

घनश्याम प्रसाद
अध्यक्ष तथा पदेन सचिव भारत सरकार
GHANSHYAM PRASAD
Chairperson & Ex-officio Secretary
To the Government Of India



केन्द्रीय विद्युत प्राधिकरण
भारत सरकार
विद्युत मंत्रालय
सेवा भवन, आर.के. पुरम
नई दिल्ली-110066
Central Electricity Authority
Ministry of Power
Sewa Bhawan, R. K. Puram
New Delhi-110066

Dear Secretaries

23/06/2026

Over the past decade, the Indian power sector has made remarkable progress in ensuring adequate generation capacity and strengthening the transmission network along with augmentation of distribution infrastructure under DDUGJY, IPDS, Saubhagaya & ongoing RDSS schemes. However, despite the overall adequacy of generation resources and availability of power in the grid, several States continue to experience consumer outages and load shedding during the summer months. Field experience and operational feedback indicate that a significant proportion of such interruptions arise from constraints within the distribution network. These include overloading of distribution transformers and feeders, inadequate transformation capacity at substations, delayed system augmentation, failure of aging equipment, local network bottlenecks, and insufficient preventive maintenance.

2. The increasing penetration of air-conditioning loads, rapid urbanization, expansion of commercial establishments, growth in agricultural demand, electric vehicle charging infrastructure etc are further accelerating the growth of peak demand at the distribution level. In many cases, the actual growth in local demand exceeds the pace of network strengthening, resulting in transformer failures, feeder tripping, voltage-related issues, and consequent load shedding during peak demand periods.

3. In view of the above, there is a need for all distribution utilities to transition from a predominantly reactive approach of addressing outages after they occur to a proactive approach based on scientific planning, predictive analysis, preventive maintenance, and advance preparedness for seasonal demand growth.

4. Accordingly, Central Electricity Authority has prepared a set of Advisory measures for Discoms aimed at minimizing load shedding and improving reliability of power supply during peak demand periods. The advisory emphasizes systematic assessment of network loading, advance planning of augmentation works, preventive maintenance of critical assets, data-driven monitoring of distribution infrastructure, and strengthening of emergency response mechanisms.

5. Considering the expected increase in demand during forthcoming summer seasons, I would request you to advise all distribution utilities in your State to review their preparedness and take suitable action on the above lines. Particular emphasis may be placed on identifying network constraints well in advance and ensuring timely completion of augmentation and maintenance works before the onset of peak demand conditions. The copy of Advisory is attached for reference.

6. I would also request that a State-level review of summer preparedness be undertaken under your guidance and that utilities may be encouraged to institutionalize an annual distribution system capacity assessment and summer preparedness exercise as a regular management practice. Central Electricity Authority would be happy to provide any technical support, guidance, or sharing of best practices that may assist the utilities in this regard.

With regards

Yours sincerely,


(Ghanshyam Prasad)

To

Principal Secretary (Power)/Secretary (Energy)
All States/UTs

ADVISORY FOR DISTRIBUTION UTILITIES FOR PREVENTION OF LOAD SHEDDING DURING PEAK DEMAND PERIODS AND IMPROVING THE RELIABILITY OF POWER SUPPLY

During the peak power demand season, the issue of load shedding in various parts of the country is being noted. Based on experience across states, a significant portion of summer load shedding is not caused by generation shortage but due to **distribution network constraints, transformer failures, overloaded feeders, inadequate preventive maintenance, delayed augmentation and poor visibility of emerging load growth pockets.**

This advisory focus on **"Summer Preparedness and Distribution System Reliability Measures"** with both immediate (within 1 year) and medium-term (1–3 years) actions, which may be adopted by discoms for taking necessary actions to avoid the load shedding in some areas of operation.

1. OBJECTIVE

To ensure reliable and quality power supply during peak summer demand by adopting proactive planning, preventive maintenance, accurate load forecasting, network strengthening, and data-driven operational practices at discom level, district/circle level & division level.

The advisory aims to:

- Minimize consumer outages and load shedding.
- Prevent transformer and feeder overloading. Thus reduction in the failure rate
- Improve reliability indices.
- Enhance preparedness for seasonal demand growth.
- Strengthen distribution network resilience.

2. INDICATIVE ROOT CAUSES OF SUMMER LOAD SHEDDING

Many instances of load shedding arise due to:

(a) Distribution System Constraints

- Overloaded Distribution Transformers (DTs).
- Overloaded 11 kV feeders.
- Overloaded 33 kV feeders.
- Inadequate transformer capacity at 33/11 kV substations.
- Overloading of LT network .
- Voltage drop issues.
- Failure of aged equipment.

(b) Planning Deficiencies

- Underestimation of demand growth.
- Delayed augmentation of network.
- Lack of scientific load forecasting.
- Non updating of contract demand of consumers due to changed life style. Particularly the consumers are installing large load equipment such as ACs but are not updating the sanctioned load. Discoms plan which is based on sanctioned load are caught unaware resulting in the increased failure rates during Summer.

(c) O&M Deficiencies

- Inadequate preventive maintenance.
- Delayed replacement of failed DTs/Panels/lines
- Poor inventory management.
- Lack of outage management systems.

3. DISTRIBUTION SYSTEM PLANNING BASED ON ACCURATE LOAD ASSESSMENT**3.1 Consumer Load Assessment**

DISCOMs should undertake annual assessment of connected and coincident loads at 33 KV sub-station level & DT level.

Special attention should be given to:

- Air-conditioning penetration.
- New residential townships.
- Commercial complexes.
- EV charging stations.
- Agricultural feeder growth.
- Industrial expansion.

Recommended Actions

- Annual consumer load survey.
- GIS tagging of major consumers.
- Assessment of actual peak demand contribution.
- Identification of high-growth areas and planning of adequate distribution system

3.2 Scientific Load Forecasting

Every DISCOM should prepare:

Short-Term Forecast (1 year)

Based on:

- Historical feeder demand and future expected load
- Weather conditions.
- Consumer additions.
- Air-conditioning penetration.

Medium-Term Forecast (3 years)

Based on:

- Urban development plans.
- Industrial corridors.
- Smart city projects.
- EV adoption trends.

Recommended Practice

Forecasting should be carried out at:

- Distribution Transformer level.
- 11 kV feeder level.
- 33 kV feeder level.
- Substation level.

As smart meters are being installed now a days at Feeder, DT and consumer level, the data of smart meters should be leveraged for accurate forecasting & loading of each element of distribution system.

4. ANNUAL SUMMER PREPAREDNESS EXERCISE

Each DISCOM should complete a Summer Preparedness Review by February every year. The review should cover:

Network Capacity Assessment

Identification of:

- DTs loaded above 80%.
- Feeders loaded above 80%.
- Power transformers loaded above 75%.
- Areas experiencing low voltage.

Hotspot Mapping

Develop district-wise /division wise list of:

- Frequent transformer failure locations.
- High complaint areas.
- Rapidly growing load centres.

5. USE OF DATA ANALYTICS

5.1 DT Meter Analytics

All DTs should be metered with smart meters and the following meter data should be analysed monthly

- Maximum demand.
- Peak loading.
- Loading duration.
- Voltage profile.
- Transformer losses.

Action Thresholds

Loading Level	Action
>80%	Monitor and plan for augmentation
>90%	Immediate augmentation required

5.2 Feeder Meter Analytics

Analysis of:

- Peak loading.
- Voltage profile.
- Technical losses.
- Power factor.

Feeders showing persistent loading above 80% should be prioritized for augmentation.

5.3 GIS-Based Capacity Dashboard

DISCOMs should maintain GIS dashboards showing:

- DT loading.(existing & expected next years)
- Feeder loading. .(existing & expected next years)
- Substation loading. .(existing & expected next years)
- Consumer growth.

This enables identification of future constraints and the appropriate action should be initiated by discom for augmentation of system or shifting of some load on nearby under loaded system before peak month.

6. PREVENTIVE MAINTENANCE MEASURES (TO BE COMPLETED BEFORE MARCH)

A comprehensive Annual Preventive Maintenance programmes of 33 kV substations, 11 kV feeders, Distribution Transformers, LT etc. shall be completed prior to the onset of summer season. No critical maintenance activity shall be deferred for the summer season except under exceptional circumstances.

6.1 Distribution Transformers

Comprehensive inspection of:

- Oil level.
- Silica gel.
- Bushing condition.
- Earthing.
- LT connections.
- Breathers.

6.2 33/11 kV Substations

Inspection of:

- Power transformers.
- Breakers.
- Protection relays.
- CT/PT health.
- Capacitor banks.

6.3 Feeder Maintenance

- Tree trimming.
- Jumper tightening.
- Hot spot detection.
- Thermographic scanning.

6.4 Capacitor Banks

Ensure all capacitor banks should be functional before the peak season as it will provide benefits like Reduced current loading, Improved voltage profile, & Reduced transformer loading etc..

6.5 Additional Measures

During pre-summer inspections and maintenance, particular attention shall be paid to the following:

- i. Loose or degraded electrical connections at joints, terminations and tap points
- ii. Hotspots on conductors, connectors and bus-bars identified through thermal imaging surveys
- iii. Vegetation encroachment, tree branches and other obstructions in line corridors requiring trimming/clearance
- iv. Damaged insulators on overhead lines and equipment
- v. Distribution Transformer condition including oil level, BDV, physical integrity, etc.
- vi. Adequacy and condition of earthing systems across the distribution network

7. MEASURES TO PREVENT DT FAILURES

Many summer outages arise due to DT burning due to overloading or poor maintenance

Recommended Actions

➤ Load Balancing

- Phase balancing.
- Redistribution of consumer load.

➤ DT Augmentation

Where loading exceeds 90% during last peak period:

- Replace with higher capacity DT or Install additional DT.
- Or shifting of some load to nearby under loaded DT, if available

➤ LT Bifurcation

Reduce LT loading by:

- Creating additional DT centres.
- Reducing LT network length.

8. EMERGENCY RESPONSE PREPAREDNESS

➤ Mobile Distribution Transformers

Every urban circle should maintain:

- Mobile DTs as per assessment

- Mobile transformer trolleys.

This will provide the Rapid restoration of power supply due to DT failure and it will reduced outage duration for the consumers

Further, adequate Inventory in store for DTs, conductor, Panels, insulators, Poles, meters etc should be maintained at division level.

➤ **Emergency Response Teams**

Dedicated Emergency Response Teams (ERTs) shall be constituted targeting to restore the power supply as soon as possible within the applicable norms and regulations. These teams may be positioned at strategic locations, equipped with adequately trained manpower, vehicles, tools, testing equipment and requisite safety equipment including PPE, fall-arrest system, etc. along with an adequate inventory of critical spares.

Regular training may be provided to DISCOM personnel, including engineers, linemen, and other field staff, on preventive maintenance, fault detection, hotline maintenance, outage management and rapid restoration of supply.

9. OUTAGE MANAGEMENT SYSTEM (OMS)

DISCOMs should establish OMS integrated with GIS, SCADA, AMI and Consumer complaint systems. This will provide the several benefits like Faster fault localization, Reduced restoration time, better reliability reporting etc

10. DEMAND SIDE MANAGEMENT MEASURES

During peak summer, discoms may adopts some Voluntary Demand Response measures targeting some big loads like Commercial buildings, Large consumers, some industries etc. The implementation of Time-of-Day Tariff also encourage consumers for shifting of load away from evening peaks. Further, promotional program for Efficient Cooling Programs like purchasing of only star rated Acs, efficient fans etc by the consumers

11. SUMMER PREPAREDNESS COMMITTEE AT CIRCLE/ DISTRICT LEVEL

Each DISCOM should establish a committee headed by the Electrical Circle Head to review the demand growth, DT loading, Feeder loading, Equipment availability and Outage statistics. The committee should also approve the requisite short term & medium term plan for preventing the load shedding in the circle/ district.

12. RELIABILITY MONITORING FRAMEWORK

Every DISCOM should monitor various reliability factors like SAIDI, SAIFI, CAIDI, DT failure rate, Feeder failure rate and Substation outages etc and should prepare the plan to improve these parameters.

13. CONSUMER GRIEVANCE REDRESSAL MECHANISM:

- a) DISCOMs shall strengthen their consumer grievance redressal mechanisms ensuring that adequate arrangements are in place to handle the significantly higher volume of complaints and service requests that typically arise during summer peak times.
- b) Round-the-clock (24x7) complaint handling facilities, including toll-free helpline numbers, call centres, mobile app-based complaint registration, and web-based portals, shall remain fully operational throughout the peak summer season.
- c) Sufficient field staff including Junior Engineers (JEs), Sub-Divisional Officers (SDOs), Linemen, Cable Jointers, Technicians, and Line Maintenance Teams, shall be deployed in adequate numbers across all divisions and sub-divisions to ensure prompt attendance of faults and expeditious restoration of supply.
- d) Special Summer Control Rooms / Situation Rooms shall be established at the Circle/Zone level during peak summer months, manned by senior officers, for real-time monitoring of outage data, tracking of major faults and coordination of restoration efforts.

MEDIUM-TERM MEASURES (1–3 YEARS)

1.1 Distribution Planning Studies

Each DISCOM should institutionalize:

- Load flow studies.
- Short-circuit studies.
- Reliability studies.
- Hosting capacity studies.

Network expansion should be based on scientific studies rather than complaint-driven augmentation.

Wherever technically feasible, N-1 contingency arrangements shall be established at the DT level through interconnections, ring-main units (RMUs), or alternate supply routes, so as to minimise consumer interruptions in the event of a transformer failure.

1.2 33/11 kV Substations

New substations should be planned where:

- Existing transformer loading exceeds 70–75%.
- Rapid urbanization is occurring.
- Long 11 kV feeders exist.

Planning should anticipate demand at least 5 years ahead.

- (a) In substations where loading is expected to approach or exceed safe operating thresholds, DISCOMs shall proactively undertake the following:
 - i. Augmentation of existing power transformer capacity or installation of additional power transformers to enhance substation transformation capacity to meet growing load demand.
 - ii. Installation of additional 11 kV feeder bays for better load distribution
 - iii. Construction of new substations for high-load-growth areas.
- (b) N-1 reliability criteria shall be ensured for growth of all critical substations.
- (c) All protection systems at Sub-stations including numerical relays, circuit breakers, isolators, earthing switches, DC battery systems, substation auxiliary systems etc. shall be tested, calibrated, and maintained in healthy condition, to prevent avoidable tripping and outages.

1.3 Feeder Segregation and Bifurcation

Undertake:

- Long feeder bifurcation.
- Additional feeders from substations.
- Dedicated industrial feeders where required.
- Provision of dedicated Feeders for large-load consumers (commercial complexes, industrial units, etc.)
- Conversion of LT-dominated networks to HT networks wherever technically and economically feasible

1.4 Smart Distribution Infrastructure

Priority deployment of:

- Smart meters.
- DT meters.
- Feeder meters.
- SCADA.
- DMS/ADMS etc, if not available

1.5 Development of a dedicated team for Data Analytics of smart meter data

DISCOMs may constitute dedicated team to leverage smart meter analytics to improve load forecasting, demand assessment, and scientific planning of the distribution network, thereby enhancing system visibility and operational efficiency.

1.6 Asset Health Monitoring

- Adopt condition-based maintenance using data from smart meters installed on DTs and Feeders for online monitoring of the transformers and feeders. Also take some actions for predictive analytics of power transformers.
- Undertake periodic predictive analytics of power transformers and critical & high capacity DTs like thermal imaging surveys, periodic load measurements, transformer oil BDV testing, and comprehensive health assessments and take necessary actions for O&M of such transformers.

CONCLUSION

Every DISCOM should prepare an **Annual Distribution System Capacity Assessment and Summer Preparedness Plan** based on feeder-wise, DT-wise and substation-wise loading data. It should also focus on the granular circle wise or division wise plan as well. Most summer load shedding can be prevented if utilities identify assets exceeding 80% loading six months in advance and take corrective actions before the onset of the peak season. The emphasis should shift from *reactive fault rectification* to *predictive planning and preventive maintenance*, supported by feeder meters, DT meters, GIS mapping, OMS, and scientific distribution planning studies.