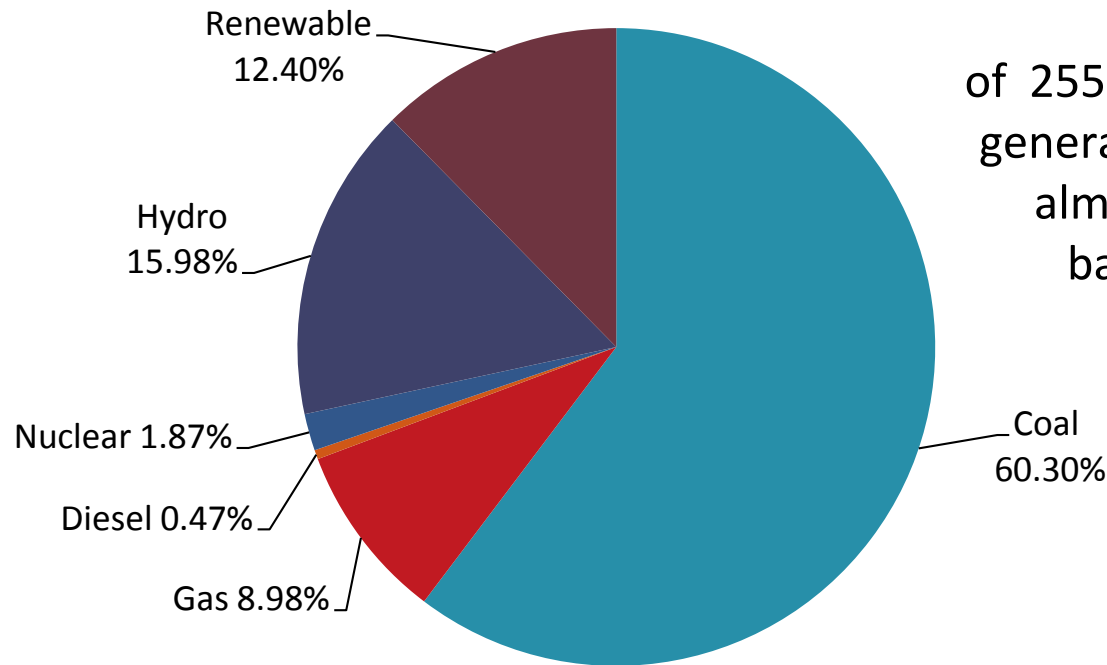




Energy poverty, climate change & renewable Energy: A global convergence programme

Chandra Bhushan

Energy Mix in India

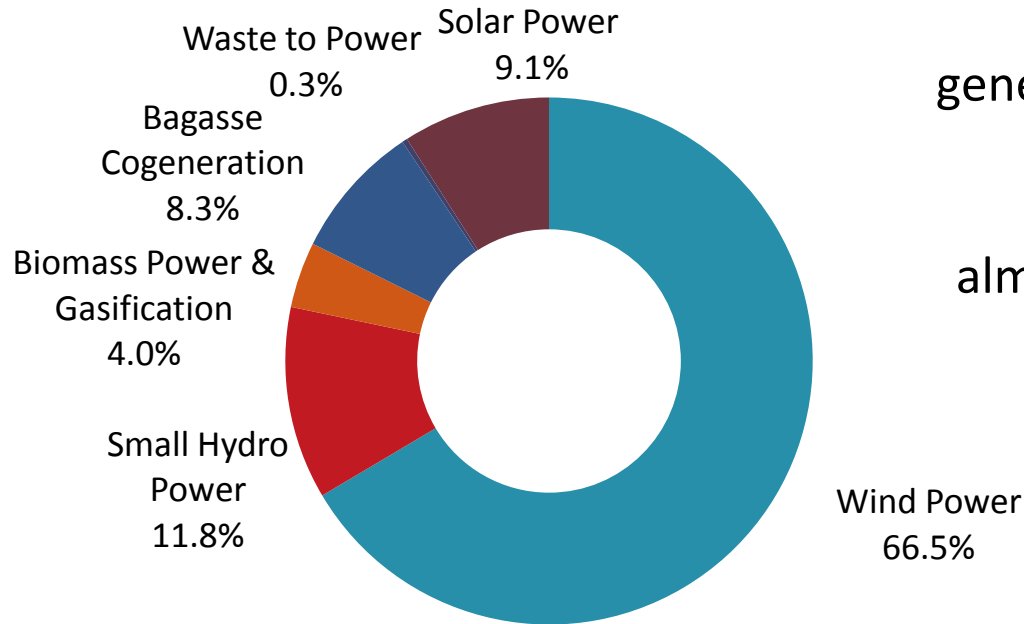


Total capacity of 255.69 GW for power generation out of which almost 70 per cent is based on fossil fuel.

As on December 31, 2014



Renewable Energy in India



Renewable power generation capacity of 33.79 GW out of which almost 67 per cent is based on wind.

As on December 31, 2014



The Real Issue – Energy Poverty

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.
- Electrification rate in rural India is only 55.3% as compared to 92.7% in urban India.
- The Census of 2011 records that 77 million households in India use kerosene for lighting purposes, out of which 72 million are located in rural India
- About 1.0 million households use solar for lighting



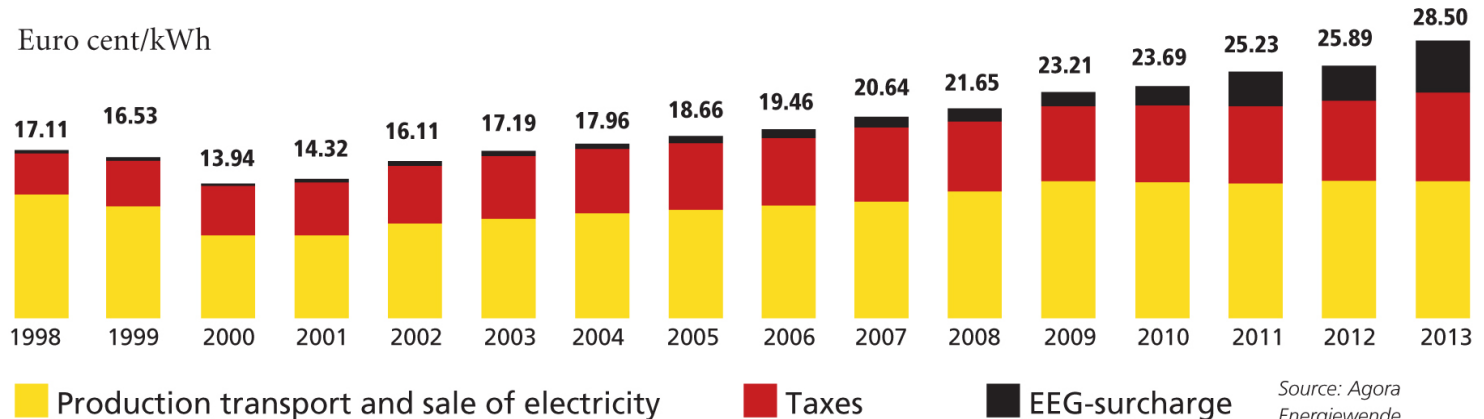
The Real Issue – Affordability

Energy affordability

- US\$ 0.10-0.50/ kWh: Developed countries
- US\$ 0.05-0.10/kWh: Emerging economies
- US\$ 0.02-0.10/kWh: Least developing countries
- For most developing countries, indigenous hydropower, coal and gas can provide 24 X 7 electricity at US\$ 0.05-0.10/kWh. Many can't afford even this.
- Wind and solar too reaching US\$ 0.07-0.15/kWh at certain hours of the day.



What an average Indian can afford at Germany's electricity prices?



At US\$ 1000 per capita income, if an average Indian spends 10% income on electricity, she/ he can afford less than 0.5 kWh/ day at Germany's prices.

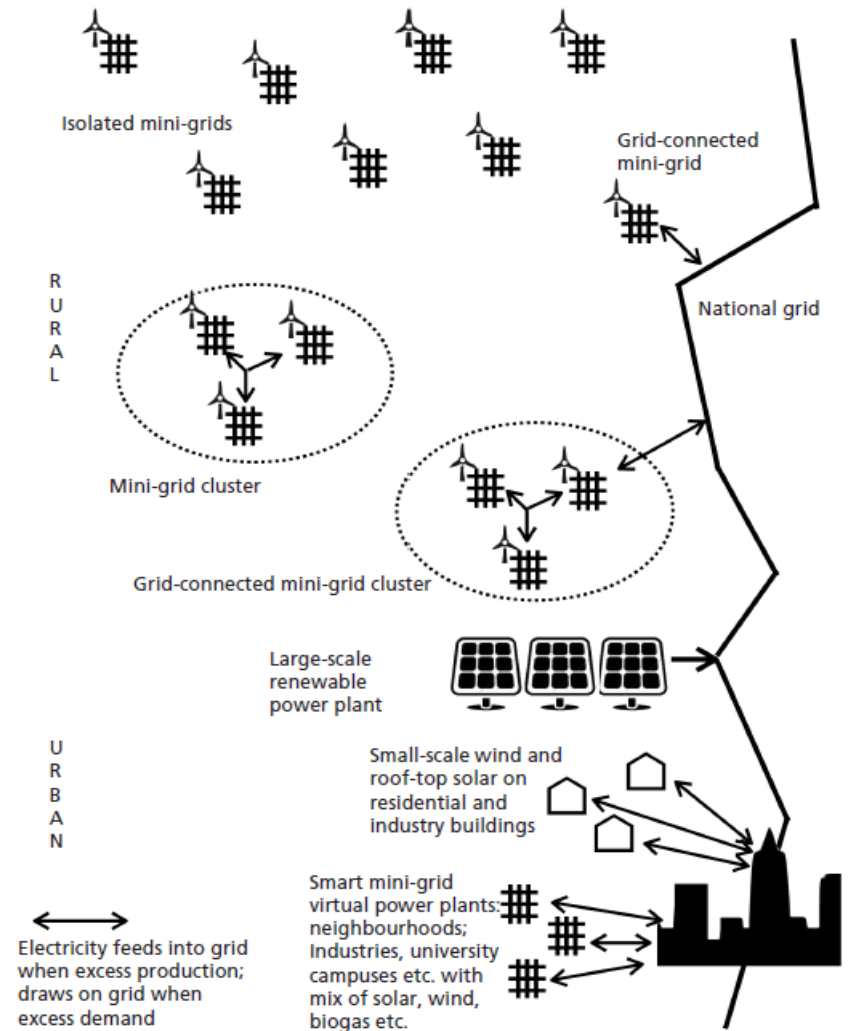
The convergence agenda

- The challenge of providing energy access to 74 million rural households 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 distributed generation system.
- A co-benefit agenda
 - ▣ Combat the concerns related to climate change
 - ▣ Provide energy security
 - ▣ Contribute to overall human development





The Future Energy Model: Decentralised, Distributed & Renewable



The future

- We believe that the future energy system is largely distributed and decentralised renewable energy – both in the global North and South
 - ▣ Bold expansion of renewable energy mini-grids - both isolated and connected to the national grid
 - ▣ increasing role for small-scale electricity generation – i.e. individual households and businesses feeding excess energy into the grid – and drawing on the grid when needed.



What is required?

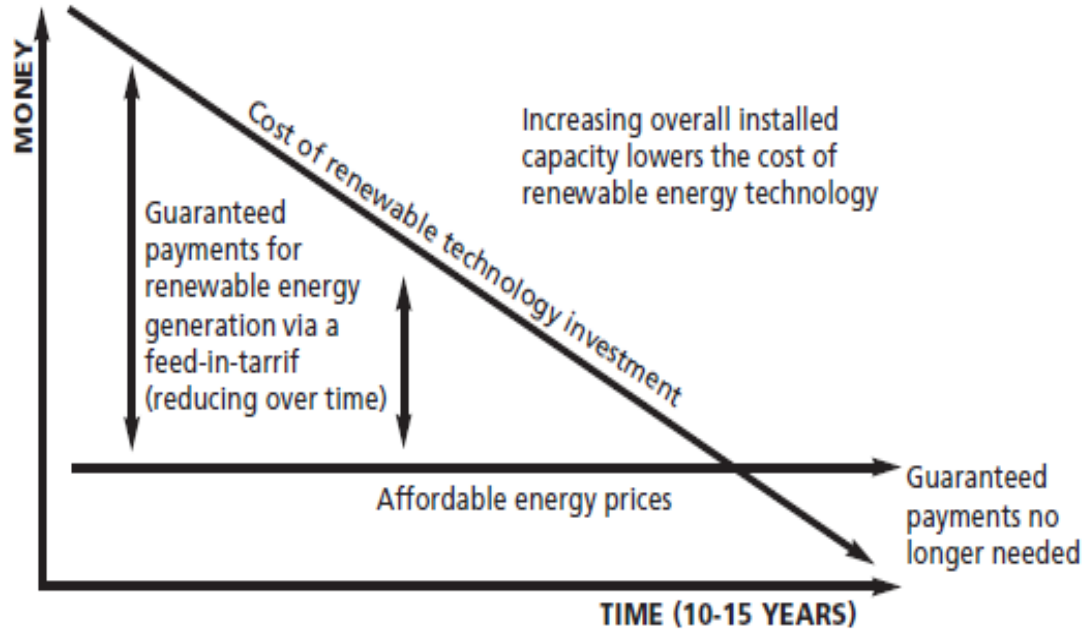
- ❑ Most potent regulations and incentives (such as payment guarantee systems) to spur renewable energy investments
- ❑ A well designed, substantial international finance mechanism to enable the kind of renewable energy future



Payment Guarantees/Feed-in Tariffs

- Developers of renewable energy installments are guaranteed payments - covering the difference between investment costs and the revenue from sales of the energy (at lower, affordable prices for the consumers), with a reasonable premium profit.
- These support systems often include a right to feed into another grid (usually the national grid) excess electricity that the producer does not consume him/herself, again at a guaranteed price.

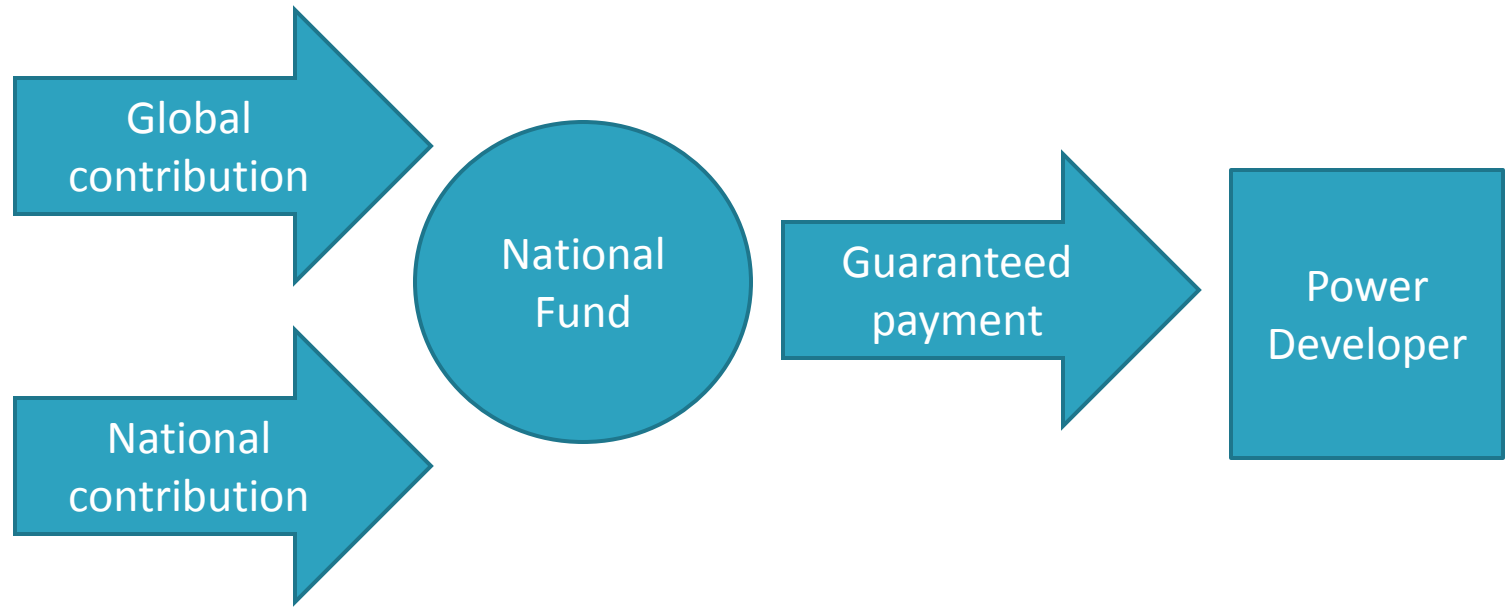




Assumption of declining cost of renewable energy technology overtime



How the Mechanism will Work



Continued



CHANDRA BHUSHAN
Deputy Director General
Centre for Science & Environment (CSE)
chandra@cseindia.org