Financial Year	Total RPO	Non-Solar RPO		Solar RPO	Hydro
		Wind	Biomass bagasse and other	Solar	Hydro Power
2024-25	20.70%	8.55%	0.8%	11.25%	0.1%

Source: GERC (Procurement of Energy from Renewable Sources) (Third Amendment) Regulations,2022

Further, the aforesaid Regulation recognises the certificates issued within the scope of Central Electricity Regulatory Commission's (CERC) Notification No. L-1/12/2010-CERC dated 14th January 2010 as the valid instruments for the discharge of the mandatory obligations set out in these Regulations for the obligated entities to purchase electricity from Renewable Energy Sources termed as Renewable Energy Certificates (REC).

End of Chapter 1

Chapter 2: Study of Competitive Bidding Results for Wind Solar Hybrid

2.1 Introduction

Solar Energy Corporation of India (SECI) has been playing the key role of a nodal agency for conducting e-reverse auction for procurement for power for solar and wind projects. SECI has also published tender for supply of round the clock (RTC) power, peak power as well as power procurement from Wind –Solar Hybrid projects as per guidelines issued by MNRE.

The tariff discovered during the control period of present tariff order (2021-2023) under the Inter-State Transmission System connected (ISTS) Wind Solar Hybrid Project tender floated by SECI as well wind solar hybrid tariff, the discovery rates under the State specific bidding conducted by State level entities is discussed in the following section.

2.2 SECI Wind-Solar Hybrid Power Projects (Tranche-III)

In January 2020, SECI had issued a Request for Selection (RfS) for setting up of 1200 MW ISTS-connected Wind-Solar Hybrid power projects in India (Tranche-III). The tender received a total of 3310 MW of bids, being oversubscribed by 2110 MW. The L1 tariff of ₹2.41/kWh was quoted by Adani Renewable Energy (600 MW), ABC Renewable Energy (380 MW), Amp Energy Green (130 MW). Acme Solar made the L2 price mark at ₹2.42/kWh for 300 MW capacity, but was allotted 90 MW under the bucket-filling method. Players such as Adani and ReNew Power have been frequent participants in the previous WSH tenders. Whereas, Acme Solar, NLC (Neyveli Lignite Corporation), Sembcorp (Green Infra) are the new players that have participated and shown keen interest to bid in a WSH tender for the first time.

Table 2:Tariff Discovered in SECI hybrid Tender (Tranche – III)

Sr. No.	Name of the Project	Capacity (in MW)	Tariff (₹/kWh)
1	ABE Renewable Energy Private Limited	380	2.41
2	Adani Renewable Energy Holding Eight Limited	600	2.41
3	AMP Energy Green	130	2.41

	Private Limited		
4	ACME Solar Holding Private Limited	300	2.42

2.3 SECI Wind-Solar Hybrid Power Projects (Tranche-IV)

In April 2021, SECI had issued a Request for Selection (RfS) for setting up of 1200 MW ISTS-connected Wind-Solar Hybrid power projects in India (Tranche-IV). The tender received a total of 6280 MW of bids, being oversubscribed by 5080 MW. The L1 tariff of ₹2.34/kWh was quoted by NTPC Limited (450 MW), NLC Limited (150 MW), Project Ten Renewable Energy Limited (450 MW). Azure Power India Limited made the L2 price mark at ₹2.35/kWh for 150 MW capacity.

Table 3: Tariff Discovered in SECI hybrid Tender (Tranche – IV)

Sr. No.	Name of the Project	Capacity (in MW)	Tariff (₹/kWh)
1	NTPC Limited.	450	2.34
2	NLC India Limited	150	2.34
3	Project Ten Renewable Power Private Limited	450	2.34
4	Azure Power India Limited	300	2.35

2.4 SECI Wind-Solar Hybrid Power Projects (Tranche-V)

SECI had floated the tender to set up 1,200 MW ISTS-connected Wind-Solar Hybrid Projects in October 2021. According to the tender document, the hybrid power projects had to be designed for inter-connection with the transmission network of the central transmission utility at the voltage level of 220 kV or above. Tata Power won a capacity of 600 MW, NTPC (450 MW), and Amp Energy (120 MW), each quoting ₹2.53/kWh. SJVN quoted ₹2.54/kWh for 200 MW but was only awarded 30 MW under the bucket filling method.

Table 4: Tariff Discovered in SECI hybrid Tender (Tranche – V)

Sr. No.	Name of the Project	Capacity (in MW)	Tariff (₹/kWh)
1	Tata Power Saurya Limited	600	2.53

2	AMP Energy Green Private Limited	120	2.53
3	NTPC Renewable Energy Limited	450	2.53

2.5 Maharashtra Wind – Solar Hybrid Tender

Tender floated by Tata Power –Distribution Company Limited (TPC – D)

TPC-D initiated competitive bidding process on 20th June 2020 for power procurement from Grid Connected 225 MW Wind-Solar Hybrid power project on long term basis to meet its RPO. The tariff was discovered through Tariff based Competitive Bidding Process and adopted by the Maharashtra Electricity Regulatory Commission vide Order No. 152 of 2020 dated 10.08.2020.

Table5: Tariff Discovered in bidding conducted by TPC –D

Sr. No.	Name of the Project	Capacity (in MW)	Tariff (₹/kWh)
1	Tata Power Green Energy Limited	225	2.59

Tender floated by Maharashtra State Electricity Distribution Co. Limited

MSEDCL initiated competitive bidding process on 07th May 2021 through BHARAT portal for procurement of 500 MW grid connected Wind-Solar Hybrid Power capacity on long term basis, to mitigate its solar as well as non-solar RPO.

The tender documents prepared by MSEDCL are consistent with the MNRE National Wind Solar Hybrid Policy dated 14th May 2018 and MNRE Guidelines dated 14th October 2020 for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Wind Solar Hybrid Projects.

Tariff which was discovered through Tariff based Competitive Bidding Process is shown in the following table.

Table 6: Tariff Discovered in bidding conducted by MSEDCL

Sr. No.	Name of the Project	Capacity (in MW)	Tariff (₹/kWh)
1	M/s T P Saurya Ltd	300	2.62

2	M/s Azure Power India Ltd	200	2.62

MERC, however in its Order in Case No 15 of 2022 had rejected the above tariff as MSEDCL committed a delay of 5 months for approaching the Commission and SECI has discovered lower tariff that that of proposed by MSEDCL during same period.

2.6 Under Construction Hybrid Project (SECI):

Table 7: Summary of Under Construction Hybrid Project (CEA Report 31.10.2022)

Sr. No.	Scheme	Total Capacity Awarded (MW)	Under Construction Capacity (MW)
1	1200 MW ISTS-Connected Wind- Solar Hybrid Power Projects (Tranche-I)	840	450
2	1200 MW ISTS-Connected Wind- Solar Hybrid Power Projects (Tranche-III)	1110	1110
3	400MW ISTS-connected Round-the-clock (RTC) RE Power (RTC-1)	400	400
4	1200 MW ISTS-Connected RE Projects with assured Peak Power Supply in India (ISTS-VII)	1200	1200
5	1200MW ISTS-connected Wind Power Projects (Tranche-IV)	1050	1050
Total		4600	4210

2.7 Other Wind – Solar Hybrid Tenders floated in 2022 in India

1. PTC India floated a tender to procure 500 MW of Hybrid Renewable Energy (Tranche-I), with a green shoe option for an additional 500 MW, on a long-term basis for 25 years. PTC said that it planned to procure renewable power to the tune of 5,000 MW in the next 2-3 years in tranches of 500-1,000 MW each. The tender was floated to assess the market potential and procure power from interested hybrid renewable energy suppliers. At a later stage, based on the response, PTC may also sign a bilateral Power Purchase Agreement (PPA) with the most competitive source.
2. Rewa Ultra Mega Solar Limited (RUMSL), on behalf of Madhya Pradesh Power Management Company, issued a request for proposal for the development of 750 MW grid-connected Wind-Solar Hybrid Power Projects in Madhya Pradesh.

3. Tata Power Delhi Distribution (TPDDL) floated a tender to set up 255 MW of Wind-Solar Hybrid Power Projects with a green shoe option of an additional 255 MW across India. The projects were to be developed on a build, own, and operate basis. TPDDL will enter into a PPA with the successful bidders for 25 years from the scheduled commissioning date or from the date of full commissioning of the projects, whichever is earlier.
4. Maharashtra State Electricity Distribution Company (MSEDCL) floated tender for the procurement of 500 MW of Wind-Solar Hybrid Power on a long-term basis from grid-connected Intra-State Projects. MSEDCL would sign PPAs with the selected bidders to purchase Wind-Solar Hybrid Power for 25 years from the project's scheduled commercial operation date.
5. The above details states that the Competitive Bidding for discovery of tariff for Hybrid Projects has been adopted by SECI, distribution licensees and other in the Country and it seems that the discovered tariff is also attractive.

End of Chapter 2

CHAPTER 3: TARIFF FRAMEWORK, GENERAL PRINCIPLES AND OTHER COMMERCIAL CONSIDERATIONS

3.1 Tariff Framework:

3.1.1. The Ministry of New and Renewable Energy has notified competitive bidding guidelines for procurement of power from grid connected Wind Solar Hybrid Projects on 14.10.2020. The Commission has already directed the Distribution Licensees to procure power from Solar and Wind Projects through competitive bidding under Section 63 of the Act or by following competitive bidding process followed by SECI/MNRE etc.

The Commission has observed that, as per the provisions of the National Tariff Policy, procurement from renewable energy projects by distribution licensees is recommended through competitive bidding to keep the tariff low. Accordingly, the Govt. of India and various State Governments have initiated competitive bidding process for Procurement of Power from Wind and Solar Energy Projects, in which the discovered tariff for Solar and Wind Energy Projects has shown a substantial reduction.

3.1.2. The Commission during the control period of present Tariff Order No. 04 of 2021 (FY 2021-FY 2023) had recommended procurement of power generated from the existing project (Type A) as well new Wind Solar Hybrid Projects (Type B) as per the tariff discovered through competitive bidding through Section 63 of the Act. In case of small-scale projects which fall below the threshold limit provided in competitive bidding guidelines, the purchase of power from such projects shall be recommended based on the weighted average tariff (of Wind, Solar & Wind-Solar Hybrid) available as on 1st April or 1st October depending on the commissioning date of the project.

3.1.3. In view of the above, the Commission proposes to determine the tariff for the Type A (existing project) as well as all Type B (new wind solar hybrid power projects), based on the rates discovered through competitive bidding, the distribution licensees may approach the Commission for adoption of the tariff discovered through such Competitive Bidding Process.

3.1.5. Further, as stated earlier, the Control Period under the present dispensation expired on March 31, 2023. The Commission vide Order dated 17th March 2023 in Petition No. 2128 of 2022 has extended the control period of the Tariff Order No. 04 of 2021 up to 19th June 2023. The present Discussion Paper outlines the proposed approach and tariff framework for the control period starting from 20th June 2023 to 31st March 2026.

3.2 Tariff framework for the Project above threshold limit

Type – A (Existing projects):

In case the existing wind /solar project which presently are tied up with GUVNL/DISCOM under long term PPA at feed-in-tariff/preferential tariff is allowed/permitted to be converted into hybrid by adding new solar/wind capacity, with mutual consent between developer & GUVNL/DISCOM. The tariff for newly converted hybrid projects above the threshold limit for participation in bidding, shall be discovered through tariff based competitive bidding under Section 63 of the Act as proposed in this discussion paper. The tariff for needy converted Hybrid Projects below threshold limits shall be as proposed in para 3.1.2 above.

Captive owner itself or in case of third-party sale, both the seller and suppliers with mutual discussions eligible to convert existing project into the Hybrid Project. In case the developer intends to convert existing solar/ wind captive/third party project into hybrid power by adding new solar/wind capacity for the purpose of captive use or third party sale.

In the above cases, the developer has to (i) registered Hybrid Power Project as afresh with GEDA, (ii) need to execute fresh transmission and wheeling agreement with GETCO and/or (iii) shall pay the OA charges & losses and banking facility and charges as specified in this discussion paper.

3.3 Tariff framework for Type B (New projects)

The tariff for the new hybrid projects above threshold limit shall be discovered as per tariff based competitive bidding guidelines issued by MoP under Section 63 of the Act. The Commission may adopt such tariff.

Projects set up under OA regime for captive use or third party sale shall have to pay the Open Access charges and transmission losses and wheeling loss specified in this discussion paper.

3.4 Tariff framework for the Project below threshold limit

Threshold limit means for Wind-Solar and Storage, if any, Hybrid Project shall be 50 MW or as case may be specified by Ministry of Power, Government of India and/or Commission from time to time.

There could be cases of Wind Solar Hybrid Power Projects below the threshold limit of eligibility (50 MW) for participating in Competitive bidding. The threshold limit is consist of new capacity and add existing capacity of Wind/Solar Hybrid Project. The Commission proposes to determine the tariff for the Wind Solar and Storage, if any, Hybrid Projects falling below the threshold limit of eligibility for participating in the Competitive Bidding Process as given below:

Tariff for Wind Solar and Storage, if any, Hybrid Power Projects falling below the threshold limit of eligibility shall be considered equal to the weighted average tariff (of Wind, Solar & Wind-Solar and Storage, if any, Hybrid) available as on 1st April or 1st October depending on the commissioning date of the project and adopted by the Commission.

For Type – A (Existing projects):

The purchase of power from existing wind/solar capacity shall be in accordance with the respective PPAs with Distribution licensees. The purchase of power from additional /new capacity shall be at the weighted average tariff (for respective RE addition capacity i.e., Wind Solar and Storage, if any, Hybrid Power Projects), available as on 1st April (as discovered in the Competitive Bidding by GUVNL/ distribution licensees during previous six months October-March and adopted by the Commission) shall be applicable for the projects to be commissioned under PPAs signed during April-September.

Similarly, the weighted average tariff (for respective RE addition capacity i.e., Wind Solar and Storage, if any, Hybrid Power Prject), available as on 1st October (as discovered in the

Competitive Bidding by GUVNL/distribution licensees during previous six months April-September and adopted by the Commission) shall be applicable for the projects to be commissioned under PPAs signed during October-March.

For Type-B (New Projects)

For the Hybrid Project below 50 MW capacity the distribution licensee may purchase the electricity with consideration of the following mechanism:

The purchase of power from such projects shall be at the weighted average tariff (of Wind, Solar & Wind-Solar Hybrid) available as on 1st April or 1st October depending on the commissioning date of the project. The weighted average tariff as on 1st April (as discovered in the Competitive Bidding by GUVNL/ distribution licensees during previous six months October-March and adopted by the Commission) shall be applicable for the projects to be commissioned under PPAs signed during April-September. Similarly, the weighted average tariff of Wind, Solar & Wind-Solar Hybrid available as on 1st October (as discovered in the Competitive Bidding by GUVNL/ distribution licensees during previous six months April-September and adopted by the Commission) shall be applicable for the projects to be commissioned under PPAs signed during October-March.

In case weighted average tariff is not available for particular 6 months' period then latest weighted average tariff available for 6 months' period shall be considered. GUVNL/ distribution licensees shall place on its website the applicable tariff on which it will buy the energy generated from such Wind Solar Hybrid Power Projects. GUVNL/ distribution licensees shall communicate the link to other licensee who shall then upload such link on its respective websites. The rate will be updated every 6 months.

The distribution licensee shall procure power from Wind/Solar Hybrid Project above threshold limit i.e., 50 MW only through Competitive Bidding Process.

3.5 General Principle:

Under this section the general principles such as control period, tariff period, plant life etc. has been discussed.

3.5.1 Control Period:

The Commission proposes that the control period of the tariff framework under this discussion paper shall be effective from 20th June 2023 to 31st March, 2026.

3.5.2 Useful life of Plant:

The Useful Life for the Wind Solar Hybrid Power Projects to be commissioned during control period of this order shall be considered as 25 years from date of commissioning.

3.5.3 Tariff Period:

The tariff period for the tariff proposed by the Commission for procurement of electricity from Wind- Solar and Storage, if any, Hybrid Power Projects will be of 25 years from the date of commissioning of such projects.

3.5.4 Eligible Unit:

Any individual, company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, shall be eligible for setting up of new Wind-Solar and Storage, if any, Hybrid Projects OR shall be eligible to add wind/solar capacity at their existing solar/wind power projects, respectively, either for the purpose of captive use and/or for selling of electricity, in accordance with the Electricity Act, 2003, Rules and Regulations framed thereunder as amended from time to time. The wind and solar generation and storage, if any, may be metered separately at the pooling/sending end Sub-Station.

The choice of capacity mix between Wind and Solar and Storage, if any shall be the discretion of the Developer or as per the individual schemes as notified by the State or Central Government from time to time. However, at the locations of having good wind power potential, the Solar PV capacity to be added as the Solar-Hybrid component could be relatively smaller. Similarly, in case of the sites where the Wind Power Density (WPD) is relatively lower or moderate, the component of the Solar PV capacity could be relatively on a higher side. The ratio of different technology mix of Wind-Solar and Storage if any, percentage as a part of Hybrid Project shall be in accordance with the Notification of MNRE in this regard.

For simplicity purpose, Wind-Solar Hybrid Power Generation Plants shall be divided into two categories:

(i) **Type-A Projects**

This category shall include conversion of existing/under-construction wind or solar power plants into Hybrid Projects. Wind/Solar capacity under construction shall be considered based on the Registration Certificate issued by GEDA and evacuation permission granted by GETCO and/or DISCOMs to the Solar/Wind Project Developers. The installed Wind/Solar Capacity shall be considered based on Power Purchase Agreement (PPA)/Bulk Power Transmission Agreement (BPTA)/Wheeling Agreement capacity.

(ii) **Type-B Projects**

This shall include new Wind-Solar and Storage, if any Hybrid Power Generation Projects which are not registered with GEDA or evacuation permission is not granted by GETCO/DISCOMs. The Wind-Solar Hybrid Power Projects to be commissioned under PPAs signed during the new control period will be eligible to sell power to distribution licensees of Gujarat at the tariff approved by the Commission under this Tariff framework.

3.5.5 Forecasting and scheduling for Wind Solar Hybrid Power:

The Wind-Solar Hybrid Projects shall require to follow the provisions as prescribed under the GERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019 notified dated 19th January, 2019 and its amendments issued from time to time.

3.5.6 Applicability of Merit Order Dispatch Principle:

Wind-Solar Hybrid Power Projects irrespective of the plant capacity shall be treated as 'MUST RUN' power plants and shall not be subjected to merit order dispatch principles.

3.5.7 Reactive Energy Charge:

The Reactive Energy Charges as approved by the Commission in tariff orders for the Gujarat Energy Transmission Corporation Ltd. (GETCO) from time to time shall be applicable to such projects.

3.5.8 Metering point and Interconnection point:

The metering and interconnectivity shall be as under:

a) Energy generation from wind /solar capacity shall be measured separately at the pooling/sending end sub-station on 15 /5-minute time block by installing four Quadrant ABT compliant meters by the project developers. The project developers shall also have to install Remote Terminal Unit (RTU) and communications facilitated for transferring the real time data to SLDC for its monitoring purpose. Further, four quadrant ABT compliant meter shall be installed on each wind turbine/solar projects. All the meters will be tested in NABL laboratory and duly sealed by DICOMS. Meters shall be installed in presence of DISCOM/GETCO at the time of commissioning the Wind/Solar project and sign on such documents. The meters shall be AMR compatible so that data can be fetched at GEDA, DISCOM and SLDC remotely.

b) For the purpose of commercial settlement and energy accounting, the metering point shall be at the receiving end sub-stations of GETCO. The injection of energy from wind/solar capacity shall be worked out separately at the receiving end sub-stations of GETCO on the basis of meter reading of common meter installed at receiving end sub-stations appropriately apportioned as per the respective meter reading (active and reactive) of wind and solar ABT (four quadrant) meters installed at respective wind and solar project separately.

c) In case of Type-A projects (Existing Projects), the metering/injection point shall continue to as per existing agreement with GETCO /DISCOM.

d) In case of Type-B Projects (New Projects) that are AC or DC integrated, the metering point shall be at the receiving end of the GETCO substation. Developer shall have to install the ABT (four quadrant) Main & Check meter at their own cost duly tested sealed and installed in presence of DISCOMs' representatives. Developer shall install such meters at receiving end of GETCO sub-station as well as at Wind and Solar PV System Installations in view of the different tariff and RPO. In case of common hybrid tariff and common RPO, a single meter as per above specification for both wind and solar system shall suffice.

e) For Type-A Projects (Existing Projects), both Wind and Solar PV Systems shall use separate set of internal electrical lines and equipment and connect to the pooling/sending-end substations of the Hybrid Projects. The projects shall be mandatorily metered separately. Developers shall have to install ABT (four quadrant) meters at Wind and Solar PV System Installation as well as receiving end of the GETCO substations at their own cost duly tested sealed and installed in presence of DISCOM.

f) Internal connectivity between solar and wind capacity prior to pooling/sending-end substation shall be allowed for Type B Projects (New Projects) once a common RPO and hybrid tariff are present. Energy metering and communication facility shall be provided by the project developer's hybrid power projects in accordance with the following Regulations/Codes/Orders and their subsequent amendments:

i. Central Electricity Authority (Installation and Operation of meters) Regulations 2014 and its subsequent amendments
ii. Gujarat Electricity Grid Code 2013 and its subsequent amendments
iii. GERC (Terms and Conditions of Intra-State Open Access) Regulations, 2011 and its subsequent amendments
iv. GERC Distribution Code 2004 and its subsequent amendments

For the purpose of energy accounting, all projects shall have to provide ABT compliant (four quadrant) meters at generators and if the power is to be wheeled to consumers' premises, then ABT cum Tariff compatible meter is to be installed at the consumers' premises also. GEDA/GETCO/DISCOMs shall ensure the energy accounting of Active and Reactive energy of the Wind/Solar and/or Hybrid for each consumer/customer. Energy Accounting be done by SLDC.

3.6 Wind- Solar Hybrid System & Power Evacuation:

Hybridization of Type-A Projects (Existing Projects):

Existing Wind power or Solar Power Projects Developers, willing to install Solar PV plant or Wind Turbine Generators respectively, at the existing location, shall be allowed to do so with following conditions:

i. The total power injection (combined wind and solar) into the grid shall not be more than the transmission capacity/grid connectivity allowed/sanctioned by GETCO for this purpose. In case, addition/augmentation in the existing evacuation system is required as per the system study undertaken by GETCO due to addition of Wind/Solar and Storage Capacity, if any, Developers shall undertake such addition/augmentation in the system up to the receiving end sub-station of GETCO at their own cost. However, the primary focus is to optimize the utilization of existing transmission infrastructure and technologies, and design approaches towards minimum augmentation is encouraged.

ii. The additional solar/wind power from the Hybrid Project may be allowed to wheel power for captive use or for sale of power to a third-party or sale to DISCOMs. For transmission and wheeling of power, the applicable charges and losses shall be as specified in this Order.

iii. The Developers shall approach GETCO for determining the transmission capacity available to evacuate the additional wind/ solar power or any augmentation that may be required. GETCO shall provide the relevant data with regards to the transmission capacity utilization on its existing network.

2. Type-B Projects (New Projects)

i. The Developers of Hybrid Projects shall establish the evacuation line at their own cost up to the receiving end sub-station of GETCO.

ii. The Developer has option for wheeling of wind and solar power for their captive use or third-party sale or sale of power to the DISCOMs. For transmission and wheeling of power, the applicable charges and losses shall be as specified in this Order.

iii. Hybrid Project Developer shall approach GETCO for evacuation system planning up to the receiving station.

For both Type-A and Type-B Hybrid Projects, the Developer shall ensure for capacity allocation/sanction of transmission capacity at least equal to installed capacity of wind or solar project, whichever is higher. In case, total injection of power from Hybrid Project exceeds such allocated/sanctioned transmission capacity shall be avoided/restricted by providing necessary protection system so that such incident may not affect real time grid management to grid operators. Further in the above case, such additional power

generated from allocated/sanctioned capacity shall be considered as inadvertent flow of power and shall not be considered for commercial settlement.

Wind-Solar and Storage, if any, Hybrid Power Generation System, or the Hybrid Project, means the system of combined generation of Wind and Solar Power and Storage, if any, at existing or new Solar/Wind Power Projects with storage capacity, if any, (or) collocated where injection of wind or solar power is at the interconnection point of the pooling sub-station of existing windfarms/ sending-end sub-station of existing solar power installations with or without energy storage system.

Under the scheme of Wind-Solar Hybrid Power Generation, Wind and Solar PV Systems shall be connected at the same interconnection point at pooling/sending-end sub-station. In order to achieve the benefits of hybrid plant in terms of optimal and efficient utilization of transmission infrastructure and better grid stability by reducing the variability in renewable power generation, it is desired that:

i. At the locations of having good wind power potential, the solar PV capacity to be added as the solar-hybrid component could be relatively smaller.
ii. Similarly, in case of the sites where the wind power density is relatively lower or moderate, the component of the solar PV capacity could be relatively on a higher side. Evacuation capacity for the purpose of connectivity and injection of power shall be worked out as follows:

A. for Type-A Projects (Existing Projects) where –

a. Open Access is already granted to the extent of rated capacity of transmission line/substation of GETCO and injection of power from additional wind/ solar capacity to be set up, is restricted up to already granted rated capacity of transmission line/ substation of GETCO. The same shall be allowed without applicability of transmission charges on such additional capacity. However, the transmission losses and wheeling charges/losses shall be made applicable to such capacity as applicable to any other solar or wind project as the case may be. In case total hybrid generation exceeds the transmission capacity limit, it shall be

considered as inadvertent injection of power for which no payment or credit shall be given or under any exigency which requires curtailment of generation, the generation from additional/new wind/ solar capacity shall be curtailed first.

b. There is capacity margin in the existing transmission system/ sub-station of GETCO after taking into account open access already granted to the existing wind/solar project or any augmentation and strengthening of transmission system after receiving-end sub-station is undertaken by GETCO for allocation/sanction of transmission capacity for allowing additional wind/ solar capacity, the transmission charges and losses, and wheeling charges and losses shall be applicable on such additional sanctioned/allocated capacity as applicable to any other Solar/ Wind Project as the case may be. However, if any augmentation in the existing transmission system is required due to addition of such solar/wind capacity, up to receiving end substation of GETCO, the same shall be undertaken by the Developers at its own cost.

B. For Type-B Projects (New Projects)

The Developer of Hybrid Project shall establish a dedicated line at its own cost for evacuation of power up to receiving end sub-station of GETCO as per system study undertaken by GETCO where the Project Developer desires to inject power in the State Grid. From there onwards, GETCO shall ensure transmission system and connectivity. Transmission charges shall be applicable on the basis of sanctioned/ allocated transmission capacity. However, Developer shall ensure that power injection shall never increase beyond sanctioned/allocated transmission capacity. In case total hybrid generation exceeds the transmission capacity limit, it shall be considered as inadvertent injection of power for which no payment or credit shall be given. Transmission charges and losses, and wheeling charges and losses shall be applicable as applicable to any other open access for wind and solar projects.

3.7 Operation and maintenance of dedicated lines

The Operation and Maintenance of dedicated evacuation line including the bays shall be carried out by the GETCO at the cost of Developer of Hybrid Projects as per applicable technical standards and best practices.

3.8 Transmission and Wheeling Charges:

Third Party Sale

a. In case of injection of the electricity at 66 KV level or above and drawal of electricity up to 66 KV level, the transmission of energy from the injection point to drawal place by paying transmission charges and losses determined by the Commission.

b. In case of injection of energy at 66 KV level and drawal of energy at 11 KV voltage level in such case, wheeling of Power for third party sale from Hybrid power projects shall be allowed on payment of transmission charges applicable on sanctioned/allocated transmission capacity, transmission losses on energy feed basis, wheeling charges and losses on the energy fed into grid as measured at receiving Sub-Station of GETCO, as applicable to normal open access consumer.

c. The Cross Subsidy Surcharge and Additional Surcharge, is applicable to the consumer, as per the provisions of the Green Energy Open Access Rules and its subsequent amendments thereto notified by Ministry of Power, Govt. of India read with GERC (Green Energy Open Access) Regulations and as amended from time to time.

Wheeling of power for Captive Use

a. In case of injection of energy is at or above 66 KV voltage level and drawal of such energy up to 66 KV voltage level in such case, normal transmission charges and losses shall be applicable.

b. In case of injection at 66 KV and drawl at 11 KV voltage level, wheeling of electricity generated from the Hybrid Project to desired location(s) within the State shall be allowed on payment of transmission charges and transmission losses as applicable to normal open access consumer and wheeling charges and distribution losses of the energy fed to the grid at the receiving end sub-station of GETCO, as applicable to normal Open Access Consumers.

Provided that the entity consuming energy generated from Hybrid project for captive consumption shall require to establish/prove on annual basis that the ownership in Captive Generating Plant and consumption of such energy shall fulfil the necessary conditions stipulated in Electricity Rules, 2005 with the Distribution licensee in whose area consumer consumed energy generated from hybrid power projects. Failure to fulfil the aforesaid two conditions, such captive consumption lose the status of captive plant and it shall be qualified as supply to third party by generator and the benefits granted to captive consumption shall be withdrawn for that Financial Year and it attracts the applicability of the Cross-Subsidy Surcharge and Additional Surcharge applicable to normal Open Access Consumer prevailing at relevant time as per this Order.

The captive consumers shall provide the details of ownership in the captive generating plant and generation as well as consumption of energy from captive generating plant to the distribution licensee in whose area of supply captive consumer is situated. The Distribution Licensee shall verify the status of the captive consumers on annual basis. In case of failure to the status of captive generating plant and captive use of energy by the consumer the action may be initiated as stated above.

Wheeling of power to more than one locations

Hybrid Project Developers, who desire to wheel electricity to more than one location for captive use/third-party sale, shall pay 5 paise per unit on energy fed in the grid as measured at receiving end sub-station of GETCO, to the concerned DISCOM in whose area power is consumed in addition to above mentioned transmission charges and losses, as applicable.

Provided that in all above cases, total injection of power from the Hybrid Project exceeds such allocated/sanctioned transmission capacity, such power shall be considered as inadvertent flow of power and shall not be considered for any commercial settlement.

3.9 Banking of Surplus Energy

Like Wind & Solar technology, as a promotional measure, the Commission endeavor to continue to extend the banking facility to Wind Solar and Storage, if any, Hybrid Power Projects set up under OA regime for captive transaction or third-party, transaction whatever may be the case. The settlement of energy from the hybrid projects shall be allowed on the billing cycle basis. The settlement of energy in case of

wind power projects set up under OA regime shall be allowed on peak and off-peak hours' basis.

As per Ministry of Power, Green Energy Open Access Rules 2022, banking is permitted on billing cycle basis on payment of charges to compensate additional cost, if any to the distribution licensee. Banking charges shall be applicable as per provisions under MoP's Green Energy Open Access Rules 2022 read with GERC Green Energy Open Access Regulations in force and as amended from time to time. Further, the permitted quantum of banked energy by the Green energy open access consumers shall be at least thirty percent of the total monthly consumption of the electricity from the distribution licensee by the consumer.

3.10 Energy Accounting:

Energy Accounting related provision as provided below shall be applicable to captive as well as third party open access transaction.

1) The project which are not registered under REC mechanism and availing banking facility, the energy accounting shall be carried out by energy injection worked out at the receiving end sub-station of GETCO, shall be set-off against the consumption during the consumers' billing cycle.

   i. For net import of power, DISCOM shall charge applicable tariff of respective category to the Consumer including fixed/ demand charge, energy charges, peak charge, other charges/ penalty etc. as applicable to other Consumers.

   ii. Surplus power available, after giving set-off, at the end of billing cycle shall not be entitled for any compensation.

   iii. No carry forward of surplus energy, if any, available at the end of billing cycle.

   iv. The surplus energy, if any, available at the end of billing cycle, is eligible for REC. The distribution licensees shall certify the same as per MoP Green Energy Open Access Rules 2022 and its subsequent amendments thereto.

   v. The consumers/project developers shall require to pay banking charges as specified in the Green Energy Open Access Rules notified by the Ministry of Power,

Government of India read with provisions of GERC (Green Energy Open Access) Rules in force and as amended from time to time.

vi. The consumer/project developers not desire to utilise the green energy attributes (RE) component for fulfilment of RPO, the distribution licensee shall have considered such consumed energy of the consumers as fulfilment of its different types of RPO based on such energy consumed.

vii. The consumer who utilise RE (Green Energy) component for fulfilment of its RPO percentage, in such case, consumption of RE (Green Energy) be qualified as fulfilment of RPO.

2) **Case 2 (b):** For hybrid projects registered under REC mechanism and supply power within the State, the Energy accounting shall be based on a 15-minute time block-basis.

   i. For net import of power, the DISCOM shall charge applicable tariff of respective category to the Consumer including fixed/ demand charge, energy charges, peak charge, time of use charges, other charges/ penalty, etc. as applicable to other Consumers as per tariff orders of the Commission.

   ii. Surplus power, after giving set off, shall not be eligible for any compensation.

3) **For Type-A Projects (Existing Projects),** the energy accounting for consumption of power for captive use / third party sale from existing wind/solar project shall be governed by existing Regulations / Orders / wheeling agreement. If these provisions are different, the above provisions shall be applicable only for wheeling of power from new/additional wind/solar capacity, as a part of Hybrid Projects.

3.11 Project registered under REC Mechanism:

a. Hybrid Projects availing open access for captive use/ third-party sale under REC mechanism shall be governed as per CERC REC Regulations.

b. Such projects shall be allowed to wheel the electricity on payment of applicable transmission charges/losses, wheeling charges/losses and other charges as applicable to other normal Open Access Consumers.

c. Cross Subsidy Surcharge and Additional Surcharge shall be applicable as applicable to normal Open Access Consumers.

3.12 Restrictions:

Second hand WTGs/ solar modules or other electrical and mechanical equipment shall not be eligible for installation under this Policy.

3.13 CDM Benefits:

It is proposed that the sharing of CDM benefits or any other benefit such as carbon credit or any other benefits under CDM or any other mechanism under any provision from any source providing such benefits to the Solar –Wind Hybrid Power Project for which it shall qualify to receive such benefit may apply to the concerned authority to avail / receive the benefit for the project. The benefits which shall be receivable or received shall be shared with the procurer of power and / or licensee as under:

(i) 100% of the gross proceeds on account of such CDM benefit or any other benefit such as carbon credit or any such benefit or any other mechanism from any source or agency to be retained by the project Developer in the first year after the date of commercial operation of the generating station.

(ii) In the second year, the share from above benefits of the Beneficiaries like power procurer/licensee shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the Generating Company and the Beneficiaries like power procurer/licensee."

(iii) In case of PPA signed under competitive bidding process, the sharing of benefits received by the Hybrid project shall be as per terms and conditions of bid documents read with the PPA.

3.14 Security Deposit:

a. The Hybrid Power Developer setting up project shall be required to provide Bank Guarantee @ ₹ 15 lakhs per MW to GETCO based on allotment of transmission

capacity and in case the Developer fails to commission the Hybrid capacity within the time period mentioned hereunder, GETCO shall encash the Bank Guarantee.

b. The Developer shall commission new Hybrid capacity at least 10% of the allotted capacity within one month of charging of evacuation line, failing which, the Developer shall be liable to pay long term transmission charges for 10% of allotted capacity till such 10% of allotted capacity is commissioned.

Security Deposit

Sr. No.	Hybrid Capacity in MW	Period for commissioning the entire evacuation line along with bays and metering system
1.	1 MW to 100 MW	1.5 years from date of allotment of transmission capacity
2.	101 MW to 200 MW	2 years from date of allotment of transmission capacity
3.	201 MW to 400 MW	2.5 years from date of allotment of transmission capacity
4.	401 MW to 600 MW	3.5 years from date of allotment of transmission capacity

Provided that with prior approval of the Commission, GETCO shall issue extension on case to case basis to the Developers if they fail to commission the entire evacuation line along with bays and metering system within the stipulated time period due to unforeseen reasons.

In case of State level bid, the Commission shall approve the bid / PPA documents when the same shall be submitted before Commission for approval. Long term transmission charges are applicable as decided by the Commission in the GETCO's tariff order, from time to time.

3.15 Procedure for Integration of Wind Solar Hybrid project and Battery Energy Storage to the grid

The Commission proposes that prior to commissioning and Integration of Wind-Solar and Storage if any, Hybrid Project shall be as per the following procedures and amendments made in it from time to time in this regard.

The generating station based on Wind-Solar and Storage if any, shall submit a certificate signed by the authorised signatory not below the rank of CMD or CEO or MD or Full Time Director to the concerned SLDC, GEDA and distribution licensees before declaration of SCOD, that the said generating station including main plant equipments such Wind Turbines or Solar inverters, Storage Systems or auxiliary Systems, as case may, has complied with all relevant provisions of CEA Technical Standards for Connectivity, CEA Technical Standards for Communications, CEA (Measures relating to Safety and Electricity Supply) Regulations, 2010 and Gujarat Grid Code.

GEDA shall ensure following compliance from the Wind Solar Hybrid Project developers before carrying out testing, commissioning activities and issuing the Commissioning Certificate to the hybrid project and failure to it the certificate, if any, issued is not valid.

i. Document Submission to SLDCs

The following documents shall be submitted to SLDC proposed date of commencement of first time charging activities

a) Connectivity Details: Connection Agreement and connectivity grant letter by STU,

b) Copy of Coordination Agreement with the Qualified coordinating Agency(QCA)/Lead/Principal Generator, if any

d) Copy of agreement(s) between HPPD and HPD, if any,

e) Technical Details- Below mentioned technical details to be submitted: -

i. Static Details: Details of wind solar Hybrid power plant, Static parameters for wind generating station and Static parameters for solar generating station has been provided as per the details provided below Table No – and Table No below:

Table 8: Static Data for Wind Generating Station

Sr. No	Particulars
1	Type
2	Manufacturer
3	Make

4	Model
5	Capacity
6	Commissioning date
7	Hub Height
8	Total Height
9	RPM Range
10	Rated Wind Speed
11	**Performance Parameter**
12	Rated Electrical power at rated wind speed
13	Cut in wind speed
14	Cut out wind speed
15	Survival speed (Max wind speed)
16	Ambient temp for out of operation
17	Ambient temp for in operation
18	Low Voltage ride through (LVRT)
19	High Voltage ride through (LVRT)
20	Lightning strength (KA & Coulombs)
21	Noise Power level (db)
22	**Rotor**
23	Hub type
24	Rotor Diameter
25	Number of blades
26	Area swept by blades
27	Rated Rotational speed
28	Rotational Direction
29	Coning Angle
30	Tilting Angle
31	Design Tip speed ratio
31a	Height f Hub with respect to mean sea level
32	**Blade**
33	Length
34	Diameter
35	Material
36	Twist Angle
37	**Generator**
38	Generator type
39	Generator number of poles
40	Generator speed
41	Winding type
42	Rated Generation Voltage
43	Rated Gen frequency

44	Gen Current
45	Rated temp of generator
46	Generator cooling
47	Generator Power Factor
48	KW/MW @rated wind speed
49	KW/MW @ peak continuous
50	Frequency controller
51	Transformer
52	Transformer capacity
53	Transformer cooling type
54	Voltage
55	Winding configuration
56	**Weight**
57	Rotor Weight
58	Tower Weight
59	Nacelle Weight
60	Over speed protection
61	Design life
62	Design standard
63	Latitude
64	Longitude
65	CoD details
66	Distance above mean sea level /Height of installation with respect to mean sea level

Table 9: Static Data for Solar Generating Station

Sr. No	Particulars
1	Latitude
2	Longitude
3	Power Curve
4	Elevation and orientation angle of Arrays
5	Generation capacity of generating facility
6	Distance above mean sea level
7	CoD details
8	Rated voltage
9	Details of type of mounting (tracking , single axis, double axis , auto/manual)
10	Manufacturer and model (imp component such as panel, inverter, cable, solar panel , transformer etc
11	D C installed capacity
12	Module cell technology

13	I-V Characteristics of module
14	Inverter rating at different temp
15	Inverter efficiency curve
16	Transformer capacity & rating

It is also necessary that the Solar-Wind and Storage, if any, Hybrid Power Project connectivity with grid/commissioning of plant shall allowed by GEDA/DISCOMs/GETCO representative by verifying that such RE generators must be complied with CEA's Connectivity Standard Regulations and it shall be recorded in commissioning certificate during the inspection and commissioning activities.

3.16 Commissioning the Hybrid Project:

After following the procedure of integration of Hybrid Project with grid the commissioning of Hybrid Projects be followed. "Commissioning" with respect to the Hybrid project shall be certified by the GEDA in presence of GETCO and distribution licensee representative. GEDA should ensure that all equipment as per MNRE approved list of Solar panel manufacturers and WTG manufacturers of rated capacity and as per Indian Standards on Renewable Energy notified by BIS has been installed and energy has flown into the grid and recorded in the energy meters installed at project site and witnessing of such generation of electricity by representative authorised by DISCOM/GETCO. GEDA shall co-ordinate with DISCOMs/GETCO for fixing date of commissioning of plant and visit and decide the same. The representatives of GEDA, GETCO and distribution licensees shall sign on the commissioning of project. Non-signing of documents of commissioning of Hybrid Projects by any of the representative of above entity is not qualify for commissioning of the project. The commissioning certificate consists of the details of the Wind Turbine and Solar modules and inverter details. Moreover, GEDA shall also ensure about the solar modules, details of RFID, modules.

Further, it shall also ensure that generation data from the hybrid project shall also transferred in the real time basis through RTU to SLDC".

GERC presents this discussion paper to initiate the regulatory process for determination of tariff framework for Procurement of Power by the distribution licensees and others from Wind-Solar and Storage if any, Hybrid Power Project for State of Gujarat for the next control period starting from 20.06.2023 after considering comments received from stakeholders.

GERC invites comments from potential stakeholders on the above discussion paper. Stakeholders may offer their views / objections / suggestions as per the procedures prescribed in the GERC (Conduct of Business) Regulations, 2004 on or before 03.07.2023.

Public hearing in this regard shall be on 10.07.2023 at 11.30 a.m. in the Commission's Office. Stakeholders either in person or through their authorized representative may remain present.

Sd/-
[Roopwant Singh, IAS]
Secretary
Gujarat Electricity Regulatory Commission
Gandhinagar, Gujarat

Place: Gandhinagar
Date: 17.06.2023