Case Study: Development of regulatory framework for renewable power in India

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Background

The positive attributes of generating electricity from renewable energy sources are widely accepted, although some of these technologies may not be currently competitive commercially with conventional fuels. Renewable energy technologies can help solve energy issues related to electricity generation, namely, environmental concern, energy security, rural electrification and applications in niche markets where conventional electricity supply is not feasible. In case of India, all the above mentioned issues are important, however, the most critical issue is that of energy shortages. Almost all the states in India are facing energy shortages in the range of 3% to 21% with national average energy shortage of about 10%. Renewable energy sources can supplement the present power generation and at the same time address the environmental and energy security issues. Renewable energy technologies have a good potential in India and considerable progress has been achieved. The table 1 below shows the potential for major renewable energy technologies for power generation and the installed capacity.

Table 1: Renewable energy potential and installed capacity as on 31/03/2006

Renewable energy source	Potential (MW)	Installed capacity as on 31.03.2006 (MW)
Wind	45000	5340.6
Small Hydro	10477*	1826.4
Biomass	21000**	912.5
Urban & Industrial Wastes	1700	45.7

*- potential for the 4404 identified sites

** 16000 MW potential for the biomass power with current availability of biomass and 5000 MW potential for the bagasse cogeneration

Source: Annual Report 2005-06, Ministry of Non Conventional Energy Sources

The renewable energy technologies are being promoted through various policies and programmes of the Ministry of Non Conventional Energy Sources (MNES) and the above mentioned achievements are result of such promotional policies. However, it has been observed that in the overall power generation scenario, the utilization of renewable energy for electricity generation has remained marginal. The present installed capacity of renewable energy based electricity systems is about 8100 MW whereas the total installed capacity in India is about 1,26,000MW. Some of the

other limitations and barriers that have been faced for promoting renewable energy based electricity generation are (a) pricing of power generated from the renewable energy sources, (b) intermittent nature of electricity from wind and small hydropower, (c) barriers such as restrictions on siting, access to grid and (d) market barriers such as the lack of access to credit. Out of these issues the pricing of power generated from renewable energy sources remains the most critical issue and various policies have been implemented to overcome this issue in India. These policies are generally related to the stage of development of the technology e.g. capital subsidies in the early stages of development.

In India, MNES, in 1993 prepared policy guidelines for promotion of power generation from renewable energy sources which included provisions such as accelerated depreciation, concessions regarding the banking, wheeling and third party sale, among others. Further, the Electricity Act 2003 (EA 03) that was notified by the Ministry of Power in June 2003 along with the National Electricity Policy recognized the role of renewable energy technologies and stand-alone systems. The EA 03 has accorded significant responsibilities to the State Electricity Regulatory Commissions (SERCs) that are now key players in setting tariffs for renewable energy based electricity generation and have also been mandated to set quotas for renewable energy as a percentage of total consumption of electricity in the area of the distribution licensee. The National Tariff Policy that was notified by the Ministry of Power in January 2006, in continuation with the EA 03 and the National Electricity Policy also emphasizes the importance of setting renewable energy quotas and preferential tariffs for renewable energy procurement by the respective SERCs.

Review of Indian Legislation and Policies

Ministry of Non Conventional Energy Sources Initiatives

In India, the utilization of renewable energy technologies for electricity generation has a long history. The wind demonstration projects set up in early 80's e.g. in Tamil Nadu, Gujarat, and Maharashtra are example of this. This phase was followed by development of policy measures, including financing and institutional measures to support the renewable energy technologies. The Ministry of Non-Conventional Energy Sources (MNES), in 1993 prepared policy guidelines for promotion of power generation from renewable energy sources. Some of the salient features of this policy guideline are - buy back price of Rs. 2.25 per kWh with 5% annual escalation, with 1993 as base year, concessions regarding the banking, wheeling and third party sale and fiscal incentives like allowing 100% accelerated depreciation for renewable energy projects were also given. The MNES guidelines were valid for a period of 10 years.

Power being a concurrent subject between the central and the state governments in India; different states adopted the MNES guidelines to varying degree. Further, there have been modifications in the state level policies with on one hand, some states giving additional benefits to renewables while on the other hand, some states have even diluted the benefits that were proposed in the MNES guidelines.

Ministry of Power Initiatives

With an objective of enhancing the operations of the power sector entities in the country as well as creating a conducive environment for investments, Ministry of Power, has taken a number of initiatives in the past. These initiatives have been characterized on the basis of major legislative changes, policy measures and administrative actions and have been highlighted as follows:

Major Legislative Initiatives

Legislative framework in the past

Prior to the EA 03, the power sector in India was governed by three important legislations viz. The Indian Electricity Act, 1910; The Electricity (Supply) Act, 1948 and The Electricity Regulatory Commission (ERC) Act, 1998. Prior to the enactment of the ERC Act, 1998, the regulatory function at the central level was performed by the Central Electricity Authority (CEA) / GoI and at the state level was performed by the SEBs / state government. The authority of the CEA was exercised through the process of grant of techno-economic clearance and the stipulation of various norms. GoI was responsible for the tariff setting of central generating stations. At the state level, the state governments and the SEBs were responsible for the regulatory function of the sector.

The key features of the ERC Act, which is relevant in the context of pricing of renewable energy based power generation, are as follows:

The ERC Act, 1998

- Provision for setting up of Central Electricity Regulatory Commission (CERC) / State Electricity Regulatory Commission (SERC) with powers to determine tariffs;
- Constitution of SERC optional for states; and
- Distancing of government from tariff setting process.
- Rationale for change in legislative framework

The key reasons for devising a new legislation governing power sector were:

- Requirement for harmonizing and rationalizing provisions in the existing laws to
- Create a competitive environment which would result in enhancing quality and reliability of supply to consumers; and
- Distance regulatory responsibilities of the government.
- Obviate the need for individual states to enact their own reform laws;
- Introduce newer concepts like power trading, open access, Appellate Tribunal etc.; and
- Providing special provisions for rural areas.

Electricity Act 2003

In order to formulate a comprehensive legislation imparting renewed thrust to coordinated development of the power sector in the country, the Electricity Act, 2003 (EA 03) has been enacted. The EA 03 provides a comprehensive yet flexible legislative framework for power development and envisions a sector characterized by a competitive market in power where the regulators and the power utilities play increasingly significant roles.

Key objectives of the EA 03

The important objectives of the EA 03 are as follows:

i) To consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of the entire electricity industry;
ii) Promoting competition in the industry;
iii) Protecting the interest of consumers and supply of electricity to all areas;
iv) Rationalization of electricity tariff;
v) Ensuring transparent policies regarding subsidies;
vi) Promotion of efficient and environmentally benign policies;
vii) Constitution of CEA, Regulatory Commissions and establishment of an Appellate Tribunal; and
viii) For other related matters

The EA 03 also had its impact on the renewable power sector and recognized the role of renewable energy technologies in the National Electricity Policy and in stand-alone systems. Some of the important provisions in the Act with regard to the promotion of renewable energy are given below.

Section 3 (1)

"The Central Government shall from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy."

Section 4

"The Central Government shall, after consultation with State Governments, prepare and notify a national policy, permitting stand alone systems (including those based on renewable sources of energy and other non-conventional sources of energy) for rural areas."

The state electricity regulatory commissions (SERCs) are now crucial players in the context of state level policies for renewable.

Section 61 (h)

"The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the promotion of co-generation and generation of electricity from renewable sources of energy."

Further the EA 03 has made it mandatory for SERCs –

Section 86 (1) (e)

"to promote co–generation and generation of electricity through renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any persons, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee."

Policy measures and initiatives

National Electricity Policy

In pursuance of the provisions of the Act, the Government of India has notified the National Electricity Policy vide MOP notification No. 23/40/2004-R&R (Vol-II) dated 12.2.2005. National Electricity Policy also stresses the need for the promotion of Non-Conventional Energy Sources. The extract of the relevant provisions of the National Electricity Policy is given below -

"5.12 Cogeneration and Non-Conventional Energy Sources

5.12.1 Non-conventional sources of energy being the most environment friendly there is an urgent need to promote generation of electricity based on such sources of energy. For this purpose, efforts need to be made to reduce the capital cost of projects based on non-conventional and renewable sources of energy. Cost of energy can also be reduced by promoting competition within such projects. At the same time, adequate promotional measures would also have to be taken for development of technologies and a sustained growth of these sources.

5.12.2 The Electricity Act 2003 provides that co-generation and generation of electricity from non-conventional sources would be promoted by the SERCs by providing suitable measures for connectivity with grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies.

5.12.3 Industries in which both process heat and electricity are needed are well suited for cogeneration of electricity. A significant potential for cogeneration exists in the country, particularly in the sugar industry. SERCs may promote arrangements between the co-generator and the concerned distribution licensee for purchase of surplus power from such plants. Cogeneration system also needs to be encouraged in the overall interest of energy efficiency and also grid stability."

National Tariff Policy

In compliance with Section 3 of the EA 03, the Central Government notified the Tariff Policy vide MOP notification No.23/2/2005-R&R (Vol. III) dated January 6, 2006 in continuation with the National Electricity Policy. Some of the important provisions with regard to non-conventional energy generation are highlighted below –

Section 6.4

(1) Pursuant to provisions of section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage for purchase of energy from non-conventional sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.

It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.

(2) Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs.

(3) The Central Commission should lay down guidelines within three months for pricing non-firm power, especially from non–conventional sources, to be followed in cases where such procurement is not through competitive bidding.

Implementation of Section 86 (1) (e) of the EA 03 and Section 6.4 (1) of the National Tariff Policy are underway and different SERCs are in the process of issuing tariff orders for renewable energy based electricity generation and specifying quota/share for power from renewable energy.

Integrated Energy Policy

The Prime Minister and the Deputy Chairman, Planning Commission, Government of India, took the decision for an effective and comprehensive energy policy as an urgent imperative in the year 2004. An expert committee was constituted under the leadership of Dr. Kirit Parekh, to prepare an integrated energy policy linked with sustainable development that covers all sources of energy and addresses all aspects including energy security, access and availability, affordability and pricing, efficiency and environment. The committee was constituted on 12th August 2004. The draft integrated energy policy was circulated in December 2005 and the final policy was notified in August 2006.

The broad vision behind the energy policy is to reliably meet the demand for energy services of all sectors including the lifeline energy needs of vulnerable households, in all parts of the country, with safe and convenient energy at the least cost in a technically efficient, economically viable and environmentally sustainable manner.

The integrated energy policy has outlined some ambitious tenets. These are summarized below.

- Renewable energy may need special policies to encourage them. This should be done for a well-defined period or up to a well-defined limit and should be done in a way that encourages outcomes and not just outlays.
    - Phase out capital subsidies, which only encourage investment without ensuing outcome, by the end of the 10th Plan linked to creation of renewable grid power capacity
    - Power regulators must seek alternative incentive structures that encourage utilities to integrate wind, small hydro, cogeneration, etc., into their systems. All incentives must be linked to energy generated as opposed to capacity created.
    - Respective power regulators should mandate feed-in laws for renewable energy, where appropriate, as provided under the Electricity Act and as are mandated in many countries.

The following specific policies to promote various renewables have been recommended in the policy:

- *Mini Hydro:* A detailed survey should be carried out to identify potential sites. Identified sites should be auctioned. For plants which are not connected to grid bid for lowest tariff with a pre-specified premium in the form of Tradable Tax Rebate Certificates (TTRC) should be invited. For village level plants, the entrepreneurs should be encouraged to supply power to meet other requirements such as agro processing and milling. If the plant can feed into a grid, the grid should be required to accept power at the going time of day tariff, and the plant site should be auctioned off for minimum premium in the form of TTRC linked to output. The responsibility for investments for connecting to the grid should be fixed in advance before the bidding.
- *Wind Power:* For wind power, site selection is freer than hydro-power and wind plants can be set-up on private land. Thus there may be need to auction only sites on public property. The same two types of auctions may be followed as described above for hydro-power plants.
- *Fuel-wood Plantation:* Cooperatives should be encouraged and facilitated to grow tree plantations in villages. Cooperatives which are open to all members of the

community and which are non-discriminatory should be given government land on long-term lease. Women should be encouraged to set-up and manage such plantations so that the time they now spend in gathering fuel can be spent productively in a way that empowers them. They should also be provided finance. If organized and managed properly, such plantations are economic and successful. Field based NGOs could also be involved in this activity. To encourage large-scale plantations, contract farming should be facilitated.

- *Electricity from Wood Gasification:* This can provide electricity based on gasification of wood and can be very useful especially in remote villages. The same set of policies, indicated for micro hydel and wind power plants should be followed here.

Bio Gas Plants: The real potential of bio gas is in community level plants. To encourage private or community entrepreneurs to set these up, they need to be provided land and finance. Also to have the willing participation of all the cattle owners in the community requires an appropriate operating strategy. The essential policy required is provision of land and finance.

Coplying with the proviosons of the Electricity act 2003, and the seubsequent electricity policy different state regulatory commissions have issued regulations/ tariff orders regarding renewable energy quot and /or tariff orders for purchase of power from renwbale enrgy sources. Table 2 below provide summary of these regulations and tariff orders.

Table 2: Summary od regulation and tariff orders

States	Tariff Orders for RE sources
Andhra Pradesh	- Tariff Order for determination of tariff applicable to Non-conventional energy projects in AP: April 2004 (Wind, mini-hydel, biomass, bagasse, municipal waste, industrial waste) - Review petition on 'tariff for biomass-based power generation': July 2004 - Review petition on 'tariff for small-hydro power generation': July 2004
Karnataka	- Tariff Order for determination of tariff in respect of Renewable Sources of energy: January 18, 2005 (Mini-hydel, wind, cogeneration, biomass) - Review petition on tariff determination in respect of Renewable Sources of energy: July 20, 2005
Madhya Pradesh	- MPERC Order on Power Procurement and Tariff Determination of wind energy based power: June 2004
Maharashtra	- MERC Order on 'Tariff and related dispensation for procurement of power from Biomass based generation projects': August 2005 - MERC Order on 'Procurement of Wind Energy and Wheeling for third party sale and or self use': November 24, 2003 - MERC Order on 'Tariff Determination for Small Hydro Projects in Maharashtra': November 9, 2005 - MERC Order on Tariff and dispensation for purchase of power from Bagasse and other non-fossil fuel based non-qualifying cogeneration projects': May 25, 2005 - MERC Order on 'Procurement of Wind Energy and wheeling for third party sale or self-use': September 18, 2003
Tamil Nadu	- TNERC Draft Discussion Paper on 'Tariff Related Issues' for Non Conventional Energy sources: December 2005
Uttaranchal	- UERC Tariff Order for determination of tariff for new hydro generating stations with capacities greater than 1 MW and upto 25 MW: November 10, 2005 - UERC Order on Approach to Initial Tariff for Generating Stations with capacity upto 1 MW: November 10, 2005 - UERC Approach for determination of Tariff for Micro Hydel Generating Stations with capacity upto 1 MW: September 2005
Uttar Pradesh	- Order on suo moto proceedings in the matter of Terms and Conditions of Supply and Tariff for Captive Generating Plants and Renewable and NCE source based plants: July 18, 2005 - UPERC Approach Paper for Determination of Tariff for Captive Generation, Non-conventional and Renewable Energy Sources: July 2005

Gujarat	-	Order on Determination of price for procurement of power by the Distribution Licensees in Gujarat from Wind Energy Projects: 11th August 2006
West Bengal	-	West Bengal Electricity Regulatory Commission (Cogeneration & generation of electricity from Renewable Sources of energy) Regulations, 2006.