

Flexibility in Generation and Scheduling of Thermal Power Stations to reduce emissions

ERPC – Kolkata

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Background

Need for allowing Flexibility in Generation:

- **Need for balancing power:**

Due to large scale integration of Grid connected renewable which inherently has huge variability of generation, there is a requirement of balancing power which matches with such variations so that the security and stability of Grid is maintained.

Under present regulation, such balancing power is to be arranged by the Discoms.

- **Additional financial burden to Discoms to meet RPO:**

Most of the states already have adequate PPA. In order to meet the RPO, Discoms will have to tie up additional RE power which will pose additional financial burden on them.

Need was felt to allow some flexibility in Generation and scheduling of Thermal Power Stations so that Discoms are able to meet their RPO without facing any additional financial burden.

**The mechanism of allowing Flexibility in Generation and
Scheduling of Thermal Power Stations was issued by
Ministry of Power on 5th April 2018**

Flexibility to Generating company

- The generating company having thermal stations shall have the flexibility of using its Thermal power or renewable power to meet its scheduled generation from the specific thermal generating station.
- Generating company may establish or procure renewable energy generating capacity anywhere in the country and utilize such renewable capacities for supplying power against existing commitments .
- For procurement and supply of RE power by the Generator for supply, any License required need to be met by the respective Generating Company.
- The scheme shall be applicable only for the Thermal projects developed / being developed under Section 62 of the Electricity Act, i.e., "Regulated Tariff based Projects".

Use of flexibility in generation as proposed in the scheme is OPTIONAL and only if found feasible Generator can use power from RE sources to replace its existing thermal power to meet its schedule generation from thermal power station

Scheduling and commercial mechanism

- Declared Capacity (DC) shall be declared by the existing Thermal generating station as per the extent regulations.
- The Declared Capacity of the Thermal Generating station shall be with respect to the terms of the PPA and the availability of primary fuel.
- The declared capacity of thermal generating station cannot be based on the availability of the additional RE power.
- Once the schedule for the next day is received, the generating station shall have the flexibility of using its Thermal power or the generating company owned renewable power or procured RE Power to meet its generating station scheduled generation.

Scheduling and commercial mechanism

- The Power from RE stations would be supplied to the Beneficiaries at a Tariff which shall be equal to Energy Charge Rate (ECR) of the power station which was originally scheduled.
- The net gain realized from supply of RE power in place of thermal power under existing PPA shall be passed on to the beneficiary.
- For this purpose, at the end of the year, truing-up can be done by the Appropriate Commission and the net gain earned by the Generator shall be shared with the beneficiary in the ratio of 50 (Beneficiary) : 50 (Generator).

This shall not be applicable to RE Projects for which PPAs have already been signed by the Generator and Beneficiaries.

Deviation Settlement Mechanism (DSM) & Scheduling

- For the purposes of flexible scheduling and operation of thermal stations, while giving the DC of the existing thermal station the generator shall not take into the account the forecast of generation from renewable component.
- Once the schedule for specific thermal generating station has been received, then depending upon the forecast available for RE energy, that Generating Station shall supply power either from existing thermal station or combination of thermal and RE power to meet its scheduled power .
- The sum total of all the power actually supplied from various generating sources shall be considered for DSM purposes.
- Thus the deviation, if any, shall be made applicable to the scheduled generation from thermal station and sum total of actual generation from thermal/RE sources.

No DSM shall be payable/receivable by the generating station if it is able to meet its scheduled generation by supplying thermal and RE power in any ratio.

RPO/ RGO

- Such renewable energy procured by the beneficiaries shall qualify towards meeting their Renewable Purchase Obligations (RPO obligations).
- Power which is generated from such renewable energy shall be eligible for any cross subsidies notified by the Government from time to time including waiver from ISIS transmission charges and losses as per notification from the Government.
- Such renewable power in capacity terms shall also qualify for Renewable Generation Obligations (RGO obligations) for the generators as envisaged in the Tariff Policy and as and when notified by Government of India.

Implementation and Monitoring

- Changes, if any, required in the Regulation for implementation of the above scheme shall be made by the appropriate Electricity Regulatory Commission.
- Central Electricity Authority shall monitor the implementation and suggest changes, if required, in the scheme to the Central Government. In doing so, CEA may consult MNRE, POSOCO, CERC, Discoms and other stake holders.

CEA shall also suggest a road map for implementation of the scheme at the Generating company level i.e. a change from Station wise flexibility to company-wise flexibility

Benefits

- The flexibility in generation and scheduling of thermal power stations will :
 - Provide the Power Generators an opportunity to optimally utilize generation from RE sources
 - Beneficiaries of the Power will also get the firm power including Renewable power, which will help them to meet their RPO obligations
 - Help in reducing emissions
 - Facilitate further RE Capacity addition
 - Improve coal stock situations in Thermal plants where flexibility is being used.
- The responsibility of arranging balancing power requirement will now also be shared by the Generators.

Thank You

Issues as identified by ERPC

1. Computation of DSM.
2. Effect of Flexibility in Compensation Accounting.
3. Incentive Calculation.
4. Prevention of gaming.
5. Control area demarcation.

Issue-1: Computation of DSM

- Declared Capacity (DC) shall be declared by the existing Thermal generating station as per the extent regulations.
- Based on DC, the Schedule shall be given to the generating station.
- The sum total of all the power actually supplied from various generating sources shall be considered for DSM purposes
- **A Committee has been constituted in CERC with members from CERC, POSOCO and NTPC to deliberate on the issues to be addressed for smooth implementation of the scheme.**

Issue-2: Effect of Flexibility in Compensation Accounting

- **Compensation Accounting**
 - Compensation accounting is accounting of compensation given to generators in case of less schedule given to them.
 - Compensation accounting is being done based on Scheduled Generation.
 - In the Flexible Generation mechanism, schedule is being given to Thermal Station based on DC given by them only, hence Compensation Accounting has to be done as on current practice only.

Issue-3: Incentive Calculation

- **Current mechanism of incentive for thermal generating stations includes**
- **Incentive eligible for Thermal Generating Stations is being calculated based on the schedule generation given to them.**
- **In the Flexible Generation mechanism, schedule is being given to Thermal Station based on the DC given by them only, hence Incentive calculation has to be done as on current practice only.**

Issue-4: Prevention of gaming

- Declared Capacity (DC) shall be declared by the existing Thermal generating station as per the extent regulations based on availability of primary fuel only.
- The Declared Capacity of the Thermal Generating station shall be with respect to the terms of the PPA and the availability of primary fuel.
- The declared capacity of thermal generating station cannot be based on the availability of the additional RE power.
- **The Coal Stock positions in Power Stations is being monitored daily by CEA, hence gaming on DC due to fuel non-availability, if any, can be checked.**

Issue-5: Control area demarcation

- Control Area:
- A Committee has been constituted in CERC with members from CERC, POSOCO and NTPC to deliberate on the issues to be addressed for smooth implementation of the scheme.



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SCHEME



- The proposed scheme shall be applicable only for Thermal projects developed/being developed under section 62 of the Electricity Act i.e. “Regulated Tariff based Projects”
- Use of flexibility generation as proposed is optional.
- Changes required in the Regulation for implementation of the scheme shall be made by the appropriate Electricity Regulatory Commission.

Need for flexible generation



- **Issues faced by DISCOMs**

1. Need for balancing power: As RE generation sources are intermittent in nature and have a degree of uncertainty, the DISCOMs need to arrange balancing power to meet the power requirement when RE energy will not be available. Under present regulation, such balancing power is to be arranged by the DISCOMs.
2. Additional financial burden to DISCOMs to meet RPOs: States those have already adequate PPA will have to take additional financial burden to meet the RPO obligation.

What has been suggested:

- *Flexibility will be given to generating stations to generate RE power and supply power under existing/future contractual agreements.*
- *DISCOMs will have flexibility to procure RE power within their existing PPA and meet their RPO.*

Need for flexible generation



As per the proposed mechanism,

- *generating unit may establish or procure RE generating capacity anywhere in the country either at existing stations or at new locations.*
- *The generating companies would be allowed to utilize such renewable capacities for supplying power against the contract from thermal stations anywhere in India.*

Scheduling and Commercial Mechanism



Declared Capacity:

DC shall be declared by thermal generating stations with respect to terms of the PPA and the availability of primary fuel. The DC cannot be based on the availability of additional RE power.

Schedule & Generation:

After receiving the schedule for next day, generating station have the flexibility of using its thermal power or its own RE power or procured RE power to meet the scheduled generation.

DSM:

DSM charges shall be applicable if there is a deviation between scheduled generation of thermal stations and sum total of actual generation from Thermal/RE sources. No DSM is payable/receivable if generating station able to meet its scheduled generation by supplying thermal/RE power in any ratio.

Commercial settlement



1. The tariff of RE power will be equal to ECR of power station which was originally scheduled.
2. This tariff would include the balancing cost and the tariff risk taken by generator.
3. Net gain from supplying of RE power in place of thermal power will be calculated considering balancing power support provided and the risk taken by the generator. Truing up will be done by appropriate commission.
4. Net gain, if any, earned by generator shall be shared with beneficiary in the ratio of 50:50.

Food for thought



- D.iii.a: The thermal generating companies shall have the flexibility of using its thermal power or its owned renewable power or procured RE Power to meet its generating station scheduled generation.
 - Whether Thermal Station will declare the schedule from RE stations in their final schedule or on post facto basis it will be given.
 - If RE schedule not declared how the DSM of RE station will be treated.

Food for thought



- D.iii.b: The sum total of all the power actually supplied from various generating sources shall be considered for DSM.
 - The aggregation of all the RE power from different RE stations of different Regions for different time blocks would be a cumbersome task.
 - The actual SEM data from all RE sources from different Regions will need to be collected and processed.

Food for thought



- D.iii.c: The Declared Capacity (DC) of Thermal Station.
 - The DC will be completely dependent on the faithfulness of Thermal Station.
 - There must be checks for declaration of the DC by thermal Station.

Food for thought



- D.iii.e: The Tariff of power supplied by RE stations.
 - Balancing cost: The methodology for arriving the Balancing Cost has to be defined.
 - What are the Risks to be taken by Generators.
 - What about the fixed cost of Thermal Station corresponding to the supplied RE power.
- D.iii.h: The extra generation capacity available from existing thermal station
 - The Treatment of extra power available due to flexile operation

Energy Accounting issues



- How RE power will be shared among the beneficiaries of a particular station.
 - I. If a particular RE plant is tied with no of generating stations/companies, how to share its generation among the generating stations.
 - II. If multiple RE plants are tied with a generating station from different regions for different time blocks, how to differentiate its generation among the beneficiaries.
- Incentive Calculations
- Compensation mechanism
- The share of RE power in drawl of beneficiaries could only be known post facto.

Other Issues



- Transmission Corridor availability and booking for RE power.
- Fragmented Control Area operation.
- Limitations of thermal Stations for using RE sources for flexible scheduling.
- Planning of Renewable Purchase Obligations (RPO) by beneficiaries.



Thank You