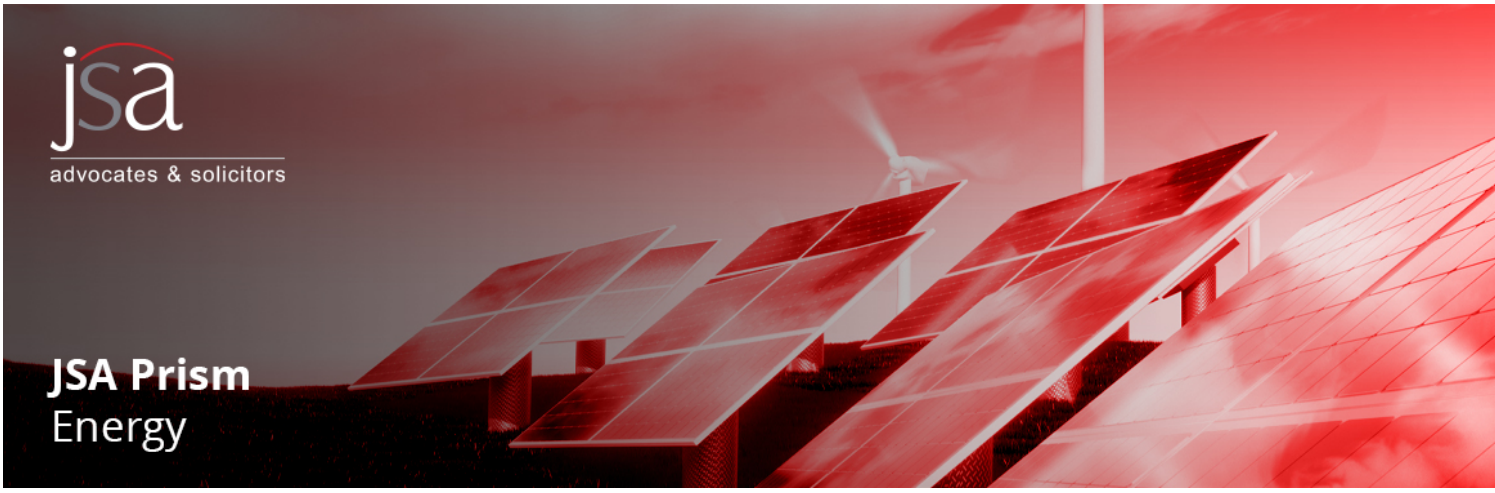

October 2024

Draft regulations for implementation of rooftop aero turbine with solar power plants

The Government of Karnataka ("**GoK**"), through its Karnataka Renewable Energy Policy 2022-2027 ("**Renewable Energy Policy**"), had committed to promoting and adopting new and emerging renewable technologies within the energy sector, including the integration of Rooftop Aero Turbines ("**RAT**") with Solar Power Plants ("**Solar Component**")[1].

RATs are small-scale wind energy systems designed for rooftop installation to generate electricity by harnessing wind power. These systems are particularly suited for urban and suburban environments, where wind speeds tend to be lower and more turbulent compared to open areas. RATs provide an efficient solution for residential power generation, either as standalone systems or in combination with solar energy[2].

In exercise of the powers conferred under the Electricity Act, 2003, the Karnataka Electricity Regulatory Commission ("**KERC**") has issued the Draft (Implementation of Rooftop Aero Turbines with Solar or Without Solar) Regulations, 2024 ("**Draft Regulations**"), to regulate and facilitate the implementation of RATs in Karnataka.

Conditions for Installation of RATs[3]

Eligible Consumers[4] ("**Consumers**") within the supply area of a Distribution Licensee ("**Distribution Licensee**") may install a RAT plant with or without accompanying Solar Component, subject to the following conditions:

1. **Installation of RAT with Solar Component**:

   a) the RAT's capacity must be at least 1 (one) kilo watts ("**kW**"); and

   b) the total installed capacity, including both RAT and the Solar Component, must not exceed 1.25 x (one point two-five times) the Consumer's sanctioned load.

   Provided that 1 (one) resource, either the RAT or the Solar Component may be installed up to 100% of the sanctioned load, while the other is capped at 25% of the sanctioned load.

   Illustration: For a Consumer with a sanctioned load of 10 (ten) kW, the Consumer may install either the RAT or Solar Component up to 10 (ten) kW, along with an additional 25% (i.e., 2.5 kW) of the alternate resource, resulting in a total installed capacity of 12.5 kW.

[1] Paragraph 5.2.10 (a) of the Karnataka Renewable Energy Policy, 2022-2027.
[2] Paragraph 3, Preamble, Draft Regulations.
[3] Regulation 4, Draft Regulations.
[4] The Term 'Eligible Consumer' has been defined to mean "*a consumer of electricity in the area of supply of a distribution licensee, who has installed or proposes to install RAT plant with solar or without solar for generation of electricity and supply to such distribution licensee on gross/net metering basis and who satisfies such other conditions as may be specified by the Commission for this purpose.*"

2. **Installation of RAT without Solar Component**: The RAT's capacity must be at least 1 (one) kW and must not exceed the Consumer's sanctioned load.

Procedure for implementation and reporting[5]

The distribution licensees are required to implement a transparent and standardised procedure for allowing Consumers to install and connect RAT plants with or without Solar Component ("**Plant**"), on a first-come, first-served basis.

Upon receiving an application for Plant installation, the Distribution Licensee are required to provide approval to the installation of the Plant based on a field report and technical feasibility, as per the timelines established by the KERC. Once approved, the Consumer is required to enter into a power purchase agreement ("**PPA**") with the Distribution Licensee.

The Consumer will be required to commission the Plant within 180 (one hundred and eighty) days from the PPA approval date. If the Plant is not commissioned within this period, the applicable tariff will be the lower of either:

1. the prevailing tariff at the time of commissioning; or
2. 90% of the agreed PPA tariff.

Every Distribution licensee is required to monitor the process of installation of the Plants by the Consumers, and submit quarterly reports to KERC in such formats, as may be specified by KERC.

Technical parameters[6]

The Draft Regulations require the Plant to comply with, *inter alia*, the following technical parameters:

1. **Interconnection with the Distribution System**: The Plant must connect at specific voltage levels based on the capacity, with costs borne by the Consumer up to the interconnection point. Plants under 150 (one hundred fifty) kW connect to the existing distribution transformer without exceeding 80% of its rated capacity, while those over 150 (one hundred fifty) connect to the existing 11 (eleven) kV distribution system and must ensure that the current does not exceed 80% of the line's rated capacity.
2. **Technical Standards**: The Plants must follow various technical and operational standards, including those set by KERC and Central Electricity Authority ("**CEA**").
3. **Safety Aspect**: Consumers are responsible for the safety of the Plant up to the interconnection point and are liable for any accidents caused by back-feeding. Distribution Licensees can disconnect the Plant in emergencies or if hazardous conditions arise, and all Plants must have anti-islanding protection and manual isolating switches.

Filing of application and proceedings for determination of tariff[7]

KERC will determine the generic tariff for Plants at the beginning of each control period. However, if significant changes in tariff parameters occur during a control period, the KERC may revise the tariffs either *suo motu* or based on review petitions filed before it.

Nevertheless, the Plants that have signed PPAs and are commissioned within a control period will maintain the generic tariff determined for that control period.

[5] Regulation 5, Draft Regulations.
[6] Regulation 6, Draft Regulations.
[7] Regulation 7, Draft Regulations.

Metering system[8]

The metering system for Plants must comply with the CEA (Installation and Operation of Meters) Regulations, 2006. For gross metering, a bi-directional (net) meter is required at the interconnection point, while for net metering, the existing meter is replaced by a bi-directional meter capable of downloading readings via meter reading instrument. The cost of new or additional meter is borne by the Consumer, and the meters must be jointly inspected and sealed by both the Consumer and the Distribution Licensee. For Consumers on a Time of Day (TOD) tariff, meters must record time-specific consumption and generation.

Energy accounting and settlement[9]

The Draft Regulations mandate that the meter readings must be taken on a monthly basis or according to the billing cycle set out in the electricity supply code.

1. **For gross metering**: The Distribution Licensee is required to display the amount of electricity exported by the Consumer during each billing period. If the event any import of energy is recorded in the bi-directional meter during a billing period, such imported energy will be charged at the higher of:
    a) the tariff agreed upon in the PPA; or
    b) the prevailing retail supply tariff applicable to the Consumer's category.
2. **For Net Metering**: The Distribution Licensee is required to display the amount of electricity injected by the Consumer, the amount of electricity supplied by the Distribution Licensee, and the net electricity billed for payment during each billing period. Further:
    a) if the electricity generated by the Plant exceeds the consumption of electricity by the Consumer during a billing period, the Distribution Licensee will be required to pay for the excess electricity at the PPA tariff rate; or
    b) if the electricity consumed by the Consumer exceeds the electricity generated by the Plant during a billing period, the Distribution Licensee will bill the Consumer for the net consumption at the tariff applicable to such Consumer.

Conclusion

The integration of RATs with or without solar, as envisioned in the Draft Regulations, signals a transformative shift in Karnataka's renewable energy strategy. By pioneering the regulation and deployment of RATs, the state not only bolsters urban energy resilience but also sets the stage for a broader decentralization of power generation. This regulatory framework enhances consumer participation in renewable energy adoption, empowering residential and commercial users alike to actively contribute to grid stability and sustainability. Furthermore, the potential combination of RATs with solar power systems exemplifies an innovative approach to overcoming the challenges posed by urban wind dynamics, effectively utilizing hybrid energy solutions to maximize efficiency and energy yield.

This initiative is poised to accelerate the adoption of cutting-edge renewable technologies, particularly in densely populated regions where space and resource constraints are prevalent. These Draft Regulations could serve as a model for other states across India to adopt, creating an ecosystem where RATs become a commonplace feature of rooftop infrastructure nationwide. Additionally, this move aligns with India's broader goals of reducing carbon emissions, diversifying its renewable energy mix, and advancing toward its international climate commitments. The successful implementation of this framework could inspire global cities and regions to integrate similar technologies.

[8] Regulation 9, Draft Regulations.
[9] Regulation 10, Draft Regulations.

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