

COMMENTS on the DRAFT of the CERC (ANCILLARY SERVICES) REGULATIONS, 2021

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1. In my view, the whole proposal in the Regulations draft is misguided, mis-directed, and devoid of logic. (I apologise for being so forthright; the terse words used are for catching your attention, and getting you to read what follows.)

2. To start with, I would like to present the specialized subject of power system operation in simplest possible terms, especially for those not fully conversant with the subject, to get an idea as to what the proposed Regulation is about.

3. The power system operation is largely about maintaining a load - generation balance in the system. When the total system load = total generation, the system frequency is constant. When load > generation, the frequency starts (and goes on) declining. When load < generation, the frequency starts (and goes on) rising. To keep the frequency constant at 50.0 Hz, it is necessary to have load = generation at 50.0 Hz to start with, and then maintain this perfect balance on second-to-second basis.

4. However, the system load depends on the aggregated consumer load, and keeps changing all the time as per consumers' requirements. System operators have no control over it, except through load-shedding. So, the frequency goes on moving up and down, as may be seen in the plots of actual frequency shown on the next page. Thus, the main job of the system operators (i.e., the load dispatch centres, the name being a misnomer) is to control the generation, aiming to restore load = generation at 50.0 Hz. This is a continuous process, because load - generation balance is dynamic.

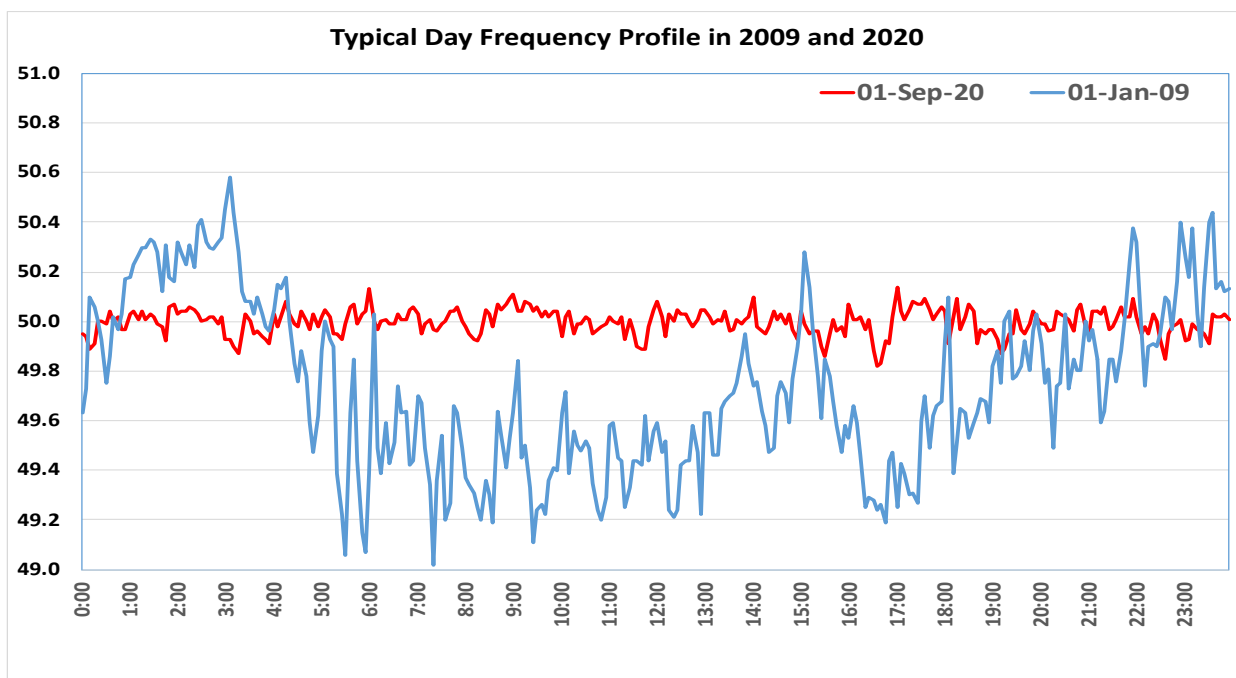
5. In the classical system control, there are three distinct steps involved in this:

(A) Primary control or response, through turbine speed governor operation all across the synchronized system, to contain the frequency drift.

(B) Secondary control, to adjust the generation within a Control area, so as to bring the ACE (Area control error) of the area to zero. This adjustment is required in the area(s) where the load or generation has changed to create the load -

generation imbalance in the system. When all control areas re-achieve ACE = 0, the system frequency automatically gets back to 50.0 Hz.

(C) Tertiary control, to readjust the generation within the affected control area, to achieve merit-order in the new circumstances, maintaining the ACE = 0.



6. Step (A) is mandatory for system security, is automatic, gets completed within a minute, and has been correctly described in 1.3 of the Explanatory Memorandum.

7. Step (B) is mandatory for eliminating a control area's deviation from its interchange schedule, and for bringing the system frequency back to 50.0 Hz. It is the responsibility of the control centre of the area to determine its ACE, and instruct the area's generating stations to move up or down, to get the area's ACE back to zero. The above action under Step (B) is required to be completed within 10-15 minutes. AGC (automatic generation control) may be deployed by the area's control centre to obviate the need for issuing instructions to the concerned generating stations, provided the latter are agreeable to being remotely controlled.

8. In case a control area is short of power, and is not likely to be able to bring its ACE down to zero in 15 minutes, it must purchase power from elsewhere in a hurry, or curtail the load within the area, to get back to ACE = 0.

9. Please note here that the focus of Secondary control is on getting ACE = 0, and getting back to 50.0 Hz is really a by-product.

10. Step (C) is not mandatory from the system's angle, but is important from the control area's own angle, for generation optimisation. This step is what 'economic dispatch' really is. There is no imposed time limit for it, because any delay or non-optimisation does not affect any body outside the control area, and all financial implications of such action / inaction impact only the entities within the area.

11. To reiterate, Step (A) is automatic, and Steps (B) and (C) are directed from the control centres of the respective control areas. No agency outside a control area has anything to do with these, as long as the control area is able to return to ACE = 0, and is not causing transmission constraints elsewhere.

12. Clear demarcation of control areas is most important in a large inter-connection like the integrated grid of India. It is the starting point for defining any power system control strategy.

13. Now let us see what has been proposed in the Regulations draft.

14. Nothing has been said upfront about the control areas. It is not clear whether the whole country is to be operated as one control area, or each region is to be a control area, or each State is to be a separate control area. Only when one gets to Regulation 8, he would have a clue that each region is to be treated as a control area. This raises a number of basic issues.

15. The five (5) regions of the country have operated so far as loose power pools. What is the logic of having each region as a control area? It is neither here nor there. From administrative and ownership angles, each State should be clearly (re)-defined as a control area. A case could also be made out for operating the whole country as one control area, for achieving country-wide economy dispatch, provided we are reconciled to centralizing the control of all generating stations at NLDC. But I am unable to see any valid justification for proposing the regions as control areas.

16. If each region is to be a control area as proposed, and its ACE is to be corrected on regional basis, as per Regulation 9(1) of the draft, why is it proposed to centralize its control at NLDC? As per established practices, and from

practicability angle, this should be the job of RLDCs. Do we doubt the competence of RLDCs?

17. We have operated the system so far treating each State as a control area, with stiff penalties under DSM for the States' deviations from schedule. The proposed Regulation is silent on this; so, it is taken that the above arrangement would continue. In such a case, the SLDCs shall need to have all intra-State generating stations to be under their control for the best utilization of the States' resources, as well as to keep the ACE of their intra-State systems close to zero.

18. As per Regulations 7(1) and 14, intra-State generating stations can also become providers of SRAS and TRAS for the region, by coming under the direct control of NLDC. And they are being enticed to switch over by the promise of good payments for SRAS and TRAS they provide! Why should the States agree to this, especially when the SLDCs themselves need to deploy all the SRAS and TRAS capability available at these stations for the States' own use?

19. A serious technical question related to the above is that any change of generation at an intra-State station as per NLDC instructions would cause a deviation from schedule at the State's boundary. How would you protect the States from getting penalised under DSM for deviations created by NLDC's actions?

20. I have not been able to locate any guidance on the above issues, either in the Regulation draft or in the Explanatory Memorandum.

21. There is no mention anywhere about economy dispatch in the draft Regulation or the Explanatory Memorandum. It is achieved through Step (C) covered above in para 5(3) and 10. Both SRAS and TRAS discussed in detail in the draft Regulation are sequential attempts to get the frequency back to 50.0 Hz, and are two parts of only the Step (B) covered in para 5(b), 7, 8 and 9. This would be clear if you see Figure-1 of the Explanatory Memorandum. What is being termed as 'Tertiary response' in the draft Regulations is only a part of conventional 'Secondary control', and conventional 'Tertiary control' as per 5(C) above is missing.

24. There is no mention about transmission constraints either, though all dispatch decisions have to be mindful of those, if any.

25. To conclude, (i) I see no point in specifying each region as a control area; (ii) even if the Commission decides to specify each region as a control area, the

control of the regions' ACE should be with the respective RLDCs, and there is no sense in centralizing it at NLDC; (iii) the system control hierarchy of NLDC - RLDC - SLDC should not be disturbed, (iv) SLDCs need to have the control over all intra-Stations, and since a generating station cannot be controlled from two LDCs, transfer of control of the intra-State stations to NLDC should not be contemplated, (v) the generation control should not be centralized for a large country like ours, but decentralized, with stress on gearing up the SLDCs to manage the States' systems in a secure and economic manner.