

Comments/Suggestions on the MERC’s draft “Maharashtra Electricity Regulatory Commission (Grid Interactive Rooftop Renewable Energy Generating Systems) Regulations, 2019”, by Prayas (Energy Group), Pune.

We welcome the publication of this draft regulation on Grid Interactive Rooftop Renewable Energy Generating Systems. There was a long felt need to make various changes in the existing net-metering regulations to make them more balanced for all stakeholders but which would also support the growth of the rooftop solar sector. Rooftop solar systems are akin to captive systems or long-term OA contracts and hence need long term regulatory certainty if such investments are to see the light of day. Rooftop solar systems offer several societal and sectoral benefits, namely

- Reduction in transmission and distribution losses
- No need for land for projects
- Distributed small investments from a new pool of investors/prosumers
- Higher level of distributed jobs in Engineering Procurement and Construction (EPC) and Operation and Maintenance (O&M), much more than those created for large scale solar projects.
- Enabling consumers to have full or part control of their electricity consumption/generation which can in turn can act as a driver for energy efficiency/conservation.

Our submission has two parts, the first of which looks at the net-metering framework critically. We propose that the Commission should continue to allow the choice of net-metering or net-billing to the consumer. However, we also suggest several changes in the net-metering framework to make it conducive for more equitable risk sharing going ahead. Our detailed comments on the specific sections of the draft regulations are elaborated in part two of the submission.

To begin with, given the importance of these regulations and the long lasting implications for consumers, we urge to Commission to hold a public hearing on these draft regulations before they are finalised.

Part 1: Net-Metering Framework

1. The Explanatory Memorandum (EM) notes on pp. 4 that, *‘As stated earlier, while formulating the draft Grid Connected RRE Regulations, 2019, the Commission has been guided by the FOR Model Regulations, 2019, relevant Regulations of this Commission and other SERCs, etc., as well as Petitions filed by different entities seeking modifications in the MERC Net Metering Regulations, 2015.*

The Commission while formulating draft MERC Grid Connected RRE Regulations, 2019, has endeavoured to balance the interest of consumers and Distribution Licensees.’

Further, the EM quotes a November, 2018 FoR meeting as follows,

The FOR, in its Meeting held on 13 November, 2018, has deliberated the Model Regulations / Report and recommended as follows:

“After deliberations, the Forum endorsed the Model Regulations and Report subject to the following modifications in the Report and Regulations:

a. Focus should be on Roof Top installations and their treatment.

b. Net billing concept will be adopted for the Roof top.

c. The treatment of Distributed Energy Resources (other than rooftop) should be studied further and presented to the FOR.”

Thus, FoR has recommended to change the existing Net Metering system to Net Billing system for all categories.

Our understanding of the FoR meeting minutes is that while it mentions that net-billing should be adopted for rooftop, it does not mention that it shall be done for all categories and that net-metering shall cease to exist. The FoR model guidelines clearly allow for the consumer to have the choice in terms of net-metering or net-billing.

*‘Any consumer in the area of the distribution licensee shall be eligible to establish [distributed renewable energy] systems **under net metering or net billing arrangement** on a first-come-first-serve basis, subject to the technical limitations as outlined in these Regulations and shall be called Prosumer.’ (Source - <http://www.forumofregulators.gov.in/Data/Reports/DMR-for-GIDRES-08-05-19.pdf>, pp. 9)*

We agree with the FoR recommendation of allowing consumers choice over the energy accounting method. Further, we find that while consumers would mainly want a rooftop solar system to save on their electricity bill and for sustainability considerations, there is also the aspect of having full or part control of their electricity consumption / generation. Hence most consumers are not looking at rooftop solar merely as a generator whose entire electricity can be sold to the DISCOM (net-billing), but more so as an option which allows them more control and choice over their electricity consumption.

Finally, one of the important consideration for the Commission in proposing new RPO targets, as outlined in the draft RPO regulations was their *‘Suitability/compatibility with State Load Curve’*. Considering the afternoon peaking system in Maharashtra, the Commission has rightly committed to a sharp increase in the solar RPO whose generation profile has a high capacity value for the Maharashtra load. Similarly, rooftop solar can also significantly contribute to meeting peak afternoon demand in Maharashtra and hence needs an encouraging regulatory framework.

Considering all these aspects, we suggest that net-metering as a concept, with appropriate modifications as necessary should continue as a choice for all consumers in Maharashtra.

2. In continuation with above point of allowing the consumer the choice over net-metering or net-billing, we propose that section 4 should be modified as,

Section 4, General Conditions of Net Metering Arrangement and Net Billing Arrangement

4.1 Net Metering Arrangement or Net Billing Arrangement, as the case may be, shall be permitted by the Distribution Licensee on a non-discriminatory and Distribution Transformer-wise or feeder wise 'first come, first serve' basis to Eligible Consumers who have installed or intend to install a Renewable Energy Generating System connected to the Network of such Distribution Licensee:

Provided that the inter-connection of such System with the Network of the Distribution Licensee is undertaken in accordance with the standards and norms specified in the Central Electricity Authority (CEA) (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013 or as may be specified in future.

4.2 The Eligible Consumer may set up the Renewable Energy Generating System under the Net Metering or Net Billing Arrangement as per their choice.

3. PART C - COMMERCIAL ARRANGEMENTS

The existing net-metering framework essentially allows energy banking without any restriction at no cost for the consumer. The consumer uses the grid as a virtual bank by banking excess generation and un-banking the same as needed throughout the year, thereby saving on the cost and efficiency loss from the use of a battery system. There is a cost to the energy banking service since the price of electricity varies throughout the day and across the year as well, corresponding to demand patterns, weather, generation availability etc. The cost of this energy banking as well as providing reliability is borne by the DISCOM (i.e. the non-rooftop solar consumers). This essentially disassociates any need for the rooftop solar consumer to match the solar generation to their demand profile. A preliminary analysis of comparing rooftop solar generation and load profiles for residential consumers to understand the level of instantaneous solar consumption and banking is provided in Annexure 1.

Hence there is a need for a more balanced net-metering approach going forward. This would involve valuing the service of energy banking appropriately and having the consumers to at least partly bear the cost of reliability and future uncertainty.

Firstly, we suggest that any consumer category should be able to choose between net-metering and net-billing arrangements. Hence the Commission should do away with the distinction that non-residential consumers should only be able to avail net-billing.

Secondly, with regard to net-metering, we feel that the 300 kWh limit is too onerous and restrictive and should be relaxed. The IT systems needed for separately accounting for the 300 kWh limit for thousands of individual residential consumers can become too onerous for the DISCOM and increase transaction costs.

Further, as per Part — D (Net Metering and Net Billing Arrangement), section 10 of the model FoR regulations,

10. ii. Individual project capacity

a) The capacity of PDRES shall not exceed the sanctioned load/contract demand of the prosumer.

Provided further that minimum size of renewable energy system that can be set up under net metering and net-billing arrangement would be 1 kW and 10kW respectively.

Hence the FoR has recommended a minimum size of 10 kW for net-billing implying that all systems smaller than 10 kW would only avail net-metering. MNRE is also providing capital subsidies for only smaller residential consumers up to 10 kW above which no subsidies are available. Both these clearly suggest the need for strongly supporting small rooftop solar systems.

Considering all these issues and the need to support smaller rooftop systems, we suggest that net-metering be allowed for any class of consumers with a limit of 10 kW (in case of solar PV) or 1200 kWh¹/month (for all non-solar renewable energy systems).

For projects up to 10 kW solar PV or with a set-off limit of 1200 kWh/month

- a) The only proposed change is that excess banked energy at the end of the yearly settlement period will be purchased by DISCOM at generic tariff applicable for that year and not at the 'Average Cost of Power Purchase as approved by the Commission for that year'.

For renewable energy systems > 10 kW, a modified version of net-metering as detailed below could be adopted.

For solar PV projects > 10 kW but up to 100 kW or for other RE projects with a set-off limit of 12,000 kWh/month

- a) Maximum monthly energy allowed for set-off against consumption or for banking: 12,000 kWh/month.
- b) Banked Energy: Banking could be allowed in a manner which is similar to that allowed for Open Access as per the '*Maharashtra Electricity Regulatory Commission (Distribution Open Access) (First Amendment) Regulations, 2019*'. Hence,
*'Banking of energy shall be permitted only on monthly basis.
Provided that the credit for banked energy shall not be permitted to be carried forward to subsequent months and the credit for energy banked during the month shall be adjusted during the same month as per the energy injected in the respective Time of Day ('TOD') slots determined by the Commission in its Orders determining the Tariffs of the Distribution Licensees;
Provided further that the energy banked during peak TOD slots may also be drawn during off-peak TOD slots, but the energy banked during off-peak TOD slots may not be drawn during peak TOD slots.
Illustration: Energy banked during:*
 - *Night off-peak TOD slot (2200 hrs – 0600 hrs) may only be drawn in the same TOD slot*

¹ 10 kW solar PV with a 17% CUF would generate ~ 1241 kWh/month

- *Off-peak TOD slot (0600 hrs – 0900 hrs & 1200 hrs – 1800 hrs) may be drawn in the same TOD slot and also during Night off-peak TOD slot (However, the energy banked during night off-peak and off peak shall not be drawn during morning peak and evening peak)*
- *Morning peak TOD slot (0900 hrs – 1200 hrs) may be drawn in the same TOD slot and also during Off-peak and Night off-peak TOD slots*
- *Evening peak TOD slot (1800 hrs – 2200 hrs) may be drawn in the same TOD slot and also during Off-peak and Night off-peak TOD slots'*

With regard to excess unutilised energy at the end of the month, one could again follow the OA regulations with the minor change of doing away with the restriction that the DISCOM purchase would be, '*limited to 10% of the actual total generation by such Renewable Energy generator in such month.*' Such a restriction would not be needed since this form of banking is already being restricted to solar capacity of 10-100 kW or a maximum of 12,000 kWh/month for other RE generators. Hence the provision could be as follows,

The unutilised banked energy at the end of the month shall be considered as deemed purchase by the Distribution Licensee at a rate equivalent to that stipulated under yearly Generic RE Tariff Order applicable for respective technology.

Provided that such deemed purchase shall be counted towards the Renewable Purchase Obligation of the Distribution Licensee.

Hence, the buy-back of unutilised banked energy at the end of the year would be at the Generic Tariff for that RE technology notified by the Commission for that year. Potential principles for setting generic tariff for rooftop solar are discussed later in the submission.

- c) Additional Fixed Charges or Demand Charges and any other Charges for such system: These charges proposed under regulation 7.10 should be applicable. Such a charge becomes necessary since the present tariff structure is such that some share of the fixed costs of the DISCOM are recovered through energy charges. As an illustration, for 2019-20, the wheeling charge of Rs 1.28/kWh for residential consumers, which is essentially a fixed wires cost is being recovered through the variable charge per kWh. If this were translated to an additional fixed charge, then for a 1 kW solar PV system with 17% CUF generating 1489 kWh/kWp/year, this would mean an additional charge of Rs 1906²/kW of solar/year or Rs 159/kW of solar/month. Thus the proposed charge could be to be tune of ~ Rs 150/kW of solar/month.
- d) Banking Charges: We propose that there should be explicit monetary charges for energy banking unlike the ad-hoc in-kind energy banking allowed for OA/CPP transactions. These could be linked to the ToD charges applicable as per the MERC regulated tariff in force as

² Rs 1.28/kWh * 1489 kWh/year = Rs 1906/year

this essentially reflects the price differential for drawing power in the peak slots. For the ToD time slot of 1800-2200, the existing extra variable charge is Rs 1.1/kWh. Thus, Rs 1.1/kWh could be the banking charge for each kWh of energy banked by rooftop systems and this could be benchmarked against this ToD slot as and when charges for this ToD slot are revised.

For any renewable energy projects > 100 kW

- a) Maximum monthly energy allowed for set-off against consumption or for banking: All solar generation can be consumed as load within each 15-minute block.
- b) There would be no banking of energy. Instead, any excess generation not immediately consumed as load, which is injected into the grid in each 15-minute block will be valued at ***the lowest variable cost of the DISCOM's backed down power for the respective 15-minute block*** and the credit of this amount would be given to the consumer by the DISCOM in each billing cycle.
- c) Additional Fixed Charges or Demand Charges and any other Charges for such system: These charges proposed under draft regulation 7.10 should be applicable. They could be to be tune of ~ Rs 150/kW of solar/month.

The proposed net-metering framework for 100 kW+ rooftop solar systems will involve significant changes in the metering and billing systems and hence may need sufficient preparatory time for the DISCOM. Hence the Commission could consider applying the framework suggested for the 10-100 kW solar systems for the 100 kW+ solar systems in the interim period (without the 100 kW restriction for solar and 12,000 kWh/month restriction for other RE), with the clear directive that the suggested 15-minute settlement framework would be put in place as and when the DISCOM shows its metering and billing preparedness for the same.

4. Further, we propose another accounting change for all net-metering or net-billing projects. At the end of each year, the DISCOM should not leave any credit in the consumer's bill. The present practice of rolling over of consumer credit (if any) should be allowed for a maximum of one year. The DISCOM should settle any remaining credit amount with the consumer and make an actual payment at the end of the year to the consumer so that each year begins with no credit left with DISCOM. This would benefit consumers who are in receipt of credit in their bills even at the end of the year. Since their dependence on the DISCOM is low and the present accounting practice is such that this credit gets carried forward continuously, they would not get the entire benefit of their system until this proposed accounting change is made.
5. Three possible principles for setting generic tariff for buy back by DISCOM
 - a) Lowest MW scale solar tariff discovered through bidding, adjusted for transmission and distribution charges and losses, i.e. landed price of MW scale solar PV.
 - b) Marginal cost of generation during daytime, adjusted for transmission and distribution charges and losses.

- c) Cost plus generic tariff for rooftop solar assuming Capex of ~ Rs 4.5-5.5 cr/MW, CUF of ~ 17-18%.

For comparison, the proposed modified framework for net-metering is summarised in the table below.

Suggested Net-Metering framework across project sizes			
Project Size	Upto 10 kW solar PV or 1200 kWh/month for other RE	> 10 kW and upto 100 kW solar or > 1200 kWh/month and upto 12,000 kWh/month for other RE	Greater than 100 kW solar
Monthly maximum energy allowed for set-off against consumption or for banking	1200 kWh	12,000 kWh	All solar generation can be consumed as load within each 15-minute block.
Banked Energy	Yearly banking. Excess banked energy at the end of the yearly settlement period will be purchased by DISCOM at generic tariff for that RE technology applicable for that year.	Monthly banking. Provided that the credit for banked energy shall not be permitted to be carried forward to subsequent months and the credit for energy banked during the month shall be adjusted during the same month as per the energy injected in the respective Time of Day ('TOD') slots; Energy banked during peak TOD slots may also be drawn during off-peak TOD slots, but the energy banked during off-peak TOD slots may not be drawn during peak TOD slots. The unutilised banked energy at the end of the month shall be considered as deemed purchase by the Distribution Licensee at generic tariff applicable for that year.	No energy banking. Instead, any excess generation not immediately consumed as load, which is injected into the grid in each 15-minute block will be valued at the lowest variable cost of the DISCOM's backed down power for the respective 15-minute block and the credit of this amount would be given to the consumer by the DISCOM in each billing cycle.
Billing for energy drawn from the DISCOM	Existing slab wise tariff will be applicable		
Additional Fixed Charges or Demand Charges and any other Charges for such systems	Not Applicable	Applicable. Could be to be tune of ~ Rs 150/kW of solar/month	Applicable. Could be to be tune of ~ Rs 150/kW of solar/month
Banking Charges	Not Applicable	Rs 1.1/kWh for each kWh of energy banked, linked to the Peak ToD slot (e.g. currently of 1800-2200) as per MERC tariff.	Not applicable since there is settlement at each 15 minute interval

While the DISCOM is likely to lose sales from high paying consumers during the day-time, given the long term nature of the rooftop solar investments, this loss of sales is for the very long term and hence can be planned for unlike most of existing Short Term Open Access (STOA). Also given the growth in overall demand, the under-utilisation of existing generating assets will be off-set in the coming years as long as new generation assets are added in optimal manner considering sales migration due to rooftop, OA / Captive etc. With our proposed modification in the net-metering framework, we feel that the DISCOM's losses will be greatly reduced and would be a more equitable framework considering all stakeholders. Further, apart from getting free solar RPO credits from non-obligated consumers who set up net-metering based rooftop solar systems, the GoI is also offering significant incentives for DISCOMs for rooftop solar deployment up to 18,000 MW. Considering these aspects and the well-known benefits of rooftop solar, we feel that the suggested modified net-metering framework is a good way forward for the sector.

Part 2: Comments/Suggestions on specific sections of the draft regulations

Regulation 1 Short title, extent and commencement

1. Regulation 1.3 notes that, *'These Regulations shall come into force from the date of their publication in the Official Gazette.'*

We suggest that an additional section 1.4 be added as follows,

The Operating Period of these Regulations shall be for five years.

This will provide regulatory clarity to all stakeholders. Additionally, it would also ensure revision of regulations with likely changes in technology and market developments.

Regulation 2 Definitions

2. *"Eligible Consumer" means a consumer of electricity in the area of supply of the Distribution Licensee who uses or intends to use a Renewable Energy Generating System having a capacity less than 1 MW, installed on a roof-top or any other mounting structure in his premises, to meet all or part or no part of his own electricity requirement, and includes a Consumer catering to a common load such as a Housing Society:*
 - a. *Provided that such Generating System may be owned and/or operated by such Consumer, or by a Distribution Licensee or third party leasing such System to the Consumer:*
 - b. *Provided further that in case of Net Billing Arrangement, the capacity limit of 1 MW shall not apply;*

The 1 MW limit for net-metering consumers has no strict technical basis and should be done away with as long as the upper limit for such systems is the contract demand or sanctioned load. The same limit has been done away with in the Net Billing arrangement further underscoring that this is not a technical issue.

Secondly, many SERCs (Rajasthan, Delhi, Telangana, Madhya Pradesh, Punjab etc.) allow for third party ownership systems and have no restriction that such systems can only be leased to

eligible consumers. This will also avoid un-necessary creative contract structuring to bypass such restrictions. Hence we suggest that the eligible consumer definition be change to

*“Eligible Consumer” means a consumer of electricity in the area of supply of the Distribution Licensee who uses or intends to use a Renewable Energy Generating System having a capacity **no more than their contract demand**, installed on a roof-top or any other mounting structure in his premises, to meet all or part or no part of his own electricity requirement, and includes a Consumer catering to a common load such as a Housing Society:*

- a. *Provided that such Generating System may be owned and/or operated by such Consumer, or by a Distribution Licensee or third party.*

3. *“Renewable Energy Generating System” means the Renewable Energy power system installed on a Consumer’s premises, and owned and/or operated by such Consumer or by a Distribution Licensee or a third party, that uses Renewable Energy for conversion into electricity;*

For abundant clarity this could be modified to

*“Renewable Energy Generating System” means the Renewable Energy power system **with or without energy storage**, installed on a Consumer’s premises, and owned and/or operated by such Consumer or by a Distribution Licensee or a third party, that uses Renewable Energy for conversion into electricity;*

4. Regulation 4.1 proviso states that - *Provided that the inter-connection of such System with the Network of the Distribution Licensee is undertaken in accordance with the standards and norms specified in the Central Electricity Authority (CEA) (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013 or as may be specified in future.*

While most of such system inter-connection will be done at the LT level or at the most at the 33 kV level, adhering to the CEA connectivity regulations for distributed generation resources would suffice. However, there could be a possibility of connecting such systems at higher voltages as well, as has been seen in few other states. Hence we suggest that section 4.1 be reworded as,

Provided that the inter-connection of such System with the Network of the Distribution Licensee is undertaken in accordance with the standards and norms specified in the Central Electricity Authority (CEA) (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013 or Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations or as may be specified in future.

5. Regulation 5.2 – *‘The cumulative capacity of all Renewable Energy Generating Systems under Net Metering Arrangements and/or Net Billing Arrangements connected to a particular Distribution Transformer/feeder of the Licensee shall be allowed up to 40% of its rated capacity: Provided that the Distribution Licensee shall allow Net Metering and/or Net Billing connectivity exceeding 40% of such rated capacity, unless any adverse impact has been assessed based on a detailed load study carried out by it.’*

In stark contrast, the FoR has recommended 100%. Specifically, the model regulations state that *'Hosting capacity: The cumulative capacity of distribution renewable energy systems allowed to be interconnected with the distribution network (feeder/distribution transformer) shall not exceed 100% of the feeder and/or distribution transformer capacity, as applicable. Provided that the feeder/transformer mentioned above, considered for the purpose of calculating the hosting capacity, shall mean the feeder/transformer owned by the distribution licensee.'*

In line with the FoR recommendation, we too suggest that the DT/feeder limit should be increased from 40% to 100%.

6. *Regulation 5.3: The Distribution Licensee shall update the Distribution Transformer-wise capacity available and the cumulative capacity of the Renewable Energy Generating Systems installed under Net Metering arrangements quarterly, and provide the information on its website in the month following the close of the relevant quarter in the format specified in Annexure 6.*

This is a good step and necessary for prosumers to know where systems can be installed and how much spare DT capacity is available if any. However, it would be better if the DISCOM not only provides this information on a quarterly basis but also publishes the following information which would be useful for planning.

- a. Details of circle/ feeder wise rooftop generation capacity,
- b. Circle-wise quantum of excess generation and payments made for the same,
- c. Number and capacity of behind the meter RE systems which are not availing net metering/net-billing,
- d. Average time taken for processing an application in each circle,
- e. Number of DTs where the capacity threshold has been reached.

We request the Commission to direct the DISCOM to additionally publish this information on a quarterly basis.

6. *'7.2 The Eligible Consumer may install a Renewable Energy Generating System with or without battery back-up:
Provided that, if an Eligible Consumer opts for connectivity with a battery back-up, the inverter shall have appropriate arrangement to prevent the battery/decentralized generation (DG) power from flowing into the grid in the absence of grid supply, and that an automatic as well as manual isolation switch shall also be provided.*

7.6 The Eligible Consumer may use his Renewable Energy Generating System in islanding mode for his own consumption.'

We welcome both these sections (7.2 and 7.6) since they will give a strong push for battery energy storage systems.

7. *Section 7.10 Renewable Energy Generating Systems connected behind the Consumer's meter shall be allowed only after prior intimation to the respective Distribution Licensee:*
- a. *Provided that the Consumer shall be responsible for ensuring that all necessary safeguarding measures as specified by Central Electricity Authority (CEA) are taken:*
 - b. *Provided further that the Commission may determine additional Fixed Charges or Demand Charges and any other Charges for such systems, in the retail Tariff Order, if Distribution Licensee proposes such additional Fixed Charges or Demand Charges and any other Charges for such systems, in its retail supply Tariff Petition, supported by adequate justification:*
 - c. *Provided also that in case the Consumer installs Renewable Energy Generating Systems behind the Consumer's meter without prior intimation to the respective Distribution Licensee, then the total additional liabilities in terms of additional Fixed Charges or Demand Charges and any other Charges for such systems, shall be levied at twice at the determined rate for such period of default.*

We recognise the intent of this provision and support it since there is a possibility of various captive generating systems presently connected to the grid behind the consumer meter, which the DISCOM may not be aware of.

The Commission should further direct that each renewable energy generating system should be given a unique ID by the DISCOM and that a database with relevant details of each project should be available in the public domain without personal details of the consumer.

Further, given the reality that some share of the fixed costs of the DISCOM are being recovered through energy charges, it becomes necessary to levy some form of '*additional Fixed Charges or Demand Charges and any other Charges for such systems*' as proposed in section 7.10. As an illustration, for 2019-20, the wheeling charge of Rs 1.28/kWh for residential consumers, which is essentially a fixed wires cost is being recovered through the variable charge per kWh. If this were translated to an additional fixed charge, then for a 1 kW solar PV system with 17% CUF generating 1489 kWh/kWp/year, this would mean an additional charge of Rs 1906³/kW of solar/year or Rs 159/kW of solar/year. The DISCOM would need to propose and recover such additional fixed charges from consumers that avail of net-metering facility. However, such a charge should only be decided as part of the larger tariff process. But it needs to be clarified in the regulation that any such charge will not be applicable for net billing systems.

We support the proposal of the Commission to recover additional fixed charges from renewable energy consumers availing net metering. We also support the proposal to ensure registration of all behind the meter systems. However, the current drafting of Regulations 7.6 and 7.10 is partly unclear and leaves several critical issues open to interpretation. This could lead to significant litigation, regulatory uncertainty and policy ambiguity in the future. Some of these issues are discussed below:

³ Rs 1.28/kWh * 1489 kWh/year = Rs 1906/year

Issues with the applicability of the charge

- i. It is not clear if the 'additional fixed charge or demand charge or any other charge' is applicable on all renewable energy generators. These could be generators (possibly with battery systems), which do not wish to avail either net-metering or net-billing framework but only operate as captive/self-generation systems permanently in islanding / off-grid mode.
- ii. Further, since the additional charge seems to be levied to recover fixed costs of the DISCOM which are lost due to sales migration, would it also be levied on conventional generators (e.g. diesel based systems) and stand-by generators connected behind the meter in the future? These could be operating in synchronized or off-grid mode.

Issues with the determination and levy of the charge

- iii. Unlike the Additional Surcharge borne by open access consumers, which is calculated and levied to recover the fixed costs of backed down generation assets due to OA sales migration, the proposed additional fixed charge may continue to be levied even if load growth of the DISCOM ensures that its assets are being utilised to ensure adequate revenue recovery. Therefore, there is a need for a sun-set clause or a mechanism to phase out the proposed charge in a time-bound manner.
- iv. It is not clear if such renewable energy systems, in addition to the additional fixed charge would also attract electricity duty for consumption from the renewable energy generating plants in a manner similar to current captive plants.
- v. If the additional fixed charge proposed in the draft regulations is applicable to all renewable energy generation systems, would it be applicable over and above the additional demand for HT consumers having captive generation (see excerpt from tariff order below)?

HT industry, Demand Charge (Rs/ kVA/ month): 391.00

*i. High Tension Industrial consumers having captive generation facility synchronized with the grid will pay **additional Demand Charges** of Rs. 20/kVA/Month only on the extent of Stand-by Contract Demand component and not on the entire Contract Demand.*

ii. Stand-by Charges will be levied on such consumers on the Stand-by component, only if the consumer's demand exceeds the Contract Demand.

*iii. This **additional Demand Charge** will not be applicable if there is no Stand-by demand and the Captive Unit is synchronised with the Grid only for the export of power.*

iv. Demand Charge shall be applicable at 25% of the above rates on the start-up demand contracted by the Power Plant (as referred to at (h) above) with the Distribution Licensee.

v. Demand Charge shall be applicable at 75% of the above rates for Steel Plant operating with electric arc furnaces.

The draft regulation should clarify all these issues regarding applicability, determination and levy of charges to ensure regulatory certainty and reduced litigation.

8. *Section 8.4 Existing Meter in the premises of the Eligible Consumer shall be replaced by the Net Meter at the cost of the Consumer, in accordance with the provisions of the Electricity Supply Code.*

Section 8.7 The Eligible Consumer shall procure, at his own cost, a Renewable Energy Generation Meter conforming to the applicable CEA Regulations at an appropriate location to measure the energy generated from the Renewable Energy Generating System.

We urge the Commission to reconsider the proposed change under which the consumer would bear the meter cost. The meter would be used for billing the consumer or for RPO accounting for the DISCOM as well and hence the Commission should continue the current practice under which this cost should be borne by the DISCOM.

9. *Section 9.2: All applications and payment of fees shall be compulsorily made through web-based processing system by electronic means only.*

We strongly support this move towards a web-based system as this would go a long way in improving the customer satisfaction and reducing transaction costs.

10. Section 12.6 specifies the equation according to which the DISCOM will raise the bill on the consumer with regard to net-billing.

It would be useful for the Commission to clarify how the electricity duty would be levied in this case. Would the ED be calculated on the bill after giving credit to the consumer for energy sold to the DISCOM or before giving credit?

11. While ‘*these Regulations shall come into force from the date of their publication in the Official Gazette*’ it is important to make it clear that existing net-metering contracts will continue as per existing contracts until they expire and will not have any new commercial conditions attached to them after these draft regulations are finalised. Hence a new section should be introduced in the regulations. This could be on the lines of the *Maharashtra Electricity Regulatory Commission (Distribution Open Access) (First Amendment) Regulations, 2019* as reproduced below.

Amendment in Regulation 38 of the Principal Regulations:

The provisos of existing Regulation 38.3 shall be amended as under:

*“Provided that the provisions of these regulation, as amended from time to time relating to Banking under Regulation 20, the definition of Billing Demand, change in injection or drawal point under Regulation 26 and revision in Contract Demand under Regulation 4.2 with amendments thereof shall be applicable to existing Open Access Agreements or contracts; Provided further that **provision relating to Banking of the Principal Regulations shall continue to apply for existing Open Access Agreements or contracts as on date of notification of the first amendment of the Principal Regulations, till the expiry of the approved period for such OA transactions**, beyond which provision relating to Banking under Regulation 20 of the first amendment of the Principal Regulations shall apply.*

12. The Commission can also consider introducing “Group Net Metering” and “Virtual Net Metering” to ease and accelerate the implementation of rooftop solar, especially in large housing societies. The DERC guidelines ([Delhi Electricity Regulatory Commission \(Group Net Metering and Virtual Net Metering for Renewable Energy\) Guidelines, 2019](#)) have introduced these measures and have defined them as follows.

“Group Net Metering” means an arrangement whereby surplus energy generated/injected from a Renewable Energy System or Battery Energy Storage System (BESS) charged through Renewable Energy System is exported to the grid through Net Meter and the exported energy is adjusted in more than one electricity service connection(s) of the same consumer located within the same distribution licensee’s area of supply;

“Virtual Net Metering” means an arrangement whereby entire energy generated/injected from a Renewable Energy System or Battery Energy Storage System (BESS) charged through Renewable Energy System is exported to the grid from renewable energy meter/ gross meter and the energy exported is adjusted in more than one electricity service connection(s) of participating consumers located within the same distribution licensee’s area of supply;

13. The Annexure 1 (Procedure for Application for connectivity of Renewable Energy Generating System with Distribution Licensee’s Network) specifies various timelines such as
- a. *The Distribution Licensee shall register the Application and acknowledge its receipt within **three working days***
 - b. *The Distribution Licensee shall conduct a technical feasibility study within **15 working days** from the registration of the Application*
 - c. *Before rejecting any application for setting up a Renewable Energy Generating System at a particular Distribution Transformer, the Distribution Licensee shall serve the Applicant with a notice to rectify, within **15 days** or such longer period as may be necessary, the deficiencies.*
 - d. *If found technically feasible, the Distribution Licensee shall, within **7 working days** of the completion of the feasibility study, convey its approval for installing the Renewable Energy Generating System.*
 - e. *The Distribution Licensee shall complete the testing and commissioning of the System within **10 working days** from receipt of such request.*

There is anecdotal evidence of significant delays in these procedures in many cases. Given that the present regulations mandate this entire process to be carried out online, this would be easy to track for each application. Hence we request the Commission to consider levying a monetary penal provision for delay in these procedures. This could be ~ Rs 100 for each day of delay. The consumer should have access and be aware of claims to pending fines through the portal. Such provisions for transparent tracking and penal provision can go a long way in ensuring accountability of the DISCOMs for ensuring streamlined and effective processes.

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Annexure: Estimating instantaneous consumption from rooftop solar versus solar generation being banked by households.

Given the increasing uptake of residential consumers opting for rooftop solar with net metering, it is important to have an understanding of how much solar energy a typical residential consumer is likely to consume instantaneously from the rooftop solar PV plant (RTPV) and how much is going to be banked, based on consumer load and solar generation profiles.

For the purpose of this analysis, we used the 15-min load profile data of 41 residential consumers in Pune city for FY 2018-19. These consumers have been categorized into three consumption categories as follows:

1. Within a consumption slab of 1000-1500 kWh/year
2. Within a consumption slab of 1500-2500 kWh/year
3. With a consumption of 2500+ kWh/year.

The load profile data has been collected as a part a Prayas (Energy Group's) [e-MARC](#) initiative, i.e. 'Monitoring and Analysis of Residential Electricity Consumption', under which the electricity consumption of residential consumers in Pune city is being measured and monitored on minute-wise basis through an IoT based system, since November 2017. The 15-min load profiles for all the consumer categories were plotted against the 15-min generation profiles for three rooftop solar plants of capacities – 1kW, 1.5 kW, 2.5 kW. The solar generation profiles have been obtained from NREL's System Advisor Model ([SAM](#)).

Instantaneous consumption is defined as the demand met through the solar energy generating system for a given interval. If the demand is less than the energy generated, instantaneous consumption is equal to the demand. If the demand is more than the energy generated, instantaneous consumption is equal to the energy generated.

Table 1 below shows an average month-wise instantaneous consumption of solar generation for three consumption categories with appropriate RTPV capacity for illustration. These monthly values have been arrived at after averaging the instantaneous solar consumption values for each of the 96, 15-minute intervals in a day across the month. It is evident from the table that, for any of these categories with given RTPV capacity, the annual average share of instantaneous solar consumption is ~35% of generation, which leads to the banking of remaining ~65% energy in the year. However, the month-wise instantaneous solar consumption varies between 24%-49% of solar generation.

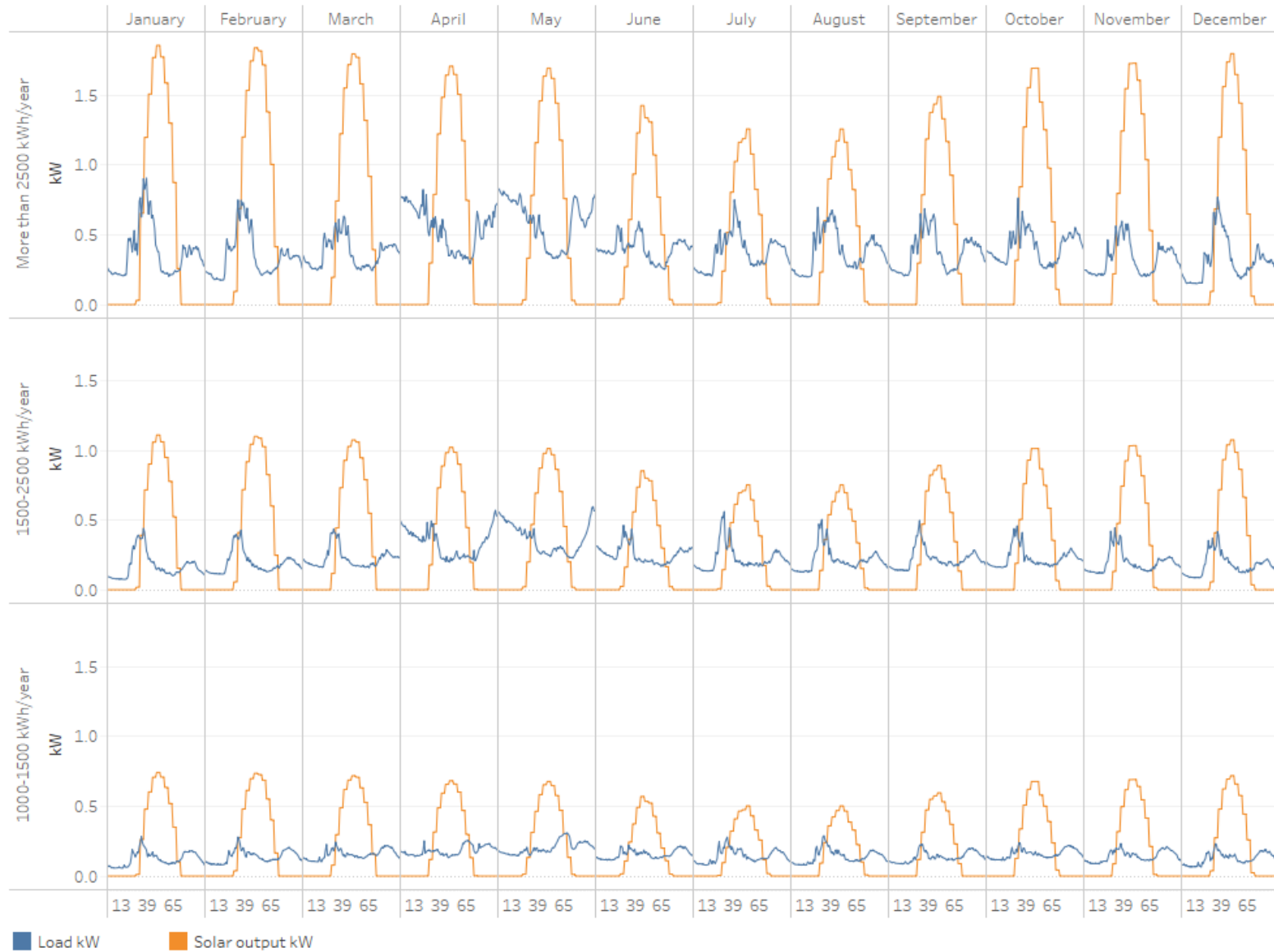
Further, the three graphs below the table show the month wise load, solar generation, import-export of power and instantaneous solar consumption for an average day for the three consumption categories.

Table 1: Average month wise instantaneous consumption from rooftop solar

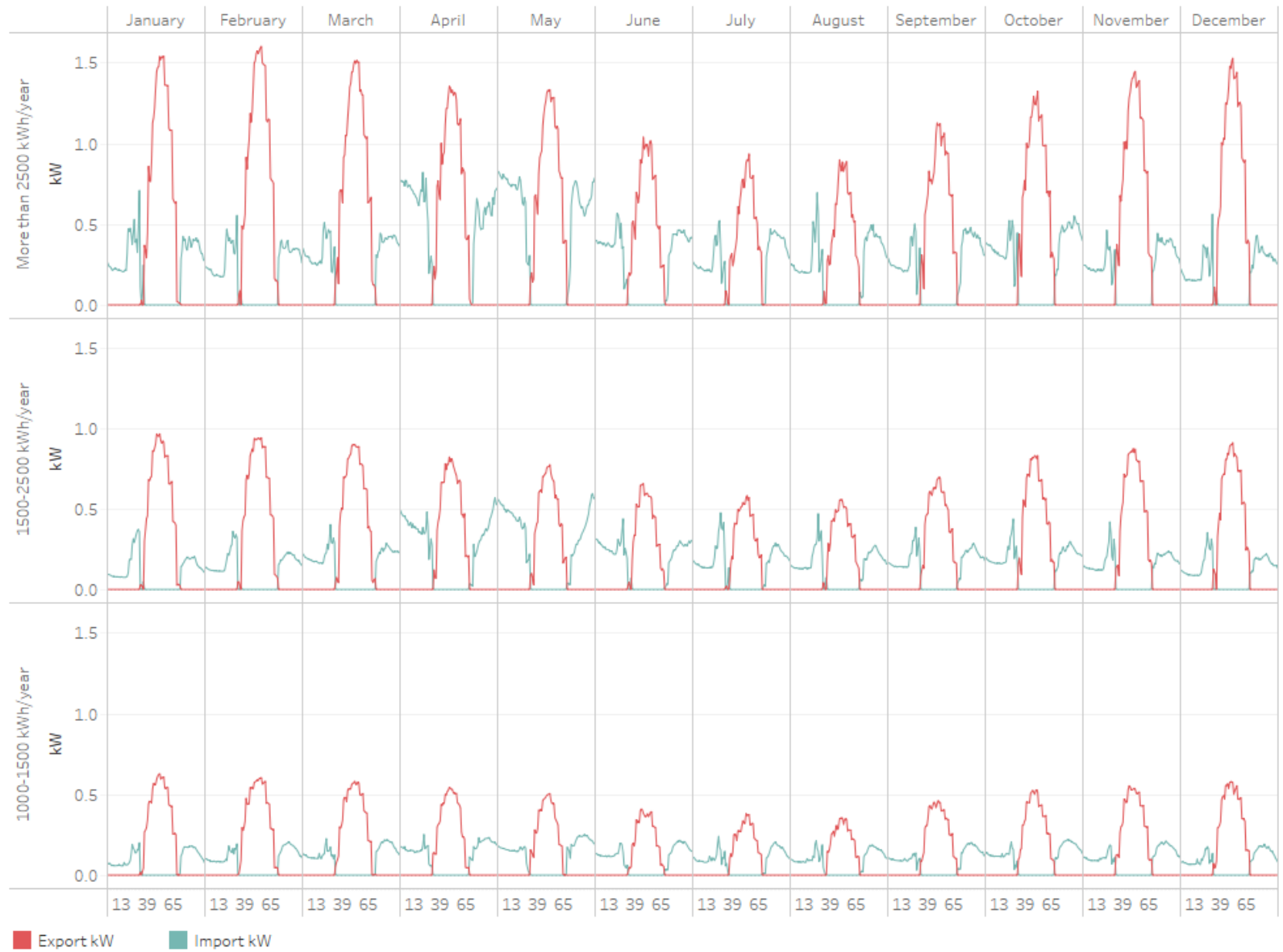
Annual residential electricity consumption per household	1000-1500 kWh/year	1500-2500 kWh/year	2500+ kWh/year
Size of rooftop solar installation	1 KW	1.5 kW	2.5 kW
April	37%	36%	36%
May	45%	41%	37%
June	42%	40%	41%
July	45%	42%	49%
August	44%	42%	48%
September	34%	36%	39%
October	34%	31%	35%
November	30%	27%	29%
December	27%	26%	30%
January	26%	24%	33%
February	28%	25%	30%
March	31%	28%	30%
Annual average	35%	33%	36%

Source: Prayas (Energy Group) analysis based on eMARC and SAM data

Month-wise Load profiles & solar generation for three consumption categories



Month-wise power flow (Import-Export) for three consumption categories



Month-wise instantaneous solar consumption for three consumption categories

