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The poor in climate change

MARCH 11 & 12

Mini-grid Policy Model:
CSE PERSPECTIVE

Aruna Kumarankandath



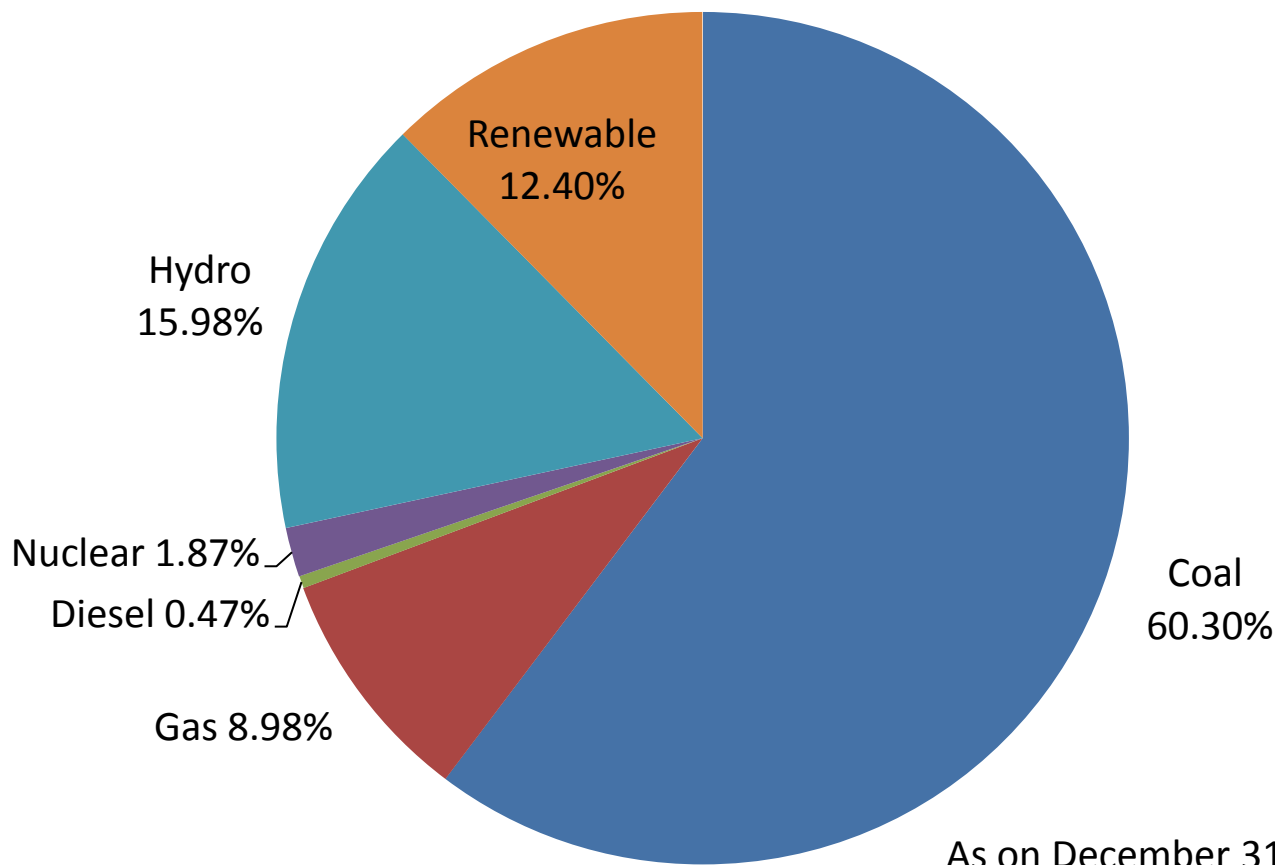
Centre for Science and Environment



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Energy Mix in India

India has a total capacity of 255.69 GW for power generation out of which almost 70 per cent is based on fossil fuel.

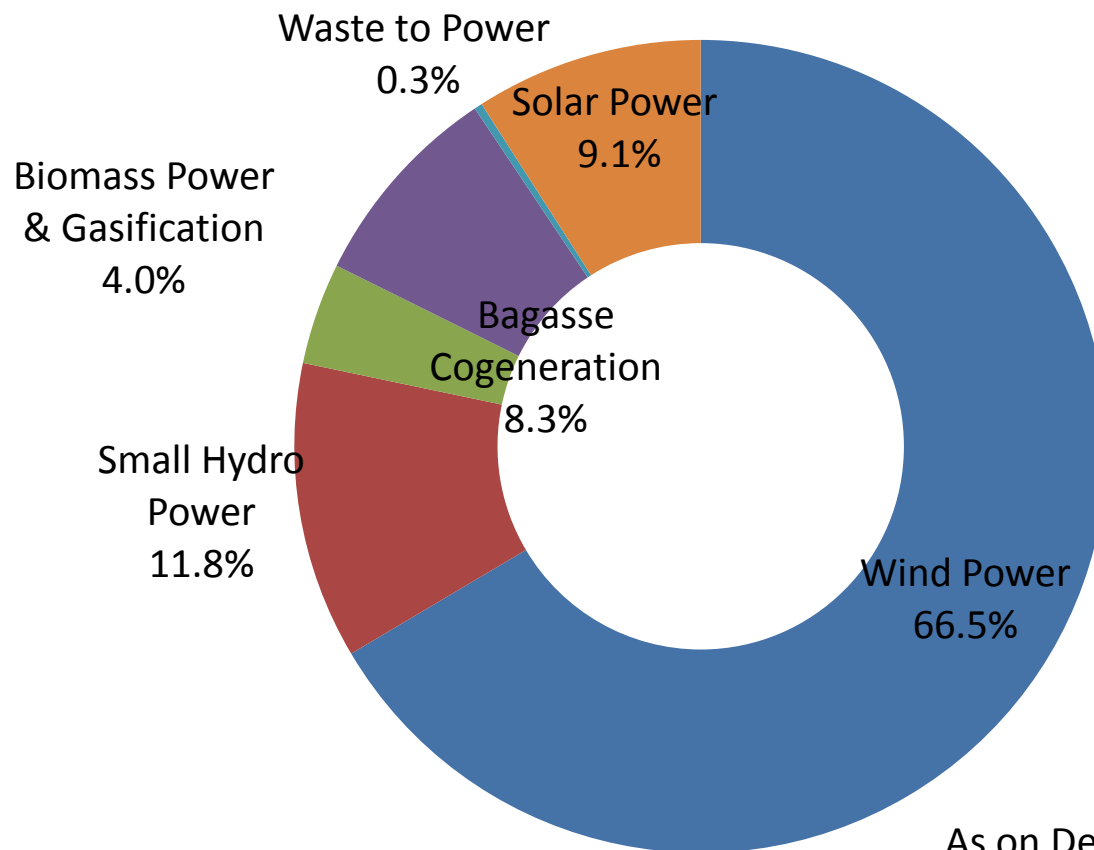




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Renewable Energy in India

India has a renewable power generation capacity of 33.79 GW out of which almost 67 per cent is based on wind.



As on December 31, 2014



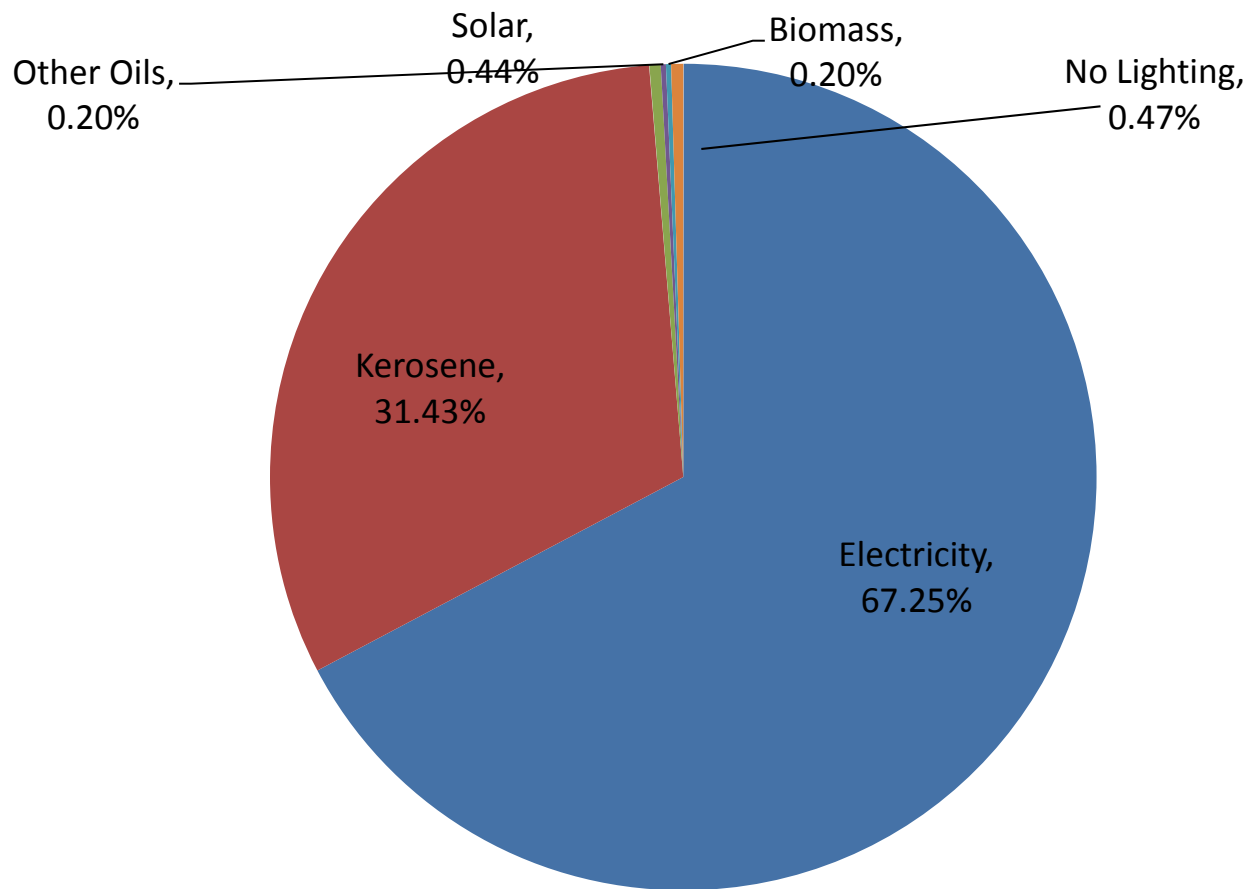


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Electricity Access in India

According to IEA, 306 million people do not have access to electricity in India



Source: Census 2011

Off-grid Renewable Energy

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Off-Grid Installations	As on Dec 31, 2014
Waste to Energy	141.27
Biomass (non-bagasse) Cogeneration	561.64
Biomass Gasifiers	
• Rural	18.23
• Industrial	153.40
Aero-Generators/Hybrid systems	2.38
SPV Systems	227.12
Water mills/micro hydel	15.21
Bio-gas based energy system	4.07
Total	1,123.32





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Energy Poverty - Real Issue

According to International Energy Agency (IEA), globally, there are 1.2 billion people who do not have access to electricity; of these, 306 million live in India.

- As per the 2011 census, the rate of electrification has improved – 67.2 % compared to 55.8% back in 2001.
- The electrification rate in rural India is only 55.3% as compared to 92.7% in urban India
- The Census of 2011 records that 77,461,497.44 households in India use kerosene for lighting purposes, out of which 72,501,147.36 are located in rural India.
- About 1.0 million households use solar for lighting





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Energy Poverty - Low HDI

One of the main causes of low human development index (HDI) in rural areas is the lack of access to electricity - India is currently placed 136th among 187 countries on the UN's HDI count

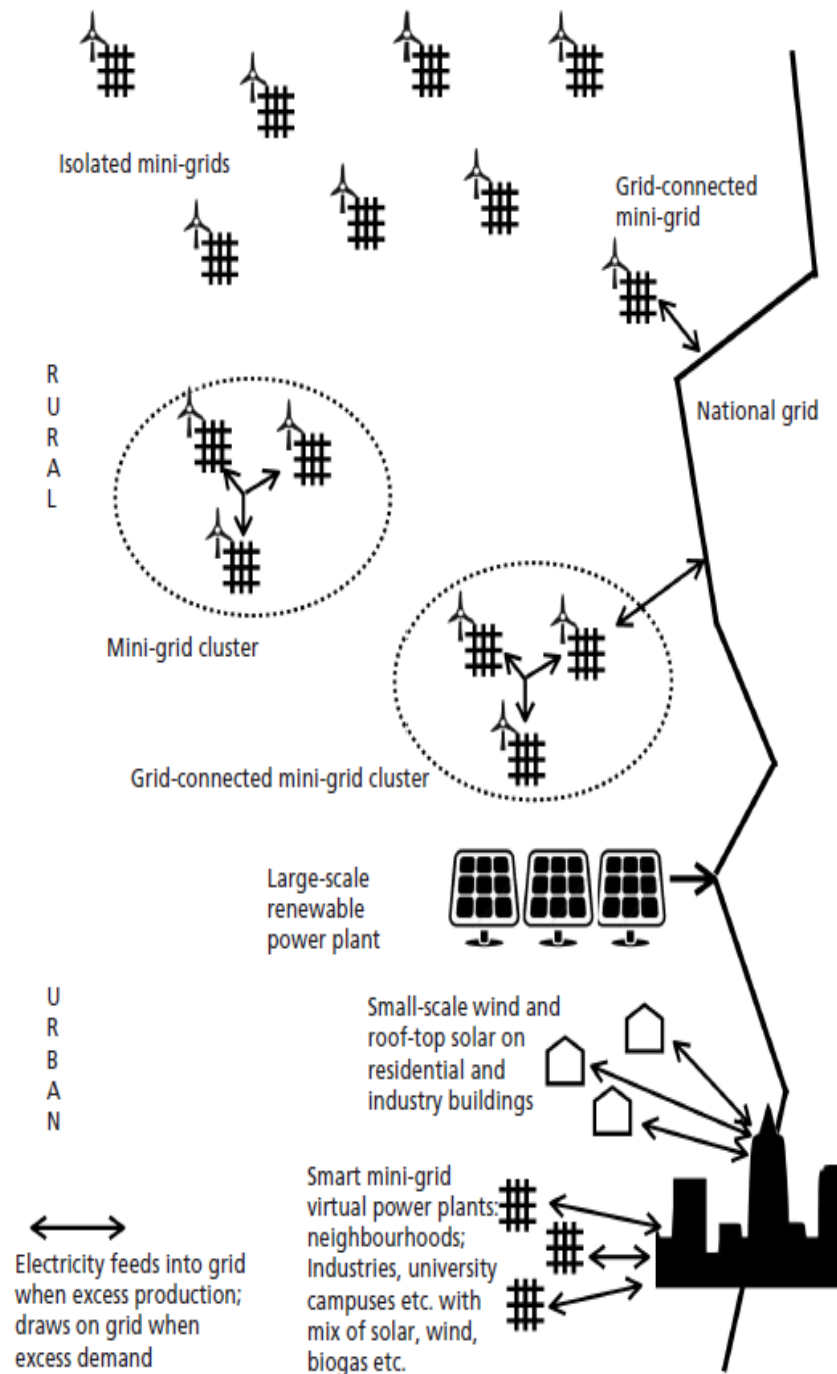
- Lack of access means education, health and hygiene, and overall standards of living are quite low in un-electrified villages
- Non-traditional economic activities cannot happen in villages that have no access to electricity





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The Future Energy Model: Decentralised, Distributed & Renewable





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Mini-grids as a solution

- The challenge of providing 24x7 power to 74 million rural households by 2019 actually offers a huge opportunity to leapfrog 25 per cent of India's population from dirty fossil fuel to clean energy directly by adopting renewable energy-based decentralised distributed generation with distribution.
- Power infrastructure development with mini-grid can provide
 - An investment opportunity
 - Untapped market for developers
 - Combat the concerns related to climate change
 - Provide energy security
 - Contribute to overall human development





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Scaling up Mini-grids: Issues & Challenges



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Policy Challenges

The Electricity Act - 2003, National Electricity Policy - 2005, National Tariff Policy - 2006 and Rural Electrification Policy – 2006 together answered all the questions regarding development of decentralised distributed generation (DDG)

- The policies give a base model for the renewable energy based DDG systems to generate and distribute power in both remote villages and in grid connected areas.
- They can act as a franchise of the distribution company, collect revenues from the consumers, manage the system and undertake routine operation and maintenance of distribution infrastructure.
- What is lacking is a clear definition of how these existing policies are to be implemented, monitored and verified.





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Economic Challenges

- High capital and operating expenditures
- Low demand in rural areas
- Irregular tariff collection
- Bureaucratic delays





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Social Challenges

- Human resource training at the local level is essential
 - Engage with the community to understand village demography and socio-cultural equations
 - Engage the community for ease of daily operations and maintenance of the system
 - Community ownership
- Aspirational needs of the poor





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Technological & Operational Challenges

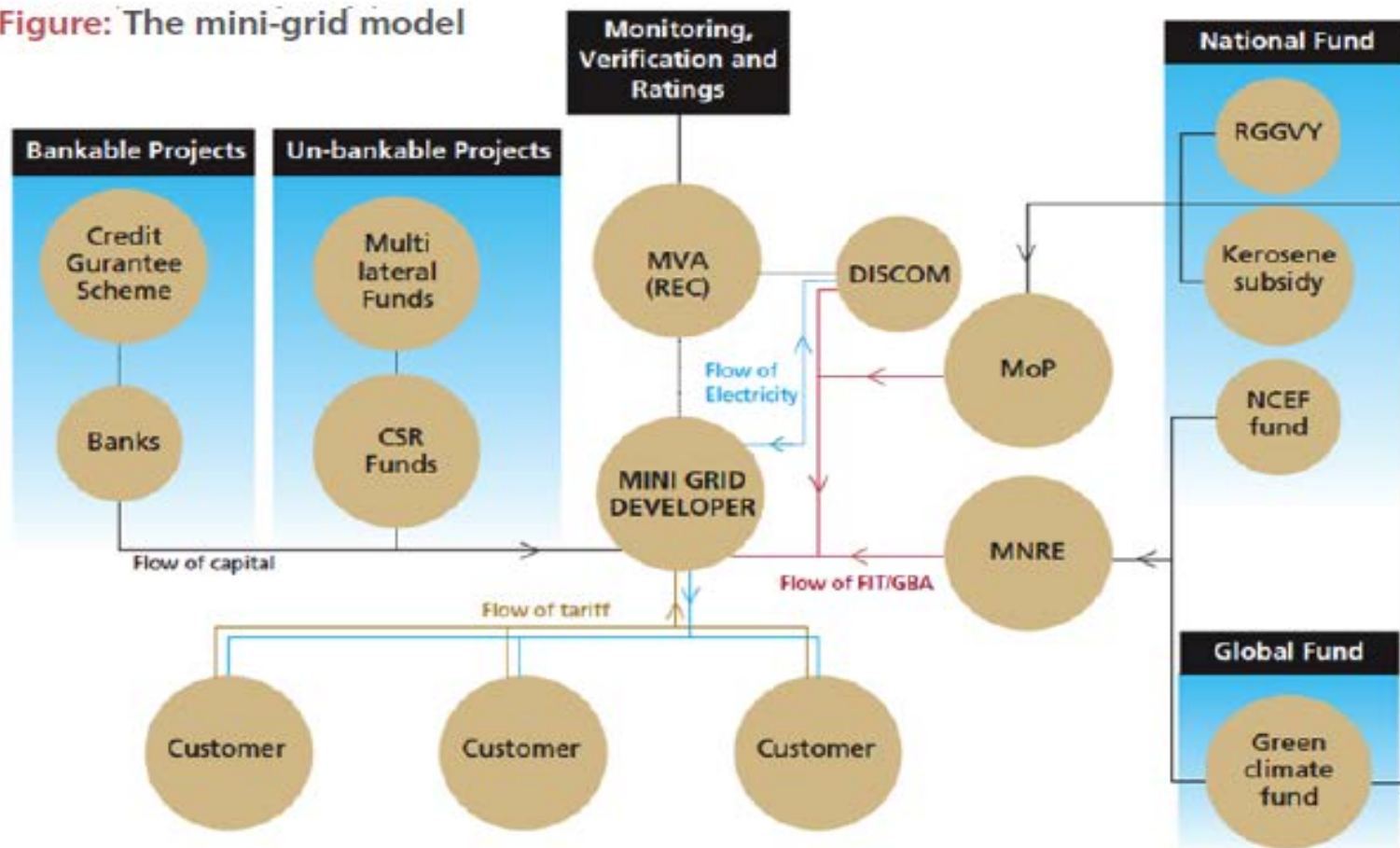
- Minimum economically viable size
- Stability of the grid with more mini-grids joining the system
- Separate inventory and human power for O&M
- Fear of competition from the grid





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Figure: The mini-grid model



Financing the Model

- **RGGVY:** Rs 23,397 crore has been earmarked for the 12th Plan, out of which only Rs 1,000 crore has been allocated to the DDG scheme.
- **National Clean Energy Fund (NCEF):** NCEF has a depository of Rs 8, 200 crore and is expected to reach Rs 10,000 crore by 2015 according to the 12th Plan. Now that the coal cess has been doubled, money coming to the fund has increased.
- **Diversion of kerosene subsidy:** In the FY 2013-14, the government has spent Rs 31,256 crore for subsidy on kerosene. This subsidy must be diverted progressively towards development of mini-grids.
- **Green Climate Fund (GCF):** The UNFCCC has developed a Green Climate Fund (GCF) in order to support programmes, policies, and other activities of participating developing nations.. For this, a model for the GFIT is required to be developed quickly; CSE is currently working on it.



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