

Renewable Regulatory Fund (RRF) Mechanism in India

Forecasting, balancing and Scheduling of Renewable Energy in India

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Grid Integration of Infirm Renewable

- **Large scale penetration of infirm wind poses challenge to grid operation.....Hence**
- **CERC initiative to provide framework for**
 - forecasting and scheduling of Wind Generation and
 - complementary commercial mechanism (**Renewable Regulatory Fund (RRF) mechanism**)
- **Objectives of RRF mechanism :**
 - To induce the wind generator to reveal its schedule of generation as close as possible to the forecast actual generation.
 - To minimize the impact of variable renewable energy generation on the host state.
 - To insulate the renewable generator from commercial impact of deviation of generation within a tolerable range.

RRF Mechanism (complementary commercial mechanism)

- **RRF: Basic principles**
 - Wind generators (commissioned after a specific date) mandated to undertake forecasting and give schedule of their generation on a day ahead basis
 - flexibility of revision of schedule closer to real time
 - Commercial impact on deviation from schedule of generation
 - For deviation within a permissible limit - no commercial impact for wind generators
 - For deviation beyond this limit – wind generators liable to pay deviation charge which is linked to grid frequency

RRF Mechanism (complementary commercial mechanism)

Framework under Indian Electricity Grid Code (IEGC)

- Threshold limit for scheduling
 - ✓ *Wind farms with collective capacity of 10 MW and above,*
 - ✓ *Solar generating plants with capacity of 5 MW and above*
 - connected at ≥ 33 KV level and at pooling stations commissioned on or after 3.5.2010.....to give day ahead schedule
- Forecasting/scheduling requirement for wind generators
 - ✓ Wind generators to forecast up to an accuracy of 70%
 - ✓ Revisions up to a max 8 times in day (1 for each 3 hr time slot)
 - ✓ Revisions after a 6 time block notice
- Commercial Impact for deviation of actual generation from scheduled generation
 - ✓ wind generators (i) not liable to UI charges for deviation within the permissible band of +/- 30% w.r.t. schedule; (ii) liable to UI charges for deviation beyond this limit.
 - ✓ No UI charge payable/receivable by solar generators
 - ✓ Implication of UI charges to be shared by all the States/UTs/DVC

Implementation of RRF Mechanism

- ✓ IEGC Regulations, 2010 notified on 28.04.2010
 - ✓ Implementation of RRF Mechanism envisaged from 1st Jan 2011
- ✓ RRF Procedure
 - ✓ Procedure was notified on 18.02.2011, Mock Exercise: 1st July 2011, Implementation: 1st Jan 2012
- ✓ Task Force by MNRE
 - ✓ At the instance of CERC, MNRE constituted a Task Force on 28.03.2012 and submitted Report to CERC on 04.09.2012
- ✓ CERC Order dated 16.01.2013
 - ✓ Applicable to Pooling Stations/wind farms/ Solar Plants commissioned on or after 03.05.2010, Mock Exercise to be started from 01.02.2013
 - ✓ RRF to be Implemented from 01.07.2013, Revised procedure submitted by NLDC
- ✓ CERC Order dated 9.07.2013
 - ✓ Approved revised detailed Procedure for implementation of RRF mechanism
 - ✓ Directed implementation of the mechanism with effect from 15.7.2013
- ✓ CERC Order dated 07.01.2014
 - ✓ *“...While the forecasting and scheduling of wind generation shall continue as per the provisions of the Grid Code and RRF procedure approved vide our order dated 9.7.2013, the commercial mechanism outlined therein shall remain suspended till further orders”.*

Status of Mock Exercise

S.	State	No. of wind/solar Pooling Station (PS) under RRF		No. of wind/solar PS giving schedule		Coordinating Agency (CA) Designated
		No. of PS	Capacity in MW	No. of PS	Capacity in MW	
Southern Region						
1	Tamil Nadu	1	101	0	0	Not yet identified
2	Karnataka	12	513	6	317	Identified for 1 PS, legal authorization not submitted
3	A P	10	255	2	0	Not yet identified
Western Region						
1	Gujarat	75	1636	75	1636	Identified for 2 PSs, legal authorization submitted to SLDC
2	Maharashtra	8	917	5	587	Not yet identified
3	M P	9	197	9	197	
Northern Region						
1	Rajasthan	31	1157	0	0	Identified for all PSs, legal authorization not submitted
Eastern Region						
1	Odisha	1	5	1	5	
	Total	147	4525	98	2742	

Implementation difficulties of RRF Mechanism.....

- ✓ CERC Jurisdiction on intra-State transaction
- ✓ Cut-off date: 3.5.2010: Low Coverage of wind capacity under RRF
- ✓ Inability to achieve accuracy levels (+/- 30%)
- ✓ Forecasting Service providers do not give guarantee to achieve accuracy levels (+/- 30%)
- ✓ Need for provision to take care zero schedule/zero actual generation/very low generation during low wind season
- ✓ Deviation charge linked to UI rate and Reference rate
 - ✓ Inherent gaming possibility in current design
 - ✓ Dose not encourage accurate forecast
- ✓ Financial Impact on wind energy generators
- ✓ Forecasting: An additional Risk not covered under Feed-in Tariff

Implementation difficulties of RRF Mechanism

- ✓ Centralised Forecasting v/s Decentralized Forecasting
- ✓ Coordinating Agency: no significant reputed agencies in this field with proven track record
- ✓ Need for flexibility of revision in Schedule
- ✓ Data communication facilities yet to be made available by most of the Pooling Stations
- ✓ Suspension of Commercial implication creates non seriousness among Generators
- ✓ Need for development of regional balancing market

Way Forward

- ✓ Need for review of existing RRF mechanism. Strong case being made for the following:.....
- ✓ All wind energy generators need to give mandatory scheduling
 - ✓ Older plants to be exempted from imbalance charge for deviation from schedule.
- ✓ In long run, centralised forecasting approach need be adopted for integration of large scale variable renewable energy
 - ✓ Renewable Energy Management Center (REMC) need be developed at State level
- ✓ Need for de-linking imbalance settlement from UI rate and Reference rate
- ✓ Shorter Gate Closure and more revision in Schedule
- ✓ Tolerance limit w.r.t. installed Capacity to resolve issue of zero generation during low wind season
- ✓ Imbalance charges at the fixed rate in paise/unit for deviation beyond the limit
- ✓ Need to do away with the provision of payment for excess generation beyond 150% at UI rate of 50-50.2 Hz
- ✓ Need for incentive mechanism for better forecasting

CERC examining all issues, concept note/draft regulation likely shortly

THANK YOU!!!

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