WISE - PUNE

Feed-in Tariff*

January 2010

*connectedthinking

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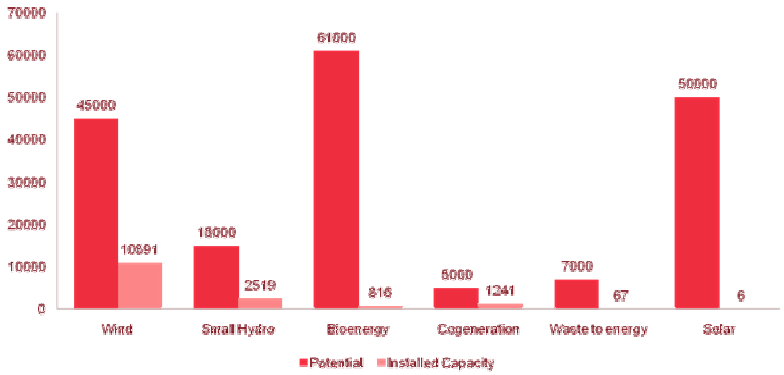
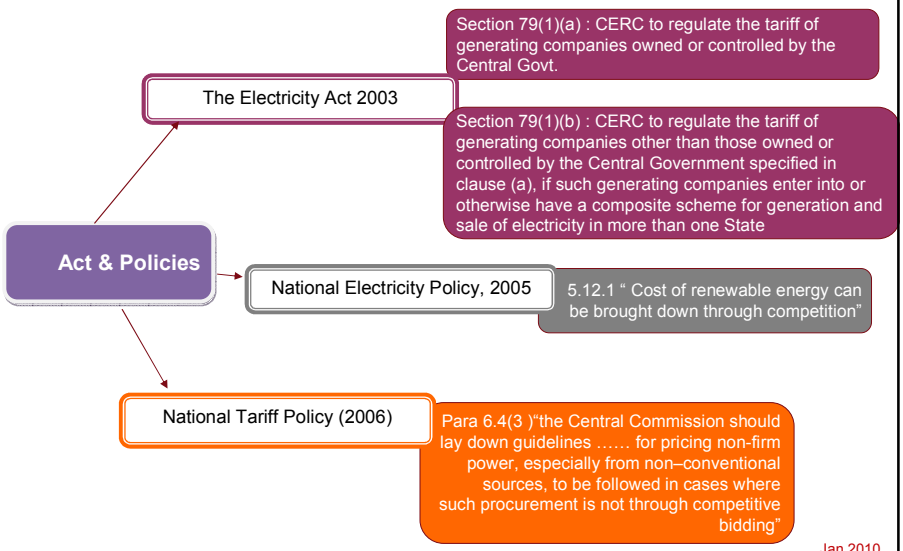
1. Introduction
2. International experience
3. Feed-in tariff in India
   - Key issues
   - Way ahead

The potential & opportunity- Renewable Energy



Source: MNRE (Oct 2009)

Policy & Regulatory Framework

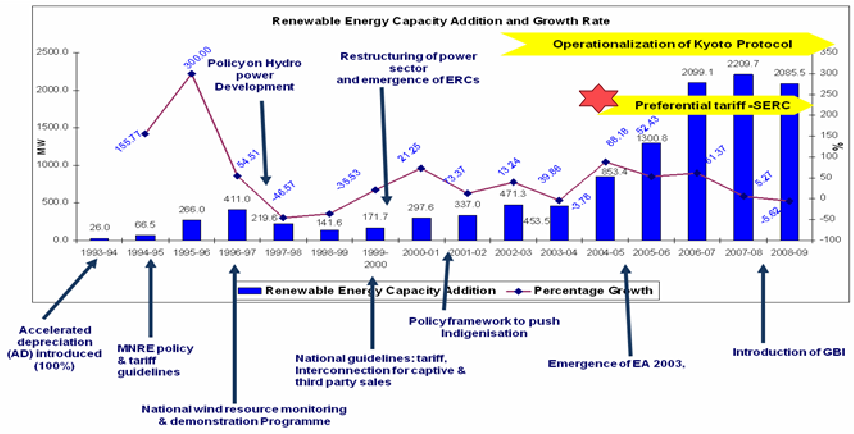


Assessment of major RE support mechanism

Assessment of the major RE support mechanisms' effectiveness				
	Increase in Installed Power	*Administration Efforts*	*Economic Efficiency*	*Enhance Competition*
Investment subsidies	H	M	M	N
Feed-in tariffs	H	L	M	N
Renewable certificates	L/M	M/H	H	Y
Competitive bidding	L	H	h	Y
Environmental pricing (e.g. CO2 tax)	L	L	H	Y

Source : Secondary research
H : high, M : Medium, L : Low, Y : Yes, N : No

FIT & its impact Indian RE growth



Source : PwC research

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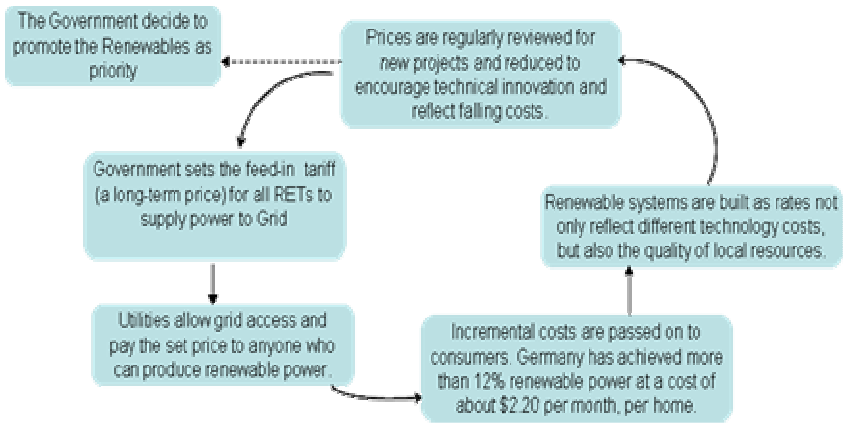
Feed-in tariff mechanism



International Experience : Feed-in tariff

Germany

- Grid operators must pay fixed rates depending on technology & year of commissioning
- Degression of tariffs :
  - To incorporate maturity of technology
  - Rate of degression varies from 1 to 5 % depending upon technology
- Stepped nature of tariffs to incorporate financial efficiency due to scale of the project or better potential site

Spain

- RE based power generator given two options :
  - Regulated tariff, calculated as a % of the yearly average tariff
  - Free market sale, through the bidding system. Price set by market or bilateral negotiation, plus an incentive and a premium for the power guarantee
- Forecasts for feeding electricity(> 10 MW) (At least 30 hours before the start of each day).
- Cost of deviation : 10% of the average electricity tariff applied to the difference. (when the permitted tolerance is exceeded – the tolerances are 20% for solar and wind power, and 5% for the rest).

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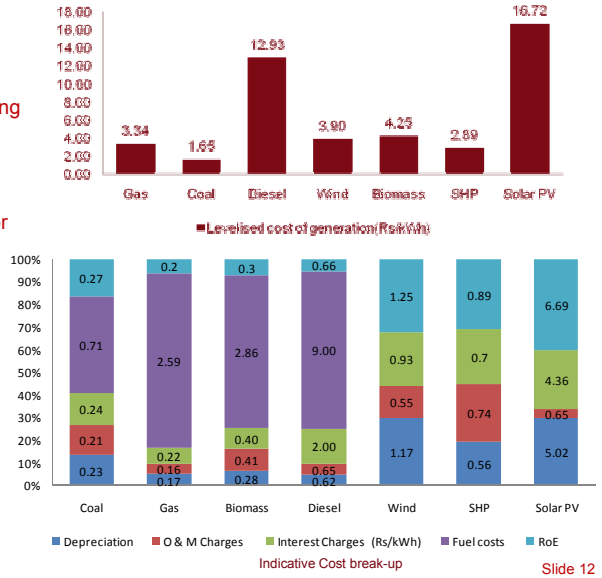
Design of Feed-in tariff

- Key Characteristics
  - Integrates the impact of all the cost and benefits of RE into a single instrument.
  - Different prices for different technologies and project sizes
  - Prices that aim to cover total project costs and provide a reasonable rate of return over the contract term
  - Ability to "jump start" the market for developed RE technologies by providing long term investment security and market stability.
  - Long term visibility of underlying principles for FIT determination is crucial for developers' confidence.
- Indian Experience
  - Most common instrument.
  - Being used for all active RE technologies. Introduced by most states except J&K, Jharkhand, Orissa and the North Eastern states.
  - RE development in states without FITs has typically lagged by far. States with inadequate FITs have experienced slow down in RE development
  - Preferred by developers because it enhances project bankability

Design of Feed-in tariff

- Cost –plus approach
- Factors considered while designing FIT
  - Capital cost for the plant
  - Other costs related to the project, such as expenses for licensing procedures
  - Operation and maintenance (O&M) costs
  - Fuel costs (in the case of biomass and biogas)
  - Inflation
  - Interest payments for the invested capital
  - Return on equity



Key Issues – Feed- in tariff

- Different tariff determination approaches followed by SERC's
- Variation in different components of tariff across states
- At times, cost components considered on the basis of old projects. Using their capital costs even after assuming a rate of inflation still leaves a wide margin (PwC review of World Bank's Second Line of Credit to IREDA) .
- SERC's have been mandated with balancing the viability of the sector while ensuring that the consumers are not burdened with too high tariffs
- Result limited roll out of RE projects
- Need to undertake economic impact of RE projects while tariff determination
- Need to devise a framework to address gaps and inconsistencies and enhance incentives through appropriate tariffs for most viable investments, without putting much burden on electricity consumers

State wise review : Feed- in tariff

Year of Tariff issue	State	Tariff (Rs/kWh)	Capital Cost (Rs Crore/MW)	CUF (%)	RoE	Fuel Cost (Rs/MT)
Biomass						
2005	Karnataka	3.1	4	75	16% Pre Tax	1000
2008	Chhattisgarh	2.98	4	80	16% Pre Tax	850/937
2009	A.P	4.15	4	80	16% Pre Tax	2000
2009	CERC		4.5	80	19% Pre tax (upto 10 yrs) 24% Pre-tax(after 11th yr)	
Small Hydro						
2004	A.P	2.6	3.63	35	16% Pre Tax	-
2007	H.P	2.87	6.5	45	14% post tax	-
2005	Karnataka	3.24	3.9	30	16% Pre Tax	-
2009	CERC		5.5 (< 5 MW) 5 (>= 5 MW)	30	19% Pre tax (1 to 10 yrs) 24% Pre-tax(after 11th yr)	
Wind						
2005	Karnataka	3.4	4.25	26.5	16% Pre Tax	-
2006	Gujarat	3.37	4.65	23	14% post tax	-
2009	Tamil Nadu	3.39	5.6	27.15	16% Pre Tax	-
2009	CERC		5.15	-	19% Pre tax (1 to 10 yrs) 24% Pre-tax(after 11th yr)	

CERC regulations on RE Tariff

- CERC has issued regulation on Terms and Conditions for Tariff determination from Renewable Energy Sources in year 2009
- Provides a capital cost indexation approach
  - to incorporate the changes in the capital cost of the RE projects into the tariff
  - will ensure that any future technological & efficiency gains
- Fuel indexation formula to incorporate the impact of factors like fuel handling cost, transportation cost, inflation, wholesale price index on the biomass fuel cost.
  - will provide a structured approach towards the determination of biomass fuel price
- CERC in its regulation on RE tariff has provided a ROE of 19% Pre tax (1 to 10 yrs) and 24% Pre-tax (after 11th yr)
  - Most of the states have provided pre-tax 16% as ROE
- Tariff regulation also covers solar PV & solar thermal technologies

Way Ahead

- CERC Regulation on RE tariff, if adopted by all states, will remove inconsistencies related to FIT determination across states
- Need to enhance resources and infrastructure to monitor and analyse the RE sector
  - CERC, in conjunction with the SERC's, needs to develop a Renewable Energy Regulatory Information System at the national and state level. This database and information system will capture and monitor the cost of RE projects and can be shared across SERC's.
  - Will bring more transparency & enhance efficiency
- SERCs need to be provided resources and the capacity (through more skilled manpower, advanced analysis & management tools) to consider the economic benefits associated with RE while calculating FIT

Thank you

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