

**Comments/Suggestions from Power Foundation of India (PFI) on the  
Draft Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination  
from Renewable Energy Sources) Regulations, 2024**

- 1) PFI is a Policy Research and Advocacy entity, a registered society under the aegis of the Ministry of Power, Government of India, and supported by twelve leading Central Power Sector Organisations, to undertake evidence-based policy research and facilitate informed decision making by the Regulators, Ministry and stakeholders concerned with the Power Sector. It is led by Director General Shri Sanjiv Nandan Sahai (Former Secretary in Ministry of Power, Government of India).
- 2) Central Electricity Regulatory Commission (CERC) has sought comments / suggestions from various stakeholders on Draft *CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2024*. PFI has reviewed and analysed the said draft Regulations, and welcomes the initiatives or modifications in the Draft Regulations related to:
  - a) Providing Generic Tariff to Municipal Solid Waste (MSW) and Refused Derived Fuel (RDF) based power projects with consideration of distinct normative parameters of Capital Cost, O&M and PLF. Earlier also, CERC RE Regulations 2015 had generic tariff parameters for MSW & RDF but later RE Regulations 2020 provided project specific Tariff to MSW & RDF based projects, thus no generic norms were available for Capital Cost and O&M. The distinct normative parameters of Capital Cost, O&M and PLF will help SERCs to benchmark Tariff for MSW & RDF projects in their State.
  - b) Increase of 0.5% in Return on Equity (RoE) for Small Hydro Projects considering their longer gestation period.
  - c) Synchronizing various provisions related to LPSC and Hybrid Energy projects with MoP guidelines.
- 3) As sought, the comments / suggestions of PFI on the said draft Regulations are as follows:

**A. No Specific Inter-State SHP, Biomass and MSW Projects**

- a) The existing capacities of Small Hydro Plant, Biomass and MSW Projects are such that they will rarely qualify as Inter-State projects / Composite scheme. Thus, jurisdiction of CERC for such projects rarely arise. It is noted from explanatory memorandum issued by CERC that in the past 8 years, no Tariff Orders has been issued by CERC for such

projects i.e., SHP, Biomass & MSW governed by its *Renewable Energy Sources Regulations, 2017 and 2020*. Therefore, it is suggested that norms for Small Hydro Plant, Biomass and MSW Projects need not be decided by CERC. For such intra-state projects, it is rather SERCs who should prudently determine the Capital Cost, O&M, CUF etc. depending upon local and geographical issues pertaining in their State.

- b) CERC has prepared *draft Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2024* u/s 178 and 61 of the Electricity Act, 2003 (Act), however, CERC in the said draft Regulations has not mentioned any scientific studies supported by actual data for arriving at firm numbers for Capital Cost (in Rs. Cr./MW), CUF, O&M etc., for the various projects. To re-iterate, other Renewable projects like SHP, Biomass & MSW have local and geographical issues pertaining to specific State.
- c) In light of the above, it may be prudent that the said draft Regulations be modified in totality by CERC and Tariff related parameters only for Solar and Wind Power Projects may be specified. Solar and Wind Power Projects of inter-state in nature, if any, the Capital Cost should be considered on case-to-case basis after prudence check, when Petition is filed before CERC, as in the case of conventional generators.

#### **B. REGULATION 25- “CUF OF WIND POWER PROJECTS”**

- a) It is noted that proposed and ongoing provisions related to CUF for wind power projects are same despite the fact that ongoing provisions were issued in the year 2020 (*CERC RE Regulations 2020* valid for Control Period FY 2020-21 to FY 2023-24) and proposed provisions are issued in the year 2024 (*CERC draft RE Regulations 2024* valid for Control Period FY 2024-25 to FY 2026-27). The CUF for Wind Power Projects in the draft Regulations are as follows:

*Table 1 CUF of Wind Power Projects as per draft RE Regulations 2024*

Annual Mean Wind Power Density (WPD) (W/m <sup>2</sup> )	CUF (%) (at 100-meter hub-height)	PFI Remarks
upto 220	22%	Same CUF stipulated in <i>CERC RE Regulations 2020</i> and <i>draft RE regulations, 2024</i> .
221-275	24%	
276-330	28%	
331-440	33%	
>440	35%	

- b) CERC in its Explanatory Memorandum for *draft RE Regulations 2024* has mentioned that it has analysed CUF for various State Electricity Regulatory Commission (SERCs), which varies

within 20% to 33% (RERC: 20%, KERC: 33%, MPERC: 23%, TNERC: 29.15%, MERC: 30%) and has accordingly retained the CUF in draft Regulations 2024 as specified in Tariff Regulations, 2020.

- c) It is pertinent to mention that various SERCs like that of Maharashtra and Karnataka have increased CUF of Wind Power Projects, after giving due weightage to improvement in technology, as follows:

Table 2 CUF of Wind Power Projects as per SERCs

States	CUF (for FY 2019-20)	CUF (for FY 2024-25)
Maharashtra	Minimum 22%	Minimum 30%
Karnataka	31%	33%

- d) Further, actual CUF of the wind power projects commissioned in FY 2021-22 is around 34%<sup>1</sup> but CERC has considered CUF of quite lesser quantum for various Wind Power Density.
- e) Further also, Hon'ble Appellate Tribunal for Electricity (APTEL) in its judgment dated 25/11/2014 in Appeal No. 82 of 2014, has ruled that CUF has to be determined considering the scientific study or supporting data available for the State from Centre for Wind Energy Technology (C-WET) or any other reliable data or based on actual wind energy generation data available with the distribution licensees, as follows:

*“8.8 We, therefore, direct the State Commission to reconsider the issue and decide after considering a scientific study or supporting data available for the State from C-WET or any other reliable data. The State Commission may also take into consideration the actual wind energy generation data available with the distribution licensees for the existing wind power generators for different areas of the State and the Regulations and object and reasons of the Regulations of the Central Commission.”*

- f) **However, as stipulated above, CERC has retained CUF till FY 2026-27 at same levels as that of FY 2020-21 which needs correction on account of actual data, technological advancements and other factors as deemed fit. Therefore, it is suggested that CERC may obtain actual CUF information from developers operating across various geographies of the country and thereafter conduct scientific study considering actual CUF, technological advancements, site locations etc. to fix normative CUF for Wind Power Projects for the Control Period from FY 2024-25 to FY 2026-27.**

<sup>1</sup> MNRE Annual Report for 2022-23 and CEA

- g) Our analysis reveals that 2% increase in CUF i.e., from 30% to 32% decreases levelized Tariff by 6% i.e., from Rs. 3.98/kWh to Rs. 3.73/kWh. (Assumptions = Capacity: 1 MW Capital Cost: Rs. 7.5 Cr. /MW IoL: 9.12%, IoWC: 10.62%, O&M: 10 lakh/MW with 3.84% escalation)

### C. REGULATIONS 47- "CUF OF SOLAR PV POWER PROJECTS"

- a) It is noted that proposed and ongoing provisions related to CUF of Solar power projects are same despite the fact that ongoing provisions were issued in the year 2020 (CERC RE Regulations 2020 valid for Control Period FY 2020-21 to FY 2023-24) and proposed provisions are issued in the year 2024 (CERC draft RE Regulations 2024 valid for Control Period FY 2024-25 to FY 2026-27). The CUF for Solar power projects is as follows:

Table 3 CUF of Solar power projects as per draft Regulations

Solar project	CUF (%)	Remarks
Solar PV	21%	Same CUF stipulated in CERC RE Regulations 2020 and draft RE Regulations, 2024.
Solar Thermal	23%	
Floating Solar	19%	

- b) The Commission in its Explanatory Memorandum for draft CERC RE Regulations 2024 has mentioned that it has analysed CUF for various SERCs, which varies in the range of 19% to 28% and after such review has retained the CUF in draft Regulations 2024 as specified in the RE Tariff Regulations, 2020. No basis has been provided in Explanatory Memorandum of draft Regulations as to how 21% CUF is arrived from the wide range of 19% to 28%. Even, the information related to 19% to 28% range is also not revealed in Explanatory Memorandum.
- c) It is pertinent to mention that various SERCs like that of Maharashtra and Karnataka have increased CUF of Solar Power Projects, as follows:

Table 4 CUF of Solar Power Projects as per SERCs

States	CUF (for FY 2019-20)	CUF (for FY 2024-25)
Maharashtra	19%	28%
Karnataka	19%	22%

- d) However, as stipulated above, CERC has retained CUF till FY 2026-27 at same levels as that of FY 2020-21 which needs correction on account of actual data, considering findings of Hon'ble APTEL in its judgment dated 25/11/2014 in Appeal No. 82 of 2014, technological advancements and other factors as deemed fit. Therefore, it is suggested that CERC may obtain actual CUF information from developers operating across various

geographies of the country and thereafter conduct scientific study considering actual CUF, technological advancements, site locations etc. to fix normative CUF for Solar Power Projects for the Control Period from FY 2024-25 to FY 2026-27.

- e) Further, our analysis reveal that 2% increase in CUF i.e., from 21% to 23% decreases levelized Tariff by 9% i.e., from Rs. 4.05/kWh to Rs. 3.70/kWh based on the norms stipulated above.

**D. REGULATIONS 27- “CAPITAL COST ESCALATION FOR SMALL HYDRO POWER (SHP), BIOMASS POWER PROJECTS BASED ON RANKINE CYCLE TECHNOLOGY, NON-FOSSIL FUEL BASED CO-GENERATION PROJECTS, BIOMASS GASIFIER POWER PROJECTS, BIOGAS BASED POWER PROJECTS”**

- a) CERC has proposed 14% escalation factor in the capital cost for SHP, Biomass power projects based on Rankine cycle technology, non-fossil fuel-based co-generation projects, biomass gasifier power projects and biogas-based power projects for the upcoming Control Period- FY 2024-25 to FY 2026-27 over the Capital Cost defined in RE Regulations 2020 for FY 2020-21. CERC has arrived at 14% escalation factor by considering average of growth rates of three indices: Manufacturing Index, Infrastructure Industry Index and Wholesale Price Index (WPI) from FY 2019-20 to FY 2022-23 as follows:

*Table 5 Growth in indexation for Capital cost*

Parameters	FY 2020	FY 2023	Growth rate (%)
Manufacturing Index	129.6	137.1	6%
Wholesale Price Index (WPI)	121.8	152.5	25%
Infrastructure Industry Index	131.6	146.7	11%
	<b>Average</b>		<b>14%</b>

- b) It is noted that Capital cost has been defined in the draft Regulation 12 as cost inclusive of:

- Land Cost (inc. pre-development expenses)
- **Plant & Machinery, Civil work**
- Erection and Commissioning, Financing Cost
- Evacuation Infrastructure

- c) Our analysis from the Tariff Petitions filed by utilities and other sources reveals that the nearly 85% - 90% of Capital Cost comprises of Civil works and Plant & Machinery only, as follows:

Table 6 Break up of Capital cost for different technologies of power project

Capital cost components	SHP <sup>2</sup>	Biomass <sup>3</sup>	Biogas <sup>3</sup>	Cogen <sup>4</sup>
Plant & Machinery	15-20%	70-73%	70-73%	55-60%
Major Civil Works	60-65%	20-23%	20-23%	10-15%
Others (land, erection, Evacuation, etc.)	15-20%	4-10%	4-10%	25-30%

d) Further, as mentioned above, CERC has considered 3 parameters viz. Manufacturing Index, WPI and Infrastructure Industry Index for arriving out % escalation in Capital Cost. Out of the said 3 parameters one of the parameters is WPI which has been considered for all commodities despite the fact that Capital Cost is majorly governed by Civil works and Plant & Machinery only.

e) Components of WPI are as follows:

- i. Primary Articles (Food, Non-food, Minerals, Crude Petroleum & Natural gas)- 22.6%
- ii. Fuel & Power (LPG, Petrol, High Speed Diesel)- 13.15%
- iii. Manufactured Products (Food products, Plant & Machinery, Non-metals etc.)- 64.23%

Source: [https://eaindustry.nic.in/pdf\\_files/cmonthly.pdf](https://eaindustry.nic.in/pdf_files/cmonthly.pdf)

f) Considering WPI of all commodities for escalating the overall Capital Cost is not suitable as the movement of prices of the major civil works and plant & machinery are captured mainly through WPI of manufacturing of other Non-metallic mineral products, manufacturing of Electrical equipment and manufacturing of Plant & Machinery, respectively. Therefore, it is suggested to use WPI indices which are specific to the Non-metallic mineral products (primarily governing Civil works), manufacturing of Electrical equipment and Plant & Machinery only as follows:

Table 7 Growth Rate in WPI index as per CERC

WPI Index	FY 20	FY 21	FY 22	FY 23	Growth rate % (FY 20 to FY 23)
For all Commodities	121.8	123.4	139.4	152.5	25.21 % (As considered by CERC)
<b>Manufactured products</b>					
• Non-metallic mineral products	116.7	117.6	123.7	133.7	14.6%
• Machinery and equipment	113.1	114	120	126.2	11.6%
• Electrical equipment	111.3	113.6	122.3	128.8	15.7%
Average of Manufactured products only					<b>13.97%</b>

Source: [https://eaindustry.nic.in/download\\_data\\_1112.asp](https://eaindustry.nic.in/download_data_1112.asp)

<sup>2</sup> [https://mserc.gov.in/discussion/petition\\_2023-24/MePGCL\\_Petition\\_Ganol\\_SHP.pdf](https://mserc.gov.in/discussion/petition_2023-24/MePGCL_Petition_Ganol_SHP.pdf)

<sup>3</sup> [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2012/RE\\_Technologies\\_Cost\\_Analysis-BIOMASS.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2012/RE_Technologies_Cost_Analysis-BIOMASS.pdf)

<sup>4</sup> [https://environmentclearance.nic.in/writereaddata/Online/TOR/0\\_0\\_05\\_Dec\\_2014\\_1806251771draft\\_DPR\\_-\\_Lokmanya\\_Nov\\_2014.pdf](https://environmentclearance.nic.in/writereaddata/Online/TOR/0_0_05_Dec_2014_1806251771draft_DPR_-_Lokmanya_Nov_2014.pdf)

g) Further, CERC has considered Manufacturing Index and Infrastructure Industry Index for computing escalation, as stipulated in Table 5 Growth in indexation for Capital cost above. The manufacturing production industries index is prepared by the Ministry of Statistics and Programme Implementation (MoSPI) as a part of Index of Industrial Production (IIP). IIP refers the aggregation of the outputs of basket of industries, which are expressed or measured in different units. It covers mining, manufacturing, and electricity with their weightage 14.37%, 77.63% and 7.99%, respectively.

The infrastructure production industries index is prepared by the Department for Promotion of Industry and Internal Trade (DPIIT). This is also called as Combined Index of Core Industries (ICI), which measures the combined and individual performance of production of eight core industries viz. Coal, Crude Oil, Natural gas, Petroleum refinery products, Fertilizers, Steel, Cement and Electricity. Their weightages are 4.16%, 2.77%, 3.62%, 11.29%, 1.06%, 7.21%, 2.16%, 7.99%, respectively and collectively hold a weightage of 40.27% in IIP at base 2011-12. Steel and Cement which form major part of Capital Cost of Power Projects are within the manufacturing production industries. Hence, infrastructure industries index may not be included for capital cost escalation.

h) **Based on the discussions above, it is proposed to use WPI index for manufactured products (Other non-metallic mineral products, manufacturing of Electrical equipment and Plant & Machinery) rather than WPI for all commodities and exclude Infrastructure Industry Index for computing escalation factor as follows:**

Table 8 Growth rate suggested for escalation in Capital Cost

Sr. No.	Parameters	CERC (Growth Rate)	Suggested by PFI
A	Manufacturing Index	6%	6%
B1	Wholesale Price Index (WPI) for all Commodities	25%	-
B2	WPI for manufactured products (Other non-metallic mineral products, Electrical equipment and Plant & Machinery)	-	13.97% (Table-7)
C	Infrastructure Industry Index	11%	-
	Average (A,B1,C) = CERC Average (A,B2) = PFI	<b>14%</b>	<b>9.98%</b>

#### **E. REGULATIONS- 27 "CAPITAL COST OF SMALL HYDRO PROJECTS"**

a) CERC in *draft RE Regulations 2024* has proposed the normative capital cost for Small Hydro Projects (SHP) during the first year of the Control Period, i.e., FY 2024-25 as:



Table 9 Capital cost for SHP as per draft Regulations

Region	Project size	Capital Cost (Rs. lakh/ MW)
Himachal Pradesh, Uttarakhand, West Bengal, Jammu and Kashmir, Ladakh and Northeastern States	Below 5 MW	1200
	5 MW to 25 MW	1200
Other States	Below 5 MW	890
	5 MW to 25 MW	1027

- b) As tabulated above, CERC has proposed uniform Capital cost for SHP with project size below 5 MW and from 5 MW to 25 MW for the projects located in 1<sup>st</sup> set of States in the table. However, in contradiction to the draft Regulations, the explanatory memorandum of the same stipulates at para no. 5.2.1 that Capital Cost will be higher for SHP projects below 5 MW compared to the Capital Cost Norms for SHP projects between 5 MW and 25 MW as follows:

*“ 5.2.1. CAPITAL COST*

*The provision for Capital Cost for Small Hydro projects as per the existing RE Tariff Regulations, 2020 is as follows:*

*....*

*The Commission has specified higher Capital Cost norms for SHP projects below 5 MW compared to the Capital Cost Norms for SHP projects between 5 MW and 25 MW, as hydro projects below 5 MW have a higher capital cost and operating cost due to their small size, remote locations, grid connectivity issues, etc.*

*....*

- c) Even, in CERC RE Tariff Regulations 2020, the said anomaly is noted. Accordingly, CERC may conduct scientific study and revise the Capital cost for SHPs giving due weightage to Size, Gestation Period, Geography, Grid Connectivity etc.

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