Experience of Implementing REC Mechanism in India

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Abstract : *India has been graced with rich renewable resources. With depleting conventional resources along with increasing awareness and concerns about environment, the stage seems to be set for an increased mix of Renewable Energy (RE) into the overall energy requirement in the country. Since the cost of electricity generated from such resources is expensive, large scale development of renewable resources did not take place. Enactment of the Electricity Act 2003 (the Act) has lent further support to renewable energy by stipulating purchase of a percentage of the power procurement by distribution utilities from renewable energy sources. The renewable purchase obligation as well as preferential tariff for procurement of such power has been specified by various State Electricity Regulatory Commissions (SERCs). Renewable energy sources are not spread evenly across the state boundaries and the very high cost of generation from RE sources discourages local distribution licensees from purchasing electricity generated from RE sources. Renewable Energy Certificate seeks to address the mismatch between availability of RE sources and the requirement of the obligated entities to meet their renewable purchase obligation by purchasing green attributes of renewable energy remotely located in the form of Renewable Energy Certificate (REC). This paper discusses regulatory developments and efforts of the Central Agency (National Load Despatch Centre) in facilitating the nationally tradable renewable energy credits in the form of Renewable Energy Certificates (REC) for encouraging investment in renewable and also achieving the targets set by respective SERCs for renewable purchase obligations.*

1. INTRODUCTION

Energy is a critical foundation for economic growth and social progress. Higher is the economic growth, higher is the requirement of energy, depleting fossil fuels and its pollution on the environment has given rise to the ever-serious contradiction among energy providing, environment protection and economic development. Renewable energy, with the availability of its renewability and non-pollution, will prove to be an effective and practical choice to guarantee the future development of the world. As India is among the largest developing countries in the world, with richly endowed renewable energy potential (India is fifth largest wind energy producer just after US, Germany, China & Spain as on 2009), developing renewable energy is its inevitable choice for sustainable economic growth. Renewable energy has been categorized as traditional and new renewable energy. The former includes large hydropower, biomass burnt directly etc; the latter includes small hydropower, solar energy, wind energy, biomass energy, geothermal energy and ocean energy, etc. This paper deals with the new renewable energy sources.

Potential & installed capacity of major renewable energy sources in India as on 31.12.2010 is tabled below.

Source	Potential (MW)	Installed Capacity (MW)
Wind	45000	13065
Biomass	17000	997
Small Hydro (<25MW)	15000	2939
Cogeneration-Bagasse	5000	1562
Waste	2700	73
Solar	>100000	17

Source: Ministry of New and Renewable Energy (MNRE)

Government of India has come out with Acts, Policies and regulations to support renewables. The major contributors are as under.

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1.1. Electricity Act 2003

The enactment of the Electricity Act 2003 (The Act) has accelerated the process of reform in the Indian power sector. The Act has enabled competition in the Indian power sector in bulk as well as retail electricity supply, in phases. To meet the challenges in the emerging competitive environment, the Act promotes electricity generation from co-generation and renewable energy sources by directing the SERCs to specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee and 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

1.2. National Electricity Policy 2005

The National Electricity Policy 2005 stipulates that progressively the share of electricity from non-conventional sources would need to be increased; 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 deferential in prices to promote these technologies.

1.3. Tariff Policy 2006

The Tariff Policy announced in January 2006 has the following provisions:

Pursuant to provisions of section 86 (1) (e) of the Act, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentages for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 01, 2006.

1.4. Indian Electricity Grid Code-2010

Grid codes around the world are changing to incorporate renewables into the grid. Federal Energy Regulatory Commission (FERC) order 661-A is an example.

Indian Electricity Grid Code 2010 (IEGC) has also incorporated special provisions of connection, operations, forecasting, scheduling and commercial settlement for wind and solar generating plants.

1.5. Central Electricity Regulatory Commission (CERC) Regulation & REC Mechanism

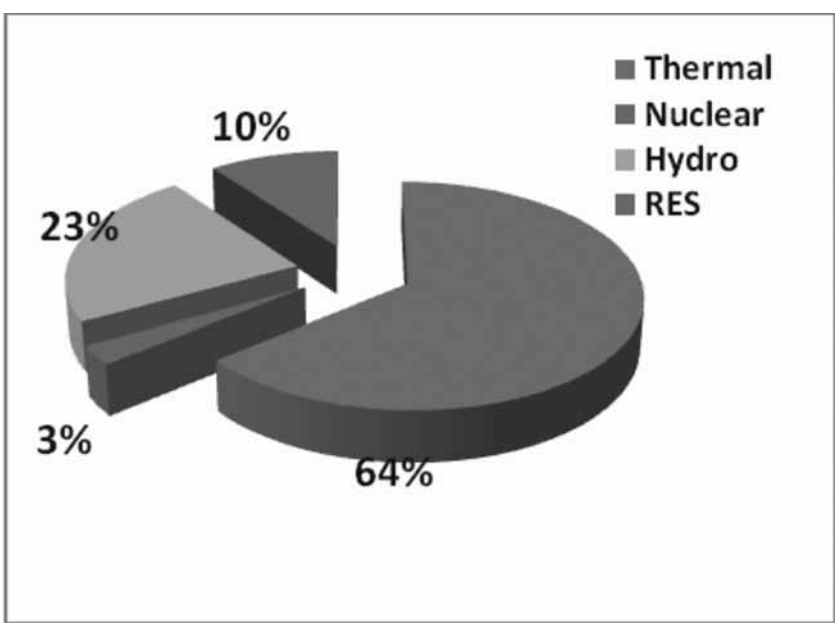

Fig. 1 : Technology-wise distribution of installed capacity in India (Source: CEA–June, 2010)

Contribution of renewable energy sources in the total portfolio of capacity as well as gross generation is still very low. As on 31st December, 2010, the renewable energy sources constituted only about 10 % of the total installed generation capacity (171926 MW) in the country.

The National Action Plan on Climate Change (NAPCC) has set the target of 5% renewable energy purchase for FY 2009-10 which will increase by 1% for next 10 years. The NAPCC further recommends strong regulatory measures to fulfil these targets.

For the development of Non-conventional energy sources, efforts need to be made to reduce the capital cost of such projects. 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.

While the Electricity Act, 2003, the policies framed under the Act, and also the NAPCC provide for a roadmap for increasing the share of renewable in the total generation capacity in the country, there are constraints in terms of availability of RE sources evenly across different parts of the country. This inhibits the State Commissions, especially in those states where the potential of RE sources is not that significant, from specifying higher renewable purchase obligation. For example, given the fact that Delhi does not have sufficient renewable energy potential, the State Commission of Delhi has specified RPO of 1% for the distribution licensees in the State. There are states like Madhya Pradesh where the SERC has fixed the RPO of 10% but actual achievement of RPO is less than 1%. The prescribed level of renewable portfolio standard for some of the states in US are—California 20% by 2017, Nevada 20% by 2015, New Mexico 10% by 2011, Texas 5% by 2015 and New York 25% by 2013.

In India some states like Rajasthan and Tamil Nadu have very high potential of RE sources and the State Commissions have also specified higher RPO. In fact, in such states there are avenues for harnessing the potential even beyond the RPO level fixed by the State Commissions. However, the very high cost of generation from RE sources discourages local distribution licensees from purchasing electricity generated from RE sources beyond the RPO level mandated by the State Commission.

It is in this context that the concept of Renewable Energy Certificate (REC) assumes significance. This concept seeks to address the mismatch between availability of RE sources and the requirement of the obligated entities to meet their renewable purchase obligation. This concept was evolved by the Forum of Regulators (FOR).

In view of the above contexts and to overcome the regional constraints, after detailed deliberations with all stakeholders, CERC notified the “Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010” on 14th Jan-2010, introducing the modalities of REC in the Indian Electricity Sector.

RECs are also known by under functionally equivalent names such as Green Tags, Renewable Obligation Certificates or Tradable Renewable Certificates

Internationally in countries like UK, US, Australia, Japan, Netherlands, Denmark & Poland the concept has been used to facilitate a robust and credible market for trading the green attributes of the electricity, with a view to provide an additional source of revenue to renewable energy generators.

2. SALIENT FEATURES OF REC FRAMEWORK

- Cost of electricity generation from renewable energy sources is classified as cost of electricity generation equivalent to conventional energy sources and the cost for environmental attributes.
- RE generators will have two options:
  - either to sell the renewable energy at preferential tariff , or
  - to sell electricity generation and environmental attributes associated with RE generation in the form of REC separately

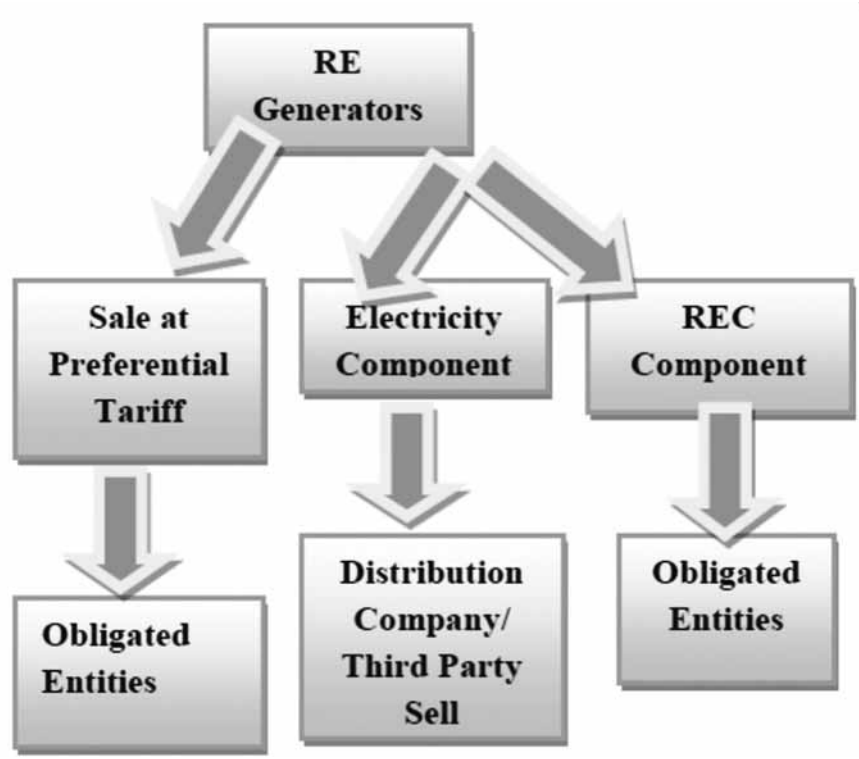

Fig. 2 : Block Diagram of REC Concept

Grid connected RE Technologies approved by MNRE would be eligible under this scheme

- Existing projects having firm PPA would not be eligible till the end of the contract period or a period of three years from the date of premature termination of the agreement, whichever is earlier.
- Captive Generators (including their self consumption) shall be eligible for REC if they do not avail promotional / concessional Wheeling Charges, Banking Facility and enjoy Electricity Duty Waiver. However, if they forgo such benefits, they will not be eligible to access the market for 3 years. Provided that the 3 year limit does not apply if the concessions are withdrawn by the state or state commission
- Under REC Mechanism, RE generating company sells the electricity generated either
  - to the distribution licensee at a price not exceeding the pooled cost of power purchase of such distribution licensee, or
  - to any other licensee or to an open access consumer at a mutually agreed price, or through power exchange at market determined price.
- Central Agency would issue REC to RE generators
- One REC will be issued to the RE generators for 1 MWh of electricity injected into the grid from renewable energy sources
- REC would be issued to RE generators only
- Categories of Certificates: Solar and Non-solar
- CERC may, in consultation with the Central Agency, appoint from time to time compliance auditors to inquire into and report on the compliance of these Regulations by the person applying for registration, or on the compliance by the renewable energy generators in regard to the eligibility of the Certificates and all matters connected thereto.

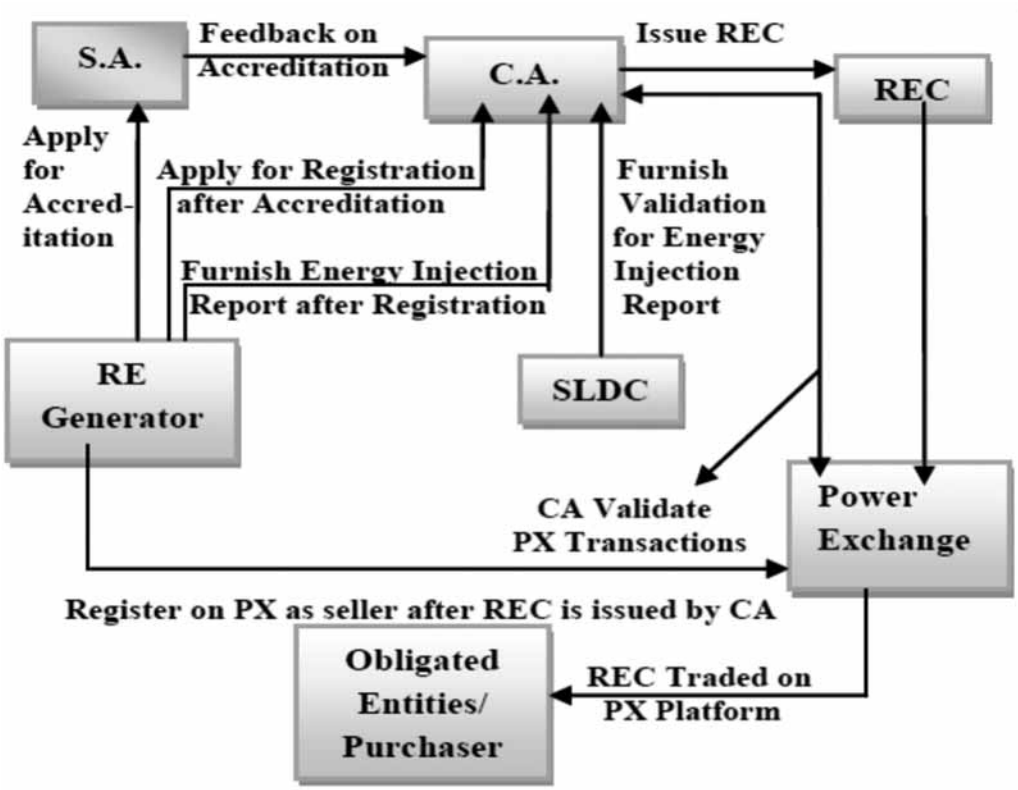

Fig. 3 : Block Diagram of REC Process

3. EFFORTS OF CENTRAL AGENCY

CERC has notified National Load Despatch Centre (NLDC) as the Central Agency for implementation of REC Mechanism in India on 29th January, 2010.

Till then National Load Despatch Centre, along with FOR Secretariat, has worked extensively to turn the REC Regulations into reality. With the continuous efforts of NLDC in close coordination with CERC and other agencies, REC Mechanism was converted into full-fledged automated web application and the REC Mechanism was launched on 18th November, 2010.

Efforts of NLDC can be highlighted into two parts i.e. Pre Launch Preparations and Post launch Efforts.

3.1. Pre Launch Preparations

NLDC and CERC/FOR conducted several meetings and various steps were taken in close coordination to make this mechanism, a fully automated system. These can be summarized below:

3.1.1. *Preparation of REC Procedures*

Detailed REC Procedures for implementation of REC Mechanism were prepared by NLDC in consultation with FOR Secretariat and consultant. These procedures which include Registration of eligible entities, Issuance of RECs, Redemption of RECs and model Guidelines for Accreditation were also made available in public domain on websites of NLDC & FOLD, RLDCs, FOR & CERC for inviting stakeholders comments.

Subsequently, in the meetings held at CERC office in the month of April, 2010 and May, 2010, provisions of draft detailed procedures on implementation of REC Mechanism were deliberated. Based on the deliberations, on the provisions of the draft detailed procedures, with the CERC/FOR Secretariat in the aforesaid meetings and stakeholders comments, suitable modifications were incorporated in the draft detailed procedures covering:

(a) Registration of eligible entities by Central Agency.

(b) Issuance of REC by Central Agency.

(c) Redemption of REC by Central Agency.

(d) Model guidelines for Accreditation by State Agency.

The REC procedures were then submitted for approval of CERC which were approved and notified by CERC on 01st June, 2010.

Subsequently on 29th September, 2010 CERC came out with first amendment in REC Regulations incorporating stipulations of provision of three year cooling period for entities breaching preferential tariff to come under the ambit of REC Mechanism and inclusion of qualifying self consumption from Captive RE Generators for issuance of RECs subject to certain eligibility criteria.

Accordingly, REC Procedures were modified by NLDC and submitted to CERC for approval. Amended Procedures were approved and notified by CERC on 09th November, 2010. During the deliberations with FOR Secretariat on revised procedures, it was agreed that the RECs issued to CPPs for self consumption can only be extinguished through the CERC approved Power Exchanges.

3.1.2. *Software Design*

REC Mechanism is now a fully automated Mechanism dedicated to nation, a unique application of its kind.

In order to make the system, automated, FOR Secretariat, CERC, NLDC & the Software Developer appointed by FOR Secretariat worked round the clock and several meetings were held for formulating design guidelines including logics and data mapping points. Administrator Rights of the software were given to NLDC as it is the Central Agency for REC Mechanism. Therefore, as part of design strategy, it was decided that NLDC will provide one time login credentials to State Agencies, SERCs and CERC after seeking prescribed details in order to provide access to the application.

Views of Power Exchanges were also incorporated in the software and the modalities and platform for information exchange between Power exchanges and NLDC for redemption of REC were designed.

Software was designed in modules and each module were tested rigorously by NLDC, FOR and the Software Developer. Stake holders like Maharashtra Energy Development Agency, Punjab Energy Development Agency, etc. were also involved in testing of Accreditation module. Separate Mock tests on Redemption module were conducted in coordination with Power Exchanges.

Regular review meeting were held by the Management of NLDC, FOR Secretariat and the Software Developer to review the development status.

3.1.3. *Capacity Building Workshops (Pre Launch)*

Several Capacity building workshops were organised by NLDC for stakeholders like State Agencies, SERCs and SLDCs to make them familiar with REC Regulations and REC Procedures. As a part of familiarisation program, communications were sent by NLDC to SLDCs informing their exclusive role in verifying energy injection report under REC Mechanism and it was requested to establish the required protocol with distribution licensee in order to avoid any difficulty in later stage in verifying the energy injection report of the RE Generating Plant. NLDC was also part of the capacity building workshops organised by FOR Secretariat.

3.2. Post Launch Efforts

After launch of REC Mechanism on 18th November, 2010, spontaneous efforts are being made by NLDC to facilitate the REC Mechanism and to make it run smoother and achieve the height of success and can be made exemplary across the globe.

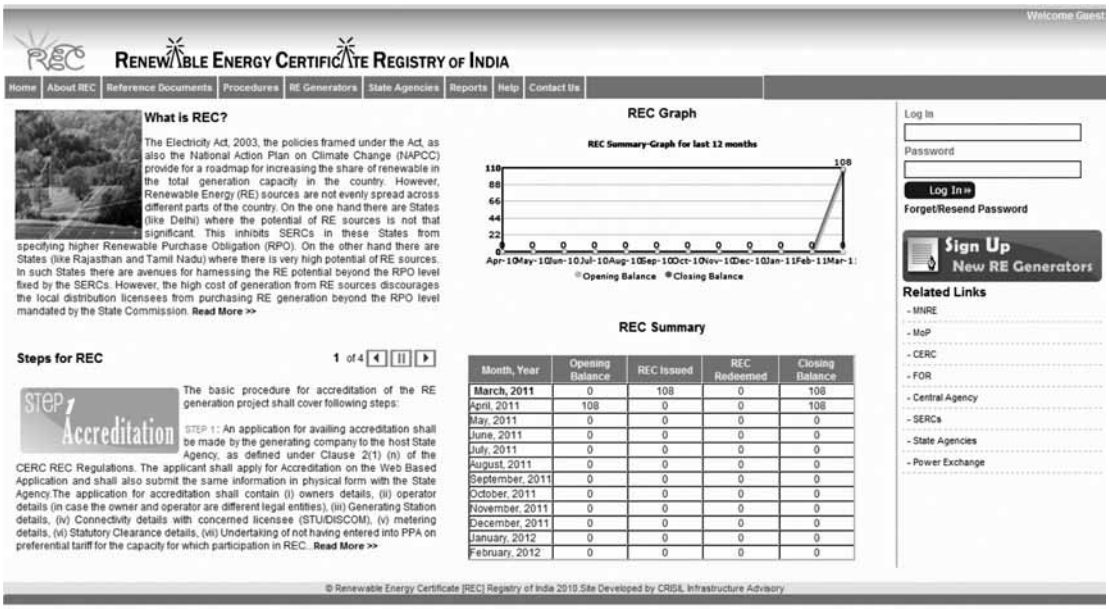

Fig. 4 : Snapshot of Home Page of REC Web Application. https://www.recregistryindia.in

3.2.1. *Continuous Technical Support*

NLDC provides technical support to all the stake holders like State Agencies, RE Generators, SERCs, Consultants, etc. regarding REC Mechanism including web application via email, telephone and in person. Effort is always made to provide the technical assistance in minimum possible timeframe. Any minor requirement which arises out of practical cases which were not foreseen during design stage are also incorporated in the web application after proper testing in a separate testing environment.

3.2.2. *Capacity Building Workshops (Post Launch)*

Capacity Building workshops are being organised focusing the needs of particular stake holder, e.g. post launch, hands-on training exclusively for State agencies on REC web application have been conducted twice till 15th March,2011.Workshops were conducted for the SERCs, SLDCs and State Agencies on the REC Mechanism. It is also planned to organise capacity building workshops including hands-on training region wise covering stake holders of the region. Further, NLDC official(s) have been the resource person of about half a dozen workshops organised on REC by various agencies in various parts of the country to create awareness on REC Mechanism

3.2.3. *Login Credentials*

As mentioned earlier, as the administrative rights of the REC web application is with NLDC which provides login credentials to State Agencies, SERCs and CERC after seeking prescribed details. Accordingly, communications were sent for furnishing the details and based on the information received login to 11 State agencies, 5 SERCs and CERC have been provided as on 15th March, 2011. As and when details are received, access to REC Web Application to respective agencies shall be provided.

3.2.4. *Registration, Issuance & Trading of RECs by Central Agency*

As per the provisions of REC Regulations and the approved REC Procedures, NLDC approves the application for Registration. As on 15th March, 2011, 9 RE Generators have been registered by Central agency under REC Mechanism, 19 Application for registration have been received which are under scrutiny and many more are expected in near future.

Issuance of RECs to the eligible entities are done based on the validated energy injection report of SLDCs. As on 15th March, 2011 total 108 RECs have been issued.

It is expected that first trade under REC Mechanism will occur on 30th March, 2011.

4. RELEVENT ORDERS RELATED TO REC

(a) CERC has determined floor price and forbearance price for dealing in Certificates, which shall remain valid up to FY 2012.

	Non Solar REC (₹/ MWh)	Solar REC (₹/ MWh)
Forbearance Price	3,900	17,000
Floor Price	1,500	12,000

(b) CERC notified REC Fees and Charges Order on 10th August, 2010.

Accreditation Charges

SL.N.	Fee and Charges towards Accreditation	Amount in ₹
1	Application Processing Fees (One Time)	5,000
2	Accreditation Charges (One Time)	30,000
3	Annual Charges	10,000
4	Revalidation Charge at the end of five (5) years	15,000

Registration Charges

SL.N.	Fee and Charges towards Registration	Amount in ₹
1	Application Processing Fees (One Time)	1,000
2	Registration Charges (One Time)	5,000
3	Annual Charges	1,000
4	Revalidation Charge at the end of five (5) years	5,000

Issuance Charges

SL.N.	Fee and Charges towards Issuance of REC	Amount in ₹
1	Fees per Certificate	10

5. WAY FORWORD

Recognising the fact that, like other resources, the renewable resources are also not evenly distributed across the country, REC Mechanism encourages setting up of larger generation capacities at resource rich locations and, through a process of Certification create a market based instrument which can be helpful to obligated entities or voluntary buyers to fulfil their Renewable Purchase Obligation/ Social Responsibility. Response till date is very encouraging. States play a very critical role in this Mechanism and as on 17th March, 2011, 24 SERCs have notified draft RPO Regulation out of which 16 have notified the final Regulations and 19 States have notified the State Agencies. Also, 48 RE Generators are accredited of which 15 are registered and many more applications for registration have been received and many more expected for registration as well as accreditation. 108 RECs have been issued and trading is likely to take place on 30th March, 2011. Central Agency under the guidance of CERC/FOR and with the support of all the stake holders like SERCs, State Agencies, SLDCs, etc., will always make its best effort to facilitate this mechanism.

Acknowledgement

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