



**ORDER
OF THE
WEST BENGAL ELECTRICITY REGULATORY COMMISSION**

**IN
CASE NO: OA – 370 /21 – 22**

IN REGARD TO THE APPLICATION FOR APPROVAL OF THE SCHEME FOR SMART METERING FOR THE PETITIONER'S AREA OF SUPPLY IN TERMS OF RULE 5 (1) OF THE ELECTRICITY (RIGHTS OF CONSUMERS) RULES, 2020 READ WITH REGULATION 3.12 OF THE WEST BENGAL ELECTRICITY REGULATORY COMMISSION (ELECTRICITY SUPPLY CODE) REGULATIONS, 2013

PRESENT:

**DR MALLELA VENKATESWARA RAO, CHAIRPERSON
SRI PULAK KUMAR TEWARI, MEMBER**

DATE: 29.05.2023



FACTS IN BRIEF:

- 1.0 The CESC Limited (in short 'CESC'), under cover of their letter dated 02.07.2021, has submitted the present petition under Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020 read with regulation 3.12 of the West Bengal Electricity Regulatory Commission (Electricity Supply Code) Regulations, 2013, seeking this Commission to approve the Scheme for smart metering for CESC's area of supply, which inter-alia includes installation of smart pre-payment meters for consumers situated in its licensed area, and for consequential directions. The Commission has admitted the application in Case No. OA – 370/21-22.
- 2.0 The application of CESC inter-alia states the followings:
- 2.1 The present petition is invoking Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020 notified by the Central Government on 31.12.2020 read with Regulation 3.12 of the West Bengal Electricity Regulatory Commission (Electricity Supply Code) Regulations, 2013.
- 2.2 CESC serves 34 lakhs consumers approximately, which includes domestic, industrial and commercial users. 72% of CESC's consumers have a monthly bill of less than Rs. 375. Against the same, present per end-point cost of smart metering system for a 5-year project period works out to around Rs. 6,265. Majority of consumers pay monthly bills less than 6% of the typical costs associated with each smart meter installation.
- 2.3 Section 55 of the Electricity Act, 2003 provides that no licensee shall supply electricity except through installation of a correct meter in accordance with regulations to be made in this regard by the Central Electricity Authority ("CEA"). First proviso to Section 55 allows a consumer to either purchase the meter by itself or to take the same on rent from the concerned distribution licensee.
- 2.4 CEA has notified the CEA (Installation and operation of meters) Regulations 2006 (in short "CEA Metering Regulations") that came into force on 17.03.2006. Subsequently, on 23.12.2019, CEA made amendments to the CEA Metering Regulations and made it compulsory for all new consumer meters to be smart meters with pre-payment feature. In addition, it has been specified that existing meters other than smart meters shall be replaced with smart meters with pre-payment feature, within the time frame specified by the Central Government. The Petitioner, on 21.10.2020, had addressed a communication to CEA



highlighting the challenges related to installation of smart pre-payment meters / pre-payment meters.

- 2.5 The West Bengal Electricity Regulatory Commission (Electricity Supply Code) Regulations, 2013 issued by this Commission (in short 'Electricity Supply Code') provides the following with respect to smart metering:

"3.12 Smart Metering:

*For smart meter, if accessories are required to be installed at the consumer's premises for the purpose of different requirements under smart grid implementation, then the consumer will provide the space for such installation. **For the smart metering purpose, the licensee shall submit its proposal to the Commission for approval giving details of the scheme for such smart metering for which the Commission will come out with an order.** For introduction of smart meter Commission may bring out necessary orders which may be applicable for such cases. On stabilization of the Smart metering system the appropriate regulations will be framed subsequently. It is to be noted that where smart meter will be introduced it will be mandatory."*

- 2.6 Rule 5 of the Electricity Rules 2020 issued by the Central Government, in exercise of its powers under Section 176 (1) read with Section 176 (2) (z), which came force with effect from 31.12.2020, deals with metering wherein *inter-alia* a restriction has been placed on giving electricity connection unless a smart pre-payment meter or pre-payment meter is installed. Relevant excerpts of Rule 5 read as follows:

*"5 (1) No connection shall be given without a meter and such meter shall be the smart pre-payment meter or pre-payment meter. **Any exception to the smart meter or prepayment meter shall have to be duly approved by the Commission.** The Commission, while doing so, shall record proper justification for allowing the deviation from installation of the smart pre-payment meter or pre-payment meter."*

- 2.7 As per the Electricity Act, 2003, safeguarding or protecting the interest of the consumers and prevention of tariff shock are some of the cornerstones for tariff determination, together with recovery of the cost of electricity in a reasonable manner.
- 2.8 Rule 5 (1) of the Electricity Rules 2020, beside directing to give electricity connections with smart pre-payment meters or pre-payment meters, also vests the State Electricity Regulatory Commission with the power to make an exception to it and to permit deviation from such requirement of installing smart pre-payment meter or pre-payment meter with proper justification for allowing the deviation.



- 2.9 It is apparent that the Electricity Rules 2020, read in consonance with the mother Act, allows deviation from the program of installation of smart pre-payment meters or pre-payment meters where the same is justified to meet other requirements of the Act, mainly safeguarding the interest of the consumers.
- 2.10 Regulation 3.12 of the Electricity Supply Code issued by this Commission which deals with smart metering does not in any manner contradict or conflict with the Electricity Rules 2020 or with the CEA Metering Regulations. The prescription to seek approval of this Commission by a licensee to its scheme for smart metering is, hence, compulsory and brooks no exception.
- 2.11 A combined reading of Rule 5 (1) of the Electricity Rules 2020 and Regulation 3.12 of the Electricity Supply Code posits that the rollout of smart metering should be in accordance with the implementation scheme as approved by this Commission under the Electricity Supply Code. Any aspects relating to implementation of smart metering, including those relating to manner of rollout, its timing, phasing / staggering, geographic spread, scope of consumer coverage etc. that may be decided by the Commission while approving the scheme for smart metering as per Regulation 3.12 of the Electricity Supply Code, would be permissible under Rule 5 (1) of the Electricity Rules 2020 that unequivocally vests the Commission with the power to make any exception / deviation from installation of the smart pre-payment/ pre-payment meter.
- 2.12 The imminent necessity to formulate a scheme for smart metering has arisen in view of the Electricity Rules 2020 notified by the Central Government on 31.12.2020 which requires that electricity connections are to be given by a licensee with a smart pre-payment / pre-payment meter. Further, the Act provides that the cost of electric meter is to be effectively recovered from the consumer who requires electricity supply be it smart or pre-payment or static meter.
- 2.13 Electricity Rules 2020 is applicable to all existing and intending consumers and the State Electricity Regulatory Commissions have been conferred with power to allow deviation in metering infrastructure with respect to connection of supply. This is particularly important for the private distribution licensees who do not have the benefit of State grants or funds at their disposal to take up such a capital-intensive exercise unlike State Distribution Utilities.
- 2.14 Smart metering system consists of meters and communication system. At present, the communication system can be achieved either through Radio-Frequency (RF) mesh or cellular



technology. Cellular technology is going through constant technology evolution (2G, 3G, 4G, 5G) etc. and adoption of a specific cellular technology may result in significant sunk costs, going forward, owing to obsolescence. On the other hand, RF-Mesh, with its multiple possible communication 'pathways', is a superior technology from communication point of view as in this case the distribution licensees are fully in control over the mitigation of issues encountered. However, RF-Mesh technology requires upfront capital expenditure in providing for the communication canopy across the entire licensed area/ targeted demarcated area. Therefore, for carpet deployment, RF-Mesh is the preferred option as all benefits of smart metering pertaining to one demarcated area can be better achieved under this option.

2.15 In the above backdrop, the Petitioner herein foresees two scenarios, namely, (i) installation of smart metering only for new installations and defective meter replacement and (ii) smart metering for entire meter population. Detailed CAPEX and OPEX for cellular smart metering technology and RF mesh technology and status report on smart meter pilot project are submitted with the application.

2.16 **Smart metering only for new installations and defective meter replacement only:**

2.16.1 If smart meters are deployed only for new connections and against defective meter replacement cases, these meters would have to be installed across the entire licensed area in a widely scattered manner. This can be achieved with cellular smart meters. Incremental capital expenditure (CAPEX) for installation of smart meters in place of vanilla static meters, for such deployment, would be Rs. 60 Crores per year, only for new connections and replacement of defective meters. There will be an additional operational expenditure (OPEX) for Software as a Service (SaaS) costs, SIM rental costs and data storage costs, which would amount to around Rs. 14 Crores in the first year. Yearly OPEX for each subsequent year would, however, depend on the cumulative meter installations up to that year at the same going rate.

2.16.2 However, the following concerns prevail with respect to cellular based communication for smart metering:

- i) The communication technology over 2G shall inevitably be phased out in the near future and therefore selection of this technology may be a risky proposition in the long run. Incidentally, 3G is already phased out.



- ii) The other emerging cellular technologies like NB-IoT for communication with smart sensors / meters need to be evaluated thoroughly to check whether the technology is capable enough to fulfil all the requirements / use cases / functionalities of Advanced Metering Infrastructure (AMI), including remote firmware upgrades in bulk and the availability of the network at every nook and corner. Further, as of now, only one communication solution provider is operating in India currently for NB-IoT, which may be a point of concern, both from technical and commercial point of view.
- iii) 4G, as an AMI solution, has very few proponents in India currently, especially amongst the meter manufacturers, owing primarily to high meter costs.
- iv) Reading success of 2G based smart metering systems, currently installed across licensed area, generally varies around 90%, owing to the absence of proper mobile network signal strength. Reading collection has to be done manually in cases where the meters cannot be read remotely. Blanket deployment of cellular based smart meters therefore would be practically challenging from the point of view of managing and collecting physical readings from around 10% of the entire consumer base spread across the entire licensed area.

2.16.3 On the other hand, RF-Mesh technology, when used for last mile communication, is mostly suitable for carpet deployment and would require the installation/erection of the RF-Mesh Communication Canopy prior to installation of smart meters.

2.17 **Smart metering for entire meter population**

2.17.1 If the existing meters for the entire 34 lakh consumers of the Petitioner are to be replaced by smart pre-payment meters, RF-Mesh technology is more suited and would require erection of communication canopy upfront. Considering all practicalities, the same will be a daunting task, even if for the sake of argument capital resource is not considered as a constraint. If, however, the entire activity is to be carried out, the CAPEX will be around Rs. 1,615 Crores for a population of 34 lakh consumers which includes costs of smart meters and communication network devices to complete the job in at least 5 years' time with all other resources at disposal. There will be a significant tariff impact under this scenario.



- 2.17.2 Replacement of all post-paid meters would practically involve many other associated activities including and not limited to evaluation of meters, Head End Systems (HES)/ Meter Data Management System (MDMS), integration of the legacy reading collection/ billing systems with the HES/MDMS, revamping data storage systems, building IT infrastructures, integration of meters with communication modules if the meters and communication modules are of different makes, etc. This is in addition to the physical activities that would also need to be carried out, like replacement/renovation of meter boards wherever required in order to accommodate smart meters in the same meter board. Further in case of RF-Mesh deployment, additional activities like network surveys, network planning, installation of network devices along with necessary provision for power supply, earthing and fencing would also have to be carried out. Considering all practicalities, replacement of all existing post-paid meters within anything less than 5 years is a daunting task considering scale of operations, even if provisioning of capital resource is not considered as an impediment.
- 2.17.3 Additionally, there are associated OPEX covering installation, software setup costs and Software as a Service (SaaS) costs for Head End System, etc. amounting to a total cost of around Rs. 515 Crores in 5 years. Therefore, the total outgo is around Rs. 2,130 Crores considering both CAPEX and OPEX. The cost per end-point (meter) for the entire 5-year period is around Rs. 6,265. Beyond the project period, recurring OPEX at Rs. 15 per end-point per month would continue. However, for RF-Mesh technology, regular OPEX in SIM rental costs etc. can be avoided.
- 2.18 Additional costs for Meter Data Management System (MDMS), system integration and associated software would have to be considered separately for both the above scenarios.
- 2.19 Deployment of smart meter at a mass scale, therefore, will cause financial burden on consumers of the Petitioner without matching benefits. It is respectfully stated that the Government of India, through its various policies, has been focusing on improvement of AT&C losses of distribution licensees, particularly whose loss figures are above a certain level. This may be considered as a useful benchmark for taking any decision or action regarding metering, as there will be major cost implications that will ultimately have to be borne by the consumers. Thus, the objective of installation of smart pre-payment meters needs to be evaluated on the basis of cost benefit analysis.



- 2.20 It is worthwhile to mention that the deployment of smart pre-payment / pre-payment metering is generally intended to improve billing / collection efficiency of the licensees. However, certain distribution licensees like CESC have already made considerable progress towards improving billing / collection efficiency through sustained initiatives and therefore the potential for further improvement might not be commensurate with costs incurred.
- 2.21 **Pre-payment Meters**
- 2.21.1 Standalone pre-payment meters carry many inherent design limitations and if deployed, these meters will make it difficult for the licensee to carry out many important activities such as consumer specific energy accounting and energy auditing functions.
- 2.21.2 Considering all practicalities, effecting tariff changes in the installed standalone pre-payment meters, estimation of available balance in case of two-part tariff with rebate / surcharge mechanisms, adjustment of meter balance post burnt / defective replacement of meters, remote surveillance, net metering functionality etc. would continue to be very difficult. The existing basic / stand-alone pre-payment meters shall also not be able to meet other future needs of the distribution licensees.
- 2.21.3 Pre-payment feature is not applicable for external CT or CT and PT operated meters as these meters do not possess in-built connection / disconnection switches.
- 2.21.4 Annexure – C2 of West Bengal Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2011 providing for 'TARIFF SCHEME FOR DIFFERENT CLASSES OF CONSUMERS' allows Prepaid Tariff under 'Optional Tariff Scheme' for certain categories of LT consumers.
- 2.22 **Smart meters:**
- 2.22.1 Smart metering eco-system not only comprises the smart meters, but also encompasses the remote communication infrastructure / network and back-end software system (Head End System), Meter Data Management System (MDMS) and Data Storage. Smart pre-payment meters are essentially smart meters, where the pre-payment functionalities shall reside at the back-end server. Pre-payment functionality shall be achieved through integrating suitable software application with Head-end system or Meter Data Management System, which will communicate and control the field smart meters, at preconfigured intervals.



- 2.22.2 The distribution licensees are still carrying out Proof of Concepts and Pilot trials on different communication technologies in order to evaluate and select the most suitable communication technology and back-end software applications with respect to capability towards interoperability, scalability and meeting the future needs of the licensees. All the components of the smart metering ecosystem need to be selected and implemented judiciously, ensuring cost optimization in different sub-systems, so that value added services can be extended without impacting electricity tariff adversely.
- 2.22.3 Deployment of smart metering, therefore, must be planned for a distribution licensee based on its pain and gain areas. Priorities and drivers will be different from one distribution licensee to another.
- 2.23 The Government of India, through its various policies, rules and regulations have been focusing on improving consumer services, power quality to the end consumers and reduction in distribution losses. Monitoring of parameters like SAIDI, SAIFI and CAIDI, energy audit of various feeders, DTRs, etc. have been given importance in order to meet the above. These are some of the use cases of Advanced Metering Infrastructure (AMI) that would be reaped from smart meters, once deployed. However, these parameters can be obtained from smart meter data, only if blanket deployment is considered for which RF-Mesh is definitely better suited than cellular based smart meters. Furthermore, since the Distribution Utilities would either own this RF-Mesh network or pay for it in Network-as-a-Service (NaaS) mode, communication inadequacy mitigation would be fast and the distribution licensees would be in full control over the process.
- 2.24 It is imperative that, should the distribution licensees decide to deploy RF-Mesh communication for smart metering for all new consumers, which will essentially be at scattered locations, spread all over the licensed area, a pan-license area "rich" RF-Mesh communication canopy has to be erected and invested in, upfront, so that, any smart meter installed for any new consumer is able to talk and listen to this communication infrastructure, irrespective of its own location / reachability, with ease, in "hang & run" mode.
- 2.25 Deployment of all the above components will result in substantial costs to be incurred by the distribution licensee, mix of both one-time capital expenditure and monthly recurring operating cost which would ultimately be passed on to consumers and would mean additional burden on



the consumers through an increase in electricity tariff, without any commensurate benefits for them.

- 2.26 It may be relevant to mention here that the Petitioner has successfully commissioned RF-Mesh based smart meters in two pockets of the Petitioner's licensed area, namely, Jodhpur Park and Howrah Pilkhana, the reports on which are already in the records of the Commission. The Petitioner has also deployed cellular based point-to-point smart meters in a scattered manner throughout its licensed area.
- 2.27 In view of the foregoing considerations, the Petitioner is seeking to deploy smart meters, based on specific requirements and benefits, for existing and new connections, from time to time. Some of the use cases, which the Petitioner foresees for smart metering, going ahead are for consumers with distributed generation sources, metering upcoming condominiums provided the consumers are willing to pay for smart meters, blanket deployment in selected pilfer-prone areas based on suitability and cost benefit analyses, deployment in areas where RF-Mesh is already in place. Further, the Petitioner seeks this Commission's approval to continue with installation of normal static meters also in order to avoid unnecessary burden on the end-consumers.
- 2.28 In light of the foregoing submissions the Petitioner humbly beseech the Commission to –
- Approve the Scheme for smart metering as set out at paragraph 2.27 above in accordance with Regulation 3.12 of the West Bengal Electricity Regulatory Commission (Electricity Supply Code) Regulations, 2013;
 - Allow the Petitioner to install smart pre-payment meter as per the Scheme for smart metering and to that extent exempt the Petitioner from installation of smart pre-payment meter / pre-payment meter while giving new electricity connections in accordance with Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020;
 - Allow the Petitioner to install normal static meters apart from smart meters and deploy smart pre-payment meters in relevant cases and on specific requirements and pre-payment meters at the option of the consumer, where optional tariff for pre-payment meters are allowed through the applicable tariff order;



- d) Exempt the Petitioner from mandatory installation of smart pre-payment meter / pre-payment meter while giving new electricity connections pending the disposal of the present petition, in accordance with Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020;
- e) Grant ad-interim ex-parte relief in terms of prayer (d) above;
- f) Dispose of the Petition expeditiously as the business of the Commission would permit; and
- g) Such further order or orders as the Commission may deem fit and proper.

OBSERVATIONS OF THE COMMISSION:

- 3.1 The Commission has noted that CESC has commissioned RF-Mesh based smart meters in two pockets within its licensed area and it has also deployed cellular based point-to-point smart meters in a scattered manner throughout its licensed area.
- 3.2 CESC has hailed the RF-Mesh technology as most suitable for carpet deployment of smart metering for last mile communication but flagged that it requires high upfront capital expenditure with consequent tariff shock to consumers without any commensurate benefit to them.
- 3.3 Instead of smart metering for entire meter population, CESC has prayed to deploy smart meters, based on specific requirements and benefits, for existing and new connections, from time to time, such as (i) for consumers with distributed generation sources, (ii) metering upcoming condominiums provided the consumers are willing to pay for smart meters, (iii) blanket deployment in selected pilfer-prone areas based on suitability and cost benefit analyses, and (v) deployment in areas where RF-Mesh is already in place.
- 3.4 In this regard, CESC has requested this Commission to exempt the Petitioner from mandatory installation of smart pre-payment meter / pre-payment meter while giving new electricity connections pending the disposal of the present petition, referring Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020. Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020 is reproduced below:



Approval of the scheme for smart metering for the petitioner's area of supply in terms of Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020 read with regulation 3.12 of the West Bengal Electricity Regulatory Commission (Electricity Supply Code) Regulations, 2013



5. Metering – (1) *No connection shall be given without a meter and such meter shall be the smart prepayment meter or pre-payment meter. Any exception to the smart meter or prepayment meter shall have to be duly approved by the Commission. The Commission, while doing so, shall record proper justification for allowing the deviation from installation of the smart pre-payment meter or prepayment meter.*

- 3.5 The Commission observes that CESC in its petition is seeking almost a waiver from installation of smart metering and proposing the implementation based on its choice and convenience whereas the Rule 5 (1) of the Electricity (Rights of Consumers) Rules, 2020, directs the Commission to allow any exception to the smart meter or prepayment meter after recording proper justification for allowing the deviation from installation of the smart pre-payment meter or prepayment meter. However, the Commission does not find any justification in allowing CESC an overall exemption and leaving the licensee to implement smart metering on selective basis.

ORDER OF THE COMMISSION:

- 4.1 The Commission, after considering the submissions made by CESC in their application dated 02.07.2021 and based on the observations made hereinabove, does not find any merit to approve the proposal of CESC to implement the installation of smart pre-payment meters or pre-payment meters on selective basis for consumers situated in its licensed area.
- 4.2 The petition is thus disposed of.
- 4.3 A copy of the order shall be posted in the website of the Commission.
- 4.4 CESC shall download the copy of the order from the website of the Commission and act on it. Certified copy of the order, if applied for, be given to the parties on completion of formalities laid down in the West Bengal Electricity Regulatory Commission (Conduct of Business) Regulations, 2013, as amended and on submission of necessary fees.

**Sd/-
(PULAK KUMAR TEWARI)
MEMBER**

**Sd/-
(MALLELA VENKATESWARA RAO)
CHAIRPERSON**

Dated: 29.05.2023

**Sd/-
SECRETARY**