

## Comments and Suggestions on draft Grid Interactive Rooftop Renewable Energy Generating Systems) (First Amendment) Regulations, 2023

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The Maharashtra Electricity Regulatory Commission (MERC) has proposed amendments to the Grid Interactive Rooftop Renewable Energy Systems Regulation, 2019 and the Distribution Open Access Regulations, 2016 to implement Central Government Rules to promote green energy, particularly, the Green Energy Open Access (GEOA) Rules, 2022 and the Electricity (Rights of Consumers) Rules.

In light of the Rights of Consumers Rules, the proposed amendments to the Grid Interactive Rooftop Renewable Energy Systems Regulations, 2019 (or the GIRRES Regulations) seek to define net billing and gross metering as per the Rights of Consumers Rules. Based on the definitions, procedures for gross metering implementation and modifications to the commercial arrangements for net billing are also specified.

In Case No.322 of 2019, to incentivize installation of RTPV, the MERC decided not to impose any Grid Support Charge on net-metering arrangement till cumulative installed capacity of RTPV in the State reaches 2000 MW. With rooftop capacity nearing 2 GW, it is unclear if Grid Support Surcharge will be levied on all existing as well as upcoming rooftop systems or only the new systems.

The GEOA Rules reduces the eligibility limit for open access to 100 kW and stipulates no load limitation on captive. This implies that grid interactive rooftop systems can avail open access and be treated as captive, which calls for greater clarity in the regulations.

Given the development of rooftop solar, green open access rules and metering technologies, it is important to consider whether an alternative framework would better suit future developments.

### **Need for a balanced framework**

The proposed amendments implies that a renewable energy system can be subject to different techno-commercial arrangements. As shown in Table 1, there is a need to consider the entire landscape of options to procure renewable from non-DISCOM sources and understand the services provided by the DISCOM. For consumers with load between 100kW and 1 MW, there seem to be multiple options to procure RE. However, for a large number of consumers with load between 100 kW and 1 MW, some arrangements are more concessional than others in accounting for balancing, banking and loss of cross subsidy revenue of the DISCOM. For example, if those with less than 1 MW load avail net metering, then most consumers would rather opt for net metering arrangements rather than onsite captive so as to avoid banking restrictions (restrictions on carry forward of surplus, drawal of power during peak slots) and still obtain banking services. However, if grid support charges were levied, consumers would register as captive as 8% in-kind banking charge is not reflective of the cost of banking services provided by the DISCOMs. Thus, it is likely that the arrangement chosen by consumers would be determined

by the concessional nature of the charges rather than techno-economic frameworks most suited for the requirements of the consumer. This could lead to disproportionate development and undue cost burden on DISCOMs, which ultimately has to be borne by regulated, mostly small consumers of DISCOM.

Table 1: Various arrangements for consumers to procure renewables from non-DISCOM sources in the proposed amendments to distribution open access as GIRRES regulations

Particulars	BTM (Behind the meter)	Captive	Open Access	Net Metering	Net Billing	Gross Metering
Arrangement	Consumer demand is met by generation from RE when possible. Drawal from grid at regulated tariffs when required. No injection of power in the grid	Consumer has full or partial ownership of plant. Can be onsite or offsite, can avail access to T&D network for wheeling in case of offsite.	Third party contracts from generators, purchase from traders, power exchanges etc.	Consumption from onsite renewable capacity set off against generation for billing period. Surplus injected during the billing period is carried forward to next cycle. Credited units is adjusted at the end of the year.	Drawal from DISCOM billed at approved tariff and injection of surplus from onsite renewable capacity is purchased by DISCOM at pre-determined rate.	Energy generated by onsite renewable capacity is purchased by DISCOM at pre-determined rate. Energy consumed by prosumer is billed at grid tariff.
Metering requirement	As per supply code for category	Special Energy Meter		AMI, Net meter, check meter		
Limitation on sizing of RE system	Shall not exceed Contract/Sanctioned load of consumer	No limitation, subject to load flow studies		RE system shall not exceed Contract demand or Sanctioned load of consumer		No Limitation
Eligibility based on Contract demand	None	None	100 kW and above	1 MW and below	None	None
Banking service	No	Yes, Monthly banking. Restriction on drawal during peak slots, 8% in kind banking charge, No carry-forward of surplus		Yes, Service akin to monthly banking with carry forward of surplus. No restrictions on drawal during peak slots, grid	Service akin to monthly banking within ToD slot with no carry forward of surplus. No charges.	None

Charges levied (CSS, AS, GSC, AFC)	Additional fixed charge (AFC) levied.	None	Cross subsidy and Additional surcharge	Grid Support Charge levied (less than 10 kW load exempt)	None	None
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## Principles of a balanced framework

A balanced framework for grid interactive systems should be forward looking and promote long-term development. It should provide clarity and certainty to consumers and focus on compensation of costs incurred by the DISCOM especially for loss of revenue, provision of banking, balancing etc. In this context, such a framework should:

- Ensure that smaller consumers with limited requirements are not unduly burdened
- Be cost-effective, in terms of metering and implementation costs
- Encourage self-consumption and load balancing by incentivising alignment of demand with generation profile
- Have separate frameworks (especially for scheduling, metering and energy accounting) for consumers connected at the HT and LT network.
- Harmonise processes, practices, grid services provided and charges across the GIRRES regulations and the GEOA regulations
- Compensate DISCOM adequately for banking, grid balancing services but also in order to meet universal service obligation to consumers availing power from multiple sources.

The framework should evolve through deliberations, understanding current developments and costs to the DISCOM for various services. Till such a framework evolves, it is suggested that grid support charges are levied on all net metering and net billing consumers for the next three years or till the cumulative capacity reaches 3 GW, whichever is earlier. By then a comprehensive framework based on the principles above should be operationalised. Such an indicative framework is detailed below:

## Proposed Framework

Separate frameworks of charges, application procedures, metering for consumers need to evolve based on their contract demand as well as based on whether they are opting for open access, captive, net billing and the duration of the contracts.

### Separate frameworks for HT and LT consumers

With implementation of GEOA rules, many LT consumers can be captive. Thus, in addition to onsite consumption, LT consumers also have choice for offsite generation of RE. Further, to ensure energy accounting, it is crucial that:

- **Green Open Access is limited to HT consumers:** Given the metering, energy accounting and scheduling requirements, it is suggested that green open access be limited to HT consumers. Most 100 kW and above consumers are in any case connected to the HT network. This will

also help address operational issues, especially with respect to DSM, procurement from power exchanges and address implementation challenges before LT network rollout.

- **Captive consumers on LT network:** As there is no eligibility limit as per the Green Open Access Rules, all grid interactive rooftop systems (if owned by the consumer) can qualify as onsite captive. In addition, LT captive consumers can also be offsite. Specific arrangements are required for banking, grid balancing and energy accounting in order to provide captive prosumers within the LT network. These services also need to be charged to compensate DISCOMs. The charges and commercial arrangements, especially for offsite captive, are outlined in the framework.
- **Framework for net billing and banking to be different for HT and LT consumers:** Energy accounting to operationalize net billing and banking for LT consumers can be on a ToD slot-wise basis for LT consumers. However, as HT consumers have AMI meters, energy accounting can at least be on a 30 minute basis. Further 1 MW and above consumers can have energy accounting for each 15 minute block. This variation in energy accounting can help develop different frameworks for banking and net billing as detailed in the following section.

### **Applicable charges in proposed framework for various services provided by the DISCOM**

To ensure adequate pricing and compensation of services, the following charges are to be levied on applicable consumers. The applicability of these charges and the methodology for calculation would vary depending on metering capability.

- **Banking charges:** If significant banking service is provided, banking charges, where feasible, is proposed to be levied as a percentage of energy banked. Levying the charge on energy banked rather than energy generated, wheeled or consumed incentivizes generation and load balancing at consumer end. Where, metering infrastructure is not capable of providing data on actual energy banked on an hourly basis, banking charges can be levied on non-DISCOM energy consumed (i.e.-energy generated net of wheeling loss, if applicable).
- **Service Obligation Charges:** To compensate DISCOM for loss of revenue/ cross subsidy, grid support and services rendered by DISCOM related to being supplier of last resort. This is to be levied on a per kW basis on contracted renewable energy capacity by the captive, net billing and net metering consumer. Open Access consumers are exempt from paying this charge due levy of cross subsidy surcharge and additional surcharge.
- **Time of Day (ToD) tariffs:** Currently, most consumers with load greater than 20 kW are subject to time of day tariffs. Further, the Commission should notify ToD tariffs for all consumers with load > 10 kW with RTPV systems. It is suggested that consumers with grid interactive RE systems need to adopt ToD tariff and their meters are should be capable of ToD slot-wise energy accounting under the regulations. Without such meters, consumers should not be allowed to avail net billing, banking services.

- **Supplementary fixed charges for RE capacity in excess of contract demand:** The GIRRES regulations require that consumers restrict their onsite contracted RE capacity to their contract demand. However, as captive consumers, offsite RE generation is also possible for consumers with load less than 1 MW. It is suggested consumers be allowed to deploy RE capacity exceeding their contract demand, subject to load flow studies, as long they pay supplementary fixed charges (on a per kW basis) levied on every kW in excess of the contract demand.
- **Cross subsidy surcharge and Additional Surcharge:** Applicable on a per unit basis on open access consumers connected to the HT network. Comments and suggestions related to these charges are discussed in the submission on GEOA regulations appended here in Annexure-1.
- **Wheeling charge:** Applicable on off-site generation as per MERC regulations.

With clear delineation of banking and service obligation charges, the grid support charge levied on all energy generated by net metering systems in the existing framework is not necessary.

### Proposal for net metering, net billing and banking

It is proposed that:

- **Net metering** is restricted to consumers with sanctioned load less than 10 kW.
- LT and HT Consumers with load > 10 kW, whether onsite or off-site, can chose between **net billing and banking arrangements**.
- Banking service is provided on a ToD slot-wise basis subject to applicable banking charges. However, the applicability of charges will vary based on metering arrangement such that:
  - LT consumers with load > 10 kW are subject to monthly banking with banking charged levied in kind as a percentage of non-DISCOM consumption (energy generated net of wheeling loss).
  - HT consumers with better metering infrastructure are subject to monthly banking with banking charged levied in kind as a percentage of energy banked.
- For net billing and banking arrangements the generation and consumption should be accounted for on:
  - ToD slot-wise basis for LT consumers.
  - 30 minute for HT consumers contract demand less than 1 MW.
  - 15 minute for HT consumers with contract demand greater than 1 MW.

### Net metering (for consumers with load less than 10 kW)

As per the Explanatory Memorandum of the proposed amendment to the GIRRES regulations, between FY19 and FY23, rooftop solar capacity under the net metering arrangement has grown from 298 MW to 1425 MW. This accounts for about 13% of the total RTPV systems in India. About 67,000 consumers have availed this arrangement since FY19. On average, the contract demand per consumer availing net metering service is about 17 to 20 kW. Currently, net metering is a concessional arrangement (especially for balancing and banking services) as consumers are able to offset variable renewable energy generated from their systems with

DISCOM power at any time. Such a concession should be given to consumers with onsite RE systems having connected load less than 10 kW who are not currently within the ambit of ToD tariffs. **With renewable energy costs reducing rapidly and scale of deployment increasing significantly, RE sources need to stand on its own proposition, and hence, such concessional services should be targeted only to smaller consumers.** However, to compensate DISCOM for standby and other services provided and for loss of cross subsidy, consumers should pay a monthly **service obligation charge** (of say, Rs. 250 per kW of Rooftop RE capacity). In addition, carry-forward of surplus should not be allowed such that offset is restricted to the billing cycle alone.

### Choice between net billing and banking for LT consumers with contract demand > 10 kW

- LT consumers with load greater than 10 kW should be given a choice to avail either of the option of net billing or banking on a ToD slot-wise basis:
  - **ToD slot-wise net billing:** Drawal from the DISCOM is charged at applicable grid tariff along with ToD tariffs. Injection is purchased at a pre-determined rate to be declared at the beginning of the financial year and could be in line with recently discovered RE tariff for respective technologies. Both injection and drawal are noted on a ToD slot-wise basis and commercial settlement takes place on a monthly basis.
  - **ToD slot-wise banking:** Under this option, surplus power can be banked by the consumer as long as drawal of the power is within the same ToD slot in the month. Consumer pays a banking charge of 8% (in kind) of non-DISCOM energy consumed. If renewable energy capacity is available at Rs.4 per unit, the banking charges for onsite capacity would translate to Rs.0.32 per unit of energy generated.
- All consumers (including captive) availing either of the option must pay **service obligation charge** (of say, Rs. 250/kW of contracted RE capacity).
- All energy accounting takes place on a ToD slot-wise basis. Thus, banking and net billing service is on a ToD slot-wise basis.
- In case of offsite renewable, consumer can contract capacity in excess of contract demand subject to a limit of 50% of the contract capacity and after payment of supplementary fixed charges (levied on a Rs./kW basis on capacity contracted in excess of contract demand)

### Choice between net billing or banking with 30 or 15 minute energy accounting for HT consumers

- For HT consumers with contract demand less than 1 MW:
  - Energy generation and consumption should be accounted for on a half hourly basis. All HT consumers have AMR meters with capability of recording data every 30 minutes. With improvements in metering technology, energy accounting can take place on a 15 minute basis over time.
  - **For net billing arrangement:** Drawal from the DISCOM is charged at applicable grid tariff along with ToD tariffs for each 30 minute slot. Injection is purchased at a pre-determined rate to be declared at the beginning of the financial year and could be in

- line with recently discovered RE tariff for respective technologies. Both injection and drawal are noted every 30 minutes.
- **For banking arrangement:** Energy generation and consumption to be noted every 30 minutes to arrive at the quantum of energy banked. Banking to be allowed on a monthly basis with injection and drawal restricted to ToD slots. Banking charge would be at 20% (in kind) of energy banked. If 30% of energy is banked in a year, this translates to about Rs. 0.25 to 0.30 per unit of non-DISCOM consumption. This is comparable to the charge levied on LT consumers. However, with increase in quantum of energy banked, DISCOM compensation will increase.
  - For HT consumers with contract demand greater than 1 MW:
    - Energy generation and consumption should be accounted on a 15 minute basis as consumers are to have special energy meters (SEM).
    - **For net billing arrangement:** Drawal from the DISCOM is charged at applicable grid tariff along with ToD tariffs for each 15 minute block. Injection is purchased at a pre-determined rate to be declared at the beginning of the financial year and could be in line with recently discovered RE tariff for respective technologies. Both injection and drawal are noted every 15 minutes.
    - **For banking arrangement:** Energy generation and consumption to be noted every 15 minutes to arrive at the quantum of energy banked. Banking to be allowed on a monthly basis with injection and drawal restricted to ToD slots. Banking charge would be at 20% (in kind) of energy banked.
  - All consumers (including captive) availing either of the option must pay **service obligation charge** (of say, Rs. 250/kW of contracted RE capacity).
  - In case of offsite renewable, consumer can contract capacity in excess of contract demand subject to a limit of 50% of the contract capacity and after payment of supplementary fixed charges (levied on a Rs./kW basis on capacity contracted in excess of contract demand)

### Framework Development and Progress monitoring

The Grid Interactive Renewable Energy related developments in Maharashtra are rapidly evolving given increasing investments, rise in DISCOM tariffs and the implementation of the green open access rules. It is vital that:

- Wide Stakeholder and public consultations are held to understand challenges before the DISCOM, consumers and renewable energy developers.
- A new balanced framework where banking and grid balancing services are provided at cost and where DISCOMs are compensated for loss of CSS is implemented before cumulative capacity of grid interactive RE reaches 3 GW
- Developments in rooftop space be studied and reported along with open access and captive. Agreements with consumers, applications procedures, data formats need to be streamlined and revised to account for various models and to gain a complete picture.

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