



Idam Infrastructure Advisory Pvt. Ltd.

Session-5, Day 2

Evolution of RPO and REC Mechanisms : Indian Experience

SAARC Knowledge Sharing Workshop on Modern Techniques including Renewable Energy Auctions for Economizing Renewable Energy Tariff

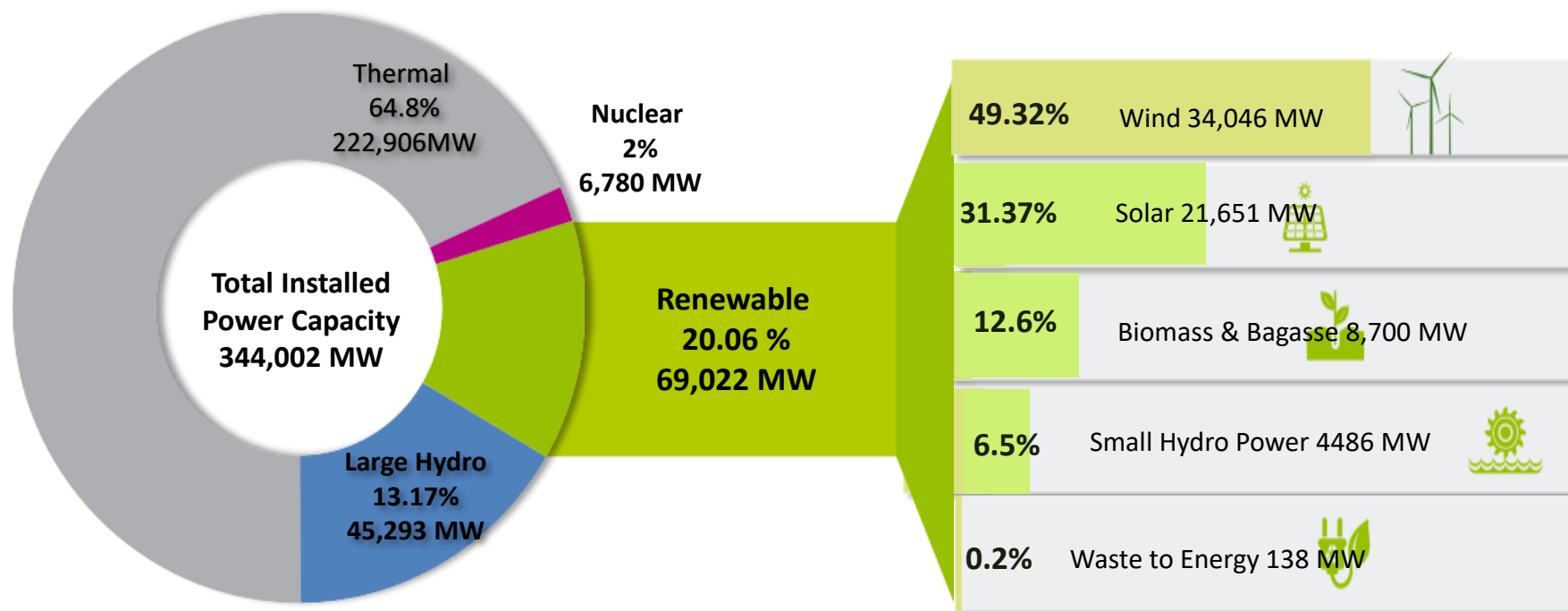
By Ajit Pandit, Director Idam Infra

May 2018

- ☐ **Renewable Energy Development in India**
- ☐ **Legal and Regulatory Framework for Development of Renewable Energy in India**
- ☐ **Evolution of RPO Mechanism : Indian Experience**
 - ☐ Statutory premise and policy guidance
 - ☐ Concept and Scope of RPO
 - ☐ Key Design features and considerations
 - ☐ Implementation experience and Enforcement
- ☐ **Renewable Energy Certificate Mechanism**
 - ☐ Objective and Design considerations
 - ☐ Salient features of framework
 - ☐ Implementation aspects
 - ☐ Trading experience and status update
- ☐ **Way Forward**

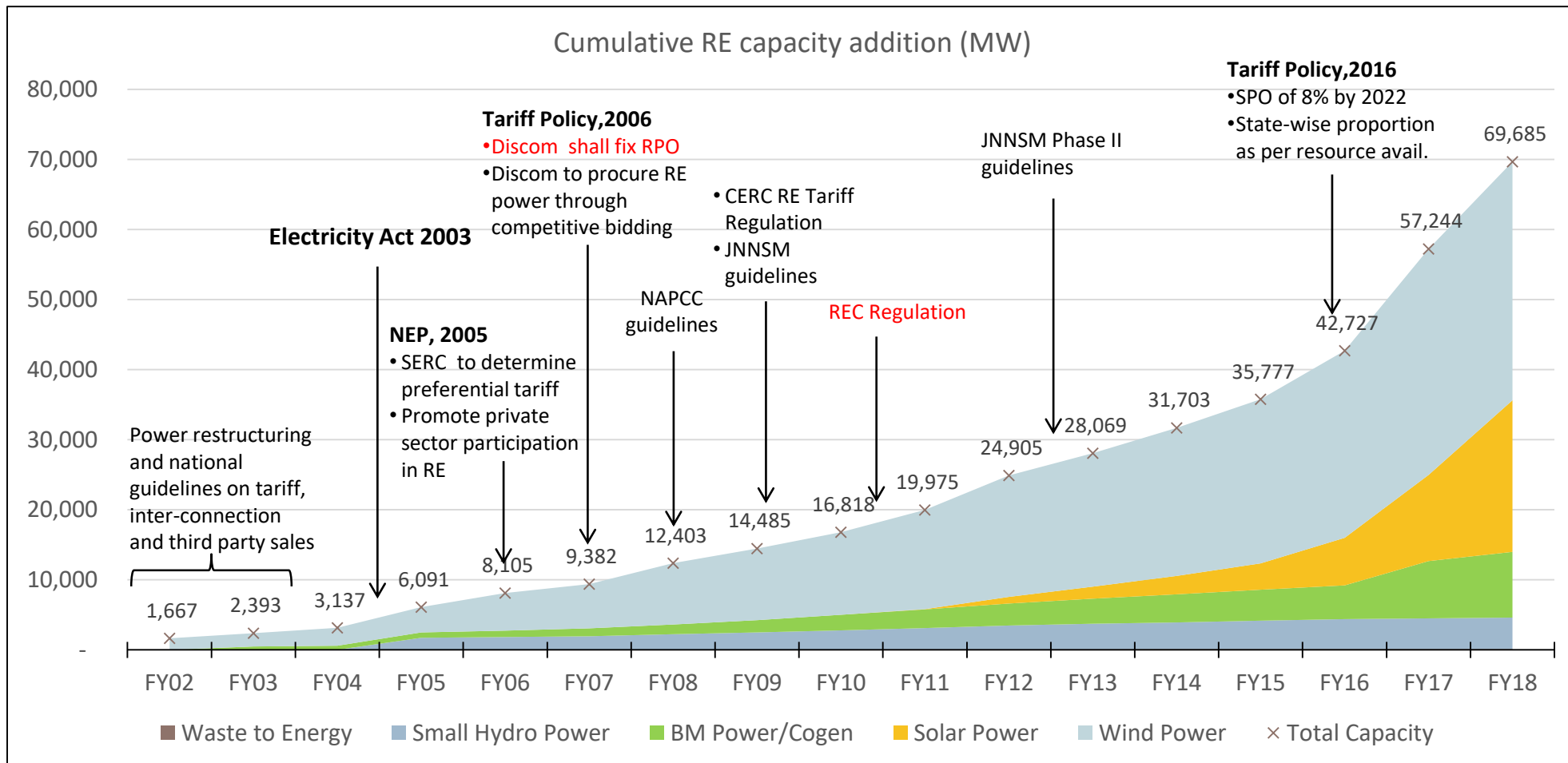
Renewable Energy Development in India

India's Power Scenario & Share of Renewable Energy



As per India's INDC, 40% of Energy in India shall be from non-fossil fuels by 2030

Growth in RE – Historic Trends and Growth Enablers



❑ The certainty in legal framework at National level and supportive regulatory framework at state level along with conducive policy framework by Government has ensured Private Sector's interests in Renewable Energy Development

Legal and Regulatory Framework for Development of Renewable Energy in India

The Electricity Act, 2003: Enabling Provisions

- ☐ **The EA 2003 has outlined several enabling provisions to accelerate the development of RE generation**
- ☐ **Section 3**
 - ☐ National Electricity Policy and Plan for development of power system based on optimal utilization of resources including renewable sources of energy
- ☐ **Section 61**
 - ☐ Development of Tariff Regulations by Regulatory Commission for promotion of generation from RE sources in their area of jurisdiction
- ☐ **Section 66**
 - ☐ Regulatory Commission shall endeavor to promote the development of market (including trading) in power.
- ☐ **Section 86(1) (e)**
 - ☐ Provides Statutory Framework and Mandates SERC for promotion of Generation of Electricity from RE sources

Promotion of RE is by Policy Design and Regulatory Initiative

Central Government

- Electricity Act 2003 (Jun 2003)
- National Electricity Policy (Feb 2005)
- National Tariff Policy (Jan 2006, Amendment 2011, Jan 2016)
- National Action Plan on Climate Change (Jun 2008)

Central Electricity Regulatory Commission

- Regulations for Preferential Tariff for RE (2009, 12 & 17)
- **Renewable Energy Certificate Mechanism (Jan 2010)**
- Implementation Framework (continuously amended)

State Electricity Regulatory Commission

- Preferential RE Tariff Orders by SERCs (2002 onwards)
- All states have mandated **Renewable Purchase Obligations**
- Modification to RPO and adoption of REC framework

Tariff Policy 2006

- Appropriate Commission shall **fix RPO** and SERCs shall **fix its tariff** latest by April 1, 2006
- Initially Appropriate Commission to **fix preferential tariffs** for distribution utility to procure RE
- In future, distribution utility to **procure RE through competitive bidding** within suppliers offering same type of RE
- In long-term, RE technologies need to compete with all other sources in terms of full costs
- **CERC to provide guidelines for pricing non-firm power** if RE procurement is **not** through competitive bidding

Amendments TP 2011

- SERCs to reserve a **minimum percentage for purchase of solar energy** ... which shall go up to **0.25%** by the end of 2012-12 and further up to **3% by 2022**
- Purchase of energy from non-conventional sources of energy takes places more or less in same proportion in different States
- An appropriate **mechanism such as Renewable Energy Certificate (REC) would need to be evolved**
- REC Mechanism should also have a **solar specific REC**

Tariff Policy 2016

- New tariff policy seeks State Commissions to fix year wise **RPO trajectory** so as to reach **17% in the total energy mix by 2022 including minimum 8% from Solar**
- It also refers to **adoption** of an appropriate mechanism such as **REC mechanism**
- **Appropriate Commission** may also **provide** a suitable **regulatory framework** for **encouraging** such other emerging **renewable energy** technologies by prescribing **separate technology based REC multiplier**
- **Concept of Renewable Generation Obligation (RGO)-**
- **No inter-State transmission charges and losses** to be levied for solar and wind power.

RPO Mechanism : Indian Experience

Section 86 (1) (e) – Driver for RPO

- ❑ **Section 86(1): The State Commission shall discharge the following functions, namely:**
 - ❑ (e) promote cogeneration 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;
- ❑ **Various State Commissions have put significant emphasis on the last part of this important clause while developing regulations for Distribution Licensees under their jurisdiction**

Guidelines by MoP in line with Tariff Policy Provisions

- ❑ Considering Tariff policy Provisions & national level RE capacity addition target, MoP in consultation with MNRE notified overall RPO target for initial 3 years FY 17 to FY 19
- ❑ The notification mentions that SERCs may consider to notify RPO in line with the notification

Long term Trajectory	2016-17	2017-18	2018-19
Non-Solar	8.75%	9.50%	10.25%
Solar	2.75%	4.75	6.75%
Total	11.50%	14.25%	17.00%

- ❑ Various State Commissions have amendment of RPO target in line with the above targets

RPO- The concept

- ❑ RPO - Renewable Purchase Obligation
- ❑ Tool for promoting RE development
- ❑ Purchase of RE power made an obligatory requirement.
- ❑ Obligated Entities to meet part of their consumption through RE purchase
- ❑ Obligated Entities to include Distribution Licensee, Open Access or Captive consumer
- ❑ Obligation on energy consumption (MU terms)
- ❑ Targets set on Annual Basis and may be Generic or Technology specific

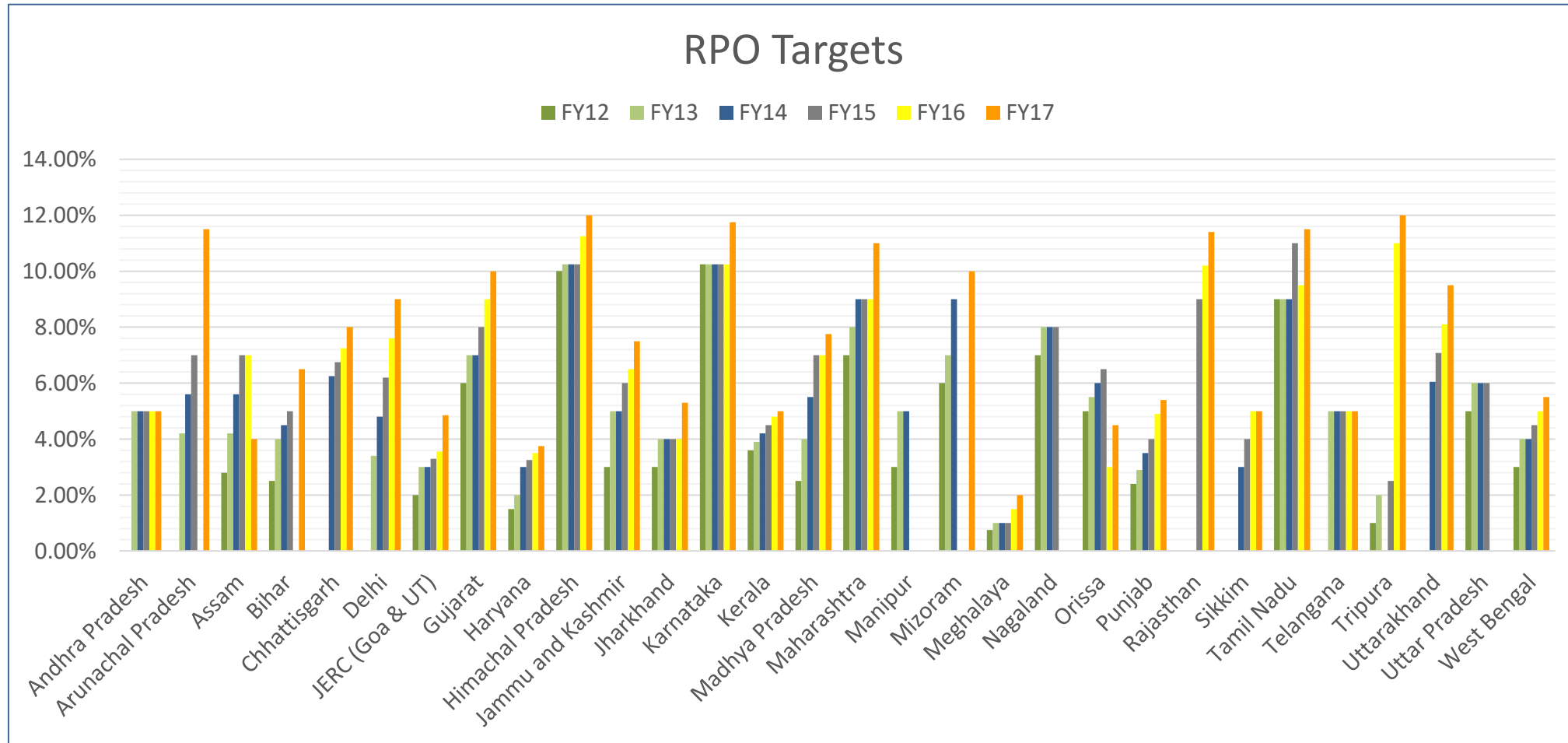
Benefits of RPO

- ☐ **RPO can drive new renewable development and can ensure that there are buyers for that energy,**
- ☐ **Retail consumers will have an interest in driving down the cost of renewable**
 - ☐ By seeking out least-cost renewable applications, or
 - ☐ By entering into long-term purchasing commitments.
- ☐ **Certainty and stability of the RPO policy will enable long-term contracts and financing for the renewable power industry, which will, in turn, lower renewable power costs**
- ☐ **RPO can be competitively neutral if it is applied equally to all retail electricity suppliers**
- ☐ **RPO can be applied in both restructured and monopoly markets**

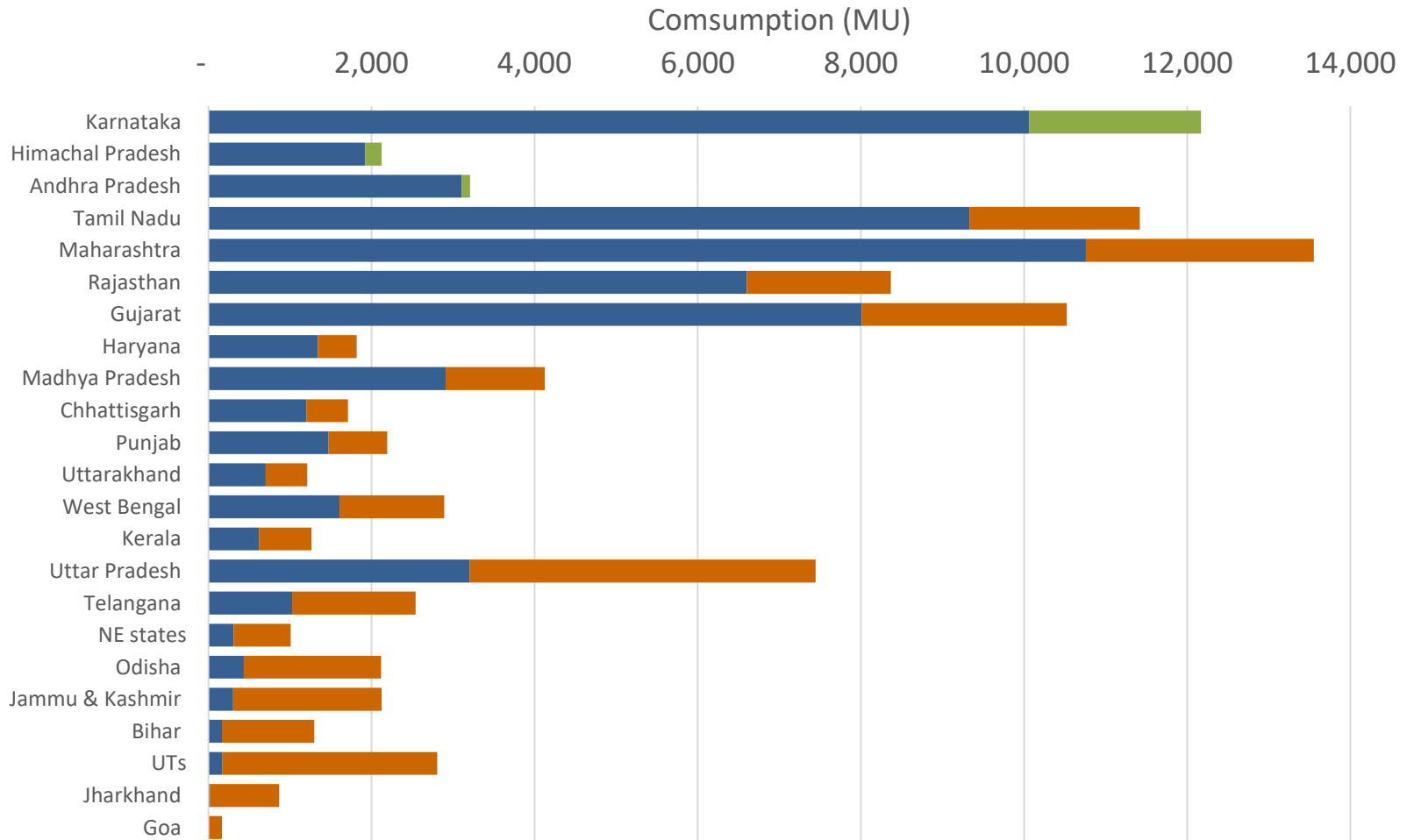
RPO : Key Design Parameters and considerations

- ☐ Energy based vs Capacity based
- ☐ Renewable energy eligibility
- ☐ Percentage requirement Vs Specific Quantum
- ☐ New vs Existing
- ☐ Applicability
- ☐ Operating mechanism
- ☐ Enforcement
- ☐ Administration
- ☐ Sunset date

RPO Targets set across the States (in recent years – FY 12 to FY 17)



RPO compliance status (in MU terms for FY 2015-16)

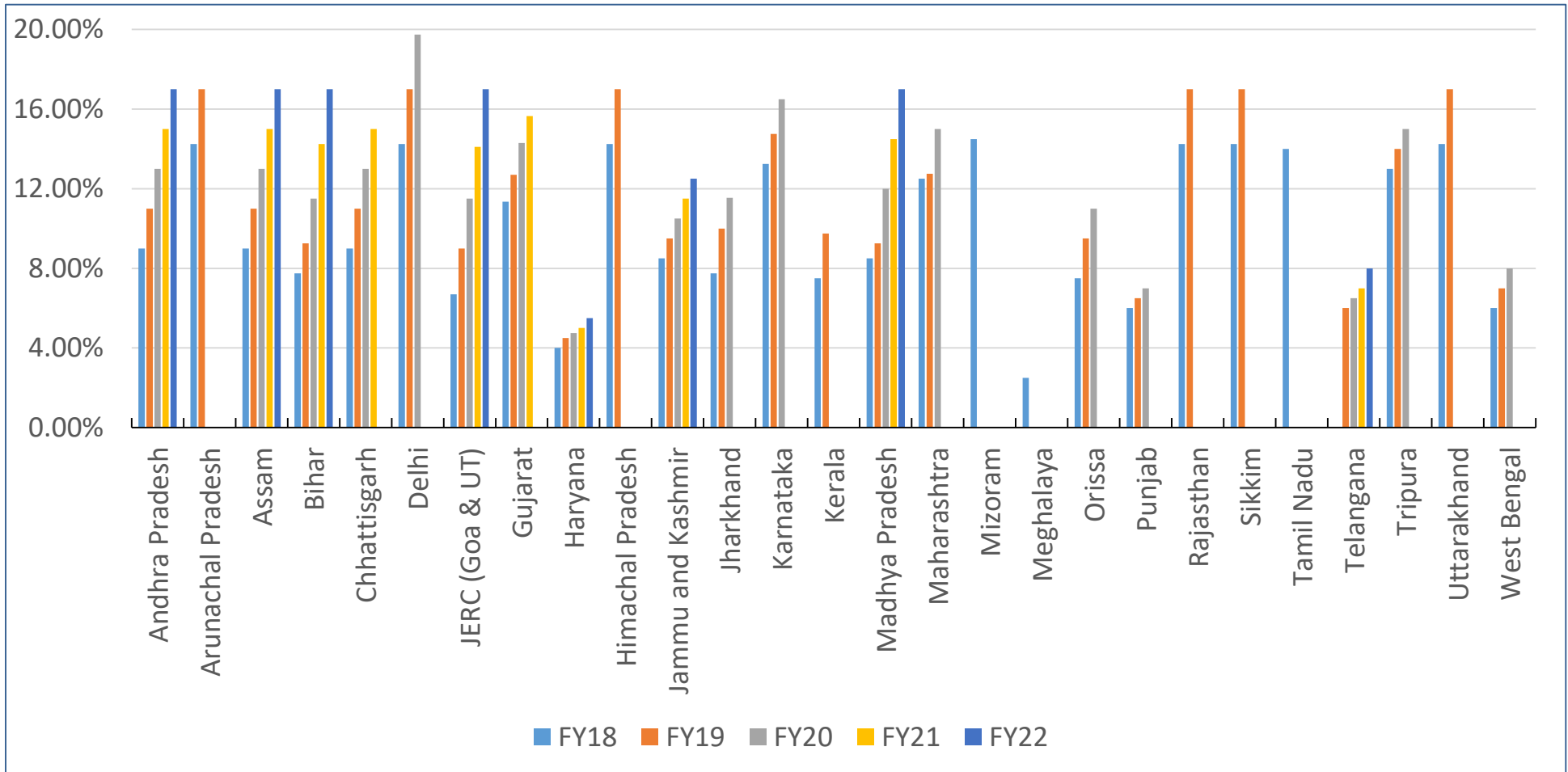


*(FY 2015-16)

■ RPO met ■ RPO shortfall ■ RPO excess

- ❑ **Target Specification: Specify % of renewable energy every utility need to purchase:**
 - ❑ Separate Targets for Solar, Non-Solar procurement.
 - ❑ Usually set close to existing purchase levels,
- ❑ **Eligible Sources :** RE sources, non-fossil fuels, cogeneration
- ❑ **Tenure:** Period is up to five years
- ❑ **Scope of Obligated Entities:** Applicability to OA/Captive Users
- ❑ **Jurisdiction:** Purchase of RE from outside the State has not been permitted,
- ❑ **Mode of Procurement:** Silent on mode of procurement, competitive or cost based except for few States
- ❑ **Implementation:** Monitoring and verification mechanisms need further refinement
- ❑ **Enforcement conditions:** Weak on enforcement methodology

RPO trajectory for future (FY 18 to FY 22)



RPO Compliance Monitoring/ Reporting: Status in Key States

	Maharashtra	Gujarat	Chhattisgarh	Madhya Pradesh	Uttarakhand	Rajasthan
Suo-moto initiatives / order by SERC on RPO compliance monitoring	Y	Y	N	Only for Solar RPO (order on petition)	Y	N
Enforcement on OEs for non compliance of RPO	Y	N	N	Rs. 25,000	Rs. 20,000	Surcharge of INR 3.59/kWh
SNA initiatives for RPO compliance data collection and reporting	Y	N	Y	N	Y	Y
Standard forms / formats for RPO compliance data collection	Y	N	Y	N	Y	Y

- Various States conduct periodic compliance monitoring for RPO compliance by DISCOMs
- However, compliance monitoring of other obligated entities need to be strengthened



Need for an innovative, process-driven and technology-based solution to address these challenges.

- **RPO compliance monitoring is crucial to ensure:**
 - RPO targets are met
 - Non-compliance is brought to the notice of regulators
- RPO compliance monitoring for DISCOM through **Annual Performance Review**, but no such monitoring mechanism for other obligated entities.
- **Suo-Motu proceedings** in few states to review the RPO compliance status by **OA and captive consumers**.
- RPO compliance review process is undertaken with **significant time lag**.

Launch of Generic RPO Compliance monitoring framework by FOR Technical Committee



Launch of Manual on Generic RPO WebTool during Forum of Regulators' Technical Committee meeting at Sasan, Gujarat (Nov 2017)

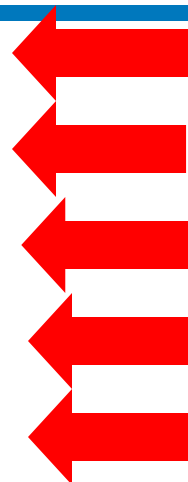
Renewable Energy Certificate Mechanism

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

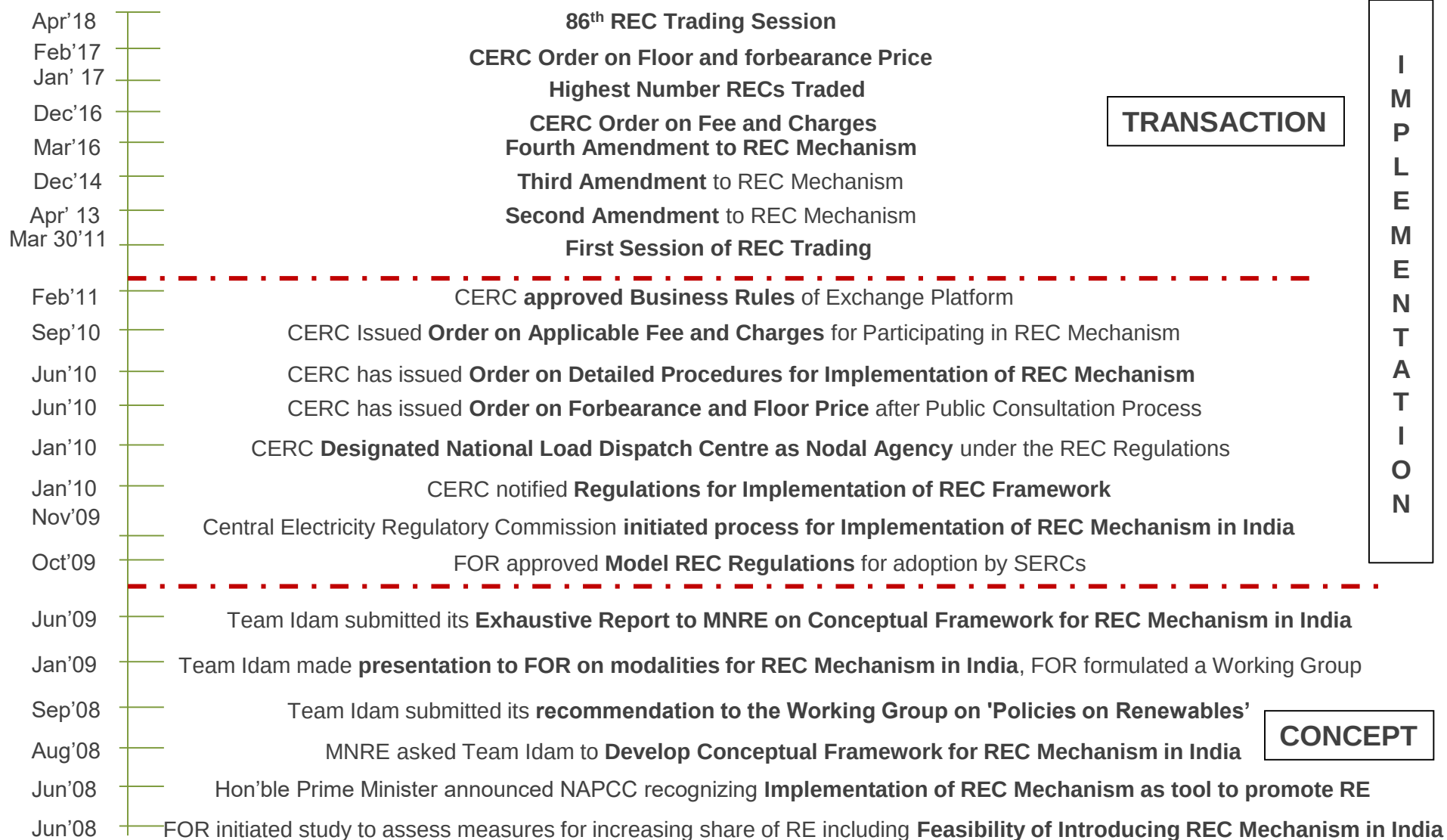
Key Objectives for Introduction of REC Mechanism

- Effective implementation of RPO
- Increased flexibility for participants
- Overcome geographical constraints
- Reduce transaction costs for RE transactions
- Enforcement of penalty mechanism
- Create competition among different RE technologies
- Development of all encompassing incentive mechanism
- Reduce risks for local distributor by limiting its liability to energy purchase

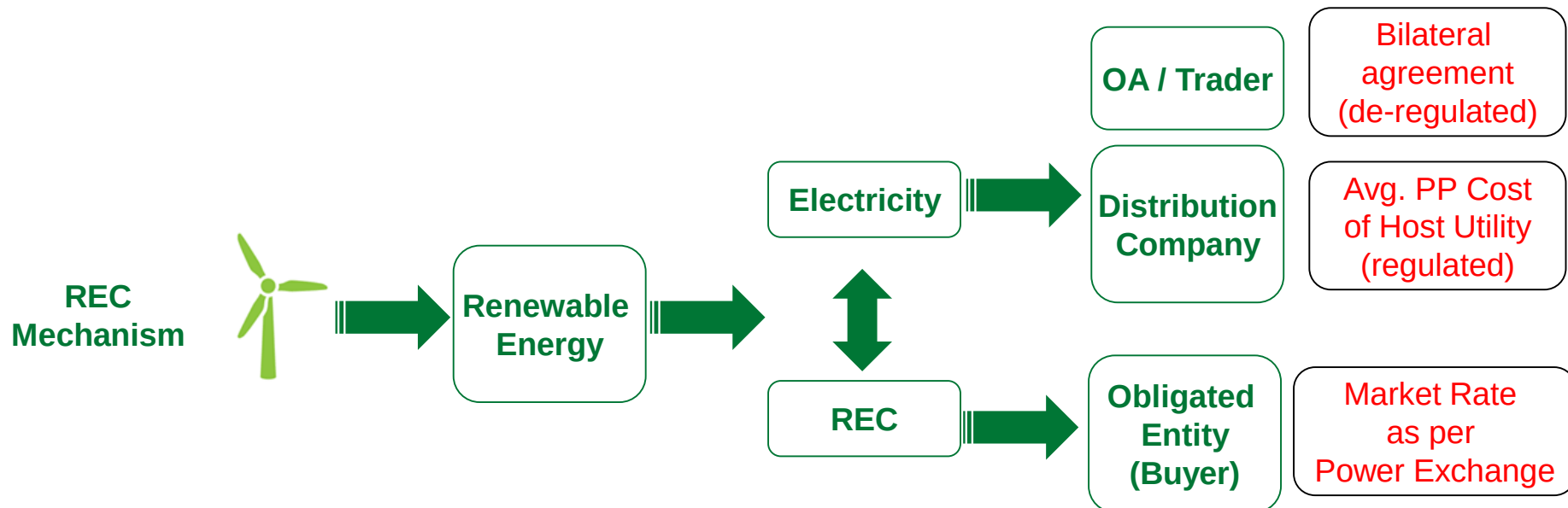
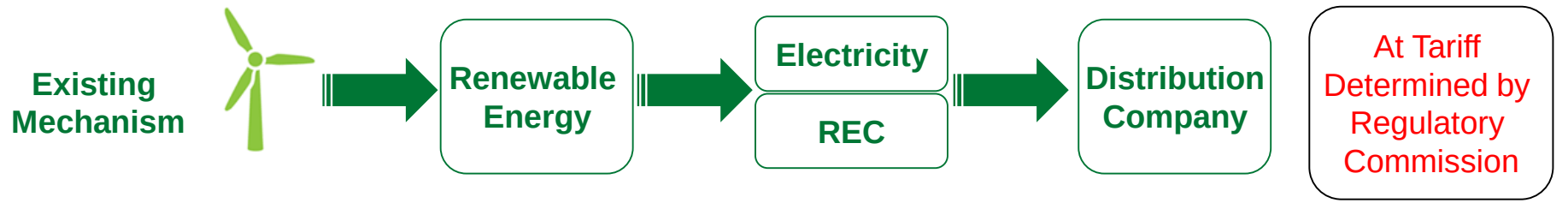


In the view of hurdles faced by RE Development, it appears that these objectives should take precedence over others

Chronology of Events – Concept to Implementation



Concept of REC Mechanism in India



Design Features



Eligible Source

Eligible Entities

Obligated Entities

REC Issuing Authority

Sale/Purchase of REC

- **Eligible Source**

- All sources recognised by MNRE under Renewable Energy Category
- Two Categories of Certificates one for Solar and other for Non-Solar

- **Eligible Entities**

- Grid Connected RE Power Projects having NO PPA at preferential tariff and received accreditation certificate from State Agency
- Shall sell electricity at Pooled cost of Power Purchase to distribution utility or at mutually agreed price to any other licensee

- **Obligated Entities**

- As defined by SERC, distribution utility, OA User, Captive Consumer

- **REC Issuing Authority**

- National Load Despatch Centre shall issue REC to Generator based on the Energy Injection Report prepared by SLDC

- **Sale/Purchase of REC**

- Transaction of REC shall take place at Power Exchanges operating under the guidance of CERC

Design Features



Denomination

Form of REC

Pricing of REC

Redemption of REC

Shelf Life

- **Denomination**

- One (1) REC shall be issued corresponding to 1 MWh of renewable energy is generated and injected into the Grid

- **Form of REC**

- REC shall be issued electronically to the Generator

- **Pricing of REC**

- To be discovered only on Power Exchanges through auction route.
- Floor and Forbearance Price shall be determined by the CERC

- **Redemption of REC**

- Obligated entities shall purchase REC from Exchange Platform and redeem it in-lieu to their fulfilment of RPO with State Agency.
- Only single trade (once through) permissible. Multiple trades not allowed.

- **Shelf Life**

- RE Generator shall apply for issuance of certificate from 3 months of energy injection in the grid
- REC shall be valid for 1 year from the date of issuance (later extended for further period)

Institutional Framework



Central Entities

- Forum of Regulators
- Central Electricity Regulatory Commission
- Central Agency (National Load Despatch Centre)
- Power Exchanges
- Compliance Auditors

State Entities

- State Electricity Regulatory Commission
- State Load Despatch Centre
- State Agencies
- Eligible Entities
- Obligated Entities

REC Mechanism – Operating Framework

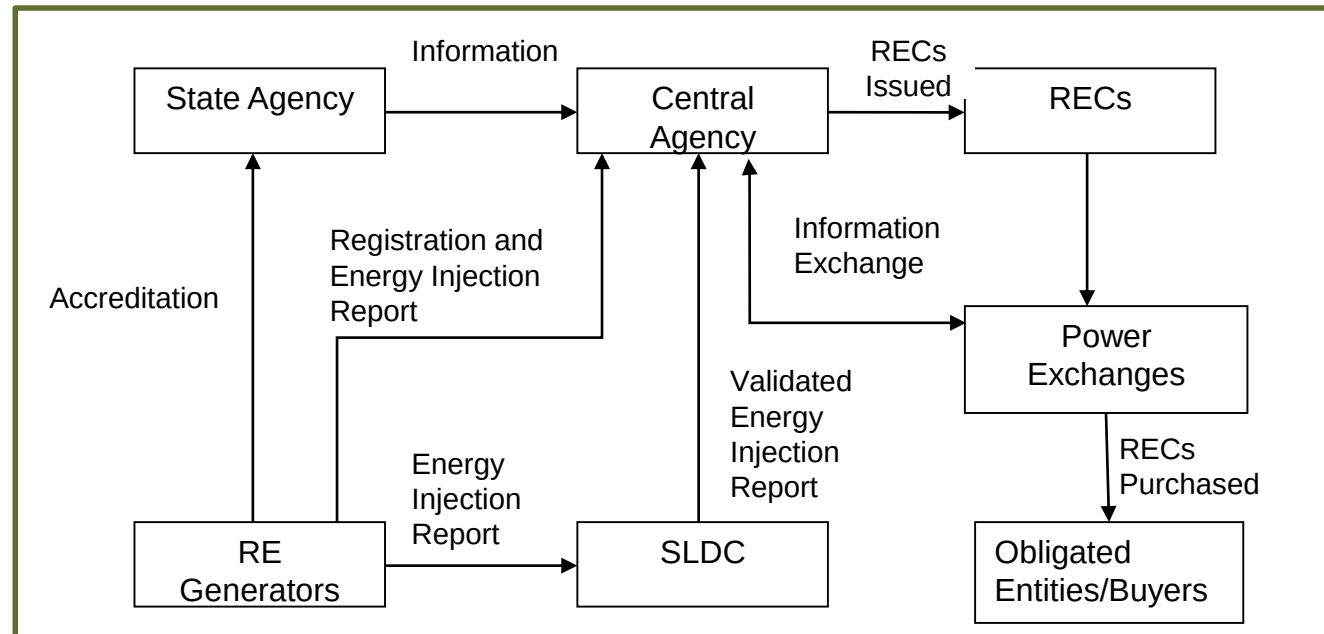
Eligible Entities: Grid connected RE sources, approved by MNRE, are eligible under this scheme.

Buyers: RECs are purchased by voluntary as well as obligated entities to meet their RPO compliance. The obligated entities are distribution utilities, open access consumers and captive power producers.

State Level Agency: SERC designate 'State Agency' for RPO compliance and accreditation for REC mechanism at State level.

Central Level Agency: CERC has designated National Load Despatch Centre (NLDC) as Central Agency for registration, repository, and other functions for implementation of REC framework at national level.

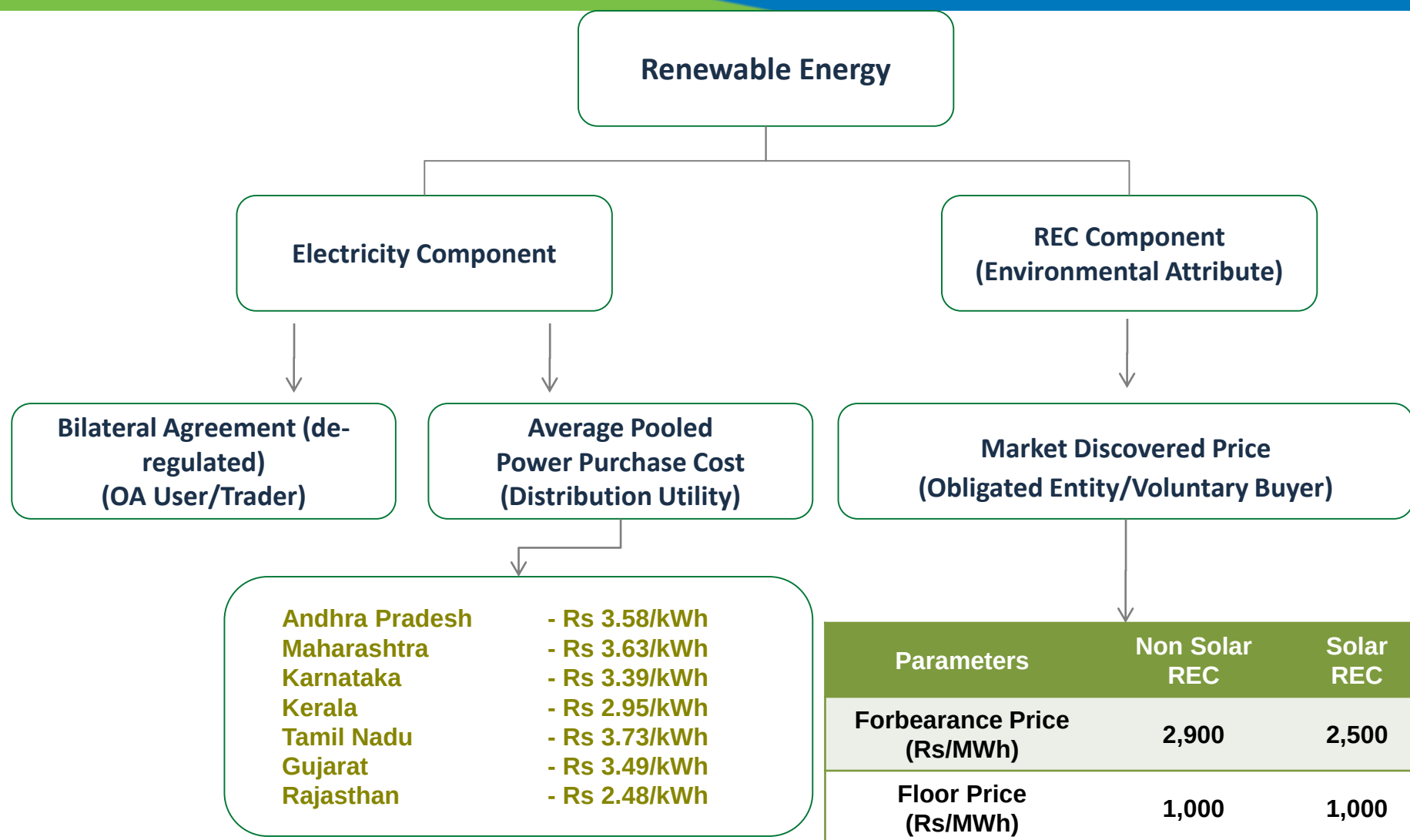
Denomination: One REC is issued for One MWh of electricity injected in to the grid from renewable energy sources. (For projects registered before 1/1/2015, 2.66 REC/MWh will be issued till 31/3/2017)



REC redemption: Trading in RECs can be carried out in the CERC approved Power Exchanges only. Re-trading of RECs is not allowed

REC Price Band: CERC has notified the 'Forbearance Price' and the 'Floor Price' for trading of RECs (both for Solar and Non-Solar RECs) which are reviewed periodically. A forecast of these prices has been provided till 2016-17.

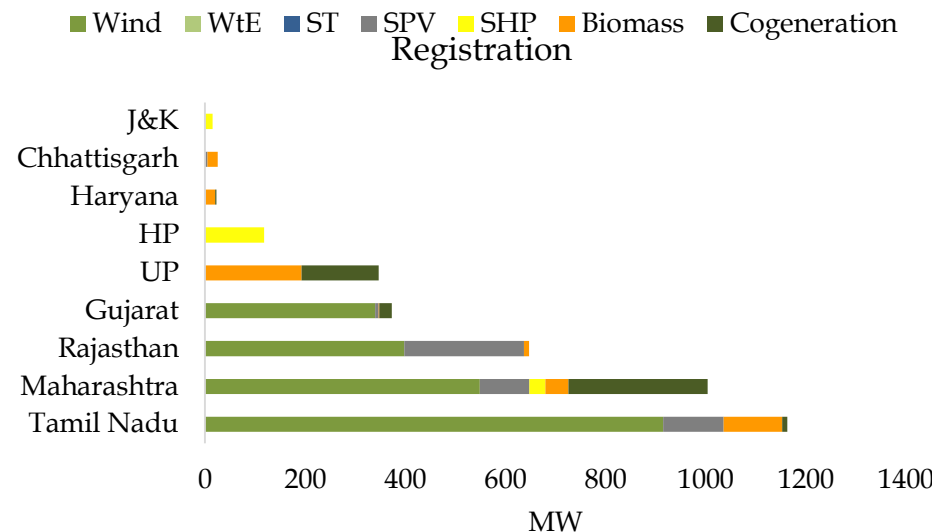
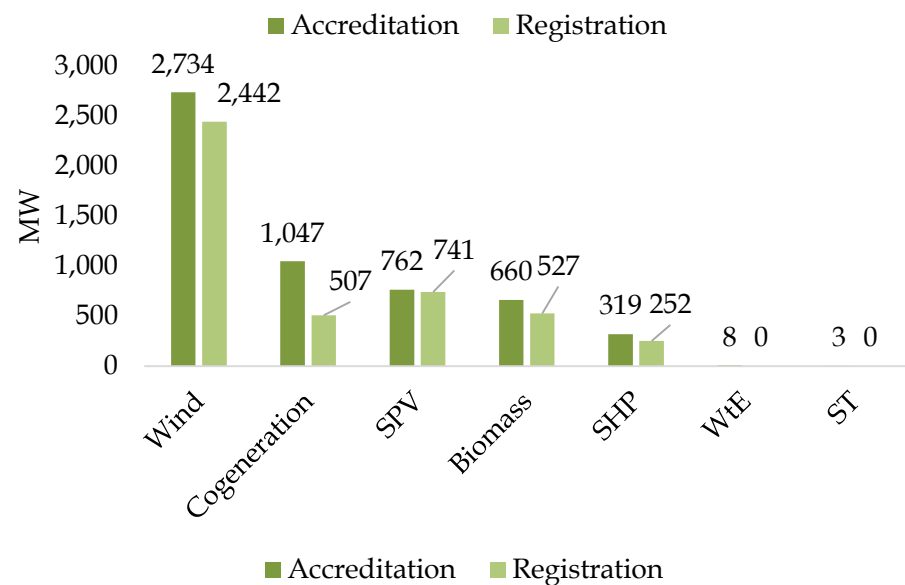
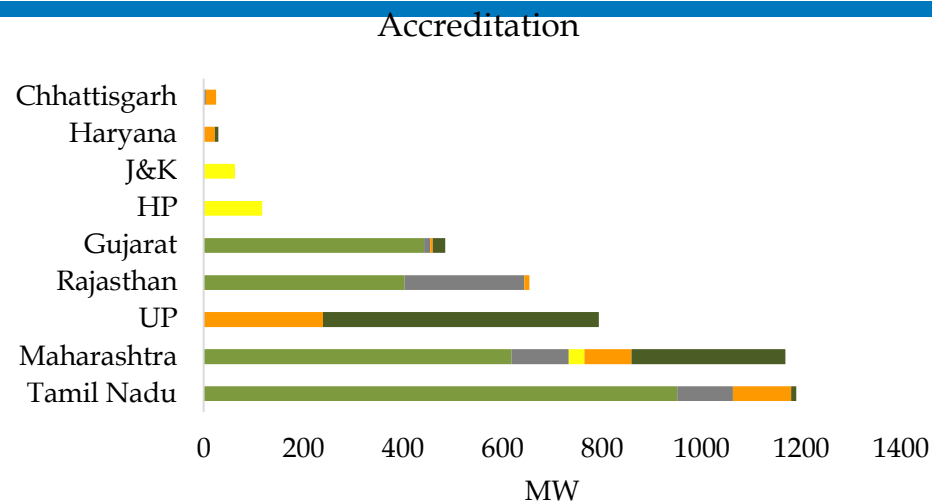
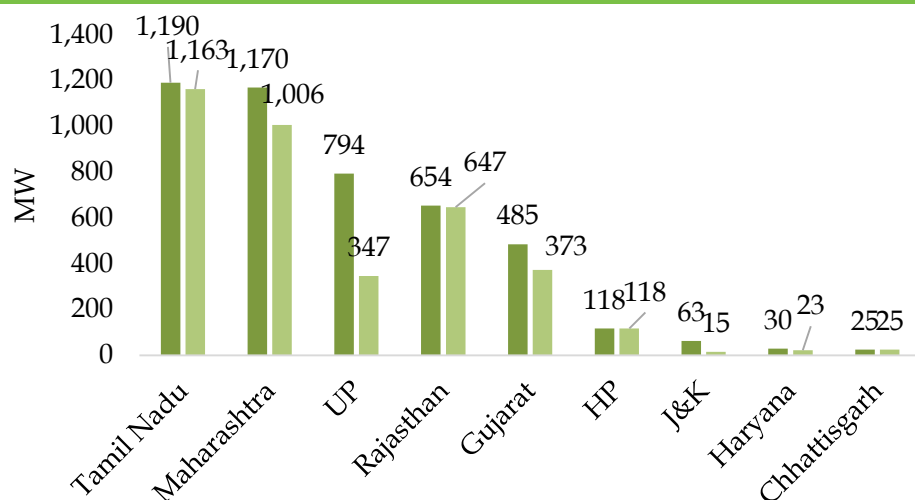
- **Formulated Model REC Regulations for SERCs**
- **Sought Legal Opinion from Solicitor General on key legal aspects**
 - Applicability of RPO to Captive Users and Open Access Consumers
 - Statutory backing for Enforcement mechanism as regulatory measure
- **Introduced Enforcement Mechanism for non-compliance**
 - Apart from legal provisions under EA 2003, obligated entity has to contribute a charge to Fund at Forbearance Price.
 - Fund to be utilised for purchase of RECs or creation of RE infrastructure as directed by SERCs
- **Extended scope of RPO applicability to captive users, open access consumers apart from DISCOMs**
- **Undertook study for setting RPO targets and long term trajectory at National level to accomplish NAPCC goals**



Status of Accreditation and Registration of Projects

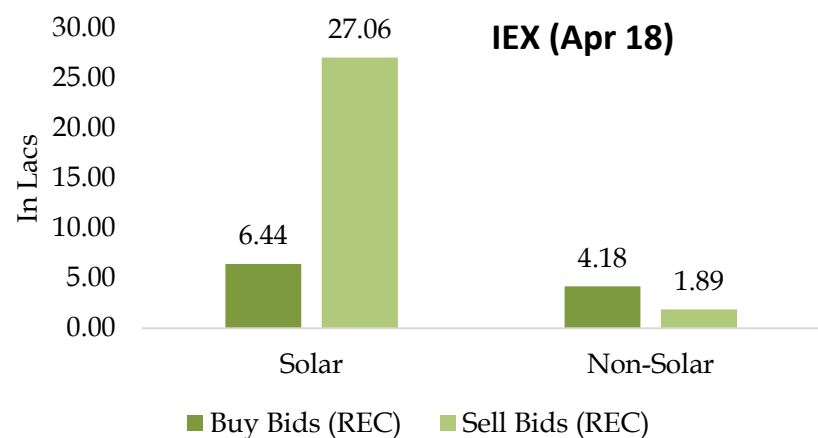
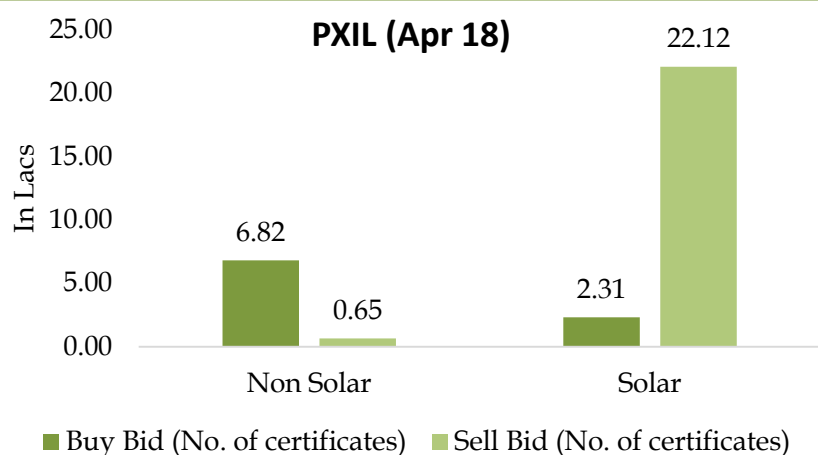
➤ Total Accredited RE Capacity : 5535 MW

➤ Total Registered RE Capacity: 4471 MW



Wind WtE ST SPV SHP Biomass Cogeneration

Status update on REC transactions and inventory



Month, Year	Opening Balance (A)	REC Issued (B)	No. of RECs Redeemed		Total E = (C + D)	Closing Balance (F = A+B-E)
			RECs Redeemed through Power Exchanges (C)	RECs Retained by RE Generators (D)		
Jan, 2018	12,507,215	667,587	1,230,826	55,514	1,286,340	11,888,462
Feb, 2018	11,888,462	336,128	2,358,396	25,004	2,383,400	9,841,190
Mar, 2018	9,841,190	492,681	2,769,433	72,153	2,841,586	7,492,285
Apr, 2018	7,492,285	330,789	1,062,661	28,704	1,091,365	6,731,709
May, 2018	6,731,709	174,254		-	-	6,905,963
Total:		46,603,045	38,105,832	1,591,250	39,697,082	

- Accumulated Inventory of RECs is slowly depleting; closing as on April 2018 is around 7 million RECs.
- Stringent enforcement of RPO is expected to reduce the inventory further
- RECs are mostly traded at floor prices owing to weak demand

Way forward for RPO and REC Mechanism

➤ RPO trajectory and Compliance Monitoring

- Long term RPO trajectory and improved periodicity for compliance
- Verification and Enforcement of RPO targets by SERCs for all Obligated Entities

➤ Next level of reforms in REC framework needs to be ushered in.

- Enabling multiple/bilateral transactions for REC trading
- Long term visibility of Floor/Forbearance price
- Standard Rules for procurement at APPC/ Model contracting arrangements

➤ Deepening and widening the scope of REC mechanism

- Encouraging participation by Voluntary market players
- REC multipliers for emerging technologies – WtE, RTPV

Thank You

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