

Comments and Objections on the proposed CERC (Deviation Settlement Mechanism and Related Matters) Regulations, 2021

1. The **objective** of the proposed Regulations, as may be inferred from the Preamble, Regulation 2 and Regulation 5(1), is to stop all regional entities from deviating from their schedules 'in the interest of reliability, security and stability of the grid', and this is proposed to be done through deployment of a commercial mechanism, which in the proposed Regulations is nothing but a camouflaged scheme of **penalties**. We seem to have forgotten that the large integrated power systems around the world have operated satisfactorily through close coordination and cooperation between all constituents of the system (including all load despatch centres), and not through distrust and enforcement.

2. The **questions** which arise here are: (a) Can the normal / common deviations from schedules be stopped? (b) Do such deviations reduce the reliability, security and stability of the grid? and (c) What does the proposed commercial mechanism entail, and what would be its impact? I have tried to answer these hereunder. I propose to send my suggestions to you in the coming days.

3. Every regional entity, as per Regulations 2 and 5(1), has to adhere to its schedule and is not to deviate from the same. Such a requirement / expectation is not pragmatic. For example, the power drawn by a **Distribution company** from the grid would always equal the sum of its aggregated consumer load and distribution losses at that time, and would vary from time to time as the consumer load varies over the day. In actual operation of the system, the Distribution company would work out the **expected** power demand of its area for the next day, based on past data, weather forecast, etc., and would accordingly provide a **drawal schedule** (for each of the 96 time-blocks) to the concerned load despatch centre.

4. However, on the day of operation, the **actual drawal** of the Distribution company from the grid would depend on the sum of the actual load of the consumers (over which the Distribution company has no direct control), and may or may not be same as that assessed on the previous day. This would result in a **deviation** from the schedule. If the actual load is higher than the assessment, the only way in which the Distribution company could adhere to its schedule is through load-shedding, which is most undesirable. If the actual consumer load is below the assessment, the Distribution company can do nothing about it within the concerned 15-minute time-block. In other words, the deviations from schedule are **inevitable** for the Distribution companies.

5. I have taken the example of a Distribution company above for simplifying the point I am trying to make. The above is valid for Union Territories (which have no

generation of their own, and the Distribution company itself is the regional entity), but in the case of **States**, the Distribution companies are embedded in the State's grid, and the State as a whole is a regional entity. While a State can try to control its actual drawal by varying its own generation in step with the consumer load variation, this compulsorily requires AGC (automatic generation control), which has not been there even in the days of SEBs (with generation, distribution and SLDC under one ownership). The generation control to regulate the State's drawal from the grid is becoming more and more difficult with diverse ownership of generating stations. In other words, even the States (as regional entities) will have deviations from their drawal schedules in spite of their best efforts.

6. A further point to note is that even with full-fledged **AGC** in operation, there is invariably a lag of many minutes between a load change and the generation change, and during the intervening period, a State's actual drawal would remain deviated from the schedule. In the established practices of conventional load dispatch followed in Western countries, the resulting mismatch between the scheduled and actual energy in a time-block is acceptable, and is allowed to be returned in kind, i.e., through a deviation of opposite polarity, in a subsequent time block. In other words, expecting a State to adhere to its schedule for a time-block is totally **utopian** and unreasonable.

7. In the case of the conventional generating stations (**Thermal, Hydro and Nuclear**), the generating capability for the next day can be assessed in a definitive manner, and their injection schedules can be set without any difficulty. Further, these stations have the capability to hold on to the set MW through their well-proven automatic controls, so as to adhere to their given schedules continuously. It is also possible for them to change their generation in a controlled way, so as to continue to adhere to their schedules even when the latter undergo a change. However, this is not the case with Renewable generation (**Solar and Wind**), in whose case the generating capability varies with changes in solar irradiance and wind speed. Their capability keeps varying, and in a manner not always predictable.

8. Both **Solar and Wind** plants produce electricity at zero incremental cost, and directly help in reducing CO₂ emission. Therefore, they must be allowed (if not encouraged) to generate power at their maximum capability all the time, even if it means generation above their respective schedule. On the other hand, their generation, at times, may fall below the given schedule, since the latter is based on weather forecasts made on the previous day. The owner / operator must not be penalised for such deviations. **In other words, deviations from schedule are inevitable for the Solar and Wind plants** as well, and should not be frowned upon.

9. Security and stability of the grid, apart from the other factors, requires a minute-by-minute, overall **load - generation balance**. This means that when one grid entity has a deviation from schedule, one or more grid entity has to have a counter-balancing deviation from schedule, and in the same time frame. Further, there is no time for the secondary and tertiary controls to come into operation in the required time frame. In other words, over-supply and under-drawal by one set of entities gets automatically balanced by under-supply and over-drawal by another set of entities, and vice-versa. This keeps on happening dynamically, and it would be **most unfair** to penalise either set of entities for the ensuing deviations.

10. It can be concluded from the above that the grid entities, in general, would have deviations from their respective schedule for a 15-minute time-block. Their magnitude may vary, but the **deviations are inevitable**. They cannot be stopped even with the best possible efforts by the concerned entity, except in the case of conventional generating stations which have been set not to provide any primary frequency response (an undesirable way of operation).

11. Coming to the next question, it should suffice to point out that we have successfully operated our regional / national grids without a reliability, security and stability issue most of the time, over the past 10 years, even with deviations. The occasional problems due to unchecked deviations have arisen mostly due to the limited transfer capability of the inter-regional links in the past. With the addition of many inter-regional links in the last 4-5 years, the likelihood such problems is also now going away. Further, while large and unchecked deviations need to be curtailed, **deviations which are unavoidable, beyond the control of the concerned entity and occur every day should be reconciled to**, and should not be prohibited / penalised in the name of 'reliability, security and stability of the grid'.

12. The formulae for **charges payable for deviations** have been specified in Regulation 8. It is seen that a regional entity can avoid paying large sums into the Regional Deviation and Ancillary Services Pool account and suffering losses, in most cases, only by completely adhering to the schedule in each of the ninety-six (96) 15-minute time-blocks. It has already been explained above that this is impossible for the Distribution companies / States and Solar & Wind generating stations. This means that they, or some other entity, would always pay into the Pool Account, would never receive anything, and would be **penalised** one way or the other. Some examples are given herein to illustrate how this would happen.

13. Let us start with the example of a **State** (a regional entity as a whole). Suppose it has a constant drawal schedule of 1000 MW for one hour, i.e., of 250 MWh for each of the 4 consecutive time-blocks. Now suppose that due to consumer load variation, the State actually draws 260 MWh in each of the first

two time-blocks, and 240 MWh in the last two time-blocks. The payments would be as follows. For each of the first two time-blocks, the State would pay its suppliers for the scheduled 250 MWh at the contracted rates, and to the Pool Account for the 10 MWh of excess drawal at the 'normal rate of charges for deviations' (NRCD). Suppose the latter (which corresponds to the U.I. rate in the earlier dispensation) is Rs 4.00 per kWh during this period. The State then **pays** into the Pool Account Rs 40,000 for each of these time-blocks. This is reasonable, and there can be no objection to this from the State's side. The entities which counter-balance this deviation by over-generation / under-drawal, however, get paid nothing for this from the Pool Account or anybody else, and the Pool Account **captures** the above Rs 40,000.

14. As for the last two time-blocks, according to the proposed Regulation, the State does not pay anything to the Pool Account for the deviation, nor does it get anything. However, the State has still to pay its suppliers for the scheduled 250 MWh at the contracted rates, while receiving only 240 MWh actually. This effectively means that the State has **overpaid** for 10 MWh of energy in each of these time blocks. In case the contracted energy charge rate is Rs 3.00 / kWh, the overpayment would be Rs 30,000 for each time-block. This is the **penalty** that the State has to pay for the above marginal (4%) deviation, even when its actual total MWh drawal for the one-hour period is the same as that scheduled. Not just this, the entities which counter-balance the above deviation by under-generating or over-drawing a total of 10,000 MWh, would have to pay Rs 40,000 into the Regional Pool Account. **The Pool Account will thus collect (capture) a net of Rs 160,000 for that one hour, for which there is no justification.**

15. Let us now examine the case of the Renewable (**Solar and Wind**) plants. As per the proposed Regulations, the generator will not get any payment for any generation above the schedule. For example, if a Solar plant, based on forecasts, is scheduled to supply 200 MW (50 MWh per 15-minute time-block), but is able to supply 210 MW due to irradiance being higher than expected. It would still be paid for only 50 MWh per time-block, though it is actually supplying 52.5 MWh. If the plant's tariff is Rs 3.00 / kWh, it would be **losing** Rs 7,500 per time-block. And the other entities, which counter-balance the above deviation by under-generating or over-drawing this 2.5 MWh, will have to **pay Rs 10,000** into the Pool Account for that 15-minute block. On the other hand, if the Solar plant is able to supply only 180 MW (45 MWh), it will have to **pay Rs 15,000** per time-block into the Pool Account (which is reasonable from the plant's angle). **The Pool Account will thus capture Rs 10,000 in the first case and Rs 15,000 in the second, per time-block.**

16. An analysis of the foregoing will bring out that the stipulations in the proposed Regulations are most unfair for all entities. Further, **crores and crores**

of rupees will be collected in the Pool Account every day without any justification, at the cost of the regional entities, especially the cash-strapped State utilities. To get an idea of the magnitude of the unjustified penalties, an exercise has been carried out for U.P. for a typical day (15-07-2021), using the scheduled and actual energy drawal figures taken from the DSM accounts issued by the NRPC Secretariat. The total of the time-block wise *over*-drawals comes to about 1075 MWh for that day, and the State, under the proposed dispensation, shall have to pay about **Rs 43 lakhs** for it into the NR Pool Account, assuming that the weighted average 'normal rate of charges for deviations' for the day is Rs 4.00 / kWh. On the other side, the total of the time-block wise *under*-drawals comes to about 4250 MWh, for which the State would not get any compensation. This means that the State would be over-paying about Rs **127 lakhs** to its suppliers, assuming the energy charge rate as Rs 3.00 / kWh, which is effectively a **net loss for the State**. Further, the entities who under-generate or over-draw to counter-balance U.P.'s under-drawal of 4250 MWh in those time-blocks, would **pay Rs 170 lakhs** into the NR Pool Account. The latter **would thus be richer by Rs 213 lakhs in a single day on account of U.P.'s deviations alone**, unless my understanding or calculation is grossly wrong.

17. The criteria for determination of 'Normal Rate of Charges for Deviations' (NRCD) has been specified in Regulation 7(1). The implementation of the provision in its first paragraph seems to be extremely tedious. Perhaps, no exercise has been carried out so far to test its practicability, and to find out the range of resulting NRCD. The second paragraph of this Regulation stipulates that for the first one year, the NRCD shall be derived from the Area Clearing Prices (ACP) of the power exchanges, 15-minute time-block wise.

18. Given below is a table of ACPs arrived at in the India Energy Exchange for 2 of the 96 time-blocks (selected at random) for 8 consecutive days. One can readily see the volatile nature of the ACP, since it depends on the weather forecast and the speculative perceptions of a few buyers and sellers. A big difference between the ACPs of DAM and RTM in the same time-block can also be seen in the tabulation. In my view, therefore, ACP is not a suitable parameter for working out the NRCD.

TIME-BLOCK →	08.45 - 09.00		20.45 - 21.00	
	DAM	RTM	DAM	RTM
20-09-2021	4080	4989	12,001	14,000
21-09-2021	3601	2968	11,251	4600
22-09-2021	3550	2981	12,000	4600

23-09-2021	3610	5999	6843	5999
24-09-2021	3749	3219	11,505	16,004
25-09-2021	4050	4284	7999	5201
26-09-2021	3247	2999	6000	4230
27-09-2021	3375	3131	6999	4500

19. As per Regulation 9(6), the money collecting in the regional Pool Accounts is to be used for payments to the providers of Ancillary Services towards full cost of SRAS-Up, incentive for SRAS and full cost of TRAS-Up. This is to be done as per provisions in the Ancillary Services Regulations, which itself is questionable. I have sent, on 19-06-2021, my detailed comments, pointing out many fundamental flaws in the proposal, on the Draft CERC (Ancillary Services) Regulations issued by the Commission on 29-05-2021. These comments are also attached, and may please be taken into consideration.