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RENEWABLE ENERGY CERTIFICATES IN INDIAN CONTEXT

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ABSTRACT

The *power sector in India is rapidly growing in size and complexity with factors such as growth of short term power, trading instruments such as renewable energy certificates (RECs), injection of renewable power into the grid, wider participation in open access and increasing contribution of independent power plants. Policy and regulatory changes are more frequent than before, reflecting the dynamic nature of the industry. Major developments in the power sector are being driven by issues such as the demand-supply gap, losses in state utilities, ageing infrastructure, private participation, and environmental impact among others. Grid-connected renewable power is the key route through which the energy fuel mix can be brought in line with the desired objectives of reducing carbon emissions as well as improving the country's energy security. In June 2010, the cumulative achievement in grid-connected renewable power stood at 17,173.90 MW which increased to 28,000 MW in March 2013 . The leading renewables include wind power, small hydropower and biogas-based cogeneration. Wind energy garners the predominant share of about 70 per cent of total grid-connected renewable capacity. According to the Ministry of New and Renewable Energy (MNRE), there is a potential of 84,776 MW (excluding solar) in grid connected renewable power. Barely 18 per cent of this has been achieved so far. India targets to increase its solar power capacity to about 10 GW by 2017 from about 1.2 GW at the end of 2012. The National Action Plan for Climate Change (NAPCC) has presently set a target of 5 per cent of power purchase from renewable, which will be increased by 1 per cent each year to reach 15 per cent by 2020. The renewable purchase obligations (RPOs) or the percentage of power that the distribution utilities are expected to procure from renewable generators, are set by the State Electricity Regulatory Commissions (SERCs) for their respective states. A new system of Renewable Energy Certificates (RECs) has been introduced in the country, by which energy generated and fed to the grid will entitle the developers to trade the RECs issued to them. The system has been recently operationalized.*

Keywords: Grid Connected Renewable Power, Climate Change, Environmental Impact etc.

I. INTRODUCTION

Renewable Energy Certificates – 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.

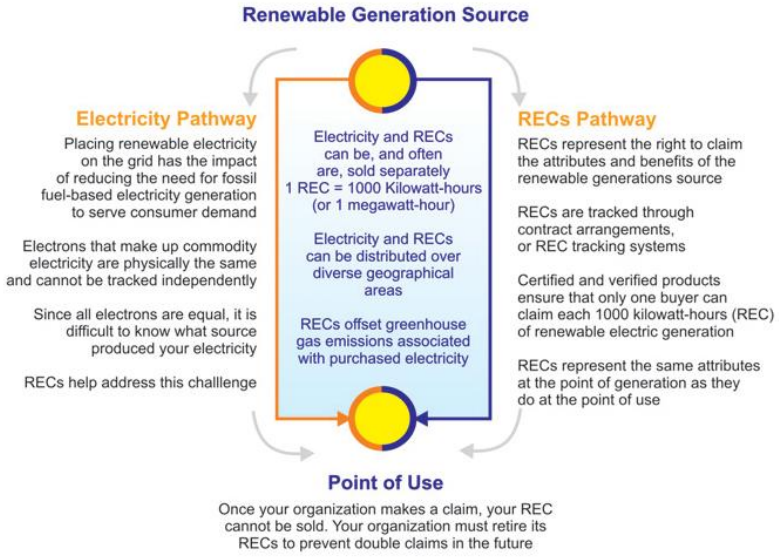
• In applying the renewable attributes to the electricity use at a facility of choice.

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 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. 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 . 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. The procedure to participate in REC mechanism involves: accreditation, registration with the central agency, issuance of REC and trading of RECs through power exchanges. 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.



II. 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.

III. TERMS AND CONDITIONS FOR ISSUANCE OF REC'S

Some features of the CERC regulations on RECs are summarized as under:

- Categories: There are two categories—solar and non-solar.
- Eligibility: All grid-connected renewable generators having installed capacities of 250 KVA and above are eligible. The entity seeking an REC has to be accredited by the respective state agency (such as TEDA in Tamil Nadu) etc. Also, it should not have any power purchase agreement (PPA) with the state regulatory commission for selling the generation on preferential tariffs on offer.

■Central agency for REC: A central agency is entrusted all operational functions related to RECs such as registration of entities, issuance of certificates, maintaining and settling REC accounts, transaction repository and others. Taking specific note of procedural delays, REC regulations provide that the central agency will issue certificates to eligible entities within 15 days of application.

■Denomination of certificates: Each REC would represent one-megawatt hour of electricity generated by the renewable energy entity and injected into the grid.

■ Transaction: RECs will be traded only through the power exchanges.

■ Price: Price determination of RECs will be within the limits set by CERC in terms of forbearance and floor price.

■Validity: REC will remain valid for up to a year from the date of issuance. The validity will stand even if the entity's accreditation is revoked at a later date.

■Compliance auditors: CERC can appoint compliance auditors for verification of regulatory processes related to RECs. Auditing will be done on a sample basis to ensure compliance of regulations at central and state level.

IV. 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.

V. 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. 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.

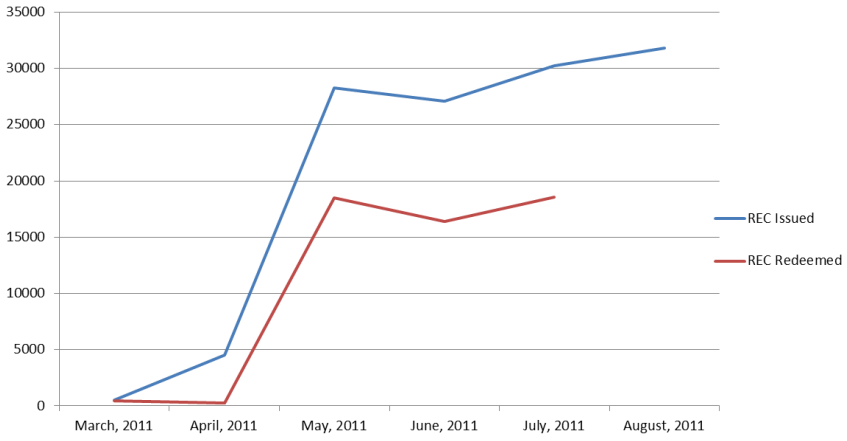
VI. RENEWABLE ENERGY CERTIFICATE PRICES HIT A NEW HIGH

As many as 1, 11,621 RECs were traded on the two exchanges – Indian Energy Exchange (IEX) and Power Exchange of India Ltd (PXIL). IEX accounted for 95 per cent of the trading and saw the number of RECs traded on it cross the 100,000-mark (105,942 RECs were traded on the exchange). The average prices were Rs 2,950 for each REC on both the exchanges. RECs are generation-based 'certificates' awarded (electronically in demat form) to those who generate electricity from renewable sources. Certificates are tradeable on the exchanges and are bought by 'obligated entities'. Trading in RECs happens on the last Wednesday of each month and the cleared volumes have been picking up month after month. In September, 46,363 RECs were traded, which was more than twice as much as in the previous month. In October, the number rose to 95,504, and to 105,000 in November. However, up till now, close to 220,000 RECs have been issued, which means that half the available certificates only got traded. Also experts have commented that the price hike has been very marginal, which reflects that the prices are very near their maturity. The future market movement, they add, will depend heavily upon how the new demand shapes up.

VII. RECENT DEVELOPMENTS, ISSUES AND CHALLENGES

There exist certain issues and challenges with the concept of RECs and their trading. The chart below shows the number of RECs issued and redeemed in India from March 2011 to August 2011. Though it shows a tremendous growth in the issuance of RECs over the last few months, it also shows the increasing gap between RECs issued and those redeemed. If the sale and redemption of RECs becomes back loaded in a financial year and is erratic during the whole year, it will affect the cash flows of the RE project developers who won't be able to rely on them as a source of revenue The REC framework requires uniform regulatory structure across the states. As of 5 August 2010, 3 SERCs Gujarat, Himachal Pradesh and Maharashtra and JERC for Mizoram and Manipur passed the final REC regulations. Eight other states have notified draft REC regulations and are waiting for state commission approvals. CERC has already granted approval to the two power exchanges (i.e. IEX and PXIL) for introducing RECs as trading products. The MNRE has agreed to provide financial assistance of Rs. 9 Crore over the next 3 years towards implementation of the mechanism. This financial support would be provided for

developing relevant software and hardware and for providing manpower to both central and state agencies. The REC mechanism assures a guaranteed return of at least Rs. 12,000 and Rs. 1,500 per certificate to solar power and non-solar generators, respectively, proving that RECs will give monetary returns to developers by compensating them for loss of preferential tariff. RECs to the tune of 13.71 lakh were offered for sale at the India Energy Exchange during the trading session of January 2013. Of these only 1.91 lakh were sold, and the remaining were stacked up with the renewable power producers. The trend of non solar and solar RECs from June 2012 to May 2013 shows that non-solar REC issuance under the REC scheme has again slipped to a new low while the solar REC issuance touched an all-time high. There is an uneven distribution of renewable energy potential in the country; certain states are generating a high percentage of electricity from renewable sources while others are not procuring even the minimum percentage; resulting in uneven tariff burdens on consumers across the country. RECs would help make the renewable electricity market stable and predictable by maximizing the benefits of renewable generation while reducing costs. Several other activities such as development of hardware and software by the REC registry and REC exchange platform, need the regulator to approve the specifications as well as audit the system. A monitoring committee will have to be set up to develop database of all renewable energy installations in a state. This activity would require significant upfront effort. In addition, significant capacity building activity will have to be undertaken at the state and central levels to ensure successful implementation of this mechanism.



Source: www.recregistryindia.in

Some of the other challenges which currently exist with the Indian REC market include:

1. Lack of long term visibility Most of the state RPO obligations have been fixed only till 2012-13. This leads to lack of visibility in terms of the future demand and growth trajectory of the REC market and questions their bankability

2. Enforcement of RPO There needs to be stricter enforcement of state RPOs. If states don't fulfill their mandatory renewable energy requirements then the penalties must be strictly enforced.

3. Awareness regarding RECs State agencies need to create more awareness about RECs amongst the obligated entities and ensure the higher uptake of RECs. Increased awareness would provide a much needed boost to this market. Though the concept of Renewable Energy Certificates is plagued by some challenges, it is still relatively new in India and holds great promise in promoting the growth of renewable energy and taking India

on path of being a low carbon economy. Renewable Energy Certificates is a relatively new and challenging market based instrument, but holds great promise in promoting the renewable energy market development in India. In a bid to promote renewable energy market in India, the Indian government has framed policies under the Electricity Act, 2003 and the National Action Plan on Climate Change (NAPCC) to increase the total renewable power generation capacity in the country. Renewable Energy Certificates (REC) is a policy instrument to catalyze the development of renewable energy. It is a market based mechanism which will help the states meet their regulatory requirements (such as Renewable Purchase Obligations (RPOs)) by overcoming the geographical constraints on existing renewable potential in different states .RECs unbundle the electricity component (commodity) from the green/environmental attributes of the power generated from renewable sources. Both the components can then be traded separately. Thus RECs help in incentivizing the production of renewable energy over and above the RPO state limit as tradable certificates are not constrained by the geographical limitations of commodity electricity.

REFERENCES

[1]. Notification No. L-1/12/2010 issued by Central Electricity Regulatory Commission, Dated: 14th January, 2010

[2]. Pooled Cost of Purchase' means the weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self generation, if any, in the previous year from all the energy suppliers long-term and short-term, but excluding those based on renewable energy sources, as the case may be.

[3]. http://www.cercind.gov.in/2011/August/Order_on_Forbearnace_&_Floor_Price_23-8 2011.pdf

[4]. www.recregistryindia.in

[5]. *www.www.infraline.com,*