IEX REC Market: An Overview
May, 2019
In this presentation

- Renewable Energy in India
- Introduction to REC Mechanism
- Market snapshot
- Voluntary REC Market
- Trading @ IEX
Installed RE Capacity

**Total Installed Capacity**
- RES 77,641
- Hydro 45,399
- Nuclear 6,780
- Thermal 226,279

**Renewable Installed Capacity**
- Wind Power, 35,625
- Solar, 28,180
- Biopower, 9,103
- W to P, 138

356,100 MW Total Installed Capacity as on 30th April’19

77,641 MW Renewable Installed Capacity as on 30th April’19

Source: CEA, MNRE
New REC Projects: Registration Trend

Data up to 31st March, 2019
Introduction to REC Mechanism
Schemes to promote RE

- **Accelerated Depreciation Scheme**
  - Mid 1990s
  - Focused on capacity addition

- **Generation Based Incentive Scheme**
  - 2009
  - Shifted focus from capacity addition to generation

- **Renewable Purchase obligation**
  - Electricity Act, 2003, National Tariff Policy, 2006 and National Action Plan on Climate Change, 2008 provided impetus to further RE growth
REC Genesis: Separating green attribute from electricity

Bundled Green Power

Seller (RE power) → Buyer (RPO Compliance)

Un-bundled Green Power

Seller (RE power) → Electricity

REC(Green Attributes) → Buyer (RPO Compliance)

Issues
• Schedulability
• Uncertainty
• Transmission Loss & Charge

Solution
• No geographic barriers
• Reduced transaction cost
• Flexibility in meeting the RPO

Discoms, Power exchanges, Bilateral Contracts
### Compliance Market: Overview of Legal Framework

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
</table>
| 2008 | National Action Plan on Climate Change (NAPCC)  
- RPO at 5% in year 2010, increasing 1% every year for 10 years.  
- Authorities may issue tradable certificates and penalties for shortfall |
| Jan’10 | CERC issued REC Regulation  
- CERC designated National Load Despatch Centre (NLDC) as Central Agency: Notification dated 29.01.2010 |
| June’10 | CERC approved Procedures for Accreditation, Registration & Issuance |
| Sep’10 | First amendment of REC Regulation |
| July’13 | Second amendment to REC Regulation  
- Amendment in eligibility, Self consumption and Validity period |
| Dec’14 | Third Amendment to REC Regulations  
- A distribution licensee shall be eligible for issuance of RECs  
- Vintage Multiplier, Validity of RECs for 1095 Days, Revision in price band of Solar RECs |
| Mar’16 | Fourth Amendment to REC Regulations  
REC Participants: Sellers/Eligible Entity
Identified Sources for RE

- Wind
- Solar
- Small Hydro
- Biomass, Biofuel, Cogeneration
- Municipal Waste
- Black Liquor
- Source approved by MNRE
REC Market Participants:
Sellers/Eligible Entity

**ELIGIBILITY CRITERIA**

- **Self consumption**
  - No promotional Banking/Wheeling
  - **ELIGIBLE**

- **Sale through: Open Access/Bilateral**
  - Sale at Mutually agreed price
  - **ELIGIBLE**

- **PPAs with distribution licensee**
  - PPA at APPC
  - **ELIGIBLE**

- **PPA at state regulated tariff**
  - **NOT ELIGIBLE**
REC Market Participants: Buyers

Obligated Entities

- Distribution Companies
- Open Access Consumers
- Industries consuming Captive Power

Voluntary Entities

- Corporates under CSR
- Individuals
Mechanisms to fulfill compliance

- **Feed in Tariff**
  - Regulated tariff
  - Purchase of electricity from RE Generator at Regulated tariff

- **Purchase of RE at market price**
  - Buy from third party

- **REC (Renewable Energy Certificates) at PXs**
  - Non Solar REC
  - Solar REC

**Penalty for non compliance in the provisions**

- If an obligated entity fails to comply with the RPO, it shall also be liable for **penalty as may be decided by the commission under section 142 of Electricity Act, 2003**:  
  - The Commission may direct the entity to deposit penal charges equivalent to the **forbearance price of REC multiplied by shortfall in units of RPO**
### Salient Features of REC Mechanism

<table>
<thead>
<tr>
<th>Participation</th>
<th>Voluntary</th>
</tr>
</thead>
<tbody>
<tr>
<td>REC Denomination</td>
<td>1 REC = 1 MWh</td>
</tr>
<tr>
<td>Validity</td>
<td>1095 Days after issuance*</td>
</tr>
<tr>
<td>Trading Platform</td>
<td>Power Exchanges only</td>
</tr>
<tr>
<td>Banking/Borrowing</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>Transfer Type</td>
<td>Single transfer only , repeated trade of the same certificate is not possible</td>
</tr>
<tr>
<td>Solar RECs</td>
<td>Floor Price: Rs 1000/MWh</td>
</tr>
<tr>
<td></td>
<td>Forbearance Price: Rs 2400/MWh</td>
</tr>
<tr>
<td>Non Solar RECs(After 01.04.2017)</td>
<td>Floor Price: Rs 1,000/MWh</td>
</tr>
<tr>
<td></td>
<td>Forbearance Price: Rs 3,000/MWh</td>
</tr>
<tr>
<td>Non Solar RECs(before 01.04.2017)</td>
<td>Floor Price: Rs 1500/MWh</td>
</tr>
<tr>
<td></td>
<td>Forbearance Price: Rs 3,300/MWh</td>
</tr>
<tr>
<td>Penalty for Non-compliance</td>
<td>‘Forbearance’ Price (Maximum Price)</td>
</tr>
<tr>
<td>Price Guarantee</td>
<td>Through ‘Floor’ Price (Minimum Price)</td>
</tr>
</tbody>
</table>
REC Mechanism

Procedure for ACCREDITATION (Through State nodal Agency)

Procedure for REGISTRATION (Through Central Agency NLDC)

Procedure for ISSUANCE (Through Central Agency NLDC)

Procedure for TRADING & REDEMPTION (Through PXs)
## Trading at IEX

<table>
<thead>
<tr>
<th>Trading Day</th>
<th>Last Wednesday of every Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Clearing</td>
<td>Closed Double sided auction</td>
</tr>
<tr>
<td>Trading Time</td>
<td>1300-1500 Hrs</td>
</tr>
<tr>
<td>By 1530 Hrs</td>
<td>Verification by Central agency for Valid REC by cleared seller at IEX</td>
</tr>
<tr>
<td>By 1600 Hrs</td>
<td>Central agency confirms REC</td>
</tr>
<tr>
<td>By 1630 Hrs</td>
<td>IEX finalizes trade</td>
</tr>
<tr>
<td>By 1700 Hrs</td>
<td>Buyer &amp; Sellers informed to Central Agency</td>
</tr>
<tr>
<td>By 1800 Hrs</td>
<td>Invoice raised (<em>proof of REC trade</em>)</td>
</tr>
</tbody>
</table>
Cleared volume: 600 RECs  

MCP: Rs 2200/REC

<table>
<thead>
<tr>
<th>BUY</th>
<th>SELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>100 REC @ Rs 3300</td>
<td>100 REC @ Rs 1500</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>600 REC @ Rs 2200</td>
<td>200 REC @ Rs 1700</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>200 REC @ Rs 1700</td>
<td>300 REC @ Rs 2000</td>
</tr>
</tbody>
</table>

200 REC sell @ Rs 1700  
300 REC sell @ Rs 2000  
100 REC sell @ Rs 1500  
200 REC buy @ Rs 1700  
600 REC sell @ Rs 2200  
1500  
2000  
2500  
3000  
3300  
3500  

No of REC
## REC: Fee & Charges

### State Nodal Agency

<table>
<thead>
<tr>
<th>Accreditation</th>
<th>Fee &amp; Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Processing Fee</td>
<td>Rs. 5000</td>
</tr>
<tr>
<td>Accreditation Charges (One Time – for 5 Years)</td>
<td>Rs. 30,000</td>
</tr>
<tr>
<td>Annual Charges</td>
<td>Rs. 10,000</td>
</tr>
<tr>
<td>Re-Validation Fees (After 5 Years)</td>
<td>Rs. 15000</td>
</tr>
</tbody>
</table>

### Central Agency

<table>
<thead>
<tr>
<th>Registration</th>
<th>Fee &amp; Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Processing Fee</td>
<td>Rs. 1000</td>
</tr>
<tr>
<td>Registration Charges (One Time – for 5 Years)</td>
<td>Rs. 5000</td>
</tr>
<tr>
<td>Annual Charges</td>
<td>Rs. 1000</td>
</tr>
<tr>
<td>Re-Validation Fees (After 5 Years)</td>
<td>Rs. 5000</td>
</tr>
</tbody>
</table>

### Issuance

<table>
<thead>
<tr>
<th>Issuance</th>
<th>Fee &amp; Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees Per REC issued</td>
<td>Rs. 4.0</td>
</tr>
</tbody>
</table>

### Redemption

<table>
<thead>
<tr>
<th>Redemption</th>
<th>Fee &amp; Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees Per REC traded</td>
<td>Rs. 20</td>
</tr>
</tbody>
</table>
Assumptions:

- Project of Capacity = 1 MW
- Capacity Utilisation Factor = 22%
- No. of Units Generated = 1.927 MU
- No. of REC Issued = 1927

<table>
<thead>
<tr>
<th>Cost Head</th>
<th>REC @ 1500</th>
<th>REC @ 2600</th>
<th>REC @ 3300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreditation</td>
<td>45,000</td>
<td>45,000</td>
<td>45,000</td>
</tr>
<tr>
<td>Registration</td>
<td>7,000</td>
<td>7,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Issuance</td>
<td>7,708</td>
<td>7,708</td>
<td>7,708</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td>59,708</td>
<td>59,708</td>
<td>59,708</td>
</tr>
<tr>
<td>Revenue from REC</td>
<td>28,90,800</td>
<td>50,10,720</td>
<td>63,59,760</td>
</tr>
<tr>
<td>% Cost Incurred</td>
<td>2.07%</td>
<td>1.19%</td>
<td>0.94%</td>
</tr>
<tr>
<td>Paise Impact Per Unit (kWh)</td>
<td>3.09</td>
<td>3.09</td>
<td>3.09</td>
</tr>
</tbody>
</table>

Similarly the cost impact (in Paise / Unit) for:

<table>
<thead>
<tr>
<th>TWO Year</th>
<th>THREE Year</th>
<th>FOUR Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.03 Paise</td>
<td>1.68 Paise</td>
<td>1.5 Paise</td>
</tr>
</tbody>
</table>
Market Snapshot
An update on RECs

<table>
<thead>
<tr>
<th></th>
<th>Accredited Capacity (MW)</th>
<th>Registered Capacity (MW)</th>
<th>No. of Projects Registered</th>
<th>No of RECs (in Cr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Issued</td>
</tr>
<tr>
<td>Non-Solar</td>
<td>3910</td>
<td>3248</td>
<td>562</td>
<td>4.51</td>
</tr>
<tr>
<td>Solar</td>
<td>759</td>
<td>753</td>
<td>371</td>
<td>0.94</td>
</tr>
<tr>
<td>Total</td>
<td>4669</td>
<td>4001</td>
<td>933</td>
<td>5.45</td>
</tr>
</tbody>
</table>

Source: REC registry India

As on May’19
Projects under REC Mechanism

State-wise RE Capacity (MW)

Data as on 21st May, 2019

Source: REC registry India

As on May’19
Data as on 21st May, 2019

Source wise RE capacity (MW)

- Wind
- Bio-fuel cogeneration
- Biomass
- Small Hydro
- Solar
- Others

Accredited Projects:
- Wind: 2291 MW
- Bio-fuel cogeneration: 858 MW
- Biomass: 502 MW
- Small Hydro: 420 MW
- Solar: 412 MW
- Others: 52 MW

Registered Projects:
- Wind: 2211 MW
- Bio-fuel cogeneration: 229 MW
- Biomass: 762 MW
- Small Hydro: 761 MW
- Solar: 2 MW
- Others: 5 MW

Source: REC registry India

As on 18-04-19
Key statistics: REC Market at IEX

Market Share: 61%

State Utilities: 28 States | 5 UTs

Generators: 1,102

Industrial Consumers: 3167

Cleared Volume: >3 Crore RECs
Highest: 32,39,142 RECs (Dec’17)

IEX Data as on May, 2019
# Participation Details at IEX

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Participants</td>
<td>4,295</td>
</tr>
<tr>
<td>Obligated Entity</td>
<td>3,167</td>
</tr>
<tr>
<td>DISCOMs</td>
<td>35</td>
</tr>
<tr>
<td>OA consumers</td>
<td>2,887</td>
</tr>
<tr>
<td>Captive Consumer</td>
<td>195</td>
</tr>
<tr>
<td>OA + Captive</td>
<td>49</td>
</tr>
<tr>
<td>Discom + Captive</td>
<td>1</td>
</tr>
<tr>
<td>Voluntary</td>
<td>26</td>
</tr>
<tr>
<td>Eligible Entity (Sellers)</td>
<td>1,102</td>
</tr>
</tbody>
</table>

As on 30th April 2019
Why REC a better option than ‘buying renewable power’?

**Schedulability**
- Less predictable
- Less controllable
- Require better prediction tools over one-day
- Scheduling changes till one-hour before

**High Overheads**
- More System imbalances
- Discoms to spend on more reserves to avoid UI
- More reserves required to balance

**Open Access costly**
- Payment of Transmission, Wheeling Charges, Losses and Scheduling Charges is higher than purchase of RECs

RECs are better way to transfer green premium than green energy
Trade @IEX
How to Start

Two step Process

• **Registration**
  - Become Member with IEX
  - Become Client through any of IEX members

• **Start Trading**
  - Last Wednesday of every Month
Key Recent Developments & their likely impact
REC Market

- Supreme Court Judgment on Renewable Purchase Obligations Applicability in Rajasthan
- Gujarat High Court judgment in the case of Hindalco (Birla Copper), and others
- Recent APTEL Judgments related to RPO / RECs
  - Case 1: IWEA, IWTMA, VS All SERCS
  - Case 2: IWPA VS GERC & all Gujarat discoms
Company Snapshot

98% Market Share

6400+ Participants

4000+ Industries  50+ Discoms

500+ Conventional Generators  1,650+ RE Participants

Transparency  Liquidity  Competition
To register for daily SMS and monthly bulletin visit our website: https://www.iexindia.com/