

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Coram:**

1. **Shri Bhanu Bhushan, Member**
2. **Shri R. Krishnamoorthy, Member**

**Petition No. 154/2007**

**In the matter of**

Maintaining grid security of the entire North East West (NEW) grid through curbing over-drawals by Northern region constituents and other measures to facilitate harnessing of all latent generation and induce Demand Side Management (DSM).

**And in the matter of**

Northern Regional Load Despatch Centre, New Delhi ... **Petitioner**

**Vs**

1. Uttar Pradesh Power Corp. Ltd., Lucknow
2. Power Development Department, Govt. of Jammu & Kashmir, Jammu
3. Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Jaipur
4. Punjab State Electricity Board, Patiala
5. Haryana Vidyut Prasaran Nigam Ltd., Panchkula
6. Delhi Transco Ltd., Delhi
7. Himachal Pradesh State Electricity Board, Shimla
8. Power Transmission Corp. of Uttaranchal Ltd, Dehradun
9. Electricity Department, Chandigarh ..... **Respondents**
10. Member-Secretary, Northern Regional Power Committee,  
New Delhi ..... **Proforma Respondent**

**ORDER**

The application made on 15.11.2007 seeks --

- (a) directions to the respondents to honour the provision of IEGC and curb their over-drawals forthwith so that the NEW grid is secure;

(b) review of UI price factor to facilitate harnessing of costly/ latent/ embedded/ unrequisioned generation during the shortage scenario and also to give the right price signals for Demand Side Management (DSM).

2. The petitioner has submitted that frequency profile of the entire North-East-West (NEW) grid has undergone sharp deterioration in November, 2007. While the frequency remained below 49.0 Hz for around 10% of the total time during October, 2007, the condition further deteriorated in November, 2007 and frequency remained below 49.0 Hz for more than 20% of total time on most days (highest was 32.4% on 14.11.2007).

3. The petitioner has stated that main reason for sustained low frequency is because of over-drawal by the constituents. It is observed from the over-drawal position furnished by the petitioner that every constituent of Northern Region has overdrawn from the grid and only the quantum of overdrawal (MW) is different for various constituents. The petitioner has issued a number of messages to the defaulting constituents both in real time and on follow up basis to curb over-drawal. The petitioner had issued directions under Section 29 of the Electricity Act, 2003 to the constituents of Northern Region. Member-Secretary, NRPC has also been informed under section 1.5 of the IEGC. However, the constituents' response has been inadequate, and the situation remains alarming.

4. It has been stated that the sustained low frequency on account of over-drawal is causing operation of UFRs in many States and frequent operation of

UFRs on daily basis results in resentment by the constituents who do not over-draw and if this trend is allowed to continue UFRs setting might be gradually lowered or blocked and the system would be left without any safety net.

5. The petitioner has stated that despite the prevailing shortage conditions, the liquid fuel generation at NTPC generating stations is not getting scheduled. The unrequisioned power in any time block in a day can be as high as 400 MW in Northern Region. In Western Region also, about 400 MW generation at Kawas GPS is reportedly unrequisioned. The petitioner's opinion is that the existing ceiling UI rate is not sufficient to harness the full naphtha generation.

6. The petitioner's prayers noted in the opening para of this order are to be seen in the context of above noted facts.

7. IEGC specified by the Commission in exercise of its powers under Section 178 of the Electricity Act, 2003 (the Act) read with Section 28 thereof, contains the provisions to curb over-drawal of power by the utilities. Also, the Commission from time to time has given directions to the State utilities to restrict their drawal to schedule. The provisions of IEGC and the directions issued by the Commission are binding on the utilities concerned. Therefore, in this regard no further directions are needed.

8. As regards review of UI vector, it is to be noticed that the Commission had amended Regulations 24 and 42 of the Central Electricity Regulatory

Commission (Terms and Conditions of Tariff) Regulations, 2004, effective from 30.4.2007 enhancing UI ceiling rate from 570 paise/KWh to 745 paise/KWh. The basis of the amendment was the Commission's order dated 5.4.2007 in Petitions No.4/2006 by NRLDC, 145/2006 by SRLDC and 15/2007 by CTU, made after hearing the stakeholders and on the premise that such UI ceiling rate would be sufficient to harness all naphtha generation. The relevant paras of the order dated 5.4.2007 are extracted hereunder:

“28. Frequency is the most critical parameter in power system operation. The standard practice followed globally is to maintain the grid frequency at or very close to the rated value (50.00 or 60.00 Hz, as the case may be) all the time. A deviation beyond 0.05 Hz would be considered alarming in developed countries, and a deviation beyond 0.1 Hz would be unimaginable. However, in India we had a history of frequency varying from below 48.0 Hz to above 52.0 Hz, and remaining beyond these levels for hours together, which led to innumerable grid collapses in Eighties and Nineties. It was to tackle these problems that the unique mechanism of UI was evolved. This innovative approach has focused incentives for improving the frequency and keeping it within the safe range of 49.0 – 50.5 Hz. A tighter control of frequency has not been attempted, keeping in view the limitations of the utilities in India.

29. The term “U.I.” stands for Unscheduled Interchange, or deviations from schedule. In the UI mechanism introduced in the country in 2002-2003 as an integral part of Availability Based Tariff (ABT), the price of deviations is linked to frequency. The simple logic is as follows. Low frequency is an indication of deficit (generation less than the demand in the system). If the frequency is to be improved, or prevented from falling further, one or more utilities in the system must increase the generation and/or reduce the load. Either action would reduce the utilities' drawal from the grid or increase its injection into the grid. The concerned utility is paid a high compensation for such drawal reduction / injection increase, as an inducement to do so. On the other hand, a utility drawing more power than its entitlement or injecting less power than its schedule is required to pay for the overdrawal / under-injection at a high rate, to discourage these during the shortage conditions.

30. Similarly, high frequency is an indication of surplus (generation more than the demand in the system). To check the frequency rise, or to bring it down to a more desirable level, one or more utilities have to

increase their drawal from the grid or reduce the injection (in case of generating companies). This is induced by charging a low rate for the extra drawal, and paying a low rate for energy under-injected.

31. It would be recalled that the frequency profile of the regional grids had dramatically improved in 2002-2003 when ABT and UI were introduced. The Commission had initially specified the UI rate in 2001 as follows :

- Zero at 50.5 Hz and above
- Rising in 5.6 paise/kWh steps for every 0.02 Hz fall in frequency
- 420 paise/kWh below 49.02 Hz

32. The ceiling rate of 420 paise/kWh had been specified so as to be higher than the prevailing Diesel generation cost (corresponding to HSD rate of Rs. 13.33/litre). The reasoning for this was that 49.0 Hz was indicative of a severe shortage, in which the costliest available generation had also to be mobilized, and the utility doing so had to be fully reimbursed through the UI mechanism. The same criterion was applied again in 2004 while revising the ceiling UI rate to 600 paise/kWh (subsequently changed to 570 paise/kWh from 1.10.2004) corresponding to the prevailing HSD rate of about Rs. 21/litre.

33. The present proposal to raise the ceiling UI rate to at least 930 paise/kWh, is for continuation of the same criterion corresponding to the present HSD rate of over Rs. 30/litre. The country is facing a serious power shortage and load shedding is rampant. Even captive generation should be brought into the grid and harnessed for reducing the load shedding quantum, as is presently being tried in Pune. Looked at from this angle, the petitioner's proposal should be readily accepted. However, we have a paradoxical situation of the state utilities losing money on account of non-remunerative consumer tariffs. They are, therefore, not interested in procuring power from costlier sources, even if it means more load shedding.

34. Still, it is a fact that the grid frequency is presently remaining below 49.0 Hz for around 10% of the time, in Southern Region as well as in the combined A.C. system of rest of the country. From grid security point of view, this is simply not acceptable. To improve the frequency, overdrawal must be discouraged more strongly, by making it costlier, and underdrawal in low frequency condition must be encouraged by paying a higher rate. There is no option. The only relaxation we can make is to raise the UI ceiling rate to about 750 paise/kWh presently, instead of raising it to 930 paise/kWh in one big jump.

35. In adopting the above relaxation, we are reconciling to not giving a commercial signal to diesel-based generation to come into the grid, but have tried to see that at least the naphtha fired generation gets a signal to be scheduled and to be on bars during times of acute shortage. For example, the landed cost of domestic Naphtha (Liquid Fuel) for the NTPC combined cycle station at Auraiya was of the order of Rs. 39142 per metric tonne during March 2007 inclusive of excise duty of 16%, education cess of 2%, sales tax at 4% and freight & service charges on freight at 12.4%. Considering a heat rate of 2000 kCal/kWh, auxiliary energy consumption of 3% and GCV of 11200 kCal/kg for Naphtha, the energy charge works out as Rs. 7.20 per kWh sent out. With variable cost less than the proposed ceiling UI rate, it should be scheduled and run, at least when frequency is 49.0 Hz or lower.

36. It is seen from the responses received that none of the Eastern and North-Eastern region constituents has objected to the petitioner's proposal, and two constituents have supported it. Southern Region constituents have agreed to the UI ceiling rate of 750 paise/kWh in 2006 itself. Western Region constituents have also reconciled to the need for making the overdrawal costlier, through a penalty instead of enhanced UI rate. We would now address the various objections raised, one by one.

37. Some respondents have opined that the previous UI rate enhancement has not been effective. This has no basis. It is well known that the frequency profile dramatically improved on introduction of ABT and UI in 2002-2003. It again improved when UI ceiling rate was increased on 1.4.2004, and it would definitely improve when UI ceiling rate is further increased. Perhaps the State utilities are confusing between "enhancement" and "UI rate being high". It would be factually correct to say that frequency profile has been bad and overdrawals are taking place in spite of the UI rate being high. This only indicates that the UI rate is not "high enough", for curtailing the overdrawals and improving the frequency profile in the scenario of growing power shortage and increasing fuel cost.

38. UI rate, being the spot price, could serve as a bench mark for the cost of traded power, provided the parties could foresee what it would be when the contracted power is actually to be supplied. But UI rate floats and is continuously changing, with variation of frequency depending on load-generation balance in the system from time to time. Further, it can only be a bench mark, and the cost of traded power would really be dependent on the demand - supply balance, as it should be in a market. All that one could expect is that the cost of traded power should not exceed the ceiling UI rate, normally. The very fact that the cost of traded power has breached and gone beyond the ceiling UI rate only shows that the latter has been capped at an unrealistic level. It also shows that there is an unmet demand, and utilities are prepared to pay a higher price to get

extra power. By restricting the ceiling UI rate at a lower level, we are only creating a market distortion, and are giving a wrong signal to the utilities, to over-draw under UI mechanism rather than to purchase extra power through a contract. The argument that with increase of UI rate cost of traded power would go up, therefore, cannot be accepted as a reason for holding back the UI ceiling rate increase, which is in any case urgent for restoring the grid security.

39. We cannot accept the arguments like “utilities overdraw under compulsion” and that “deficit States would suffer further”, for holding back the required UI ceiling rate increase. In a developed country, the overdrawals would just not be permissible. All utilities must maintain their net interchange strictly as per their schedule. UI mechanism provides a flexibility to the Indian utilities, in that they can deviate from their schedules. The premise is that they pay for the deviation. The flexibility provided cannot be stretched to a breaking point. The States have to exercise self-control, and either promptly pay for the overdrawal or not overdraw in the first place. Failure to plan for meeting their consumer demand does not entitle any State to overdraw from the grid, and thereby endanger the grid security or rob other States of their rightful share.

40. While the contribution of liquid fired generation may be a small percentage of the total generation in the country, every MW counts in the scenario of acute shortage and extensive load shedding. A single MW can light up 10,000 homes, and enable 20,000 children to study for their examinations. It is well-known that liquid-fired generation presently has to be scheduled by diktat, primarily because the variable cost of such generation has gone above the ceiling UI rate. It is necessary to remove the distortion, to let the liquid-fired generation be scheduled by the concerned utilities, if perceived to be in their overall interest.

41. As mentioned earlier, we are presently raising the UI ceiling rate only to 750 paise/kWh, which would be below the variable cost of HSD-based generation, but at least above the variable cost of combined cycle plants and heavy oil-based diesel generation. However, we do not accept the contention that linking ceiling UI rate to diesel generation cost is not reasonable.”

9. It appears to us that the existing UI ceiling rate of 745 paise/KWh is proving to be inadequate. While proposing the enhancement of UI ceiling rate to 745 paise/KWh, the Commission in paras 32, 33 and 41 of its order 5.4.2007 (extracted above) had noted that UI ceiling rate should be above cost of diesel based

generation. However, the Commission made a compromise and covered only the naphtha cost while revising UI ceiling rate. Thus, the problem now reported by the petitioner was already foreseen by the Commission. Therefore, the present frequency trend calls for further revision of UI rate and accordingly we propose to take proceedings for further rationalization of UI rate on all India basis. It is proposed to retain zero UI rate at 50.5 Hz and above, and below 50.5 Hz, rise in 8.0 paise per unit step for each 0.02 Hz fall in frequency is proposed, to reach 280 paise per unit for 49.8 – 49.82 Hz step, and then rising in 18 paise per unit step for each 0.02 Hz fall in frequency to reach 1000 paise per unit as the ceiling UI rate for all frequency below 49.02 Hz, to be precise. It is clarified that the congestion charge of Rs 3 per KWh, effective from 19.11.2007, has a different focus. It is applicable for Northern Region only, and for a situation when frequency is still in normal range but inter-regional links are getting overloaded. The levy and determination of congestion charge is to be notified by the petitioner based on loading conditions of inter-regional links, as specified in our order dated 7.11.2007.

10. Accordingly, we direct that a draft notification for amendment of Regulations 24 and 42 on the proposal, contained in the preceding para be published to invite comments/suggestions/objections to the proposal by 20.12.2007. A final view in the matter will be taken on consideration of the comments/suggestions/objections received from the stakeholders.



10. For the view we have taken no further proceedings are necessary in the present petition which accordingly stands disposed of.

Sd/-  
**(R. KRISHNAMOORTHY)**  
**MEMBER**

Sd/-  
**(BHANU BHUSHAN)**  
**MEMBER**

New Delhi dated the 4<sup>th</sup> December 2007