



ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(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 संख्या: एनएलडीसी/आरपीसी/2023

दिनांक: 16th जनवरी, 2023

सेवा मे,

1. Member Secretary, NRPC, 18/A, SJSS Marg, Katwaria Sarai, New Delhi-110016
2. Member Secretary, WRPC, F-3, MIDC Area, Andheri (East), Mumbai-400093
3. Member Secretary, SRPC, 29, Race Course Cross Road, Bangalore-560009.
4. Member Secretary, ERPC, 14, Golf Club Road, Kolkata-700033
5. Member Secretary, NERPC, Lapalang, Shillong, Meghalaya 793006

- संदर्भ: 1. एनएलडीसी/आरपीसी/2022 dated 28th November'2022
2. एनएलडीसी/आरपीसी/2022 dated 02nd December'2022
3. CERC: Petition No. 16/SM/2022, Order dated 26th December, 2022
4. एनएलडीसी ईमेल दिनांक: 10th January, 2023

विषय: Revised Methodology for computation & declaration of Normal Rate for Deviation

महोदय,

CERC vide order dated: 26th Dec'2022 in Petition No. 16/SM/2022 directed for implementation of price cap in the Deviation Settlement Mechanism and Related Matters Regulations, 2022. This change needs to be incorporated in the "Methodology for Computation & Declaration of Normal Rate".

Further difference in methodology/philosophy in accounting of Inter-regional deviation calculation is observed in the statement of charges for deviation being issued in different regions.

The "statement of reasons" published by CERC on Deviation Settlement and Related Matters Regulations, 2022 states as follows:

"11. Charges for inter-regional deviation and deviation in respect of cross-border transactions

.....The Commission feels the provision is amply clear and adequate. Further detailing in regard to scheduling and accounting for deviation shall be stipulated by the NLDC/RLDC/RPC in the accounting procedure."

Accordingly, in order to incorporate the direction of CERC and to address the inter-regional and cross-border deviation computation issues, the methodology has been revised and is enclosed herewith. The same has been uploaded on the Grid-India website.

सादर धन्यवाद,

भवदीय

(Debasis De)

Executive Director

Encl: As above

Copy to: 1. Secretary CERC, 3 rd & 4 th Floor, Chanderlok Building, 36, Janpath, New Delhi- 110001
2. Executive Director NRLDC/WRLDC/SRLDC/ERLDC/NERLDC

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Grid Controller of India limited

(Formerly Power System Operation Corporation Limited)

(A Govt. of India Enterprise)

Methodology for Computation & Declaration of Normal Rate

In accordance with

CERC Deviation Settlement Mechanism Regulations, 2022

Version-3

16th January'2023

National Load Despatch Centre (NLDC)

New Delhi

Methodology for computation & declaration of Normal Rate in line with CERC Deviation Settlement Mechanism and Related Matters Regulations, 2022

1. Background

CERC Deviation Settlement Mechanism Regulations, 2022 (hereinafter referred to as “DSM Regulations”) was notified on 14th March 2022. The date of implementation has been notified as 05.12.2022 by CERC on 31st October 2022.

This regulation provides for declaration of Normal Rate of charges for deviation which, as per the DSM Regulations, is applicable for deviation in a time block.

The methodology to be adopted for computation of normal rate of charges for deviation is summarised below.

For the period 05.12.2022 to 04.12.2023	From 05.12.2023 onwards
<p>The normal rate of charges for deviation for a time block shall be equal to the highest of:</p> <p>i. the weighted average Area Clearing Price (ACP) of the Day Ahead Market segments of all the Power Exchanges;</p> <p style="text-align: center;">or</p> <p>ii. the weighted average ACP of the Real Time Market segment of all the Power Exchanges;</p> <p style="text-align: center;">or</p> <p>iii. the Weighted Average Ancillary Service Charge of all the regions for that time block.</p> <p>Provided further that in case of non-availability of ACP for any time block on a given day, ACP for the corresponding time block of the last available day shall be considered.</p>	<p>Weighted Average Ancillary Service Charge (in paise/kWh) computed based on the total quantum of Ancillary Services deployed and the net charges payable to the Ancillary Service Providers for all the Regions for that time block.</p>

The normal rate of charges (paise /Kwh) for deviation shall be rounded off to the nearest two decimal places.

2. Procedure for calculating the normal rate of charges:

- a. The weighted average ACP of the Day Ahead Market (DAM, G-DAM) and Real Time Market (RTM) shall be calculated bid area wise considering all Power Exchanges. The list of Bid Areas and States covered under Bid-Areas is enclosed as *Annexure-1*.
- b. Subsequently, as and when any new market segment is introduced in Day Ahead Market, this would be suitably incorporated in the rate computations.

- c. In case of non-availability of ACP in any Power Exchange for a Bid-Area for a time block, if ACP is discovered in other exchanges/exchange, the available discovered ACP shall be considered for computing the weighted average ACP for that time block.
- d. In case of non-availability of ACP for any time block on a given day in all Power Exchanges, the last available ACP for the corresponding time block shall be considered. The non-availability of ACP shall only be considered for those time blocks where the market has not cleared. In case price declared is zero by the Power Exchanges, the same shall be considered.
- e. The **weighted average ACP of the Day Ahead Market** segments of all the Power Exchanges shall be computed as follows.

The weighted average ACP of the Day Ahead Market segments shall be computed by considering the block wise, area wise price and cleared volume for Day Ahead Market (DAM) and GDAM (Green Day Ahead Market) in all the operational Power Exchanges.

For a given time block, the following methodology shall be used for computation of the weighted average ACP in Day Ahead Market for sample bid Area A1.

DAM	
Volume IEX (Buy +Sell) = A1 _{IEX}	Price IEX = P1 _{IEX}
Volume PXIL (Buy +Sell) = A1 _{PXIL}	Price IEX = P1 _{PXIL}
Volume HPX (Buy +Sell) = A1 _{HPX}	Price HPX = P1 _{HPX}
GDAM	
Volume IEX (Buy +Sell) = A1 _{G-IEX}	Price IEX = P1 _{G-IEX}
Volume PXIL (Buy +Sell) = A1 _{G-PXIL}	Price IEX = P1 _{G-PXIL}
Volume HPX (Buy +Sell) = A1 _{G-HPX}	Price HPX = P1 _{G-HPX}

Volume in Kwh and Price in paisa/Kwh

Weighted Average ACP of DAM (paise/Unit) =

$$\frac{[(A1_{IEX} * P1_{IEX}) + (A1_{PXIL} * P1_{PXIL}) + (A1_{HPX} * P1_{HPX}) + (A1_{G-IEX} * P1_{G-IEX}) + (A1_{G-PXIL} * P1_{G-PXIL}) + (A1_{G-HPX} * P1_{G-HPX})]}{[A1_{IEX} + A1_{PXIL} + A1_{HPX} + A1_{G-IEX} + A1_{G-PXIL} + A1_{G-HPX}]}$$

- f. The **weighted average ACP of the Real Time Market** segment of all the Power Exchanges shall be computed as follows.

The weighted average ACP of the Real Time Market (RTM) segment of all the Power Exchanges shall be computed by considering the block wise, area wise price and volume of RTM in all the operational Power Exchanges.

In case of non-availability of ACP for any time block on a given day in all Power Exchanges, ACP for the corresponding time block of the last available day shall be considered. The non-availability of ACP shall only be considered for those time blocks where the market has not cleared. In case price declared is zero by the Power Exchanges, the same shall be considered.

For a given time block, the following methodology shall be used for computation of the weighted average ACP for Real Time Market for a sample bid Area A1

RTM	
Volume IEX (Buy +Sell) = A1 _{IEX}	Price IEX = P2 _{IEX}
Volume PXIL (Buy +Sell) = A1 _{PXIL}	Price PXIL = P2 _{PXIL}
Volume HPX (Buy +Sell) = A1 _{HPX}	Price HPX = P2 _{HPX}

Volume in Kwh and Price in paisa/Kwh

Weighted Average ACP of RTM (paise/Unit) =

$$[(A1_{IEX} * P2_{IEX}) + (A1_{PXIL} * P2_{PXIL}) + (A1_{HPX} * P2_{HPX})]$$

$$[A2_{IEX} + A2_{PXIL} + A2_{HPX}]$$

g. The **weighted average Ancillary Service Charge** shall be computed as follows.

The weighted average Ancillary Service Charge of all the regions for that time block shall be computed duly considering the RRAS (Regulation Up and Regulation down) and SRAS (Up and down) despatched on all India basis.

The following shall be used for computation for a sample time block:

RRAS	SRAS
RRAS_Up Volume (Mwh) = RRASUP _{v1.....vn} Variable Cost (Rs/Unit) = VC _{1.....n} Fixed cost (Rs/Unit)= FC _{1.....n} Mark Up (Rs/Unit)= 0.5 RRAS_UP(Rs) = (FC ₁ + VC ₁ +0.5)*1000* RRASUP _{v1+....} +(FC _n + VC _n +0.5)*1000* RRASUP _{vn} n= number of stations	SRAS_Up Volume 15 min (Mwh) = SRASUP _{v1(15).....vn(15)} Energy charge/compensation charge(Rs/Unit) = VC _{1.....n} Mark Up (Rs/Unit= M _{1.....y} SRAS Up price= SRASUP _{P1.....pn} SRAS_Up(Rs) =(VC ₁ * SRASUP _{v1(15)+...+ VC_n* SRASUP_{vn(15)}) *1000 n= number of stations}
RRAS_Down Volume (Mwh) = RRASDN _{v1.....vn} Variable Cost (Rs/Unit) = VC _{1.....n} RRAS_Down (Rs) = (RRASDN _{v1} *0.75*VC _{1+.....} + RRASDN _{v1} *0.75* VC _n)*1000	SRAS_Down Volume 15 min (Mwh) = SRAS-DN _{v1(15).....vn(15)} Energy charge/compensation charge(Rs/Unit) = VC _{1.....n} SRAS_Down(Rs)=(SRAS-DN _{v1(15)} *VC _{1+.....} +SRAS-DN _{vn(15)} *VC _n) *1000
	SRAS_Incentive SRAS Incentive Rate (Rs/Unit)=P ₁₋₆ SRAS_Up Volume 05 min (Mwh) = SRASUP _{v1(5).....vn(5)} SRAS_Down Volume 05 min(Mwh) = SRAS-DN _{v1(5).....vn(5)} P ₁ = 0.5, P ₂ = 0.4, P ₃ = 0.3, P ₄ = 0.2, P ₅ = 0.1, P ₆ = 0; SRAS_Incentive=(SRASUP _{v1(5)} + SRAS-DN _{v1(5)}) * P ₁₋₆ +.....+(SRASUP _{vn(5)} + SRAS-DN _{vn(5)}) * P ₁₋₆

**SRAS performance would be measured on a daily basis to arrive at the Incentive Rate which would be used for computing the incentive for the block for the station.*

Ancillary Services Net Cost (Rs) AS_{NET} (Rs):

$$[RRAS_UP - RRAS_Down + SRAS_Up + SRAS_Incentive - SRAS_Down]$$

If $AS_{NET} > 0$

Weighted Average Ancillary Service Charge of All India (paise/Unit) =

$$\frac{100 * AS_{NET}}{[(RRAS_Up\ Volume + SRAS_Up\ Volume(15min)) * 1000]}$$

If $AS_{NET} < 0$

Weighted Average Ancillary Service Charge of All India (paise/Unit) =

$$\frac{100 * AS_{NET}}{[(RRAS_Down\ Volume + SRAS_Down\ Volume(15min)) * 1000]}$$

h. **Normal Rate of Charges (paise/Unit) of an area for a time block =**

- Maximum of weighted average ACP of DAM of that area
- weighted average ACP of RTM of that area
- Weighted Average Ancillary Service Charge of All India

Subject to a cap rate of Rs 12 per kWh or as specified by CERC from time to time.

3. Normal rate of charges for deviation for inter-regional deviation and cross-border transactions.

- a. Inter-regional corridors are interconnected through different bid areas and neighboring countries are also connected to different bid areas in India. To simplify the settlement of inter-regional and cross-border deviations, the highest of the weighted average price of the unconstrained market clearing price (UMCP) of DAM, RTM of all Power Exchanges & weighted average Ancillary Services charges shall be considered for computing the normal rate of charges for deviation.
- b. The charges for deviation in respect of cross-border transactions, caused by way of over-drawal/under drawal or under-injection/over-injection shall be payable at the normal rate of charges for deviation.
- c. Charges for Deviation of Inter-regional Exchange between the two regions shall be computed based on normal rate applicable. No additional charges or volume limit shall be applicable for inter-regional deviations. Charges for Deviation shall be applicable for over-drawal or under-injection and under-drawal or over-injection for inter-regional deviations.

Illustration:

Block No	SR to WR (Schedule)	SR to WR (Actual)	Deviation	Normal rate Paisa/Unit)	Deviation Amount as per SRPC(Rs)	Deviation Amount as per WRPC(Rs)	Payable/Receivable
1	100 MW	150 MW	50MW	400	50000	-50000	Payable by WR to SR
2	100 MW	50MW	-50MW	400	-50000	50000	Payable by SR to WR
3	-200 MW	-300 MW	-100 MW	400	-100000	100000	Payable by SR to WR
4	-200 MW	-100 MW	100 MW	400	100000	-100000	Payable by WR to SR

d. In case of non-availability of UMCP for any time block on a given day in all Power Exchanges, the last available UMCP for the corresponding time block shall be considered.

The following shall be used for computation for weighted average UMCP of DAM for a sample time block:

DAM	
Volume IEX (Buy +Sell) = V_{IEX}	UMCP IEX = P_{IEX}
Volume PXIL (Buy +Sell) = V_{PXIL}	UMCP PXIL= P_{PXIL}
Volume HPX (Buy +Sell) = V_{HPX}	UMCP HPX = P_{HPX}
GDAM	
Volume IEX (Buy +Sell) = V_{G-IEX}	UMCP IEX = P_{G-IEX}
Volume PXIL (Buy +Sell) = V_{G-PXIL}	UMCP IEX = P_{G-PXIL}
Volume HPX (Buy +Sell) = V_{G-HPX}	UMCP HPX = P_{G-HPX}

Volume in Kwh and Price in paisa/Kwh

weighted average UMCP of DAM (paise/unit) =

$$\frac{[(V_{IEX} * P_{IEX}) + (V_{PXIL} * P_{PXIL}) + (V_{HPX} * P_{HPX}) + (V_{G-IEX} * P_{G-IEX}) + (V_{G-PXIL} * P_{G-PXIL}) + (V_{G-HPX} * P_{G-HPX})]}{[V_{IEX} + V_{PXIL} + V_{HPX} + V_{G-IEX} + V_{G-PXIL} + V_{G-HPX}]}$$

The following shall be used for computation for weighted average UMCP of RTM for a time block

RTM	
Volume IEX (Buy +Sell) = V_{IEX}	Price IEX = P_{IEX}
Volume PXIL (Buy +Sell) = V_{PXIL}	Price PXIL = P_{PXIL}
Volume HPX (Buy +Sell) = V_{HPX}	Price HPX = P_{HPX}

Volume in Kwh and Price in paisa/Kwh

weighted average UMCP of RTM (paise/unit) =

$$[(V_{IEX} * P_{IEX}) + (V_{PXIL} * P_{PXIL}) + (V_{HPX} * P_{HPX})]$$

$$[V_{IEX} + V_{PXIL} + V_{HPX}]$$

4. Validity of the procedure:

This procedure is valid for one year from 05.12.2022 to 04.12.2023. The procedure shall be reviewed prior to completion of one year or in case of any regulatory changes or based on the experience gained.

5. Time line for publication of normal rate of charges for deviation:

NLDC shall publish the normal rate of charges for deviation on weekly basis by Thursday of the current week for the previous week (Monday to Sunday).

Normal rate of charges shall not be revised after declaration as per the timeline above. No post facto revision in the DSM account would be carried out due to any revision of normal rate of charges for deviation or contract rate or reference charge rate already used for DSM computation.

Annexure-1: Bid Areas and States covered under Bid-Areas

Sr. No.	Bid Area	Region	States covered under Bid Area
1	N1	NR	Jammu and Kashmir, Himachal Pradesh, Chandigarh, Haryana
2	N2	NR	Uttar Pradesh , Uttaranchal, Rajasthan, Delhi
3	N3	NR	Punjab
4	E1	ER	West Bengal, Sikkim, Bihar, Jharkhand
5	E2	ER	Orissa
6	W1	WR	Madhya Pradesh
7	W2	WR	Maharashtra, Gujarat, Daman and Diu, Dadar and Nagar Haveli, North Goa
8	W3	WR	Chhattisgarh
9	S1	SR	Andhra Pradesh, Telangana, Karnataka, South Goa
10	S2	SR	Tamil Nadu, Puducherry
11	S3	SR	Kerala
12	A1	NER	Tripura, Manipur, Mizoram, Nagaland
13	A2	NER	Assam, Arunachal Pradesh, Meghalaya

Revision History:

Ver No	Date of Issue	Original Clause	Revised Clause	Remarks
1	02 nd Dec'22			Original Methodology
2	12 th Dec'22	<p>g. ASNET>0</p> <p>If ASNET>0 Weighted Average Ancillary Service Charge of All India (paise/Unit) =</p> $\frac{100*AS_{NET}}{[(RRAS_Up\ Volume+ SRAS_Up\ Volume(15min) -RRAS_Down\ Volume- SRAS_Down\ Volume(15min)) *1000]}$ <p>If ASNET<0 Weighted Average Ancillary Service Charge of All India (paise/Unit) =</p> <p>(-) $\left[\frac{100*AS_{NET}}{[(RRAS_Up\ Volume+ SRAS_Up\ Volume(15min) -RRAS_Down\ Volume- SRAS_Down\ Volume(15min)) *1000]} \right]$</p>	<p>g.ASNET>0</p> <p>If ASNET>0 Weighted Average Ancillary Service Charge of All India (paise/Unit) =</p> $\frac{100*AS_{NET}}{[(RRAS_Up\ Volume+ SRAS_Up\ Volume(15min)) *1000]}$ <p>If ASNET<0 Weighted Average Ancillary Service Charge of All India (paise/Unit) =</p> $\frac{100*AS_{NET}}{(RRAS_Down\ Volume+ SRAS_Down) Volume(15min)) *1000}$	<p>It was observed that in some situations, netting of the Ancillary despatched quantum leads to high/unrealistic Weighted Average Ancillary Service Charge (Paisa/Unit) and in extreme case, infeasible Weighted Average Ancillary Service Charge (Paisa/Unit).</p>

Ver No	Date of Issue	Original Clause	Revised Clause	Remarks
3	16 th Jan'23	2.h.Normal Rate of Charges (paise/Unit) of an area for a time block = Maximum of <ul style="list-style-type: none"> • weighted average ACP of DAM of that area • weighted average ACP of RTM of that area • Weighted Average Ancillary Service Charge of All India 	2.h.Normal Rate of Charges (paise/Unit) of an area for a time block = Maximum of <ul style="list-style-type: none"> • weighted average ACP of DAM of that area • weighted average ACP of RTM of that area • Weighted Average Ancillary Service Charge of All India <p>Subject to a cap rate of Rs 12 per kWh or as specified by CERC from time to time.</p>	CERC: Petition No. 16/SM/2022 Order dated 26 th Dec'22 <i>"10....Accordingly, the Commission decides that the Normal Rate of Charges for Deviations for a time block as specified in Regulation 7 of the DSM Regulations, 2022 shall be subject to the cap of Rs 12 per kWh, until further orders. "</i>
		New clause added 3.b & 3.c	<p>b. The charges for deviation in respect of cross-border transactions, caused by way of over-drawal/under drawal or under-injection/over-injection shall be payable at the normal rate of charges for deviation.</p> <p>c. Charges for Deviation of Inter-regional Exchange between the two regions shall be computed based on normal rate applicable. No addition charges or volume limit shall be applicable for inter-regional deviations. Charges for Deviation shall be applicable for over-drawal or under-injection and under-drawal or over-injection for inter-regional deviations.</p>	In order to have uniform approach amongst RPCs for computation off deviation charges.