available
- 4 aerogenerator manufacturers while others are system integrators, dealers, service providers etc

Scheme for the programme on "Small Wind Energy and Hybrid Systems(SWES)"

Implementation Route

State Nodal Agency(SNA)

Manufacturers

Eligibility

Bundled Proposals cumulative capacity of 30 kW, min of 3 systems

Rating:

Capacity of individual Aerogenerators /hybrid-100 kW

Ceiling of CFA for single project

Aerogenerators : 10 kW

Hybrid systems : 50 kW

Central Financial Assistance

Community Use, and Direct use by Govt., Defence, Para Central/State military etc-
60 % of ex-works cost

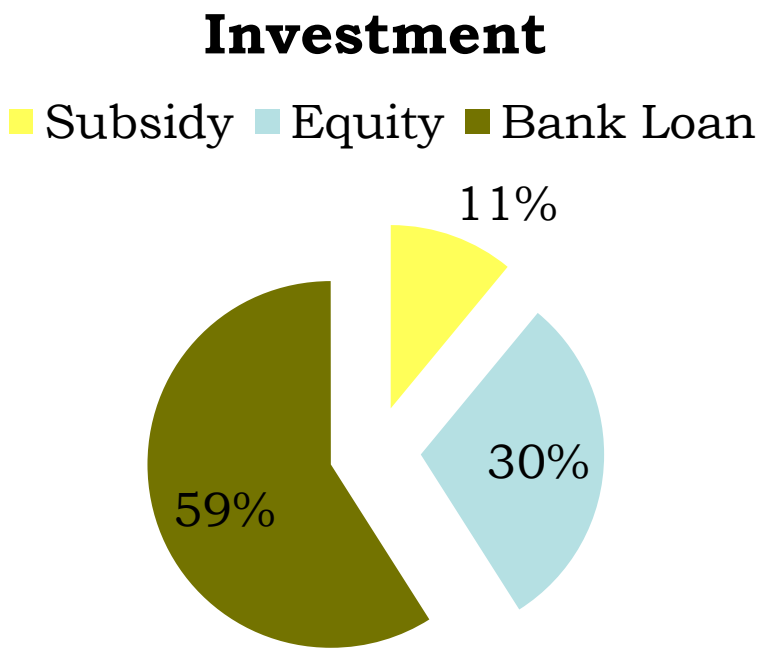
Individuals, Industrial users, R&D and academic institutions-
40 % of ex-works cost

10 kW Sample Wind-Solar Hybrid Model

Load	Qty	Per Day kWh Requirement
11 W CFL(with electronic chokes)	150	12.5 to 15.70 kWh
Fans(75 W to 80 W)	30	19.0 to 23.00 kWh
Computers/ TV/Other such appliance	20	1.6 to 2.0 kWh
Total		**33.1 to 40.70 kWh**

10kW hybrid(1:1 Wind-Solar) model shall be able to support it with generation @ 46kWhr per day

Financial of a Sample Wind Solar Hybrid System- 10 kW



Assumptions

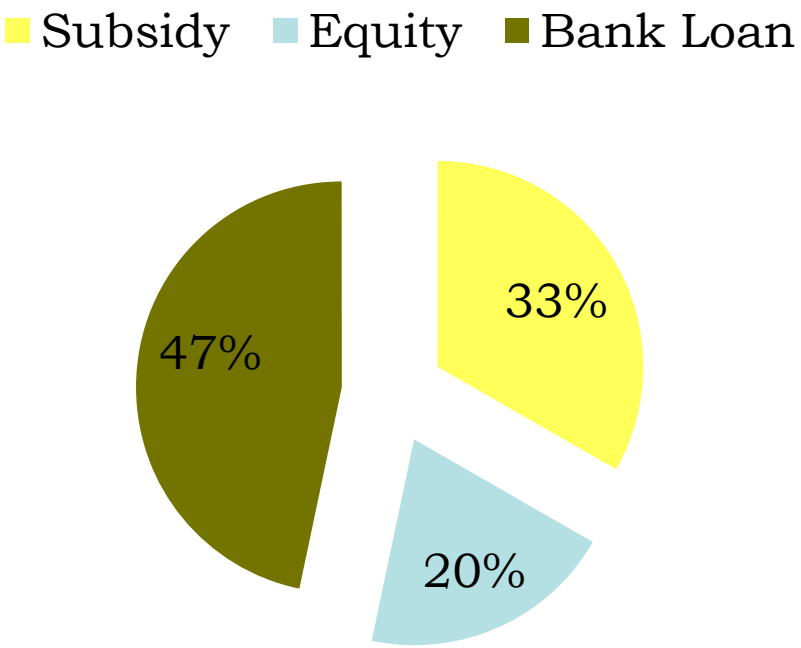
Life of the Project- 20 years
Cost per KW- INR 0.3 million[USD 6500]
O&M Costs-Free for 1 year , 1% project cost
Depreciation: SLM for 20 years with 10 % salvage value
Replacement Cost of fuel- INR 15/unit[33 cents/unit]

Loan Period- 11 years
Interest- 11-12% per annum

"Not Bankable from Lenders' Perspective"

Financial of a Sample Wind Solar Hybrid System- 10 kW

Investments



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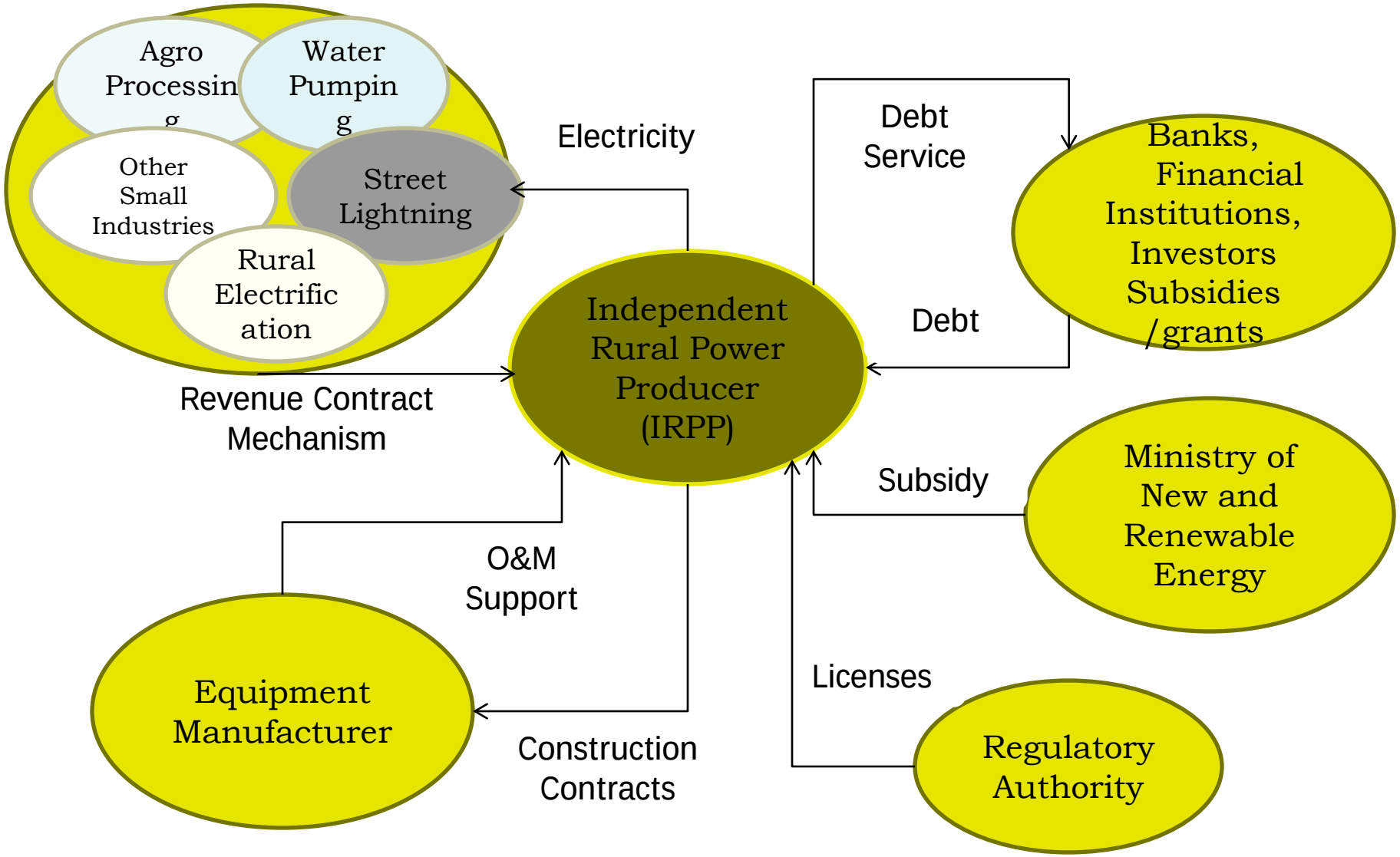
O&M Costs-Free for 1 year , 1% project cost
Depreciation: SLM for 20 years with 10 % salvage value
Replacement Cost of fuel- INR 15/unit[33 cents/unit]

Loan Period- 15 years
Interest- 5% per annum

"Average DSCR of 1.2 is achievable for FI's"

MODEL FOR HYBRID



Inline With DESIPOWER 100 Village empowerment Program

Financial Issues

Lending to Independent Rural Power Producer

Credibility of IRPP to pay –

Secure Payment Mechanism from end-users through individual contracts

Proceeds of earmarks collections: irrevocable for payment to lenders

Direct lending to End Users

Normal Business Risk as Lending to Small Scale/ Mini Scale Industries/ Trusts/ Societies/ NGO's-

No Separate Revenue Generation

Only savings in energy costs

Way Forward

- Testing, Certification & Standards.
- Recognition by banks/FIs for soft cost like micrositing, cost of designing of system in line with the user requirements, cost of monitoring the performance.
- Preparation of DPRs for mini-grid concept can be taken up for financial support on case to case basis.
- Awareness programs by SNAs, NGOs, technical organizations, Govt. undertakings, manufacturers and user organizations etc.
- Improvement of system efficiencies.

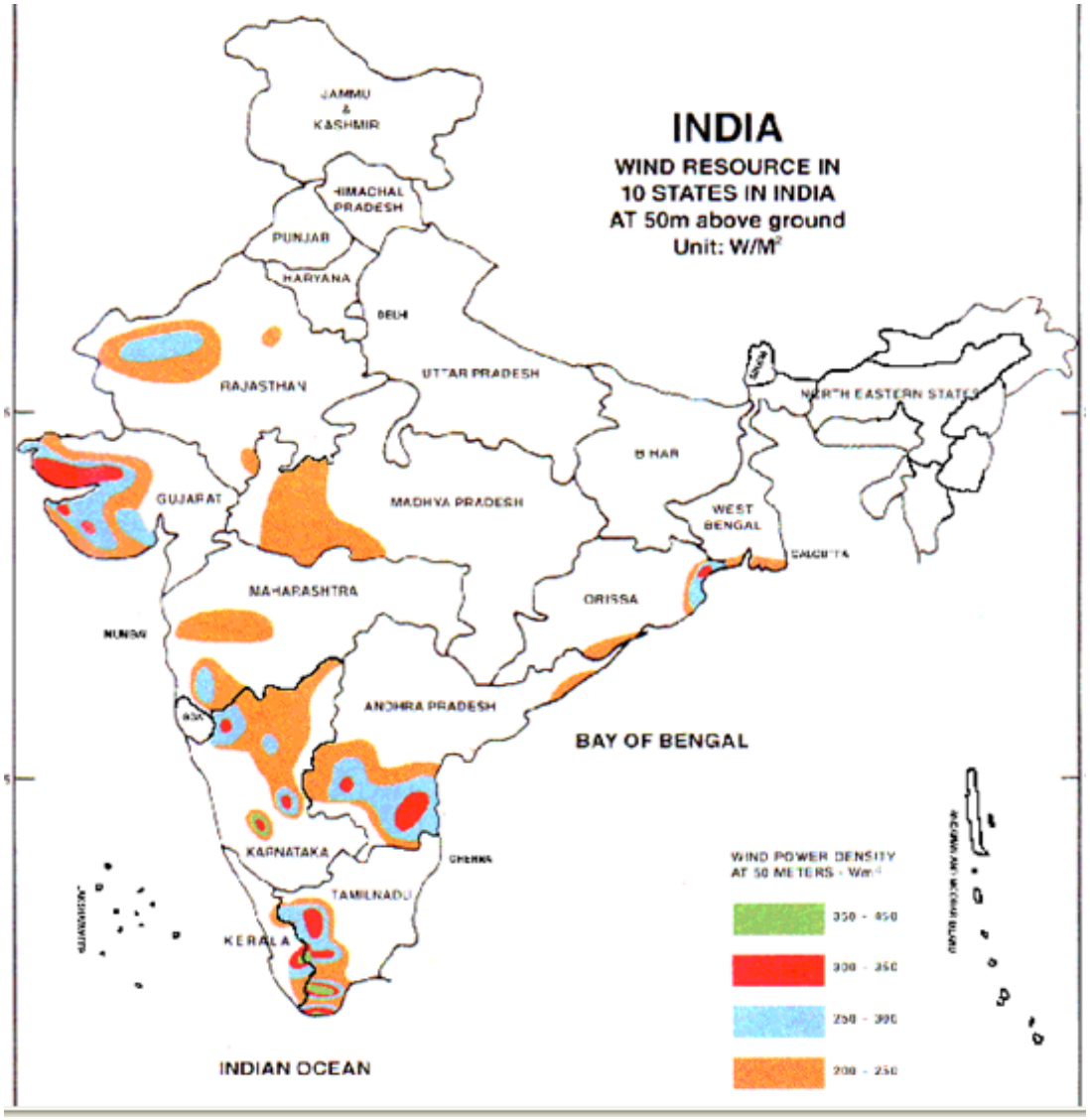
Thank You

Solar Mission

Application Segment	Phase - I	Phase-II	Phase- III
	2010-13	2013-17	2017-22
Utility grid power	1,000-2,000 MW	4000-10,000 MW	20,000 MW
Off- grid Applications	200 MW	1,000 MW	2,000 MW

- Enabling a policy framework for the deployment of 20,000 MW of solar power by 2022
- Deploy 20 million solar lighting systems for rural areas by 2022.

Wind Resource in India



Barriers- Small Wind

- High Costs
  - Large Wind System- USD 1.3 million/MW
  - Small Wind/Solar System-USD 6500/kW
- Wind Resource Assessment at a lower height – resource of solar-wind supplementary nature
- Micrositing
- Testing, Certification & Standards
- Lack Of Awareness
- Lack Of Skilled Manpower