

Comments from stakeholders on Draft Guidelines for assessment of ramping capability

- 1. Tm should be total number of blocks where on-bar DC is declared excluding the blocks to reach technical minimum during start-ups plus four blocks for stabilization (SRPC)**

All outages including RSD and all blocks below Tech min should be removed while counting Tm & Td (NTPC)

The total time blocks taken shall be the time blocks for which the unit is on bar. (KSEBL)

The Tm computation shall be based on the DC declared blocks excluding blocks upto technical Minimum and eight blocks above technical minimum during startup of Units owing to stabilization of Boiler water/steam chemistry parameters. Td/Tm shall be at 0.85 (NTPL)

It is recognized that Tm should include the blocks where at least one machine is on-bar. Furthermore, startup/shutdown blocks would also be excluded from computation of Tm. Therefore, Tm shall include only the blocks when non-zero on-bar DC is declared and when schedule is greater than or equal to technical minimum.

- 2. Ramp rates are being declared per minute while actual and scheduling ramps are based on actual energy as per SEMs/declared by generator. Therefore, there was a need for specifying the ramp rates for scheduling purpose (block wise) and could be compared with the actual ramp rates achieved in a block. (SRPC)**

Block-wise ramp rates are being declared by ISGS in terms of MW/block in the scheduling software of respective RLDCs for each of the time blocks. The ramping in injection schedules of the ISGS is limited to these ramp rates declared by the generators.

- 3. Td/Tm shall be = 1 (as suggested by beneficiaries) / ≥ 0.95 (as suggested by ISGS) / ≥ 0.98 (as recommended by SRPC secretariat/SRLDC) (SRPC)**

ISGS need to declare ramping capability of at least 1%/minute for ideally 100% of time. However, to take care of contingencies that may result in temporary reduction of ramping capability, e.g. tripping of auxiliaries, some margin has been provided and qualifying threshold for Td/Tm has been kept at 0.85. (15% consideration has been given to take care of the above)

- 4. Additional RoE should not be in steps for achieving 1% ramps but rather on linear basis. (SRPC, NTPC)**

In Clause 5.3, computation of additional ROE percentage shall include AARR upto two decimal points instead of the integer AARR (NTPL)

The relevant clauses in the regulation do not allow for additional RoE on pro-rata basis for ramps rates between the steps.

- 5. D is the number of time blocks when the scheduled ramp rate is greater than or equal to 1%/min, excluding the 1st block when ramp direction changes and the blocks to reach technical minimum during start ups plus four block for stabilization. (SRPC, NTPC, NLCIL)**

In clause 4.1, 15% ex-bus generation corresponding to MCR per time block shall be changed to 7.5% ex-bus generation, as ramp up/ ramp down rate of 1% per minute as per CERC regulation will achieve only 7.5% ex bus generation in the block. Generator shall be allowed to increase the declared Ramp Up / Down rate, whenever schedule revision is given (NTPL)

In first block of ramping and whenever ramp changes direction, the ramping capability measured on the basis of average MW from SEM shall be less in the particular blocks. To take care of this aspect, during the blocks when ramp starts from flat schedule or changes directions, if the actual ramp is $\geq 50\%$ of scheduled ramp/ benchmark ramp, such blocks would be counted as having satisfied the ramping requirement. This will be suitably incorporated in the revised guidelines.

6. **Calculation of ramping performance of each thermal ISGS shall be carried out by RPCs at the end of each month of financial year on cumulative basis, and shall be posted on respective RPC websites (SRPC)**

Billing Mechanism has not been addressed in the Procedure. The same needs to be incorporated. Billing corresponding to 1% ramping rate can be billed along with monthly bill. Incentive / disincentive may be billed on monthly /quarterly basis based on ramping statement issued by RLDC. (NTPC)

Calculation shall be done by RLDCs which shall be certified and published by RPCs.

7. **Issues in comparing corresponding change in actual vs schedule under different conditions – margins in DSM, sign change, touching technical minimum, touching normative ex bus injection, AGC-DCS, technical issues in units, coal quality issues. (SRPC)**

F/D computation may be considered as 0.5 instead of 0.75, due to constraints due to cyclic schedule change, SCED operation and AGC (5 minutes block) operation. In Clause 4.5 & 4.6, the tolerance of 5% in ramp rate for accounting E & F may be considered as 10% due to cyclic schedule change, SCED operation and AGC (5 minutes block) operation (NTPL)

Constraints such as technical minimum, DC, normative ex-bus capability etc. are satisfied at the time of preparation of schedules – scheduled ramp would take into account these factors. For taking care of various technical issues, margin of 25% of blocks has been provided, as qualifying threshold for F/D and E/D is 0.75.

The final implemented schedule shall serve as the basis for computation. To incorporate impact of AGC, 15-minute average AGC MW shall be added to the final implemented schedule.

Net Injection Schedule_t = Final injection Schedule_t + AGC MW and

Where AGC MW is the 15-minute average of (AGC setpoint – Unit Load Setpoint)

8. **Additional RoE= (Average ramp achieved in 'F' blocks - 1) × 0.25%. In the above formula, the component 'Average ramp achieved in F blocks' may be restricted to 'Average of declared ramp of Tm blocks'. (SRPC)**

Generators may or may not be able to fulfil the declared ramp rate. Therefore, actual performance needs to be taken into account to holistically assess ramping capability.

9. **F/D calculation may be changed to 0.25 from the proposed 0.75 in the draft, due to constraints faced in Lignite based power plants which restricts the higher ramp up/ramp down (Low calorific value and high moisture content of lignite, heavy slag formation above 900°C, load variations (+ or – 5 MW) during furnace water lances operation) (NLCIL)**

F/D of 0.25 would imply that the plant is not able to meet the declared ramp capability in actual operation for 75% of time. It is essential that true ramping capability of the plant should be declared by ISGS.

10. **F computation may also include all blocks where 1% ramp up/down achieved irrespective of scheduling (NLCIL)**

Generators must ramp only when required by the grid / beneficiaries – therefore, ramping shall be assessed only when injection schedule requires ramping.

11. **Penalty shall be avoided at least for the first year till stabilization of the system of operation. The CFBC boilers of TPS2E shall be fully exempted permanently from reduction in RoE for ramp up and ramp down regulations, due to high heat energy retention characteristics because of its refractory lining. (NLCIL)**

The first-year operation (01.04.2020 to 31.03.2020) may be considered as test/ trial operation for assessing ramp capability (NTPL)

Any specific exemptions are beyond the scope of these guidelines. Concerned utilities may approach CERC in this regard

12. **The ramp up and ramp down schedule for every revision shall come into effect well in advance for the system to respond and the same rule followed for Declared Capacity (DC) revision (i.e. Revision is come into force in 4th block from the block in which revision is made) shall also be followed for ramp up and ramp down schedule (NLCIL)**

Despatch schedule of “T” th block needs to be mandatorily made available to the Generators at least at the very beginning of “T-1” th block so that necessary actions may be taken to adhere to schedule (NTPC)

Ramp up/ ramp down is simply part of injection schedule of the generator, the preparation of which is governed by timelines specified in IEGC and other regulations/orders of CERC.

13. **Ramp rate to be considered for scheduling = Declared ramp rate x On Bar DC (not the MCR of the available units). This is necessary since only the on bar units would give the ramp up/down requirements. (NTPC)**

Ramp rate is declared by ISGS in terms of MW/block. The benchmark ramp rate is expressed in terms of percentage of unit capacity on bar less normative auxiliary consumption.

14. **For base load generating stations, there may not be a requirement for such frequent change in generation and thus, RLDC might not require to give such schedules which would test the ramping capability of the generator, however, such situation can't decide whether the generator is capable of ramping rate of more than 1% per minute. Hence, in such cases where the generating station is not being given an opportunity to demonstrate its capability to achieve a ramp rate of 1% per minute, the deemed ramp rate should be assumed to be as declared by the generator with the capping of Tested Ramp Rate. (MPL)**

The additional RoE for ramping capability shall be paid for by the beneficiaries. If the plants are not called upon to provide ramping capability, then paying additional RoE for the same does not appear appropriate. Again, to ensure that generators which are required to ramp very less often and do not get adequate opportunity are not penalized, lower threshold on number of blocks with ramp in schedule D has been kept (90 blocks/month).

15. **Instead of linking AARR to average rate in blocks when scheduled ramp rate is 1%/min or more, it shall be linked to overall average of ramp rates as declared by the generator (T_o) with the capping of Tested Ramp Rate (Tr) and shall not be limited to actual average ramp**

rate of only those blocks where opportunity to ramp has been provided. This is in view of the fact that there could be various uncontrollable situations in a generating station, where on one hand the generator might not be able to declare the ramp rate upto 1%/min, but on other hand for rest of the blocks, generator would be capable to demonstrate and declare ramp rates of more than 1% per min upto the capping of Tested Ramp Rate (T_r), thus making an yearly average of 1% per min. Hence, as far as the generator is capable of achieving an average ramp rate of 1% per minute, the generator shall not be penalised. Hence, for the check for additional RoE, if $E/D \geq 0.50$, then Additional RoE (%) = $(T_o - 1) * 0.25\%$. It would be more appropriate if some scientific/logical reasoning may be provided for selection of such a sample size or such criteria of 75%. Else, we understand that the threshold condition to decide may be considered as 50% instead of 75% i.e if a generator proves its capability for more than 50% of the opportunities given, no adverse action should be taken to reduce its RoE. (MPL)

Additional RoE should be paid by the beneficiaries only if the ramp capability is utilized in normal operation. Demonstration under test conditions without providing this capability to the grid is different from providing ramping capability under actual operation.

Threshold for E/D and F/D has been kept at 0.75 instead of 1 considering that under certain condition, generators might not be able to follow the scheduled ramp, like taking in or cutting out of mills, tripping of auxiliaries or other technical issues.

16. **Let's assume that the generator is forced to perform a ramp up of declared ramp rate, for which unit needs to take a standby mill in operation and other related procedures, whereas in subsequent time block, the generator/unit is required to ramp down at the same declared rate. In such a case, where the unit would be under the effect of procedures taken in prior block to give effect to ramp rate, steps taken down for ramp down in subsequent time block may not be prevalent and thus, the unit may not succeed in achieving the declared ramp rate. Hence, it is pertinent to mention to include appropriate treatment of such instances in the standard procedure (MPL)**

To take care of such instances, margin of 25% has been provided in E/D and F/D.

17. **In view of the Real Time market which is to be operational from 01.04.2020 and with these rules of Ramping rate in place, it is expected that the generators might face frequent ramping instructions which might cause a lot of wastage of system heat and in other words, would lead to losses which should be compensated under such regulations/procedure. (MPL)**

This matter is beyond the scope of these guidelines.