



# REC Market in India

## Issues and prospects



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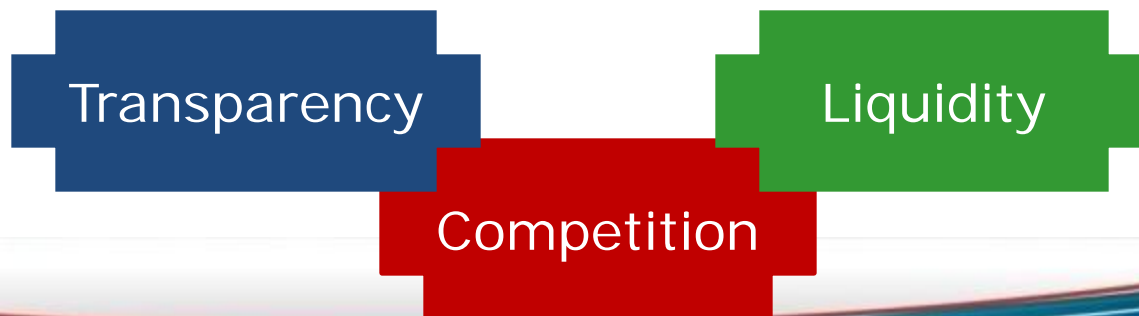
# Exchange Overview



**96%** Market Share    **~80,000MWh** average daily trade

**3300+** Participants



**2900+** Industries



# IEX Market Segments

## Delivery-based Contracts



<b>Day-Ahead Market (DAM)</b> since June,08	<b>Closed , Double-sided Auction</b> <i>10-12 am bidding</i> <i>Each 15-min block , 0.1 MW min NOC required</i>	
<b>Term-Ahead Market</b> since Sep,09	<b>Intra-Day</b> - for the same day starting 2 pm <b>Daily-</b> for rolling seven days (delivery starting after 4 days) <b>Weekly-</b> for 1 week (Monday-Sunday)	  
<b>Renewable Energy Certificates</b> since Feb,11	<b>Green Attributes as Certificates</b> <b>Sellers :</b> RE generators not under feed in tariffs <b>Buyers:</b> Obligated entities <i>1MWh equivalent to 1 REC</i>	

## Next... Energy Saving Certificates

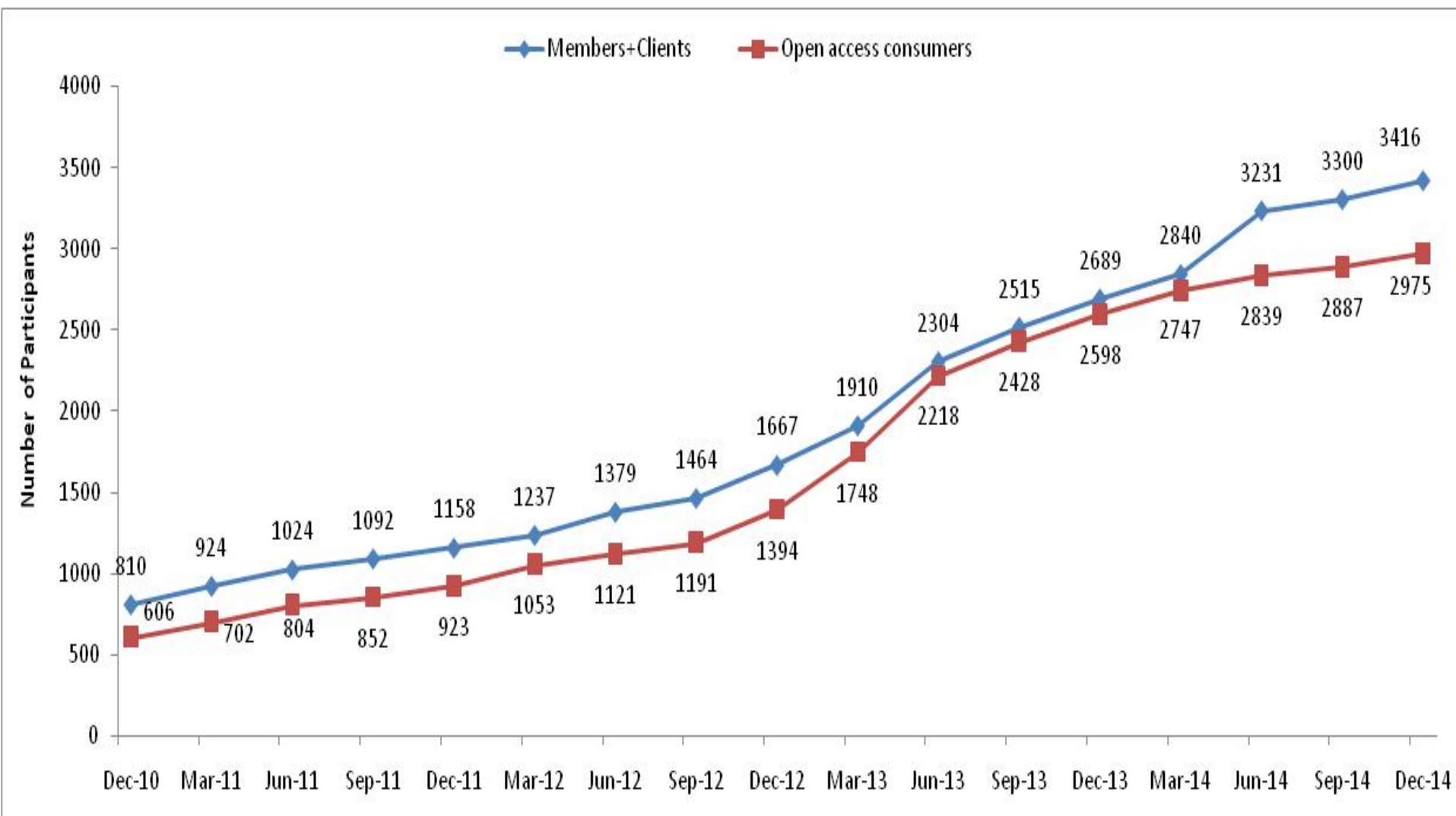


Auction



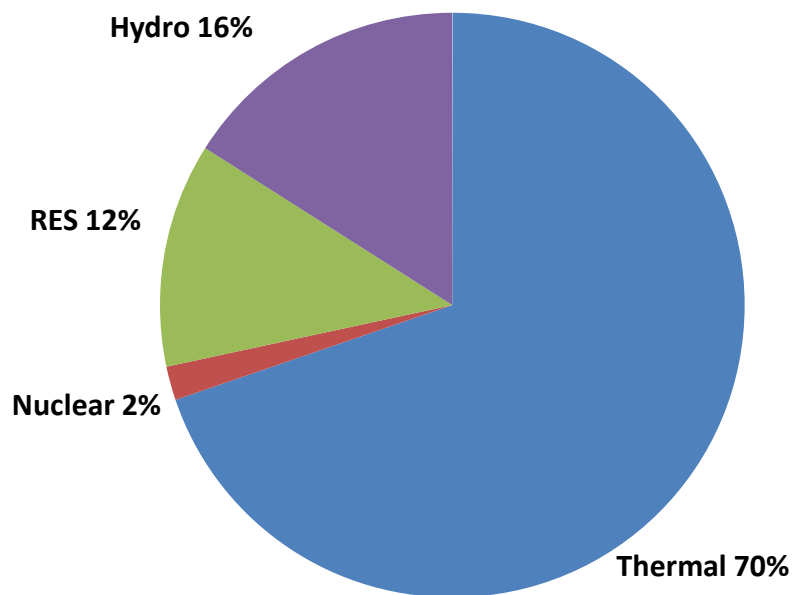
Continuous

# Increasing Participation



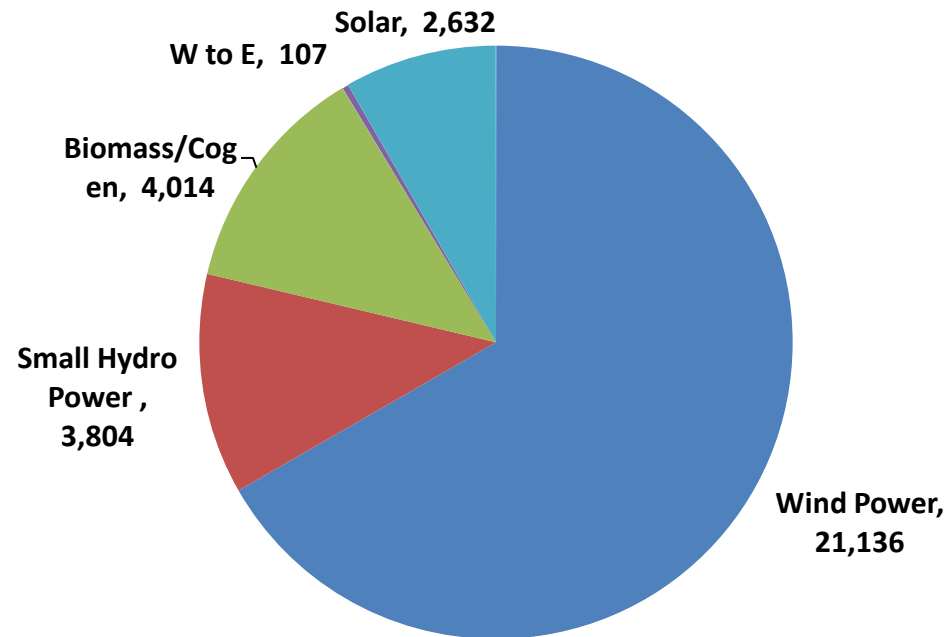
# Overview of Renewables

## Total Installed Capacity



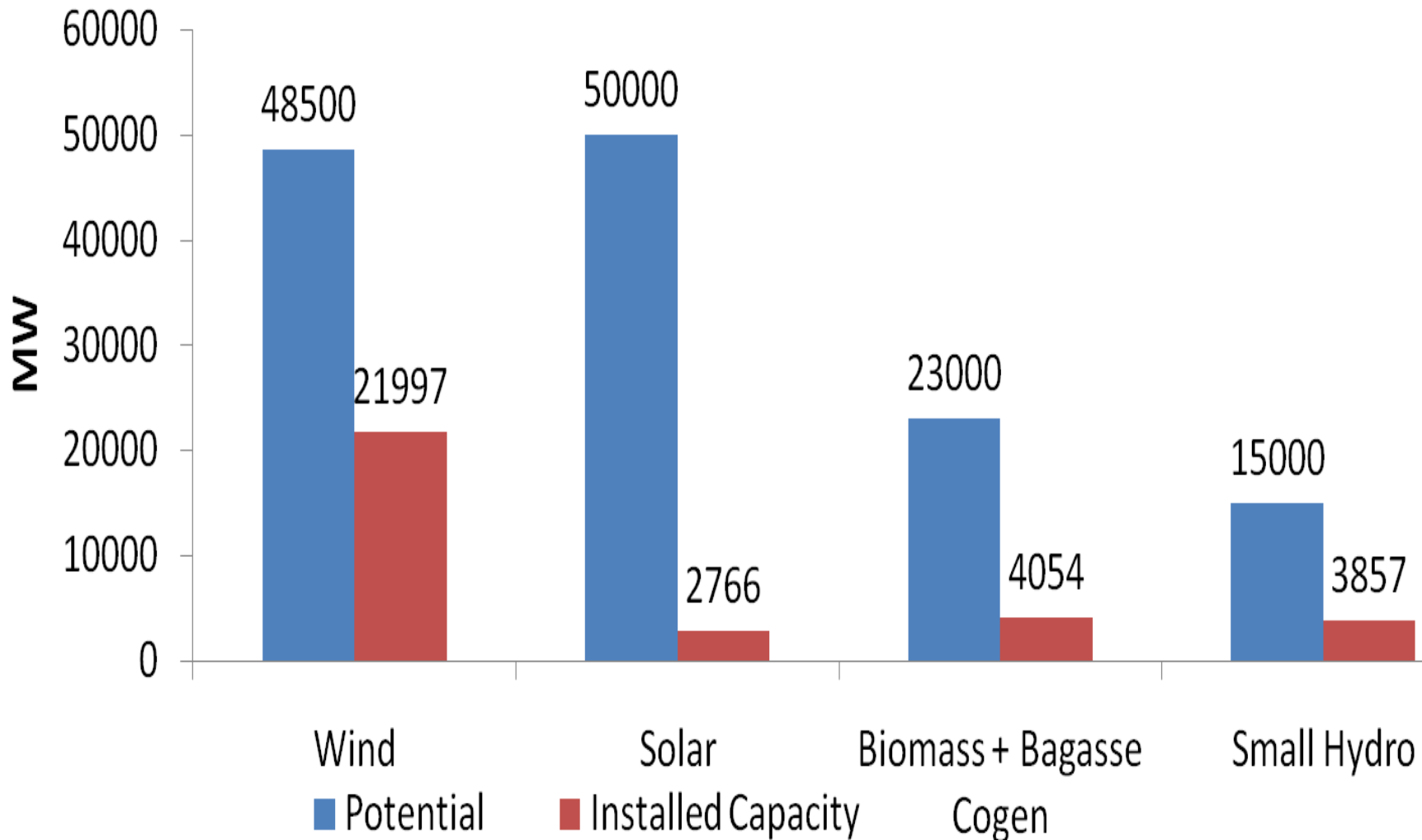
**2,55,681 MW Total Installed Capacity  
as on 31<sup>st</sup> Dec'14**

## Renewable Installed Capacity



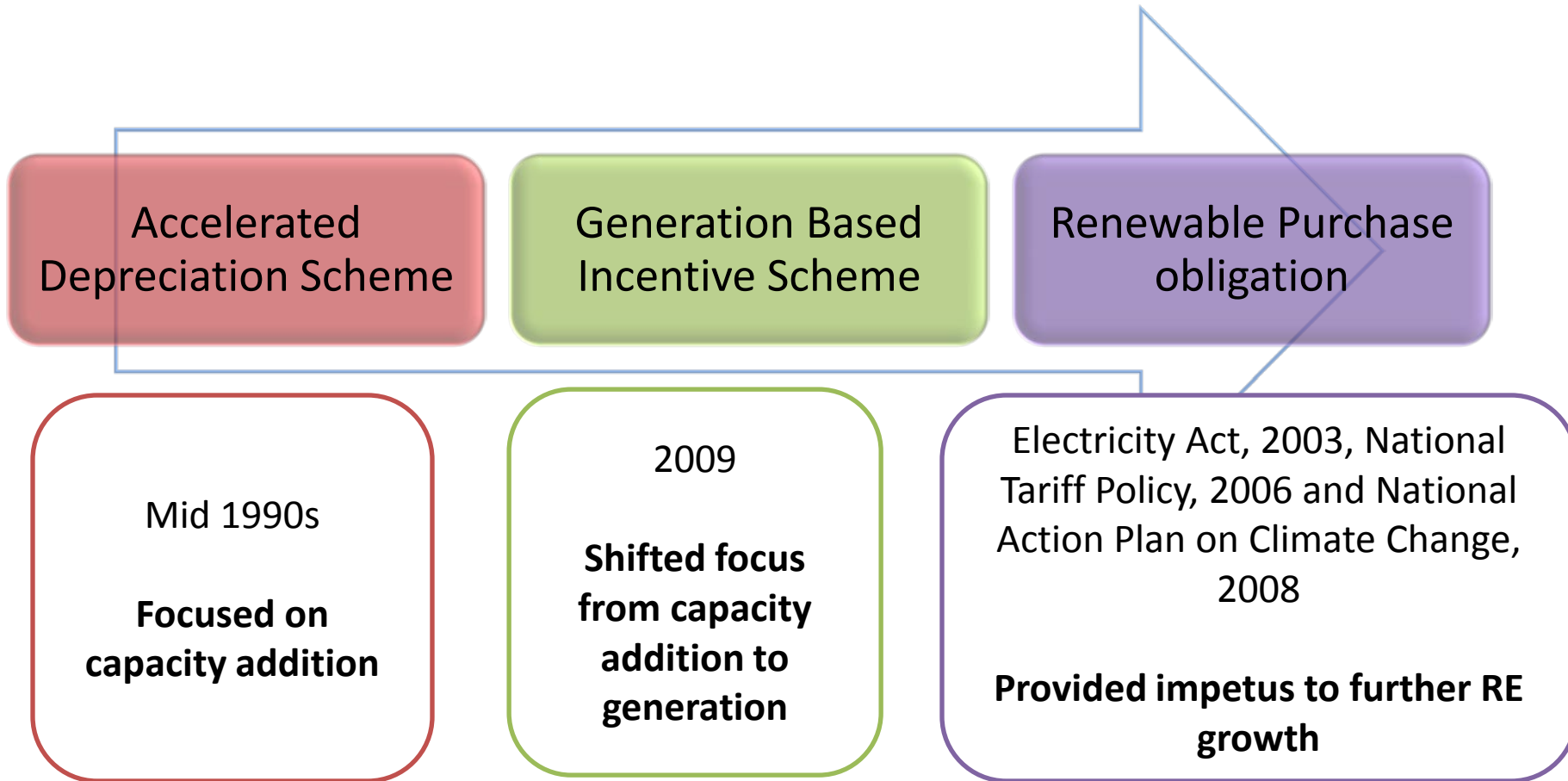
**31,692 MW Total Installed Capacity  
as on on 31<sup>st</sup> Dec'14**

# A vast RE Potential to harness





# Schemes to promote RE in the country



# Introduction to REC Mechanism



## 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

- Amendment to accommodate CPPs foregoing concessions

## July'13: Second amendment to REC Regulation

- Amendment in eligibility, Self consumption and Validity period

## Jan'15: Third amendment to REC Regulation

# REC Genesis: Separating green attribute from electricity

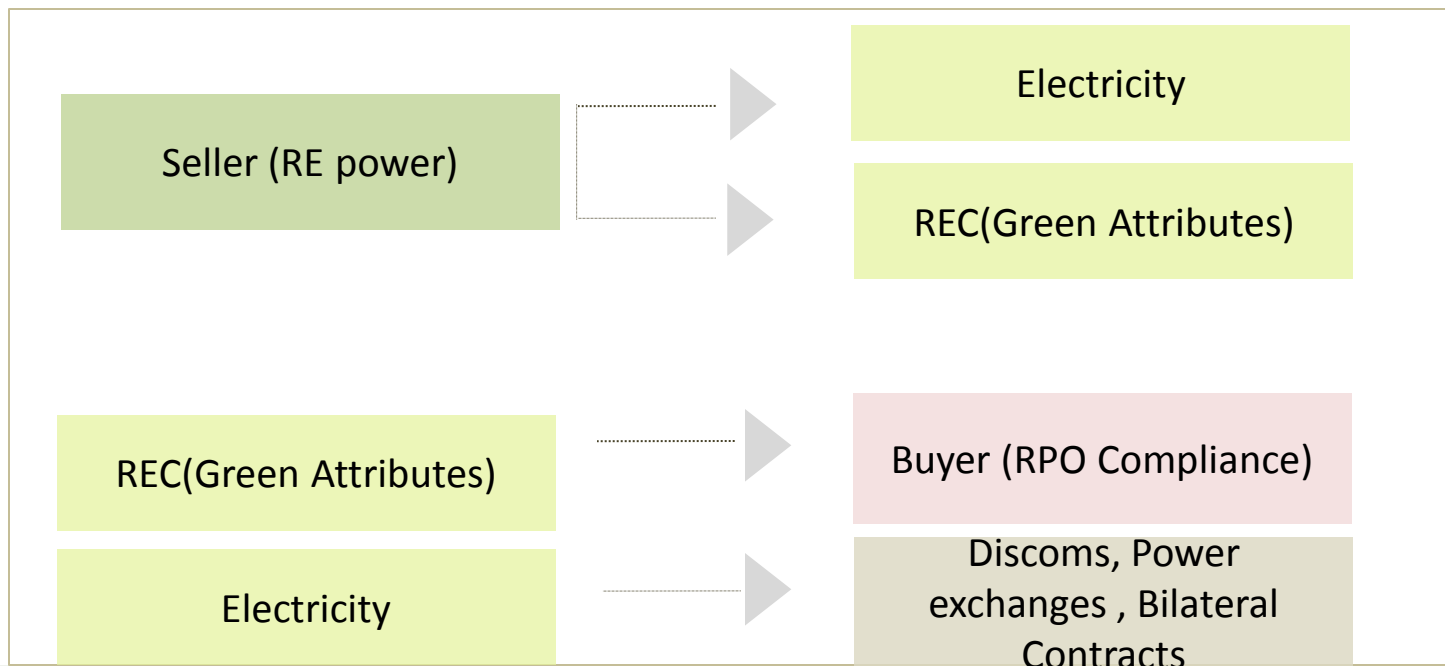
## Bundled Green Power



### Issues

- Schedulability
- Uncertainty
- Transmission Loss & Charge

## Un-bundled Green Power



### Solution

- No geographic barriers
- Reduced transaction cost
- Flexibility in meeting the RPO

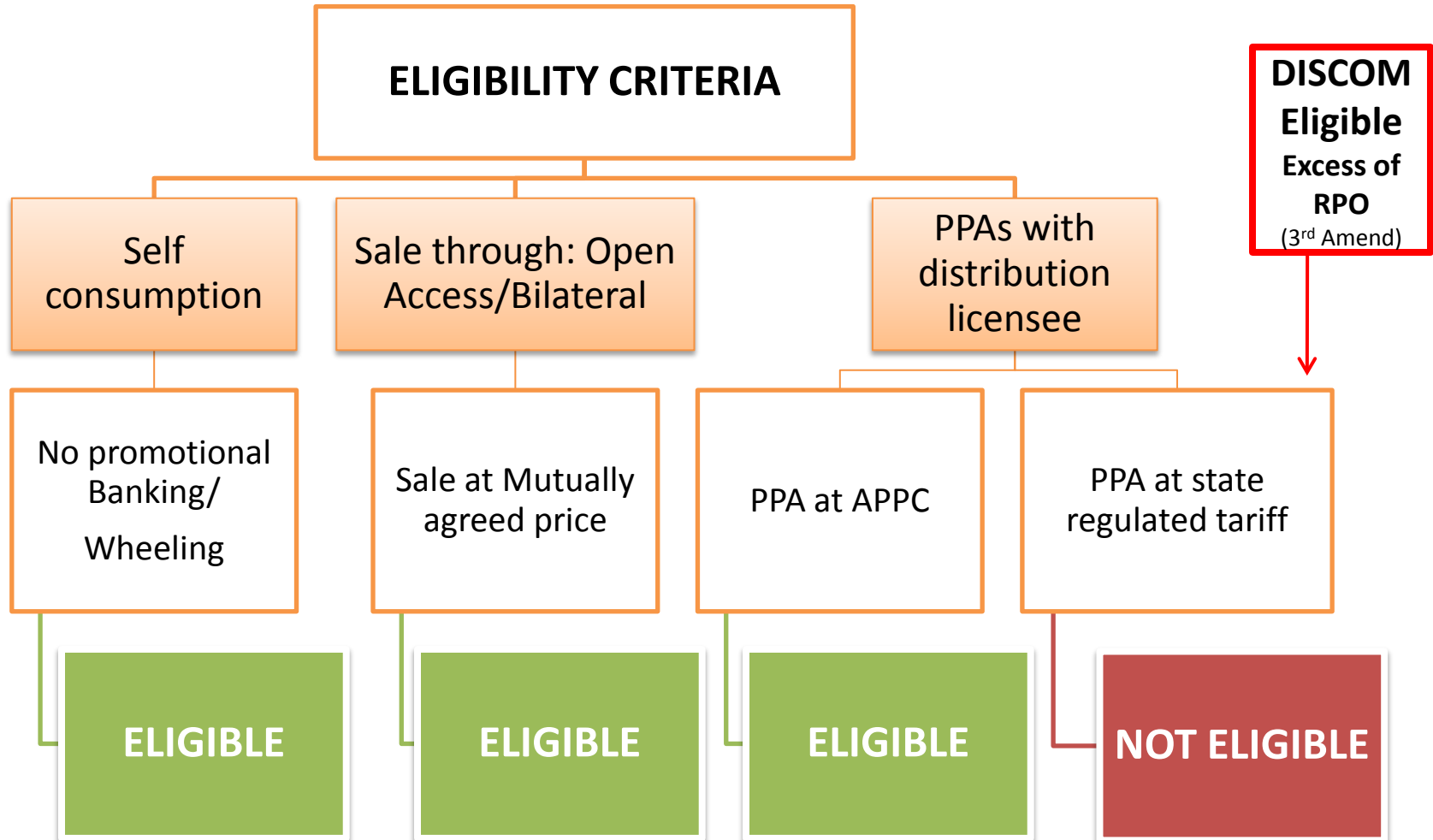
# REC Participants: Sellers/Eligible Entity

## Identified Sources for RE



- Wind
- Solar
- Small Hydro
- Biomass, Biofuel, Cogeneration
- Municipal Waste
- Black Liquor
- Any other source approved by the MNRE

# REC Market Participants: Sellers/Eligible Entity



# REC Market Participants : Buyers

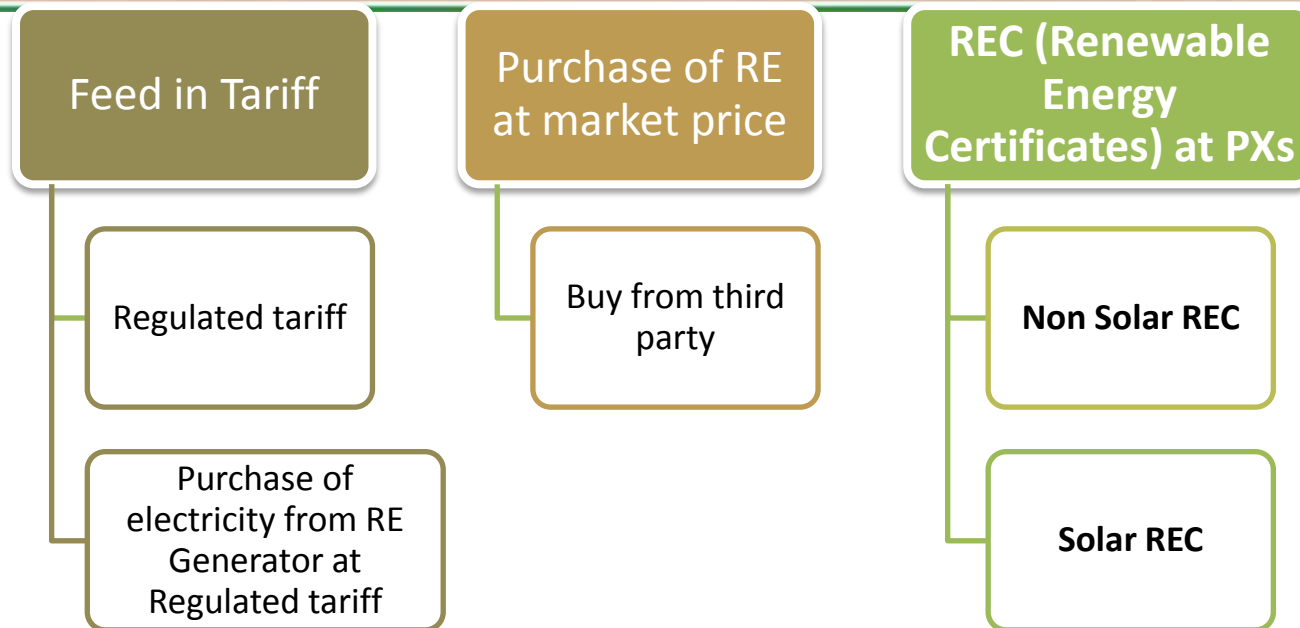
## Obligated Entities

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

## Voluntary Entities

- Corporates, under CSR
- Individuals

# Mechanisms to fulfill compliance



## 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**
  - **Proposed 3<sup>rd</sup> EA Amendment Bill 2014 has provisions of additional penalty upto Rs 1 crore**

# Salient Features of REC Mechanism



Participation	Voluntary
REC Denomination	1 REC = 1 MWh
Validity	1095 Days after issuance*
Categories	1. Solar REC 2. Non-Solar REC
Trading Platform	Power Exchanges only
Banking/Borrowing	Not Allowed
Transfer Type	Single transfer only , repeated trade of the same certificate is not possible
Solar RECs	*Floor Price: Rs 3,500 /MWh *Forbearance Price: Rs 5,800/MWh
Non Solar RECs	Floor Price: Rs 1,500/MWh Forbearance Price: Rs 3,300/MWh
Penalty for Non-compliance	'Forbearance' Price (Maximum Price)
Price Guarantee	Through 'Floor' Price (Minimum Price)

\*CERC Order dated: 30 Dec'14



# 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)

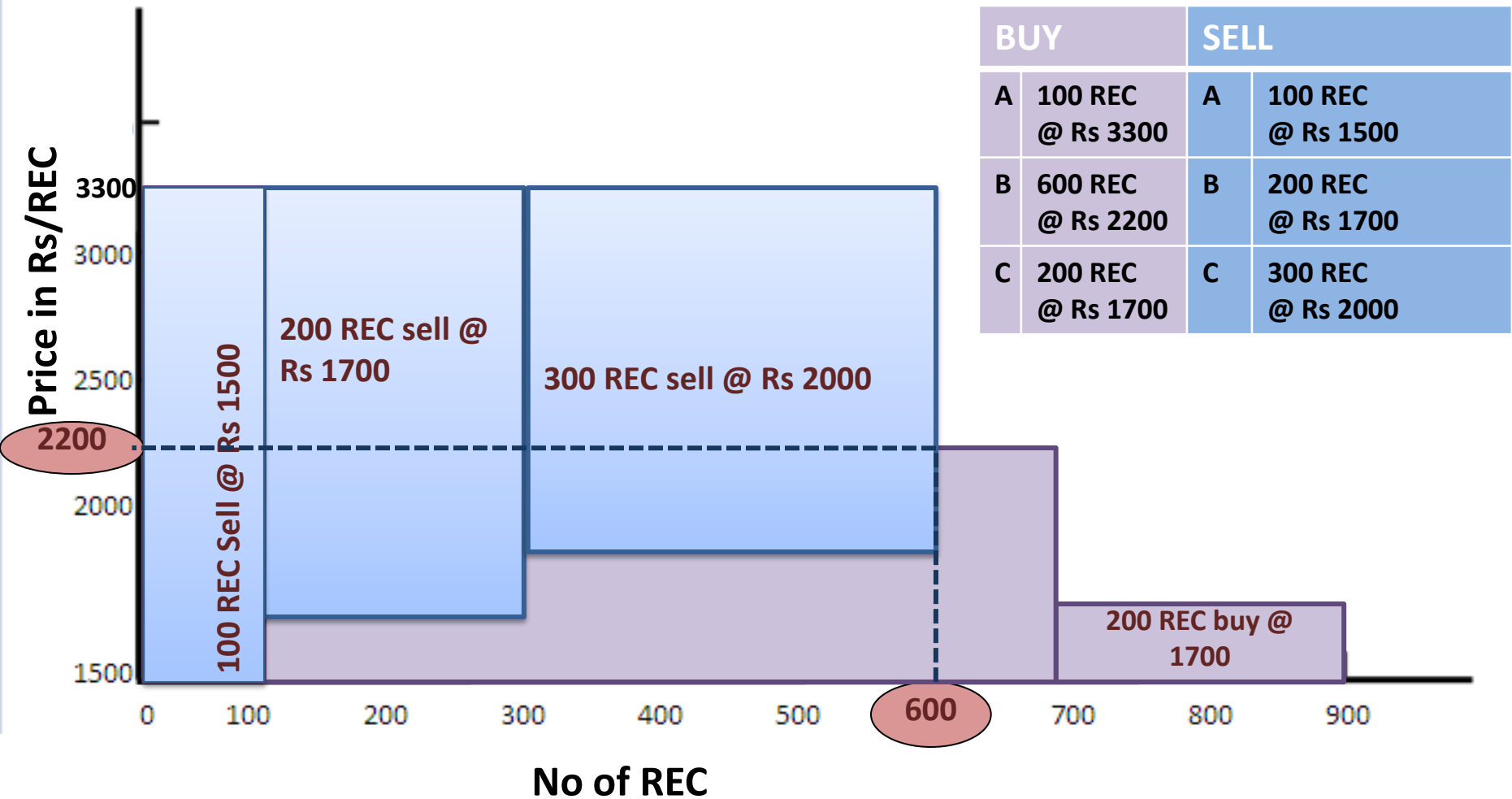
# Trading at IEX



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

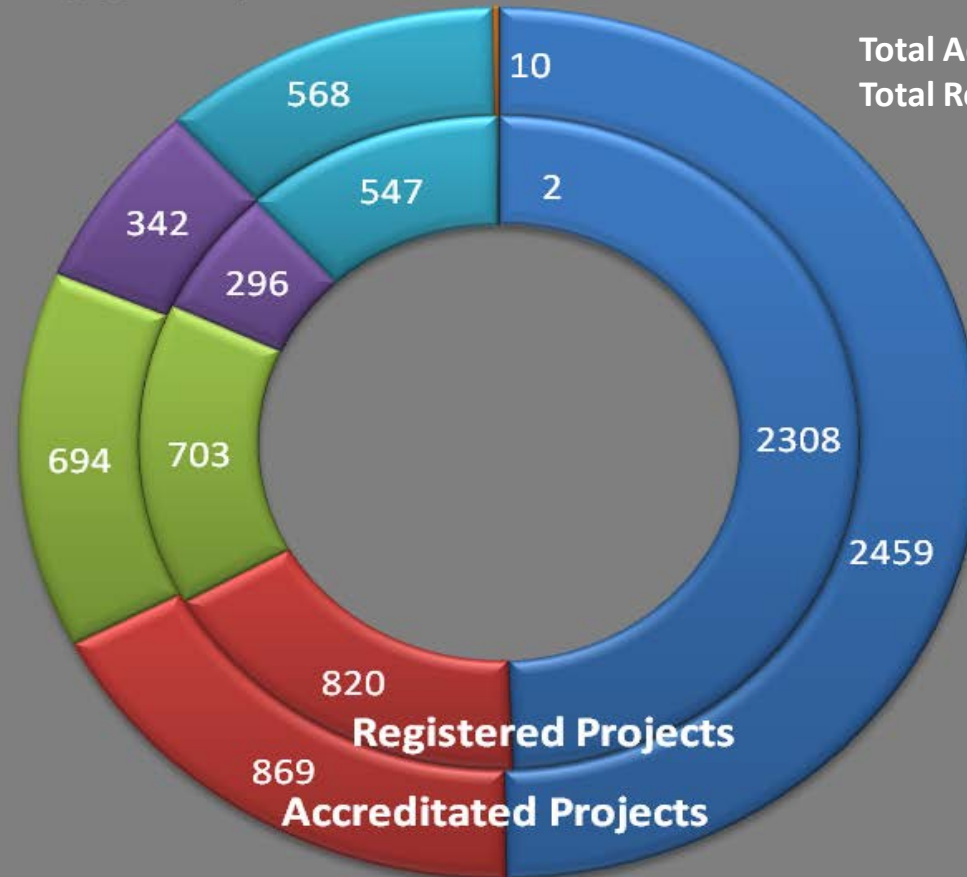


# Projects under REC Mechanism

As on 9<sup>th</sup> Jan'15

Total Accredited = 4942MW  
Total Registered = 4676 MW

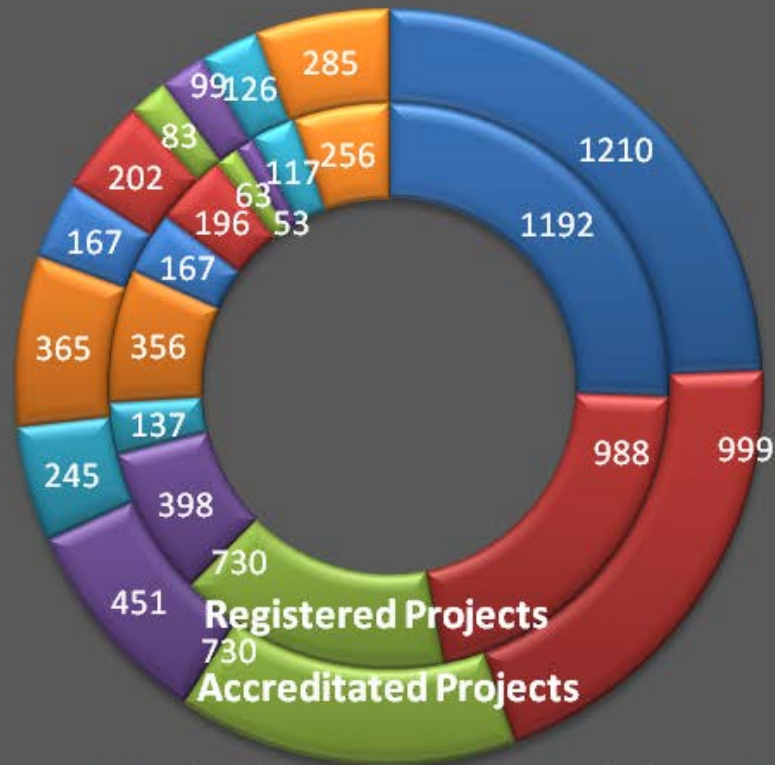
## Source wise RE capacity (MW)



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

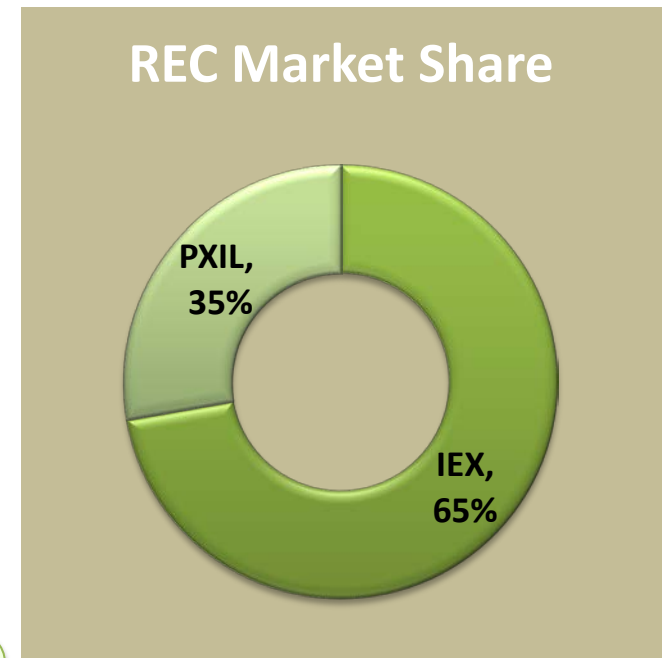
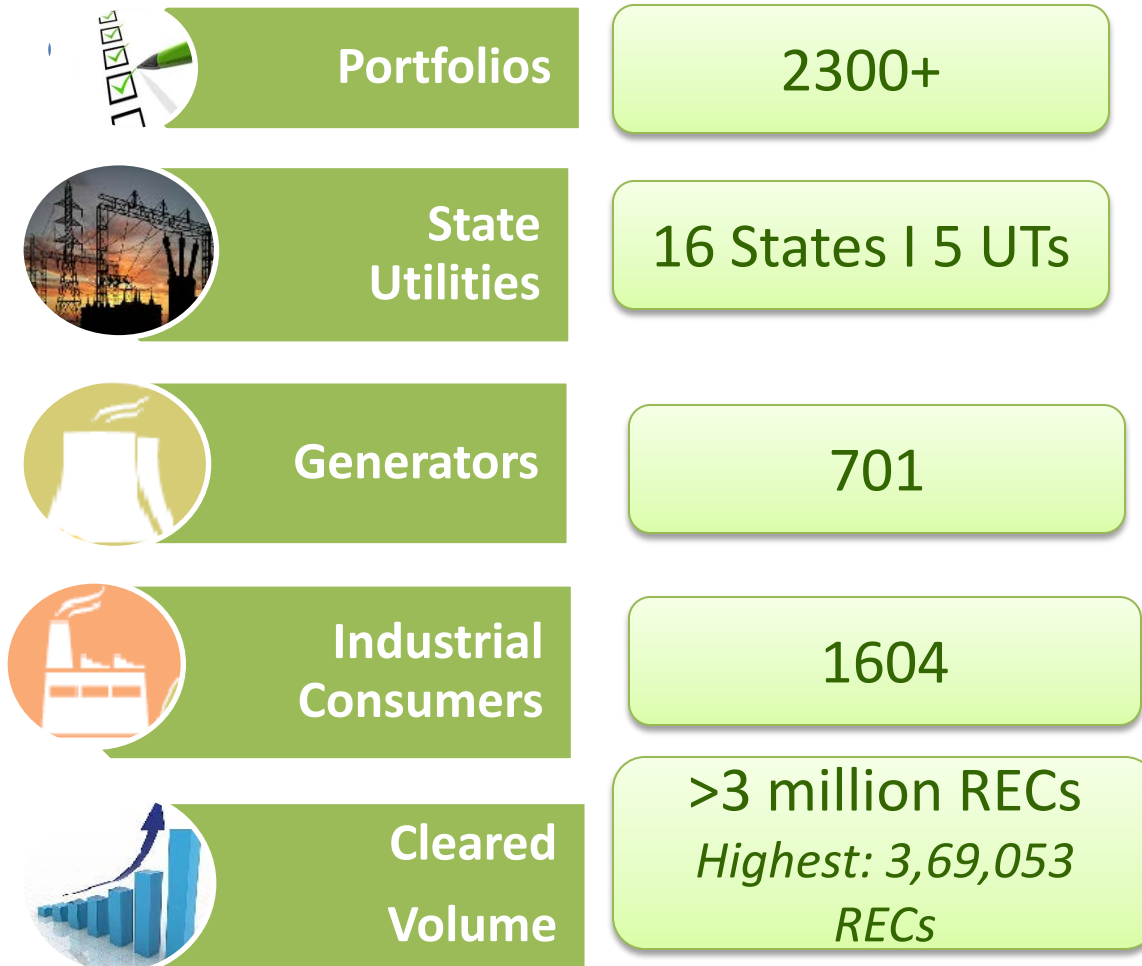
# Projects under REC Mechanism

## State-wise RE Capacity (MW)



- Tamil Nadu
- Maharashtra
- Uttar Pradesh
- Gujarat
- Karnataka
- Rajasthan
- Andhra Pradesh
- Madhya Pradesh
- Chhattisgarh
- Punjab
- Himanchal Pradesh
- Others

# Key statistics: REC Market at IEX

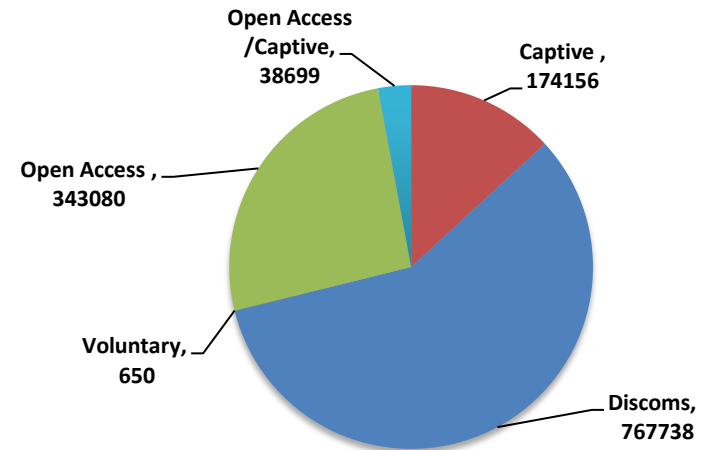


**IEX Data as on 9<sup>th</sup> Jan 2015**

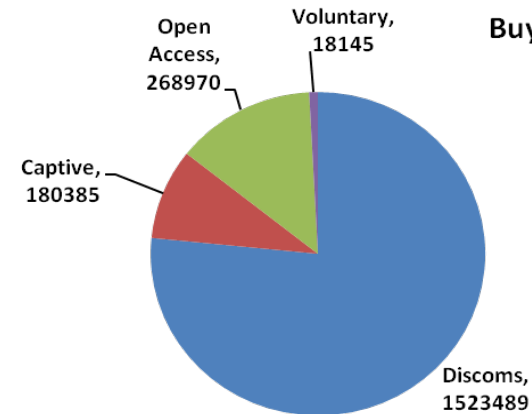
# Participation Details at IEX

Registered Participants	2317
Obligated Entity	1604
DISCOMs	22
OA consumers	1501
Captive Consumer	60
OA + Captive	20
Discom + Captive	1
Voluntary	12
Eligible Entity (Sellers)	701

Buyer Mix FY '13-14



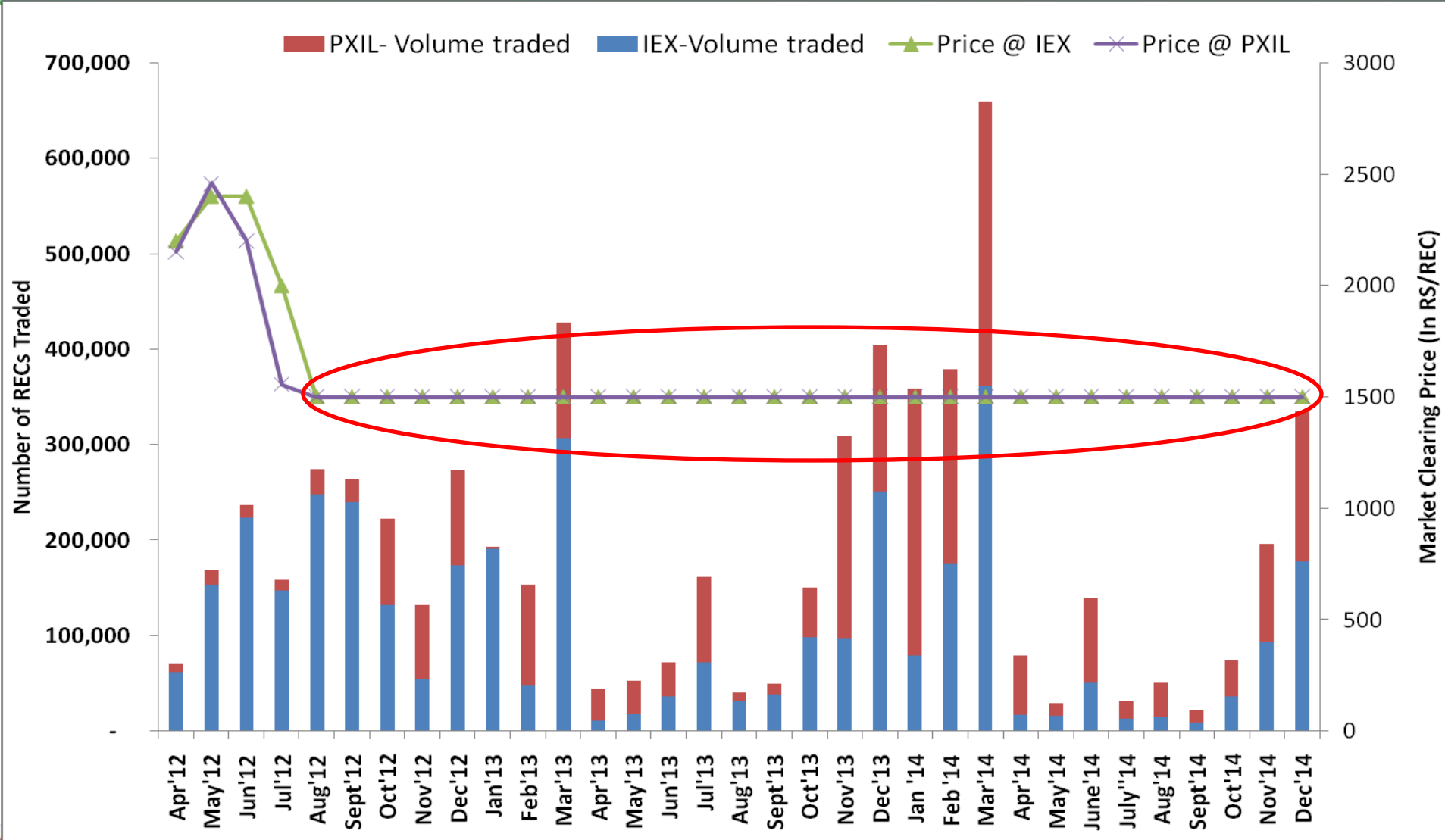
Buyer Mix FY'12-13



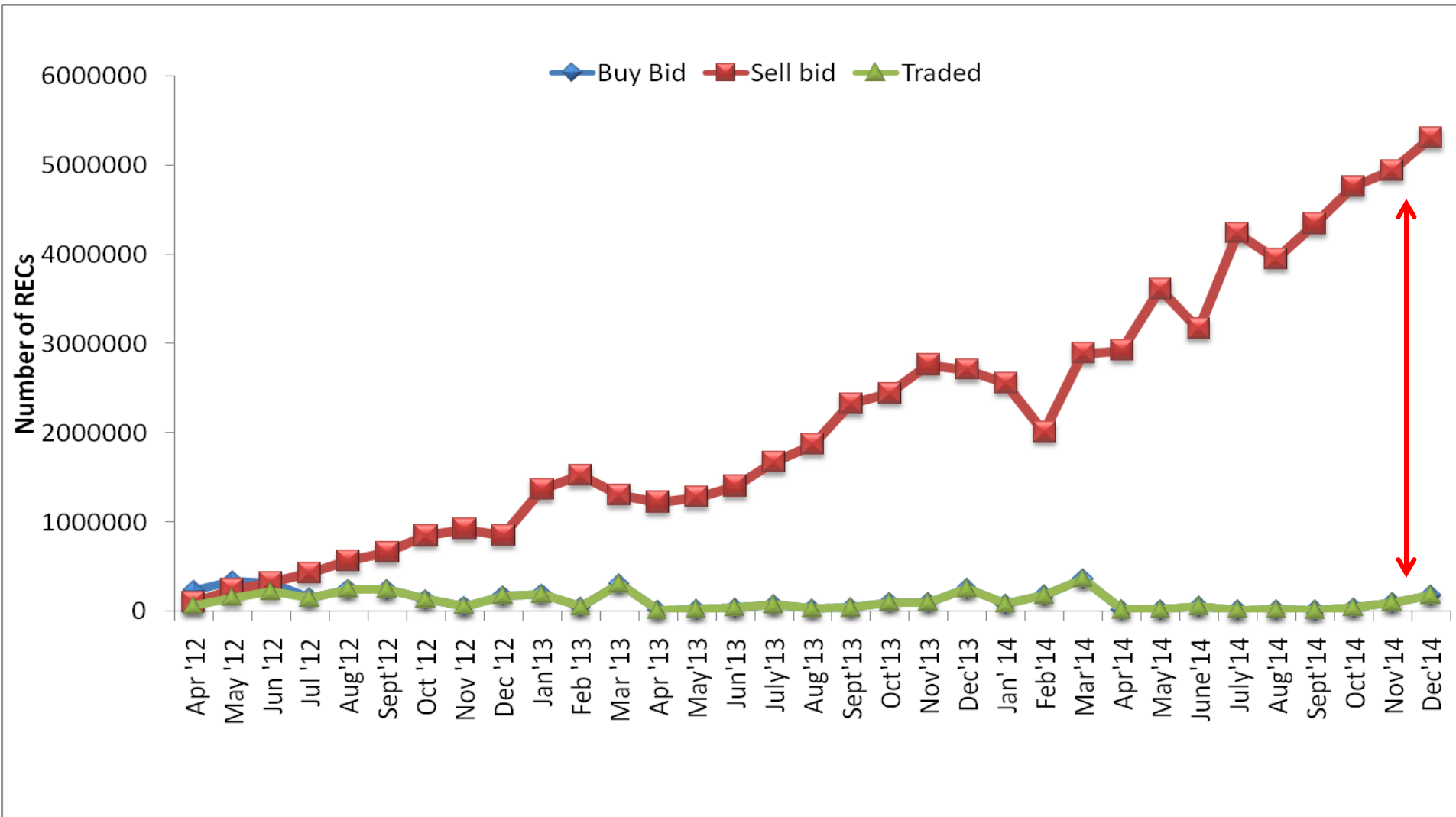


# Market status & Challenges

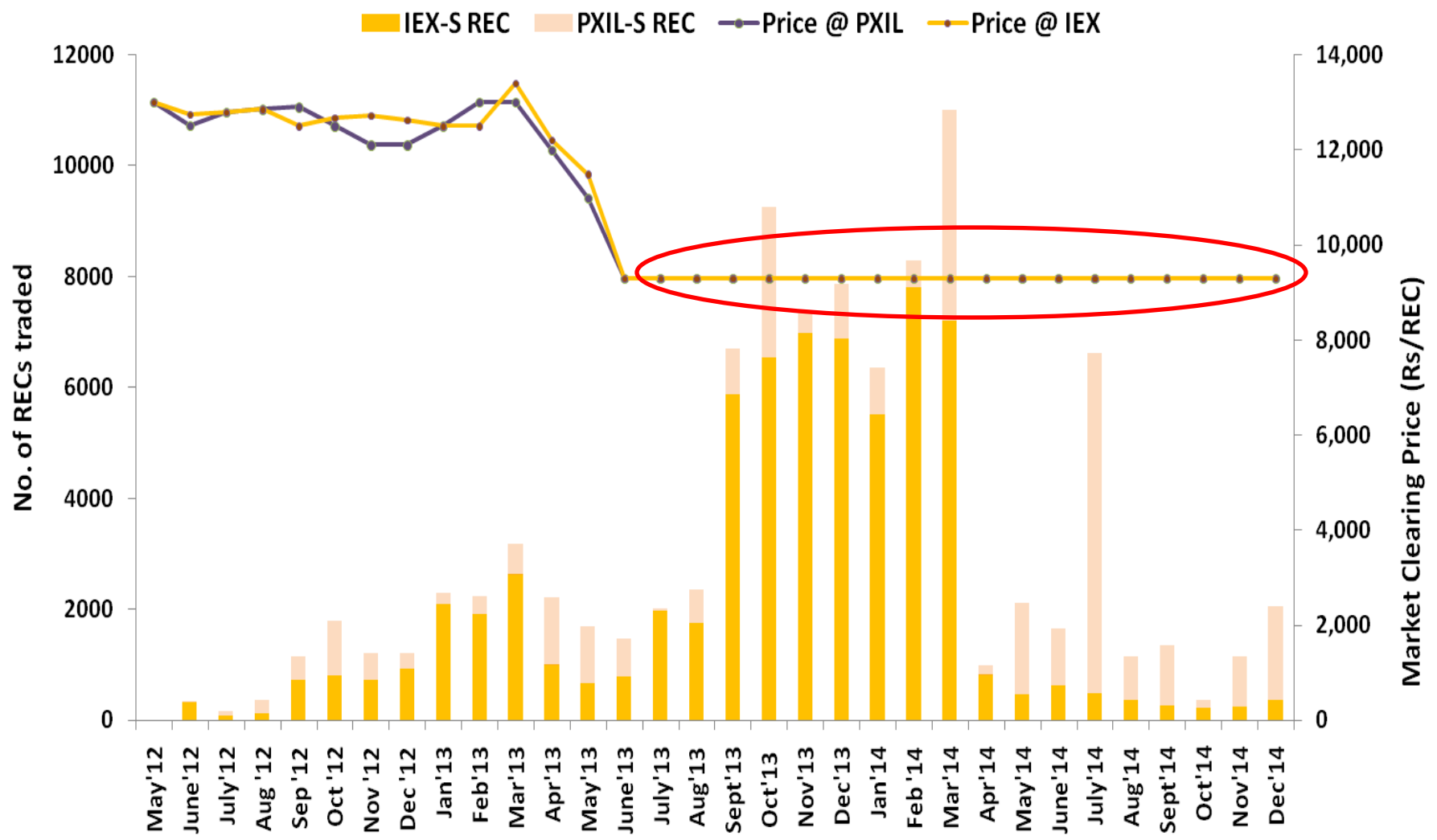
# N-Solar REC trade detail



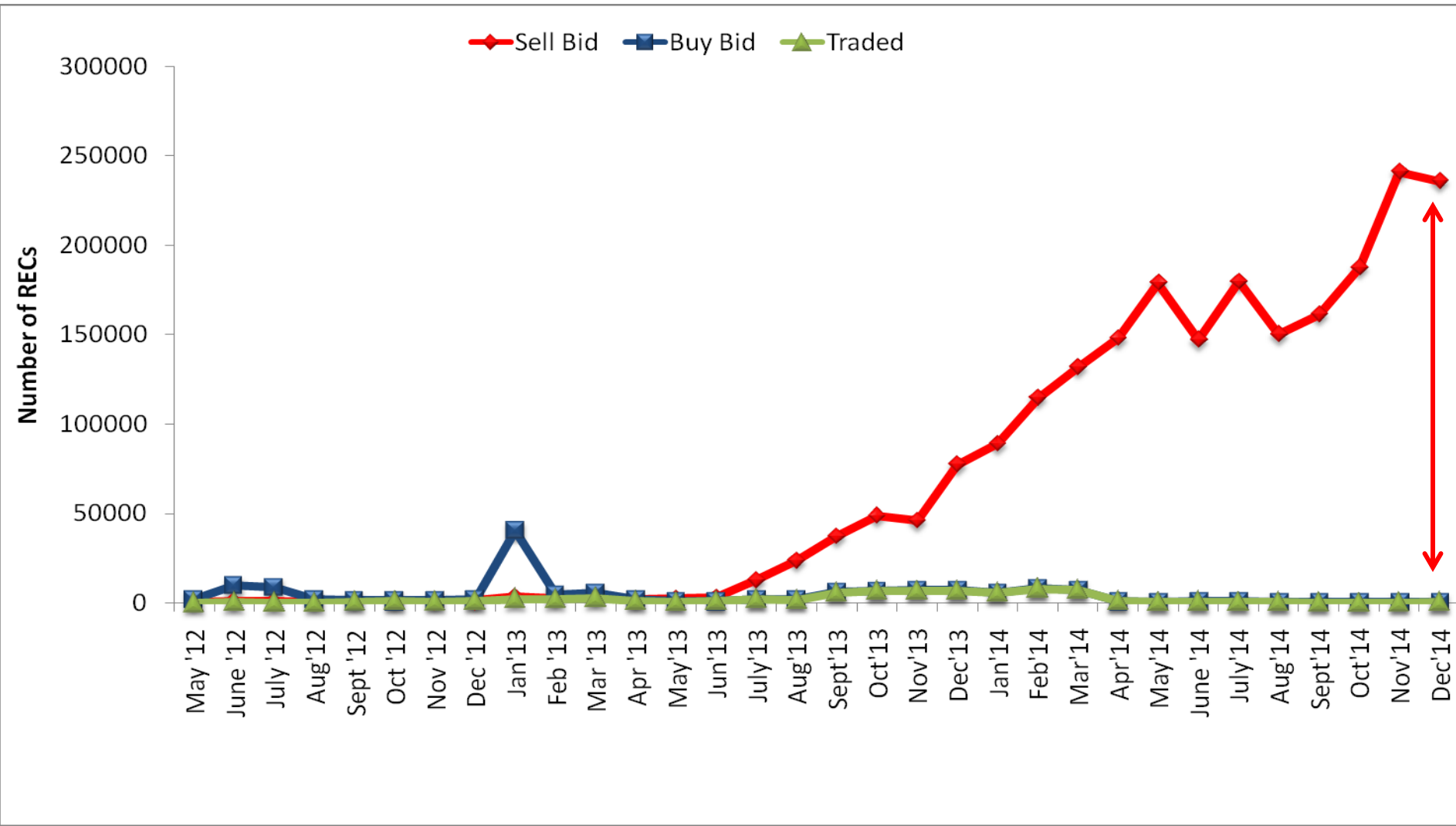
# Non Solar REC Trade details



# Solar REC trade detail



# Solar REC Trade details



# Demand deficiency

	Accredited Capacity (MW)	Registered Capacity (MW)	RECs Issued	RECs Traded	Balance
Non -Solar	4,374	4,130	1,88,22,229	72,32,454 38%	1,14,58,918 62%
Solar	568	547	6,85,099	98,202 14%	5,86,897 86%

As on 9<sup>th</sup> January '2015

## Overall RPO Compliance

- FY12-13: Wt. avg RPO is 5.9% against NAPCC target of 8%; RPO realized was around 4%
- FY13-14: Wt. avg RPO is 7.3% against NAPCC target of 9%; RPO realization was lagging

## Non-Solar Compliance (FY-14)

- **50-100 % : 13 States** (Karnataka, TN, Rajasthan, Goa, Nagaland, A.P, J&K, Punjab, Uttarakhand H.P, Chhattisgarh, Maharashtra, Gujarat)
- **<50 % : 11 States** (Kerala, Delhi, Haryana, W.B, Bihar, M.P, Assam, Arunachal, Tripura, Meghalaya, U.P)

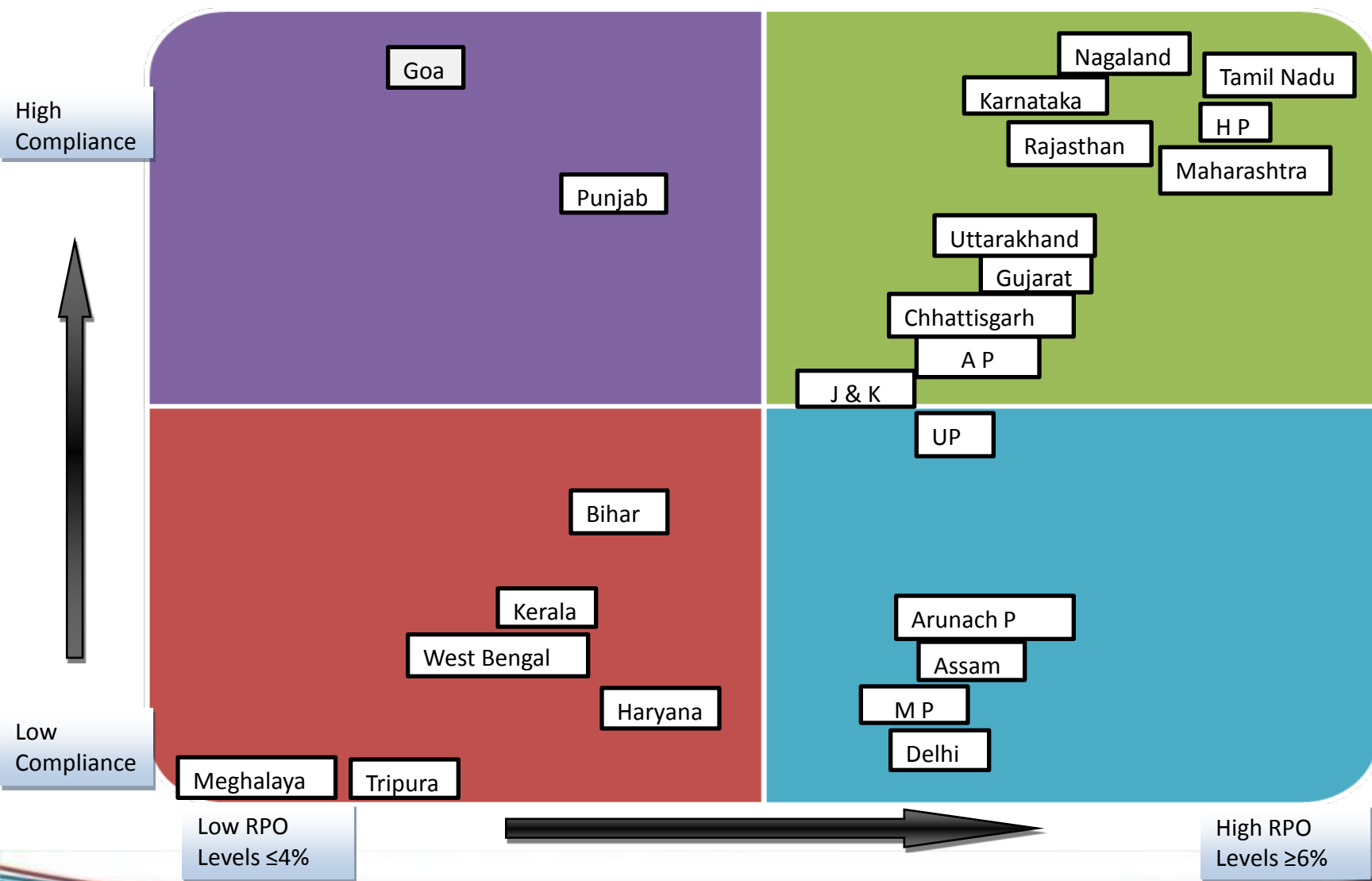
## Solar Compliance (FY-14)

- **50-100 % : 10 States** (A.P, TN, Gujarat, Rajasthan, Goa, Punjab, Bihar, Chhattisgarh, Maharashtra, Meghalaya)
- **<50 % : 14 States** (Kerala, Karnataka, U.P, Delhi, Haryana, Uttarakhand, H.P, W.B, M.P, Assam, Arunachal, Tripura, Nagaland J&K)



# State-wise Non- Solar RPO Compliance Status

FY13-14



# Third amendment to REC Regulation



- Effective from 1st January, 2015
- Distribution licensee eligible for issuance of RECs for procurement of renewable energy in excess of the RPO
- Vintage Multiplier for RECs issued to solar generators registered prior to 1st Jan 2015
- Validity of RECs is now 1095 Days
- Revised price limits for Solar REC:

Solar REC	NEW (INR/ MWh)	OLD (INR/ MWh)
Forbearance Price	5800	13400
Floor Price	3500	9300

# Vintage Multiplier, consequent market distortion

- Amendment to REC Regulation 7: The vintage multiplier shall be provided to solar generating companies registered under REC framework prior 1st January 2015 and shall be applicable for the period from 1st January 2015 upto 31st March 2017
- ***Vintage Multiplier = Floor Price of Base Year(FY12-13) / Current Year Floor Price = 9300/3500 = 2.66***

View	Counterview
<ul style="list-style-type: none"><li>• Aimed to provide relief to generators registered before the revision of floor price, whose valuation got affected.</li></ul>	<ul style="list-style-type: none"><li>• In a market, increase in supply should be balanced through increase in demand. Else imbalance in the market will be created which inturn impacts the price discovery. Also, new projects will be impacted as the excess supply brings down the REC prices and hence impacting valuation.</li><li>• Commensurate demand should be created for the oversupply</li></ul>

# Likely impact of Solar RECs due to Vintage Multiplier

- Solar RE Generators registered prior to 1 Jan 2015 = 547.99 MW
- Solar RECs issued per month  $\approx$  60,000 RECs
- With Vintage Multiplier of 2.66, monthly issuance may reach to 1,60,000 RECs

Year	Solar RPO (%)	Capacity required to meet RPO (MW)
2014-15	0.75 %	5165
2015-16	1.00 %	7420
2016-17	1.25 %	9994
2017-18	1.75 %	15080
2018-19	2.25 %	20901
2019-20	2.50 %	25041

- Oversupply of RECs by old RE generators may impact pricing, and hence the valuation of potential entrants

# Extension of life of RECs

- REC market has remained illiquid and RECs face the risk of extinction without getting traded
- Around 60,000 RECs were supposed to expire by December, 2014, if the same doesn't get traded
- As such, CERC has initially extended the validity of RECs from 365 days to 730 days, and finally to 1095 days
- REC mechanism was initially designed to have 1 year cycle, but no definite cycle exists in present form

View	Counterview
<ul style="list-style-type: none"><li>• Safeguards the interest of RE generators till the REC market revives</li></ul>	<ul style="list-style-type: none"><li>• Extension of validity is equivalent to creation of <u>Regulatory Asset</u></li><li>• Demand side corrective measures should be the solution</li></ul>

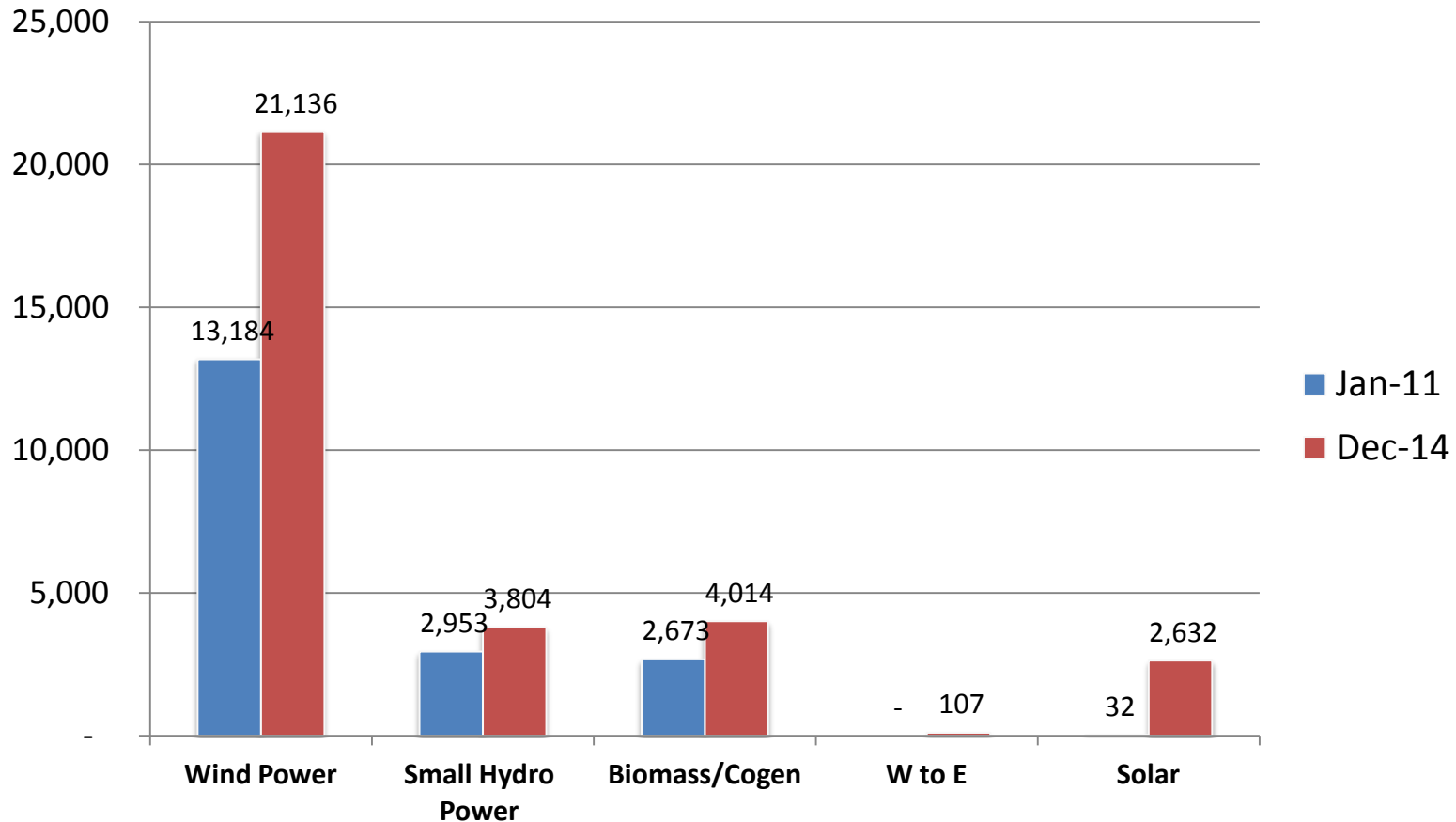
# CERC Statement of Objects and Reasons for REC Regulations 2010



- The concept of renewable energy certificate seeks to address the mismatch between availability of renewable energy sources and the requirement of obligated entities to meet their renewable purchase obligations
- 3.5.2 The REC mechanism seeks to promote additional investment in the RE projects and is meant to provide RE generators an alternate mode for recovery of their costs. The issuance of REC to obligated entities may result in forcing the RE developers to engage in PPAs only with the local utility which inturn may affect new investment.

# Renewable Installed Capacity (MW)

change with introduction of REC mechanism



As of Dec-14, RE Capacity of 4654 MW registered with CA,  
Out of which 1489MW is from old plants, which accounts to 75.3 lakh RECs



# The Electricity (Amendment) Bill, 2014

Further impetus to REC



- 1) More teeth to regulators for enforcing RPO on Obligated Entities. Provision of an additional penalty of Rs 1 Crore for each contravention and Rs 10 Lakhs per day for continuing failure
- 2) Open Access consumers procuring electricity from renewable energy sources shall not be required to pay the surcharge for open access

- Cases of exemption of RPO for Obligated Entities consuming Cogeneration power from fossil fuel
- Some ERCs permitting carry forward of RPO shortfall
- Utilities approaching ERCs for exemption of RPO
- Some states introduced provision of fulfilling RPO bypassing REC purchasing by paying higher green tariff

- With regards to Captive Plants, double counting is possible, as PAT mechanism considers Renewable Generation under gate-to-gate plant boundary in computing specific energy consumption of a plant for issuance of Energy Savings Certificates (ESCerts)

# Thank You for your attention

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