


MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO.LTD.
CIN NO. U40109MH2005SGC153646

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Ref: MSLDC/TECH/OP/REMC/MEGC-2020/2646

Date: 31/12/2021

To,
As per mailing list.

Sub: Procedure for Renewable Energy (Wind & Solar) curtailment in accordance with the provisions of the MEGC, 2020.

Ref: 1. The MERC (State Grid Code) Regulations, 2020.

Dear Sir/Madam,

In reference to above subject, it is to inform you that Hon'ble MERC in the MEGC, 2020 has entrusted responsibilities on various Entities viz. MSLDC, STU, Transmission/Distribution Licensees, Users, etc, for development of various Procedures/Guidelines. Accordingly, as per the Regulation No. 28.2 of the MEGC, 2020, this office has prepared a "Procedure for Renewable Energy (Wind & Solar) Generation Curtailment in the State". The said procedure has been prepared in consultation with Operational Coordination Committee (OCC) after seeking comments/suggestions from the various Stake holders in the State. Further, the Core Group of Grid Coordination Committee (GCC) has consented the said procedure for implementation in the State.

In view of above, please find attached herewith the "Procedure for Renewable Energy (Wind & Solar) Generation Curtailment in the State". The copy of the same is available on MSLDC Website at

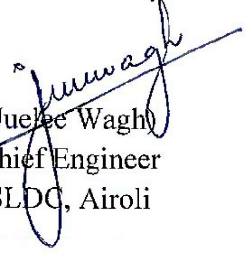
www.mahasldc.in → Regulations, Procedures & Meetings → Procedures → RE Curtailment Procedure

The Procedure shall be effective from the date of this letter. All the Stakeholders are requested to adhere to the provisions of the said procedure.

Submitted for needful please.

Encl: As above.

Yours sincerely


(Jyoti Wagh)
Chief Engineer
SLDC, Airoli

Sub: Procedure for Renewable Energy (Wind & Solar) curtailment in accordance with the provisions of the MEGC, 2020.

Copy s.w.r.s. to:

The Chairman and Managing Director, MSETCL, Prakashganga, Mumbai.

The Director (Operations), MSETCL, Prakashganga, Mumbai.

The Executive Director, MSLDC, Airoli, Navi Mumbai.

The Executive Director (Operations), MSETCL, Prakashganga, Mumbai.

Copy f.w.c. to:

The Chief Engineer (STU), MSETCL, Prakashganga, Mumbai.

Mailing list:

All the QCAs in the State of Maharashtra

All the Wind Generators in the State of Maharashtra

All the Solar Generators in the State of Maharashtra

All the Wind & Solar Park Developers in the State of Maharashtra

All the Wind & Solar OEMs in the State of Maharashtra

All the Distribution Licensees in the State of Maharashtra

All the Transmission Licensees in the State of Maharashtra



Procedure for Renewable Energy (Wind & Solar) Curtailment in the State

In accordance with
The Maharashtra Electricity Regulatory
Commission
(State Grid Code) Regulations, 2020

Prepared by

**Maharashtra State Load Despatch Centre
Airoli**

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PROCEDURE FOR RE (WIND & SOLAR) GENERATION IN THE STATE

1. **OUTLINE:**

- 1.1. This Procedure is in accordance with the various provisions of the Regulation No. 28.2, 30.13 of the MERC (State Grid Code) Regulations, 2020, Regulation No. 14 of the MERC (Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation) Regulations, 2018 and Procedures formulated therein. All applicants shall abide by the provisions of the Regulations. All applicants shall abide by the CEA (Technical Standards for Connectivity to the Grid) Regulations, 2019.
- 1.2. RE Generation is highly variable, intermittent and unpredictable with forecasting challenges leading to difficulties in RE integration. All efforts shall be made by the System operators to despatch RE Generation subject to Grid Constraints & Grid Security.
- 1.3. In-spite of having 'MUST RUN' status for Wind & Solar Generation, during real time operations there are chances for issuing curtailment / backing down instructions to such generators even though all the efforts for accommodating RE generation are taken by the System Operators.
- 1.4. The need for curtailment may arise due to planned/forced outages on the evacuation infrastructure and heavy Demand crash in the State with heavy under-drawl from ISTS & all the conventional generations are running at technical minimum with frequency beyond higher permissible limits, etc.
- 1.5. RE Curtailment is the last option being exercised by MSLDC for maintaining Grid stable & secure due to violation of various system parameters. As such, the curtailments need to be implemented immediately in real time so as to avoid grid disturbances or continued alert/emergency operation of the Grid.
- 1.6. There are around 118 Nos. of PSS with total installed capacity of RE generation to the tune of around 6500 MW. To these PSS, around 4800 No. of generating units i.e. WTGs & Solar PV Modules owned by more than 1000 individual generators are connected. There are around 25 different Plant operators viz. OEMs,

Developers, etc. which are operating the Wind/Solar farms on behalf of the generators.

- 1.7. Proper co-ordination among various Stake-holders is required for effective & successful implementation of the curtailments. Any mis-communication/delay in implementation of MSLDC directions may lead to grid disturbances.
- 1.8. In order to implement the curtailments smoothly, to avoid mis-communications or any disputes, this procedure has been prepared which shall consist of scenarios for requirement of curtailment, identification of generators, protocol of sharing instructions, roles & responsibilities of various Stake-holders, etc.

2. DEFINITIONS:

- A. **“Associated Evacuation network”** means the EHV, HV network which is the existing network of any transmission or distribution licensee through which generation is evacuated.
- B. **“Available Capacity” (or “AvC”)** of Wind or Solar Energy Generators means the cumulative capacity rating of the Wind turbines, Solar inverters or Solar thermal generators that are capable of generating power in a given time block as declared by such Generators or QCA, as the case may be;
- C. **“Dedicated Evacuation network”** means the dedicated EHV, HV, LV network designed and developed for evacuation of generation through specific Generating Station or a group of Generating Stations.
- D. **“F&S Regulations”** means the MERC (Forecasting, Scheduling & Deviation Settlement for Solar & Wind Generation) Regulations, 2018.
- E. **“MEGC-2020”** means the MERC (State Grid Code) Regulations, 2020.
- F. **“Original Equipment Manufacturer” (or “OEM”)** means the Manufacturer of the Wind Turbines or Solar PV modules/Inverters, etc, installed in any PSS.
- G. **“Pooling Sub-Station” (or “PSS”)** means a Sub-Station consisting of a step-up transformer and associated switchgear to the Low Voltage (LV) side of which several Wind or Solar Energy Generators are connected:

Provided that, where a Generating Unit is connected through a common or an individual feeder terminating at a Sub-Station of a Distribution Licensee, the State Transmission Utility or the Central Transmission Utility, such Sub-Station shall be treated

as the Pooling Sub-Station for such Wind or Solar Energy Generator for the purposes of these Regulations;

- H. **“Plant Operators”** means the agency or a company which is appointed by the Wind & Solar Generators for operating the Generating Plant on behalf of them, such as Developers, OEMs, etc.
- I. **“Qualified Co-ordinating Agency” (or “QCA”)** means the agency appointed by the Wind or Solar Energy Generators connected to a Pooling Sub-Station, or by an individual Generator connected directly to a Sub-Station, to perform the functions and discharge the obligations specified in these Regulations;
- J. **“State OCC”** means the Operational Co-ordination Committee constituted under the aegis of MEGC’ 2020.
- K. Save as aforesaid and unless repugnant words and expressions used in these Regulations and not defined, but defined in the Act, or the CERC (Indian Electricity Grid Code) Regulations or Regulations of the Central Electricity Authority or any other Regulations of this Commission shall have the meaning assigned to them respectively in the Act or IEGC or any other Regulations as the case may be.

3. APPLICABILITY OF THE PROCEDURE:

- 3.1. The procedure shall be applicable to various Stake-holders in the State such as Wind & Solar Energy Generators, Hybrid RE Plants covered under the ambit of said regulations, registered QCAs, STU, Distribution & Transmission Licensees, Wind & Solar Power Developers, Plant operators appointed by the Generators for operation & Maintenance of the Plant on behalf of the Generators, etc.

4. METHODOLOGY:

- 4.1. There shall be different scenarios, viz. heavy demand crash, heavy under-drawl by the State due to increase in RE Generation, Overloading/tripping/outage of Evacuation network, etc. based on which curtailment methodology shall differ. The scenario-wise methodology shall be as below.

- **Scenario – 1: Heavy Demand Crash along with High RE Injection**
- **Scenario – 2: Restrictions due to Evacuation Infrastructure**

4.2. **Scenario – 1: Heavy Demand Crash along with High RE Injection**

4.2.1. In this scenario, due to various reasons covered under 'Force Majeure' such as Cyclone, Flood, Earthquake, directives of Government, War, riots, etc. as specified in Regulation No. 2 (2.1) (44) of the MEGC, 2020, demand can crash drastically. Under such conditions, even though forecast of demand is possible, accuracy is a major constraint.

Under such conditions, the demand crash is primarily due to tripping of electrical network due to damage or break-down or manual opening of the electrical network for safety purpose.

4.2.2. Also, due to some partial/major grid disturbances, viz. tripping of 765 kV or 400 kV or major 220 kV Sub-Station or ring main feeding load to the metro cities, etc. sudden loss of load may occur resulting in heavy demand crash. It is not possible to anticipate such incidences & volume of demand crash.

4.2.3. There are chances that on some specific occasions (Special events like Earth Day, etc), the end consumers may not use electricity for specific time. For such scenarios, forecasting of demand crash is possible, however, not with high degree of accuracy as it is not possible to anticipate the response of end consumers.

4.2.4. RE Generation is seasonal and maximum injection is mainly during particular seasons e.g. high Wind generation in Monsoon season & high Solar injection during summer.

4.2.5. Under demand crash scenarios considered above, MSLDC shall take action of backing down of all the conventional generators to operate at technical minimum level based on technical parameters of the Thermal generators so as to accommodate maximum RE injection considering Network Constraints, Congestion, Voltage Management and such security measures.

4.2.6. Discoms shall be directed to reduce the requisition from their contracted Inter-State Generating Stations (ISGS) through revision of Schedules. Also, Discoms, shall be advised to withdraw any demand curtailments, issued.

4.2.7. In case of demand crash due to tripping or break-down or manual opening of the electrical network, concerned transmission &

distribution licensee shall be directed to restore the network elements on priority so as to restore demand.

- 4.2.8. However, in spite of above corrective measures, if the system parameters viz. high Voltages, high frequency, heavy under-drawl from ISTS, etc. are not within the permissible limits as specified under IEGC & MEGC-2020, may lead to grid security problems and as a last option, the RE Power shall be curtailed. Such curtailment shall be governed by the Regulation No. 14 of the MERC (F, S & DSM for Solar & Wind Generation) Regulations, 2018.
- 4.2.9. In case of 'N-1' or 'N-1-1' non-compliance at some locations or congestion in some corridors, in some cases, RE Generation at some locations can adversely affect the grid, curtailment of RE generation always need to be made as a last option. In such cases, RE Generators at some locations may get curtailment instructions. Such curtailment shall be governed by the Regulation No. 14 of the MERC (F, S & DSM for Solar & Wind Generation) Regulations, 2018.
- 4.2.10. The quantum of curtailment shall be identified based on real time system conditions by the MSLDC Control Room System Operators in accordance with the provisions of the said Procedure.

4.3. **Scenario – 2: Restrictions due to Evacuation Infrastructure**

- 4.3.1. RE generation is seasonal with low annual PLF as compared to Conventional generators.
- 4.3.2. The dedicated evacuation network is planned and developed so as to evacuate RE power without any constraints. Such network may be developed for evacuation of power from individual RE Project or for a group of RE Projects. As per the CEA Transmission Planning Criteria, 2013, the 'N-1' condition for immediate evacuation arrangement for Solar & Wind Projects is not mandatory. Hence, in most of the cases, the dedicated evacuation arrangement which is (in most of the cases) constructed & maintained by the Developers/Generators, is not 'N-1' compliant. Also, in some cases, RE Generation is evacuated through the existing network of the Transmission/Distribution Licensee, i.e. Associated Evacuation network.

4.3.3. In case of tripping or outage on Dedicated evacuation network connected to individual PSS, resulting in to reduction in evacuation capacity:

- (a) Partially, then RE injection from the concerned PSS shall be curtailed partially and injection shall be restricted to limit the loading on evacuation network which is in service, within thermal limits.

The Thermal limit shall be in accordance with the limits provided in the appropriate CEA (CEA Transmission Planning Criteria, 2013)/CERC/MERC Regulations related to Connectivity standards/Grid Code, etc.

- (b) Fully, then RE injection from the concerned PSS shall be curtailed Fully.

4.3.4. In case of tripping or outage on Dedicated evacuation network developed for evacuation of power from a group of PSS or Associated Evacuation network, resulting in to reduction in evacuation capacity:

- (a) Partially, then RE injection from the concerned group of PSS shall be curtailed partially and injection shall be restricted to limit the loading on evacuation network which is in service within thermal limits. The PSS-wise curtailment shall be on pro-rata basis based on installed capacity.

The Thermal limit shall be in accordance with the limits provided in the appropriate CEA (CEA Transmission Planning Criteria, 2013)/CERC/MERC Regulations related to Connectivity standards/Grid Code, etc.

- (b) Fully, then RE injection from the concerned group of PSS shall be curtailed Fully.

4.3.5. In case of tripping of dedicated evacuation arrangement or associated evacuation network, MSLDC shall instruct the concerned Transmission or Distribution Licensee to restore the network so as to avoid curtailment of RE Generation.

4.3.6. In case of Planned/Forced outage on dedicated evacuation arrangement or associated evacuation network, it shall be the responsibility of the concerned Transmission/Distribution Licensee or Developer/Plant Operator/Generator, depending up on ownership of the network, to adhere to the timelines for completion

of the maintenance activity so as to avoid delay in restoration of the curtailment issued to RE Generation.

4.3.7. In above such cases, the Curtailment shall be governed by the Regulation No. 14 of the MERC (F, S & DSM for Solar & Wind Generation) Regulations, 2018.

4.4. As per Regulation No. 30.13 of the MEGC, MSLDC shall direct the generators to curtail the Reactive Power injection/drawl with the Grid as per System requirements.

5. RESPONSIBILITY OF VARIOUS STAKE-HOLDERS:

5.1. For effective implementation of curtailments, proper co-ordination among various Stake-holders is required. The roles & responsibilities of various Stake-holders are as below.

5.2. Responsibility of MSLDC:

5.2.1. MSLDC shall be the nodal agency for issuing curtailment instructions.

5.2.2. In real time grid operations, the System Operators in MSLDC Control Room shall identify the need of curtailment, PSS or group of PSS along with quantum which needs to be curtailed or quantum to which generation is to be restricted.

5.2.3. MSLDC shall identify PSS-wise Dedicated Evacuation network and Associated evacuation network, tripping or outage of which shall impact the evacuation of generation, within 30 days from the date of notification of this procedure. Such details shall be made available on MSLDC website. Whenever topology change occurs, the network shall be updated accordingly on six monthly basis.

5.2.4. Schedule revisions due to curtailment shall be made by MSLDC in real time through the MSLDC REMC Scheduling Software. No post-facto schedule revisions, shall be made by MSLDC, unless under force majeure conditions.

5.2.5. While issuing Curtailment, in addition to the curtailment details, details of the System conditions viz. State Demand, State Generation, Drawl by the State from ISTS, Grid Frequency, Confirmation of operation of Thermal units at Technical Minimum level, etc shall be specified by MSLDC through a Web-based platform through e-mail.

- 5.2.6. MSLDC shall maintain the list of Curtailment instructions along with reason and shall follow the existing procedure of uploading the same on MSLDC website on monthly basis in the format attached as **ANNEXURE - 1**.
- 5.2.7. The existing process of uploading the list of Backing down instructions issued to Thermal Generators on Daily basis shall be followed by MSLDC.
- 5.2.8. All the incidences of Curtailment shall be discussed in the Quarterly State OCC Meeting wherein representation of 2 Nos. of RE Generators, one for Wind & one for Solar (based on alphabetic order on rotation basis) is also available. The agenda & Minutes of State OCC Meetings shall be made available on MSLDC Website.
- 5.2.9. The existing practice of intimation of any curtailment or loss of generation arise due to tripping of dedicated or associated evacuation network, to concerned Transmission/Distribution Licensee through MSLDC's Quarterly System Operational Feedback Report shall be followed by MSLDC.

Provided that if the curtailment or loss of generation is due to the tripping of evacuation network owned & operated by the Developer or Generator, QCA shall intimate the same to concerned developer/generator for rectification.

5.3. Responsibility of QCAs:

- 5.3.1. QCA being single point contact as per the Regulation No. 5.7 of the MERC F&S Regulations, shall be the nodal agency for implementation of the curtailment issued along with revision in schedules in real time.
- 5.3.2. QCA shall inform the contact details of 3 Nos. of representatives to where instructions shall be issued by MSLDC Control room. As the need for curtailment may arise at any time, One of the contact details shall be mandatorily, of the Control room operated 24x7 by the QCA.
- 5.3.3. QCA shall ensure implementation of the curtailment through respective Generators or the Plant operators, viz. OEMs, Developers, etc. The MSLDC instructions passed by the QCA shall be binding on the Generators and their appointed Plant operators.

- 5.3.4. QCA shall revise the Schedules in accordance with the quantum of curtailment as instructed by MSLDC.
- 5.3.5. QCA in co-ordination with Generators shall develop protocol for communication of Curtailment instructions from MSLDC for actual implementation. Such PSS-wise protocol shall be submitted to MSLDC within 30 days from the date of notification of the said procedure.
- 5.3.6. The protocol shall consist of mode of communication, details of instructions issued, details of authorized persons of Generators/Plant Operating agencies on behalf of generators, feedback from Generators/Plant Operating agencies on behalf of generators towards implementation or withdrawal of the curtailment

5.4. **Responsibility of Generators and Plant Operators:**

- 5.4.1. At most of the PSS, large no. of generators are connected to single PSS. Such wind/solar farms are normally operated by Plant Operators appointed by the generators. In some of the PSS, there are multiple Plant Operators who are operating plants on behalf of their generators.

Due to involvement of such large no. of stake-holders, it becomes crucial to implement curtailments in short time frame for getting required relief for maintaining system security.

It is the combined responsibility of all the stake-holders, viz. QCAs, Generators, Developers, Plant Operators, OEMs, etc. for providing support to MSLDC for operating the grid at normal level and maintaining the grid safe, reliable and stable.

- 5.4.2. For proper co-ordination of implementation of the curtailments, the Generators shall declare the details viz. Name, Contact No., e-mail id, etc) of nodal officers who are responsible for operating plant in real time. Such nodal officers may be themselves (if plant is operated by them itself) or nodal officers of the plant operators which are appointed by the generators.

The details of PSS-wise nodal officers shall be submitted to respective QCAs & final PSS-wise list shall be submitted by the QCA to MSLDC. The details shall be updated as and when there is

change in the nodal officer or contact details so as to avoid delay in communication under emergent situations of curtailment.

Further, in order to avoid miscommunication due to large no of nodal officers, the PSS-wise nodal officers shall be limited to 2 Nos. and the 3rd shall be the nodal officer of QCA.

The details of PSS-wise Nodal Officers shall be submitted as per **ANNEXURE – 2**.

5.4.3. Since the QCAs are primarily responsible for Forecasting, Scheduling & settlement of Deviation accounts, the onus of implementation of curtailment shall be with the generators, hence, the Generators shall coordinate with their plant operators and with respective QCAs to jointly develop PSS-wise protocol for communication of Curtailment instructions for actual implementation. Such PSS-wise protocol shall be submitted to MSLDC within 30 days from the date of notification of the said procedure through QCA.

5.4.4. Once the QCA is registered for any PSS, it shall be binding on all the generators connected to the said PSS to act upon the instructions passed on by the MSLDC through QCA even if any generator has not issued consent to the QCA.

5.4.5. Since the issues of curtailment/loss of generation due to force majeure or constraints in the evacuation infrastructure are being discussed in the State OCC, the active participation of the RE Generator/QCA (selected alphabetically on cyclic basis) shall be required.

5.5. **Responsibility of Transmission & Distribution Licensees:**

5.5.1. Most of the PSS and Associated evacuation network are owned and operated by the Transmission or Distribution Licensees.

5.5.2. All the concerned Transmission & Distribution Licensees shall declare the PSS-wise detailed list of Nodal officers to MSLDC for co-ordination for curtailment implementation.

5.5.3. After issuance of curtailment instructions, if the generation is not reduced, MSLDC shall issue instructions to the respective nodal officers for opening of EHV or 33 kV interface of the concerned Wind or Solar Farm.

- 5.5.4. Once the instructions of opening of the EHV or 33 kV interface is issued by MSLDC, the same shall be implemented immediately and the timings shall be communicated to MSLDC.
- 5.5.5. Once the action as per Clause No. 5.5.4 is initiated, the restoration shall be only after the instructions from the MSLDC Control Room.
- 5.5.6. For opening and restoration of the interface arrangements, Code system shall be followed by MSLDC Control Room and the concerned nodal officer.
- 5.5.7. Any Planned outages required for maintenance activity shall be availed by the Transmission/Distribution Licensee during low generation period of the RE Generation.
- Provided that 'No Objection Certificate' (NoC) from the Nodal Officer shall be sought in advance.
- Provided further that during planned outage, if curtailment is not required, then NoC shall not be required, only intimation through e-mail to the Nodal Officer shall be required.
- 5.5.8. If the curtailment is due to tripping of the Dedicated or Associated Evacuation Arrangement owned & operated by the Transmission/Distribution Licensee, the same shall be restored on Priority.
- 5.5.9. Further, in case of strengthening of the evacuation infrastructure requirements by the Transmission/Distribution Licensee, the same shall be planned by the concerned Transmission/Distribution Licensee. The Timelines for rectification of the constraints shall be intimated to State OCC.

6. PROTOCOL FOR COMMUNICATION & IMPLEMENTATION:

- 6.1. The first aim of System Operator is to restore the System conditions to normal level, hence, preliminary instructions of curtailment & restoration shall be passed through e-mail.
- Provided that e-mails shall be sent on the e-mail ids provided by the QCAs, Generators in the protocol developed in accordance with the Clause No. 5.4.2 & 5.4.3 above.
- 6.2. It shall be binding on all the QCAs, Generators, Plant Operators, etc. to adhere to the instructions given (including Curtailment

instructions) by MSLDC through e-mail and implement it immediately.

As it is utmost important to implement curtailment and get required relief to the Grid, MSLDC shall inform the Nodal Officers telephonically to ensure implementation. Any non-compliance in respect to implementation of the MSLDC instructions shall be treated in accordance with the provisions of the Act, Regulations & said procedure.

6.2.1. MSLDC has already developed Web-based portal for intimation of the PSS-wise Curtailments to respective QCAs. Through this portal, MSLDC shall issue curtailment in Schedules which shall be intimated to the QCA through automated e-mail facility.

6.2.2. Since the existing portal is accessible only to QCAs, provision for intimation of Curtailment instructions along with the System Parameters during imposition of curtailment to the Nodal Officers shall be developed by MSLDC.

6.2.3. The curtailment instructions shall have following information:

- Name of PSS
- Quantum of Generation to be curtailed or Quantum to which generation is to be restricted
- Time Block from which curtailment to be implemented
- Probable Time Block at which curtailment shall be withdrawn
- Reason for Curtailment
- State Demand (*)
- State Generation (*)
- Actual Wind & Solar Generation of the State (*)
- Grid Frequency (*)
- Drawl by the State from ISTS (*)
- Confirmation towards operation of Thermal Units at Technical Minimum level (*)
- Details of Transmission Constraint along with loading conditions

The System parameter data at the time of imposition of curtailment shall be based on SCADA data based on which real

time decisions are made by MSLDC. In case of any issues in SCADA data observed at later stage, the decision taken by MSLDC during imposition of curtailment shall prevail.

(*) not applicable in case of curtailment is imposed due to transmission constraints.

- 6.2.4. Based on the System conditions, the System Operators in MSLDC Control Room shall review the decision of revision in the quantum of curtailment or withdrawal of curtailment. Such revision in quantum or withdrawal of curtailment shall be informed to QCA through voice communication for implementation which shall be confirmed through e-mail in next two hours.
- 6.3. The curtailment shall be implemented from 4th time block including time block in which instructions have been issued, however, the implementation shall be started from the time block in which instructions have been issued so that actual results shall be obtained from 4th time block.
- 6.4. MSLDC shall impose restrictions on maximum permissible Schedule & Generation through MSLDC REMC Scheduling Software during the curtailment period.
- 6.5. QCA shall revise the schedule as per the instructions of MSLDC and punch in the MSLDC REMC Scheduling Software in accordance with the restrictions imposed. As the Plant is available for generation, the AvC shall not be changed.
- 6.6. As per the F&S Regulations, one revision in each 1^{1/2} hrs slot is permitted, and there are chances that the QCA have revised schedule in a slot and there is a need of curtailment. Under such conditions, QCA shall prepare the revised schedules and punch in the MSLDC REMC Scheduling software immediately when the next slot of 1^{1/2} hrs is started. Thus, the schedule submitted by the QCA shall be implemented from the 4th time block of next slot of 1^{1/2} hrs. MSLDC shall revise the schedules for such time blocks for which it is not possible for QCA to update schedules i.e. the block from which curtailment was issued and the 4th time block of the next 1^{1/2} hrs. The methodology for such schedule revisions shall be as follows:
 - 6.6.1. If reducing trend in actual generation within 3 time blocks is observed, the schedules for these 4 time blocks shall be replaced

by the actual generation. If no reducing trend is observed, the schedules for these time blocks shall remain unchanged.

- 6.6.2. 100 % curtailment is issued, i.e. total generation is to be reduced to 'ZERO':

From 5th time block & up to the 4th time block of next 1^{1/2} hrs slot, existing schedules shall be made 'ZERO'. So that after 4th time block of the next 1^{1/2} hrs slot, the revised schedules submitted by the QCA shall be implemented.

From 5th time block, even if the actual generation is not reduced to 'ZERO' and/or the QCA fails to submit revised forecasts in MSLDC Scheduling software, existing schedules shall be changed to 'ZERO' unless curtailment quantum is not revised or withdrawn. The violation of MSLDC instructions shall be dealt with appropriately as per relevant provisions of the MEGC, 2020 & EA, 2003, as amended from time to time.

- 6.6.3. Partial curtailment is issued i.e. out of total generation, actual generation is restricted to specific quantum:

- (a) If generation is reduced as per required limits:

From 5th time block & up to the 4th time block of next 1^{1/2} hrs slot, schedules shall be replaced by actual generation. So that after 4th time block of the next 1^{1/2} hrs slot, the revised schedules submitted by the QCA shall be implemented.

- (b) If generation is not reduced as per required limit:

Existing schedules shall be reduced by the instructed quantum of generation reduction from 5th time block & up to the 4th time block of next 1^{1/2} hrs slot. After 4th time block of the next 1^{1/2} hrs slot, the revised schedules submitted by the QCA shall be implemented.

- (c) In above cases, if QCA fails to submit the revised schedules, from the 4th time block of the next 1^{1/2} hrs slot existing Schedules shall be reduced by the quantum of generation reduction instructed.

- 6.7. Illustrations for above scenarios for Schedule revision are as follows:

6.7.1. Slot-wise timings & time blocks are tabulated below:

Slot No.	Timing	Time Block	Effective from Time Block
R-7	09:00 to 10:30	37 to 42	40
R-8	10:30 to 12:00	43 to 48	46

6.7.2. In Slot 'R-7' QCA has submitted revised forecast in 37th time block. The revised schedule shall be implemented from 40th time block. The next revision is permitted in slot of 'R-8' from 43rd time block.

6.7.3. Now there is a need of curtailment from 38th time block. Thus, MSLDC shall communicate the instructions of curtailment to the QCA in the 38th time block and the said instruction shall be implemented w.e.f. 41st time block. In such case, the action for implementation of curtailment shall be initiated from the 38th time block itself.

6.7.4. In above case, based on the instructions issued by MSLDC, the QCA shall revise the forecast and submit the same in 43rd time block, which shall be considered for final implemented schedule, if curtailment quantum is not revised or withdrawn.

6.7.5. If reducing trend in generation is observed for the time blocks 38 to 41, MSLDC shall replace the existing Schedules by actual generation for the said blocks. If reducing trend is not observed, the existing schedules shall remain unchanged.

6.7.6. In regards to Clause No. 6.6.2, MSLDC shall change the existing schedules to 'ZERO' for time blocks 42 to 45.

If QCA fails to submit revised forecasts, existing schedules up to the time block of curtailment revision/withdrawal shall be changed to 'ZERO'.

6.7.7. In regards to Clause No. 6.7.3, if generation is reduced to the quantum as per requirement, the existing schedules for the time blocks 42 to 45 shall be replaced by actual generation. The schedule revision request submitted by the QCA in R-8 slot shall be implemented from 46th time block.

If generation is not reduced to the quantum as per requirements, the existing schedules for time blocks 42 to 45 shall be reduced by the quantum of curtailment instructed.

- If it is instructed to reduce the generation by 30 MW, revised schedules shall be as tabulated below.

Schedule/Time Block	42	43	44	45
Existing Schedule	80	85	80	87
Revised Schedule	50	55	50	57

- If it is instructed to reduce the generation and restrict to 50 MW, revised schedules shall be as tabulated below.

Schedule/Time Block	42	43	44	45
Existing Schedule	80	85	80	87
Revised Schedule	50	50	50	50

- If it is instructed to reduce the generation in percentage of installed capacity of 100 MW, say reduce by 40 % of installed capacity, revised schedules shall be as tabulated below.

Schedule/Time Block	42	43	44	45
Existing Schedule	80	85	80	87
Revised Schedule	44	45	44	47

- 6.7.8. In regards to Clause No. 6.7.3, if QCA fails to submit revised forecasts, the existing schedules shall be reduced in accordance to the Clause No. 6.7.7 from 46th time block onwards till the revision or withdrawal of curtailment.
- 6.8. In above cases, if the QCA has not submitted revised schedules and there is a need of curtailment, then the QCA shall submit the revised forecasts immediately which shall be implemented from 4th time block. Thus, MSLDC shall modify the existing schedules as per above methodology only for the 4 time blocks starting from the time block in which instructions have been issued.
- 6.9. In the absence of protocol for communication between QCA, Generators/Plant operators or non-following the instructions of MSLDC even after 4th time block, MSLDC shall direct concerned transmission/distribution licensee of the respective PSS to open the interconnection by opening EHV or 33 kV lines. Such conditions shall be considered as non-compliance to the instructions of the MSLDC and action as per the Section No. 33 of the Act shall be initiated against the generators connected to the PSS.

7. PRINCIPLES OF CURTAILMENT IMPLEMENTATION:

- 7.1 There are large nos. of stakeholders involved in implementation of the curtailment & restoration viz. MSLDC, QCA, Operator at PSS, single or Multiple Plant Operators appointed by Generators, single or Multiple Generators, etc.
- 7.2 Further, in most of the PSS, there are multiple feeders having multiple Plant Operators & Generators.
- 7.3 If proper instructions are not issued, then there are chances of discrimination in implementation of the curtailments thereby resulting in to generation loss to some specific generators.
- 7.4 In view of above, Curtailment instructions shall be implemented in accordance with the following principles:
- 7.4.1. MSLDC shall maintain the list of PSS to which curtailment was issued along with quantum of curtailment.
- 7.4.2. If curtailment is required due to force majeure conditions which has affected or expected to affect specific geographic area of the State, then MSLDC shall identify the PSS in that specific area for which curtailment was not issued earlier and issue curtailment to those PSS. If the quantum required for curtailment is more than the quantum of selected PSS, then for remaining quantum, the curtailment shall be issued to the PSS for which curtailment was issued earlier.
- Further, MSLDC shall maintain the record of these PSS along with quantum for which repeated curtailment was issued so as to maintain uniformity.
- 7.4.3. In case curtailment is required to be issued due to heavy Demand crash, then MSLDC shall issue curtailment to those PSS for which curtailment was not issued earlier. If the quantum required for curtailment is more than the quantum of selected PSS, then for remaining quantum, the curtailment shall be issued to the PSS for which curtailment was issued earlier.
- Further, MSLDC shall maintain the record of these PSS along with quantum for which repeated curtailment was issued so as to maintain uniformity.
- 7.4.4. In case of curtailment is issued due to tripping or outage on Dedicated Evacuation Arrangement, then the curtailment shall be

issued only to specific PSS for which the evacuation arrangement is not available.

- 7.4.5. In case of tripping or outage on Associated Evacuation Arrangement, then curtailment shall be issued to the group of PSS to which the evacuation arrangement is associated. The curtailment shall be issued to all the PSS on pro-rata basis based on the installed capacity of each PSS.
- 7.5 Depending up on System Conditions and reason & requirement of curtailment, MSLDC shall select the PSS to which curtailment was not issued earlier. However, in case of force majeure conditions, it is not possible to maintain such order as the conditions are location specific.
- 7.6 In case of partial curtailment in any PSS having multiple Feeders, Generators, Plant Operators, then the curtailment shall be implemented by the Nodal Officers of respective PSS cyclically. No repeated curtailment shall be imposed on the feeders for which curtailment was issued earlier. However, if the curtailment quantum is more than the remaining feeders, then remaining quantum shall be obtained by implementing curtailment for the feeders to which curtailment was issued earlier. The record of Feeder-wise curtailment details shall be maintained by the Nodal Officers and shall be submitted to MSLDC through QCA as and when requested within 7 days from day of request.

Illustration:

If in PSS 'A', there are 10 Nos. of 33 kV Feeders having No. 1 to 10 and total real time generation is 80 MW. Curtailment of 50 MW out of 80 MW is issued.

In this case, the Nodal Office shall implement curtailment for the feeders starting from Feeder 1 till total curtailment quantum reaches to 50 MW. If curtailment of 50 MW is achieved through Feeder 1 to 6 then, generation from remaining feeders i.e. 7 to 10 shall be continued.

During next curtailment instruction for this PSS, the Nodal Officer shall implement curtailment for feeders 7 to 10 depending up on quantum thereby excluding feeders 1 to 6. However, if the curtailment quantum is not achieved through feeders 7 to 10 then remaining quantum shall be obtained from feeders 1 to 6.

8. PROTOCOL FOR RESTORATION:

- 8.1. Depending up on System Conditions, MSLDC shall review the curtailment imposed and depending up System conditions, the restoration shall be initiated.
- 8.2. Depending up on System conditions & reason for curtailment (Force majeure conditions like Cyclone which are mainly area specific) Curtailment of RE shall be withdrawn first.
- 8.3. Restoration instructions shall be issued to the Nodal Officers through Web-based System being developed by MSLDC through e-mail which shall be confirmed telephonically so as to restore fast.
- 8.4. The restrictions imposed in the REMC Scheduling Software shall be removed as per the restoration instructions so to enable QCAs to submit schedules in coordination with the Nodal Officers which are at Site.
- 8.5. Restoration shall be implemented from 4th time block counting the time block in which instructions have been issued.
- 8.6. If increasing trend in actual generation within 3 time blocks is observed, the schedules for these 4 time blocks shall be replaced by the actual generation. If no increasing trend is observed, the schedules for these time blocks shall remain unchanged.
- 8.7. No restoration shall be made by any stake holder without permission from MSLDC.

9. MECHANISM FOR MONITORING COMPLIANCE:

- 9.1. The event of breach or default of the procedure i.e. in complying with the following provisions:
 - 9.1.1. Non-submission of PSS-wise details of nodal officers to MSLDC by the QCAs.
 - 9.1.2. Non-submission of PSS-wise details of nodal officers of Generators or their Plant Operators to QCA.
 - 9.1.3. Non-submission of protocol for submission of communication of curtailments and implementation to MSLDC by QCAs & Generators.
 - 9.1.4. Non implementation of curtailment instructions of MSLDC either fully or partially by the QCAs or Generators.

- 9.1.5. Non-compliance of any of the terms/conditions/rules outlined under this procedure.
- 9.1.6. Non-compliance of any of the directives as per the provisions of this regulation issued by MSLDC.
- 9.1.7. Non-compliance of provisions of the Regulations, Provisions & Orders issued by Regulators or Legislative authorities by MSLDC.
- 9.2. Consequences for event of default:
- 9.2.1. In case of defaults for 9.1.1 to 9.1.3, in case of curtailments, MSLDC shall direct concerned Transmission/Distribution Licensee to open the EHV or 33 kV inter-connection of the respective Generation and curtail 100 % generation. Under such conditions, the schedules shall be made zero from the 4th time block from which curtailment instructions were issued. Any technical and/or commercial impact shall be the sole responsibility of the concerned generators.
- 9.2.2. In case of defaults for the act covered under as per 9.1.4 to 9.1.6, appropriate action as per Section – 33 (Compliance of Directions) of the Electricity Act, shall be initiated by MSLDC by giving prior notice for a period not less than 15 days and adequate opportunity shall be given to the Generators & QCA to represent the case before MSLDC.
- 9.2.3. In case Generators & QCA fails to address/rectify the breach expressed by MSLDC in the Notice within stipulated time, the MSLDC shall proceed in accordance with the appropriate provisions of the Act, Regulations and would initiate steps for disconnection from the grid.
- 9.2.4. In case of default under 9.4.7, the concerned QCA/Generators shall submit the details to the Chief Engineer (MSLDC) who is the Member Convenor of State OCC for inclusion of the issue in Agenda of the forthcoming OCC Meeting.

10. GRIEVANCE REDRESSAL:

- 10.1. MSLDC shall refer the Complaints regarding unfair practices, delays, discrimination, lack of information, supply of wrong information or any other matters to the Commission for redressal.
- 10.2. Any disputes between QCA, concern generators, Plant Operators shall be governed as per the dispute resolution mechanism under

their Agreement, failing which it shall be subject to jurisdiction of the MERC. Pending the decision of the State Commission, the directions of the MSLDC shall be complied by the QCA and concerned generator(s).

11. REMOVAL OF DIFFICULTIES:

11.1. In case of any difficulty in implementation of this procedure, MSLDC may approach the Commission for review or revision of the procedure with requisite details.

12. GENERAL:

12.1. All costs/expenses/charges associated with the application, including bank charges, Affidavits etc. shall be borne by the applicant.

12.2. The Generators and QCA shall abide by the provisions of the Electricity Act, 2003, Indian Electricity Grid Code and MERC (State Grid Code) Regulation - 2020, and applicable CERC and MERC regulations as amended from time to time.

12.3. This procedure aims at prompt and pragmatic curtailment of Wind and Solar Generations as a last option considering the Grid security as a main objective. However, some teething problems may still be experienced. The various implications would be known only after practical experience is gained by way of implementing these procedures. In order to resolve the same, this procedure shall be reviewed or revised by the MSLDC with prior approval of Commission.

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13. ANNEXURES:

ANNEXURE - 1

Format for Curtailment Report

Sr. No.	Date	Name of PSS	Curtailment Period		Reason for Curtailment	Actual Generation at the time of Curtailment	System Parameters (*)
			From Time Block	To Time Block			

() System Parameters shall be applicable only in case of Curtailment due to Force Majeure, Heavy Demand Crash, etc, and shall not be applicable in case of Transmission Constraints.*

Format for declaration of Nodal Officer for PSS

Name of PSS:			
Name of QCA:			
Particulars	For QCA	For Generators	For Generators
Name of Nodal Officer			
Designation			
Mobile No			
Telephone No			
Address			