Impact of Renewable Energy Certificate (REC) Mechanism in India


Power System Operation Corporation Ltd. (POSOCO)
Installed Capacity

All India Installed Capacity- 3,30,152 MW

- Renewables, 58,303, 18%
- Hydro, 44,614, 13%
- Nuclear, 6,780, 2%
- Thermal (Coal+Gas+Disel), 2,20,455, 67%

RE Installed Capacity- 58,303 MW

- Wind Power, 32,508 MW, 56%
- Solar Power, 13,115 MW, 22%
- BioPower, 8,182 MW, 14%
- Waste to Power, 114 MW

1.7 % of the total solar potential
10.7 % of the total wind potential

175 GW Target for Renewable Energy by 2022

As on 31.07.2017, Source: CEA
Legal Framework

- Federal Structure
- Electricity is a concurrent subject
- Principal Central Legislation
  - Electricity Act, 2003
    - Basic policy and regulatory framework
- Regulatory Framework
  - Central level
    - Central Electricity Regulatory Commission (CERC) (Inter-State)
  - Province level
    - State Electricity Regulatory Commission (SERCs) (Intra-State)
  - Forum of Regulators - for harmonization

- Electricity Act 2003 has outlined several enabling provisions to accelerate the development of RE based generation
  - National Electricity Policy and Plan
  - Tariff Regulations by Regulatory Commission
  - Purchase Obligation from Renewable Energy Sources
  - Development of market (including trading) in power

- RPO Trajectory notified by Ministry of Power

<table>
<thead>
<tr>
<th>Long term Trajectory</th>
<th>2016-17</th>
<th>2017-18</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Solar</td>
<td>8.75%</td>
<td>9.50%</td>
<td>10.25%</td>
</tr>
<tr>
<td>Solar</td>
<td>2.75%</td>
<td>4.75</td>
<td>6.75</td>
</tr>
<tr>
<td>Total</td>
<td>11.50%</td>
<td>14.25%</td>
<td>17.00%</td>
</tr>
</tbody>
</table>
Why REC Mechanism was created?

- Renewable sources are not spread evenly across country
- Many states with no or little RE were not able to promote RE
- States with good RE felt they have exhausted their capacity to absorb
- It is difficult to carry out inter-State sales using CERC OA Regulations for large scale deployment of RE following reasons:
  - Most RE generators are difficult to schedule
  - Transaction would be expensive due to low capacity factors of RE
  - RE generators are not connected to STU but to DISCOMS
  - Intra-state balancing systems have not yet stabilized
- Therefore, a mechanism that will enable inter-state sale and purchase of renewable energy was required.
Concept of Renewable Energy Certificate

One REC represents one MWh of energy generated from renewable sources
CERC REC Regulations -2010

RE Generation

- Sale of Green Energy
  - Obligated Entities
- Electricity Component
  - Distribution Company / Third Party Sale / Power Exchange
- REC Component
  - Obligated Entities / Voluntary Buyers
Eligibility for Registration under REC Mechanism

1. Distribution Licensee – which has purchased Renewable Energy over and above their RPO

2. Grid Connected RE technology approved by MNRE under following routes

- Self Consumption/ Captive use
  - Plant Commissioned prior to 29.09.2010 or after 31.03.2016
  - Not Eligible

- Third party sale/Open Access
  - Plant Commissioned between 29.09.2010 and 31.03.2016 and not availing benefit in the form of concessional / promotional transmission or wheeling charges and/or banking facility benefit & registered before 30.06.2016
  - Eligible

- PPA with Distribution Licensee
  - RE generator is not availing benefit in the form of concessional/ promotional transmission or wheeling charges and/or banking facility benefit
  - Eligible

  - Sell to DISCOM at Pooled cost of Power Purchase
  - Eligible

  - PPA at rates as determined under section 62 and 63 of Act
  - Not Eligible
<table>
<thead>
<tr>
<th><strong>Salient Features of the REC Mechanism</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation</strong></td>
</tr>
<tr>
<td><strong>REC Denomination</strong></td>
</tr>
<tr>
<td><strong>Validity</strong></td>
</tr>
<tr>
<td><strong>Categories</strong></td>
</tr>
<tr>
<td><strong>Sellers</strong></td>
</tr>
<tr>
<td><strong>Buyers</strong></td>
</tr>
<tr>
<td><strong>Trading Platform</strong></td>
</tr>
<tr>
<td><strong>Trading Periodicity</strong></td>
</tr>
<tr>
<td><strong>Banking / Borrowing</strong></td>
</tr>
<tr>
<td><strong>Transfer Type</strong></td>
</tr>
<tr>
<td><strong>Solar RECs</strong></td>
</tr>
<tr>
<td><strong>Non-Solar RECs</strong></td>
</tr>
<tr>
<td><strong>Penalty for Non-compliance</strong></td>
</tr>
<tr>
<td><strong>Price Guarantee</strong></td>
</tr>
</tbody>
</table>
Processes in REC Mechanism

STAGES UNDER REC MECHANISM

1. ACCREDITATION
   - RE GENERATOR APPLIES ONLINE
   - STATE AGENCY VERIFIES DETAILS
   - STATE AGENCY ACCREDITATE/ REJECTS

2. REGISTRATION
   - RE GENERATOR APPLIES ONLINE
   - CENTRAL AGENCY VERIFIES DETAILS
   - CENTRAL AGENCY REGISTER/ REJECT

3. ISSUANCE
   - RE GENERATOR APPLIES ONLINE (10th, 20th and last day of month)
   - SLDC VALIDATES ENERGY INJECTION REPORT
   - CENTRAL AGENCY ISSUES REC

4. REDEMPTION
   - Redemtion through Power Exchanges (PX)
     - BUYERS & SELLERS PLACE BIDS AT PXs
     - POWER EXCHANGES SEND PROVISIONAL FILE TO CENTRAL AGENCY FOR VALIDATION OF SALE BIDS
     - CENTRAL AGENCY SENDS EXCEPTION REPORT IF ANY
     - PXs PROCESS FINAL TRADE
   - Redemption through Self-retention of RECs by RE generators
Key Highlights:
- Transparent
- Accessible pan India
- User Friendly
- Real Time Data on REC
- Single Touch Point for information for RE Generators

NLDC designated as Central Agency for REC Mechanism by Hon’ble CERC

The NLDC has developed various procedures to operationalize REC mechanism
Important Amendments in REC Regulations

• RE generator eligible for RECs from the date of commercial operation or from the date of registration whichever is later

• Incentive to DISCOMs to procure beyond RPO target - DISCOMs eligible to receive RECs

• Project under Self-consumption route is not eligible for new Registration

• Vintage Multiplier Factor of 2.66 for Solar Generators- upto 31.03.2017

• An RE Generator may retain RECs for offsetting its RPO as a consumer

• Revocation of RECs/recovery of sale proceeds of RECs if the project Registered on false information
## Floor and Forbearance Price

### Non - Solar REC

<table>
<thead>
<tr>
<th></th>
<th>01.06.2010-31.03.2012</th>
<th>01.04.2012-31.03.2017</th>
<th>w.e.f. 01.04.2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forbearance Price</td>
<td>3,900</td>
<td>3,300</td>
<td>3000</td>
</tr>
<tr>
<td>(Rs./MWh)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor Price</td>
<td>1,500</td>
<td>1,500</td>
<td>1000</td>
</tr>
<tr>
<td>(Rs./MWh)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Solar REC

<table>
<thead>
<tr>
<th></th>
<th>01.06.2010 - 31.03.2012</th>
<th>01.04.2012 -31.12.2014</th>
<th>01.01.2015 - 31.03.2017</th>
<th>w.e.f. 01.04.2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forbearance Price</td>
<td>17,000</td>
<td>13,400</td>
<td>5,800</td>
<td>2,400</td>
</tr>
<tr>
<td>(Rs./MWh)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor Price</td>
<td>12,000</td>
<td>9,300</td>
<td>3,500</td>
<td>1,000</td>
</tr>
<tr>
<td>(Rs./MWh)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Impact of REC Mechanism on Stakeholders

- **Investment facilitated by the REC Mechanism**
  - Provides avenue to RE generator(s) to sell their power locally to DISCOM and/or open access consumer
  - Capital investment of more than ₹220 billion have been made by the stakeholders

- **Facilitates RPO Compliance**
  - DISCOM, Captive Power Plants (CPP) and Open Access consumers as the obligated entities have purchased REC

- **Impact on CO₂ Emissions**
  - Emission reduction of 34 Million ton of CO₂
  - RECs included in the India’s intended nationally determined contribution (INDC) under UNFCCC

- **Integrity and Probity of the REC Mechanism**

- **Capacity Building**

- **Dissemination of Information and Transparency**
Few Judicial Orders regarding RPO Compliance

• **APTEL Order dated 20\textsuperscript{th} April 2015**
  
The judgment delivered by Appellate Tribunal is on the petition filed by InWEA against all State Commissions for enforcement of RPO
  o **Monitoring of compliance** of RPO should be carried out periodically as provided in Regulations.
  o Carry forward/review should be allowed strictly as per the provisions of the Regulations keeping in view of availability of REC
  o In case of default in fulfilling RPO, the penal provision should be exercised
  o SERC are bound by their own Regulations

• **Hon’ble Supreme court (SC) judgment dated 13\textsuperscript{th} May 2015**
  
Hindustan Zinc vs Rajasthan Electricity Regulatory Commission(RERC) on the applicability of Renewable Purchase Obligation (RPO) regulations. The Hon’ble SC ruled that:
  o **RPO on Captive consumer and Open Access consumer is justified**
  o Obligated entities have option to purchase RECs from Power Exchange(s)
  o Subsequent to the Order, till 31.08.2017, Captive Power Plants and Open Access consumers purchased 10.2 Million RECs (~70 % of the total)
Hon’ble Supreme Court Order regarding REC Trading

- Hon’ble CERC vide order dated 30.03.2017 reduced the Floor and Forbearance Price w.e.f. 01.04.2017

<table>
<thead>
<tr>
<th></th>
<th>Non - Solar REC</th>
<th>Solar REC</th>
<th>Non - Solar REC</th>
<th>Solar REC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forbearance Price</strong> (Rs./MWh)</td>
<td>3,300</td>
<td>5,800</td>
<td>3,000</td>
<td>2,400</td>
</tr>
<tr>
<td><strong>Floor Price</strong> (Rs./MWh)</td>
<td>1,500</td>
<td>3,500</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

- Against CERC order, many stakeholders have filed Petition before Appellate Tribunal and Hon’ble Supreme Court
- Hon’ble Supreme Court vide interim order dated 08.05.2017, stayed the trading of RECs
- Hon’ble Supreme Court vide order dated on 14.07.2017, allowed the trading of non-solar RECs as per CERC Order dated 30.03.2017
- Further, till the matter is pending before APTEL, the difference between the old and new floor price shall be deposited with CERC by the Power Exchange(s)
- Trading of Solar RECs shall remain suspended until further orders
## Source-wise Breakup

<table>
<thead>
<tr>
<th>SN</th>
<th>Source</th>
<th>Registered Capacity</th>
<th>Unit</th>
<th>No. of RECs Issued</th>
<th>No. of RECs Redeemed</th>
<th>Closing Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wind</td>
<td>2,428</td>
<td>563</td>
<td>15,777,104</td>
<td>9,045,507</td>
<td>5,752,164</td>
</tr>
<tr>
<td>2</td>
<td>Urban or Municipal Waste</td>
<td>0</td>
<td>0</td>
<td>72,892</td>
<td>44,105</td>
<td>28,787</td>
</tr>
<tr>
<td>4</td>
<td>Solar PV</td>
<td>734</td>
<td>361</td>
<td>7,006,010</td>
<td>1,653,478</td>
<td>5,302,465</td>
</tr>
<tr>
<td>5</td>
<td>Small Hydro</td>
<td>255</td>
<td>33</td>
<td>3,449,804</td>
<td>2,224,537</td>
<td>1,218,982</td>
</tr>
<tr>
<td>6</td>
<td>Biogas</td>
<td>2</td>
<td>1</td>
<td>16,843</td>
<td>9,970</td>
<td>1,863</td>
</tr>
<tr>
<td>9</td>
<td>Biomass</td>
<td>558</td>
<td>62</td>
<td>8,152,013</td>
<td>5,233,717</td>
<td>2,781,811</td>
</tr>
<tr>
<td>10</td>
<td>Bio-fuel cogeneration</td>
<td>507</td>
<td>75</td>
<td>7,025,908</td>
<td>4,173,799</td>
<td>2,847,108</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,484</strong></td>
<td><strong>1,095</strong></td>
<td></td>
<td><strong>41,500,574</strong></td>
<td><strong>22,385,113</strong></td>
<td><strong>17,933,180</strong></td>
</tr>
</tbody>
</table>

- RE generators from 21 States are participating in the REC Mechanism
- RE Projects with capacity as low as 0.10 MW (Solar) and as high as 50.4 MW (Wind)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of DISCOM</th>
<th>State</th>
<th>Date of Registration</th>
<th>No. of RECs Issued</th>
<th>No. of RECs Redeemed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reliance Infrastructure Ltd.</td>
<td>Maharashtra</td>
<td>16.06.2016</td>
<td>4,590</td>
<td>56,310</td>
</tr>
<tr>
<td>2</td>
<td>HPSEB Ltd.</td>
<td>Himachal Pradesh</td>
<td>11.07.2016</td>
<td>541,000</td>
<td>56,310</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>545,590</strong></td>
<td><strong>56,310</strong></td>
</tr>
</tbody>
</table>

As on 31.08.2017
### Projects Registered under REC Mechanism

#### Registered Capacity: 4484 (MW)

- **Wind, 2,428 MW**
- **Biomass, 558 MW**
- **Bio-fuel cogeneration, 507 MW**
- **Small Hydro, 255 MW**
- **Biogas, 2 MW**
- **Solar PV, 734 MW**

#### Details of Registered Solar Project

<table>
<thead>
<tr>
<th>S. No.</th>
<th>state</th>
<th>No. of Projects</th>
<th>Registered Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rajasthan</td>
<td>104</td>
<td>239</td>
</tr>
<tr>
<td>2</td>
<td>Madhya Pradesh</td>
<td>100</td>
<td>185</td>
</tr>
<tr>
<td>3</td>
<td>Maharashtra</td>
<td>60</td>
<td>91</td>
</tr>
<tr>
<td>4</td>
<td>Tamil Nadu</td>
<td>56</td>
<td>121</td>
</tr>
<tr>
<td>5</td>
<td>Andhra Pradesh</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>6</td>
<td>Telangana</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>7</td>
<td>Gujarat</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Chhattisgarh</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Odisha</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Delhi</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>Haryana</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Kerala</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Tripura</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>361</strong></td>
<td><strong>734</strong></td>
</tr>
</tbody>
</table>

#### Registered Capacity (MW) Year-Wise

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1814</td>
</tr>
<tr>
<td>2012</td>
<td>1516</td>
</tr>
<tr>
<td>2013</td>
<td>792</td>
</tr>
<tr>
<td>2014</td>
<td>736</td>
</tr>
<tr>
<td>2015</td>
<td>328</td>
</tr>
<tr>
<td>2016</td>
<td>491</td>
</tr>
<tr>
<td>2017</td>
<td>214</td>
</tr>
</tbody>
</table>

*Till 31.08.2017*
RECs Traded Till 31-Aug-2017: ~2.23 Crore (22.3 Million) RECs worth ₹ 3860 Crore (US$ 603 Million) in 76 trading sessions.

Inventory: More than 1.85 Crore (18.5 Million) RECs worth ₹1850 Crore * (US$ 289 Million)

*Floor price @ ₹ 1000/REC
No. of RECs Issued and Redeemed

- REC Issued
- REC Redeemed

- 1st trading of RECs on Power
- Second Amendment in REC Regulations in
- 3rd Amendment in REC regulation in
- SC Order on Hindusthan Zinc: May’15
- 4th Amendment of REC Regulations
- Trading of RECs in the month of May’17 and June’17 suspended as Per Hon’ble SC Order
Trading of Solar RECs and Market Clearing Price (₹/REC)

- **Floor price Rs. 9,300/MWh (from Apr'2013 to Dec'14)**
- **Trading at floor Price since June 2013**
- **Floor price Rs. 3,500/MWh (w.e.f. Jan'2015)**
- **Floor price Rs. 1,000/MWh (w.e.f. Apr'2017)**

The chart shows the trading volume and market clearing price over time, with specific floor prices noted for different periods.
Trading of Non- Solar RECs and Market Clearing Price (₹/REC)

Forbearance Price (till, March 2012) = Rs. 3,900/MWh

Floor price = Rs. 1,500/MWh (w.e.f. June 2010)

Forbearance Price (w.e.f Apr, 2017) = Rs. 3,000/MWh

Floor price = Rs. 1,000/MWh (w.e.f. Apr, 2017)

Floor price = Rs. 1,500/MWh (w.e.f. June 2010)

Forbearance Price (w.e.f Apr, 2017) = Rs. 2,900/MWh
Challenges and Way Forward

• **RPO Compliance**
  o For sustainable REC Market strict enforcement of RPO compliance by concerned SERCs
  o RPO monitoring system at the State as well as Central Level
  o Bankability of the Projects due to huge inventory of the RECs

• **Demand-Supply mismatch impacting the trading of RECs**
  o Huge REC inventory due to oversupply of RECs in comparison to demand

• **Deepening of Voluntary Market**
  o Up to 30th March 2017, 29,226 RECs have been purchased by Voluntary buyers
  o Most of the RECs were purchased by Central Public sector Enterprises
  o Voluntary procurement of RECs reduced considerably

• **Market Design related Issues**
  o Types of RECs (Solar and Non-solar) being issued to the RE generators
  o Need for Vintage and technology based Multiplier factor, secondary market etc.

• **Capacity Building of Stakeholders at all levels**
Web Links

- www.cercind.gov.in
- www.powermin.nic.in
- www.mnre.gov.in
- www.forumofregulators.gov.in
- www.posoco.in
- www.cea.gov.in
- www.forumofld.in
- www.iexindia.com
- www.powerexindia.com
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