



**INDIAN ENERGY EXCHANGE**  
**India's No. 1 Power Exchange**

*Meeting Portfolio Obligation through  
trading Renewable Energy and RECs...*

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# In this Presentation...

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- Legislative Policy and Regulatory Development
- Indian Power Scenario
- Meeting RPO through FiT and REC
- REC Mechanism
- Way Forward

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# Legislative Policy and Regulatory Development

# Regulatory Policy development...1/3

Policy / Regulation	Year	Key Focus
Electricity Act	2003	<ol style="list-style-type: none"> <li>1. Sector Reorganization and competitive Market</li> <li>2. Consolidate the laws relating to generation, transmission, distribution, trading and use of electricity</li> <li>3. Promotion of efficient and environment friendly policies</li> </ol>
National Electricity Policy	2005	<ol style="list-style-type: none"> <li>1. Overall Sector Development</li> <li>2. The Central Government shall, from time to time, prepare the national electricity policy and tariff policy in consultation with the State Governments and the Authority</li> </ol>
Tariff Policy	2006	Performance Based Regulation
The National Action Plan for Climate Change (NAPCC)	2008	<ol style="list-style-type: none"> <li>1. 5% renewable energy purchase for FY 2009-10 at national level under central RPO framework</li> <li>2. Increase in RPO obligation by 1% each year for next 10 years</li> </ol>

# Regulatory Policy development ...2/3

Policy / Regulation	Year	Key Focus
REC RPO Regulation	2010	<ol style="list-style-type: none"><li>1. Regulations for the development of market in power from Non Conventional Energy Sources by issuance of transferable and saleable credit certificates</li><li>2. Mechanism and Features</li><li>3. Role of State agency , Central Agency , Eligibility action in case of default</li></ol>
Model REC regulation	2009	<ol style="list-style-type: none"><li>1. Defining the framework to develop REC regulation in the respective states</li></ol>
Floor and Forbearance Price order	2010	<ol style="list-style-type: none"><li>1. Mechanism to determine the floor and forbearance price</li></ol>

## **Section 86.** (Functions of State Commission) : --

(1) The State Commission shall discharge the following functions, namely:-

*(e) Promote co-generation 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;*

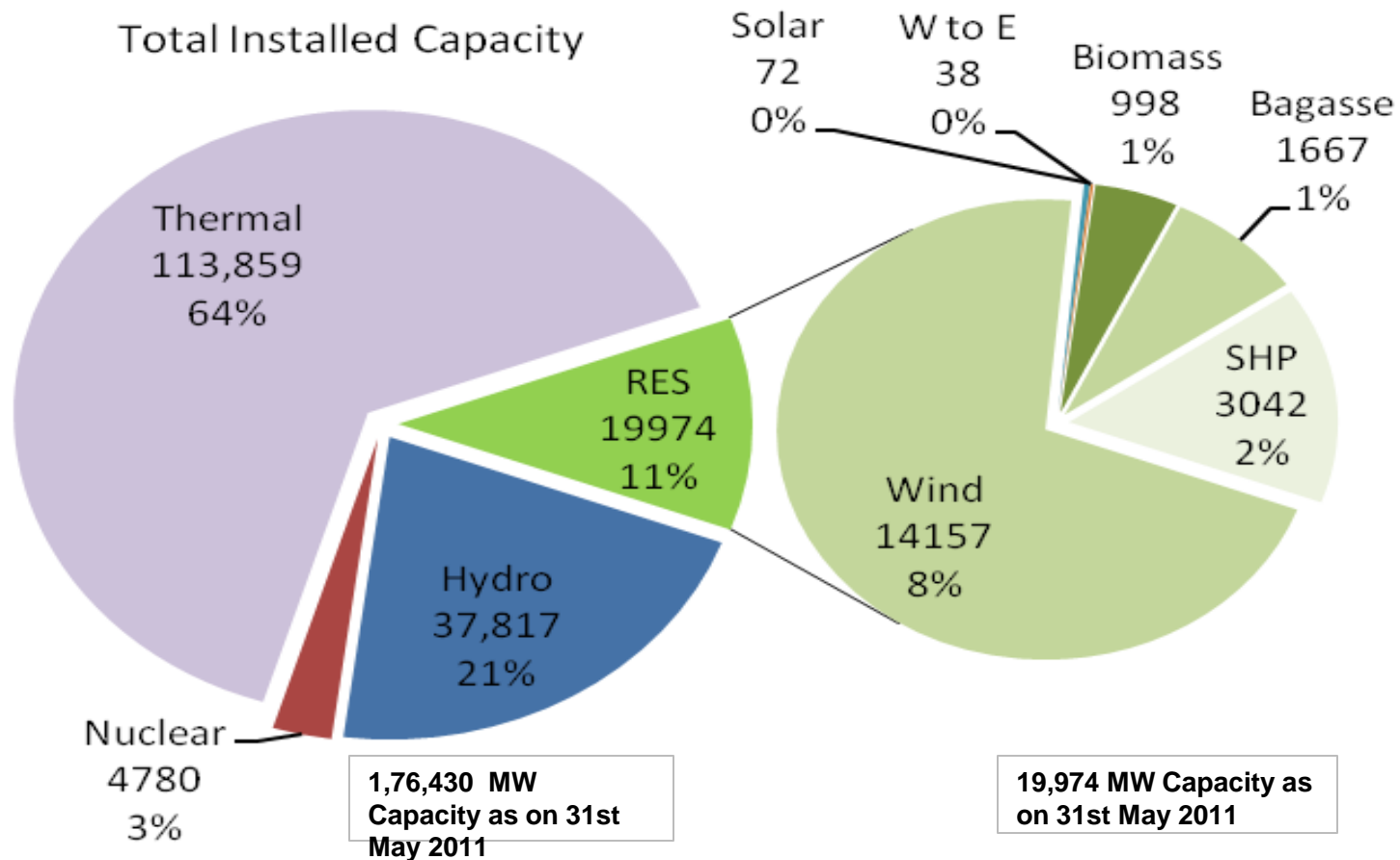
# RPO Scenario : India....

Region	State	RPO		Total
		Non Solar	Solar	
Northern Region	Himachal Pradesh	11%	0.10%	11.10%
	Haryana	1.25%	0.25%	1.50%
Western Region	Maharashtra	6.75%	0.25%	7.00%
	Goa and Uts	1.70%	0.30%	2.00%
Southern Region	Tamil Nadu			14.00%
	Kerala	2.75%	0.25%	3.00%
Eastern Region	Orissa	4.90%	0.10%	5.00%
	Bihar	2.00%	0.50%	2.50%
North Eastern Region	Mizoram			6%
	Assam	2.70%	0.10%	2.80%

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# Indian Power Scenario

# Present Status Installed Renewable Generation Capacity



# Power Supply Position

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Power supply position in the country during 2010-2011

<u>Particulars</u>	<u>Energy (MU)</u>	<u>Peak (MW)</u>
Requirement	861591	12287
Availability	788355	110256
Shortage	73236	12031
(%)	8.50%	9.80%

Anticipated power supply position in the country during 2011-2012

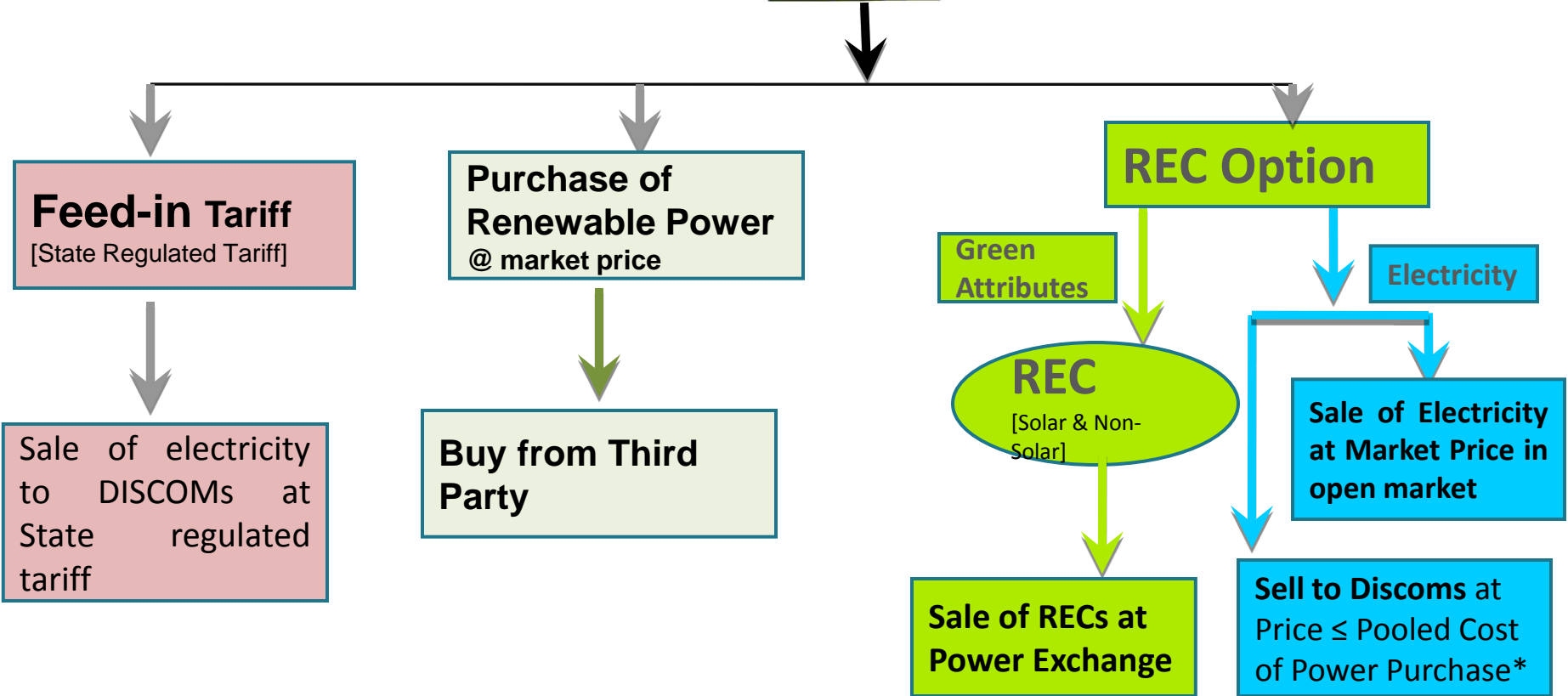
<u>Particulars</u>	<u>Energy (MU)</u>	<u>Peak (MW)</u>
Requirement	933741	136193
Availability	837374	118676
Shortage	96367	17517
(%)	10.3%	12.9%

A capacity addition of **17191 MW** during the year **2011-12** comprising **14111 MW of thermal, 2080 MW of hydro and 1000 MW of nuclear** power stations has been considered.

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# Options available to meet RPOs

# Options for Purchasing Renewable to meet RPOs



\* - Weighted Average Pooled Price at which distribution licensee has purchased electricity (including cost of self generation, long-term and short term purchase) in the previous year, but excluding the cost of RE power purchase

# 1) Purchase Renewable power through FiT

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## ✓ Feed in Tariff :

- Cost-plus tariff : Generator gets about 14% RoE plus all fixed and recurring costs on normative basis
- Purchase as-and-when-generated
- Scheduling not required
- Local Discom can only purchase through FiT
- Different tariffs for each source, State, etc.
- State Commission's jurisdiction

## 2) Purchase Renewable Power

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### ✓ Buy from RE Generator @Market prices

- Generators will be scheduled.
- Provision For Infirm generation from Wind and Solar Plant :-
- Actual generation within +/- 30% of the schedule, no UI would be payable/receivable by Generator. (effective from 1<sup>st</sup> Jan,12)

### ✓ Buy from third party within State

- Generators not required to be scheduled
- Wheeling on monthly basis

### 3) Purchase RECs

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- ✓ Buy Electricity through any source (other than FiT)
- ✓ Buy RECs to compensate RPO ... mechanism explained

# Why REC a better option than 'buying renewable power' ?

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## 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 to LDCs(50-100p/kWh) vis-à-vis 7p/kWh in RECs

**RECs are better way to transfer green premium than green energy**

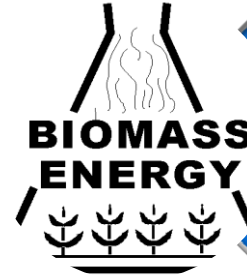
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# REC Trading

# REC Sellers : Approved Sources



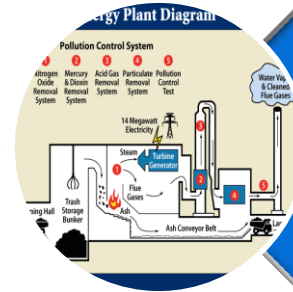
*Wind*



*Biomass,  
Bio – fuel  
co - generation*



*Solar*



*Municipal Wastes*



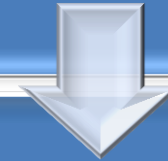
*Small Hydro*



*Any type/source  
approved by  
MNRE*

# Process for RE Generators ... through RECs

*Procedure for ACCREDITION (Through State nodal Agency)*



*Procedure for REGISTRATION (Through Central Agency NLDC)*



*Procedure for ISSUANCE (Through Central Agency NLDC)*



*Procedure for TRADING & REDEMPTION (Through PXs)*

# Salient Features of REC Mechanism

Participation	Voluntary
REC Denomination	1 MWh
Validity	365 Days after issuance
Categories	1. Solar REC 2. Non-Solar REC
Trading Platform	Power Exchanges only
Banking	Not Allowed
Borrowing	Not Allowed
Transfer Type	Single transfer only , repeated trade of the same certificate is not possible
Penalty for Non-compliance	'Forbearance' Price (Maximum Price)
Price Guarantee	Through 'Floor' Price (Minimum Price)
Price Discovery Mechanism	Closed Double-sided Auction
Trading Calendar	Last Wednesday of the month (T day)
Trading Period	1300-1500 hrs (T day)
Market Clearing	1700 hrs(T day)

# RECs Floor/Forbearance Price

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	<b>Floor Price</b>	<b>Forbearance Price</b>
Solar RECs	Rs. 12,000/REC	Rs. 17,000/REC
Non-Solar RECs	Rs. 1,500/REC	Rs. 3,900/REC

1 REC is equivalent to 1 MWh

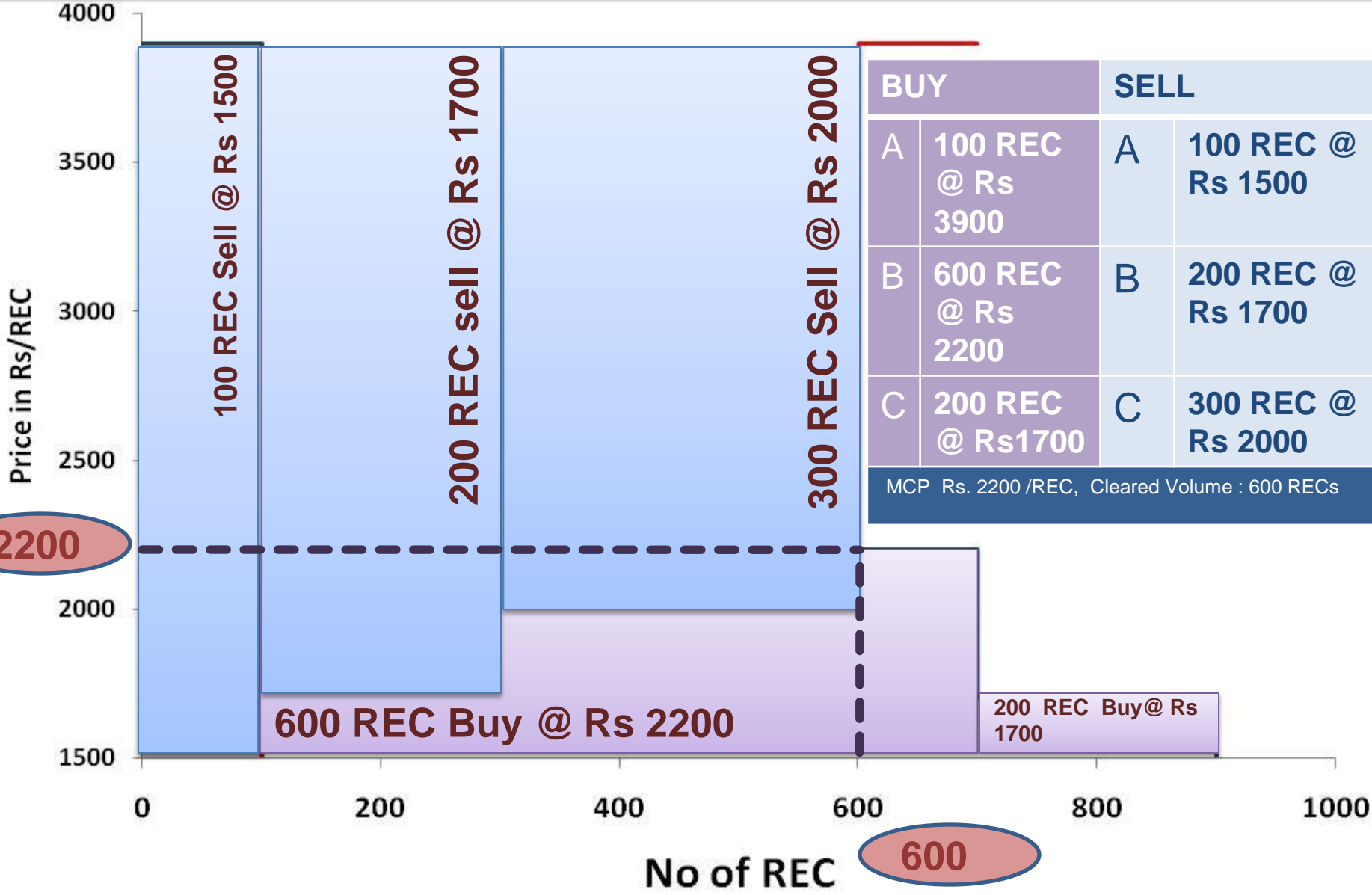
Reference : CERC Order in matter of Petition no. 99/2010, dated March 23, 2010

# Trading at IEX

Trading Day	Last Wednesday of every Month
Market Clearing	Closed Double sided auction
Trading Time	1300-1500 Hrs
By 1530 Hrs	Verification by Central agency for Valid REC by cleared seller at IEX
By 1600 Hrs	Central agency confirms REC
By 1630 Hrs	IEX finalizes trade
By 1700 Hrs	Buyer & Sellers informed to Central Agency
By 1800 Hrs	Invoice raised ( <i>proof of REC trade</i> )

Cleared volume : 600 RECs

MCP: Rs 2200/REC



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# Way Forward

# Way forward

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- Renewable power transfers across the country is difficult
- In-firm nature of renewable power creates reliability issues in power system
- RECs can be exchanged across country
- Common REC Mechanism can be developed

Way ahead

SAARC REC Market

SAARC Electricity Markets

Thank You



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