Alliance for an Energy Efficient Economy™

AEEE Comments on

Karnataka Electricity Regulatory Commission

Draft

Framework for Demand Flexibility (DF)/ Demand Side Management (DSM) Regulations, 2025

Alliance for an Energy Efficient Economy
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About AEEE

Alliance for an Energy Efficient Economy (AEEE) is India's foremost energy efficiency policy support and market enablement not-for-profit organisation. AEEE advances energy efficiency as a resource and provides policy and implementation support to catalyse responsible energy use for a climate-resilient and energy-secure future. We collaborate with government, industry, and civil society organisations and drive policy research, innovation, and on-ground impact, targeting national and state-level energy savings and greenhouse gas emission reductions. Our three organisational goals to foster an efficient and equitable energy transition are: enabling 100 GW of demand offset, facilitating INR 1,00,000 crore in green investments, and empowering over 500,000 green professionals to support India's net-zero goals. We are committed to supporting India's 2030 Nationally Determined Contributions (NDC), the Kigali amendment to the Montreal Protocol, and the UN Sustainable Development Goals (SDG) 2030.

AEEE believes that decarbonising the power sector substantially will require building enough flexibility in the power system to match supply and demand. The Smart and Resilient Power and Mobility vertical at AEEE has developed frameworks to help utilities integrate demand-side strategies and create a resilient energy system that supports the transition to a low-carbon economy. Some of the recent and ongoing works at the SRPM vertical include research on catalysing the demand flexibility market in India, creating standards for demand response ready appliances, analysing behavioural demand response in the residential category of consumers and accelerating utility-driven demand side management programmes.

Comments and Suggestive Recommendations

Primary Recommendations

1. Preamble

The draft highlights, "*The DF/DSM programs are a cost-effective way to reduce energy consumption and improve the efficiency of the energy system. By managing demand on the grid,* ***greenhouse gas emissions*** *can avoid the need for expensive infrastructure upgrades and improve system reliability."*

We propose the following modification:

The DF/DSM programs are cost-effective way to reduce energy consumption and improve the efficiency of the energy system. By managing demand on the grid, ESCOM/ DISCOM can avoid the need for expensive infrastructure upgrades and improve system reliability.

2. Definition of Demand Flexibility

The draft highlights demand flexibility as the ability of demand-side loads that can vary consumption patterns hourly or any other timescale, 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.

We suggest the change in the definition of demand flexibility in clause 2.9 of the draft:

"Demand Flexibility" means the capacity of demand-side loads that can vary their consumption patterns hourly or on another timescale in response to system conditions (such as price, stability, and reliability) as determined by the licensee to help integrate higher amounts of renewable energy, and managing electricity demand (peak or otherwise) resulting in making electricity more affordable to consumers with the co-benefits of reducing or deferring system costs.

- The draft regulations propose incentives and penalties for DISCOMs. It stems from a belief that the Demand Flexibility (DF) potential exists within Karnataka. Is there empirical evidence or a specific study quantifying this potential, identifying eligible customer categories, and assessing their willingness to participate? If such a study exists, we request it be placed in the public domain. If not, we strongly suggest conducting and publishing a baseline potential assessment prior to finalizing these regulations.

- Point 3.4 (e) of the DSM guiding principles mentions that programs can be implemented by the licensees directly or through the Aggregators appointed by them. Distribution Licensee shall ensure that the Aggregators and the IVAs are separate entities". The roles and responsibilities of the aggregator are unclear. For example, if aggregators are tasked to enrol/recruit DF customers, will they be responsible for getting into a contract with them, or will it be the responsibility of DISCOM?

3. Definition of DF Demand-Side Resource

In clause 2.11, the draft defines "**DF Demand-Side Resource**" as 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), Time and Cost.

For "DF Demand-Side Resource" to be an integral part of day-to-day operations, it is important for system operator to be aware of "Duration of availability" of the resource, as well as how fast the resource can respond to the system requirement/signal. Therefore, we suggest the following change in the definition in clause 2.11 of the draft:

"DF/Demand-Side Resource" means a saving in consumption (kWh) and/or demand (kW/KVA) available as a result of implementation of DF / DSM programme (as a single or group of device at a single or multiple locations) to be expressed in five important dimensions: Quantum – as to how much is available (kWh and/or kW); Time – as to when is it available (at what time of day, on what days, in what season); Duration of availability (period of availability), Response time – time duration between when a signal or request is issued to modify consumption/demand and when it actually occurs, and the Cost – as at what would be the cost;

4. Demand Flexibility (DF)/ Demand Side Management (DSM)

Clause 3.1, the draft mentions *Every Distribution Licensee shall adopt DF / DSM in their day-to-day operations, and undertake planning, designing and implementation of appropriate DF / DSM programmes 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.*

We suggest the following change:

Every Distribution Licensee shall adopt DF / DSM in their day- to-day operations, and undertake DF / DSM potential assessment, planning, designing and implementation of appropriate DF / DSM programmes 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 DF/DSM cell will be responsible for monitoring and reporting the DSM/DF program progress to the commission.

Additionally, draft directs the Licensees shall adequately staff the DF / DSM Cell as required for its activity. The DF / DSM Cell shall be responsible for monitoring and reporting of DF / DSM programme to the commission. **The commission may like to clearly outline the roles and responsibilities of DF / DSM Cell for DF / DSM activities. Furthermore, the staff assigned to DF / DSM Cell should not be assigned any other duties to ensure that they are dedicated to DF / DSM. They shall have a minimum tenure of three years. Any change before the staff completes three years shall require prior approval of commission.**

5. Cost recovery of DF / DSM measures

Clause 3.2 (iii), the draft mentions *DF / DSM related activities/ programmes undertaken by the Distribution Licensees shall result in overall tariff reductions to the consumers.*

The commission may like to revisit this clause. The DFPO target of 0.5% of peak would have minimal impact on the tariff.

6. Incentive for Participating Licensees

Clause 3.4 (d), related to DFPO incentives and disincentives, mentions that the Distribution Licensee shall be eligible for an incentive of INR 0.20 Crore for every MW achieved in excess of DFPO. Similarly, the Distribution Licensee shall be subjected to a disincentive of INR 0.20 Crore for every MW underachievement of DFPO.

a. It is unclear how the incentive of INR 0.20 Crore per MW is determined. Does it also factor in the reduction in transmission infrastructure requirements, or is the value determined on the basis of distribution network avoidance?
b. To be eligible for this incentive, whether the Distribution Licensee is required to meet the DFPO target once a year, or the Distribution licensee will get this incentive each time the DFPO target is achieved?
c. While the proposed incentives and disincentives for achieving Demand Flexibility Portfolio Obligations (DFPO) are a step in the right direction, consider **introducing tiered incentives**

that reward higher performance levels. This could motivate distribution licensees to exceed basic compliance.

d. What kind of **accountability mechanisms** will be in place for distribution licensees that fail to meet these targets?

7. DF / DSM Portfolio Deployment

Clause 3.4 (e), related to DF/DSM portfolio deployment in key sectors, outlines several strategies for demand flexibility but does not specifically **include heavy load appliances in the residential and commercial sector (such as residential ACs).** The air conditioners should be a key focus in the demand flexibility strategy, especially in managing peak electricity demand. In line with our suggestion, we suggest the following changes in the draft:

DF/DSM portfolio deployment: Distribution Licensees shall implement DF/DSM programmes 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 programmes 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, programmes proposed and implemented through these Regulations shall include, but not limited to, the following

a) 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;

b) 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;

c) behind-the-meter battery energy storage systems;

d) heat pumps in residential, hospitals, hotels, industries, commercial buildings;

e) thermal energy storage systems in residential, hospitals, hotels, industries, commercial buildings;

f) efficient refrigeration/cold storage programmes;

g) retrofitting of old/inefficient appliances or replacement with efficient appliances at consumer premises;

h) behavioural changes in the end-uses facilitated through awareness programmes that do not need any specific investments;

i) heavy load appliances in the residential and commercial sectors, like air conditioners.

8. Evaluation, Measurement and Verification

In clause 11, related to Impact Evaluation, the draft mentions that impact evaluation shall primarily be carried out using either of the three approaches:

1. Measurement & verification approach;
2. Deemed savings approach; and
3. Large-scale data analysis

The draft mentions that the distribution licensee should propose the evaluation process that complies with the IPMVP guidelines at the approval stage of the new demand side management programmes.

IPMVP is typically used as a high-level framework rather than a standalone calculation manual. For demand flexibility (which includes load shedding, shifting, and modulation), IPMVP can provide the core

principles, while specific calculation methodologies (like those from specific grid operators) provide the detailed "math". In some cases, the utility allows aggregator to submit their own methodology for M&V as well. A few examples of globally accepted M&V methods for demand flexibility include - Meter Before Meter After (spot reduction), Historical Baseline, Regression, etc. Further, adjustments are performed to increase the robustness of these methodologies.

The draft also mentions using the Deemed Savings approach under clause 11.2, where savings are reported based on historical values from typical DSM projects. However, savings can vary significantly on a daily basis across different DSM projects, meaning these reported savings may need to reflect actual project outcomes accurately.

Under clause 11.3 for large-scale data analysis, the draft mentions analysing savings through a time series analysis. However, a time series analysis typically requires a substantial amount of data, and with sufficient data, the impact evaluated using this method may be accurate. In this scenario, we have the following question:

1. In **which scenario** would a deemed saving approach and large-scale data analysis be applicable? Could you **provide an example** of this?
2. The option to be exercised in **order of priority** based on the **associated costs and efforts**.

Secondary Recommendations

9. Other Comments

9.1 Calculation of Demand Flexibility Portfolio Obligation

In clause 3.4 (c), related to **DFPO multi-year targets**, the draft mentions that the distribution licensees shall adhere to specific demand flexibility portfolio obligations (DFPO). The draft specifies demand flexibility portfolio obligations starting at 0.5% of the peak demand from the previous financial. **However, it is unclear how the 0.5% is determined**.

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