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Green Hydrogen: A Path Towards Sustainable Industrial Revolution in Gujarat

Introduction

Hydrogen is produced through electrolysis process, using either conventional or non-conventional sources of energy. In the process, water molecules are split into hydrogen and oxygen, and the hydrogen gas is compressed, stored, and transported for various applications. Green Hydrogen i.e., generating hydrogen using non-conventional sources of energy such as wind and solar, can lead to a significant reduction in carbon emissions compared to fossil fuel-based hydrogen production.

Gujarat and Green Hydrogen

Gujarat aims to revolutionize its industrial sector and reduce carbon emissions by promoting the production of green hydrogen. Gujarat has introduced a policy, namely, ***"Policy-2023 for leasing the government fallow land for green hydrogen production using non-conventional energy sources such as solar, wind, wind solar hybrid energy"*** to promote the manufacturing of green hydrogen and optimize the use of land in the state for that purpose. The government through the policy aims to encourages the development of solar, wind, and wind-solar hybrid projects to produce green hydrogen, and includes provisions to lease government fallow land for these projects. The policy incentivizes the establishment of green hydrogen manufacturing units, promotes new technologies, and generates employment opportunities.

The Policy Requirements

- **Application and Allotment of Land:** Companies interested in green hydrogen production can apply for land allotment from the government through a lease contract. An expert committee shall verify the applications. Subleasing of the allotted land is not permitted, and companies must meet the proposed green hydrogen production targets in their applications. Annual rent and security deposit requirements are defined, ensuring the commitment of applicants towards their projects.

Deemed Non-Agricultural Status: To expedite implementation of renewable energy projects, including green hydrogen, Gujarat has announced to provide deemed non-agricultural certificates. This eliminates the need for companies to convert agricultural land to non-agricultural status, streamlining the process of land clearance for green hydrogen projects.

Qualifications for Companies: Companies applying for land allotment must meet specific qualifications. They should have the capacity to generate a minimum of 1 lakh metric tonnes of green hydrogen and prior experience in producing 500 MW of renewable energy.

Rent and Lease Period: The annual rent for the leased land is fixed, subject to escalations every three years. The lease period shall be of 40 years, and the land can only be used for green hydrogen production. Companies are to be responsible for all project-related expenses, including infrastructure development. Failure to achieve the proposed green hydrogen production targets may result in the forfeiture of additional land.

Responsibilities of the Applicant: Applicants are responsible for financing, developing, operating, and maintaining the green hydrogen plant. They are also required to establish infrastructure leading to transmission utility substations. The project must be finalized within a span of eight years, adhering to specific predetermined production milestones to be achieved. Surplus electricity generated can be supplied outside the project after obtaining the government's permission.

Conclusion

The adoption of green hydrogen in Gujarat holds immense potential to transform the industrial sector and contribute to a cleaner and more sustainable environment. The state's policies, land leasing initiatives, and collaborations with major corporations demonstrate its commitment to promote green hydrogen production. Now it is up to the private sector to tap into this green growth opportunity, fulfill their responsibilities if they choose to go for green hydrogen projects under the policy and work diligently towards achieving the proposed green hydrogen production targets, ensuring a successful transition towards a low-carbon future.

SERCs' Alignment with the GOAR for an Equitable Energy

The Ministry of Power, Government of India ("**MoP**"), issued a circular dated May 13, 2023 ("**Circular**") directing the State Electricity Regulatory Commissions ("**SERCs**") to take appropriate action for determination of Green Tariff in exercise of their powers under section 181 of the Electricity Act, 2003 ("**Act**"). The directives involve implementation of the Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022 ("**GOAR**") and alignment of Open Access Regulations of the SERCs in accordance with the GOAR.

GOAR aims to help India in its renewable energy programs as it facilitates the open access of green energy to the willing consumers. Rule 4(2)(C)(c) of the GOAR mandates the respective SERCs to determine separately the Green Tariff to be charged from the consumers. Additionally, the MoP via the Circular directed all SERCs to determine the Green Tariff as per the methodology provided in the GOAR and the Circular.

The GOAR read with the Circular mandates SERCs to determine Green Tariff based on the sum of Average Pooled Power Purchase Cost of the Renewable Energy ("**RE**"), Cross-Subsidy Charges ("**CSS**") (which shall not exceed 20% of Average Cost of Supply), and reasonable margin of 25 paisa.

Rule 4(2)(C)(c) of the GOAR is reproduced below:

> *"The tariff for the green energy shall be determined separately by the Appropriate Commission, which shall comprise of the average pooled power purchase cost of the renewable energy, cross-subsidy charges if any, and service charges covering the prudent cost of the distribution licensee for providing the green energy;"*

Paragraph 3 of the Circular is reproduced below:

"It has come to notice that only a few States have determined the Green Tariffs, however such tariffs had been set at a rate much higher than the Average Power Purchase Cost of renewable energy procured by the Discoms. It is imperative that for incentivizing more and more use of renewable energy, the tariffs strictly in accordance with said Rules.

In view of this position, it is clarified that in no case the Green Tariff should be higher than Average Power Purchase Cost of RE + Surcharge @ 20% of ACoS + (say) a reasonable margin of 25 paisa."

In so far as the state of Maharashtra is concerned, the SERC of the state viz., Maharashtra Electricity Regulatory Commission ("**MERC**") vide its order dated March 31, 2023 in Case No. 226 of 2022 ("**Tariff Order**") has determined the Green Tariff. The methodology adopted by MERC in the Tariff Order to determine the Green Tariff is distinct from the methodology adopted in the GOAR. While the GOAR mandates the determination of Green Tariff on the basis of average pooled power purchase cost of RE, the MERC has determined the Green Tariff on the basis of difference between the pooled power purchase cost of non-conventional and conventional sources of energy in its Tariff order based on its earlier order dated March 22, 2021 in Case No. 134 of 2020 ("**MERC Earlier Order**"). The MERC Earlier Order determined the Green Tariff which was payable in addition to the regular tariff. The relevant extract of the Tariff Order is reproduced below:

> *"7.15.5 The Commission determined Green Power Tariff for the consumers opting for meeting its 100% of power requirement through RE sources in the Case No. 134 of 2020 dated 22.03.2021, which is stipulated as Rs 0.66 per kWh as per the conditions and methodology specified under said Order. 7.15.6 On 6 June, 2022, Ministry of Power, GoI has notified Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022. The said rules mandate the State Commission to determine Green Power Tariff. The Commission has already determined the same vide its Order dated 22 March, 2021 as mentioned above.*
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> *7.15.7 Such Green Power Tariff would be in addition to regular tariff approved in MYT Order. The Commission observes that the concept of Green Tariff has been well appreciated by many stakeholders across state as it provides opportunity for consumers willing to meet their power requirement*

7.15.8 Besides, there have been several developments since introduction of concept including COVID pandemic situation, which also has bearing on renewable energy development in the country. Other market related developments such as introduction of GDAM/GTAM and REC multiplier etc. are still evolving. Under the circumstance, the Commission is of the considered view that any change in mechanism of Green Tariff is not desirable at this stage and the same should continue for remaining period of the 4th Control Period. Thus, the Commission hereby approves the Green Tariff of Rs 0.66/kWh to be applicable during remaining period of 4th Control Period (i.e. FY 2023- 24 and FY 2024-25).

7.15.9 However for ease of implementation and to comply with provisions of MoP Rules, the Commission stipulates following terms and conditions for levy of Green Power Tariff.

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7.15.9.6 The Consumer will have option to select the quantum of green power to be purchased in steps of 25% and going up to 100% of the consumption."

In MERC Earlier Order, as per the methodology explained above, MERC determined the Green Tariff of Rs. 0.66/kWh, which is over and above the normal tariff. The relevant extract of the MERC Earlier Order is reproduced below:

"17.8 Based on the above discussion and considering difficulties in stipulating Discom wise Green Tariff, the Commission by using its inherent regulatory powers rules that Green Power Tariff which would be uniform for all Distribution Licensees in the State is to be computed as difference between pooled power purchase cost of non-conventional and conventional sources of energy (only variable cost) for all Distribution Licensees in the State. While doing so, instead of computing year wise different tariff, uniform number for MYT control period is computed for providing certainty in rate. However, this approach may be reviewed at the time of MTR proceedings.

However, this approach may be reviewed at the time of MTR proceedings. Accordingly, computation of green power tariff is tabulated below:

Total	RE power Procurement for MYT Period			Non-RE power procurement (only variable) for MYT Period			Diff Bet RE & Non-RE power
	MU	Rs. Cr	Rs/ kWh	MU	Rs. Cr	Rs/ kWh	Rs/ kWh
MSEDCL	141772	57440	4.05	586029	146412	2.50	1.55
AEML-D	13295	4691	3.53	38206	15367	4.02	-0.49
BEST Undertaking	2949	940	3.19	22534	7938	3.58	-0.34
TPC-D	3927	1491	3.80	22377	8069	3.61	0.19
MBPPL	58	17	2.88	348	161	4.19	-1.31
GEPL	41	12	2.88	248	101	4.08	-1.20
KRC	35	10	2.89	190	76	4.02	-1.14
Total	162077	64600	3.99	669968	178125	2.66	1.33

17.9 Thus, as per methodology explained above Rs. 1.33/kWh could be Green Power Tariff. However, as this concept is being introduced for the first time and also considering the fact that Distribution Licensee would be able to use such power consumed by consumers towards fulfilment of its RPO target, certain benefit of the same needs to be passed on to concerned consumers. Hence, the Commission decides to levy only 50% of charge determined above i.e. 0.66/kWh as Green Power Tariff to the consumer opting for meeting its 100% of power requirement through RE sources. Such Green Power Tariff would be in addition to regular tariff approved in MYT Order.

> *17.10 All electricity consumers in the State have the option to source 100% RE power by additionally paying above stated Green Power Tariff."*

Further, with regards to Renewable Purchase Obligations ("**RPO**"), the MERC in MERC Earlier Order stated that where the consumer is not classified as obligated entity under RPO Regulations, it is deemed suitable to allocate the energy towards the RPO fulfillment of the Distribution Licensee. The relevant extract of the MERC Earlier Order is reproduced below:

> *"19.3 The Commission notes that vide its RPO-REC Regulations, 2019, it has set out an increasing trajectory for fulfilment of RPO compliance by the obligated entities. For complying with the same, it necessitates Distribution Lionesses to tie up various RE sources and as the trajectory isincreasing, Distribution Licensees would require MERC Order in Case No. 134 of 2020 Page 19 of 21 additional purchase of RE power. In view of that if the consumer is not an obligated entity under RPO Regulations, it would be appropriate to count that energy towards RPO fulfilment of Distribution Licensee which will reduce the additional cost of the utility for purchasing the same and ultimately benefit its consumers."*

The findings of MERC in the MERC Earlier Order regarding RPO was reiterated in the Tariff Order. The relevant extract of the Tariff Order is reproduced below:

> *"7.15.9.3 If the Obligated Entity wants to meet its RPO by requisitioning RE Power from the Distribution Licensee, then such entity shall pay additional Rs 0.50 /kWh for the Green Power Tariff i.e., the Obligated entity shall pay total Green Power Tariff of Rs 1.16/kWh. Since the obligated entity also has the option to meet RPO by purchasing REC and is currently being traded at Rs 1/kWh, the green tariff is proposed with slight premium to REC Price.*

> 7.15.9.5 If the consumer is not an obligated entity under RPO Regulations, then that energy shall be counted towards RPO fulfilment of Distribution Licensee."

The aforementioned analysis and directives of MERC in the MERC Earlier Order and the Tariff Order are in consonance of the rules specified under GOAR. The relevant extract of GOAR is reproduced below:

> "(f) The *green* energy purchased from distribution licensee or from Renewable Energy sources other than distribution licensee in excess of Renewable Purchase Obligation of obligated entity shall be counted towards Renewable Purchase Obligation compliance of the distribution licensee."

To conclude, it is imperative that all SERCs recognize the importance of harmonizing their practices with the GOAR and strive towards establishing an equitable environment for all participants involved in the energy sector. It is also crucial to ensure consistency in the application of Green Tariff and to avoid penalizing any party involved. The objective of promoting the use of renewable energy and supporting India's renewable energy programs can only be accomplished by adhering to the specified methodologies outlined in the GOAR. Such adherence will foster confidence among stakeholders, thereby encouraging greater participation in the adoption of renewable energy and attaining India's broader sustainability objectives.

Ministry of Power's Dual Incentive: ISTS Charge Waiver for Offshore Wind Projects and Green Hydrogen/ Ammonia Production Units

The Ministry of Power via notification dated May 29, 2023 (**"Notification"**) waived off the Inter-State Transmission (**"ISTS"**) charges for transmission of electricity by off-shore wind power projects and green hydrogen/ammonia production units in order to promote such projects/units.

As per the Notification, ISTS charges are being waived off for off shore wind power projects which are commissioned on or before December 31, 2023 for a period of 25 years starting from the date of commissioning of the projects. Prior to this Notification, all the wind projects were given such waiver but now the off-shore wind projects are placed separately and the waiver will be given upto June 30, 2032 with graded transmission charges thereafter.

The Notification prescribes the applicable ISTS charges for offshore wind power projects that will commission after December 31, 2032. The offshore wind power projects commissioned between January 1, 2033 and December 31, 2034 will be levied 25% of the applicable ISTS charges and those commissioned between January 1, 2034 and December 31, 2035 will be levied 50% of the applicable ISTS charges. The ISTS charges will be 75% of the applicable ISTS charges for those commissioned between January 1, 2035 to December 31, 2036 and 100% of the applicable ISTS charges for those commissioned after January 1, 2037.

Additionally, the Notification has also granted a waiver of ISTS charges on the green hydrogen/ammonia production units which are using renewable energy, pumped storage system or battery storage system or any other hybrid combination of such technologies, which are commissioned on or before December 31, 2023 for a period of 25 years starting from the date of commissioning of the projects.

The Notification prescribes the applicable ISTS charges for green hydrogen/ammonia production units that will commission after December 31, 2030. The offshore wind pow-

ISTS charges and those commissioned between January 1, 2032 and December 31, 2033 will be levied 50% of the applicable ISTS charges. The ISTS charges will be 75% of the applicable ISTS charges for those commissioned between January 1, 2034 to December 31, 2035 and 100% of the applicable ISTS charges for those commissioned after January 1, 2036.

Moreover, if green hydrogen/ammonia production units have contracted energy or consumption from an Energy Storage System Project/Scheme of at least 51% of their annual contracted energy or consumption as renewable energy, they shall be eligible for the exemption from the payment of ISTS charges.

If a project/unit is eligible for such waiver of ISTS charges based on its original date of commissioning, then such project/unit shall be eligible for waiver even in case when the commercial operational date is extended by the competent authority. This is necessary in order to give confidence to the investors who are making investment decision based on the present circumstances but the start of commercial operation might get extended due to reasons beyond their control.

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Warm Regards,

Dipali Sarvaiya Sheth

Founder

ETERNITY LEGAL
Advocates & Solicitor
Patent & Trademark Attorneys

D-226, Neelkanth Business Park,

Vidyavihar (West), Mumbai– 400086

Email: contact@eternitylegal.com Tel no.: +91 22 2515-9001

Website: www.eternitylegal.com