

# Renewable Energy

## and **Renewal Energy Certificates** in Indian Context



With the increasing demand of energy and growing depletion of resources for energy generation, a global movement towards production of renewable energy (RE) is being thought. Renewable Energy is generated from resources which are renewable or which may last forever like sunlight, wind, rain, tide, geothermal heat etc. Small hydro generation also falls under the Renewable Energy. Opposite to RE, energy generated from conventional sources like fossil fuels or gas are formed by natural resources such as anaerobic decomposition of buried dead organisms. Fossil fuels- the non-renewable resources, take millions of years to form, and reserves are getting depleted much faster than the new ones being formed.

- P K Agarwal

The production and use of fossil fuels raises environmental concerns. A global movement towards the generation of renewable energy is therefore under way to help meet increased energy needs.

### Policy Support for Renewal Energy

The policies in India are being geared up towards the support of renewable energy. They are characterized by trade-offs between four major drivers:

- Rapidly growing economy, with a need for dependable and reliable supply of electricity, gas, and petroleum products;
- Increasing household incomes, with a need for affordable and adequate supply of electricity, and clean cooking fuels;
- Limited domestic reserves of fossil fuels, and the need to import a vast fraction of the gas, crude oil, and petroleum product requirements, and recently the need to import coal as well; and
- Indoor, urban and regional environmental impacts, necessitating the need for the adoption of cleaner fuels and cleaner technologies.

The supply of adequate, yet affordable electricity generated and used cleanly is a continuing challenge because expansion of supply and adoption of cleaner technologies, especially renewable energy, often means that the electricity is too expensive for many Indians, particularly in rural areas.

A road map has been provided in various policies / legislation for supporting the movement of renewable energy in India.

### Electricity Act 2003

Section 86(1): The State Commission shall discharge the following functions (e): promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid

and sale of electricity to any person, 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.

### 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 differential in prices to promote these technologies.

### 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.
- 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.
- 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.

- 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.

### Key Drivers for REC

Under Electricity Act 2003, the State Electricity Regulatory Commission (SERCs) set targets for distribution companies to purchase certain percentage of their total power requirement from renewable energy sources. This target is termed as Renewable Purchase Obligation (RPO). However, there are certain limitations of State specific approach when RE development strategies are to be deployed at national level. Existing legal framework under EA 2003 puts responsibility for promotion of renewable energy on SERCs. As a result, the regulations developed by the SERCs differ from each other on many counts. Further, these regulations do not recognize purchase of renewable energy from outside the State for the purpose of fulfillment of RPO target set by the SERC for the distribution utility in the State. The requirement of scheduling and prohibitive long term open access charges poses major barrier for RE abundant States to undertake inter-State sale of their surplus RE based power to the States which do not have sufficient RE based power. Consequently, the States with lower RE potential have to keep their RPO target at lower level. In addition, the unit cost of the RE based non-firm power is higher than the conventional power sources. As a result, while RE abundant States have no motivation to produce RE based power more than that required to satisfy the RPO mandate within the State. On the other hand, RE scarce States are not able to procure RE generation from other States.

In June 2008 Hon'ble Prime Minister of India announced National Action Plan for Climate Change (NAPCC) to outline its strategy to meet the challenge of Climate Change. NAPCC envisages several measures to address global warming. One of the measure is increasing the share of renewable energy in total electricity consumption in the country. Contribution of renewable energy sources in the total portfolio of capacity as well as gross generation is still very low. As on 31st July, 2009, the renewable energy sources constituted only about 8.5% of the total generation capacity in the country. In terms of actual generation, the share of renewable is estimated to be in the range of 3.5% of the total generation. NAPCC has set the target of 5% renewable energy purchase for FY 2009-10 against current level of around 3.5%. Further, NAPCC envisages that such target will increase by 1% for next 10 years. This would mean NAPCC envisages renewable energy to constitute approx 15% of the energy mix of India. This would require quantum jump in deployment of renewable energy across the country. To achieve these targets, NAPCC etc mandates a instrument called Renewable Energy Certificate (REC).

## What is Renewable Energy Certificate (REC)?

A REC is a paper or electronic instrument which represents the property rights to the environmental, social, and other non-power qualities of renewable energy generation. REC and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source.

RECs provide buyers, flexibility:

- In procuring renewable power to meet renewable power purchase obligation across a diverse geographical area.
- In applying the renewable attributes to the electricity use at a facility of choice.

This flexibility allows organizations to support renewable energy development and protect the environment when green power products are not locally available.

All grid-tied renewable-based

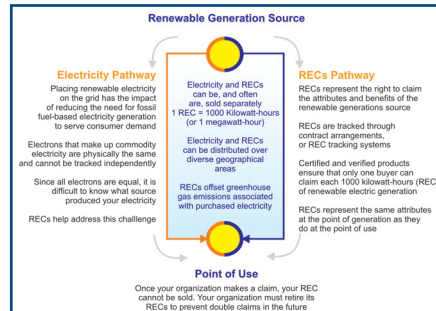


Fig. 1: REC is a attribute of RE Generation

electricity generators produce two distinct products:

- Physical electricity
- RECs

At the point of generation, both components can be sold together or separately, as a bundled or unbundled product. In either case, the renewable generator feeds the physical electricity onto the electricity grid, where it mixes with electricity from other generation sources. Since electrons from all generation sources are indistinguishable, it is impossible to track the physical electrons from a specific point of generation to a specific point of use. Refer Fig. 1.

RECs serve the role of laying claim to and accounting for the associated attributes of renewable-based generation. The REC and the associated underlying physical electricity take separate pathways to the point of end use (see diagram). As renewable generators produce electricity, they have a positive impact, reducing the need for fossil fuel-based generation sources to meet consumer demand. RECs embody these positive environmental impacts and convey these benefits to the REC owner.

As renewable generators produce electricity, they create one REC for every 1000 kilowatt-hours (or 1 megawatt-hour) of electricity placed on the grid. If

the physical electricity and the associated RECs are sold to separate buyers, the electricity is no longer considered "renewable" or "green." The REC product is what conveys the attributes and benefits of the renewable electricity, not the electricity itself.

## REC in Indian Context

The key driver for implementation of REC mechanism in India is Renewable Purchase Obligation (RPO) mandated by SERC for power utilities. Electricity Act 2003 mandates SERC with the function of RE promotion within state. Under EA 2003, the SERCs set targets for distribution companies to purchase certain percentage of their total power requirement from renewable energy sources. This target is termed as Renewable Purchase Obligation (RPO). However, there are certain limitations of State specific approach when RE development strategies are to be deployed at national level.

Although India is abundantly gifted with variety of renewable energy (RE) sources, not all States are endowed with same level of renewable energy sources. While some States have very high renewable energy potential, some States have very little renewable energy potential.

To solve this problem Forum of Regulators in association with CERC and SERC proposed REC mechanism. In REC mechanism, REC is a market-based instrument to promote renewable energy and facilitate renewable energy purchase obligations amongst various stakeholders. RECs have been used extensively as a successful market based policy instrument to promote renewable energy in many countries, such as Australia, Japan, US, Netherlands, Denmark and UK.

In the proposed mechanism, one REC is to be issued to the RE generator for every one MWh electrical, generated from renewable energy, fed into the grid. There will be separate certificate for solar and non-solar energy generation.

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The RE generator may sell electricity to the local distribution company and associated RECs to any distribution company or any other obligated entity across India. The entities with RPO target, such as distribution companies etc. which are required to purchase Renewable Energy have been referred to as 'Obligated Entities'. The purchase of RECs will be deemed as a purchase of power generated from renewable sources and accordingly will be allowed for compliance the RPO target. REC mechanism will enable Obligated Entities in any State to procure RECs from RE generator in any of the States in India and surrender the same to satisfy its RPO target.

## **Renewable Energy Certificate Regulations**

To enable REC mechanism in India, Central Electricity Regulatory Commission notified regulations called "Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010". As per these regulations:-

A generating agency engaged in generation of electricity from renewable energy sources shall be eligible to get credit of REC if it

- Does not have any power purchase agreement for the capacity related to such generation to sell electricity at a preferential tariff determined by the appropriate commission.
- Sells the electricity generated either i) to the distribution licensee of the area in which eligible entity is located ii) to any other licensee or to open access consumer at a mutually agreed price, or through power exchange at market determined price.
- The generating agency has to obtain accreditation from State Agency (a agency designated by respective SERC for the purpose).
- The generating agency can get issued one REC for each 1 MWh generated as above.
- For getting REC issued, the RE generating agency has to get registered with Central agency nominated by CERC for maintaining REC-registry (National Load Despatch Center has been designated as Central Agency by CERC).
- The Certificate shall be issued to the eligible entity on the basis of units electricity generated from renewable energy sources and injected into the grid and as certified by the State Agency/ State Load Despatch Center.
- Each Certificate issued shall represent one Megawatt hour of electricity generated from renewable energy source and injected into grid.
- The Renewable Energy Certificates can only be traded in Power Exchange in India.
- The price of Certificates shall be discovered in the Power Exchange. Provided that the Commission may, in consultation with the Central Agency and Forum of Regulators from time to time provided for the floor price and forbearance price separately for solar non-solar certificates. Floor price means the minimum price at and above which the certificate can be dealt in the power

exchange. The forbearance price means the ceiling price within which only the certificates can be dealt in the power exchange.

Any obligated entity (the entity mandated to fulfill the renewable purchase obligations), may purchase the certificates by bidding for purchase in power exchange in order to fulfill its renewable purchase obligations.

## Institutional Framework of REC Mechanism

- Government of India - Ministry of New and Renewable Energy (MNRE) is the nodal agency for promotion of renewable energy in the country. Role of MNRE is to facilitate REC mechanism in India.
- Forum of Regulators – being a common platform for all electricity regulators in India. FOR plays a crucial role of bringing consensus on design/development and coordination for implementation in various states participating in REC mechanism.
- Central Electricity Regulatory Commission – CERC is responsible for regulatory framework for inter-state transactions. REC mechanism is a platform for providing inter-state transactions in renewable energy. Hence, to provide regulatory framework for REC mechanism is the responsibility of CERC.
- State Electricity Regulatory Commission – SERC is responsible for regulating intra-state transactions. Since generation, consumption and obligation of renewable energy is generally at state level, SERC is responsible for providing regulatory framework within the state.
- State Agency – State agency in the context of REC is an agency designated by SERC within the regulated state. State agency shall be responsible for accreditation of RE generators, certification of RE in consultation with SLDC for the purpose of issue of REC.
- State Load Despatch Center – SLDC

are doing metering, energy accounting of the energy being generated and consumed within a state. Hence, providing accurate data on RE generation and consumption in a state is the responsibility of SLDC of that state.

- National Load Despatch Center – has been designated as central agency. The role of NLDC is very crucial for over all success of REC mechanism in India. NLDC will function as REC-registry. Function of REC-registry are
  - ♦ Registration of eligible RE generators for issuing REC.
  - ♦ Issuance of REC to RE generators.
  - ♦ Accounting of RECs.
  - ♦ Tracking of REC in its lifetime.
  - ♦ Extinction of REC after its sale.
  - ♦ Provide information to compliance auditors.
- Power Exchange – REC can only be traded in power exchange. Hence to provide trading and to facilitate trading of REC within the regulatory framework is the responsibility of power exchanges. Sale and purchase of REC will be done in power exchange. Power exchange will coordinate with central agency for verification of REC account.
- RE Consumers (Obligated Entities) – Sole purpose of REC mechanism is to facilitate obligated entity to meet its renewable purchase obligation as mandated by concerned SERC. Obligated entities are generally distribution companies in states who are required to purchase certain percentage (as fixed by SERC) of its power requirement from the power generated from renewable sources. Obligated entities are the buyers of REC.
- RE Generators - They are the generating plant whose inputs to the energy generation are from renewable sources. RE generator is responsible for injecting the power into the grid which has been

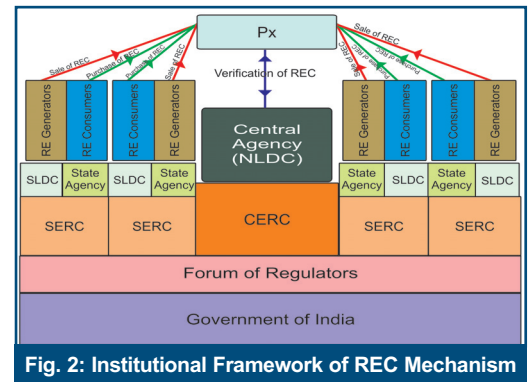


Fig. 2: Institutional Framework of REC Mechanism

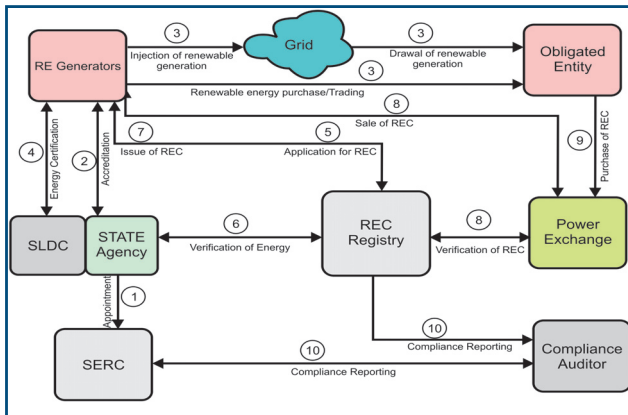
generated by use of RE resources. RE generators are responsible for getting accreditation from state agency, registration with central agency (NLDC) and getting REC issued and selling the same through power exchanges.

- Compliance Auditors – compliance auditor is a third party appointed by CERC for accessing the compliance of REC regulations.

## Operational structure of REC Mechanism

REC is new concept to be put through first time in Indian power sector. Hence, a harmonized and compatible operational framework is needed to be put in place for a successful implementation of REC mechanism in India. The proposed operational structure of REC mechanism is as depicted in the figure:

- Each State Electricity Regulatory Commission appoints an entity known as state agency, responsible for accreditation of renewable energy generator.
- Renewable energy generator gets accredited its RE capacity from the concerned state agency.
- Renewable energy is generated and injected in the grid by accredited RE generator. The energy is consumed by the load connected to the grid. The load owner or load server has purchase agreement with RE generator or trader.
- The quantum of energy so injected is metered and accounted by SLDC. The injected energy is certified by



**Fig. 3: Operational Structure of REC Mechanism**

SLDC/State Agency and informed to central agency.

- RE generator after getting registered with central agency (National Load Despatch Center) apply for issue of REC based on its certified energy
- REC registry verifies the claim of RE generator with state agency/SLDC.
- After verification, REC registry issue REC to RE generator as one REC for every 1 Mega Watt Hour of renewable energy certified.

RE generator in power exchange. Power exchange verifies with REC registry before settlement of the trade selling the certificate.

- Obligated entity buys the REC from power exchange for fulfilling its obligation of renewable energy purchase which it could not do through buy of renewable energy directly from RE generator. REC is extinguished from the account of RE generator in REC registry. Obligated entity surrenders REC purchased in order to meet its renewable purchase obligation;

### The Last Words

REC mechanism is proposed to be implemented w.e.f. 1st April 2010. The

frame work detailed above is still under finalization stage. Best of the efforts are being done for making the mechanism paperless as far as possible. Agencies like MNRE, CERC, NLDC, Px, CRISIL, ABPS etc are working tirelessly to meet the dead line of 1st April 2010. At the time of reading this article, REC mechanism might be in place. ■



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