

**MAHARASHTRA ELECTRICITY REGULATORY  
COMMISSION  
EXPLANATORY MEMORANDUM (EM)**

**On**

**DRAFT**

**MERC (Demand Flexibility and Demand Side Management –  
Implementation Framework, Cost-effectiveness Assessment; and  
Evaluation,  
Measurement and Verification) Regulations, 2024**

**August 2024**

This explanatory memo is being shared as a part of the public commenting process along with the intended changes to the existing regulation related to demand flexibility/ demand side management activities.

## **SECTION 1: BACKGROUND**

The Maharashtra Electricity Regulatory Commission (MERC or Commission) went through the process of drafting first generation Demand Side Management Regulations during the years 2009-10. After receiving public comments, two regulations were drafted by the Commission, which included Demand Side Management Implementation Framework and Demand Side Management Cost Effectiveness Assessment Tests. Both these regulations were notified in the Gazette of Maharashtra in April 2010 and are currently available at the following links on the MERC website: [https://merc.gov.in/regulation\\_type/current-regulations-demand-side-management/](https://merc.gov.in/regulation_type/current-regulations-demand-side-management/)

The Commission in Maharashtra was the first in India to issue these pioneering regulations, subsequently followed by a number of states across the country. This is a part of the emphasis placed by the Commission on promoting environmentally benign Generation, Transmission and Distribution of electricity, which would embed efficiency at its core.

The Commission in Maharashtra was also amongst the first ones to create a trajectory for renewable energy portfolio obligations and also feed in tariffs in the country to promote higher penetration of renewable energy. In the recent past, the Central Ministry of Power, as well as the state of Maharashtra have embarked on the important journey of embedding higher levels of renewable energy in the Indian Power Grid, most notably under the Panchamrit scheme announced by the central government. This scheme focuses on 500 GW of installed Renewable Energy capacity by 2030 and 50% of electricity consumed in the country to come from renewable energy sources around the same year. It is thus important to align different regulations by the Commission to support efficiency at end use consumption across all the categories of consumers, at the same time create opportunities to embed newer renewable energy capacity in key sectors.

## **SECTION 2: PROGRESS OF 2010 REGULATIONS RELATED TO DEMAND SIDE MANAGEMENT**

As mentioned above, the Commission notified DSM regulations in April 2010. The key part of the regulations, specifically related to the implementation framework, focused on creating an opportunity for different distribution licensees to design programs promoting energy conservation, energy efficiency and load management among different categories of consumers.

All the four distribution companies actively participated in several demand side management programs that they designed for the approval of this Commission. The kinds of programs that were implemented by the four Distribution Companies included lighting initiatives in all consumer categories, efficiency improvement in air conditioning systems, appliance replacement initiatives for air conditioners and refrigerators, energy audit campaigns and load shifting opportunities through thermal energy storage and demand response initiatives.

During the past decade all the distribution licensees combined reported approximately 50 MW of savings through energy consumption in key categories as a part of their DSM portfolio. Two distribution licensees also demonstrated a possibility of approximately 25 MW of demand response initiatives working closely with power markets and the consumer load.

## **SECTION 3: RATIONALE FOR NEW REGULATIONS**

Given the changing context of generation profiles from different types of generation plants including the ones behind the meter (within the consumer premises) and heavy emphasis on solarization of agriculture feeders as well as households, it is now imperative to place demand side management as an opportunity in the form of a combination of demand flexibility, demand side management, demand response, energy efficiency and energy conservation.

In the past, based on changing load profiles and consumption requirements, generation plants would follow the load. In the newer context with variations in generation capacity specifically coming from renewable energy, it is now important for the load to follow the generation as well, in order to meet the renewal portfolio obligations of distribution licensees in Maharashtra. These utilities are moving forward with newer contracts for solar photovoltaic systems as well as wind projects. In certain cases, some new bids in Maharashtra and at the Central Government level include renewables and energy storage, including battery energy storage and pumped hydro storage. In the recent past, Maharashtra State Electricity Distribution Company Ltd

launched a process to embed 9,000 MW of solarization in the agricultural sector, which would require additional loads to be created during the time when solar energy is generated. In this context, it is now important to articulate Demand Side Management in the form of demand flexibility. In order to meet the new requirements, it is proposed to rephrase demand side management regulations to a new articulation of demand flexibility and demand side management regulations. Demand flexibility is generally defined as the ability of the load to come online or go offline based on the generation at that particular time of the day.

In order to make robust and comprehensive regulations, it is proposed to notify one single regulation titled Demand Flexibility and Demand Side Management Implementation Framework Cost Effectiveness Assessment and Evaluation Measurement and Verification Regulations 2024. The regulations have three distinct components:

- Part A Implementation framework
- Part B Cost effectiveness assessment tests
- Part C Evaluation, measurement and verification

It is intended to create one single notified regulation in order to also include evaluation measurement and verification which was not present in the previous set of regulations notified in 2010.

One of the key aspects of the new proposed regulations is setting out certain targets for the distribution licensees to create portfolios of demand flexibility and demand response. Based on the initial assessments by distribution licensee and discussions with experts in the field, in order to embed 500 GW of renewable energy into the Indian power system, approximately 10% of the current peak demand should be met with using flexible demand, which is expected to offer certain resources at costs that are much lesser than the lowest renewable energy bids as well.

As an example, consumer category wise number of consumers and connected loads for one of the licensees are presented below:

<b>Sr No.</b>	<b>Category</b>	<b>Number of consumers</b>	<b>Connected load/Contract Demand</b>	
1	LT I -BPL	2,29,668	27,895	kW
2	LT I Domestic	2,13,13,414	2,32,28,744	kW
3	LT II Non-Domestic	20,56,116	43,74,152	kW
4	LT III PWW	56,108	1,70,143	kW
5	LT IV Agriculture	45,12,918	2,31,17,092	HP
6	LT V Power loom	56,864	3,88,889	kW

Sr No.	Category	Number of consumers	Connected load/Contract Demand	
7	LT V Industrial General	3,81,297	46,61,941	kW
8	LT VI Streetlight	1,02,641	4,85,336	kW
9	LT X - Public services	1,34,260	72,437	kW
10	LT EV Charging	145	1,308	kW
11	LT Prepaid	7,454		
12	HT-I Industries	14,945	88,50,694	KVA
13	HT-II Commercial	3,076	5,58,151	KVA
14	HT III Railways	101	26,874	KVA
15	HT IV-PWW	1,027	3,18,404	KVA
16	HT V Agricultural	1,419	4,75,576	KVA
17	HT VI Bulk Supply (Housing Complex)	262	54077	KVA
18	HT Temporary	-		KVA
19	HT-IX Public services	1,517	2,95,596	KVA
20	MSPGCL AUX SUPPLY	28	240724	KVA
21	HT EV Charging stations 11 KV	2	391	KVA
22	HT EV Charging Stations 12 KV	4	9854	KVA
<b>23</b>	<b>Total</b>	<b>2,88,73,266</b>	<b>6,73,58,278</b>	

(Source: MERC order 226 of 2022)

This means that the total connected load of the distribution licensee is approx. 67,000 MW. Out of which 3% of the past year's peak demand of 22,000 MW (approx.660 MW) can be demand flexibility prospect. Such a flexible demand can be met through multiple end-uses such as water pumping, HVAC in C&I consumers and other bulk loads. The proposed regulations now include a demand flexibility portfolio obligation (DFPO) that is cascaded as shown in the table below:

Year	Target as share of previous year's reported peak demand
1	3%
2	4%
3	5%
4	6%
5	7%

It is also proposed that after year five, the distribution licensees shall follow the process of 7% flexible demand being made available to the grid compared to the previous year's reported peak demand, or any variation proposed by the Commission.

Distribution Licensee shall be eligible for incentive of INR 0.20 Crores for every MW achieved in excess of DFPO. Similarly, Distribution Licensee shall be subjected to dis-incentive of INR 0.20 Crores for every MW underachievement of DFPO.

Proposed regulations also suggest setting up a DF/DSM consultation committee comprising a group of experts working under the direction of the Commission, to provide reviews, suggestions and objections on the DF/DSM programme portfolio submitted by the distribution licensees and providing recommendations based on its findings to the Commission for approval.

#### **SECTION 4: TECHNOLOGICAL INTERVENTIONS**

Given the nature of changing loads and newer loads coming online, such as electric vehicles, the proposed regulations now also include electric vehicles as one of the key technologies at the end use level that can be used for demand flexibility by the distribution licensees. Other technologies that are proposed as examples in the regulations include thermal energy storage and heat pumps for residential, public sector, hospitals, hotels and commercial sectors. Based on recent experiments related to water pumping systems, the regulations also suggest including newer flexible loads such as water pumping systems for urban local bodies, Municipal corporations and Nagar parishads and bulk loads such as lift irrigation schemes that are operated by Water Resources Department and the Command Area Development structures in the agricultural sector.

Based on current tariff order analysis, anywhere between 20-25% of the load is available as flexible demand from sectors such as public waterworks, lift irrigation schemes, end-use air-conditioning systems, end use water heating and the emerging electric vehicles market. The EV charging infrastructure market itself has a good potential to provide demand flexibility opportunities as bulk power and bulk resources that are available to the system. The electric vehicle charging infrastructure related to bus fleet, freight, fleet four wheelers, three wheelers, two wheelers is a good opportunity to be considered as flexible demand.

Part B of the proposed regulations is based on the existing cost effectiveness assessment tests regulations of 2010. All the distribution licensees routinely submit their proposals to the Commission with cost effectiveness test analysis and the rate impact tests carried out based on the regulations. As such, the cost effectiveness tests have not been changed in these regulations. However, there is an emphasis on ancillary services available that have been crafted through

the new regulations by the Central Electricity Regulatory Commission. These define primary, secondary and tertiary resources available as ancillary services and envisage additional revenue flow coming to the distribution licensees when aggregated demand is made available in the tertiary ancillary services market. Any revenues that would be collected by the distribution licensees directly or through their aggregators would form a part of the revenue stream or the benefits stream in the benefit cost analysis process that has been crafted.

The distribution licensees have successfully implemented several demand side management programs in the past and submitted the evaluation reports to the commission through the Demand Side Management Consulting Committee. In order to bring all the reporting of demand flexibility and demand side management projects implemented by the distribution licensees into the new proposed regulations also into the section on evaluation measurement and verification, three types of evaluations namely Process evaluation, Impact evaluation and Market effective evaluation are proposed under these regulations. Avoided cost of power purchase for social cost test is taken as Rs. 12/kWh which is prevalent ceiling rate for Day Ahead market set by CERC. The evaluations can be carried out using independent verification agency to be appointed by the distribution licensees with expertise in designing of the programs as well as evaluating the programs and aligned with the Bureau of Energy Efficiency professional training and the certification through the certified energy auditors and certified energy managers, in addition to certified measurement and verification professionals being available through certain international certification agencies.

The Commission now invites the distribution licensees and other stakeholders to offer their comments to the proposed regulations in order to ensure a proper consultation process to be followed before the notification of the regulations.