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(भारत सरकार का उद्यम)  
**GRID CONTROLLER OF INDIA LIMITED**  
(A Government of India Enterprise)



[formerly Power System Operation Corporation Limited (POSOCO)]

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संदर्भ: GRID-INDIA/NLDC/CERC/

दिनांक: 20<sup>th</sup> February 2024

सेवा में,

सचिव,

केन्द्रीय विद्युत विनियामक आयोग

3<sup>rd</sup> एवं 4<sup>th</sup> फ्लोर, चंद्रलोक बिल्डिंग

36, जनपथ, नयी दिल्ली, 110001

**विषय:** Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for the tariff period from 1.4.2024 to 31.3.2029.

महोदय/महोदया,

The suggestions on behalf of Regional Load Despatch Centres (RLDCs) and National Load Despatch Centre (NLDC) on Draft Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 are enclosed herewith for kind perusal and consideration of the Hon'ble Commission.

सधन्यवाद,

भवदीय,

(एस. सी. सक्सेना)

कार्यपालक-निदेशक-रा.भा.प्रे.के.

**Encl:** As above





**Grid Controller of India Limited**  
**(A Govt. of India Enterprise)**  
**(Formerly Power System Operation Corporation Limited)**

**Suggestions on behalf of Regional Load Despatch Centres (RLDCs) and National Load Despatch Centre (NLDC) on CERC Terms and Conditions of Tariff Regulation-2024**

Since 2001 CERC Tariff Regulations have played crucial role in shaping Indian power sector. CERC Tariff Regulations 2024 holds the potential to benefit consumers, investors, and the sector as a whole by promoting resource efficiency, sustainability, and affordability. While economy and efficiency are important factors, regulations must complement reliability and security of the grid as energy may at times be cheaper, but reliability is always expensive. Grid must derive benefits from high investment in generation and transmission. Such investment should ensure Flexibility, Dependability, Reliability, Resilience of Grid.

Optimal utilisation of all the resources including RE, thermal, hydro etc. is essential to ensure supply security for the country. With increasing penetration of renewable generation, resource adequacy in all the time horizon is becoming more important. However, emphasis also needs to be given to the flexibility requirements, so that the conventional generation capacity aligns with the grid requirements especially in view of large-scale renewable energy integration into the grid.

Various operational aspects such as incentivization of ramping, startup time of generators, linking fuel stock with availability, use of old thermal generators as synchronous condenser, modalities for determining of tariff for energy storage devices like - Battery Energy Storage System (BESS), Pump Storage etc. among others are important from reliability considerations.

Grid-India's suggestions emphasize the aspects of grid security, reliability, flexibility, resilience, and resource adequacy among other things. Grid-India's comments on behalf of NLDC/RLDCs are summarized as follows:

## **1. Regulation : 30.3(i) & (ii) Deduction of RoE on account of non-availability of FGMO**

### **Provision in Draft Regulation:**

The clause 30.3 (i) and (ii) of the draft regulation states that

Quote -

- i) *In case of a new project, the rate of return on equity shall be reduced by 1.00% for such period as may be decided by the Commission if the generating station or transmission system is found to be declared under commercial operation without commissioning of any of the Free Governor Mode Operation (FGMO), data telemetry, communication system up to load dispatch center or protection system based on the report submitted by the respective RLDC;*
- ii) *in case of an existing generating station, as and when any of the requirements under (i) above of this Regulation are found lacking based on the report submitted by the concerned RLDC, the rate of return on equity shall be reduced by 1.00% for the period for which the deficiency continues;*

Unquote

### **Suggestions:**

- a) FGMO is a mandated service under provisions of IEGC. Hence, incentivizing only the generators whose tariff is determined by Hon'ble Commission may have negative impact on the other generators such as Section 63 plants, Merchant plants, IPPs etc.
- b) Further, as per the above provisions of the Draft Regulation, in case of lack of functional FGMO the Return on Equity (ROE) of existing generators shall be reduced, whereas the new station would get the ROE only if it has commissioned the FGMO. Hence, the return of equity is higher for a new station compared to an existing station even for both the stations the FGMO is not operational during real time operation.

**Hence, the above provisions in the Tariff Regulation may be dropped.**

**Further, in future, market based Primary Response Ancillary Service (PRAS) is also envisaged. It would then put all generators on equal footing. In existing stations lacking functional FGMO should be treated as violation of provisions of IEGC similar to other stations, and suitable penalty should be applicable.**

## **2. Regulation : 30.3.(iii) Need for flexibility: Ramp performance incentive**

### **Provision in Draft Regulation:**

Quote -

*30.3.iii. in the case of a thermal generating station:*

- a) *rate of return on equity shall be reduced by 0.25% in case of failure to achieve the ramp rate as specified under Regulation 45(9) of IEGC Regulations, 2023.*

b) an additional rate of return on equity of 0.25% shall be allowed for every incremental ramp rate of 1% per minute achieved over and above the ramp rate specified under Regulation 45(9) of IEGC Regulations, 2023, subject to the ceiling of additional rate of return on equity of 1.00%:

.....

Unquote

**Suggestion:**

a) As large scale RE will keep on integrating into the grid, the thermal fleet has to complement to the variability being introduced by RE into grid. The diurnal variation of demand has also increased steeply. The diurnal variation of demand for the period 01.01.2013 to 26.07.2023 is shown in Figure 1. The variation in the diurnal demand has resulted into high ramping requirement during morning and evening peak hours. The variation in the diurnal demand for a typical day has been depicted in Figure 2.

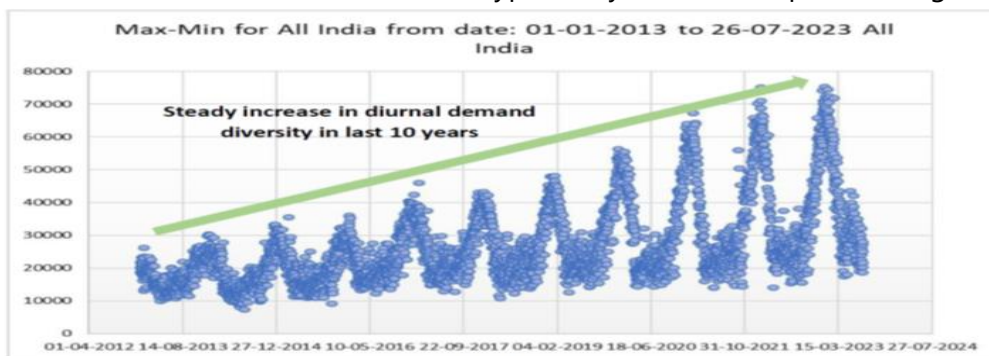


Fig-1

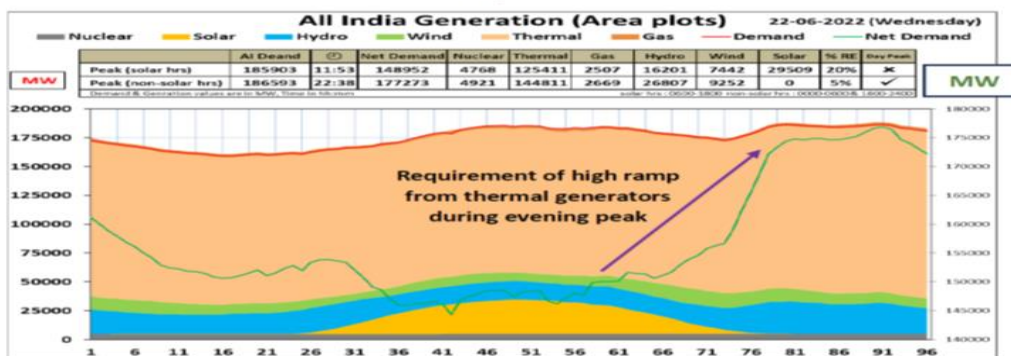


Fig-2

b) The Return on Equity (RoE) linked Ramp performance incentive has been a welcome step from Hon'ble Commission in 2019-24 tariff period. It has ensured at least 1% ramp from all thermal generators whose tariff is determined by Hon'ble Central Commission. However, it is seen that no generators have earned incentive in the 2019-24 tariff period so far for providing higher ramp rates more than 1%. Whereas, few generators such as Singrauli, Barh-I, Kahalgaon Stage-II have lost RoE, for under performance in the above period. The Ramp performance of Thermal Generators during tariff period 2019-24 is shown in Table 1.

Station	Total no. of Time Blocks which are considered (Tm)	No. of Time Blocks Where Declared Ramp Up & Down rate $\geq 1\%$ (Td)	Td/Tm	No. of time blocks where scheduled ramp $\geq 1\%/min$ (D)	Out of (D), no. of time blocks where actual ramp $\geq$ scheduled ramp (E)	Out of (D), no. of time blocks where actual ramp $\geq 1\%/min$ (F)	Average actual ramp rate during blocks when scheduled ramp $\geq 1\%/min$ (%/min) (AARR)	E/D	F/D	Recommended change in RoE(%) (#)
<b>2020-21</b>										
KHSTPP-II	33206	31734	0.96	1130	825	837	0.92	0.73	0.74	-0.25
NPGC	30998	17468	0.56	959	898	907	1.05	0.94	0.95	-0.25
SINGRAULI	35030	29229	0.83	166	72	75	0.71	0.43	0.45	-0.25
VSTPS I	34608	2373	0.07	138	90	90	0.89	0.65	0.65	-0.25
<b>2021-22</b>										
Nil										
<b>2022-23</b>										
BARH-I	26151	5394	0.21	93	82	83	1.09	0.88	0.89	-0.25
<b>2023-24</b>										
Nil										

(#)(-) negative indicates deduction in RoE

No generators achieved additional RoE on account of higher ramp performance

Table: 1 Ramp performance of Thermal Generators during tariff period 2019-24

Clause 7 of CEA Central Electricity Authority (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023 dated 25<sup>th</sup> January 2023 states that

*Quote*

*7. Ramp rates capabilities of coal based thermal power generating units for flexible operation. -*

*(1) The coal based thermal power generating units shall have ramp rate capability of minimum three percent per minute for their operation between seventy percent to hundred percent of maximum continuous power rating and shall have ramp rate capability of minimum two percent per minute for their operation between fifty-five percent to seventy percent of maximum continuous power rating.*

*Provided that the generating units which are not capable to comply with this regulation, shall comply with the same within one year of the notification of these regulations.*

*(2) The coal based thermal power generating units shall achieve ramp rate capability of minimum one percent per minute for their operation between forty percent to fifty-five percent of maximum continuous power rating as per phasing plan mentioned in the sub-regulation (2) of regulation 5 of these regulations.*

*Unquote*

The above provision may add more complexity in computation of ramp performance for payment of incentives for higher ramp rate.

- d) A performance based incentive has been introduced under CERC (Ancillary Services) Regulations, 2022. The 12.7 para of the Detailed Procedure for Secondary Reserve Ancillary Services (SRAS) states that

*Quote*

*12.7 SRAS Provider shall be eligible for incentive based on the performance measured and the 5-minute MWh data calculated for SRAS-Up and SRAS-Down aggregated over a day, as under:*

Actual performance vis-à-vis secondary control signal for an SRAS Provider	Incentive Rate (paise/kWh)
95 % and above	(+) 50
75 % to below 95%	(+) 40
60 % to below 75%	(+) 30
50% to below 60%	(+) 20
20 % to below 50%	(+) 10
Below 20%	0

*Unquote*

Presently 60 numbers of generating units under Automatic Generation Control (AGC) operation are providing higher ramp rate up to 1.5%-2% per minute. Higher ramp rates would ensure higher ramp reserves available for despatch under Ancillary Services.

***Hence, it is suggested that to ensure better performance by the thermal generators, in terms of higher ramp rates, the provision in Ancillary Regulation 2022 is more effective. Hence, the same may be dropped in the Terms of Condition of Tariff Regulation and the incentive provisions in Ancillary Service Regulations may be reviewed.***

### **3. Regulation 34(1): Incentivizing adequacy of fuel stock: Linking generator availability with fuel stock**

#### **Provision in Draft Regulation:**

*Quote -*

*34. (1) The working capital shall cover: (a) For Coal-based/lignite-fired thermal generating stations: (i) Cost of coal or lignite, if applicable, for 10 days for pit-head generating stations and 20 days for non-pit-head generating stations for generation corresponding to the normative annual plant availability factor or the maximum coal/lignite stock storage capacity, whichever is lower;*

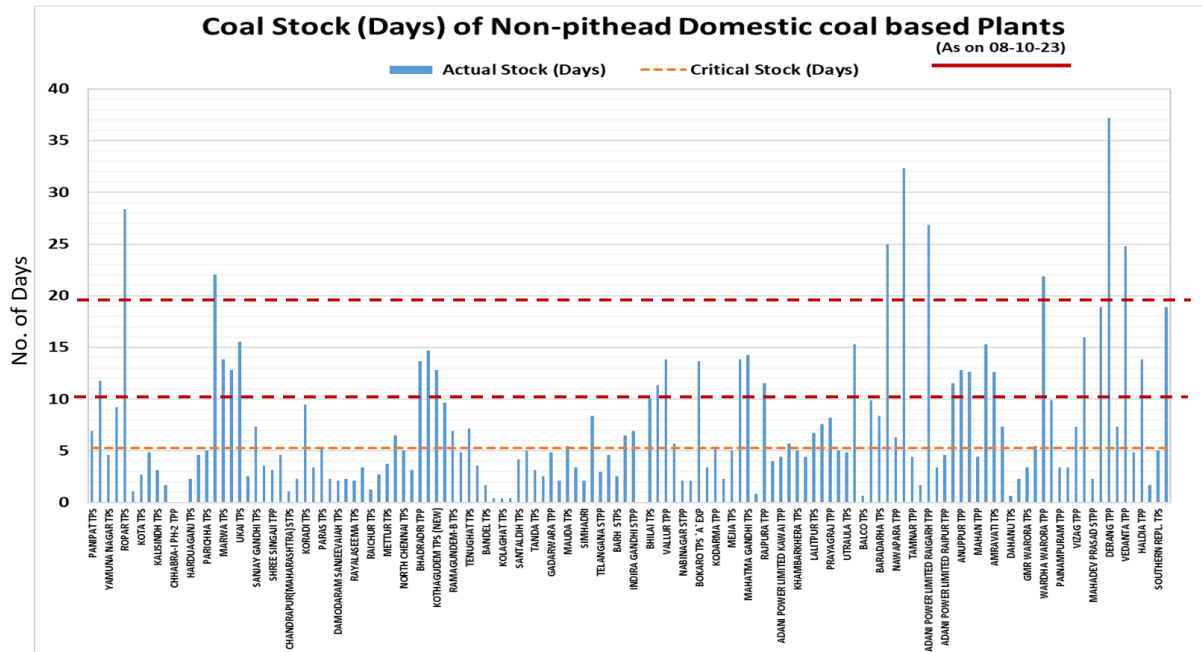
*Unquote*

#### **Suggestions:**

- a) Draft regulation has allowed Generators interest on working capital corresponding to different fuel stock circumstances.
- b) The availability of generators is calculated on a day ahead basis, which doesn't truly capture the on-site fuel stock position. It has been observed that during real time operation generators are declaring full availability for the day but not maintaining enough fuel stock as required under the Regulations. This becomes evident during the periods of continuous high demand where they are not able to generate on a sustained basis up to the Declared Capacity (DC). Instead, the generators revise the DC in accordance with the provision of IEGC Regulations.
- c) During the high demand period of Oct-2023, it has been observed that only a few non-pit head plants could maintain desired coal stocks, while most of the plants barely

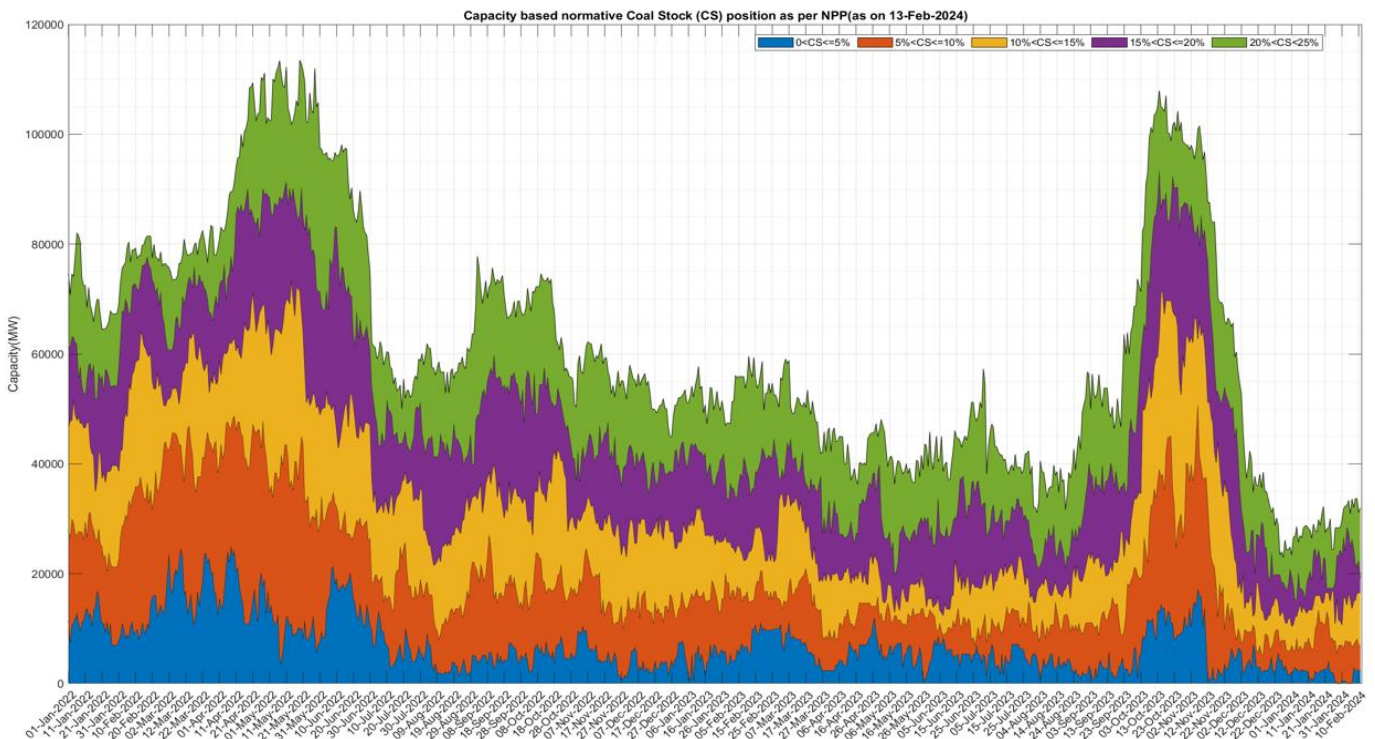


maintained critical coal stock level. The coal stock position of a typical day 08<sup>th</sup> October 2023, is depicted in Figure 3.



**Fig-3**

Further, that coal stock position gets severely depleted especially with onset of high demand seasons. The thermal generation capacity under critical coal stock is depicted in Figure 4. It can be seen from the figure that in October 2023, more than 50% capacity of the coal based thermal fleet were having coal stock less than 25% .



**Fig-4**

d) It is pertinent to mention that CERC staff paper on Methodology for Computing “Deterrent Charges” for maintaining lower coal stock by coal based thermal generating

stations suggests for disincentives for thermal power plants in the event the availability is lower than the Normative availability (as per prevailing CERC/SERC Regulations/Norms, as applicable) due to lower stock of coal maintained by the power plant as compared to the norm specified by the CEA.

**Maintaining adequate fuel stock is necessary for resource adequacy to reliably serve expected demand of the consumers in cost effective manner in all time horizon. Hence it is suggested that the Generator availability may be suitably linked to fuel availability also for fixed cost recovery. For scheduling purposes, the daily availability declaration as per IEGC shall continue to be used.**

**Illustrations:**

**Say on 1<sup>st</sup> day of the month for a non-pit head plant the coal stock position available at CEA National Power Portal be of 15 days. The normative coal stock is 20 days for such plants.**

**So, on the 1st day the coal stock availability will be  $100 \times 15/20 = 75\%$  of normative. Similarly for each day in the month the coal position in term of percentage of normative availability can be worked out and average of the 30 days will be the monthly availability of the coal stock.**

**For every 10% reduction in normative coal stock a certain percentage of say 0.1% of availability can be reduced for the purposes of payment of Fixed Charges. Necessary accounts can be published by the concern RPC in REA.**

**4. Regulation 62(3): Generation Availability: Peak & Off-peak declaration by RLDC**

**Provision in Draft Regulation:**

*Quote –*

62(3).....

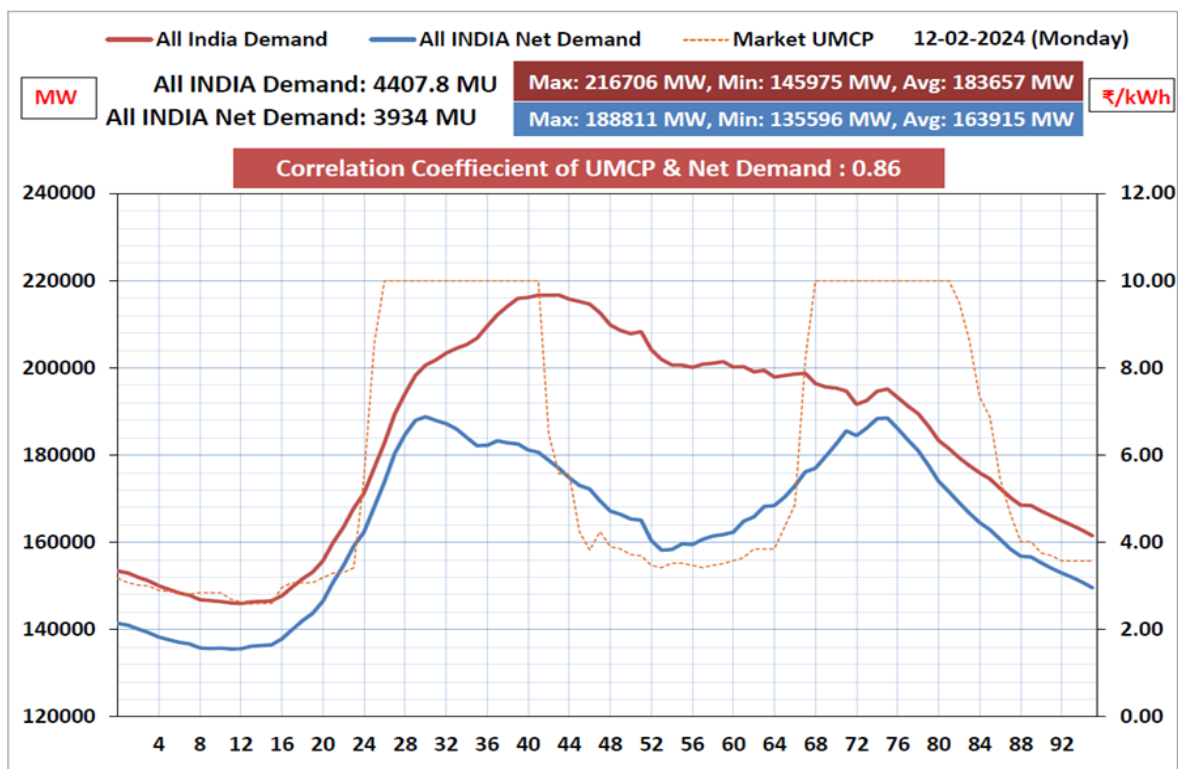
*Provided that RLDC, after duly considering the comments of the concerned stakeholders, shall declare Peak Hours in such a way as to coincide with the majority of the Peak Hours of the region to the maximum extent possible...*

*Unquote*

**Suggestions:**

- a) With increasing RE penetration, and shifting of agricultural loads during the solar hours, the shape of the net load (demand less RE generation) has undergone changes in past years. The net load curve of a typical day is depicted in Figure 5.





**Fig-5**

- b) The peak demand of nation is occurring in solar hours. However, occasionally shortages are being observed during non-solar hours. Hence, for maximizing thermal and hydro generation, it is desirable to consider all India net load in place of peak demand while declaring the peak hours with due consideration of all India hydro generation and seasonality.
- c) With the increasing footprint of the Indian electricity grid and its extension to neighboring countries, a 'regional' approach might be sub-optimal. Further, with synchronous interconnection of grids and a pan India Electricity Market, declaration of peak at national level by NLDC merits consideration.
- d) Guidelines for Resource Adequacy Planning Framework for India mandates DISCOMS to tie-ups to meet estimated requirement of their contribution towards meeting coincident national peak. The 3.8 clause of the above Guideline states that

Quote -

*3.8 Distribution licensees, through the LT-DRAP, shall also demonstrate to the SERC/JERC, their plan to meet their Peak demand and energy requirement with a mix of long-term, medium-term and short-term contracts, including power exchanges. The composition of the contracts will depend upon the load curve of each distribution utility. The share of long-term contracts is suggested to be at least 75% of the required capacities as per LT-DRAP or as specified by the respective SERC/JERC. The medium-term contracts are suggested to be in range of 10-20% while the rest can be met through short-term contracts. Distribution licensees shall also demonstrate their plans to contract existing capacities and plans to build or contract future capacity for the planning horizon.*

Unquote

The guideline has mandated Central Electricity Authority to publish Long term National Resource Adequacy Plan (LT-NRAP with planning horizon of 10 years on a rolling basis)

and NLDC to annually publish a one-year look-ahead Short-term National Resource Adequacy Plan (ST-NRAP) (with one-year look-ahead window).

- e) Considering high solar penetration in coming days, peak hours and off-peak hours of thermal generating stations may be increased to 6 hours and 18 hours respectively to take care of impact of Solar generation on the demand curve.

**Hence, it is suggested that Hon'ble Commission may specify peak hours in such a way which coincides with the hours of Peak All India net load (demand less RE generation).**

## 5. Regulation 72(b): Reliability of HVDCs:

Quote

*(b) For Incentive, NATAF shall be as under:*

*(1) AC system: 98,50%;*

*(2) HVDC bi-pole links and HVDC back-to-back Stations: 97.50%:*

*Provided that no Incentive shall be payable for availability beyond 99.75%:*

*Provided further that for AC system, actual outage hours shall be considered for computation of availability up to two tripping per year. After two tripping in a year, for every tripping, an additional 12 hours of outage shall be considered in addition to the actual outage hours:*

Unquote

- a) Reliable operation of HVDCs is important from the grid security aspect. As per the provision in the draft regulation for AC lines an additional 12 hour outage shall be considered in addition to the actual outage for more than 2 trippings in a year.
- b) No such provision is present for the HVDC system. A sample data for year wise number of tripping for HVDC elements is depicted in Table 2.

	2022	2023
800 KV HVDC Kurukshetra(PG) Pole-1	6	3
800 KV HVDC Kurukshetra(PG) Pole-2	4	8
800 KV HVDC Kurukshetra(PG) Pole-3	7	6
800 KV HVDC Kurukshetra(PG) Pole-4	9	9
800 KV HVDC Agra(PG) Pole-1	1	1
800 KV HVDC Agra(PG) Pole-2	1	2
800 KV HVDC Agra(PG) Pole-3	0	2
800 KV HVDC Agra(PG) Pole-4	3	0
500 KV HVDC Mahindergarh(APL) Pole-1	0	5
500 KV HVDC Mahindergarh(APL) Pole-2	0	6
HVDC GAJUWAKA POLE 1	0	2
HVDC GAJUWAKA POLE 2	2	0
HVDC PUGALUR RAIGARH POLE-1	2	2
HVDC PUGALUR RAIGARH POLE-2	2	0
HVDC PUGALUR RAIGARH POLE-3	2	4
HVDC PUGALUR RAIGARH POLE-4	3	1
POLE 1 AT KOLAR	0	2
POLE 2 AT KOLAR	3	0
HVDC-PUGALUR -THRISSUR HVDC VSC-1	4	2
HVDC-PUGALUR -THRISSUR HVDC VSC-2	6	1
HVDC 70KV VINDHYACHAL Pole 1	3	1
HVDC 70KV VINDHYACHAL Pole 2	2	1

**Table-2 Sample year wise no. of tripping for HVDC elements**

**In order to ensure reliability in the grid, similar operational and tariff norms, as applicable for AC lines may be extended for HVDC systems. However, for new HVDC assets one year of stabilization period may be allowed.**

#### **6. Reliability of STATCOMS : Appendix IV (3)**

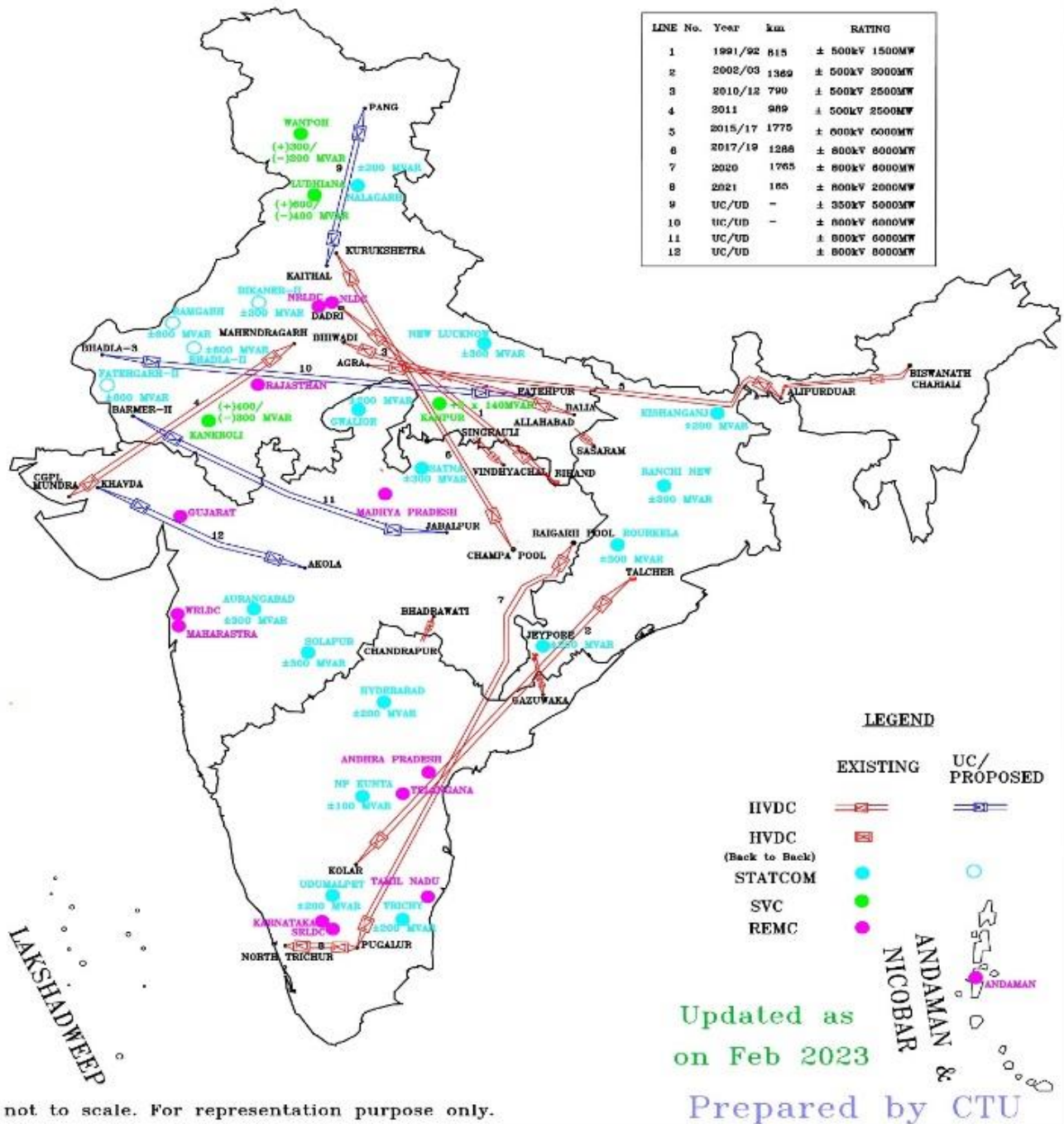
- a) A large number of STATCOMs have been planned in the RE corridors. STATCOMs are crucial for reliable integration of RE sources. The Appendix-IV and Appendix-V of Draft Regulation deals with Procedure for Calculation of Transmission System Availability Factor for a month. The formulae for Calculation of Availability of each category of Transmission Elements mentions the NATAF of the AC systems, HVDC bi-pole systems and HVDC B/B systems only.
- b) First time charging procedure for STATCOMs was issued by NLDC vide communication dated 19th April 2018. In this communication NLDC has clearly brought out the list of telemetry points and data to be reported from site to RLDC/NLDC control room in reference to STATCOM operation. However, all telemetered data in this regard are yet to be provided in some cases.

Thus, in order to determine the STATCOM performance, transmission licensee should be made responsible for furnishing PMU output at RLDC/NLDC. To analyse the dynamic performance of STATCOM, transmission licensee shall report the high resolution data of the period for faults where STATCOM should activate or as and when requested for by the RLDCs/NLDC.

- c) STATCOM being a dynamic VAR compensation device, provides fast reactive support to the grid during transient as well steady state operation. STATCOM has an additional feature of power oscillation damping which need tuning of its settings. In order to analyse the dynamic performance of STATCOM (STATCOM+ MSR /MSC) during day-to-day operation, installation of PMU for measuring the parameters of Coupling Transformer of the STATCOM is essential. In addition to PMUs, high resolution data of the period for faults where STATCOM should operate is also required to be provided by the transmission licensees. In absence of dynamic response data, it becomes difficult to analyse the performance or availability of STATCOM. The details of existing and proposed STATCOM are shown in Figure 6. The list of existing and upcoming STATCOMs is enclosed as Annexure I.



# HVDC Links, STATCOM/SVC & REMC(s) in India



Map not to scale. For representation purpose only.

Fig-6

Considering the important role of STATCOMs in grid reliability, STATCOMs and SVCs Normative Annual Transmission System Availability Factor (NATAF) calculation should be separately mentioned in the TCT Regulations suitably.

To determine the STATCOM performance, transmission licensee should be made more responsible for furnishing high resolution data from field to RLDCs/NLDC. Failure to submit data within 24 hours related to dynamic compensation provided by STATCOM

**subsequent to an event should render it deemed unavailable. Non-performance should be considered as deemed unavailable for 24 hours on each occasion.**

**7. Thermal flexibility - Start-up time of generators:**

- a) Generator startup time is an important attribute for thermal flexibility. The same could be incentivized. It is important for the LDCs that generators quickly respond to the startup instructions for adequacy of supply in the grid.
- b) Considering the large scale renewable integration in India, it is important that the generators coming out of cold reserve must be on bar well within the revival time in accordance with the CERC Regulations and Approved Procedures.
- c) Regulation-10(2) of UPERC (Merit Order Despatch and Optimization of Power Purchase) Regulations, 2021 states that

Quote

*(2) Once a unit is taken out under RSD, it can be recalled anytime after 8 hours. In case of system requirements, the generating unit can be revived before 8 hours as per the instructions of the SLDC. Similarly, distribution licensee can also direct revival of a unit before 8 hours looking at overall cost implication:*

*Provided that the time to start a machine under different conditions such as HOT, WARM and COLD shall not be more than 4 hours, 8 hours and 12 hours respectively. However, if a generating unit under RSD is put under wet preservation after prior intimation to SLDC/beneficiary, additional six hours will be allowed to start the unit:*

*Provided further if machine is unable to revive within the prescribed time, such generating company shall provide the reasons along with justification to the SLDC and SLDC shall act accordingly.*

Unquote.

The relevant Regulation is available at [UPERC \(Merit Order Despatch and Optimization of Power Purchase\) Regulations, 2021](#).

- d) In the draft procedure on Security Constrained Unit Commitment (SCUC), Unit Shut Down (USD), and Security Constrained Economic Despatch (SCED) at Regional Level, prepared by NLDC and submitted to Hon'ble Commission for approval, the timing for different mode of starts is mentioned as followed:

*"6.13 The allowable time for revival of units under hot, warm and cold start up shall be 4 hours, 8 hours, and 12 hours respectively. The total time available for the revival of the unit would be the duration between the time of instruction by NLDC/RLDCs and the target time for synchronization of the unit."*

**As per the Procedures of Ancillary Service Regulations 2022, the ancillary services providers mention the startup time in the prescribed format on monthly/weekly basis. The median value of the startup times furnished by the Ancillary Services Providers in different categories could be used as a benchmark.**

**An incentive may be provided to such generators which successfully comply with 90% instances of the startup instructions by the LDCs within the above benchmark time in a year.**

**Illustration:**

**Say the start up time of a generating station is provided as 8 hours. Out of 10 instructions, 9 instructions were honored by the generating station within. In such a case the compliance shall be 90%. If 90% performance is achieved, a lumpsum incentive of say ₹ 1 lac per start up may be given to the generator.**

**8. Para wise suggestions are enclosed as Annexure II**



# STATCOMs in Non-RE Pockets

ANNEXURE I



S. No.	Region	STATCOM STATION	Model/Make	VSC (Dynamic Part)	Mechanically Switched Reactor (MSR)	Mechanically Switched Capacitor (MSC)	MSC/MSR Switching Logic
1	NR	NALAGARH	RXPE	2*+/-150 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
2		LUCKNOW	RXPE	2*+/-100 MVAR	2*125 MVAR	2*125 MVAR	Bus Voltage Based
3	WR	SOLAPUR	RXPE	2*+/-150 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
4		AURANGABAD	RXPE	2*+/-150 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
5		SATNA	RXPE	2*+/-150 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
6		GWALIOR	RXPE	2*+/-100 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
7	ER	KISHANGANJ	SIEMENS	2*+/-100 MVAR	2*125 MVAR	NA	Current Based
8		RANCHI	SIEMENS	3*+/-100 MVAR	2*125 MVAR	NA	Current Based
9		JEYPORE	SIEMENS	2*+/-100 MVAR	2*125 MVAR	2*125 MVAR	Current Based
10		ROURKELA	SIEMENS	3*+/-100 MVAR	2*125 MVAR	NA	Current Based
11	SR	NP KUNTHA	HYOSUNG	2*+/-50 MVAR	NA	NA	NA
12		HYDERABAD/ GHANAPUR	HYOSUNG	2*+/-100 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
13		TRICHY	HYOSUNG	2*+/-100 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based
14		UDUMALPET	HYOSUNG	2*+/-100 MVAR	2*125 MVAR	1*125 MVAR	Bus Voltage Based

## OEM Breakup

- RXPE – 06
- Hyosung – 04
- Siemens - 04

# STATCOMs in RE Complex

S. No.	Region	STATCOM STATION	Model/Make	VSC (Dynamic Part)	Mechanically Switched Reactor (MSR)	Mechanically Switched Capacitor (MSC)	MSC/MSR Switching Logic
1	NR	Bhadla-II (STATCOM-I)*	Siemens	2*+/-150 MVAR	1*125 MVAR	2*125 MVAR	Current Based
2		Bhadla-II (STATCOM-II)^	Siemens	2*+/-150 MVAR	1*125 MVAR	2*125 MVAR	Current Based
3		Fatehgarh-II (STATCOM-I)	Siemens	2*+/-150 MVAR	1*125 MVAR	2*125 MVAR	Current Based
4		Fatehgarh-II (STATCOM-II)	Siemens	2*+/-150 MVAR	1*125 MVAR	2*125 MVAR	Current Based
5		Bikaner-II	Siemens	2*+/-150 MVAR	1*125 MVAR	2*125 MVAR	Current Based
6		RAMGARH	Upcoming	+/- 300 MVAR	1*125 MVAR	2*125 MVAR	
7		RAMGARH	Upcoming	+/- 300 MVAR	1*125 MVAR	2*125 MVAR	
8		FATEHGARH - III	Upcoming	+/- 300 MVAR	1*125 MVAR	2*125 MVAR	
9		FATEHGARH - III	Upcoming	+/- 300 MVAR	1*125 MVAR	2*125 MVAR	
10	WR	Khavda PS-I	Upcoming	+/- 300 MVAR	2*125 MVAR	1*125 MVAR	
11		Khavda PS-I	Upcoming	+/- 300 MVAR	2*125 MVAR	1*125 MVAR	
12		Khavda PS-III	Upcoming	+/- 300 MVAR	2*125 MVAR	1*125 MVAR	

**Para wise suggestions on behalf of Regional Load Despatch Centres (RLDCs) and National Load Despatch Centre (NLDC) on CERC Terms and Conditions of Tariff Regulation-2024**

Sr. No.	Para no. of the draft Regulation	Provisions in Draft Regulation	Suggestions on Draft Regulation	Justification for the Comments/ Suggestions
1.	<b>Para 3.66</b>	' <b>Rated Voltage</b> ' means the voltage at which the transmission system is designed to operate and includes such lower voltage at which any transmission line is charged or for the time being charged, in consultation with long-term customers.	' <b>Rated Voltage</b> ' means the voltage at which the transmission system is designed to operate and includes such lower voltage at which any transmission line is charged or for the time being charged, in consultation with <b>CTUIL/RLDCs/NLDC/SLDCs/GNA Grantees</b>	For transmission system key stakeholders include - CTUIL/RLDCs/NLDC/SLDCs/GNA Grantees. Hence all stakeholders should be consulted before charging the transmission system.
2.	<b>Para 3(69)</b>	'Run-of-River Generating Station with Pondage' means a hydro generating station with sufficient pondage for meeting the diurnal variation of power demand;	'Run-of-River Generating Station with Pondage' means a hydro generating station with a <b>minimum 3 hours of pondage</b> for meeting the diurnal variation of power demand;	This definition of RoR with pondage in draft regulation seems to be more generic. In IEGC-2023, Run-of-River Generating Station with Pondage is referred as 3 hours pondage. The same may be harmonised in the Draft regulation.
3.	<b>Para 3.88(g)</b>	The useful life of Communication system excluding OPGW, IT and SCADA is 7 years.	The useful life of <b>IT, SCADA and Communication System excluding OPGW</b> is 7 years.	There is ambiguity in the mentioned clause which could be misinterpreted as exclusion of IT and SCADA systems as well and hence, it may be rephrased as proposed.
4.	<b>Para 9</b>	<b>Clause 9. Application for determination of tariff</b> (1) Para.3 <i>Provided further that transmission licensees shall combine all the elements</i>	As per present regulatory provisions, transmission licensees are commissioning the elements of a project as and when it is completed and getting Annual	Due to above new provisions, transmission licensees may prefer to do the commissioning the elements in a group, as the last element of the group of elements (as per the investment approval) COD date in a particular



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		<p><i>of the transmission system in the Investment Approval, which are attaining commissioning during a particular month and declare a single COD for the combined Asset, which shall be the date of the COD of the last element commissioned in that month and such Asset shall be treated as single Asset for tariff purposes.</i></p>	<p>Fixed Charges from the date of COD. The draft regulation may be suitably amended for continuation of same practice.</p>	<p>month shall be considered as the COD of the group elements. There is no benefit for the licensee in early charging of any available element, which may enhance system reliability.</p>
5.	<b>Para 20</b>	<p><b>Prudence Check of Capital Cost:</b> <i>The following principles shall be adopted for prudence check of capital cost of the existing or new projects:</i></p> <p><i>(1) In case of the thermal generating station and the transmission system, prudence check of capital cost shall include scrutiny of the capital expenditure, in light of capital cost of similar projects based on past historical data, wherever available, reasonableness of financing plan, interest during construction, incidental expenditure during construction, use of efficient technology, cost over-run and time over-run, procurement of equipment and materials through competitive bidding as given in</i></p>	<p>In the regulation, it is not provided any benchmark/indicative cost which to be considered in case of non-availability of separate capital cost of any generating station or transmissions system rather than it is relied on reasonable cost during prudence check. <b>Benchmark/indicative cost</b> may be mentioned in the regulation in case of non-availability of separate capital cost of any generating station or transmissions system.</p>	<p>In the petition no. 209/MP/2017 in matter of <b>AD Hydro Power Limited Versus Everest Power Private Limited &amp; ors.</b> wherein, the Hon'ble CERC had relied on the capital cost of 400 kV D/C transmission line and 400 kV bays in the same region, and other tariff orders, to arrive at the capital cost of the 220 kV D/C transmission line, using the ratio of indicative cost between the 400 kV and 220 kV lines and bays as used for determining POC slab rates.</p> <p>However, Hon'ble APTEL in appeal no. 410 of 2019 had set aside the above commission order based on that no benchmark norm has been specified by the CERC.</p> <p>Additionally, in case of <b>BBMB</b> transmission it is observed that even it is declared as ISTS, the</p>

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		<p><i>Regulation 100 below and such other matters as may be considered appropriate by the Commission: Provided that, while carrying out the prudence check, the Commission shall also examine whether the generating company or transmission licensee, as the case may be, has been careful in its judgments and decisions in the execution of the project.</i></p>		<p>tariff of the same is not included in the POC computation due to non-availability of capital cost.</p> <p>In view of the above, benchmark/ indicative cost may be mentioned in the regulation in case of non-availability of separate capital cost of any generating station or transmissions system.</p>
6.	<b>Para 27</b>	Additional Capitalisation on account of Renovation and Modernisation	Provision to enable synchronous condenser mode of operation of old/retiring conventional power stations including Gas based Generating Stations may also be proposed under Renovation and Modernisation.	With the high penetration of renewable energy sources like wind and solar power and gradual reduction/decommissioning of conventional generators, total system inertia of grid would decline. Old/retiring conventional power stations may provide support to the grid by operating in synchronous condenser mode.
7.	<b>Para 35(1)</b>	In case a generating station or unit thereof, or a transmission system including communication systems or element thereof after it is certified by <b>CEA or CTU or any other statutory authority</b> , that any asset cannot be operated or needs to be replaced on account of environmental concerns or safety issues or system upgradation or a combination of these factors not	Clarity may be given for the statutory body for any generating station or unit thereof and for the transmission system including communication for the decommissioning process separately.	As per the above, CEA or CTU or any other statutory authority are the certifying agency for decommissioning of any generating station or unit thereof, or a transmission system. There is no clarity regarding which statutory agency need to be approached for decommissioning activities for different type of elements, which may lead to confusion or delaying the process.

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		<p>attributable to generating company or a transmission licensee, the unrecovered depreciable value may be allowed to be recovered on a case-to-case basis after duly adjusting the actual salvage value post disposal of such project. Provided that the manner of recovery, including a number of instalments in which such unrecovered depreciation will be allowed, shall be specified by the Commission on a case-to-case basis. Provided further that no carrying cost shall be allowed on any delay associated with such recovery.</p>		
8.	<b>Para 64(4)</b>	<p>In case of part or full use of an <b>alternative source of fuel supply</b> by coal based thermal generating stations other than as agreed by the generating company and beneficiaries in their power purchase agreement for the supply of contracted power on account of a shortage of fuel or optimization of economical operation through blending, the use of an alternative source of fuel supply shall be permitted to generating station up to a maximum of 6% blending by weight.</p>	<p>In case of part or full use of an alternative source of fuel supply by coal based thermal generating stations other than as agreed by the generating company and beneficiaries in their power purchase agreement for the supply of contracted power on account of a shortage of fuel or optimization of economical operation through blending, the use of an alternative source of fuel supply shall be permitted to generating station up</p>	<p>Ministry of Power (MoP) issues directions to all GENCOs including Independent Power Producers (IPPs) for the timely Import of Coal for blending purposes and maximizing production in captive coal mines. In order to ensure harmony between Regulation and MoP order(s) pertaining to Coal blending norms, suggested change is hereby proposed.</p>



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			to a maximum of 6% blending by weight <b>or as notified by MoP time to time.</b>	
9.	<b>Para 65(3)</b>	<p>The PAFM shall be computed in accordance with the following formula:</p> $PAFM = 10000 \times \sum_{i=1}^N \frac{DC_i}{\{N \times IC \times (100 - AUX)\}} \%$ <p>Where,  AUX = Normative auxiliary energy consumption in percentage  DC<sub>i</sub> = Declared capacity (in ex-bus MW) for the 1<sup>st</sup> day of the month, which the station can deliver for at least three (3) hours, as certified by the nodal load despatch centre after the day is over.  IC = Installed capacity (in MW) of the complete generating station  N = Number of days in the month</p>	<p>The PAFM shall be computed in accordance with the following formula:</p> $PAFM = 10000 \times \sum_{i=1}^N \frac{DC_i}{\{N \times IC \times (100 - AUX)\}} \%$ <p>Where,  AUX = Normative auxiliary energy consumption in percentage  DC<sub>i</sub> = Declared capacity (in ex-bus MW) for the <b>"i th"</b> day of the month, which the station can deliver for at least three (3) hours, <b>or the average of the maximum 12 time block DC furnished by the RoR as applicable</b>, as certified by the nodal load despatch centre after the day is over.  IC = Installed capacity (in MW) of the complete generating station  N = Number of days in the month</p>	<p>"1<sup>st</sup> "day in place of <b>"i th"</b> day may be a typographical error.</p> <p>A pure RoR station may not be able to deliver power as per declared capacity (in ex-bus MW) for at least three (3) hours. Currently for RoR stations daily DC is being calculated as the average of the maximum 12 time block DC furnished by the RoR. Same may be included suitably to make the practice as a part of the regulation.</p>
10.	<b>Para 65(7) &amp; 65(9)</b>	<b>65. Computation and Payment of Capacity Charge and Energy Charge for Hydro Generating Stations:</b> .....	In accordance with the above, any surplus energy beyond the designated design energy will be billed at 120 paise per unit.	It is to be noted that when Hydro plant's saleable scheduled energy (ex-bus) during a year is less than the saleable design energy (ex-bus) for reasons beyond the control of the

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		<p>(7) In case the saleable scheduled energy (ex-bus) of a hydro generating station during a year is less than the saleable design energy (ex-bus) for reasons beyond the control of the generating station, the generating station may directly recover the shortfall in energy charges in six equal interest-free monthly instalments after adjusting for DSM Energy in the immediately following year and shall be subject to truing up at the end of the tariff period.</p> <p>.....</p> <p>(9) In case the energy charge rate (ECR) for a hydro generating station, computed as per clause (5) of this Regulation exceeds one hundred and twenty paise per kWh, and the actual saleable energy in a year exceeds <math>\{DE \times (100 - AUX) \times (100 - FEHS) / 10000\}</math> MWh, the energy charge for the energy in excess of the above shall be billed at one hundred and twenty paise per kWh only.</p>	<p>However, in case of surplus power available with the generator and DSM price is more than 120 paise per unit, there may be a scenario where generator might schedule their energy close to the annual design energy, and over inject into the grid.</p>	<p>generating station, the generating station is allowed to directly recover the shortfall in energy charges from its beneficiaries. However, in case of saleable energy is more than the annual design energy, no benefit is passed on to the beneficiaries.</p> <p>Hence, it is proposed that Hon'ble Commission may provide suitable provisions in the Regulation so that the said benefit could be passed on to the beneficiaries also.</p>

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11.	<b>Para 66(2)</b>	<p>The capacity charge payable to a pumped storage hydro generating station for a calendar month shall be:</p> <p><b>(AFC x NDM / NDY)</b> (In Rupees)</p> <p>if actual Generation during the month is <math>\geq</math> 75 % of the Pumping Energy consumed by the station during the month and</p> <p><b>{(AFC x NDM / NDY) x (Actual Generation during the month during peak hours/ 75% of the Pumping Energy consumed by the station during the month)}</b> (in Rupees)},</p> <p>if actual Generation during the month is &lt; 75 % of the Pumping Energy consumed by the station during the month.</p>	<p>PSPs may declare separate availability for generation and pumping and weighted average of generation and 0.75*pumping availability may be considered as the availability of PSP and accordingly PAFM may be calculated.</p>	<p>The unit's availability for PSP operation and the compatibility of the units running in generation and pumping mode to be considered for recovery of full capacity charge.</p> <p>Moreover, the upstream and downstream conditions of the reservoir may entail only generation or only pumping on case-to-case basis.</p>
12.	<b>Para 70</b>	<p>The norms of operation as given hereunder shall apply to thermal generating stations:</p> <p><b>(A) Normative Annual Plant Availability Factor (NAPAF)</b></p>	<p>The norms of operation as given hereunder shall apply to thermal generating stations:</p> <p><b>(A) Normative Annual Plant Availability Factor (NAPAF)</b></p>	<p>Typographical error may be corrected.</p>

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		(a) 85% or all thermal generating stations, except those covered under clauses (c), (c), (d) & (d)	(a) 85% or all thermal generating stations, except those covered under clauses <b>(b)</b> , (c), (d) & <b>(e)</b>	
13.	<b>Para 93(1)</b>	<p><b>93. Approval Process of Non-ISTS Lines carrying Inter-State Power:</b></p> <p>(1) Existing intra-state transmission lines other than Natural ISTS lines shall be considered as ISTS systems;</p> <p>Provided that these transmission lines are being used for evacuation and transfer of inter-state power on a regular basis as identified by CTU in consultation with the concerned RPC and RLDC;</p> <p>.....</p>	The <b>definition of inter-state power transfer</b> should be explicitly clarified.	In a particular petition ( <b>246/MP/2018</b> ), it has been noted that the petitioner engages in interstate transactions and asserts that the line in question should be classified as an inter-state line as the transaction involves inter-state power transfer. Thus, there remains ambiguity in what constitutes inter-state power transfer.
14..	<b>Para 93(2)</b>	<p>(2) Existing Intra State lines which were planned as ISTS System shall also be considered as ISTS lines;</p> <p>Provided that such lines have not been developed for the sole purpose of the beneficiary(ies) of a single State;</p> <p>.....</p>	The certification of the aforementioned line as an Inter-State Transmission System (ISTS) is to be carried out by some authority. Hence name of the authority needs to be mentioned.	This process involves the coordination of either the Central Electricity Regulatory Commission (CERC) or the Central Transmission Utility (CTU), in consultation with the Regional Power Committee (RPC) and the Regional Load Despatch Centre (RLDC). Further, based on the inputs of all concerned agencies, an authority needs to certify an existing Intra State line as ISTS System. The

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				same may be explicitly mentioned for better clarity.
15.	<b>Para 93 (3)</b>	(3) CTU, in consultation with RLDC shall identify all such natural ISTS lines and non-ISTS lines which are utilized for ISTS power transfer after ascertaining that such nature of flow of power has become permanent.	It is suggested that the certification of a non-ISTS line as an ISTS line takes into account a certain percentage of power flow that remains consistent throughout the entire year, irrespective of seasonal variations.	Power flow varies in a transmission system depending up on the load generation balance scenarios. It is suggested to take into account a certain percentage of power flow that remains consistent throughout the entire year, irrespective of power flow (including direction of flow) variations.
16.	<b>Para 2 of Appendix-IV</b>	... Each ICT bank (three single-phase transformers together) shall form one element;	Hon'ble Commission may provide suitable provision for reduction in availability for the outage of an ICT beyond a nominal changeover time of spare transformer.	This interpretation of ICT misses the relevance of spare units. The ICTs which have capitalized the spares, shall be included as three + one spare. The outage of ICT beyond a nominal changeover time of spare may be considered a candidate for penal provision
17.	<b>Para 2 of Appendix-IV</b>	HVDC Bi-pole links: Each pole of the HVDC link, along with associated equipment at both ends, shall be considered as one element.	The HVDC conductors (there are two dedicated metallic return in HVDCs) along with poles may be considered for calculation of availability	HVDC availability is simply based on rating of poles. There are no incentives for black start or other ancillary services to be received from VSC HVDCs. In future, VSC HVDCs are planned and these services if not separately verified may result in full recovery of asset even after sub-optimal operation.
18.	<b>Para 3 of Appendix-IV</b>	The transmission line availability is based on the number of sub-conductors	Hon'ble Commission may provide suitable provision to attach weightage factor in terms of dynamic line rating shared by the transmission line owner.	There is no incentive or penalty for the line owner to ensure line healthiness for operation up to the thermal limit. CEA Manual on planning criteria 2023 mentions that in real time system operation, capacity of transmission line may be assessed through



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				Dynamic Line Loading, however, this may not be used while transmission system planning.
19.	<b>Para 5(i) of Appendix-IV</b>	A reasonable restoration time for the element shall be considered by the Member Secretary, RPC, and any additional time taken by the transmission licensee for restoration of the element beyond the reasonable time shall be treated as outage time attributable to the transmission licensee.	Instead of considering reasonable restoration time, to reduce subjectivity a reasonable restoration time may be mentioned by Hon'ble Commission in the Regulation. Transmission Service providers may be incentivized to adopt resiliency practices like ERS, crew management, communication system healthiness, reliable auxiliary supply etc.	In Standard of Performance Regulations restoration times have been clearly mentioned. With the target restoration time available, licensees may take proactive actions to minimize the outage time. Post facto reconciliation creates uncertainty to the system operator. The resiliency related aspects may be considered for timely restoration of lines.
	<b>Para 6 of Appendix -IV</b>	6. Time frame for certification of transmission system availability: (1) The following schedule shall be followed for certification of availability by the Member Secretary of the concerned RPC:  • Submission of outage data by Transmission Licensees to RLDC/ constituents – By the 5th of the following month;	6. Time frame for certification of transmission system availability: (1) The following schedule shall be followed for certification of availability by the Member Secretary of the concerned RPC:  • Submission of outage data <b>along with documentary proof (if any) and TAFPn calculation</b> by Transmission Licensees to RLDC/ constituents – By the 5th of the following month;	Documentary proof is needed for verifying outage data. Further, transmission system availability factor for the n <sup>th</sup> calendar month (TAFPn) calculation is required cross verification.

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20.	-----	'Maximum Continuous Rating'	'Maximum Continuous Rating' or 'MCR' of a generating unit of Hydro Generating station may be included in the MCR definition.	'Maximum Continuous Rating' or 'MCR' is defined in Draft Regulation for Thermal and Gas plant while in relation to a generating unit of Hydro Generating station it is not defined. The same may also be included in MCR definition.
21.	-----	Additional Capitalization	Additional capitalization by the Transmission licensee on account of Renovation and Modernisation may be included.	There is no provision outlined regarding additional capitalization by the Transmission licensee on account of R&M.
22.	-----	Debt – Equity	The Debt – Equity ratio for the generating stations which are acquired through NCLT process may be mentioned.	The Debt – Equity Ratio for a new project has been specified as 70:30. However, for the projects acquired after NCLT proceedings, the Debt-Equity ratio lacks clarity that whether it will be the same as for new project or there will be a different mechanism to fix the same

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