No. 23/21/2018-R&R
Government of India
Ministry of Power
***

Shram Shakti Bhawan, Rafi Marg,
New Delhi, 17th July, 2018

To

1. Chairperson, Central Electricity Authority, New Delhi.
2. Secretary, CERC, New Delhi.
3. Pr. Secretary/Secretary (Energy/Power), State Governments.
4. CMD, PGCIL, Gurugram.
5. CMD, POSOCO, New Delhi.
6. CMD, NTPC, New Delhi.
7. DG, Association of Power Producers, New Delhi.

Subject: Draft concept note on 'Merit Order Operation – Flexibility in Generation and Scheduling of Thermal Power Stations to reduce the cost of power to the consumer' – regarding.

Sir,

I am directed to say that a draft concept note on "Merit Order Operation – Flexibility in Generation and Scheduling of Thermal Power Stations to reduce the cost of power to the consumer" has been prepared to optimize cost of power.

2. A draft concept note on the above subject is enclosed with the request that comments of your Department/Organisation may please be furnished to this Ministry by 1st August, 2018.

Yours faithfully,

Encl: As above

(Sandeep Naik) 17.7.18
Director
Tel: 2371 5250

Copy for information to:

PPS to Secretary (Power), PPS to AS(R&R), PS to CE(R&R), PS to Dir(R&R).

DRAFT

Flexibility in Generation and Scheduling of Thermal Power Stations to reduce the cost of power to the consumer

A. Background

There has been a significant increase in the installed generation capacity in the country to around 344 GW as on 31.5.2018 which includes the RE Capacity of around 70 GW. The peak electricity demand in the country was around 173 GW. Due to huge generation capacity addition and the demand growth not being commensurate with the capacity addition, has resulted in decreasing PLF trend of the coal based thermal power plants. This has resulted in the increased un-requisitioned power from coal based thermal power stations in certain periods. Moreover, since power from Central Generating Stations is allocated to beneficiaries within a region, it has also been observed that at many times cheaper power from one station in a region remains un-requisitioned while costlier power of other station in other region is dispatched which results in increased average cost of power for the country. PLF of the coal based stations is expected to further decrease with increased addition of Renewable based capacity and therefore the aberration of cheaper stations remaining unutilized and costlier station running may increase.

The Government of India has taken various policy initiatives in order to reduce the cost of generation. In the year 2016, Government had allowed "*flexibility in utilization of domestic coal by States*". Earlier, each power plant owned by a company signed Fuel Supply Agreements (FSA) for supply of coal from a specified coal mine. The policy for flexible utilization of coal allowed a company to use coal within its basket in the most optimal manner such that unnecessary coal transportation is avoided and the benefits of lower costs of power generation could be passed on to the beneficiary states.

Thereafter, on 05.04.2018, Government had issued scheme for "Flexibility in Generation and Scheduling of Thermal Power Stations to reduce emission" wherein flexibility has been given to generating company to supply Renewable power against schedule received for thermal power. The Scheme envisages sharing of benefits, if any arising out of the scheme, between the generators and beneficiaries in 50:50 ratio.

In a similar manner, in order to reduce the overall cost of generation of a generating company, flexibility should be given to generating company to supply power from any of its generating station against schedule received for its stations and gains realized in the process could be shared with beneficiaries.

B. Need for Allowing Flexibility in Generation for cost optimization

(i) Optimisation in scheduling of generation to reduce overall cost of power at national level

We have already achieved "One Nation, One Grid, One Frequency and at present on most of days One Price in the electricity Exchange". The Electricity Grid had evolved from local grid to State level grid and then to Regional Grid and finally National synchronous electricity Grid. Indian Electricity Grid is also connected to other countries (Bhutan, Nepal and Bangladesh) to gain international character. Accordingly, with the constraint free robust transmission grid in place, time has come to move ahead from regional level scheduling to National level optimization in scheduling of generation.

At present the Discoms/ States tie-up for supply of power from various power stations/ generating companies. States generally requisition power from a station on day ahead basis considering its merit order among all the stations from which it has power tie-up. However, on a national level, it is seen that many stations having low Energy Charge Rate (ECR) are not fully scheduled whereas the costlier stations are scheduled at the same time. The needy beneficiaries are not able to schedule power from stations having lower ECR as

they do not have power allocation/ Power Purchase Agreement (PPA) in these stations. They have no other option but to schedule the costlier power available in their basket. Therefore, cheaper power of a station in a region remain unutilized whereas at the same time costlier power of a station in another region is dispatched which results in increased average cost of power for the country.

In order to maximize utilization of cheaper power, flexibility needs to be given to the generating company to supply the power requisitioned by beneficiaries / States through Merit Order operation of its stations on national level, that is, cheaper station of the generating company shall be dispatched up to its maximum capability before scheduling costlier stations till the total power requisitioned by all its beneficiaries is met.

(ii) Optimum utilization of the railway infrastructure for transportation of coal to power station

Generally, the cheaper power is available at the pit head power stations or power stations located nearer to the mines. In both cases, the coal transportation coat is less resulting in the cheaper power. The turnaround of railway rakes is faster and reliability of coal supply to such power stations is also better. As per CEA, normative requirement of coal stock in the pithead power stations or the stations located nearer to the mines are less thus requiring less inventory cost. Government has already decided that coal transportation for the plants located within 20 km from the mines has to be done by Closed conveyor belt (except the existing plants which has MGR) and plants located between 20 to 40 Km from mines through MGR.

Thus, if national level optimization in scheduling of generation is done, there would be more generation from pit head stations resulting in less requirement of coal movement to far off power plants. Railways infrastructure which is constrained at the moment particularly for up country movement and at other

locations, can be better utilized under this. During 2017-18 and the 2018-19 (till date), it has been observed that most of the power stations located far from the mines has critical or supercritical coal stock.

C. Benefits Envisaged:

a. Optimal utilization of the available resources by running the generating stations supplying power at lesser tariff and reducing the overall average cost of generation.

b. Optimum utilization of the railway network due to optimum utilization of pit head stations and reduced generation from more expensive generating stations requiring transportation of coal over long distances.

c. Flexibility will enable higher loading of cheaper generating stations resulting in improvement of their operational efficiency as against the present efficiency level.

d. The energy accounting and billing shall remain the same as per extant regulations. Only the gains shall be shared with the beneficiaries, thus the average cost of power to the beneficiaries shall reduce.

e. More pooled reserve capacity would be available to take care of any unforeseen contingencies in the grid.

D. Proposed Mechanism for allowing Flexibility in Generation for cost optimization

a. Station-wise allocation to different beneficiaries as per the present system shall continue.

b. Individual power station shall declare its Availability to Regional Load Despatch Centre (RLDC) as per existing practice. A replica to be maintained

at the National Load Dispatch Centre (NLDC) for Inter-regional Scheduling (or National level scheduling).

c. RLDC/NLDC shall seek total requisition from all the beneficiaries against their total entitlement from different Stations of a Generating Company as per present system.

d. Based on the requisition received from the beneficiaries, RLDC/NLDC shall issue the Original Schedule (**R-0**) for Generating Stations as is being done presently, which shall be used for raising bills.

e. Based on the total power requisitioned by various beneficiaries of the generating company, RLDC/NLDC shall schedule the stations of the generating company, subject to transmission constraints, as per Merit Order of the generating company such that the station of that generating company having least ECR shall be first utilized fully (i.e. up to its DC) followed by the next station with next higher ECR which shall be dispatched to the maximum and so on till the entire schedule of all beneficiaries is met by the generating company.

f. RLDC/NLDC shall complete such Merit Order operation based Generation Bucket Filling (**GBF**) scheduling subject to any constraint arising due to transmission / other Grid security.

g. Thereafter, RLDC/NLDC shall issue the actual dispatch schedule (**GBF-0**) for the generating stations. It is possible that the schedule of some Stations may be lowered to technical minimum level and few others may be put in Reserve Shut Down. In case the last generating station's schedule is less than the technical minimum level, the schedule of last but one generating station in the merit order may be reduced to an extent so that the last station gets scheduled to the technical minimum. The generating stations which could not get schedule due to higher cost in the merit order will be required to be on reserve (spinning reserve as per requirement of the Grid code, if any).

h. Stations of a Generating Company shall be required to generate as per such finalized **GBF-0** Schedule.

i. The generating stations and beneficiaries will be free to revise their availability and requisition respectively in real time as per present practice. The revision made by the generating stations or the beneficiary shall be reflected in the revision of GBF.

j. Schedules of Beneficiaries under GBF may be treated as temporary re-allocation to facilitate Long Term Access and avoid extra charge under STOA.

k. Energy Accounting and billing methodology shall remain the same as per extant regulations i.e. based on the schedule given by the beneficiary for individual stations.

l. The net benefit realized, if any, from supply of power from station having lower ECR power in place of costlier thermal power not scheduled and billed due to National Merit operation of its stations by a generating company shall be shared with the beneficiaries in the ratio of 50:50. The gain, if any, during the month shall be equally shared in proportion to their total drawal from the generating company and the reconciliation would be done annually. (Example: Say total gain is Rs 200 cr and the total energy sold during the month is 20000 Million units. The gain to be distributed among the beneficiary would be Rs 100 Cr. So, there would be a reduction of 5 paise per unit (1000/20000x100= 5). If say a beneficiary has purchased 5000 million units from the generating company, he will be paid back Rs 25 crore.)

m. The unrequisitioned surplus power of the generating company can be requisitioned by any beneficiary of the generating company provided he agrees to pay for it. A common supplementary PPA between generating company and the beneficiary(ies) may be signed to enable this.

n. **Deviation Settlement Mechanism (DSM):** Stations shall be subjected to charges for deviations from Actual Dispatch schedule (**GBF-0)** under DSM Regulations as per existing practice. The Deviation settlement mechanism may be evolved at the level of the generating company instead of power station wise as per the existing practice. The appropriate commission may work out a mechanism for the deviation settlement of the aggregated schedule of the generating company vis-à-vis the actual drawal from the generating company.

o. **Part-Load Compensation:** The Part-load compensation shall be billed based on the Original schedule **R-0** and as per extant Regulations. Difference between compensation billed based on Original schedule **R-0** and compensation arrived based on Actual Dispatch schedule **GBF-0** shall be taken into account while calculating net gain defined in Para D (l) above.

p. **Incentive:** As incentive is payable by the beneficiaries of a station as per the energy scheduled by them, incentive would continue to be based on the **R-0** Schedule and as per extant Regulations.

E. Implementation of the Scheme

a. Changes, if any, required in the Regulation for implementation of the above scheme shall be made by the appropriate Electricity Regulatory Commission.

b. National Merit Order Despatch shall bring out benefits as envisaged above, however there may be Operational and Commercial issues that may arise during implementation of scheme at national level for all Generating Companies i.e. Cenral, State and Private Generating Companies. To start with initially, this scheme shall be implemented by Central Generating Stations. Accordingly the Central Generating Companies shall be able to implement the scheme.

c. The scheme may be suitably extended to other Generating Companies based on the experience gained during the process and in consultation with the stakeholders.

d. Central Electricity Authority shall monitor the implementation of this scheme and resolve any issues arising during its implementation. The status of implementation will be sent to Ministry of Power on quarterly basis.

e. The scheme may be reviewed by MoP/ CEA after one year. If required, the scheme may be modified based on the operational feedback by the stakeholders.