Creating Innovative Solutions for a Sustainable Future

Socio-economic benefits of RE: India's experience

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Outline

Creating Innovative Solutions for a Sustainable Future

- Scope of study
- Organization structure
- Policy development review
- RE achievements
- Socio- economic impact of RE in India

Scope of our study

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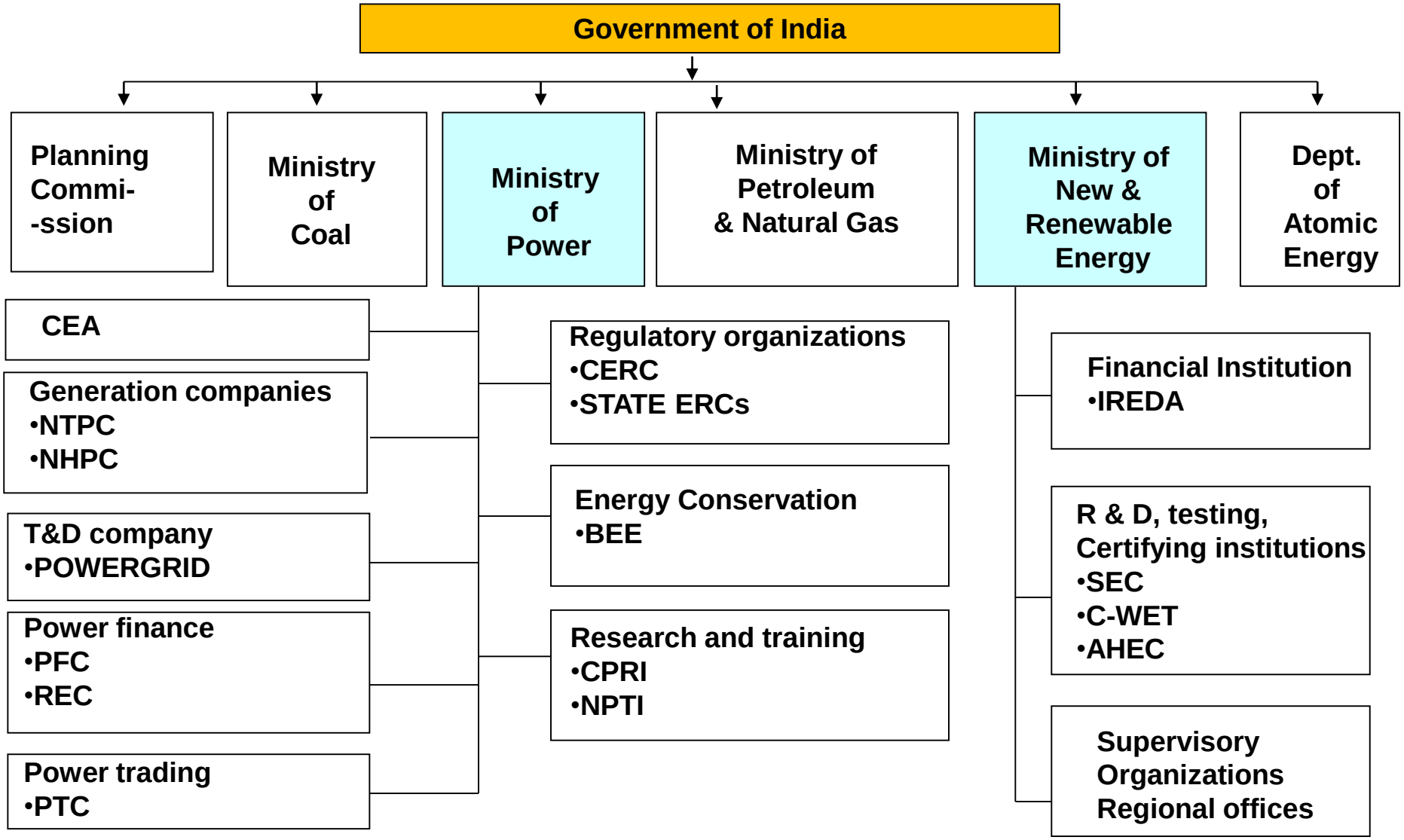
- **Brief background:** population and GDP, labor market, industrial base (i.e. what industries/sectors are most developed)
- **Energy sector overview:** energy pricing, consumption, production, energy mix, energy system regulation
- **Literature review** of existing work on socio-economic impacts in the respective country
- **Renewable energy:** targets and installed capacities, financing
- **RE sector development:** description of how the sector developed, what policies contributed to diversifying the energy mix and localizing production (i.e. with reference to the various policies chosen by IRENA).
- **Key value creation achieved**: overview of key value added in terms of employment, energy access, industrial development

Energy sector related ministries/ departments



Renewable energy sector development in India

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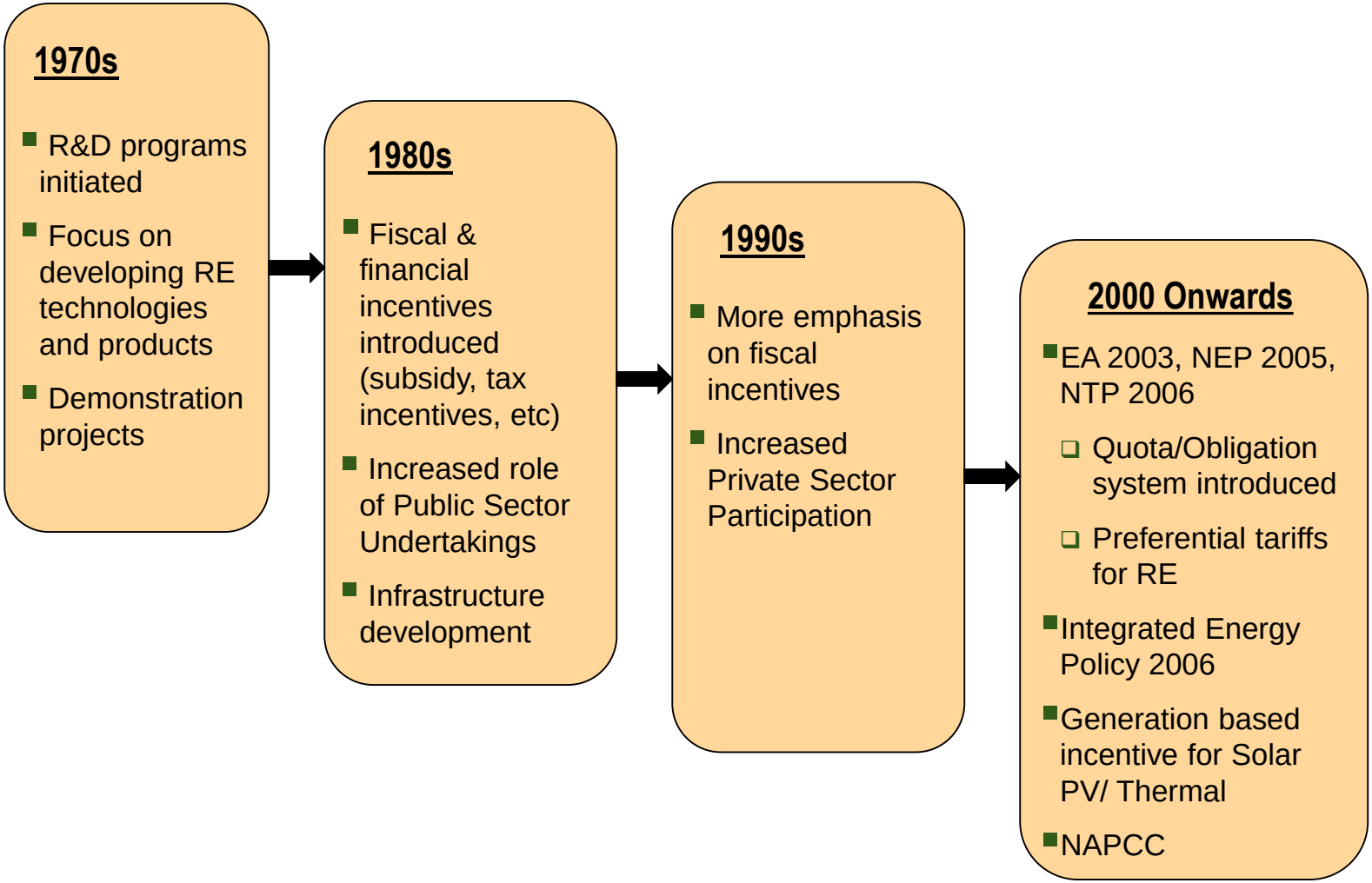

Installed Power Generation Capacity

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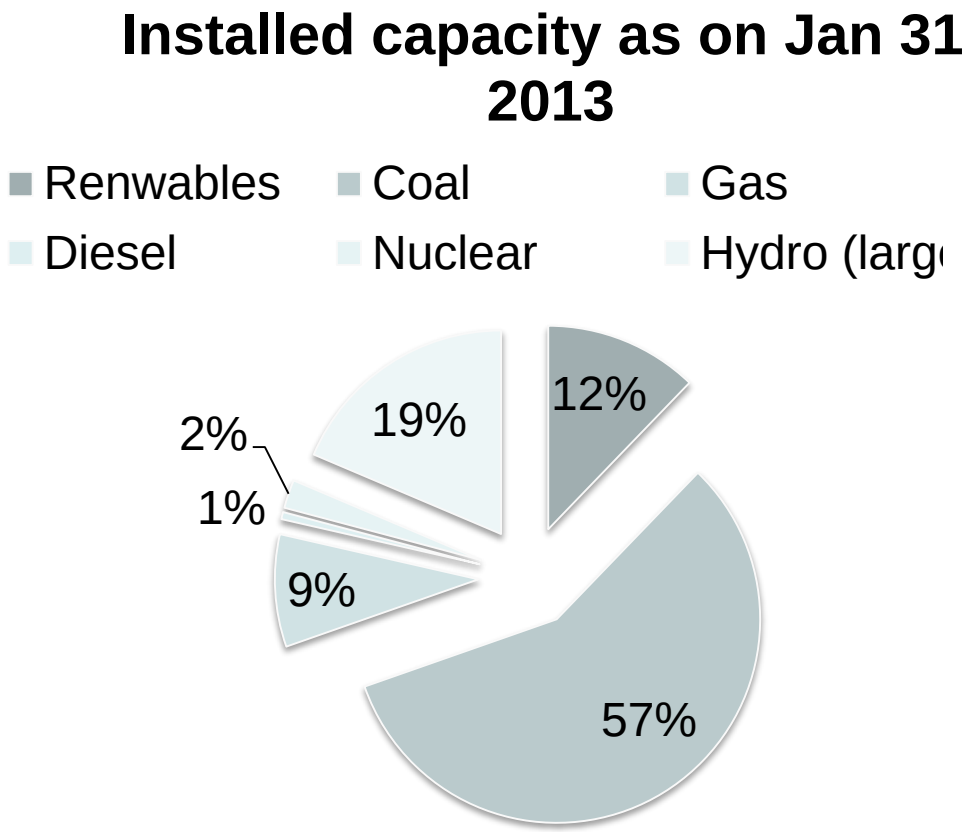
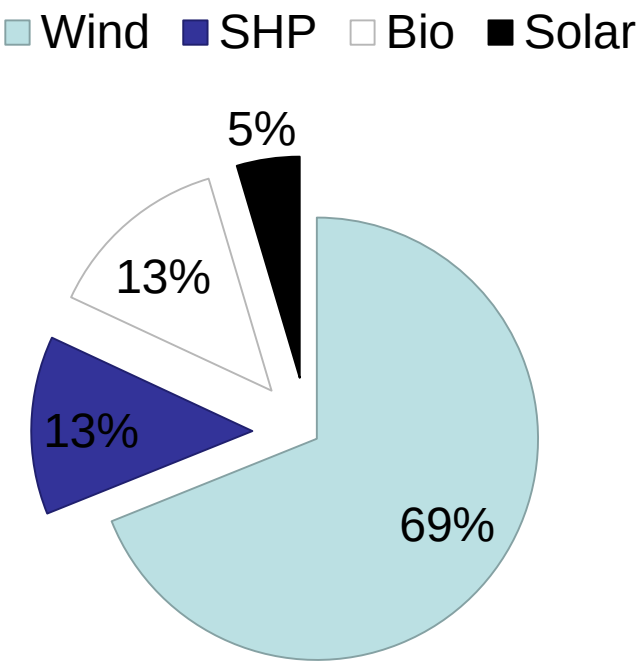


Total installed 213 GW



Total installed RE 26.7GW

Renewables Installed capacity

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New & Renewable Energy Cumulative deployment of various Renewable Energy Systems/ Devices in the country as on 28/02/2013				
Renewable Energy Programme/ Systems	**Target for 2012-13**	**Deployment during February, 2013**	**Total Deployment in 2012-13**	**Cumulative achievement up to 28.02.2013**
I. POWER FROM RENEWABLES:				
A. GRID-INTERACTIVE POWER (CAPACITIES IN MW)				
Wind Power	2500	83.20	1282.20	18634.90
Small Hydro Power	350	46.05	156.98	3552.29
Biomass Power	105	15.00	113.50	1263.60
Bagasse Cogeneration	350	20.00	315.70	2300.93
Waste to Power –Urban	20	-	6.40	96.08
-Industrial		-	-	-
Solar Power (SPV)	800	210.18	505.48	1446.66
Total	4125.00	374.43	2380.26	27294.46
B. OFF-GRID/ CAPTIVE POWER (CAPACITIES IN MW_{EQ})				
Waste to Energy -Urban	20.00	1.06	13.82	115.56
-Industrial				
Biomass(non-bagasse) Cogeneration	60.00	5.06	60.59	443.10
Biomass Gasifiers -Rural-	1.50	-	0.672	16.792
Industrial	10.00	-	6.02	140.10
Aero-Genrators/Hybrid systems	0.50	0.24	0.44	2.09
SPV Systems (>1kW)	30.00	-	17.59	107.80
Water mills/micro hydel	2.00 (500 Nos.)	-	(270 nos)	2131 Nos.
Total	126.00	6.36	99.13	825.44

Renewables Installed capacity contd…

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New & Renewable Energy Cumulative deployment of various Renewable Energy Systems/ Devices in the country as on 28/02/2013				
Renewable Energy Programme / Systems	**Target for 2012-13**	**Deployment during February, 2013**	**Total Deployment in 2012-13**	**Cumulative achievement up to 28.02.2013**
II. REMOTE VILLAGE ELECTRIFICATION				
No. of Remote Village/Hamlets provided with RE Systems	--	--	--	--
III. OTHER RENEWABLE ENERGY SYSTEMS				
Family Biogas Plants (No. in lakhs)	1.25	--	0.77	46.11
Solar Water Heating - Coll. Areas (Million m2)	0.60	--	0.91	6.92

Socio-economic impact (national estimates)

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India energy revolution report:

- RES currently employs more than 200,000 people and is expected to create to 2.4 million jobs with an annual turnover of INR 540,000 million
- Employment can further increase by 14 times by 2030.

MNRE-CII report on HRD:

- Till 2010, the sector had employed almost 3,50,000 (direct and indirect employment). Moderate and high growth scenario project 10,51,000 and 13,95,000 jobs by 2020 respectively
- Wind Energy - 42,000, Solar PV On-grid – 4000, Off grid – 72000, Solar Thermal – Off-grid – 41000, Biomass On-grid – 35000, Biomass gasifier – 22000, Biogas - 85000, Small hydro – 35000
- Employment creation in processing of raw materials; the manufacture of technology; project design and management; installation and/or plant construction; operations and maintenance etc.

Socio-economic impact (national estimates) Contd…

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- Potential of direct and indirect job creation by 2020 across the value chain: Wind (40,000 – 1,60,000), solar pv (1,52,000), solar off-grid (225000), thermal app (270000), biomass grid (100,000), biomass gasifier (63000), small hydro (30,000), etc.
- There are already 1.1 million households who are having decentralized solar energy to meet their lighting energy needs
- More than 10,000 villages are meeting their lighting energy needs from renewable energy sources
- New investments in renewables have now exceeded US $10 billion per year
- Application of various fiscal incentives (central and state levels), depreciation allowance and remunerative returns for power fed into the grid

Other socio-economic benefits (based on case studies)

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(i) Reduction of migratory flows from rural to urban areas,

(ii) The creation of local employment (social entrepreneurship)

(iii) Potential of having relatively faster access to electricity at a lower cost

(iv) Opportunities for training, thus increasing the overall education/ training/skills levels of the population

(v) Access to various rural infrastructure like health centres, education institutes that further strengthen human development

(vi) Improved access to renewable energy leads to better labour productivity, health and income generation of poor women in India, thus promoting gender equality

MNRE programs relevant to Women

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Intervention	Relevance to women
Solar Thermal Energy	- Solar cookers- Solar dryers for drying vegetables, fruits, spices, etc.-Domestic solar water heaters
Solar Photovoltaic (SPV)	- Lighting in remote areas where grid-based power is not available- Better Safety (reduction in violence)- A boost to businesses, especially women vendors. - Solar electricity to run TVs, fans etc. in villages suffering from long periods of load shedding- Solar lanterns for village markets- Solar torches for mobility in villages at night
Biomass Gasifier	- Income generation opportunities- Lighting- Involvement of women's groups in feedstock arrangements and also in operation & management, thus creating additional employment opportunities
National Project on Clean Energy Services for rural areas including biogas programme	- Clean cooking fuel for cooking, lighting, heating etc. - Clean kitchen - Reduction in time spent on fuel collection - Organic manure for agriculture
Rural energy entrepreneurship/ |Institutional development	- Enhanced income opportunities - Economic freedom - Control over income
Women and renewable energy development	- Women are trained under the biogas programme
Awareness and Extension Programme	- Promote effective use of renewables especially among women
Improved Stoves	- Reduces time spent in kitchen- Reduces time spent on fuelwood collection - Cleaner kitchen- Reduced indoor pollution

Source: http://indiagovernance.gov.in/files/gender-analysis.pdf

Some Indian case studies

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- PRADAN, in association with SHGs in certain villages in Jharkhand, helped replace diesel DG sets with solar pv sets for weaving a key activity among village women.
- Availability of power has improved the economy of the village and also proved advantageous for the education and social needs of the villagers.
- Ability to work at night.

- Emissions from kerosene lamps and DG sets posed health risks to traders and shoppers in Bhopal.
- Rural Energy Network created simple business model by renting solar lantern @ Rs 8 /night.
- This was almost half the charge of a kerosene lamp or electric light, with no pollution.

- Micro-hydro plant installed at village Putsil has catalysed visible changes.
- Main beneficiaries of electrification are women; incredible application of community participation
- Approach employed by community to manage the plant has effective combination of traditional values of concern and flexibility

Thank you !