



## RAJASTHAN ELECTRICITY REGULATORY COMMISSION

'Vidyut Viniyamak Bhawan', Near State Motor Garage, Sahakar Marg, Jaipur  
Tel.: 0141-2741299, 2740067 Fax: 0141-2741018 E-mail: [mercjpr@yahoo.co.in](mailto:mercjpr@yahoo.co.in)  
Website: [www.erc.rajasthan.gov.in](http://www.erc.rajasthan.gov.in)

### PUBLIC NOTICE

In exercise of powers conferred under Section 181(2) (zp) of the Electricity Act, 2003 (36 of 2003) read with relevant sections of the Electricity Act, 2003, and all other provisions enabling it in this behalf, the Rajasthan Electricity Regulatory Commission having framed the Draft Regulations, "Rajasthan Electricity Regulatory Commission (Demand Flexibility (DF)/Demand Side Management (DSM)) Regulations, 2026", invites comments/suggestions from the interested person before finalizing them.

Notice is hereby issued inviting comments/suggestions on the above draft Regulations from interested persons. The comments/suggestions, if any, in six set/copies in writing shall reach the Receiving Officer of the Commission on or before 27.02.2026. The copy of the draft Regulations along with Explanatory Memorandum may be obtained from the Receiving Officer of the Commission on payment of Rs. 100/-. The draft Regulations along with Explanatory Memorandum are also available on Commission's website [www.erc.rajasthan.gov.in](http://www.erc.rajasthan.gov.in).

Secretary

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(Not to be published)

Dated: 28.01.2026

Secretary



# राजस्थान विद्युत विनियामक आयोग

विद्युत विनियामक भवन, स्टेट मोटर गेरेज के पास, सहकार मार्ग, जयपुर-302001  
दूरभाष : 0141-2741299,2740067 फ़ैक्स : 0141-2741018 ई-मेल : [recjpr@yahoo.co.in](mailto:recjpr@yahoo.co.in)  
website: [www.erc.rajasthan.gov.in](http://www.erc.rajasthan.gov.in)

## सार्वजनिक सूचना

विद्युत अधिनियम, 2003 की धारा 181(2)(zp) तथा सहपठित संबंधित धारा द्वारा प्रदत्तशक्तियों का प्रयोग करते हुए एवं अन्य सभी प्रावधान जो इस संदर्भ में इसे सामर्थ्य प्रदान करते हैं, के अंतर्गत राजस्थान विद्युत विनियामक आयोग द्वारा प्रारूप विनियम, "राजस्थान इलेक्ट्रिसिटी रेगुलेटरी कमीशन (डिमांड फ्लेक्सिबिलिटी / डिमांड साइड मैनेजमेंट ( DSM )) रेगुलेशन, 2026", बनाए गए हैं, इस विनियम को अंतिम रूप देने से पूर्व आयोग द्वारा सभी इच्छुक व्यक्तियों से सुझाव/टिप्पणियां आमंत्रित की जाती हैं।

एतद्वारा उपरोक्त वर्णित प्रारूप विनियम की सूचना जारी कर इच्छुक व्यक्तियों से सुझाव/टिप्पणियाँ आमन्त्रित की जाती है। अगर कोई सुझाव/टिप्पणियाँ देना चाहे तो छह सेट/प्रतियां लिखित रूप में आयोग के प्राप्तकर्ता अधिकारी को दिनांक 27.02.2026 तक या इससे पूर्व प्रस्तुत कर सकता है। प्रारूप विनियम की प्रतिलिपि आयोग के प्राप्तकर्ता अधिकारी के पास उपलब्ध है जिसे रू 100/- का नकद भुगतान दे कर प्राप्त किया जा सकता है। प्रस्तावित विनियम आयोग की वेबसाईट [www.erc.rajasthan.gov.in](http://www.erc.rajasthan.gov.in) पर भी उपलब्ध हैं।

सचिव

(अप्रकाशनीय)

दिनांक 28.01.2026

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## **EXPLANATORY MEMORANDUM**

### **Draft Rajasthan Electricity Regulatory Commission (Demand Flexibility (DF)/Demand Side Management (DSM) Regulations, 2026**

Rajasthan power sector is currently undergoing a structural transformation, and has established itself as a national leader in renewable energy, dominated by solar power. While this achievement aligns with national climate goals, it has introduced significant operational complexities, primarily the "duck curve" phenomenon. This occurs as solar generation surges during the day but collapses just as evening demand peaks, requiring the rapid ramping of expensive thermal plants or costly short-term power purchases. To address this, the Government of Rajasthan, in its Integrated Clean Energy Policy 2024, has emphasized the integration of energy efficiency and demand side management in the energy ecosystem. Further, Chairman Discoms has also requested vide their letter dated 09.01.2026 to formulate a comprehensive regulatory framework for Demand Flexibility and Demand Response.

The proposed regulations recognize that modern Demand Side Management (DSM) must work on two complementary levels to be effective. The first fold focuses on Load Shifting and Demand Flexibility, which aims to defer or shift demand from high-cost peak periods to low-cost, low-demand periods, specifically the solar-rich hours. This Active management helps the grid absorb excess renewable energy that might otherwise be wasted. The second fold remains rooted in Energy Efficiency, which focuses on reducing overall demand by increasing the efficiency of end-use appliances and industrial processes. Together, this two-fold approach directly reduces the power procurement costs of Discoms by minimizing the need for expensive peaking power. These systemic savings subsequently reduce the overall tariff burden on consumers.

To operationalize these goals, the regulations mandate that every Distribution Licensee (Discom) shall establish a dedicated DF/DSM Cell led by a senior officer of Chief Engineer rank. This cell will be responsible for conducting load research and designing programs tailored to various consumer segments. Discoms will be required to meet specific targets for flexible demand. To support this, a DF/DSM Consultation Committee may be constituted to act as a technical advisory body, ensuring that demand-side resources are managed with the same professional rigor as traditional supply-side assets.

Recognizing that individual small-scale consumers may lack the technical means to participate directly, the regulations introduce the role of Aggregators. These entities will bundle the flexible loads of multiple consumers, such as electric vehicle fleets or smart-appliance users, and offer them as a single resource to the Discom. This creates a new marketplace for demand flexibility. Special emphasis is placed on the agricultural sector through the PM-KUSUM scheme, where solarizing pumps allows for massive shifts in agricultural load to daylight hours. Furthermore, the framework leverages the Advanced Metering Infrastructure (AMI) being deployed under the Revamped Distribution Sector Scheme (RDSS) to provide the necessary real-time data for these flexibility programs.

Every proposed DF/DSM program must undergo rigorous economic testing, including the Total Resource Cost test to ensure net social benefit and the Ratepayer Impact Measure test to prevent adverse tariff hikes for non-participants. Furthermore, the Commission has mandated an Evaluation, Measurement, and Verification (EM&V) process. This involves the appointment of Independent Verification Agencies (IVAs) who will use international protocols to verify that the reported load shifts and efficiency gains are accurate and yield real financial benefits for the utility and its consumers.

The Draft RERC (Demand Flexibility and DSM) Regulations, 2026, represent a comprehensive response to the challenges of the energy transition in Rajasthan. By aligning with the Integrated Clean Energy Policy 2024, the Commission is providing a clear legal path for demand-side resources to contribute to grid stability and cost effective power purchase. This two-fold strategy of shifting peak load and improving efficiency will drive down system costs, enhance reliability, and ensure that Rajasthan's abundant solar energy translates into lower bills for every consumer.

Overall, the Draft Regulations represent a progressive and timely regulatory reform that aligns with the operational realities of a renewable-dominated grid. Subject to careful implementation, monitoring of cost recovery, and phased capacity building, the Regulations have the potential to enhance grid reliability, moderate tariffs, and maximize utilization of low-cost renewable energy in the State.

Considering the above aspects, the Commission has prepared draft RERC (Demand Flexibility / Demand Side Management) Regulations, 2026.

Before finalizing the draft Regulations, Commission invites objection/suggestions from the stakeholders on the draft Regulations as enclosed herewith.

**RAJASTHAN ELECTRICITY REGULATORY COMMISSION (DEMAND FLEXIBILITY (DF) / DEMAND SIDE MANAGEMENT (DSM)) REGULATIONS, 2026**

**DRAFT NOTIFICATION**

In exercise of the powers conferred under Section 181(2) (zp) of the Electricity Act, 2003 (36 of 2003) read with sections 3, 61, 66, 86 and all other powers enabling in this behalf, the Rajasthan Electricity Regulatory Commission hereby makes the following Regulations, namely:

**1. Short Title, extent and Commencement**

- (1) These Regulations may be called the "Rajasthan Electricity Regulatory Commission (Demand Flexibility (DF)/Demand Side Management (DSM)) Regulations, 2026."
- (2) These Regulations shall be applicable to all the Distribution Licensees including deemed Distribution licensees in the State of Rajasthan.
- (3) These Regulations shall come into effect from the date of notification in the Rajasthan Gazette.
- (4) Demand Flexibility Portfolio obligation under Regulation 3.4.1( c) shall be effective from 1 Apr, 2026.

**2. Definitions**

**2.1** In these Regulations, unless the context otherwise requires:

- a) "**Act**" means the Electricity Act, 2003(36 of 2003) as amended from time to time.
- b) "**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 flexibility mechanism, Distributed Generation, Energy Storage etc., within the area of distribution licensee;
- c) "**ARR**" means Annual Revenue Requirement.
- d) "**Avoided Costs**" means the incremental costs saved by the distribution licensee when it avoids purchase of power or distribution related costs in existing or new distribution system investment or upgrades because of implementation of DF / DSM programmes;
- e) "**Baseline data**" means the data relating to the consumption and/or demand for electricity from any specified class or category of consumers or any distribution area, before a DSM/DF programme begins, to provide a starting point for comparison for assessing the program impact;
- f) "**Commission**" means the Rajasthan Electricity Regulatory Commission (RERC) as constituted under Section 82 of the Act;
- g) "**Cost Effectiveness**" means an indicator of the relative performance or economic attractiveness of any investment in DF/DSM programme or when compared to the costs of energy produced and delivered in the absence of such an investment and as stipulated in

Chapter II of these Regulations;

- h) **"Demand Flexibility" or "DF"** means the ability of demand-side loads that can vary consumption patterns hourly or any other time scale, for making electricity more affordable to consumers with the co-benefits of reducing or deferring system costs or an end-use consumption that can increase or decrease as a demand response measure;
- i) **"Demand Flexibility Portfolio Obligations" or "DFPO"** means a trajectory of flexible demand that a distribution licensee needs to ensure availability on an annual basis to provide quick ramping-up and ramping-down of the load based on the system requirements, including maximizing renewable energy integration services;
- j) **"DF/DSM Resource"** means a saving in consumption (kWh) and/or demand (kW/KVA), as a result of implementation of DF /DSM programme (as a single or group of devices at a single or multiple locations), expressed in three important dimensions namely Quantum (kWh and/or kW/kVA), Time and Cost;
- k) **"Distribution Licensee"** means a person who has been granted a license under Section 14 of the Act to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply and includes a deemed Licensee;
- l) **"DF / DSM Cell"** means a specific Cell to be set-up by the Distribution Licensee for targeted activities towards implementation of the DF/DSM activities mandated under these Regulations.
- m) **"Demand Response"** means variation in electricity usage by the end consumers or by a control area manually or automatically, on standalone or aggregated basis, in response to the system requirements.
- n) **"DSM"** means Demand Side Management; capturing the actions of a Distribution Licensee towards altering the end-use of electricity - whether it is to increase demand, decrease it, shift it between high and low peak periods - in the overall interests of reducing Distribution Licensee costs.
- o) **"Energy Efficiency"** means activities or programs that encourage consumers to reduce energy use by making investments in more efficient equipment or control that reduces energy use while maintaining a comparable level of service as perceived by the consumer;
- p) **"Evaluation, Measurement and Verification or EMV"** means activities included under **Chapter III of these Regulations**, which involves evaluation, monitoring, measurement and verification of DF / DSM programmes;
- q) **"Independent Verification Agency or IVAs"** are either individuals certified as energy auditors or energy managers or measurement and verification professionals or organisations with individuals certified as energy auditors or energy managers or measurement and verification professionals;
- r) **"IPMVP"** means International Performance Measurement & Verification Protocol which

provides guidelines that can be used to estimate the savings from the DF/DSM programmes;

- s) **“Life”** means an estimate of the median number of years that the DF/ DSM measures installed and operable under the program or the warrantied years of service.
- t) **“Load Management”** means programs that reduce or shift peak demand from periods of high-cost electricity to non-peak or low-cost time periods, with a neutral effect or negligible increase in electric use;
- u) **“Load Research”** means an activity embracing the measurement and study of the characteristics of electric loads to provide a thorough and reliable knowledge of trends, and general behaviour of the load characteristics of the consumers serviced by the distribution licensee using a variety of metering (including data capture from smart metering systems), surveys, detailed energy audits of consumer-end energy consumption to capture daily, monthly, seasonal and annual usage patterns;
- v) **“MYT”** means Multi Year Tariff;
- w) **“NPV”** means Net Present Value;
- x) **“PCT”** or Participant Cost Test measures the quantifiable benefits and costs to a consumer for participating in a DF/DSM programme;
- y) **“RIM”** or Ratepayer Impact Measure means test which evaluates the impact of the programme implementation and costs on consumers;
- z) **“SCT”** or Societal Cost Test measures the quantifiable benefits and costs of the DF/DSM programme on society as a whole;
- aa) **“TRC”** or Total Resource Cost test means which measures the total quantifiable benefits and costs of a DF/DSM programme;

**2.2** Save as aforesaid and unless repugnant to the context or the subject matter otherwise requires words and expressions used in these regulations and not defined, but defined in the Act, or any other Regulations of this Commission, shall have the same meaning as assigned to them respectively in the Act or the Rules or any other Regulations made there under:

## CHAPTER I: IMPLEMENTATION

### 3. Basic Principles in Licensee operations:

#### 3.1 Demand Flexibility (DF)/Demand Side Management (DSM):

3.1.1 Every Distribution Licensee shall adopt DF / DSM in their day-to-day operations, and undertake planning, designing and implementation of appropriate DF / DSM programs on a sustained basis that are measurable, replicable and available for smooth grid operations, balancing the supply and demand; and to ensure Resource Adequacy requirements under other Regulations. The Licensees shall adequately staff the DF / DSM Cell as required for its activity and such cell be headed by an officer, who is not below the rank of Chief Engineer.

3.1.2 The Distribution Licensee shall pursue the following objectives w.r.t DF and DSM activities:

- (i) Control, change and influence electricity demand;
- (ii) Encourage consumers to amend their electricity consumption pattern both with respect to timing and level of electricity demand for efficient use of energy;
- (iii) Complement supply side strategies to help the utilities to avoid or reduce or postpone a) costly capacity (generation, transmission & distribution network) additions b) costly power purchases and embedding cheaper renewable power instead.
- (iv) Reduce the environmental damage by reducing the emission of greenhouse gases;
- (v) Supplement national level efforts for implementation of various DSM programmes.
- (vi) Make strategic efforts to induce lasting structural or behavioural changes in the market that will result in increased adoption of energy efficiency, as well as the identification and integration of flexible demand with relevant technologies, services, and practices;
- (vii) Protect the interest of the consumers and shall result in overall reduction in tariff for all the consumers.

#### 3.2 Cost recovery of DF/DSM measures:

3.2.1 Distribution Licensees may propose to recover all justifiable costs incurred by them in any DF / DSM related activity, including conducting Load Research (LR), planning, designing, implementing, monitoring and evaluating DF/DSM programs, under Capital Investment Plan in the MYT/ARR filing and Annual financial reporting.

3.2.2 All such DF /DSM related activities/programs undertaken by the Distribution Licensees.

- (i) shall be cost-effective for the Distribution Licensees as well as to the consumers as stipulated under **Chapter II of these Regulations**;
- (ii) shall protect the interest of consumers and implemented in an equitable manner;

(iii) shall result in overall tariff reductions to the consumers, or marginal increase as defined in Chapter II;

### **3.3 Role of Distribution Licensees:**

- (i) To allocate funds (in terms of percentage of the total budget of the Distribution Licensee) to the DF / DSM Cell
- (ii) To develop a robust DF / DSM portfolio structure on a rolling basis for the MYT/ARR period for the purpose of planning.
- (iii) Conduct consumer outreach and awareness to inform consumers of DF/DSM programmes and encourage their participation.
- (iv) To conduct and submit load research reports duly identifying opportunities and proposing measures to implement demand flexibility, load management, energy conservation and energy efficiency programmes;
- (v) To submit a report to the Commission:
  - a. On the impact on energy and demand, together with the cost-benefit analysis as stipulated under **Chapter II** of these Regulations and;
  - b. On the evaluation, measurement and verification of the implemented programmes stipulated under **Chapter III** of these Regulations;
- (vi) Create and maintain a digital registry of aggregators, consumers, flexible resources, baselines, and event performance.
- (vii) Implement specific directions of the Commission.

### **3.4 DF/DSM Guiding Principles:**

3.4.1 The duties of the Distribution Licensees shall be as follows:

- a) Development of DF / DSM portfolio:.** The DF / DSM program portfolio shall broadly include the following:
  - (i) findings of a detailed load research and market research activity including consumers' perspectives and willingness to participate in the DF / DSM initiatives;
  - (ii) detailed working of the possible DF programs to be implemented and the DFPO targets that include all components such as DF, energy efficiency and energy conservation measures;
  - (iii) Prepare a 5 year strategy and a roadmap towards fulfilment of the DFPO portfolio obligation;
  - (iv) portfolio and program-specific cost-effectiveness assessment;
  - (v) develop DF and DSM evaluation, measurement and verification procedures;

- (vi) funds deployment plan to meet the yearly DF targets and other energy efficiency and energy conservation portfolio roll-out on an annual basis.
- (vii) Promotion of load shifting and Demand Response Program.
- (viii) Provide appropriate tariff based incentives or rebates to all HT and LT categories of consumers participating in DR programs by installing smart meters
- (ix) Implementation of latest technologies in the DSM measures such as Internet of Things (IoT) wherever possible for energy savings and operational efficiency.

**b) Timelines for submission of DF/DSM portfolio and according approvals:** The distribution licensees shall submit a “DF / DSM program portfolio and implementation action plan” (Annexure 1) along with the MYT/ARR Tariff filing. On annual basis, the distribution licensees shall submit “Status report on DF / DSM implementation” along with APR proposals for the respective years.

**c) DFPO multi-year targets:** Distribution Licensees shall adhere to specific demand flexibility portfolio obligations (DFPO) set-up with a following specific trajectory:

<b>Financial Year</b>	<b>DFPO as percentage of peak demand experienced in previous Financial Year[..]</b>
FY 2026-27	0.25%
FY 2027-28	1%
FY 2028-29	1.5%
FY 2029-30	2.0%

The targets for subsequent years shall be notified by the Commission from time to time. The Licensee may meet the DFPO through its own programs (e.g., behavioral DR apps) or by procuring capacity from registered Aggregators.

**d) DFPO incentives and disincentives:** Distribution Licensee shall be eligible for an incentive of INR 0.20 Crores for every MW achieved in excess of DFPO. Similarly, Distribution Licensee shall be subjected to a disincentive of INR 0.20 Crores for every MW under-achievement of DFPO. The Distribution licensee shall report its performance regarding achievement of DFPO target in their ARR petition.

**e) DF and DSM Zones:** Distribution Licensee shall, on annual basis, identify the designated areas/DTs, Feeders, Substations with network constraints as “DF/DSM Zones”. The designated DF/DSM Zones shall be targeted for DF and DSM programmes.

**f) DF / DSM portfolio programmes:** Distribution Licensees shall implement DF/DSM programs that add to the portfolio of resource adequacy and those that include demand flexibility to provide quick ramp-up and ramp-down services, reduce peak demand and associated costly power purchase. The Demand Flexibility programs shall also include

Demand Response initiatives involving consumers agreeing to modulate their load shapes. Given the new loads that are now experienced by the Distribution Licensees, programs proposed and implemented through these Regulations shall include, but not limited to, the following:

- i. time-based and selective pumping (based on the cost of energy) in Lift Irrigation Schemes, Municipal Corporations, Urban Local Bodies, drinking water schemes at villages and cluster of villages;
- ii. smart charging of electric vehicles in the 2-wheeler, 3-wheeler, passenger cars, fleet vehicles, public transportation buses, freight carriers, first-mile and last-mile delivery vehicles;
- iii. behind-the-meter battery energy storage systems;
- iv. heat pumps in residential, hospitals, hotels, industries, commercial buildings;
- v. thermal energy storage systems in residential, hospitals, hotels, industries, commercial buildings;
- vi. efficient refrigeration/cold storage programmes;
- vii. replacement of old/inefficient appliances with efficient appliances at consumer premises;
- viii. behavioural changes in the end-uses facilitated through awareness programmes that do not need any specific investments.
- ix. Monitoring of Harmonic levels in the grid.
- x. Centralised procurement of demand flexibility from the aggregators
- xi. Shifting the agricultural load to solar or wind hours. Also, leveraging Solar-agriculture or the PM-KUSUM scheme.
- xii. Consumers participating in utility-led aggregation models, such as Virtual and Group Net-metering, can be incentivized to participate in demand flexibility.

Discom shall plan, design, and implement demand response programmes with the objective of reducing peak demand. Discom shall define participation criteria, baseline methodologies, event triggers, and incentive or penalty mechanisms, and ensure transparent measurement, verification, and settlement of demand response performance.

Consumers participating in demand response programmes shall comply with programme guidelines, respond to demand response events by reducing or shifting load as committed, and allow access to required metering or control infrastructure. Participation shall be voluntary unless otherwise mandated by the Commission, and all programmes shall be implemented in a non-discriminatory manner, with safeguards to protect consumer interests and data privacy.

In addition to the above, specific energy conservation initiatives at the consumers' premises, including domestic consumers, agricultural sector etc., shall be included in the portfolio and shall be funded through the DF/DSM portfolio Capex. The said programs can be implemented by the licensees directly or through the Aggregators appointed by them following due procurement processes as the costs incurred towards the appointment of Aggregators are embedded in the programme costs. Distribution Licensee shall satisfy themselves that the Aggregator is technically and financially competent to undertake on their behalf the functions and discharge the obligations specified in these Regulations. Distribution Licensee shall ensure that the Aggregators and the IVAs are separate entities.

Distribution licensee or through aggregators (on behalf of Distribution licensee) shall ensure consumer awareness and willful consent to participate in DF and DSM programmes. Further, consumers shall be made aware of their withdrawal from the programme and associated rights and processes.

**g) Public disclosure of the DF / DSM portfolio and review documents:** Distribution Licensee shall publish following documents on their websites on an annual basis:

- (i) Load Research,
- (ii) Appliance use and saturation reports,
- (iii) DF/DSM program portfolio and implementation action plan
- (iv) Status report on DF / DSM implementation,
- (v) DF/DSM portfolio evaluation, measurement and verification reports.

Provided that consumer load data shall not be shared with any third party, in compliance with the Digital Personal Data Protection Act, 2023, without explicit, revocable consent, except for the purpose of settlement and verification by the IVA."

#### **4. DF / DSM Consultation Committee (DF / DSM-CC) :**

A separate DF / DSM Consultation Committee may also be set up, if required, with a stated tenure and terms of reference.

#### **5. DF/DSM funding:**

**5.1** Funding of all the DF / DSM portfolio programs and plans to be implemented by the Distribution Licensees shall be included in the MYT/ARR filing. Distribution Licensees shall be allowed to recover all costs subject to prudence check by the Commission based on the cost- effectiveness assessment test included in **Chapter II** of these Regulations.

**5.2** The Commission may direct the Distribution Licensees to adopt other complementing DF/DSM funding approaches such as creating a pool of funds through collection of DF-DSM Charge at a later date through tariff; if such an approach is found beneficial.

## CHAPTER II: COST-EFFECTIVENESS ASSESSMENT TESTS

The economic-effectiveness of a portfolio is to assess the decision variables, inter alia DF/DSM measure/program costs and impacts (both energy – kWh and demand – kVA or KW), discount rate, life, escalation rate and avoided cost.

### 6. Criteria for Cost-effectiveness:

Distribution Licensees shall submit the results of specific Cost-effectiveness Assessment test. Distribution Licensees shall evaluate **Total Resource Cost (TRC)** test as the main hurdle test; followed by the **Ratepayer-Impact Measure (RIM)** test that confirms the fact that program implementation and costs incurred would not impact the tariffs adversely. The program screening shall be carried out using the following tests:

- a) **TRC as the main hurdle test:** All DF/DSM programs that show positive number for the Net Present Value (NPV) of the Benefits over the NPV of Costs should be considered for evaluation of RIM test;
- b) **RIM test:** DF/DSM Programs that show positive number when NPV of the Benefits over the Costs, the programs having lower impact on the Rate payers shall be considered for implementation.
- c) **Life-cycle revenue impact (LRIRIM) test:** DF / DSM Programs that do not show positive number for RIM test may be implemented if the tariff impact due to the implementation of the DF / DSM Programs is less than Rs. 0.005/kWh or less than 0.05% of the existing tariff, whichever is higher. All the energy savings numbers should be corrected for power shortages, if any.

### 7. Total Resources Cost test:

The main hurdle test shall be carried out by calculating Net Present Value (NPV) of Benefits (B) and Costs (C). NPV for a DF/DSM measure/program shall be determined as the difference between B and C.

Where,

**B=NPV of measure/programme benefits discounted over a specified time period**

**C=NPV of measure/programme costs discounted over a specified time period** If the measure/program benefit in year “t” is “B<sub>t</sub>”, and discounting rate is “r”, the time period for discounting is “n” years, then B can be expressed as:

$$B = \sum_{t=1}^n [(B_t) / (1+r)^{t-1}] \quad (\text{equation 1})$$

Similarly, if the measure/programme cost in year “t” is “C<sub>t</sub>”, and discounting rate is “r”, the time period for discounting is “n” years, then C can be expressed as:

$$C = \sum_{t=1}^n [(C_t) / (1+r)^{t-1}] \text{(equation 2)}$$

**Cost and benefit elements for the TRC test shall be determined considering the following:**

- a) The cost of efficient device/equipment/appliance/technology or practice, including the applicable taxes, duties and levies;
- b) Installation, trial and commissioning costs associated with efficient device/equipment/appliance/practice/technology;
- c) Yearly operation and maintenance costs over the life of the measure/program;
- d) Old inefficient equipment removal and safe disposal costs (if the DSM measure/program involves replacement or retrofitting), and recovery of salvage value of such equipment;
- e) Program administration, monitoring and evaluation costs;
- f) Program marketing costs and consumer onboarding cost, including cost associated with consumer awareness.
- g) Avoided cost/benefits including avoided power procurement, avoided infrastructure upgrades, reduced maintenance of grid infrastructure, revenue from surplus power during peak hours etc.

***Explanation:***

If there are any tax credits and grants the same shall be considered as reduction in the cost. Similarly, if there is old equipment/device / appliance / technology etc., that is being replaced; the salvage value of this old equipment or device shall be considered as a reduction in the cost.

Benefits of a DF/DSM program or a DF/DSM measure are the savings in the energy (kWh) consumed and/or savings in the demand (kW). The kWh savings shall be calculated based on the number of hours the energy efficient appliance/equipment is used and number of days in a year the appliance/equipment is used. These savings usually occur at the point of use and are experienced by the consumer installing a DF / DSM measure or consumer participating in a DF / DSM program. To arrive at the avoided purchase of power by the licensee, the participant savings at the point of use have to be suitably adjusted to account for system transmission and distribution losses; as well as value of Grid-connected Distributed Solar PV Systems.

Thus, if  $\Delta S$  is savings at point of use in year “t” are  $\Delta S_t$  expressed in kWh, and if transmission and distribution losses expressed as percentage in the same year are  $TL_t$  and  $DL_t$ , respectively, the Avoided Purchase of Power in year “t” (APPt) by the licensee would be:  $=\Delta S_t / [(1- TL_t) \times (1- DL_t)]$ .

If rate of power purchase in year “t” is  $R_t$ , then Avoided Power Purchase Cost (APPC<sub>t</sub>) in year “t” would be:  $= APP_t \times R_t$

**Any reduction in “intra-state transmission charges”, as a result of reduction in the average co-incident peak demand of the licensee shall be considered a “benefit” under this test.**

While calculating energy and demand savings as benefits, year-on-year escalation rate of 5% should be considered. Tests should consider a discount rate equal to Weighted Average Cost of Capital (WACC).

Both benefits and costs shall be calculated over the “Life” of the technology being deployed. Distribution Licensee shall use the “warrantied” life of the retrofit by the technology provider as it is important to ensure that the savings considered are realized over the life-span of the equipment/appliances.

## **8. Rate payer Impact Measure test:**

### **8.1** Cost elements mentioned below shall be considered for evaluation:

- a) The cost of efficient device/equipment/appliance/ technology or practice, including the applicable taxes, duties, levies, etc., paid for by the licensee or to the extent paid for by the licensee;
- b) Installation, trial and commissioning costs associated with efficient device/equipment/appliance/practice/technology paid for by the licensee or to the extent paid for by the licensee;
- c) Yearly operation and maintenance costs over the life of the measure/programme paid for by the licensee or to the extent paid for by the licensee;
- d) Old inefficient equipment removal and safe disposal costs (if the DSM program involves replacement or retrofitting) paid for by the licensee or to the extent paid for by the licensee;
- e) Program administration, monitoring and evaluation costs paid for by the licensee or to the extent paid for by the licensee;
- f) Program marketing costs, including incentives, if any, paid for by the licensee or to the extent paid for by the licensee;
- g) Decrease in licensee revenues due to the DSM programme;

### **8.2** Benefits of the DSM program shall be calculated as “**Avoided Cost of Power Purchase**”. If savings due to a DSM program/measure at point of use in year “t” are $\Delta St$ , and if transmission and distribution losses in the same year are $TL_t$ and $DL_t$ , expressed as a percentage respectively, the Avoided purchase of power in year “t” (APPC<sub>t</sub>) by the licensee would be:

$$=\Delta St / [(1 - TL_t) \times (1 - DL_t)]$$

If rate of power purchase in year “t”, is  $R_t$ , then avoided power purchase cost (APPC<sub>t</sub>) in year “t” would be: =  $APP_t \times R_t$

- 8.3 Any reduction in “intra-state transmission charges”, as a result of reduction in the average co-incident peak demand of the licensee shall be considered as a “benefit” under this test;
- 8.4 While calculating energy and demand savings as benefits, year-on-year escalation rate of 5% should be considered;

**Note: Tests should consider a discount rate of WACC.**

- 8.5 Both benefits and costs shall be calculated over the “Life” of the technology;
- 8.6 Distribution Licensee shall use the “warrantied” life of the retrofit by the technology provider, as it is important to ensure that the savings considered are realized over the life-span of the equipment/appliance.
- 8.7 Distribution Licensees shall also submit results of two more test – Participants Cost Test (PCT) and Societal Cost Test (SCT); though these are not considered in the decision-making. Methods for carrying out the PCT and SCT are provided in **Annexure 2** to these Regulations.

## **9. Life-cycle Revenue Impact – RIM test:**

- 9.1 LRIRIM test shall be conducted using same data used for calculating the RIM test described in Regulation 8 of these regulations.
- 9.2 Difference between NPV of Cost and NPV of Benefits shall be divided with total utility kWh sales to determine the rate impact on the non-participants.
- 9.3 Distribution Licensees shall also submit results of two more test – Participants Cost Test (PCT) and Societal Cost Test (SCT); though these are not considered in the decision-making. Methods for carrying out the PCT and SCT are provided in Annexure 2 to these Regulations.

## **10. Values of key inputs used in the tests:**

The default input values to be considered by all Distribution Licensees in the State, shall be as follows:

- a) **Avoided cost of power purchase** for TRC, RIM and PCT–Weighted Average of Highest Marginal Cost of Power Purchase related to top 10% of energy use stack for the previous financial year.
- b) Avoided cost of power purchase for SCT will be the prevalent ceiling rate for Day ahead market set by CERC, revised from time to time as valid at the time of submission of the DF/DSM portfolio.

The Commission may, by order, revise the above values annually, if necessary.

## CHAPTER III: EVALUATION, MEASUREMENT AND VERIFICATION

### 11. DSM Evaluation, Measurement & Verification Guiding Principles

11.1 Three basic types of evaluations covered under these Regulations include:

- a) **Impact evaluation:** that determines the impacts (e.g., energy and demand savings) and co-benefits (e.g., avoided emissions, health benefits, job creation, energy security, transmission/distribution benefits, and water savings) that directly result from a program. Impact evaluations support cost-effectiveness analysis aimed at identifying relative program costs and benefits.
- b) **Process evaluation** that assesses program delivery, from design to implementation, in order to identify bottlenecks, efficiencies, constraints, and potential improvements. Timelines in identifying opportunities for improvement is essential.
- c) **Market effects evaluation** that estimates a program's influence on encouraging future DF/DSM projects because of changes in the energy marketplace.

11.2 Entire **Evaluation, Measurement & Verification (EMV)** process for all the demand flexibility and demand side management projects and programs shall be managed in a transparent manner using online and real-time assessment tools wherever feasible. The Distribution Licensees shall empanel Independent Verification Agencies (IVAs), who are either individuals or organizations with expertise defined under these Regulations. The Commission may choose to have an IVA to evaluate the programs directly as well on a case-to-case basis if it chooses to do so.

### 12. Impact Evaluation:

The impact evaluation expressed as gross energy/demand savings and the demand flexibility created shall be determined by comparing energy use and demand after a DF/DSM program is implemented (i.e. the reporting period) with the energy use and demand if the program has not been implemented (i.e. the baseline). The estimated savings shall be determined by the following equation:

**Estimated savings = (baseline use) – (reporting period use) ± (appropriate adjustments)**

The impact evaluation shall primarily be carried out using either of the three approaches:

- a) Measurement & verification approach;
- b) Deemed savings approach; and
- c) Large-scale data analysis.

### 13. Measurement & verification approach:

Four generic measurement & verification methodologies A, B, C and D described in the **International Performance Measurement & Verification Protocol (IPMVP)** may be

used to estimate the savings comparing baseline use and reporting period use with appropriate adjustments thereto. **The distribution licensee should propose the evaluation process that complies with the IPMVP guidelines at the approval stage of the new demand side management programs.** If the distribution licensees wish to propose any other suitable methodologies, the portfolio and programs should include those explicitly with justifications thereto. **Annexure - 3** shows the general description of the four measurement & verification methodologies as per IPMVP.

#### **14. Deemed savings approach:**

**14.1 Deemed savings (also referred to as “stipulated” savings)** shall be reported on the basis of historical savings values of typical DSM projects. Sources of deemed savings values must be documented in the evaluation plan.

**14.2** The deemed savings determined for a sample of projects shall be applied to all the projects in the DSM program to estimate the program-level savings. The deemed savings approach shall be recommended by the distribution licensee for DSM programs that are repeated and have fixed operating conditions (e.g. operating hours) and well-substantiated savings values (e.g. energy consumption patterns). Distribution licensees shall propose this approach when well documented and systematically validated sources, such as historical evaluations, are available for certain types of technologies.

#### **15. Large-scale data analysis:**

In case of established homogeneous energy use patterns and implementation of programs in such categories, the savings evaluation can be carried out using time-series comparisons of energy use before and after the implementation of demand side management programs. The other approach shall include comparison of energy use of participants and non-participants.

#### **16. Process evaluation:**

Distribution licensees shall also include robust process evaluations to improve the programme design and cost-effectiveness of the proposed measures. Process evaluations shall be structured in order to examine the efficiency and effectiveness of DF/DSM programme implementation procedures and system.

#### **17. Market Effect Evaluation:**

The EMV shall also assess Market effects as a result of the specific DF / DSM programmes. This evaluation shall include:

- a) Assessment of additional DF / DSM programs implemented by the participants without the support from distribution licensee.
- b) Additional entities implementing the technical interventions promoted through the distribution licensee’s DSM programs.
- c) Assessment of pricing, changes in pre-dominant efficiencies and availability of

efficient products in the market.

**18. Empanelment of Independent Verification Agencies:**

Distribution Licensees shall empanel Independent Verification Agencies (IVAs). The IVAs shall be selected based on the following criteria:

- a) IVAs should be individual consultants, consultancy organizations, academic/research institutions, civil society organisations and/or consortia thereof;
- b) IVAs should have at least one BEE Certified Energy Auditor or Certified Energy Manager; or a Certified Measurement & Verification Professional (CMVP) certified by any national or international certification agency on their team in case of consultancy organizations/consortia thereof; and
- c) Shall possess experience in design, implementation, review, measurement, verification and statistical analysis related to large datasets.
- d) The IVAs appointed for specific projects should not have been involved in DF/DSM program design, implementation, review, and any related activity.

**19. EMV report formats:**

The EMV reports submitted by the IVAs shall include atleast the following:

- a) DF/DSM portfolio/programme description,
- b) description of the proposed impact,
- c) process and market evaluation methodologies,
- d) description of measurement instruments,
- e) sampling process,
- f) reporting period,
- g) baseline period,
- h) metering/measurement accuracies,
- i) statistical analyses carried,
- j) list of assumptions,
- k) survey instruments used and annexes including the key raw data, list of respondents with their contact details, and credentials of IVAs.

## CHAPTER IV: MISCELLANEOUS

### **20. Powers to remove difficulties:**

If any difficulty arises in giving effect to any of the provisions of these Regulations, the Commission may by order, take suitable action, not being inconsistent with the Act which appears to the Commission to be necessary or expedient for the purpose of removing difficulties.

### **21. Savings:**

Notwithstanding, anything done or any action taken or purported to have been done or taken, including any procedure, minutes, reports, confirmation or declaration of any action related to Demand Flexibility (DF)/Demand Side Management (DSM) prior to the commencement of these Regulations, shall be deemed to have been done or taken under the relevant provisions of these regulations.

### **22. Orders and Practice Directions:**

Subject to the provisions of the Act, the Commission may from time-to-time issue orders and directions with regard to the implementation of these Regulations.

### **23. Power to Amend:**

The Commission may, at any time, vary, alter, modify or amend any provisions of these Regulations.

**By the Order of the Commission,**

Secretary

Rajasthan Electricity Regulatory Commission

**Annexure 1: Format of DF/DSM program portfolio and implementation action plan**

DF/DSM Detailed Project Report (DPR) to be submitted by the Distribution Licensees for the approval of the Commission shall be required to include the following (**for ARR proposal**):

**PROJECT DATA FORMAT:**

**Name of the Licensee:** ..... **Zone/ Circle /Division**  
**/Location :**...../...../...../.....

**Name/Description of the DF/DSM Work:**..... **Estimated Cost:**  
.....

**Proposed Date of Commencement:**..... **Targeted Date of Completion:**.....

**BRIEF DESCRIPTION OF THE WORK**

**i. New Proposals shall include:**

- a. overview of the Plan,
- b. the DF / DSM target for the Plan period;
- c. total funding envisaged for the MYT/ARR period with a break up of funds for programmes and funds for administration and management of DF / DSM effort by the licensee, listing and brief description of the DF / DSM programs proposed to be implemented for meeting the DF / DSM targets set by the Commission;
- d. Plan level and individual DF / DSM program level cost effectiveness, including impact on consumer tariffs;
- e. qualitative and/or quantitative contribution of the Plan;
- f. year wise break up of achievement of targets and funds requirement;

**ii. Briefly record the reasons (circumstances necessitating) for taking up the Work in comparison with following (if applicable):**

- a. achievements of the past multi-year plan as against the targets;
- b. the reasons and explanations if the targets set have not been achieved;
- c. fund usage;
- d. Justification on the major constraints faced in the implementation of various programmes;
- e. suggestions /facts to be considered for future implementation

**iii. Characteristics to be considered for proposal:**

- a. Present time series (past 5 years) information about power situation in general, including

demand met, load shedding, if any;

- b. the consumer base of the licensee – total number of consumers, consumers by rate category;
- c. Total consumption and break-up of the same by consumer and rate category;
- d. Source wise energy purchase and the average rate of purchase of power; Load duration curve, peak load by season, typical average daily, seasonal and weekly load curves;
- e. Forecast of demand, energy requirement, sales and revenue requirement over the next five years (Plan period), including elaboration of methodology used, data used, statement of underlying assumptions used and basis for the assumptions, sensitivity analysis carried out and changes in assumptions and other conditions assumed for carrying out sensitivity analysis.
- f. **Primary/Major objective or the purpose intended to be achieved in terms of quantifying the results intended (Ex: reducing the peak load of ... . MVA/kVA (in comparison with targets approved by the Commission if applicable)**

.....  
.....

g. **Action Plan for achievement of primary objective:**

i. **To be achieved in full on commissioning**

ii. **To be achieved in phases of 1<sup>st</sup> Year.....%,**

**2<sup>nd</sup> Year:....%,**

**3<sup>rd</sup> Year: .....%.**

h) **DF / DSM Plan targets and the resource availability estimates:** Details on the proposed DSM targets and the resource requirements for meeting the targets.

i) **List other intended objectives, if any to be achieved and the time planned for achievement of targets such as identification of sectors, segments and end-uses:** Details on the sectors such as domestic, commercial, industrial, agriculture, segments such as consumer category, such as – offices, hospitals, hotels, malls, banks, industrial cluster - industrial estate, geographical area, street lighting, gram panchayat water supply systems, specific feeders, etc. and end-uses (lighting, pumping, heating, space cooling, air-conditioning, etc.) target for be the achievement and justification for choosing these sectors, segments and end-uses.

**Name of the Objectives**

**Targeted time of achievement**

- 1. ....
- 2. ....
- 3. ....
- 4. ....
- 5. ....

**j) Identification of DF / DSM measures/technology options / portfolio plans to achieve DSM targets:**

Detailed process (including justification) to be used for identification of DSM measures and technologies (within the identified sectors, segments and end-uses) that are intended to achieve the targets.

**k) Details of financing plan for the project to be undertaken, if any. Else provide the sources from which the funds were diverted**

.....

**l) Planning of Expenditure:**

**Year 1:Rs. .... Year 2:Rs. .... Year 3:Rs. ....**

**a. Provide the list of alternatives considered. If the alternatives are provided, mention the basis on which the proposed scheme is finalised.**

.....  
.....

**b. Details of Cost Benefit Analysis as specified in these Regulations.**

.....  
.....  
.....

- iv. **Individual Program Description:** For each of the DSM program included in the final identified portfolio of DSM programs, provide information highlighted at the end of this Annexure.
- v. **Annual and cumulative achievements :** Details of annual contribution that will come forth from various DSM programs in the final identified portfolio (to ensure that the Plan cumulative targets are met).
- vi. **DF/DSM Plan EMV:** Details on the EMV Plan for the DSM Plan as per the **Chapter III** of these regulations.

- vii. **DF/DSM Plan monitoring and reporting:** Details on the monitoring and reporting Plan (frequency, minimum content, format, indicators and means of verification chosen).
- viii. **Implementation Plan:** Details on the schedule of implementation of different elements of the programs, portfolio and plan; also qualifying the same with submission of activity charts.

**Note:**

**The cost effectiveness shall be calculated as per tests indicated in Chapter II of these Regulations**

**To be submitted in APR:**

**Elements of Detailed Project Report (DPR) Document:**

This shall be a reference document for the licensee and all stakeholders. This shall have information on the consumer segments along with identified DSM measures to be implemented and have information on incentives achieved and features of consumer/vendor interface, delivery options, institutional relationships, detailed program implementation plan with time lines and implementation responsibilities. The APR shall include the following elements.

**1. Program description:**

- a. Description of DSM measures and technologies, the program is intending to implement, relevant pricing, quality assurance and replacement/guarantee policy as per prevailing Regulations.
- b. Consumer segments the program is targeting, including eligibility criteria to be used for identification of potential consumers within the identified target segment.
- c. Other stakeholders (financiers, energy services companies, equipment vendors, consultants, energy auditors, trade associations, groups of persons, NGOs, academic institutions, government organisations) involved in the implementation process, description of their roles and responsibilities and manner of participation.
- d. Barriers the program is addressing.
- e. Strategy the program proposes to use, including proposed incentives, if any, strategies to motivate consumers and other stakeholders to participate in the program, description of payment and collection mechanism and equipment/appliance/service delivery mechanism.
- f. Description of program management and implementation arrangements, including description of institutional relationships and internal programme tracking systems followed by the licensees.

**2. EMV, Monitoring & Reporting:**

This shall include EMV and monitoring and reporting plans:

- a. Description of baseline calculation and description of monitoring and verification methodology.

- b. Description of DSM program monitoring, review and impact (in terms of program participation, in terms of increases in penetration level of efficient devices and technologies, and in terms of load reduction/energy savings) analysis system/mechanism.
- 3.** Details of Implementation schedule as per actuals v/s target:
- 4.** Annual and cumulative savings due to the program with all the assumptions used in savings estimation process, including base line considered.
- 5.** Annual program funding requirements: This shall include description of financing arrangement and share of distribution licensee, vendors, consumers, retailers, State government, Central government, etc.
- 6.** Cost effectiveness calculation details, including program costs and benefits, impact on consumer tariffs, with explicit description of all the input values considered and cost effectiveness calculations.
- 7.** Dispute Resolution Mechanism: Appropriate mechanism to be followed for resolution of disputes arising during program implementation stage.

## **Annexure 2: Methods to carry out the PCT and SCT**

### **1. Participants Cost Test (PCT)**

This test provides a measure of the quantifiable benefits and costs to an “average” consumer for participating in a DSM program. Since many consumers do not base their decision to participate in a DSM program entirely on quantifiable variables (many times consumers decision to buy an appliance/device/equipment are based on factors such as discount offered, features, brand value, initial cost, etc.), this test may not fully represent the benefits and costs of a program to a consumer.

#### **1.1 Costs**

In its simplest form, the costs in this test are the program costs paid by the participant. In addition, any increase in electricity bill of the participant as a result of the DSM program is also to be considered as costs under this test. Thus the “Cost” elements usually associated with this test are:

- a) The cost of efficient device/equipment/appliance/technology or practice, including the applicable taxes, duties, levies, etc. paid for or to the extent paid for by the participant;
- b) Installation, trial and commissioning costs associated with efficient device/equipment/appliance/practice/technology paid or to the extent paid by the participant;
- c) Annual operation and maintenance costs over the life of the measure/program paid for or to the extent paid for by the participant;
- d) Old inefficient equipment removal costs (if the DSM measure/program involves replacement or retrofitting) paid for or to the extent paid for by the participant;
- e) Program administration, monitoring and evaluation costs paid for or to the extent paid for by the participant;
- f) Program marketing costs, including incentives, if any, paid or to the extent paid for by the participant;
- g) Increase in participant electricity bill due to the DSM program.
- h) If there is old equipment/device/appliance/technology etc. that is being replaced; the salvage value of this old equipment or device is considered as a reduction in the cost.

Similarly, if there is tax credit or incentive offered to the consumer the same can be treated as reduction in cost. Conventionally, the same will be treated as benefits accruing to the participant as a result of DSM program under PCT.

#### **1.2 Benefits**

Benefits under this test are the reduction in consumer’s electricity bills, tax credit received by the

consumer, and incentives received by the consumer.

### 1.3 Test Results

The NPV will be used as the primary evaluation criterion. An NPV value of zero or above will indicate that PCT test has been passed. It would also mean that the DSM programme is beneficial for an “average” participating consumer. On the other hand, a NPV value of less than zero will indicate that the DSM measure/programme being evaluated for PCT has failed the PCT, i.e. participation in a DSM programme is not beneficial for the consumer.

Tax credits and incentives appear on the benefit side of the NPV equation under this test. Thus, the benefit side of the DSM program can be boosted by offering incentives or tax credits. For DSM programs that show negative NPV values, the PCT test can help identify the threshold level of tax credit/incentive that would need to be offered to make the DSM program beneficial from participant perspective. Such threshold value will be the tax credit/incentive values for which NPV is zero.

Sensitivity analysis with respect to various assumptions should also be conducted in order to understand the level of influence of each assumption on the NPV value.

## 2. Societal Cost Test (SCT)

The Societal Cost Test is structurally similar to the Total Resource Cost Test. However, since the SCT goes beyond the TRC test in that it attempts to quantify the change in the total resource costs to society as a whole rather than to only the service territory (the licensee and its consumers), it would be necessary to consider different values for some of the input variables such as power purchase rate, discount rate, etc. More specifically, the Societal Test differs from the TRC Test in the following ways:

- 2.1 The value of power purchase rate will need to be the “**social cost of power**” which could be considered as the consumers’ willingness to pay for power or the price the consumers are willing to pay for power. In the Indian context, ceiling rate for Day Ahead market set by the CERC can be used as a proxy for consumers’ willingness to pay for power, and thus the social cost of power can be taken as per **Regulation 9** of these Regulations.
- 2.2 Since taxes, duties, levies, tax credits etc. are treated as a transfer payment in the Societal Test, they should be excluded from the calculations.
- 2.3 The value of the discounting rate under SCT should be the societal discount rate. In the context of DSM programmes, the licensees could use the societal discounting rate as per **Regulation 8** of these Regulations.
- 2.4 Certain indirect benefits such as reduction in greenhouse gases that takes place as an effect of implementing a DSM measure should be considered while calculating SCT.

**Annexure 3: IPMVP Measurement & Verification methodologies and recommended selection process.**

The four IPMVP Options provide a flexible set of methods (Options A, B, C, and D) for evaluating energy savings in facilities with varying levels of savings certainty and cost. A brief description of each Option is provided here:

**Option A** involves using a combination of both stipulations and measurements of the key factors needed to calculate savings in engineering models.

**Options B and C** involve using spot, short-term, or continuous measurements in engineering models (Option B) or regression analyses (Option C).

**Option D** may include spot, short-term, or continuous measurements to calibrate computer simulation models.

A particular option is chosen based on various features of each project. One criterion that works across all of the approaches is IVA's experience and expertise.

**Secretary**

**Rajasthan Electricity Regulatory Commission**