



नई दिल्ली
NEW DELHI

कोरम/ Coram:

श्री पी. के. पुजारी, अध्यक्ष/ Shri P. K. Pujari, Chairperson
श्री आई. एस. झा, सदस्य/ Shri. I.S. Jha, Member
श्री अरुण गोयल, सदस्य/ Shri. Arun Goyal, Member

दिनांक/ Date: 18th of February , 2021

IN THE MATTER OF:

Calculation of Average Power Purchase Cost (APPC) rate at the national level

PROPOSAL

The Central Electricity Regulatory Commission, in discharge of its responsibilities under the Electricity Act 2003 has notified the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Third Amendment) Regulations, 2015, and the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) (Second Amendment) Regulations, 2015 to provide inter alia for the Framework on Forecasting, Scheduling and Imbalance handling for Variable Renewable Energy Sources (Wind and Solar).

2. The above amendments to the respective Regulations apply to wind and solar generating stations that are regional entities. These generators are paid by their respective beneficiaries as per schedule, and deviation from schedule is settled at a 'Fixed Rate' . 'Fixed Rate' has been defined as the PPA rate of generators as determined under section 62 of the Electricity Act 2003 (Act) or adopted under

section 63 of the Act. The relevant provision of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 in this context (Regulation 5, clause 1, sub-clause v) is extracted below:

“... Where the Fixed Rate is the PPA rate as determined by the Commission under section 62 of the Act or adopted by the Commission under section 63 of the Act. In case of multiple PPAs, the weighted average of the PPA rates shall be taken as the Fixed Rate. ...”

3. However, in respect of the generators not covered under section 62 or section 63 of the Act, Average Power Purchase Cost (APPC) rate at National level is considered as ‘the fixed rate’ for deviation settlement. The relevant provision of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 (Regulation 5, clause 1, sub-clause v) is extracted below:

“...Fixed Rate for Open Access participants selling power which is not accounted for RPO compliance of the buyer, and the captive wind or solar plants shall be the Average Power Purchase Cost (APPC) rate at the National level, as may be determined by the Commission from time to time through a separate order. A copy of the order shall be endorsed to all RPCs.”

This implies that for Open Access wind or solar generators that are regional entities and selling power which is not accounted for RPO compliance of obligated entities, and for captive power plants where PPAs do not exist, settlement shall be done at APPC determined at the national level. In pursuance of this provision, the Commission is required to determine the national level APPC.

4. The Commission notified Order dated 25.1.2016 for ‘Determination of Average Power Purchase Cost (APPC) at the national level’ (Petition No. 15/SM/2015) and determined the National APPC as Rs 3.40 / kWh.

The above APPC value was applicable during the remaining months of FY 2015-16, as well as for FY 2016-17, for the purpose of deviation settlement in respect of open access and captive wind and solar generators fulfilling the requirement of regional entities.

5. Subsequently, the Commission notified Order dated 31.8.2017 for 'Determination of Average Power Purchase Cost (APPC) at the national level' (Petition No. 11/SM/2017) and determined the National APPC as Rs 3.48 / kWh.

The above APPC was applicable during FY 2017-18 and until further orders, for the purpose of deviation settlement in respect of the open access and captive wind and solar generators that are regional entities.

6. Further, the Commission notified Order dated 21.6.2018 for 'Determination of Average Power Purchase Cost (APPC) at the national level' (Petition No. 4/SM/2018) and determined the National APPC as Rs 3.53 / kWh.

The above APPC was applicable during FY 2018-19 and until further orders, for the purpose of deviation settlement in respect of the open access and captive wind and solar generators that are regional entities.

7. Later, the Commission notified Order dated 6.6.2019 for 'Determination of Average Power Purchase Cost (APPC) at the national level' (Petition No. 5/SM/2019) and determined the National APPC as Rs 3.60 / kWh.

The above APPC was applicable during FY 2019-20 and until further orders, for the purpose of deviation settlement in respect of the open access and captive wind and solar generators that are regional entities.

8. In this context, it would be pertinent to mention that Regulation 5(c) of Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 defines Average Power Purchase Cost (APPC) as follows:

"for the purpose of these regulations 'Pooled Cost of Purchase' means the weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self generation, if any, in the previous year from all the energy suppliers long-term and short-term, but excluding those based on renewable energy sources, as the case may be."

9. Accordingly, APPC at the national level for FY 2021-22 is proposed to be determined by computing the average of APPC of all States and Union Territories, weighted by volume of conventional power purchased by the respective State/UT.

10. Data for approved power purchase cost and volume of power for FY 2020-21 have been extracted from the respective FY 2021 Tariff Orders issued by SERCs of

the States. Data used for calculation of APPC in respect of all States and UTs are given in the **Annexure** to this Order.

11. The total cost of power purchase considered for computation of APPC excludes cost of generation or procurement from renewable energy sources and transmission charges. Exclusion of cost of generation or procurement from renewable sources is in alignment with the objective of determining APPC, which is to ascertain the average cost of power from conventional sources of electricity. Furthermore, with a view to ascertaining energy costs only, transmission charges are excluded from these calculations.

12. Based on the tariff orders issued by the SERCs/JERCs for FY 2020-21, the APPC at the National level has been worked out as **Rs. 3.85/kWh**. It is proposed that APPC shall be applicable during FY 2021-22 and until further orders for the purpose of deviation settlement in respect of the open access and captive wind and solar generators fulfilling the requirement of regional entities.

13. The Commission invites comments of stakeholders on the proposed determination of APPC as per the Annexure to the Order, by 08.03.2021.

(Arun Goyal)
MEMBER

(I.S. Jha)
MEMBER

(P.K Pujari)
CHAIRPERSON

NEW DELHI, 18.02.2021

DETERMINATION OF APPC AT THE NATIONAL LEVEL

1. Regulation 5(c) of Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 defines Average Power Purchase Cost (APPC) as follows:

“for the purpose of these regulations ‘Pooled Cost of Purchase’ means the weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self generation, if any, in the previous year from all the energy suppliers long-term and short-term, but excluding those based on renewable energy sources, as the case may be.”

2. Thus, Average Power Purchase Cost (APPC) at the national level has been obtained by computing the average of APPC of all States and Union Territories, weighted by volume of conventional power purchased by the respective State/UT.
3. Data for approved purchase cost and volume of power for FY 2020-21 was obtained from the respective FY 2020-21 Tariff Orders of the States/UTs. Links to these tariff orders can be found in Table-II below. In case there were separate tariff orders for different utilities, they have been listed separately.
4. Exceptions to this dataset are as follows:
5. J & K – The approved figure for the FY 2020-21 from the MYT order for 2nd Control Period FY 2016-17 to FY 2020-21 issued on 7.10.2016 has been used as no new order has been passed by the concerned SERC.
6. Rajasthan – In the absence of approved figure for FY 2020-21, the figure for FY 2019-20 approved by the Commission under its Tariff order for FY 2019-20, issued on 06.02.2020, has been used for FY 2020-21 also.
7. Arunachal Pradesh – Approved figure from Tariff Order for FY 2018-19 has been considered as the SERC has allowed to continue the Tariff for FY 2018-19, issued through order dated 6th Sep 2019, till further orders.
8. West Bengal – For WBSEDCL & CESC, the figures for the FY 2017-18 approved in the Tariff Orders of FY 2017-18 have been considered as no new order has been issued by the SERC.

9. Tamil Nadu – As SERC has not issued any new order subsequent to the Tariff Order for FY 2018-19 (published on 11th August 2017) , the approved figure for FY 2018-19 has been used for FY 2020-21 also.
10. Telangana – As TSERC vide order dated 20.03.2020 extended the applicability of Tariff issued for FY 2018-19 to FY 2020-21 also, the approved figure for FY 2018-19 has been used for 2020-21 also.
11. Jharkhand - For SAIL Bokaro, for FY 2020-21, JSERC has directed to continue with the tariff applicable for FY 2019-20. As ARR for FY 2020-21 is not approved, the ARR for FY 2019-20 has been considered for this exercise.
The power purchase quantum and cost have been considered from the aforesaid Orders as they are the latest available data.
12. In case of multiple utilities operating in a State, average of power purchase cost weighted by power quantum of respective utilities was computed to derive APPC for the entire State.

Illustration:

$X_i, X_{ii}, X_{iii}, \dots, X_n$ denoting average per unit power purchase cost for respective utilities in a State (excluding cost of renewables).

$Q_i, Q_{ii}, Q_{iii}, \dots, Q_n$ denoting power quantum purchased (excluding renewable power).

Then,

$$APPC(\text{State}) = (\sum_{n=1}^n X_n Q_n) / \sum_{n=1}^n Q_n$$

6. The total cost of power purchase considered excludes cost of generation or procurement from renewable energy sources. In orders where renewable energy cost and quantum has been mentioned in total power purchase summary, it has been subtracted from the totals to obtain values corresponding to conventional sources.

$$\text{Power Quantum}_{(\text{Conventional Sources})} = \text{Power Quantum}_{(\text{Total})} - \text{Power Quantum}_{(\text{Renewable Sources})}$$

$$\text{Purchase Cost}_{(\text{Conventional Sources})} = \text{Purchase Cost}_{(\text{Total})} - \text{Purchase Cost}_{(\text{Renewable Sources})}$$

7. Furthermore, with a view to consider energy costs only, transmission charges have been excluded from these calculations.
8. Thus, if $APPC_1, APPC_2, \dots, APPC_N$ are State level APPCs, and Q_1, Q_2, \dots, Q_N are volumes of non-RE power procured by the States respectively, then, APPC at the national level is computed as follows:

$$APPC_{(\text{national})} = (\sum_{i=1}^N APPC_i Q_i) / \sum_{i=1}^N Q_i$$

9. Data for each State is given in Table- I. Table – II gives links to the respective tariff orders from which the data was extracted.

Table –I: State-wise Power procurement Volume, Cost, Average Cost per Unit for FY 2020-21

Table I: State-wise Power procurement Volume/Cost / Average Cost per Unit for FY 2020-21				
S No.	State (linked Sheet)	Volume of Power procured from Non-RE Sources (Estimated)	Cost of Power procured from Non-RE Sources	Average Cost of Non RE Power
		"X"	"Y"	"Y*10/X"
		(MUs)	(INR Crores)	(INR/Unit)
1	Andaman & Nicobar Islands	295.60	545.44	18.45
2	Andhra Pradesh	54509.60	25670.40	4.71
3	Arunachal Pradesh #	429.94	147.60	3.43
4	Assam	9323.19	4789.79	5.14
5	Bihar	29357.83	12500.41	4.26
6	Chandigarh	1705.85	586.78	3.44
7	Chhattisgarh	32685.02	10663.51	3.26
8	Dadra & Nagar Haveli	5514.82	2121.40	3.85
9	Daman & Diu	2465.75	977.46	3.96
10	Delhi	29099.83	11967.54	4.11
11	Goa	4279.62	1211.62	2.83
12	Gujarat	100333.50	36854.49	3.67
13	Haryana	60026.27	23932.88	3.99
14	Himachal Pradesh	9045.29	2325.93	2.57
15	Jammu & Kashmir *	14014.00	3887.00	2.77
16	Jharkhand \$	15425.94	6233.10	4.04
17	Karnataka	70514.21	30254.09	4.29
18	Kerala	27095.77	7766.85	2.87
19	Lakshadweep	58.87	94.97	16.13
20	Madhya Pradesh	62512.20	21450.40	3.43
21	Maharashtra	136234.02	54501.06	4.00
22	Manipur	2627.05	956.36	3.64
23	Meghalaya	2083.86	642.47	3.08
24	Mizoram	654.26	292.80	4.48
25	Nagaland	779.76	317.49	4.07
26	Orissa	26781.96	6589.24	2.46
27	Puducherry	3179.94	1294.42	4.07
28	Punjab	50883.00	18548.46	3.65
29	Rajasthan **	67456.00	26595.00	3.94
30	Sikkim	577.08	234.58	4.06
31	Tamil Nadu ^	95370.33	35545.48	3.73
32	Telangana ^^	52431.61	20570.73	3.92
33	Tripura	2627.05	956.36	3.64
34	Uttar Pradesh	103654.34	45374.82	4.38
35	Uttarakhand	13566.87	4681.58	3.45
36	West Bengal ##	60400.40	21427.81	3.55
	ALL INDIA	1148001	442510	3.85

Table – II- Links of Tariff Order referred for obtaining State wise data related for power purchase quantum and cost for the calculation of State APPC

Sr. No.	State	Discoms	Link
1	A & N Islands		http://jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20ED%20Andaman%20FY%202020-21_1232.pdf
2	Andhra Pradesh		
		APEPDCL	http://aperc.gov.in/admin/upload/RSTOrderFY202021.pdf
		APSPDCL	
3	Arunachal Pradesh #		http://www.apserc.nic.in/pdf/tariff_order_for_licencees/Tariff_Order_FY_2018-19_DOP.%20AP.pdf
4	Assam		http://aerc.nic.in/TariffOrder-APDCL-2020-21.pdf
5	Bihar		
		SBPDCL	https://berc.co.in/orders/tariff/distribution/sbpdcl/2216-tariff-order-of-nbpdcl-for-fy-2019-22
		NBPDCL	
6	Chandigarh	EWEDC	http://chdengineering.gov.in/pages/Tariff-Order-FY-2020-21.pdf
7	Chhattisgarh	CSPDCL	http://www.cserc.gov.in/upload/upload_terrif_order/04-07-2020_1593859601.pdf
8	Dadra & Nagar Haveli		http://jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20DNHPDCL%202020-21_1030.pdf
9	Daman & Diu		http://jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20ED%20DD%202020-21_1287.pdf
10	Delhi		
		TDDPL	http://www.derc.gov.in/sites/default/files/TPDDL%20-%20TARIFF%20ORDER%20FY%202020-21_0.pdf
		BYPL	http://www.derc.gov.in/sites/default/files/BYPL%20-%20TARIFF%20ORDER%20FY%202020-21_1.pdf
		BRPL	http://www.derc.gov.in/sites/default/files/BRPL%20-%20TARIFF%20ORDER%20FY%202020-21_0.pdf
		NDMC	http://www.derc.gov.in/sites/default/files/NDMC%20-%20TARIFF%20ORDER%20FY%202020-21_0.pdf
11	Goa	ED	http://www.jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20ED%20Goa%20FY%202020-21_1613.pdf
12	Gujarat		
		State Discoms	https://www.gercin.org/wp-content/uploads/document/d1cce662-68f1-4e36-a87d-70d21b603b0e.pdf
		Torrent Dahej	https://www.gercin.org/wp-content/uploads/document/2919d685-d422-4564-ba32-aa922e7667c7.pdf
		Torrent Ahmedabad & Surat	https://www.gercin.org/wp-content/uploads/document/a3c4f0b0-9878-4d03-bdcf-c9ed4044816c.pdf
13	Haryana	DHBVNL, & UHBVNL	https://herc.gov.in/WriteReadData/Orders/O20200601.pdf
14	Himachal Pradesh		http://hperc.org/File/28-19.pdf
15	Jammu & Kashmir and Ladakh (UT) *		JKSERC- ARR for 2nd MYT Control Period (October 2016) (Link not working)
16	Jharkhand \$		
		TSL	http://jserc.org/pdf/tariff_order/tsl2020a.pdf
		JUSCO	http://jserc.org/pdf/tariff_order/jusco2020a.pdf
		SAIL BOKARO	http://jserc.org/pdf/tariff_order/sail_2020.pdf
		JBVNL	http://jserc.org/pdf/tariff_order/jbvn2020.pdf
		DVC	http://jserc.org/pdf/tariff_order/dvc2020.pdf
17	Karnataka	All Discoms	https://karunadu.karnataka.gov.in/kerc/Tariff%20Order%202020/Orders/BESCOM/11-%20ESCOMs%20ANNEXURE%20-%20201%20%20PP%20for%20FY21_create.pdf

18	Kerala		https://www.kseb.in/index.php?option=com_jdownloads&view=download&id=10968:tariff-order-of-kserc-in-the-petition-filed-by-kseb-limited-op-no-15-2018-for-the-approval-of-arr-erc-and-tariff-proposals-for-the-control-period-2018-19-to-2021-22&catid=64&Itemid=676&lang=en
19	Lakshadweep		http://jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20LED%202020-21_1605.pdf
20	Madhya Pradesh	All DISCOMs	http://www.mperc.in/Retail%20Supply%20Tariff%20Order%20for%20FY%202020-21.pdf
21	Maharashtra		
		MSEDCL	https://www.merc.gov.in/mercweb/faces/merc/common/outputClient.xhtml
		BEST	https://www.merc.gov.in/mercweb/faces/merc/common/outputClient.xhtml
		AEML	https://www.merc.gov.in/mercweb/faces/merc/common/outputClient.xhtml
		TPC Distribution	https://www.merc.gov.in/mercweb/faces/merc/common/outputClient.xhtml
22	Manipur		https://jerc.mizoram.gov.in/uploads/attachments/7f99e395eede6949d7e6b2e98f13ae70/mspdl-tariff-order-for-fy2020-21.pdf
23	Meghalaya		https://mserc.gov.in/orders/2020-21/DistributionTariff_2020-21.pdf
24	Mizoram		https://jerc.mizoram.gov.in/uploads/attachments/92d86db9bbefe9144ccc21e4aaea115c/ped-tariff-order-fy-2020-21correction-16-june-2020.pdf
25	Nagaland		http://www.nerc.org.in/images/doc/Tariff%20Order%20for%20FY%202020-21.%20Review%20for%20FY%202019-20%20and%20ARR%20for%20FY%202020-21%20to%202024-25.pdf
26	Orissa		http://www.orierc.org/FY-2020-21/GRIDCO%20%20Tariff%20%20Order%20%20FY%202020-21.pdf
27	Puducherry		http://jercuts.gov.in/writereaddata/UploadFile/Tariff%20Order%20ED%20Puducherry%202020-21_1864.pdf
28	Punjab		https://docs.pspcl.in/docs/sesalesto200903151017415.pdf
29	Rajasthan **		https://rerc.rajasthan.gov.in/rerc-user-files/tariff-orders
30	Sikkim		http://www.sserc.in/sites/default/files/TARIFF%20ORDER%20-%202020-21%20%20WEBSITE_compressed_1.pdf
31	Tamil Nadu ^		http://www.tnerc.gov.in/orders/Tariff%20Order%202009/2017/TariffOrder/TANGEDCO-11-08-2017.pdf
32	Telangana ^^		https://tserc.gov.in/file_upload/uploads/Tariff%20Orders/Current%20Year%20Orders/2018-19/RSTFY2018-19.pdf
		NPDCL	https://tssouthernpower.com/ShowProperty/CP_CM_REPO/Pages/Tariffs%20and%20Regulations/Current%20Year%20Orders/Surcharge%20&%20Additional%20Surcharge%20for%20FY%202020-21
		SPDCL	
33	Tripura		https://terc.tripura.gov.in/sites/default/files/Tariff%20Order%20-%20FY%202020-21%20Clean%20Mode-converted%20%281%29-converted_0.pdf
34	Uttar Pradesh		
		State Discoms	https://www.uperc.org/App_File/TariffOrderUPStateDiscomsDigitallySigned-pdf11112020121317PM.pdf
		NPCL	https://www.uperc.org/App_File/NPCLOrderDigitallySigned-pdf125202040021PM.pdf
35	Uttarakhand	UPCL	http://uerc.gov.in/Tariff_Orders_of_FY_2020-21/Final%20Tariff%20Order%20of%20UPCL%20for%20FY%202020-21%20(18.04.2020)%20Printingwith%20Hindi.pdf
36	West Bengal ##		
		WBSEDCL	http://www.wberc.gov.in/sites/default/files/WBSEDCL%202017-18.pdf
		CESC	http://www.wberc.gov.in/sites/default/files/CESC_17-18_1.pdf
		DVC	https://wberc.gov.in/sites/default/files/Tariff%20Order_DVC_2014-2017_pdf%20%281%29.pdf

Note:

1. * J & K – The approved figure for the FY 2020-21 from the MYT order for 2nd Control Period FY 2016-17 to FY 2020-21 issued on 7.10.2016 has been used as the concerned SERC has not issued new Order for the FY 2020-21
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