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PUBLIC NOTICE

Sub: Discussion Paper for determination of generic tariff and norms in respect of Renewable power projects in the state of Odisha for fourth Control period i.e. from FY 2023-24 to 2025-26.

The Commission has prepared a discussion Paper for determination of generic tariff and norms in respect of Renewable power projects in the state of Odisha for fourth Control period i.e. from FY 2023-24 to 2025-26 in accordance with Section 61, 62 & 86(1) (b) of the Electricity Act, 2003 and OERC (Conduct of Business) Regulations, 2004.

The Commission hereby publishes the said discussion Paper for determination of generic tariff and norms in respect of Renewable power projects in the state of Odisha for fourth Control period i.e. from FY 2023-24 to 2025-26 for information of the general public. The discussion paper is available in the Commission's website: **www.orierc.org.**

Before finalisation of the said generic tariff, the Commission invites opinion through this publication. Interested persons/institutions/ associations/ Generating companies/Licensees and other stakeholders may furnish their suggestions/opinions on the said discussion Paper to the undersigned on or before **19.08.2023 (by 5.00 P.M.).** On receipt of the responses the matter will be converted to a Suo Moto proceeding under OERC (Conduct of Business) Regulations, 2004 and shall be heard by the Commission with proper notice to the parties who will have filed their objections/suggestions by the last date.

By order of the Commission

Bhubaneswar
Date: 20.07.2023

Sd/-
SECRETARY

DISCUSSION PAPER
Determination of Generic tariff and norms in respect of Renewable Power Projects in the State of Odisha

1. **Introduction:**

a. The large-scale integration of generation from Renewable Energy Source has increased their share in the generation mix. The cost per unit of RE power has come down drastically from about Rs.15 per unit to less than Rs.3 per unit due to improvement in technology, reduction in cost of raw material and competition. The procurement of RE power through competitive bidding route is the order of the day which has helped in reducing the cost of solar & wind power. One of the mandates of the State Electricity Regulatory Commission is to promote generation of electricity in the State from Renewable Energy (RE) Sources which is enshrined in Section 86(1) (e) of the Electricity Act, 2003. Accordingly, the Odisha Electricity Regulatory Commission has been promoting electricity generation from Renewable Energy (RE) Sources by providing norms for determination of their generic tariff for different control periods. OERC has been fixing these operational and financial norms in advance for different control periods since the year 2005. This approach of the Commission has created an enabling environment for investment in Renewable Energy (RE) projects in the State. It gives predictability to the tariff for generation from RE sources assuring the investors to get a reasonable return on their investments. All these actions have contributed to substantial progress in solar and small hydro capacity addition in the State.

b. Before embarking upon fixing norms for generic tariff for renewable sources the stakeholder consultation is of prime importance. Therefore, the present discussion paper is being floated by the Odisha Electricity Regulatory Commission in exercise of the powers conferred under Sections 61(h), 62(1)(a), and 86(1)(e) of the Electricity Act, 2003 and under the provisions of National Electricity Policy and all the other powers enabling it, in this behalf.

c. The Commission, vide its Order dated 16.02.2019 in Case No. 46/2018, had determined the tariff for generation from Renewable Energy Sources including co-generation for the third control period from FY 2018-19 to FY 2020-21 for all the Renewable Energy Projects except Small Hydro Projects. The Commission had decided the control period for SHEP to be from FY 2018-19 to FY 2022-23.

The tariff determined in the said order were applicable to all such RE projects for which PPAs have been approved by the Commission, after the date of issue of the said Order and also for those projects which achieved commercial operation on or after 01.04.2018 upto 31.03.2023.

2. India has an installed generation capacity of 416 GW (March 2023), of which about 179 GW is (43%) from non-fossil fuels. The total share of renewable energy (including hydro) is about 172 GW (41%) in overall generation mix. The share of wind and solar have been growing at faster pace in recent years (39 GW in 2015 to ~125 GW by 2023). The Table given below provides a sector-wise breakup of the RE installed capacities achieved in the country as on 31.03.2023.

Table - 1

Sector	Target by 2022 (GW)	Installed capacity (GW) as on 31.03.2023
Solar Power*	100.00	66.780
Wind Power	60.00	42.633
Bio energy**	10.00	10.248
Waste to energy		0.554
Small Hydro	5.00	4.944
TOTAL	**175.00**	**125.159**

3. However, the development of renewable energy sources has been confined to only 8-9 RE resource rich states. In addition to that, the policy of waiver of ISTS charges for drawal of power from those sources (Commissioned before June 2025) has created market distortion and discouraged development of RE projects in other areas of the Country and particularly in Odisha. Considering this the Government of India has decided to phase out the waiver of ISTS charges in the following manner:

Table - 2

Period of Commissioning	Applicable ISTS charges
Up to 30/06/2025	Nil
01/07/2025 to 30/06/2026	25% of applicable ISTS charges
01/07/2026 to 30/06/2027	50% of applicable ISTS charges
01/07/2027 to 30/06/2028	75% of applicable ISTS charges
01/07/2028 onwards	100% of applicable ISTS charges

4. It is observed that GRIDCO has contracted capacity of 2,420 MW from RE sources including 1,941 MW from solar sources till 31.10.2022 out of which only 460 MW is situated within the State. Hence, it is incumbent upon GRIDCO to take proactive measures for development of RE resources in the State. For this purpose, GRIDCO is

required to invite tenders for procurement of power from projects to be set up within the state at a tariff discovered through competitive bidding.

5. Further, the new Tariff Policy dated 28.01.2016, issued by the Government of India (GoI), envisages that, all the future procurements of renewable energy (except from waste to energy plants) shall be made only through competitive bidding, as per the bidding guidelines issued by the GoI. Pursuant to the said Policy, the Government of India had issued the Bidding Guidelines on 03rd August, 2017, duly prescribing the standard bidding documents along with Models for Request for Selection (RFS), Power Purchase Agreement (PPA), Power Sale Agreement (PSA) etc., to facilitate power procurement by the DISCOMs.

6. Government of Odisha has taken proactive steps on this matter and has issued Renewable Energy Policy, 2022 to give impetus to the development of RE sources within the State of Odisha. The salient features of this policy are as follows:

   a. Government of Odisha has notified "**Odisha Renewable Energy Policy, 2022**", on 30.11.2022, wherein it is emphasized to support the Government of India RE target of 500 GW and to promote new initiatives and emerging energy technologies in the State. The main objectives of the policy are to harness the Renewable Energy (RE) potential within the State of Odisha and accelerate investment in the RE sector for ensuring energy security, promoting socio-economic growth, protecting the environment and generating employment. The Policy would remain in force till 31/03/2030.

   b. All large hydro, small hydro, ground mounted solar, roof top solar, floating solar, canal top solar, wind, biomass, energy storage (including pumped storage hydro, Battery Energy Storage System), waste-to-energy, green hydrogen/green ammonia projects or any other renewable energy technology and new initiatives/ pilot projects commissioned in the State of Odisha during the Policy period shall be guided by this Policy.

   c. The Odisha Renewable Energy Policy 2022 states that the selection of projects under intra-state category shall be through a competitive bidding process, the generic tariff determined by the Commission being the benchmark, as per the requirement of DISCOMs in the state to fulfil the RPO target fixed in the Renewable Policy. Even prior to issue of the Policy, procurement of energy from Megawatt scale solar power projects was being done through a transparent competitive bidding process by GRIDCO. The Policy also points out the decision

of the Commission that all the future power procurement from RE sources shall be made through transparent competitive bidding process. Further, the Commission is required to determine the generic tariff effective from 01.04.2023 for Small Hydro Plants, Biomass Plants and all wind projects awarded under RE Policy 2022.

d. In order to promote development of RE projects in the State and to encourage RE developer, the State Government, in the said Policy, has extended the following incentives:

- Exemption of fifty (50) paisa per unit on Electricity Duty shall be provided to captive / open access consumers on consumption of energy from RE projects set up inside the State during the policy period. Such ED exemption shall be available for consumption of energy from the project for a period of fifteen (15) years from the date of commissioning of the project. In case a project is commissioned before 30.03.2026, the exemption shall be extended for five (5) more years, i.e., twenty (20) years in total.
- Energy Storage Projects based on any technology shall be exempted from payment of Electricity Duty on input energy at the rate of fifty (50) paisa per unit for a period of fifteen (15) years from the date of COD, provided such energy is sourced from RE projects in Odisha.
- Fifty percent (50%) exemption of Cross-Subsidy Surcharge shall be provided to open access consumers, on consumption of energy from RE projects commissioned in the State during the Policy period for fifteen (15) years. The OERC shall issue necessary orders in this regard.
- Exemption of twenty (20) paisa per unit on STU charges shall be provided to captive / open access consumers on consumption of energy from RE projects commissioned in the State during the Policy period for fifteen (15) years. In case a project is commissioned before 31.03.2026, the exemption shall be extended for five (5) more years, i.e., twenty (20) years in total. The OERC shall issue necessary orders in this regard.
- Twenty-five percent (25%) exemption of wheeling charges shall be provided to captive / open access consumers on consumption of energy from RE projects commissioned in the state during the Policy period for fifteen (15) years. The OERC shall issue necessary orders in this regard.

- Stamp duty on purchase/lease of land, land conversion charges and registration charges shall not be applicable for RE projects. The Revenue and Disaster Management Department shall issue necessary notifications in this regard.
- Project developer is permitted to connect the RE project with State Transmission Utility (STU), subject to the evacuation feasibility. Grant of connectivity approval from OPTCL will be provided preferably within 15 days from the date of receipt of requisite documents for registration.
- No clearance from State Pollution Control Board, Odisha would be required for RE projects except for Hydro, PSH, biomass and waste to energy projects.

7. Ministry of Power, Govt. of India, vide order dated 22.07.2022, has notified a **revised RPO trajectory** with an objective to increase the penetration of RE in the overall energy mix. Odisha RE policy is also aligned with the RPO trajectory specified by GOI. Separate trajectories have been notified for wind, hydro and other renewable and a uniform RPO has been mandated on all obligated entities. The revised RPO trajectory is as follows:

Table - 3

	2022-23	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**
WPO	0.81%	1.60%	2.46%	3.36%	4.29%	5.23%	6.16%	6.94%
HPO	0.35%	0.66%	1.08%	1.48%	1.80%	2.15%	2.51%	2.82%
Other RPO	23.44%	24.81%	26.37%	28.17%	29.86%	31.43%	32.69%	33.57%
TOTAL	24.61%	27.08%	29.91%	33.01%	35.95%	38.81%	41.36%	43.33%

Note:-

a) Hydro Purchase Obligation (HPO): All large hydro projects and small hydro projects commissioned after 08.03.2019 shall be accounted as HPO.

b) Wind Purchase Obligation (WPO): Procurement from all wind projects commissioned after 31.03.2022 shall be accounted towards WPO.

c) Other RPO: Procurement from any renewable energy source apart from the ones considered under HPO and WPO shall be part of the Other RPO.

d) Energy Storage Obligation (ESO): Starts from 1% in FY 24 and progressively increases by 0.5% each year to reach 4% by FY 30 for each obligated entity.

e) The RPO and ESO trajectories shall be uniform for all the obligated entities including DISCOMs, captive users or open access consumers for all the years, as

has been mandated under Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022.

As per RE Policy-2022 of Govt. of Odisha, to meet the new RPO trajectory, the cumulative estimated capacity addition required by DISCOMs and Industries (Captive/OA) till FY 30 is as follows:

Table - 4

Additional Requirement	**Cumulative Capacity (MW)**		
	DISCOMs	**Captive/OA**	**TOTAL**
Wind	900	2,600	3,500
Hydro	300	900	1,200
Other	4,500	12,500	17,000
Total Renewable	**5,700**	**16,000**	**21,700**

Note: Based on assumptions of demand growth, PLF of RE projects and RPO trajectory compliance, actual numbers may vary by +/- 15% depending on the PLF/CUF of the RE projects

8. **Status of development renewable sources and their generic tariff in Odisha**

The Commission has reviewed developments of renewable energy sources in Odisha during the last control period (FY 2018-19 to FY 2022-23 for SHEPs and 2018-19 to 2020-21 for other than SHEPs). The levelized Generic tariff and status of projects commissioned during the control period of various technologies prevalent upto 2022-23 are detailed below:

(A) Levellized tariff for Wind Power Projects – No Levellized tariff was determined for Wind Power Projects in the Order No. 46 of 2018 dated 16.02.2019 for the last control period (2018-19 to 2020-21). Power from wind projects to be procured only through competitive bidding process.

Status: Neither any project was developed during last control period (2018-19 to 2020-21), nor any project is in the development stage currently in the State. However, as the Wind Power is available at a competitive rate from other States, GRIDCO has executed following PSAs with SECI under ISTS Connected Wind Power Projects Scheme to procure 750 MW Wind Power with waiver of ISTS charges. By the end of the FY 2022-23, 321.5 MW Wind Power has been scheduled to GRIDCO from different projects. A detailed list is provided below:

Table - 5

Sl. No.	Name of Company and Scheme	Project Location	Contracted Capacity / Commissioned Capacity (MW)	Tariff (Rs./kWh)	PSA Date
1.	PTC under ISTS Connected Wind Power Projects Tranche-I through PTC	M/s. OSTRO-KUTCH Wind Power Pvt. Ltd., Gujarat	50/50	3.53	20.07.2017
2.	SECI under ISTS Connected Wind Power Projects Tranche-II	M/s. Green Infra Wind Energy Ltd., Kutch, Gujarat	100/100	2.72	24.11.2017
3	SECI under ISTS Connected Wind Power Projects Tranche-III	M/s. ReNew Wind Energy (AP2) Pvt. Ltd., Gujarat	50/37.5	2.51	23.03.2018
4.	SECI under ISTS connected Wind Power Scheme Tranche -IV	M/s. Vivid Solaire Energy Pvt. Ltd., Tamil Nadu	100/84	2.58	15.06.2018
5.	SECI under ISTS Connected Wind Power Projects Scheme Tranche-VI	M/s. Adani Wind Energy Kutchh Three Limited, Gujarat	50/0	2.89	22.08.2019
6.	SECI under ISTS connected Wind Power Scheme Tranche-XI	Maharashtra & Karnataka	10/0	2.76 (5.25 MW) 2.77 (4.75 MW)	07.11.2022
7.	SECI under ISTS connected Wind Power Scheme Tranche-XII	Karnataka & Gujarat	390/0	2.96 (70.9 MW) 2.97 (106.4MW) 3.01 (212.7MW)	02.02.2023

GRIDCO is in the process of execution of PSA with SECI towards procurement of 600 MW of wind capacity under ISTS Wind Projects Tranche-XIII at the applicable tariff ranging from Rs.2.97 -3.03/kWh, which is expected to be available by FY 2025-26.

(B) The Commission had determined following Levelized tariff for SHP Projects in its Order No. 46 of 2018 dated 16.02.2019 for the last control period (2018-19 to 2022-23).

Table - 6

Particular	Levelized Tariff (Rs./kWh)	Benefit of Accelerated Depreciation (if availed) (Rs./kWh)	Net Levelized Tariff (Rs./kWh)	Tariff Period (Years)

SHP projects below 5 MW capacity	6.05	(0.46)	5.59	35
SHP projects of 5 MW above to 25 MW capacity	5.07	(0.42)	4.65	35

Status: At present 08 Nos. of Small Hydro Electric Projects (SHEPs) with total installed capacity of 109.15 MW are in operation in the State supplying power to the State, as detailed below:-

Table - 7

Sl. No.	Name of the Developer	Project Location	Installed Capacity (MW)	Date of Commercial Operation	Tariff (Rs./kWh)
1	Meenakshi Power Ltd.	Middle Kolab, Koraput	25	14.07.2009	3.68
2	Meenakshi Power Ltd.	Lower Kolab, Malkangiri	12	14.07.2009	3.68
3	Odisha Power Consortium Ltd. (OPCL)	Samal Barrage, Angul	20	12.10.2009	3.71
4	OPGC Mini Hydel	Kendupatna MHP, Cuttack	0.50	23.01.1994	3.91
5	OPGC Mini Hydel	Biribati MHP, Cuttack	0.65	20.02.1994	3.91
6	M/s Baitarani Power Projects Pvt. Ltd.	Lower Baitarani SHEP, Dargarisila, Badajori, Keonjhar	24	29.08.2020	5.03
7	M/s Sri Avantika Power Projects Pvt. Ltd.	Saptadhara SHEP, Jamjhori River, Koraput	18	03.11.2021	5.06
8	M/s Kakatiya Industries Pvt. Ltd.	Bargarh Head Regulator SHEP, Bargarh Main Canal, Bargarh	9	12.05.2022	5.06 (Provisional)

The following Small Hydro Electric Projects are likely to be commissioned during the 4th control period:

Table No.8

Sl. No.	Name of the Developer	Project Location	Installed Capacity (MW)	Date of PPA Executed/ signed	Likely COD
1	M/s Indravathi Power Pvt. Ltd.	Indravati SHEPs I & II, Indravati Main Canal, Kalahandi	3.5	27.11.2015	FY 2025-26
2	M/s Sidheswari Power Generation Pvt. Ltd.	Kharagpur SHEP, Kolab River, Koraput	16.5	07.11.2016	FY 2024-25

3	M/s Meenakshi Odisha Power Pvt. Ltd.	Shaheed Lakhan Nayak SHEP, Tentuligumma, Koraput	25	GRIDOC Board has approved the proposal and PPA shall be signed after prior approval of Hon'ble OERC (to be filed)	FY 26-27

(C) Levelized tariff for Biomass Power Projects – The Commission had not determined Levellized tariff for Biomass Power Projects in its Order No. 46 of 2018 dated 16.02.2019 for the last control period (2018-19 to 2020-21) as Power from biomass projects is to be procured only through competitive bidding process.

Status: Presently only one Biomass plant of 20 MW is operational in Odisha as detailed below:

Table - 9

Sl. No.	Name of the Developer	Project Location	Installed Capacity (MW)	Date of Commercial Operation
1	M/s Jagannath Power & Infra Pvt. Ltd.	Nimidha, Dhenkanal	20	19.12.2011

(D) Levelized tariff for non-fossil fuel-based Co-generation (bagasse based) Projects – The Commission had not determined Levellized tariff for non-fossil-based Co-generation (bagasse based) Projects in its Order No. 46 of 2018 dated 16.02.2019 for the last control period (2018-19 to 2020-21) as power from Non-fossil fuel-based Co-generation (bagasse based) projects is to be procured only through competitive bidding process.

Status: Neither any project was developed during last control period (2018-19 to 2020-21) nor any project is in the development stage currently.

(E) Levellized tariff for Solar PV Power Projects – The Commission had not determined Levellized tariff for Solar PV Power Projects in its Order No. 46 of 2018 dated 16.02.2019 for the last control period (2018-19 to 2020-21) as power from solar PV projects were to be procured only through competitive bidding process.

Status: GRIDCO currently procures of 414 MW Solar PV power from the following SPV projects commissioned in the State:

Table - 10

Sl.	Name of the Project	Project Location	Capacity Installed (MW)	Date of PPA signed/ executed	Date of CoD	Tariff (Rs./kWh)
1	M/s. Raajratna Energy Holdings Pvt. Ltd.	Vil: Sadeipalli, Dist: Bolangir.	1	21.08.2010	13.07.2011	18.52
2	M/s. S.N. Mohanty	Vil: Patapur, G.P: Kundeipadaa, Block: BarangaDist: Cuttack.	1	21.08.2010	23.08.2011	
3	MGM Green Energy Ltd.	Vil: Patrapada, G.P: Tangi, Block: Tangi, Dist: Khurda	1	21.08.2010	13.10.2011	
4	M/s. MolisatiVinimay Pvt. Ltd.	Vil: Ranja, G.P.: Danara, Block: Barkote, Dist: Deogarh	1	21.08.2010	22.12.2011	
5	M/s. Jay Iron and Steel Ltd.	Vil: Haripada, Block: Bamra,Dist: Sambalpur	1	21.08.2010	11.03.2012	
6	M/s. Abacus Holdings Pvt. Ltd.	Vil: Ainlachhat, Chadheipanka, Block: Ulunda, Dist: Sonepur	1	21.08.2010	13.03.2012	
7	M/s. Shri Mahavir Ferro Alloys Pvt. Ltd.	Vil: TankajodaBlock: Bonai, Dist: Sundergarh	1	21.08.2010	15.03.2012	
8	M/s. Vivacity Renewable Energy Pvt. Ltd.	Vil: Benta, G.P.: Tangi, Block: Tangi, Dist: Nayagarh	1	21.08.2010	16.03.2012	
9	M/s. Aftaab Solar Pvt. Ltd.	Vil: Sadeipalli, Dist: Bolangir.	5	12.01.2011	07.02.2012	10.65
10	Alex Green Energy Ltd.	Chingribandh, Patnagarh, Bolangir	5	26.05.2012	19.08.2014	7.00
11	ACME Odisha Solar Power Pvt. Ltd.	Deogaon, Bolangir	25	06.03.2013	22.06.2015	7.28
12	GEDCOL	Manamunda, Boudh, Odisha	20	12.08.2014	06.06.2016	5.50
13	M/s Jyoti Solar Solutions Pvt. Ltd.	Ganjahuda, Patnagarh, Bolangir	10	25.10.2016	04.05.2018	4.50
14	M/s Sadipali Solar Pvt. Ltd.	Kandel & Sindhabhali, Kesinga, Kalahandi	20	25.10.2016	14.05.2018	
15	M/s Dakshin Odisha Urja Pvt.	Ghuchapali, Padampur, Bargarh	40	25.10.2016	05.09.2018	

Sl.	Name of the Project	Project Location	Capacity Installed (MW)	Date of PPA signed/ executed	Date of CoD	Tariff (Rs./kWh)
	Ltd.					
16	M/s Vento Power & Energy Ltd.	Dendoguda, Kesinga, Kalahandi	40	25.10.2016	26.09.2018	
17	M/s Vento Power Pvt. Ltd.	Kurkhai, Tusra, Balangir	40	25.10.2016	18.01.2019	
18	M/s Vento Power Infra Pvt. Ltd.	Salepali, Tusra, Balangir	40	25.10.2016	19.01.2019	
19	M/s Vento Energy Infra Pvt. Ltd.	Panaspadar, Tentulikhunti, Nabarangpur	40	25.10.2016	21.01.2019	
20	M/s Vento Power Projects Pvt. Ltd.	Dendoguda, Kesinga, Kalahandi	40	25.10.2016	21.01.2019	
21	M/s Aditya Birla Renewables Ltd.	Boudh	25	28.12.2018	11.03.2020	3.06
22	M/s Aditya Birla Renewables Ltd.	Bargarh	25	28.12.2018	22.09.2020	3.06
23	M/s Aditya Birla Renewables Ltd.	Bolangir	25	28.12.2018	23.12.2020	2.99
24	Solar projects in the unutilized land of OPTCL Sub-Stations by GEDCOL	Manamunda SPV Project	2	01.09.2020	12.04.2022	2.84
25		OHPC Mukhiguda P.H.	1		11.11.2022	
26		Sadeipali, New Bolangir	2		08.05.2023	
27		Baripada	1		12.05.2023	

The Solar PV projects, which are likely to be commissioned in the State during the next control period, are listed below:

Table - 11

Sl. No.	Name of the Developer	Project Location	Installed Capacity (MW)	PPA Executed/signed	Expected date of Purchase
1	Solar projects in the unutilized land of OPTCL Sub-Stations by GEDCOL	Jayanagar	2	01.09.2020	by the end of May'2023
2	M/s. Konark Suryanagri Pvt. Ltd. (Solarisation of Konark Temple & Town)	Junagarh, Kalahandi	10	19.10.2022	FY 2024-25

Besides the above, several PPAs/PSAs have been executed by GRIDCO to procure solar power from outside the State through NTPC, NVVN and SECI with waiver of ISTS charges (ISTS losses is to be paid) to meet the RPO target.

Table - 12

Sl. No.	Name of the Project	Project Location	Contracted Capacity (MW)	Date of PPA / PSA executed/signed	COD Date	Tariff (Rs./kWh)
1	Through NVVN Ltd.	Rajastan	15	12.01.2011	August'2013	10.65
2	Dadri Solar PV Station (Developed by NTPC)	Dadri, Gaziabad, UP	5	26.04.2011	30.03.2013	12.94
3	Faridabad Solar PV Station (Developed by NTPC)	Faridabad, Haryana	5	26.04.2011	31.03.2014	9.35
4	MNRE VGF Scheme Phase-II, Batch-I through SECI	Gujarat	40	12.08.2014	September'15	5.50
5	MNRE VGF Scheme Phase-II, Batch-I through SECI	Rajasthan	10	12.08.2014	June'15	5.50
6	SECI ISTS connected Solar projects Tranche-I	Bikaner, Rajasthan	300	21.08.2018	10.02.2021	2.60
7	SECI ISTS-connected Solar Power Project Scheme, Tranche-3	Jodhpur, Rajasthan	200	22.08.2019	08.03.2022	2.65

The ISTS connected Solar projects which are likely to be commissioned and the State has signed PSA for contracted capacity during the control period (2021-22 to 2025-26) are listed below:

Table - 13

Sl. No.	Name of the Project	Project Location	Contracted Capacity (MW)	Date of PSA signed/	Expected CoD	Tariff (Rs./kWh)

				executed		
1	Through SECI under ISTS-connected Manufacturing linked Solar Scheme, Tranche-1	Gujarat & Rajasthan	500	22.07.2021	31.03.2024	2.61
2	NTPC ISTS connected Solar Power Project	Rajasthan	200	18.04.2022	FY 2024-25	2.50
3	NTPC ISTS connected Solar Power Project	Rajasthan	200	30.09.2022	FY 2024-25	2.50

The RE Project which is likely to come up within the State in the next control period (2021-22 to 2025-26) is given below:

(i) GRIDCO has issued in principle approval in favour of OREDA towards procurement of 29 MW solar power to be set up in the available surplus land of OPTCL Grid Substations, which is expected to be available by FY 2024-25.

(ii) PM KUSUM Scheme

For implementation of PM KUSUM Scheme of MNRE in the State, four DISCOMs have been notified as the Implementing Agencies for Component A & C. The Commission has already determined the tariff of Rs.3.08/kWh for PM KUSUM –A and Rs.3.60/kWh for PM KUSUM-C. Component B of the Scheme is being implemented by OREDA.

Previously, taking advantage of waiver of ISTS charges and lower tariff of RE Power available in RE-rich States, GRIDCO was procuring RE Power from other States through NTPC, NVVN & SCEI etc. to keep overall power purchase cost low. But, Odisha Renewable Energy Policy-2022 has paved way for development of RE inside the State and the Tariff is expected to be competitive due to graded decrease in ISTS Charges waiver on RE Power and other incentives offered in Odisha RE Policy 2022 for generation in Odisha. Currently, GRIDCO Plans to fulfil its future RPO requirements from RE generated in the State. The Captive Generation Plants are also to comply RPO as per notification of GoI and hence procurement of power from RE sources within the State is likely to be competitive for CGP to meet their RPO.

9. In compliance with the Section (3) of the Act, the Central Government has notified the revised Tariff Policy on 28th January, 2016. The Tariff Policy elaborates the role of Regulatory Commissions, the mechanism for promoting renewable energy, the time-frame for implementation, etc.

Clause 6.4 of the Tariff Policy addresses various aspects associated with promoting and harnessing RE sources of generation including co-generation from renewable energy sources, as reproduced below:

" xxxxxxxx

2. *States shall endeavour to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the waste to energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to be notified by the Central Government.*

   However, till such notification, any such procurement of power from renewable energy source projects, may be done under Section 62 of the Electricity Act, 2003. While determining the tariff from such sources, the Appropriate Commission shall take into account the solar radiation and wind intensity which may differ from area to area to ensure that the benefits are passed on to the consumers.

3. *The Central Commission should lay down guidelines for pricing intermittent power, especially from renewable energy sources, where such procurement is not through competitive bidding. The tariff stipulated by CERC shall act as a ceiling for that category."*

10. In view of the above provisions of the National Tariff Policy, 2016, which is lying emphasis on the procurement of RE power through competitive bidding process, it is proposed that GRIDCO/ distribution licensees may procure electricity from the RE projects (except from the waste to energy plants) preferably through competitive bidding. Once the price is discovered through competitive bidding as per Section 63 of the Electricity Act, 2003, the same shall be placed before the Commission for approval. It is also possible to procure renewable power at a tariff determined by the Commission under Section 62 of the Act. Under Section 62 of the Act either a project specific tariff or generic tariff for a particular category of renewable source can be determined. However, when competitive bidding is carried out generic tariff determined by the Commission under Section 62 of the Act shall be ceiling/upper limit of tariff. The generic tariff gives a signal to the investor in the State regarding viability of their investment in development of RE sources.

11. The "CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020" was notified on 23.06.2020 for determination tariff in respect of Renewable Energy Sources. Further, CERC vide notification dated 27th March, 2023, has extended the period of applicability of the said Regulations till 30th September, 2023 or such other date as may be specified by the Commission through a separate order. The salient features of these Regulations are as follows:

(I) The generic tariff shall be determined by the Commission on annual basis in accordance with these Regulations for the following types of renewable energy projects:

a. Small hydro project;
b. Biomass power project with Rankine cycle technology;
c. Non-fossil fuel based co-generation project;
d. Biomass gasifier based power project; and
e. Biogas based power project

Provided that the generic tariff determined for the year, in which an RE project is commissioned, shall be applicable for such RE Project and shall remain valid for the tariff period.

(II) Project Specific tariff, on case-to-case basis, shall be determined by the Commission for the following types of renewable energy projects:

i) Solar PV power projects, floating solar projects and solar thermal power projects;
ii) Wind power projects (both on-shore and off-shore);
iii) Biomass gasifier-based power projects and biogas-based power projects – if a project developer opts for project specific tariff;
iv) Municipal solid waste-based power projects and refuse derived fuel-based power projects;
v) Renewable energy with storage projects; and
vi) Any other project based on new renewable energy sources or technologies approved by MNRE.

Financial and operational norms specified in these regulations, except for capital cost shall be the ceiling norms while determining the project specific tariff.

12. As per Section 61(a) of the Electricity Act, 2003, the State Commission is guided by the regulations issued by the CERC in the matter of Transmission and Generation tariff. Hence, for the purpose of determining the generic tariff of relevant RE sources, the CERC RE Regulations, 2020 are being taken as guiding factor.

13. Earlier, the Commission, in the Case No. 46 of 2018 (Suo Motu) dated 16.02.2019, had approved the levelised generic tariffs for the projects commissioned during the control period 2018-19 to 2020-21 except SHEP and had defined General principles, Financial parameters, operational parameters, and technology-wise specific parameters. However,

the Commission had directed that the Control period for SHEP would be from 2018-19 to 2022-23.

14. Since the last control period of generic tariff for renewable sources has come to an end, the Commission has now started this proceeding to finalise the generic tariff in respect of the following Renewable Energy (RE) power projects which will have CoD during the current control period FY 2023-24 to 2025-26 in the State of Odisha:

- Wind Power Projects
- Solar PV Projects
- Solar Thermal Power projects
- Small hydro projects
- Biomass projects
- Non-fossil fuel-based cogeneration projects
- Municipal Solid Waste (MSW) projects

15. **General principles for determination of Generic Tariff**

Control Period:

The Control Period shall be of three (3) financial years for all RE power projects. First year of the Control Period shall commence from the beginning of FY 2023-24 and shall continue up to the end of financial year 2025-26. In case of SHEP the first year of the Control Period shall commence from the beginning of FY 2023-24 and shall continue up to the end of financial year 2027-28.

The tariff determined for the RE projects, commissioned during above Control Period, shall remain unchanged for the RE projects for the entire duration of the Tariff Period.

Useful Life and Tariff Period for various RE Technology project

16. Tariff determined based on the principles enumerated in this discussion paper shall be applicable for Renewable Energy power projects commissioned during the whole control period and shall continue for the entire duration of the Tariff Period. Tariff period for renewable energy projects will be same as their Useful Life and tariff period shall be considered from the date of commercial operation of such power projects. The competitive bidding for procurement shall also be made for this duration of tariff period. The Useful life and Tariff period for various RE technology project is given in the following table:

Table - 14

SL. No.	RE Technology	Useful Life (Years)	Tariff period (Years)
1	Wind	**25**	**25**
2	SHP Below 5 MW 5 to 25 MW	**40**	**40**
3	Biomass power project with Rankine cycle technology	**25**	**25**
4	Non-fossil fuel-based Co-generation Project	**25**	**25**
5	Solar PV / Solar Thermal / Floating Solar Project	**25**	**25**
6	Municipal Solid Waste based power Project	**25**	**25**
7	Renewable hybrid energy project	Minimum of the Useful Life of different RE Technologies combined for Renewable Hybrid Energy Project for Composite Tariff	
8	Renewable energy with storage project	Same as Useful Life of project assuming that there is no storage	

Project Specific Tariff

17. The bidding route shall be the preferred route for selection of the RE project in the control period. However, the project being developed under bidding route /MOU route, the generic tariff so proposed in this discussion paper shall be the ceiling rate/upper limit. The GRIDCO/ DISCOM and the project developer could negotiate for lower tariff through bilateral agreement. However, the project specific tariff, on case-to-case basis, shall be determined by the Commission for the following types of projects in case above entity(ies) approach the Commission:

i. Solar PV power projects, floating solar projects and solar thermal power projects;

ii. Wind power projects (both on-shore and off-shore);

iii. Biomass gasifier-based power projects and biogas-based power projects – if a Project developer opts for project specific tariff;

iv. Municipal Solid Waste (MSW)-based power projects and refuse derived fuel-based power projects;

v. Renewable hybrid energy projects;

vi. Renewable energy with storage projects; and

vii. Any other project based on new renewable energy sources or technologies approved by MNRE.

Provided that the Financial and operational norms specified in this discussion paper, except for capital cost, shall be the ceiling norms/upper limit while determining the project specific tariff. However, the parties are free to agree in the PPA for any relaxed norms.

Petition and Proceedings for Determination of Tariff

18. A petition for determination of project specific tariff shall be accompanied by such fee as may be determined under the relevant Notification following OERC (Conduct of Business) Regulation, 2004 and shall be accompanied by:

- Information regarding financial parameters and technology specific parameters as the case may be;
- Detailed project report outlining technical and operational details, site specific aspects, premise for capital cost and financing plan, etc.
- A Statement of all applicable terms and conditions and expected expenditure for the period for which tariff is to be determined.
- A statement containing details of calculation of any subsidy and incentive received, due or assumed to be due from the Central Government and/or State Government. This statement shall also include the proposed tariff calculated without consideration of the subsidy and incentive.
- Any other information that the Commission requires the Petitioner to submit.
- The proceedings for determination of tariff shall be in accordance with the OERC (Conduct of Business) Regulations, 2004.
- Consent from beneficiary for procurement of power from renewable energy project at tariff approved by the Commission, in the form of Power Purchase Agreement (PPA) or Memorandum of Understanding (MoU); and
- Following justification is to be submitted in case of the petition is for determination of project specific tariff by renewable energy projects, where tariff for such Renewable Energy Projects is generally determined through competitive bidding process in accordance with provisions of Section 63 of the Act:
    i. Rationale for opting project specific tariff instead of competitive bidding; and
    ii. Competitiveness of the proposed tariff vis-à-vis tariff discovered through competitive bidding/ tariff prevalent in the market.

19. **Eligibility criteria for RE projects**

a) Wind:

The wind power projects set up at the site approved for Wind Technology by Government of India / State Nodal agency / Government of Odisha.

b) **Small Hydro Electric Project (SHEP)**:

The SHP projects identified / approved by the Engineer in Chief, Electricity –cum Principal Chief Electrical Inspector, Government of Odisha or State Nodal agency with installed capacity of 25 MW and below, which are commissioned during the control period and are eligible for the generic tariff.

c) Biomass Power projects

The biomass power projects based on Rankine cycle technology using **water cooled condenser** and using biomass as source of fuel.

Provided that the use of fossil fuel in such projects is restricted to 15% of total fuel consumption on annual basis as proposed by Ministry of New and Renewable Energy (MNRE), Government of India.

d) Non-fossil fuel-based co-generation projects

A project shall qualify as a co-generation project, if it is in accordance with the definition specified by the Ministry of Power, Government of India and also meets the qualifying requirement outlined below:

- **Topping cycle mode of co-generation** – Any facility that uses non-fossil fuel input for the power generation and also utilizes the thermal energy generated in form of useful heat for applications in other industrial activities simultaneously.

  Provided that, for the co-generation facility to qualify under topping cycle mode, the sum of useful power output and one half of the useful thermal outputs is greater than 45% of the facility's energy consumption, during season**.** (as per CERC's RE Regulations, 2020)

e) Solar PV and Solar Thermal projects

The solar power technologies (solar PV, Floating Solar & Solar Thermal) approved by MNRE.

f) Municipal Solid based Projects

The project shall qualify to be termed as a Municipal Solid Waste (MSW) based power project, if it is using new plant and machinery based on Rankine cycle technology and using Municipal Solid Waste (MSW) as source of fuel.

g) Hybrid Renewable Energy Projects

The hybrid RE Project, is the project where rated capacity of generation from one Renewable Energy source is at least 25% of the rated capacity of generation from other Renewable Energy Source(s) and both operate at the common point of interconnection.

Provided that energy is injected into the grid at the common interconnection point and metering is done accordingly.

h) Renewable Energy with storage project

The renewable energy project including hybrid RE project that uses, partly or fully, renewable energy generated from such project to store energy in the storage facility which is connected at the common point of interconnection of the renewable energy project.

Monitoring Mechanism for the use of fossil fuel (in case of Biomass & non-fossil fuel-based co-generation power projects)

20. The Project developer shall furnish a monthly fuel usage statement and monthly fuel procurement statement, duly certified by a (registered) Chartered Accountant, to the beneficiary (with a copy to agency appointed by the Commission for the purpose of monitoring the fossil and non-fossil fuel consumption) for each month, along with the monthly energy bill. The statement shall cover details such as –

- Quantity of fuel (in tonnes) for each fuel type (biomass/ Non-fossil fuel used in co-generation plants and fossil fuels) consumed and procured during the month for power generation purposes,
- Cumulative quantity (in tonnes) of each fuel type consumed and procured till the end of that month during the year,
- Actual (gross and net) energy generation (in kWh) during the month,
- Cumulative actual (gross and net) energy generation (in kWh) till the end of that month during the year,
- Opening fuel stock quantity (in tonnes),
- Receipt of fuel quantity (in tonnes) at the power plant site and

- Closing fuel stock quantity (in tonnes) for each fuel type (biomass/ Non-fossil fuel used in co-generation plants and fossil fuels) available at the power plant site.

Non-compliance of the condition of fossil fuel usage by the project developer, during any financial year, shall deprive such biomass/non-fossil fuel based co-generation projects from preferential tariff determined from the date of default.

21. **Compliance Monitoring**

- OREDA/GRIDCO shall be responsible for monitoring compliance of Biomass/non-fossil fuel-based co-generation projects with the norm specified.
- OREDA/ GRIDCO shall maintain such data including technical and commercial details of Biomass/Non-fossil fuel-based co-generation projects in the State and shall make the data available in the public domain by publishing the same on its website with quarterly updation.

22. **Tariff Structure**

The tariff for renewable energy sources shall consist of the following components:

(a) Return on equity;

(b) Interest on loan;

(c) Depreciation;

(d) Interest on working capital; and

(e) Operation and Maintenance expenses;

Provided that single part tariff with two components i.e. fixed cost component and fuel cost component shall be applicable for renewable energy projects having fuel cost component, like biomass power projects with rankine cycle technology, biogas-based power projects, non-fossil fuel-based co-generation projects and refuse derived fuel based power projects.

23. **Tariff Design**

The principles for tariff design is as follows:

(a) The generic tariff shall be determined, on levellised basis, for the tariff period of the project considering the year of commissioning of the project.

Provided that for renewable energy projects having two part tariff with two components, fixed cost component shall be determined on levelized basis considering the year of commissioning of the project while fuel cost component shall be determined for a particular year in the Tariff Order to be issued by the Commission.

(b) For the purpose of computation of levelized tariff, discount factor equivalent to post-tax weighted average cost of capital shall be considered.

(c) Accordingly, the discount factor considered for this exercise is equal to the post tax weighted average cost of capital on the basis of normative debt: equity ratio (i.e. 70:30).

(d) Interest Rate considered for the loan component (i.e.,70% of capital cost) is 9.12%. For equity component (i.e. 30% of capital cost), the rate of Return on Equity (ROE) is considered at post-tax rate of 14%. Further, Corporate tax rate has been considered as 34.94%. Accordingly, the discount factor derived by this method for all RE technologies is 8.35% [{(9.12% x 0.70) x (1 – 34.94%)} + (14.0% x0.30)]

(e) The above principles shall also apply for project specific tariff.

24. **Financial Parameters**

The financial parameters specified hereunder shall be applicable to all RE technologies/sources covered in this paper.

a) **Capital Cost**

The norms for the Capital Cost as specified in the subsequent sections shall be inclusive of Land cost, pre development expenses, all capital work including plant and machinery, civil work, erection and commissioning, financing & interest during construction, and cost of infrastructure for evacuation of power up to inter-connection point.

Provided that for determination of project specific tariff, the generating company shall submit the break-up of capital cost items along with its petition.

b) **Debt-Equity ratio**

- For determination of generic tariff, the debt-equity ratio shall be 70: 30.
- For project specific tariff, the following provisions shall apply:

If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff;

Provided further that the equity invested in foreign currency shall be denominated/ converted in Indian rupees on the date of each investment.

Provided also that debt equity ratio shall be derived after deducting the amount of grant or capital subsidy received for the project.

c) **Loan and Finance charges**

i) **Loan Tenure**: For the purpose of determination of generic tariff and project specific tariff, loan tenure is considered as 15 years.

ii) **Interest Rate**

The loan amount calculated on above principle shall be considered as gross normative loan for calculation of interest on loan. The normative loan outstanding as on 1st April of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan.

The normative interest rate considered for the purpose of computation of tariff in this order is the average Marginal Cost of Funds based Lending Rate (MCLR) (One year tenor) of State Bank of India (SBI) prevalent during the first six months of the previous year plus 200 basis points.

Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.

d) **Depreciation**

- The value base (Capital Base/ Rate Base) for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to 90% of the Capital Cost of the asset.

  Provided that, no depreciation shall be allowed to the extent of grant or capital subsidy received for the project.
- Depreciation rate of 4.67% per annum shall be considered for the first 15 years and remaining depreciation shall be evenly spread during remaining Useful Life of the project.
- Depreciation shall be computed from the first year of commercial operation. Provided that, in case of commercial operation of the project for part of the year, depreciation shall be computed on pro rata basis.

e) **Return on Equity**

The equity shall be 30% of the capital cost or actual equity as specified under Debt-Equity Ratio provisions.

The normative Return on Equity shall be 14%. The normative Return on Equity shall be grossed up by the latest available notified Minimum Alternate Tax (MAT) rate for the first 20 years of the Tariff Period and for the remaining Tariff Period it shall be grossed up by the latest available notified Corporate Tax rate.

f) **Interest on Working Capital**

The Working Capital requirement in respect of wind power projects, small hydro project, Solar PV, Solar thermal, floating solar projects and renewable energy with storage project shall be computed as under:

- Operation & Maintenance expenses (O&M) for one month;
- Receivables equivalent to 45 days of tariff for sale of electricity calculated based on the normative Capacity Utilisation Factor (CUF)/ Plant Load Factor (PLF), as the case may be;
- Maintenance spare @ 15% of O&M expenses

The Working Capital requirement in respect of biomass based power projects (Rankine cycle technology) and non-fossil fuel-based co-generation projects shall be computed as under:

- Fuel costs for four months equivalent to normative Plant Load Factor (PLF);
- O&M expense for one month;
- Receivables equivalent to 45 days of tariff for sale of electricity calculated based on the PLF;
- Maintenance spare @ 15% of operation and maintenance expenses

In case of RE hybrid projects, the Working Capital requirement shall be sum of the Working Capital requirement determined as per norms applicable for renewable energy sources, in proportion to their rated capacity in the project.

Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred and fifty (350) basis points above the average Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenure) of State Bank of India prevalent during the last available six months.

g) **Operation & maintenance Expenses**

'Operation and Maintenance or O&M expenses' shall comprise of repair & maintenance (R&M), establishment expenses (including employee expenses) and administrative & general expenses.

Operation and maintenance expenses shall be determined for the Tariff Period based on normative O&M expenses specified in this tariff order for the first Year of Control Period.

Normative O&M expenses allowed during first year of the Control Period (i.e. FY 2023-24) shall be escalated at the rate of 3.84% per annum for subsequent years of the control Period.

25. **Calculation of Capacity Utilization Factor (CUF) and Plant Load Factor (PLF):**

For calculation of Capacity Utilization Factor (CUF) and Plant Load Factor (PLF), as the case may be, the number of hours in a year shall be considered as 8766.

26. **Statutory Charges**

The renewable energy project developer shall recover from the beneficiaries, the statutory charges imposed by the State and Central Government such as water cess, electricity duty on normative auxiliary consumption.

27. **Subsidy or incentive by the Central or the State Government**

While determining the tariff, the Commission shall take into consideration any incentive, grant or subsidy from the Central or State Government, including accelerated depreciation benefit, availed by the project.

Provided that the following principles shall be considered for ascertaining income tax benefit on account of accelerated depreciation, if availed, for the purpose of tariff determination:

a) Assessment of benefit shall be based on normative capital cost, accelerated depreciation rate and corporate income tax rate as per relevant provisions of Income Tax Act, 1961 as amended from time to time; and

b) Capitalization of renewable energy projects during second half of the fiscal year.

c) Per unit benefit shall be derived on levelized basis considering discount factor equivalent to weighted average cost of capital.

d) Any grant, subsidy or incentives availed by renewable energy project, which is not considered at time of determination of tariff, shall be deducted by the beneficiary in subsequent bills after receipt of such grant, subsidy or incentive in suitable installments.

e) In case the Central or State Government or their agencies provide any generation-based incentive, which is specifically over and above the tariff, such incentive shall neither be taken into account while determining the tariff nor be deducted by the beneficiary in subsequent bills raised by the particular Renewable energy project.

Dispatch principles for electricity generated from Renewable Energy Sources

28. All renewable energy power plants except biomass power plants and non-fossil fuel-based co-generation plants with installed capacity of 10 MW and above, shall be treated as 'MUST RUN' power plants and shall not be subject to 'merit order dispatch' principles. However, the renewable energy power projects shall be subject to scheduling and dispatch as specified under the Orissa Grid Code (OGC) / Indian Electricity Grid Code (IEGC), as the case may be and amendments thereto from time to time.

29. **Inter-connection point**: Regulation 2.1 (l) of OERC (Procurement of Energy from Renewable Sources and its Compliance) Regulations, 2021 provides the definition and 'interpretation of Inter-connection Point'. Further, Regulation 11 of the said Regulations provides mechanism of connectivity of RE based power plant with the GRID. The interconnection and the mechanism of connectivity of RE based power plant with the GRID would accordingly be guided by the provisions under the OERC (Procurement of Energy from Renewable Sources and its Compliance) Regulations, 2021 and amendment thereof from time to time.

<u>Specific Parameters for various types of RE projects</u>

30. **Wind Power Projects:**

CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 have not specified generic capital cost for the Wind power projects. The Commission shall determine only project specific capital cost and tariff based on prevailing market trends for wind energy project.

The Commission, therefore, decides that procurement of power from all wind-based power projects shall be made through competitive bidding process only during the control period 2023-24 to 2025-26. However, project specific tariff shall be determined by the commission on the case-to-case basis. The financial and operational norms as specified under in this order, except for capital cost, shall be considered for determining the project specific tariff.

(a) **Capital cost**

i) The capital cost for wind energy projects shall include Wind turbine generator & associated auxiliaries, land cost, site development charges and other civil works, transportation charges, evacuation cost of power evacuation system up to inter-connection point, financing charges and Interest during Construction (IDC).

ii) The project specific capital cost for wind energy projects shall be determined based on the prevailing market trends.

(b) **Capacity Utilization Factor**

The normative Capacity Utilization Factor (CUF) for the wind power project in the State of Odisha shall be 22%. The normative CUF has been estimated considering annual Mean Wind Power Density as 220 Watt per sq.m (W/m2) in the State of Odisha.

(c) **Operation and Maintenance Expenses** shall be determined for project specific cases based on the prevailing market conditions.

31. **Small Hydro projects (SHP)**

The following financial and operational norms shall be considered for determination of generic tariff.

a) Capital Cost

The capital cost considered for small hydro projects during the control period (FY 2023-24 to 2027-28) shall be Rs. 780 Lakh/MW for all projects below 5 MW and Rs. 900 Lakh/MW for projects between 5 MW to 25 MW. The capital cost for small hydro projects as specified for first year of the Control Period shall remain valid for the Control Period unless reviewed by the Commission.

b) Capacity Utilisation Factor (CUF)

The normative Capacity Utilization Factor of 30% for the generic tariff determination in case of SHP is considered as per CERC RE Regulations 2020. The normative CUF as mentioned above is net of free power to the home State, if any, and any additional quantum of the power, if committed by the developer, over and above the normative CUF shall be factored into the tariff.

c) Auxiliary Consumption

Auxiliary Consumption for the small hydro projects shall be 1.0%.

d) Operation and Maintenance Expenses

i. O&M expenses for the first year of the Control Period (FY 2023-24 to 2027-28) shall be Rs. 33.66 Lakh per MW for projects below 5 MW and Rs. 24.37 lakh for projects between 5 MW to 25 MW.

ii. O&M expenses for subsequent period shall be escalated at the rate of 3.84% per annum.

e) Levellized tariff for SHP Projects

The levellized tariff over the useful life is determined based on the financial and operating parameters as discussed above and will be applicable for a period of 40 years.

Table - 15

Particular	Levellized Tariff (Rs./kWh)	Tariff Period (Years)
SHP projects below 5 MW capacity	5.84	40
SHP projects of 5 to 25 MW capacity	5.76	40

The Technical and Financial parameters considered for determination of levelized tariff are given at **Appendix–1.**

32. **Biomass power projects**

The procurement of power from all Biomass power projects based on Rankine cycle Technology shall be made through competitive bidding process only during the control period 2023-24 to 2025-26. The project specific tariff shall be determined by the commission on the case to case basis taking into account the financial and operational norms and technology specific parameters as specified in following paragraphs**.**

The financial and operational norms are based on the CERC (Terms and conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020.

(a) Capital Cost

The capital cost for Biomass projects based on Rankine Cycle Technology shall be Rs.559.00 Lakhs/MW with water cooled condenser and Rs.600.00 Lakhs/MW with air cooled Condenser for FY 2023-24. The capital cost as specified for first

year shall remain valid for the Control Period unless reviewed by the Commission.

(b) Plant Load Factor

The Plant Load Factor for determining generic tariff shall be considered as 80%.

(c) Auxiliary Consumption

The auxiliary power consumption shall be 10% for water cooled condenser and 12% for air cooled condenser.

(d) Operation and Maintenance Expenses

i) O&M expenses for the first year of the Control Period shall be Rs.46.42 Lakh per MW.

ii) O&M expenses allowed subsequent period shall be escalated at the rate of 3.84% per annum.

(e) Station Heat Rate (SHR)

The Station Heat Rate (SHR) for biomass power projects shall be 4125 kcal/kWh for AFBC boilers and 4200 kcal/kWh for travelling grate boilers.

(f) Gross Calorific Value (GCV)

The Gross Calorific Value of biomass in a particular state depends upon the type and quality of the biomass available in that State. Before arriving at the normative calorific value of biomass for Odisha, the availability and characteristics of biomass in the State has been taken into consideration. Accordingly, the normative GCV is computed as 3100 kcal/kg.

(g) Fuel Price

During first year of the Control Period, the price of biomass fuel shall be Rs.**4118**/ MT (average) which would be escalated @ 5% every year during the control period.

(h) Fuel Mix

i) The biomass based power plant shall be designed and located in such a way that different types of non-fossil fuels available in the vicinity of power project (such as crop residues, agro-industrial residues, forest residues, etc., and other biomass fuels as may be approved by MNRE) can be used in the plant.

ii) The biomass power generating company shall devise fuel management plan to ensure adequate availability of fuel to meet the project requirements.

(i) Use of Fossil Fuel

The use of fossil fuel would not be allowed for the biomass based power projects commissioned during this control period 2023-24 to2025-26. However, projects, which were commissioned or PPA was signed with GRIDCO on or before 31.03.2018, would be allowed to use fossil fuel upto 15% of the total fuel consumption on annual basis as per the generic order issued by the Commission in Case No.46 of 2018.

33. **Non-fossil fuel-based Co-generation Projects:**

In Odisha at present neither any bagasse-based cogeneration project is operation in Odisha nor any such project is envisaged during this control period. The procurement of power from all bagasse-based cogeneration projects shall be made through competitive bidding process only during the control period 2023-24 to 2025-26. Hence, Commission is not specifying any generic tariff for the non-fossil fuel-based Co-generation Projects. However, project specific tariff shall be determined by the Commission on the case-to-case basis. The financial and operational norms as specified below, except for capital cost, are in line with CERC (Terms and conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 and the norms specified for various parameters shall be used for determining the project specific tariff.

The financial and operational norms are given in the following manner based on the.

(i) Capital Cost

The normative capital cost for the non-fossil fuel-based co-generation projects shall be Rs.492 Lakh/MW for first year of the control period (2023-24 to2025-26).

(ii) Plant Load Factor

The Plant Load Factor for non-fossil fuel-based co-generation projects shall be 53%.

(iii) Auxiliary Consumption

The auxiliary power consumption shall be 8.5% of the gross energy generation.

(iv) Operation and Maintenance Expenses

(a) O&M expenses for the first year of the Control Period shall be Rs.24.52 Lakh per MW.

(b) O&M expenses for subsequent period shall be escalated at the rate of 3.84% per annum.

(v) Station Heat Rate

The Station Heat Rate for non-fossil fuel-based co-generation projects shall be 3600 kcal/kWh for power generation component alone.

(vi) Gross Calorific Value (GCV)

For bagasse-based co-generation plants, the Gross Calorific Value (GCV) for baggase shall be 2250 kcal/kg.

(vii) Fuel Price

The price of baggase fuel shall be Rs.2632/MT during first year of the Control Period and the same would be escalated @ 5.00% every year during the control period.

(viii) Use of Fossil Fuel

The use of fossil fuel would not be allowed, however, the price of biomass as determined in this order shall be applicable for use of biomass as fuel.

34. **Solar PV, Solar Thermal and Floating Solar Power Projects**

The determination of generic tariff is losing its relevance for all solar power projects because the price discovered through competitive bidding process is much lower than generic tariff. In order to develop RE projects within state, the Govt. of Odisha, in its recently notified 'Odisha Renewable Energy policy 2022', has announced several incentives such as tax exemptions, concessions, development of Land banks and Solar parks with requisite infrastructure for RE projects which should be considered in bidding. The Commission, therefore, decides not to determine generic tariff for Solar PV, Solar Thermal and Floating Solar projects for the control period 2023-24 to 2025-26 and stipulates that all the procurement of solar power are to be made through transparent competitive bidding process only.

35. **Municipal Solid Waste (MSW) based projects:**

The norms for computation tariff for MSW based projects are given below:

(a) Capital Cost

The Commission shall determine only project specific capital cost considering the prevailing market trends. There would be no indexation of the capital cost during the control period.

(b) Plant Load Factor

The Plant Load Factor for determining project specific tariff shall be

i) During stabilization: PLF - 65%

ii) During the remaining period of the 1st year (after stabilization): PLF-65%

iii) From 2nd year onwards: PLF - 75%

The stabilisation period shall not be more than 6 months from the date of commissioning of the projects.

(c) Auxiliary Consumption

The auxiliary power consumption shall be 15% of the gross energy generation.

(d) Operation and Maintenance Expenses

The Commission shall determine only project specific O&M expenses considering the prevailing market trends.

(e) Station Heat Rate (SHR)

The Station Heat Rate for Municipal Solid waste-based projects shall be 4200 kcal/kWh.

(f) Gross Calorific Value

The gross calorific value of MSW shall be determined by the Commission on case to case basis while determining the project specific tariff.

(g) Fuel Price

No fuel price is envisaged for Municipal Solid based projects. However, the Commission may consider allowing transportation cost of such fuel while determining the project specific tariff.

(h) Use of Fossil Fuel

The use of fossil fuel would not be allowed, however, the price as determined in this order shall be applicable for use of biomass as fuel.

36. **Renewable Energy with storage project:**

The norms for determination of tariff for RE with storage project shall be as follows:

a) **Capital Cost:** The Commission shall determine only project specific capital cost for renewable energy with storage project considering the prevailing market trends

b) **Storage Efficiency:** The Commission shall approve the storage efficiency only for project Specific tariff.

Provided that the minimum efficiency for solid state battery storage technology shall be 80%.

Provided further that the minimum efficiency for pumped storage based technology shall be 75%.

Efficiency of storage component of renewable energy with storage project shall be measured as ratio of output energy received from storage and input energy supplied to the storage component of such project, on annual basis.

c) **Operation and Maintenance expense**s: The Commission shall determine only project specific O&M expenses considering the prevailing market trends.

d) **Tariff determination for Energy Storage:** The tariff for renewable energy with storage project shall be a composite tariff or differential tariff based on Time of Day and shall be determined based on energy supplied from the Project including the energy supplied from the storage facility.

Provided that such tariff may be determined for supply of power on Round The Clock (RTC) basis or for time periods as agreed by Project Developer and Beneficiary.

37. **Hybrid Renewable Energy (RE) Projects:**

The norms for determination of tariff for Hybrid RE projects shall be as follows:

a) **Capital Cost:** The Commission shall determine project specific capital cost considering the prevailing market trends.

b) **Capacity Utilisation Factor (CUF):** The Commission shall determine only project specific Capacity Utilization Factor (CUF) in respect of hybrid RE projects in proportion to rated/installed capacity of generation from the renewable energy sources and applicable CUF for such renewable energy sources.

Provided that the minimum CUF for hybrid RE project shall be 30% when calculated at the inter-connection point, where the energy is injected into the grid.

c) **Operation and Maintenance expenses:** The Commission shall determine only project specific O&M expenses considering the prevailing market trends.

d) **Tariff:** The tariff for a hybrid RE project shall be composite levelised tariff for the project as a whole by factoring in the tariff components upto the minimum of the useful life of the RE technologies combined for such RE hybrid Project:

Provided that, in case any of the RE source/technologies in hybrid RE project is left with useful life, the levelised tariff for remaining useful life of such RE Sources/Technology shall be determined separately, by factoring the tariff components.

38. Based on the above observations, the summary of the proposed Generic tariff for various RE technologies/sources for the control period from 2023-24 to 2027-28 is as follows:

a. The levellized generic tariff for various renewable sources of energy having "Single part tariff' shall be as given in Table below:

Table - 16

Particular	Levellised Total Tariff (for the current control period (Rs./kWh)	Tariff Period (Years)
Wind Energy	To be procured only through competitive bidding process	
SHP projects of 5 to 25 MW capacity	5.76	40
SHP projects below 5 MW capacity	5.84	40
Solar PV, Solar Thermal & Floating Solar power Project	To be procured only through competitive bidding process	

b. The tariff for various renewable sources of energy having "Single part tariff with two components" shall be determined as given in the Table below:

Table - 17

Particular	Levellized fixed component of Tariff (Rs./kWh)	Variable(Fuel) Component of tariff	Effective tariff
Biomass	To be procured only through competitive bidding process		
Non-fossil fuel-	To be procured only through competitive bidding process		

based co-generation	
MSW	To be procured only through competitive bidding process

c. The impact of additional power purchase cost arising due to RPO shall be factored in to the ARR of GRIDCO each year.

d. The Commission shall take into consideration any incentive or subsidy offered by the Government of India/State Govt. including accelerated depreciation benefit, if availed, by the developer for the RE based power plants and such benefits shall be passed on to the consumers of the State.

e. **Rebate:** If bills of the RE based Power Projects is paid through Letter of Credit (LC), NEFT or RTGS within five working days (except holidays under N.I. Act) of presentation of bill(s), a rebate of 1.5% shall be allowed. If payment is made on any day after five working days of presentation of bills by the generating company, a rebate of 1% shall be allowed.

f. **Late Payment Surcharge:** In case the payment of any bill for charges payable under these Guidelines is delayed beyond a period of 45 days from the date of issue of bill(s), a late payment surcharge at the rate of 1.50% per month shall be levied by the generating company.

g. **Taxes and duties:** Any tax and duty levied by the Government shall be reimbursed by the beneficiary to the developer as yearend charges.

Appendix-1

Small Hydro Project (SHP)

Technical and Financial parameters

No	*Technical Parameters*	*Unit*	*Projects <5MW*	Projects of >5 MW upto 25 MW
1	Installed Power Generation Capacity of the Power Project	MW	1	1
2	Capacity Utilization Factor	%	30%	30.00%
3	Total no. of Hours	Hrs	8766	8766
4	Annual gross energy Generation	Lakh kWhs	26.3	26.30
5	Auxiliary consumption	%	1.00	1.00
6	Net energy generation	Lakhs	26.04	26.04
7	Useful Life	years	40	40
No	*Financial Parameters*			
1	Project Cost SHP plant	Rs. Lacs/MW	780	900.00
2	Non depreciable cost	% of Capital Cost	10%	10.00%
3	Depreciable Amount	lacs	702	810.00
4	Debt Fraction	%	70%	70.00%
5	Debt	lacs	546	630.00
6	Equity	lacs	234	270.00
7	TOTAL	lacs	780	900.00
8	Interest Rate on Term Loan	%	9.12	9.12%
9	Repayment Period	years	15	15
10	No of Installments for payment of loan	years	15	15
11	Moratorium Period	years	0	0
12	Depreciation (Straight Line Method) (for first 15 years)	%	4.67%	4.67%
13	Depreciation (Straight Line Method) (from 16th years onwards)	%	0.8%	0.80%
14	Discount Rate	%	8.35%	8.35%
15	O&M Cost	lakhs/MW	36.29	26.28
16	O&M Cost Escalation	%	3.84%	3.84%
17A	Return on Equity (14% considering MAT rate 17.47%) (upto 20 years)	%	16.96%	16.96%
17B	Return on Equity (Income Tax rate 34.94%) (after 20 years)		21.52%	21.52%
18	Interest on working capital	%	10.62%	10.62%
19	Annuity Factor (35 Years)			11
20	O&M Charges	Month	1	1
21	Maintenance spare	%	15%	15%
22	Receivable for debtors	Month	1.5	1.5