

## **NOTIFICATION**

### **TELANGANA STATE ELECTRICITY REGULATORY COMMISSION (SMART GRID) REGULATION, 2021**

**No.TSERC/ 4 /2021**

**Dated 28.06.2021**

#### **REGULATION No. 4 of 2021**

#### **Preamble:**

The Electricity Sector comprising of generation, transmission and distribution has to keep pace with other technologies arising out of scientific development, information technology (IT) and engineered services. A smart grid is an electrical grid with automation, communication and IT systems that can monitor power flows from points of generation to points of consumption (even down to the appliances level) and control the power flow or curtail the load to match generation in real time or near real time. The increased visibility, predictability, and even control of generation and demand bring flexibility to both generation and consumption and enable the utility to better integrate intermittent renewable generation and also reduce costs of peak power. A smart grid is cost-effective, nimble, responsive, and better engineered for reliability and self-healing operations.

The Government of India (GoI) has notified a Smart Grid Vision and Roadmap that

clearly articulates the goals and timelines for deployment with respect to the Smart Grid objectives. Further, the National Smart Grid Mission has been established by Ministry of Power (MoP), GoI to accelerate Smart Grid deployment in the country.

The Commission, in order to promote the development of Smart Grid in the State has identified on several key priorities to address existing and emerging challenges to the operation of the transmission and distribution systems. These challenges include cyber security issues, large-scale changes in generation mix and capabilities, and large potential new load from electric vehicles. The fact that a Smart Grid would permit two-way communication between the traditionally regulated components of the electric system and a large number of smart grid devices expected to be located beyond the conventional boundaries of regulated entities suggests that cyber security standards require special attention.

Smart Grid is essentially a “system of systems” and standardized communication across the interfaces of these systems is a critical enabler of Smart Grid functionality and interoperability. Smart Meter is one of the most essentially required key features in present scenario for implementation of Advanced Metering Infrastructure (AMI) and Smart Grid across the country to ensure interoperability of energy meters. The implementation of wide-area situational awareness could help mitigate the effect of reliability events by giving reliability entities an improved and manageable high-level view of system conditions and parameters.

The Commission is of the view that Smart Grid technologies have considerable potential to promote demand response, which can reduce wholesale prices and wholesale price volatility. Smart Grid capability can enhance the application of demand response to accommodate the integration of variable generation. If electricity storage technologies could be more widely deployed, they would present an important means of addressing some of the difficult issues being faced by the electric industry, including helping to address large-scale changes in generation mix.

The Commission has also observed the rising trend of Electric Vehicles in the transportation industry. Implementation of the abovementioned measures may provide the technical capability to deal with any electric vehicle-related load growth that we may see in the future.

The Commission to endeavour to bring the new technologies in the operation of the grid had earlier issued the Draft Telangana State Electricity Regulatory Commission (Smart Grid) Regulations, 2016 on 15.11.2016 and invited the suggestions/comments from interested persons/stakeholders. In response to the same, the Commission had received suggestions/comments from two (2) stakeholders.

In consonance to the roadmap and aiming to propagate the expansion of Smart Grid and allied technologies the Commission before finalising the Regulation intended to issue again the Draft Regulations for stakeholder consultation. Therefore, the Commission published the Draft Telangana State Electricity Regulatory Commission (Smart Grid) Regulations, 2020 and undertook afresh stakeholder consultation process before finalizing it.

In exercise of powers conferred by clause (zp) of sub-section (2) of Section 181 of the Electricity Act, 2003 and all other powers enabling it in that behalf and after previous publication, the Telangana State Electricity Regulatory Commission hereby makes the following Regulation:

## 1. Short title, extent and commencement

- (1) This Regulation shall be called the Telangana State Electricity Regulatory Commission (Smart Grid) Regulation, 2021.
- (2) This Regulation shall be applicable to all generating companies, transmission licensees and distribution licensees (including deemed distribution licensees and those exempted from obtaining distribution licence) and electricity consumers in the State of Telangana and connected to the state grid.
- (3) This Regulation shall come into force on the date of its publication in the Telangana Gazette.

## 2. Definitions

- (1) In this Regulation, unless the context otherwise requires:
  - (a) “**Act**” means the Electricity Act, 2003 (36 of 2003) and subsequent amendments thereof;
  - (b) “**Advanced Metering Infrastructure (AMI)**” including ‘Smart Meters’ means the infrastructure required to enable the distribution licensee to accurately collect, monitor and analyse real-time consumption data from consumers, communicate price signals to consumers and where permitted loads controlled;
  - (c) “**Aggregator**” is an entity registered with the distribution licensee to provide aggregation of one or more of the services like demand response services under the demand response mechanism, Distributed Generation, Energy Storage etc. within a control area;
  - (d) “**Bureau**” means Bureau of Indian Standards (BIS) established under section 3 of the Bureau of Indian Standards Act, 2016;
  - (e) “**Central Electricity Authority (CEA)**” means the Authority referred to in sub-section (1) of Section 70 of the Act;
  - (f) “**Commission**” means Telangana State Electricity Regulatory Commission;
  - (g) “**Cyber Security**” means protecting information, equipment, devices, computer, computer resource, network, programmes, data, communication device and information stored therein from unauthorised or unintended access, use, disclosure, disruption, modification or destruction;
  - (h) “**Distributed Generation**” means power generation at the point of consumption;
  - (i) “**Distribution Licensee**” means a licensee authorised to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply. This definition covers deemed distribution licensee and those exempted from obtaining distribution license.
  - (j) “**Electric Energy Storage**” means a set of technologies capable of storing previously generated energy and releasing energy at a later time to feed electricity into grid. Electric storage technologies may store energy as potential, kinetic, chemical, or thermal energy, and include various types of batteries, flywheels, electrochemical, capacitors, compressed air storage, thermal storage devices and pumped

- hydroelectric power and able to generate electricity;
- (k) “**Interoperability**” means the measure of ease of integration between two systems or software components to achieve a functional goal;
  - (l) “**Key Performance Indicator (KPI)**” is a type of performance measurement to evaluate its success, or to evaluate the outcome of a particular activity in which it is engaged;
  - (m) “**Microgrid**” is an intelligent electricity distribution system that interconnects loads, distributed energy resources and storage within clearly defined electrical boundaries to act as a single controllable entity with respect to the main grid. A microgrid uses information, communications and control technologies to operate the system’s distributed supply and demand resources in a controlled and coordinated way either while connected to the main grid or while islanded. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode;
  - (n) “**Prosumer**” means a consumer who consumes electricity from the grid and can also inject electricity into the grid for distribution licensee, using the same point of supply;
  - (o) “**Smart Grid**” is an electricity network that can cost-efficiently integrate the behaviour and actions of all users connected to it - generators, consumers and those that do both - in order to ensure economically efficient, sustainable power systems with low losses and high levels of quality and security of supply and safety;
  - (p) “**Smart Meter**” means a meter as specified in IS16444 and as amended from time to time;
  - (q) “**Wide Area Measurement Systems (WAMS)**” is advanced measurement technology, information tools, and operational infrastructure that facilitate the understanding and management of the increasingly complex behaviour exhibited by large power systems to enhance the system operator's "situational awareness" for safe and reliable grid operation.
- (2) Words and expressions used and not defined in this Regulation but defined in the Act shall have the meanings assigned to them in the Act.

### **3. Smart Grid objectives**

- (1) The objectives of this Regulation are to enable integration of various smart grid technologies and measures to bring about economy, efficiency improvement in generation, transmission and distribution licensee operations, manage the transmission and distribution networks effectively, enhance network security, integrate renewable and clean energy into the grid and micro grids.
- (2) The objectives also include enhancing network visibility and access, promoting optimal asset utilization, improving consumer service levels thereby allowing for participation in operations of transmission licensees, distribution licensees through greater technology adoption across the value chain in the electricity sector and particularly in the transmission and distribution segments.

#### **4. Smart Grid process**

- (1) The Smart Grid process shall constitute the activities including but not limited to the following:
  - (a) Formulation of Smart Grid programmes;
  - (b) Implementation of Smart Grid programmes;
  - (c) Cost Effectiveness Assessment of Smart Grid programmes;
  - (d) Monitoring and Reporting of Smart Grid Plans and programmes;
  - (e) Essential requisites for Smart Grid programmes;
  - (f) Customer engagement and participation;
  - (g) Customer data protection;
  - (h) Training and capacity building;
  - (i) Methodology for setting Smart Grid plans and funding levels;
  - (j) Database development framework and information system requirements;

#### **5. Constitution of Smart Grid Cell, its roles & responsibilities**

- (1) Every transmission licensee, distribution licensee shall, constitute Smart Grid Cell within three (3) months of notification of this Regulation.
- (2) The Smart Grid Cell so constituted shall have the authority and necessary resources so as to execute the functions assigned to it under this Regulation.
- (3) The Smart Grid Cell shall be responsible for:
  - (a) Baseline study and development of data;
  - (b) Formulation of Smart Grid Plans, Programmes and Projects;
  - (c) Design and development of Smart Grid projects including cost benefit analysis, plans for implementation, monitoring & reporting and for measurement & verification;
  - (d) Seeking necessary approvals to Smart Grid Plans, Programmes and Projects;
  - (e) Implementation of Smart Grid programmes;
  - (f) Any other additional function that may be assigned by the Commission from time to time;
- (4) The transmission licensee, distribution licensee may combine activities related to energy efficiency, demand side management and Smart Grid implementation within the same cell.

#### **6. Baseline study and development of data**

- (1) The transmission licensee, distribution licensee shall undertake baseline study to identify the targets and final outcomes for Smart Grid project programmes. The transmission licensee, distribution licensee shall also build the necessary database.
- (2) The transmission licensee, distribution licensee shall undertake study to estimate potential for employment of specific efficiency technologies and applications, establish key performance indicators, and determine existing baseline technical conditions.

- (3) On the basis of the results of baseline study, the transmission licensee, distribution licensee shall develop smart grid programme for its area of supply.

## **7. Formulation of Smart Grid Plan, Programmes, Projects**

- (1) The transmission licensee, distribution licensee shall submit an integrated Multi-Year Smart Grid Plan for their respective Licence areas along-with Multi Year Tariff Petition or ARR Petition, for the approval of Commission.

- (2) All Smart Grid projects requiring investments of more than Rs.20 Crore (Rupees Twenty Crore) shall be submitted to the Commission for prior approval of investments:

Provided that investments of less than Rs.20 Crore (Rupees Twenty Crore) shall not require prior approval of the Commission if it is part of Multi Year Smart Grid Plan of the utility approved by the Commission.

- (3) The proposal for Smart Grid Projects shall include:
- (a) Detailed Project Report;
  - (b) Customer engagement and participation plan as applicable;
  - (c) Training and capacity building plan; and
  - (d) any other information that may be stipulated by the Commission from time to time.

Provided that the detailed project report would include inter alia description of the project, objective and rationale for the project, technical feasibility study, projected financial implications, target stakeholders, detailed cost benefit analysis detailing all costs qualitative and quantitative in nature, assessment of the project, in line with the cost effectiveness guidelines issued by the Commission, proposed mechanism for recovery of costs, delivery strategy, implementation mechanism, implementation schedule, performance incentives if any, monitoring and evaluation plan, plan for increasing awareness among the stakeholders.

- (4) The Commission shall allow creation of provision for Research & Development activities in the field of Smart Grid projects in the Aggregate Revenue Requirement of the distribution licensee up to a limit equivalent to Rs.0.01 per unit of sales of the distribution licensee. The distribution licensee shall be required to maintain a separate account for this fund and utilization of this fund shall require prior approval of the Commission.
- (5) The Commission shall also allow creation of provision for Research & Development (R&D) activities in the field of Smart Grid projects in the Aggregate Revenue Requirement of the transmission licensee and State Load Dispatch Centre, up to a limit equivalent to 0.50 percent (0.50%) of the Aggregate Revenue Requirement of the respective year of transmission licensee and State Load Dispatch Centre. The transmission licensee and State Load Dispatch Centre shall be required to maintain a separate account for this fund and utilization of this fund shall require prior approval of the Commission.
- (6) A list of indicative components of Smart Grid Projects are as under:
- (a) Advanced Metering Infrastructure (AMI);

- (b) Demand Response;
- (c) Micro-Grids;
- (d) Distribution SCADA/Distribution Management;
- (e) Distributed Generation;
- (f) Peak Load Management;
- (g) Outage Management;
- (h) Asset Management;
- (i) Wide Area Measurement Systems;
- (j) Energy Storage Projects;
- (k) Grid Integration of Renewables;
- (l) Electric Vehicle including Grid to Vehicle (G2V) and Vehicle to Grid (V2G) Interactions;
- (m) Smart Grid Data collection and analysis;
- (n) Tariff Mechanism including interruptible and dynamic tariffs, time of use, critical peak pricing, real time pricing, etc.;

## **8. Approval of Smart Grid Plan, Programme, Project Document**

- (1) The Commission shall approve a Smart Grid Programme, Project if it is in line with the Objectives set out in clause 3 of this Regulation.
- (2) The Commission may take assistance and advice of such experts as it deems necessary for examining the proposal submitted by the transmission licensee, distribution licensee.
- (3) The Commission while according approval to the proposals, may identify costs, if any, relating to the programme, project, and decide the methodology, procedure, process for recovery of such costs:

Provided that the Commission may provide the incentive/dis-incentive mechanism for the transmission licensee, distribution licensee linked to the execution, implementation and performance during the life of the project. The Commission may also specify financial incentives/dis-incentives to participating consumers to encourage active and effective participation in the Smart Grid programs:

Provided that the Commission may modify the proposal as deemed fit in order to ensure its consistency with overall objectives.

## **9. Execution of Smart Grid programmes, projects**

- (1) The transmission licensee, distribution licensee shall undertake execution of the project, programme in line with the approval given by the Commission and other directions issued by the Commission from time to time.
- (2) The transmission licensee, distribution licensee shall normally adopt the system standards as per Regulations notified by the CEA. In such case where no standards or regulations are notified by the CEA the appropriate standards, regulations notified by the Commission shall be applicable. In respect of network, communication, products, interoperability and cyber security, the standards as provided by BIS or such appropriate authority shall be adopted. Where these standards are not yet in place, relevant

IEC/IEEE/ANSI Standards shall be followed in that order.

- (3) The Regulations relating to Standards of Performance (SoP) as notified by the Commission shall apply. Assessment of performance of the Smart Grid projects shall be carried out for incentivizing/penalizing performance of transmission licensee, distribution licensee. The Commission may specify and require implementation of additional standards of performance to maximize the benefits and ensure compliance of the Smart Grid performance standards proposed.
- (4) The transmission licensee, distribution licensee and other agencies responsible for implementation of the Smart Grid programmes, projects shall ensure that protection of consumer data and consumer privacy is accorded the highest levels of priority.

#### **10. Mechanism for Cost Recovery**

- (1) The transmission licensee, distribution licensee shall identify the net incremental costs, if any, associated with planning, design and implementation of programmes.
- (2) The transmission licensee, distribution licensee may propose methodology for recovery of net incremental costs through tariff or any other mechanism.
- (3) In order to qualify for cost recovery, each program must be:
  - (a) Approved prior to implementation; and
  - (b) Implemented in accordance with the approved program plan;
- (4) The Commission shall allow the recovery of such expenditure in the Aggregate Revenue Requirement (ARR) subject to prudence check.

#### **11. Smart Grid Programme, Project Completion Report.**

- (1) The transmission licensee, distribution licensee will prepare and submit a detailed programme, project completion report and submit the same to the Commission within one (1) month of completion of such programme.
- (2) The Report shall cover the programme, project expenses, physical achievements, constraints and difficulties faced, and deviations, if any.
- (3) The transmission licensee, distribution licensee shall place the completion report in public domain through its website.

#### **12. Monitoring, Evaluation, Measurement and Verification of execution and performance of the Smart Grid Programme, Project**

- (1) The Smart Grid programme, project shall be monitored and evaluated based on appropriate methodology including Key Performance Indicators (KPI) as decided by the Commission using suitable measurement and verification protocols identified for each of the individual programmes, projects by the Commission.
- (2) The transmission licensee, distribution licensee shall also submit an evaluation report to the Commission, which inter alia will include outcomes, benefits, lessons learnt and way forward.

### 13. Awareness and Capacity Building

- (1) In the development phase of Smart Grid programs, there would be significant needs for customer/prosumer education and outreach. The transmission licensee and distribution licensee shall earmark 1% of the project cost for each Smart Grid project towards consumer awareness and capacity building.
- (2) As part of the detailed project reports, transmission licensee, distribution licensee shall define a clear internal and external communication strategy that identifies the critical communication needs and linking the same to the key project components. The Commission may reject project proposals or may require revisions to the communication strategy if required.

### 14. Safety and standards related to smart grid

- (1) **System standards:** The transmission licensee, distribution licensee shall normally adopt the system standards as per Regulations notified by the CEA. Where CEA or BIS standards are not yet in place, relevant IEC/IEEE/ANSI Standards should be followed in that order. In such case where no standards or regulations are notified by the CEA the appropriate standards, regulations notified by the appropriate Commission shall be applicable.
- (2) **Network and communication standards:** In respect of network, communication, products, the standards provided by BIS or such appropriate authority shall be adopted. Where these standards are not yet in place, relevant IEC/IEEE/ANSI Standards should be followed in that order.
- (3) **Product standards:** Where available BIS standards shall be complied with for all equipment and technology related to Smart Grid. Where BIS standards are not yet in place, relevant IEC/IEEE/ANSI Standards should be followed in that order.
- (4) **Performance standards:** To the extent applicable, the Standards of Performance Regulation shall apply for assessing the performance of smart grid projects. The Commission may specify and require implementation of additional Standards of Performance to maximize the benefits and ensure compliance of the Smart Grid investments proposed. All Standards of Performance to be met in the Smart Grid project implementation area shall be measurable through the measurement, visualization and analytics facilities that are required to be integral part of the Smart Grid project design. The Commission, through Order, may require specific reporting arrangements to be implemented and periodic reports to be furnished to the Commission on actual performance against the required standards.
- (5) **Consumer data protection standards:** The transmission licensee, distribution licensee and other implementers of the Smart Grid projects/programs shall ensure that protection of consumer privacy is accorded the highest levels of priority in the design of the Smart Grid projects and the corresponding investment plans. Consumer data shall be protected through appropriate levels of encryption and access controls and shall ordinarily not be shared with external agencies without explicit authorization of the Commission or unless required by statutory authorities or by courts of law.
- (6) **Testing and certification:** The Commission may require the licensee to provide certificate of compliance to specific standards from the designated

nodal authority at the national level for the Smart Grid equipment installed.

**15. Power to amend**

The Commission may, at any time add, vary, alter, modify or amend any provisions of this Regulation.

**16. Power to give directions**

The Commission may, from time to time, issue orders and practice directions in regard to the implementation of the Regulation and procedures to be followed.

**17. Power to relax**

The Commission may by general or special order, for reasons to be recorded in writing and after giving an opportunity of hearing to the parties likely to be affected, may relax any of the provisions of this Regulation on its own motion or on an application made before it by an interested person.

**18. Power to remove difficulties**

If any difficulty arises in giving effect to the provisions of this Regulation, the Commission may, by general or special order, make such provisions not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.

**19. Savings**

Nothing contained in this Regulation shall limit or otherwise affect the inherent powers of the Commission from adopting a procedure in conformity with the provisions of the Act, which is at variance with any of the provisions of this Regulation, if the Commission, in view of the special circumstances of the matter or class of matters and for reasons to be recorded in writing, deems it necessary or expedient to depart from the procedure specified in this Regulation.

**20. Enquiry, investigation and adjudication**

All enquiries (inquiries), investigations and adjudications under this Regulation shall be done by the Commission through the proceedings in accordance with the provisions of the Conduct of Business Regulations as amended from time to time.

**(BY ORDER OF THE COMMISSION)**

Hyderabad  
28.06.2021

**Sd/-**  
**UMAKANTA PANDA,**  
Commission Secretary [FAC],