Report of committee
set up as per directives of 28th WRPC meeting
to study and report findings on

Operational Experience of DSM Mechanism
and
Financial impact on state DISCOMs

July 2015
1.0 Background

Hon’ble CERC had issued an order on regulation for Deviation Settlement Mechanism (DSM) 06th Jan, 2014. The DSM mechanism is in place of Unscheduled Interchange (UI) Regulation. The DSM regulation is implemented w. e. f. 17th Feb, 2014.

Before implementation of DSM, Hon’ble CERC had called comments and suggestions all constituents. Accordingly most of the stack holders has represented to Hon’ble CERC regarding difficulties envisaged during actual implementation of mechanism due to volume cap of +/- 150 MW on deviation.

Managing Director, GETCO has pointed out their views to Central Electricity Authority and Hon’ble CERC on implementation of DSM on 12th Feb, 2014 i.e. before actual implementation of mechanism. The views pointed out in above communication are representative views of all states in western Region. The letter is placed at Annexure "A"

Further, Managing Director, GETCO has again pointed out their view and operational experiences of DSM Mechanism to The Chairman, CERC on 10th Nov 2014, reiterating the same views on DSM mechanism. The letter is placed at Annexure "B"

Madhya Pradesh Power Management Company Limited (MPPMCL) made a representation dated 14.2.2014 to the Commission regarding Regulation 7 of the Deviation Settlement Mechanism Regulations, particularly pertaining to the limits on deviation volume and the consequences of crossing the limits

MPPMCL also filed a Writ Petition No. 3125 of 2014 in the Hon’ble High Court of Madhya Pradesh, Jabalpur on 18.2.2014 challenging Regulation 7 of the Deviation Settlement Mechanism. Hon’ble High Court in its order dated 21.2.2014 issued the notice to the Commission and directed to decide the representation of the petitioner.

1.1 Abstract from discussions in WRPC meetings.

Minutes of meeting of 27th TCC/WRPC held on 21st & 22nd November 2014 at Bhopal

The DSM violates basic principle of one penalty for single violation. If an entity under draws at frequency 50.10 Hz and above, it do not get a single paisa for the entire under drawl energy, however a penalty of Rs 1.78/kwh is levied on the entire volume. The Hon’ble Commission may be requested to address this issue to avoid multiple penalties for single deviation.

Constituents were of the view that the charges (capping & additional charges) have been substantially increased which is resulting in heavy penalization to DISCOMs. CE (SLDC) MP
stated that the amount of capping and additional charges has increased many folds, since the inception of DSM as compared to the capping and additional charges in the UI regime.

Other major concern raised by the beneficiaries was the limit of volume set to +/- 150 MW or 12% whichever is less, irrespective of the utility size. Beneficiaries were of view that the limit of volume should be w.r.t. the % of schedule and not in MW terms. A volume limit of 10-12% of schedule would be a fair limit. There are also penalties even if the state is helping the power system by under drawing at low frequencies.

Chairman WRPC suggested that since all the constituents have more or less same grievances on the issue. 150 MW is too small a deviation and keeping it at 12% or 150 MW or higher (instead of lower) does not appear to have a major negative impact on the grid. He suggested that if other constituents are interested and having grievances they may like to consider joining the petition.

Minutes of 28th meeting of WRPC held on 4.03.2015 at Udaipur

MD, MSETCL suggested that a group comprising of representatives from all states be formed and study the problems faced during DSM and suggest the solutions in the next WRPC meeting. If there are difficulties experienced in DSM during operation for many states, then as a region it is necessary to represent the case and also point out acceptable solutions.

TCC recommended the same. It was decided that the Scope of the Group would be to study the operational challenges mentioned above and other related issues if any, which are commonly affecting the states in WR and suggest acceptable solutions and put up to the next WRPC meeting so that the matter may be put up to the Commission as a Region, if required.

1.2 Petition filed by Tripura State Electricity Corporation before CERC

Hon'ble CERC heard the petitioner petition filed by Tripura State Electricity Corporation Limited (TSECL) also heard from MPPMCL on identical grievances on implementation of DSM. Hon. CERC had issued an order dated 20.02.2015 on petition filed by TSECL and issued order giving relief to small states, however had not passed any relief to the grievances put forth by MPPMCL. From the order issued by Hon'ble CERC, it is clear that no relief extended to big constituents. The relevant abstract of the order is as under.

“Provided further that when the schedule is less than or equal to 400 MW, the additional charges for deviation shall be based on percentage of deviation worked out with reference to schedule of 400 MW”
Form the order it is clear that relaxation on cap volume for large states is not considered by Hon'ble CERC. Hence, issue of difficulties in effective implementation of DSM regulation is still remains unaddressed.
2.0 Formation of Committee

MD, MSETCL during 28th WRPC meeting, pointed the bigger states like Maharashtra, Madhya Pradesh, Gujarat etc. face a lot of practical difficulties in restricting the deviations within limit of +/- 150 MW under DSM. However the representations with the Hon'ble CERC have been on individual basis (as only MP has approached the Commission). If there are difficulties experienced in DSM during operation for many states, then as a region it is necessary to represent the case and also point out acceptable solutions. He pointed out the following difficulties faced by Maharashtra in DSM:

1. Maharashtra system is having Maximum demand 20000 MW is met by around 14000 MW State generation and Central sector share of 6000 MW.
2. The deviation limit at the periphery as specified in the DSM regulation is 12% of share or +/-150 MW whichever is very meager as compared to the volume of power handled by state network.
3. For the larger states like Maharashtra, Gujrat, Madhya Pradesh, to maintain the deviation of +/-150 MW over a time block of 15 min. is practically difficult as demand is distributed in large geographical area. Also, unforeseen climatic factors and renewable generation in the state are affecting the demand pattern. All available resources are rescheduled continuously to remain in band.
4. Impact of Renewable Energy: The renewable energy particularly wind faces lot of uncertainties. The quantum of wind has gone up in Maharashtra. These variations are far above 150 MW limits prescribed. The RRF mechanism is suspended. In these conditions, the State is unnecessarily burdened with DSM penalties. There is a need for a group to be formed to discuss and suggest solutions.
5. Failure of Communication links: In January 2015, there were instances when the major communication links failed. Under these conditions, the State was asked to back down generation. With frequency being low, the DSM penalties were very high, as it turned out from the energy meter readings that the State was not actually under drawing as seen from the SCADA in absence of links, but was overdrawing. There should be provisions in the DSM to mitigate penalties in such cases where state is asked by WRLDC to back down and links are not fully present.
6. Need for Redundancy in links: There is a need to increase the redundancy in communication links in a phased manner so that the above point does not repeat and cause financial implications.
7. Too small margins: Apart from the RRF factor, the margin of 150 MW for states with demand like 20,000 MW in Maharashtra case, and central shares around 5000-5500 MW is too small to curtail the deviations and seriously requires to be enhanced.
8. Infirm power: New generating units injecting infirm during testing, commissioning and during trial run also cause deviations as this power is not scheduled.
MD, MSETCL suggested that a group comprising of representatives from all states be formed and study the problems faced during DSM and suggest the solutions in the next WRPC meeting. If there are difficulties experienced in DSM during operation for many states, then as a region it is necessary to represent the case and also point out acceptable solutions.

TCC recommended the suggestion by Maharashtra and it was decided that the group of the Western Region constituents would study the operational challenges mentioned above and other related issues if any, which are commonly affecting the states in Western Region and to suggest acceptable solutions and put up to the next WRPC meeting so that the matter may be put up to the Commission as a Region, if required.

WRPC agreed to the recommendation of TCC as above. During WRPC meeting, it was decided that the group shall comprise of following representation:
- 1) All Chief Engineers of State LDCs
- 2) Representative from NTPC
- 3) Officer of the rank of Chief Engineer, from DISCOMs / Holding company if required
- 4) Any other member as required during discussions

The Chief Engineer, MSLDC shall be convener of committee and outcome of the discussions and deliberations shall be reported during next WRPC meeting.

Accordingly, the Chief Engineer, MSLDC called representation from all constituents and a meeting of the group members was held on 22/04/2015 at MSLDC Kalwa. Based on the deliberations, suggestions and submission from members received during this meeting, this report is being submitted.
3.0 Committee proceedings

Maharashtra has taken up the issue of DSM limit in various WRPC OCCM and WRPC meetings. The views of all WR constituents are similar and there is unanimous opinion to enhance the limit of +/- 150 MW on state deviation. It is also worthwhile to mention that system operator is continuously engaged in maintaining state drawl schedule and issuing re-dispatch instructions to all intra-state generators and revisions of ISGS schedules. The fact that system operator is continuously engaged in maintaining state drawl schedule leads to divert attention from prime duty of system operator from maintain loading parameters in intra-state network for assuring grid security and integral operation of network.

The discipline of maintaining state drawl as per schedule cannot be ignored; however, the grid operations are commercially driven. This result in deterioration of thermal generating units due to ever changing dispatch schedule for pick up and back down instructions frequently. The system operator takes various actions to maintain load generation balance of control area to maintain state deviation within limit. Various corrective measures adopted during under drawl / over drawl are as under.

Under Drawl condition

1. Withdrawal of load shedding, if already in force including supply to Agriculture Consumers.
2. Reduction of intra-state hydro generation to minimum level.
3. Operation of pumped hydro generating units in pumping mode.
4. Downward revision of inter-state ISGS schedule by as per combined merit order stack with intra-state generating units.
5. Backing down of intra-state generating units as per combined merit order stack to their technical minimum.
6. Reserve shut down of ISGS & InSGS units observing the trend of demand pattern.
7. Even if the under drawl is not under control and RE injection is on higher side, then curtailment of RE injection.

It is observed that even after taking all above steps there are difficulties faced by system operator to control under drawl especially during demand crash scenario.

Over Drawl condition

1. Upward revision of ISGS generating units as per combined merit order stack with intra-state generating units.
2. Pickup of all intra-state thermal generating units to their maximum declared capacity and revision schedules to that effect.
3. Increase intra-state hydro generation as per requirement. Hydro generation is picked up to maximum level during persistent over drawl condition.
4 Utilization pumped storage units in generation mode.
5 Implementation of planned load shedding all over the state as per protocol approved by SERC.
6 Instruction to carry out emergency load shedding by opening of 33/22/11 KV feeders as per protocol which is already in place and well circulated at substations in the field.

Even if overdrawl is not under control by taking above measures then there are identified 132/220 KV radial feeders which are opened on instruction of system operator.

From all above measures system operator continuously takes efforts to maintain state drawl within limit of +/-150 MW. The demand variation in peak & off peak, in different seasons is of the order of 6000-8000 MW which is almost 30-40% of peak demand in case of Maharashtra. It is worthwhile to mention here that Maharashtra is having variable hydro generating capacity about 2500 MW which includes Koyna, TPC Hydro and Ghatghar pump storage. Despite of this variable hydro capacity, sometimes it is inadequate to exercise precise control on state drawl.

It is easy to appreciate that the constituents who do not have adequate controllable hydro at their disposal faces more difficulties in regulating their deviations.

Maharashtra has carried out extensive analysis of deviations during the period 01st April, 2014 to 31st March, 2015. The data used for analysis is from ABT meter data used for Regional Energy Accounting weekly bills. The data pertaining to schedule & drawl for 35040 time blocks for the period 01st April, 2014 to 31st March, 2015 is analyzed.

Following are few highlights of the analysis:
1. Under Drawl below 150 MW is for 60 % of time blocks and 1321 MUs.
2. Under Drawl within the range of 0 to 150 MW is for 6 % of time blocks and 131 MUs.
3. Over Drawl within the range of 0 to 150 MW is for 5 % of time blocks and 106 MUs.
4. Over Drawl within the range of 150 to 200 MW is for 3 % of time blocks and 69 MUs.
5. Over Drawl within the range of 200 to 250 MW is for 3 % of time blocks and 74 MUs.
6. Over Drawl above 250 MW is for 23 % of time blocks and 515 MUs.

As per DSM regulation every constituent has to change sign of drawl after ever 12 time blocks and failure do so, accounts for IEGC violation. The analysis of the data shows that Maharashtra was able to change the sign of drawl after 12 time blocks 1541 times as against 2920 times in one year. This indicates that 53 % times sign change was possible in year 2014-15.

Maharashtra also shared commercial impact on state during April 2014 to March 2015 as under:

a. Unscheduled interchange charges of Rs. 122.84Cr. is receivable.
b. Amount payable due to cap on UI is Rs. 166.22Cr.

c. Additional UI Charges payable as part of penalty is Rs. 101.07 Cr.

It can be seen that UI charges even being receivable as Rs. 122.84 Cr. had end up with Rs. 144.45 Cr. payable. State DISCOMs are facing heavy commercial loss due to capping and additional UI charges which applicable for deviation beyond +/- 150 MW.

The failure of the constituent to abide by deviation limits of DSM regulation even after continuous efforts cannot be considered as failure of system operator, but it is has limitations due to ever changing demand pattern and also inadvertent variations of generating units in control area as well as outside control area.

**The views expressed by Gujrat are on the identical views on following points:**

1) Impact of Renewable penetration in grid – Gujrat and Maharashtra are having large quantity of renewable generation installed in state. Maharashtra has renewable installation of the order of 4400 MW with RE injection of the order of 2500 MW in monsoon season. These states are experiencing variation of injection of the order of 1000 to 1500 MW. System operator is totally constrained due to MUST RUN status of renewable and control of over drawl / under drawl within 150 MW limit is actually next to impossible in such operating scenario.

2) Merchant capacity private players play significant role in drawl schedule of the state, many times drawl schedule changes even by 500 MW in consecutive time blocks.

3) More than 200 Open Access users & quantum of transaction is more than 800 MW, their change in injection / drawl schedule directly affect the state drawl schedule at inter-state boundary.

4) New generators having capacity more than 250 MW are being added to the system and their infirm generation impacts of state drawl as these generators are not scheduled before COD.

5) The generating units of the capacity 500 / 660 / 800 MW are operating in the state and tripping such generating unit has direct impact on the drawl of the state.

**The views expressed by Madhya Pradesh are as below:**

1) Tripping of State generator selling power through collective transactions, no revision is envisaged for collective transaction. Hence, tripping leads state under violation of
DSM. Therefore, in such a case, no penalty to be imposed on State for violation of conditions under DSM.

2) As per IEGC clause No. 6.5.19, in case of tripping of the State generator selling power through inter-state bilateral, only one revision is allowed. Original schedule would be made effective from the estimated time (as declared by the generator) of the restoration of the unit. In case, generator doesn’t come on bar as per scheduled time then it leads State under violation of DSM. Generator to be allowed for more than one revision for such a case.

3) At present, RRF mechanism is only limited to scheduling and forecasting of RE generators. Commercial mechanism outline in RRF mechanism is suspended till further order. In absence of commercial settlement, it has lost its sanctity. New proposed CERC framework for scheduling forecasting and imbalance handling for RE generators to be made effective as early as possible.

4) Accordingly, State should be exempted for violation due to RE variation.

5) At present, grid consists of many 800 MW/660 MW/500 MW capacity generating units. Tripping of any unit leads immediate violation of DSM. Generator tripping is inevitable. Hence, for such a force major reason there should not be any penalty on state for DSM violation.

For the States having higher demand the DSM limits +/- 150 becomes merely below 1%. No tools are available in INDIA having forecasting error within 1%. Hence, there should be reasonable deviation band to cover forecasting errors.

CERC order No. L-7/139(159)/2008 dated 22.04.2013 in the matter of approval of amendments to the detailed procedure for relieving congestion in real time operation, Annexure-1 (Detailed procedure for relieving congestion in real time operation) clause No. 3.11.1 is reproduced as under.

3.11.1. Two percent (2%) of the total anticipated peak demand met in MW of the control area/group of control area/region (to account for forecasting uncertainties)

Above clause clearly indicates/accepts the forecasting uncertainty as 2% and this level error in forecasting can be achieved only proper forecasting tool with sufficient historical demand data, meteorological parameters and sufficiently accurate weather forecast is available as input data to the forecasting tool. Presently, no state is equipped with such sophisticated forecasting tool. Hence, apparently considering the State Peak demand of big states of the order of 14000 to 20000 MW, forecasting error is much higher that DSM limit of +/-150 MW.
The deviation limit specified under DSM mechanism is very low and it almost impracticable to maintain drawl within limit due to dynamics and ever changing demand pattern on demand side. Frequent variation of intra-state resources as detailed above on other side, system operator is facing much difficulties in maintaining state deviation within band of +/- 150 MW due to inherent system dynamics.

From all above facts/submission by all western region constituents it is crystal clear that the deviation limit prescribed by DSM regulation is not practically achievable. Also, the question remains that why this fact was not brought out in early stages of DSM implementation.

The reason behind that all constituents had already submitted their comments/suggestions in response to the concept paper published by CERC, however cognizance of the same had not been taken at the time of issue of DSM regulation. This is to mention here that Statement of Reasons (SoR) was not published at the time of notification of regulation.

Further, all constituents have honored this regulation and put maximum and sincere efforts to abide by the provisions of the regulation. However, it is the fact that even after taking sincere efforts it not possible to abide by deviation limits. The issues faced by constituents were discussed at regional forum and finally arrived at the conclusion that issue needs to be referred jointly to Hon'ble CERC.

**Other related issue of monitoring of Drawl of constituents by RLDC.**

RLDC monitors drawl of all constituents against their respective schedules and issue notices on the basis of drawl figure available on RLDC - SCADA system. Actual drawl of constituents is arithmetic summation SCADA data of different drawl points. Computation of actual drawl is summation of more than 60 to 70 nos. of instantaneous MW values from various locations. This data comprises of data from ISGS - RTUs and also from data from STU RTUs. Most of the time correct data of all interface points are not available and many values are non-current / invalid due to various reasons including communication failure.

System operation is carried out on SCADA data and billing is carried out on the basis of ABT meter data. It is observation of all constituents that drawl data do not match with each other and there is wide variation in these data sets. The SCADA error is mis-leading to system operator for taking decisions on control action in maintaining deviation within limit of 150 MW and resulting in wastage of resources followed by huge financial impact in actual billing being post facto activity based on meter data.
In the order, in petition filed with CERC by Tripura in case No. RP/06/2014 clause no 18(n) it is mentioned that “As per SCADA data MP had to receive about `9.00 Crore but as per actual UI accounts, MP was payable by 5.31 Crore”

All constituents are facing problem of monitoring actual drawl data computed on the basis SCADA inputs from all interface points.

RLDCs are in process for acquisition of ABT meter data from all inter-state/ inter-region interface points under Automatic Meter Reading (AMR) scheme. ABT meters are compatible for transmission of instantaneous MW data at fixed interval. Acquisition of instantaneous MW data from interface meters and computing drawl of constituents will give correct drawl figures in addition to SCADA data. This data also can be made available to constituents for reference.
Proposal for consideration

After detail deliberations and from the submission of all Western Region constituents, the committee proposes DSM limits as below:

**Part A : Proposed Deviation Limits**

1. Schedule below 400 MW : 48 MW. (Already approved by Hon’ble CERC)
2. Schedule between 401 to 1250 MW : 12 % or 150 MW whichever is lower.
3. Schedule between 1251 to 1500 MW : 150 MW.
4. Schedule above 1501 MW : 10 % or 400 MW whichever is lower.
5. 20 % penal charges for deviation between 401 to 500 MW
6. 40 % penal charges for deviation between 501 to 600 MW
7. 100 % penal charges for deviation above 600 MW.
8. Under drawl cap for under drawl exceeding 400 MW
9. Penal charges for under drawl above frequency 50.10 Hz for under drawl exceeding 400 MW.
10. The provision of change in drawl sign in 12 time blocks may be continued.

**Part B : Data acquisition from interface ABT meters.**

Respective RLDCs may please be directed to acquire instantaneous MW data from interface ABT meters and computed drawl data of respective constituent on the basis of this data and shall be made available in real time.

**Way forward**

In compliance to the directives issued during 28th WRPC meeting, this report is being submitted to WRPC. WRPC may like to discuss and consider to share this report to all constituents / DISCOMs. All DISCOMs shall file a joint petition to Hon’ble CERC and SLDCs shall extend all possible help to DISCOMs. This report shall also be shared with other states in country and similar action is envisaged from other states in country.
Ref. No. : GETCO/SLDC/CE/MIS/Comm/CEA/ 1205
Date : 12/02/2014

To,
The Chairperson,
Central Electricity Authority,
Sewa Bhawan,
R. K. Puram,
New Delhi-110 066

Subject: Views on Hon’ble CERC Notification (Deviation Settlement Mechanism and related matters) Regulations, 2014 date 06th January’2014.

Dear Sir,

Hon’ble CERC vide its notification dated 06th January’2014 has issued Deviation Settlement Mechanism and related matters Regulations, 2014, which shall come in to force from 17.02.2014.

Hon’ble CERC vide above notification, has imposed deviation limits as here under:

In accordance with the regulation 5, clause 1(iii), “the charges for the deviation for the under draws by the buyer in a time block in excess of 12% of schedule or 150MW, shall be zero”. Further, In accordance with the regulation 5, clause 1(iii), “the charges for the Deviation for the over-injection by the seller in a time block in excess of 12% of the schedule or 150 MW, whichever is less, shall be zero, except in case of injection of infirm power, which shall be governed by the clause (5) of this Regulation”.

The limits specified on Deviation volume in regulation 7 clause 1, shall apply to the sum total of over-drawal by all the intra-State entities in the State including the distribution companies and other intra-State buyers, and shall be applicable at the inter-State boundary of the respective State.

Moreover, there is a heavy under drawl despite of backing down of all thermal units during heavy monsoons period particularly in night hours. At that time, it is very difficult to change the sign of deviation from –ve to +ve or vice versa after 12 time block.
In this regard, SLDC-Gujarat submits the following views:

1) We have already represented in our submission that integration of renewable energy is challenging task and it was explained with factual data of grid operation. It was noted from the captured data that wind variation has been observed up to 500MW and many occasions even up to 1000MW (Annexure-1). Variation between maximum & minimum wind injection was more than 1000 MW on 60 days during year 2012-13. Under this position, we have to keep State generation units either on technical minimum or in shutdown. As the gas generation is totally diminished, the ramping up / down the conventional plant is impossible quickly. System operator is totally constrained under the MUST RUN status of RE to control over drawl / under drawl in the band of 12% of schedule or 150MW (Specified volume limits). Apart from this, conventional plants suffer in terms of operational efficiency.

Under the circumstances, we suggest that band of 12% of schedule or 150MW, whichever is higher must be allowed particularly for those States, wherein RE generation is more than 2000MW.

Apart from this, special dispensation should be given to such States for either gas allocation or merit order deviation by the system operator.

2) Further, addition of merchant capacity of private players in the State with around 2000 MW capacity meant for outside the State, plays a significant role in drawl schedule of the State in following manner,

i) Many times, variation in drawl schedule in two consecutive time blocks is more than 500 MW.

ii) Tripping of bigger size units and sudden reduction in generation may lead to over drawl more than 150 MW now and then.

iii) They are selling their power through collective transactions. There is no scope of revision in collective transaction schedule in case of generator tripping. In such cases, it is very difficult for SLDC to restrict over drawl. Therefore, the system operator will need a wider band of over drawl and under drawl.

3) Also, when more than 250 Nos. of Users for the capacity of about 800MW are participating in Short Term Open Access in one State like Gujarat, the change in their injection / drawl schedule directly affects drawl schedule of the State at Inter-State boundary.

4) New generators with high capacity i.e. ≥ 300 MW capacity are being added in the grid now and then. Prior to COD of such generators, they have to be facilitated to inject their infirm power into the grid. Such infirm generation would cause deviation more than 150 MW at State periphery. Hence, it should be exempted from the volume limit specified for the State. The effect of infirm generation by embedded State generator should be nullified at State periphery.

5) In Gujarat State, around 25 % installations of renewable sources have been covered under RRF mechanism. For remaining capacity, their unforeseen variation also causes substantial deviation at State periphery.
This point gains prominence considering the fact that the Hon’ble CERC has recently suspended the commercial impact of RRF mechanism while forecasting/scheduling kept intact. There is no emphasis on RE developers to help the grid with proper forecasting. It cannot be ignored on one side and tightening the over drawl and under drawl with in the band of 12% of schedule or 150MW on other side.

There should be equal stringent measures for all RE power units particularly wind to give correct forecast. The present RRF mechanism should not be limited to wind farms size and cutoff date and all must be included.

6) Gujarat is the State wherein Intra-State ABT mechanism is fully implemented with all commercial aspects since 5th April 2010. The objective of this regulation is to maintain grid discipline by Intra State entities as envisaged under the Grid Code through the commercial mechanism of Unscheduled Interchange Charges by controlling the users of the grid in scheduling, dispatch and drawl of electricity.

Now with the introduction of Deviation settlement mechanism with the tight band of 12% of Schedule or 150MW (Specified Volumes of Limits), it will be violation in natural manner inadvertently as DISCOM are scheduling the power with their demand forecasting mechanism / load diversity & seasonal variation. It calls for the enhancing the band limits of MW drawl up to 49.70Hz operation.

7) The clause related to change of sign after 12 time-blocks seems to be counterproductive and consumer will suffer due to the shedding of load on account of grid constraint which are not many times in the control of system operator. If, there is equal contribution from supply side like RGMO / FGMO, quick ramp rate gas based generator, then, there would be substantial support to maintain drawl, but today it is missing. Moreover, thermal generating units below 200 MW capacity and gas & nuclear based generating stations in the country (which comprise of 11% of total installed capacity) are exempted from implementation of RGMO. In short, primary frequency response in Indian context is limited.

It is therefore, necessary to take the above points in to account and review this particular point of deviation change of sign. However, to have control, probable advantage to generator for over injection as well as under injection, we may fix the limit of 12% of schedule or 150MW, whichever is less. Whereas, we have to have different approach and look towards DISCOM /States and specified volume limits need to be enhanced.

Hence, the collective actions of all above events shall causing deviation at State periphery. In such circumstances, generation shall have to be picked up / backing Down from on bar State generating stations or from ISGS to curb Over Drawl / Under drawl of the State as a whole,. In ISGS, revision would become effective from 4th time block. State would continue to deviates the limits of 12% of schedule or 150MW whichever is less. With many States having their demand of the order of 10000 MW or more, at least 3 to 5 % deviation of their demand / generation may cause deviation of 300 to 500 MW.

In accordance with the Regulation 8 and 10 of order 3 of 2010 issued by Hon’ble GERC, the basic UI rate as well as additional charges for intra-State entities in Gujarat shall be
in line with the CERC notifications on the matter as amended from time to time. Hence, considering above, the clauses of deviation settlement mechanism and related matter regulation 2014 issued by Hon’ble CERC are causing concern to us.

We, therefore, request for enhancing the over drawl and under drawl band of 12% of schedule or 150MW whichever is higher for the state periphery. Meantime, existing mechanism may continue till suitable modification in new order no L-1/132/2013/CERC dated 06th January’14 are done.

Thanking you,

Yours faithfully,

For Gujarat Energy Transmission Corporation Ltd

(S.K. Negi)
Managing Director

Copy to:

1. The Secretary, Central Electricity Regulatory Commission, New Delhi.
2. The Chief Executive Officer, POSOCO, NLDC, New Delhi
3. The Member Secretary, WRPC, Mumbai.
More than 1300 MW Wind Variation in a day during the FY 2012-13

- 16-06-2012 (Max-1630, Min-236) → 17-07-2012 (Max-1823, Min-355)
- 17-12-2012 (Max-1360, Min-31) → 20-12-2012 (Max-1451, Min-58)
- 31-12-2012 (Max-1546, Min-153) → 08-02-2013 (Max-1543, Min-237)
- 01-03-2013 (Max-1739, Min-426) → 02-03-2013 (Max-1653, Min-125)

Maximum Wind variation in Two consecutive days

- 15-06-2012 (9.89 MUs) → 16-06-2012 (21.97 MUs)
- 20-07-2012 (42.87 MUs) → 21-07-2012 (24.53 MUs)
Ref. No. GETCO/SLDC/CE/Comm/CEA/32

Date: 06/11/2014

To,
The Chairperson,
Central Electricity Authority,
Sewa Bhawan,
R. K. Puram,
New Delhi-110 066.

Sub: Views on Hon'ble CERC Notification (Deviation Settlement Mechanism and related matters) Regulations, 2014 date 06th January’2014.
Ref: GETCO/SLDC/CE/MIS/Comm/CEA/1205 Date: 12/02/2014

Dear Sir,

DSM mechanism has been implemented from 17th February’14. Prior to implementation, we have expressed our views vide letter dated 12th February’14 with data and justification to consider following points:

1) We have already represented in our submission that integration of renewable energy is challenging task and it was explained with factual data of grid operation. It was noted from the captured data that wind variation has been observed up to 500 MW and on so many occasions even up to 1000 MW. Variation between maximum & minimum wind injection was more than 1000 MW on 60 days during year 2012-13 and on 82 days during the year 2013-14. Under this position we have to keep state generation units either on technical minimum or in shutdown. As the gas based generation is totally diminished, the quick ramping up / down of the conventional plants is impossible. System operator is totally constrained under the MUST RUN status of RE to control over drawl / under drawl in the band of 12% of schedule or 150 MW (Specified volume limits). Apart from this, conventional plants suffer in terms of operational efficiency.

Under the circumstances, we suggest that band of 12% of schedule or 150 MW, whichever is higher must be allowed particularly for those States, wherein RE generation is more than 2000 MW.

Apart from this, special dispensation should be given to such States for either gas allocation or merit order deviation by the system operator.
2) Further, addition of merchant capacity of private players in the State with around 2000 MW capacity meant for outside the State, plays a significant role in drawl schedule of the State in following manner:

i) Many times, variation in drawl schedule in two consecutive time blocks is more than 500 MW.

ii) Tripping of bigger size units and sudden reduction in generation may lead to over drawl more than 150 MW now and then.

iii) They are selling their power through collective transactions. There is no scope of revision in collective transaction schedule in case of generator tripping. In such cases, it is very difficult for SLDC to restrict over drawl. Therefore, the system operator will need a wider band of over drawl and under drawl.

3) Also, when more than 250 Nos. of Users for the capacity of about 800 MW are participating in Short Term Open Access in one State like Gujarat, the change in their injection / drawl schedule directly affects drawl schedule of the State at Inter-State boundary.

4) New generators with high capacity i.e. ≥ 300 MW capacity are being added in the grid now and then. Prior to COD of such generators, they have to be facilitated to inject their infirm power into the grid. Such infirm generation would cause deviation more than 150 MW at State periphery. Hence, it should be exempted from the volume limit specified for the State. **The effect of infirm generation by embedded State generator should be nullified at State periphery.**

5) In Gujarat State, around 25 % installations of renewable sources have been covered under RRF mechanism. For remaining capacity, their unforeseen variation also causes substantial deviation at State periphery.

This point gains prominence considering the fact that the Hon'ble CERC has recently suspended the commercial impact of RRF mechanism while forecasting / scheduling kept intact. There is no emphasis on RE developers to help the grid with proper forecasting. It cannot be ignored on one side and tightening the over drawl and under drawl within the band of 12% of schedule or 150 MW on other side.

There should be equal stringent measures for all RE power units particularly wind to give correct forecast. The present RRF mechanism should not be limited to wind farms size and cutoff date and all must be included.
6) Gujarat is the State wherein Intra-State ABT mechanism is fully implemented with all commercial aspects since 5th April 2010. The objective of this regulation is to maintain grid discipline by Intra State entities as envisaged under the Grid Code through the commercial mechanism of Unscheduled Interchange Charges by controlling the users of the grid in scheduling, dispatch and drawl of electricity.

Now with the introduction of Deviation Settlement Mechanism with the tight band of 12% of Schedule or 150 MW (Specified volumes of limits), it will be violation in natural manner inadvertently as DISCOMs are scheduling the power with their demand forecasting mechanism / load diversity & seasonal variation. It calls for enhancing the band limits of MW drawl up to 49.70 Hz operation.

7) The clause related to change of sign after 12 time-blocks seems to be counterproductive and consumer will suffer due to the shedding of load on account of grid constraint which are not many times in the control of system operator. If there is equal contribution from supply side like RGMO / FGMO, quick ramp rate gas based generator, then there would be substantial support to maintain drawl; but, today it is missing. Moreover, thermal generating units below 200 MW capacity and gas & nuclear based generating stations in the country (which comprise of 11% of total installed capacity) are exempted from implementation of RGMO. In short, primary frequency response in Indian context is limited.

It is therefore, necessary to take the above points into account and review this particular point of deviation change of sign. However, to have control, probable advantage to generator for over injection as well as under injection, we may fix the limit of 12% of schedule or 150 MW, whichever is less. Whereas, we should have different approach and look towards DISCOMs / States and specified volume limits need to be enhanced.

We also request to take the similar data from other States.

The operational constraints highlighted above have been captured from SLDC recorded data after the implementation of DSM from 17.02.14 to substantiate our request to carry out amendment in DSM:

1) Impact of variation in wind generation:

The variation in the wind generation for some of the typical days is shown in the attached graph as Annexure-1. It may kindly be noted from this data that variation in wind generation has been as high as 1500 MW in a day when Gujarat has wind installed capacity of 3200 MW with the peak recorded as 2500 MW.

There have been several occasions when wind energy injection has been more than 50 MUs in a day. It is also shown in Annexure-1 that maximum wind injection has been more than 2500 MW in a favorable wind generation period (monsoon).
This is the time when demand in the grid has been low with a backing down or technical minimum generation from conventional plants.

In the event of sudden rise in wind generation, the State is in under drawl whereas it is just the reverse in case of sudden drop in wind generation.

A typical chart recorded for a day on 15.05.14 is shown below. It clearly indicates the under drawl when wind generation has been on the rise achieving peak of 2021 MW from minimum 33 MW on same day.

![Deviation Chart](image)

We also would like to furnish data recorded on some of typical days for over drawl and under drawl beyond the band of ± 150 MW when variation in wind generation has been as high as 1500 MW in a day.

<table>
<thead>
<tr>
<th>Date</th>
<th>Wind variation between Maximum &amp; Minimum wind injection in a day</th>
<th>No. of blocks when deviation beyond ± 150 MW</th>
</tr>
</thead>
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<tr>
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<td>1691</td>
<td>40</td>
</tr>
<tr>
<td>15-05-2014</td>
<td>1940</td>
<td>64</td>
</tr>
<tr>
<td>02-07-2014</td>
<td>1520</td>
<td>43</td>
</tr>
<tr>
<td>02-03-2014</td>
<td>340</td>
<td>29</td>
</tr>
<tr>
<td>19-04-2014</td>
<td>302</td>
<td>17</td>
</tr>
<tr>
<td>01-06-2014</td>
<td>309</td>
<td>28</td>
</tr>
</tbody>
</table>

It is evident from above that deviation beyond ± 150 MW in nos of blocks has been less on those days when wind variation between maximum and minimum has been low. There is, therefore, direct relation of wind variation with over drawl / under drawl deviation.
As per the prevailing grid code and regulations, impact of RE generation is only on the State, because Central Generating Stations cannot be backed down / picked up to take care of such variations as the effect of any revision in ISGS plants' generation takes four time blocks. State Generating stations are very much reluctant to operate their plants quite frequently varying between technical minimum and full load as it would indeed affect the efficiency of their plants and also detrimental to the turbines. Moreover, SLDC Gujarat receives DSM notices now and then from WRLDC. The number of notices received during the month is listed below:

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Nos. of Notice received</th>
<th>Notice received due to over drawl</th>
<th>Notice received due to under drawl</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>20</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>April</td>
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<td>July</td>
<td>8</td>
<td>5</td>
<td>3</td>
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<td>Aug</td>
<td>14</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Sept</td>
<td>11</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

This sort of high RE variation especially under low demand period (monsoon) becomes all the more difficult to handle when many of the State conventional generating stations are out of service either on merit order or annual overhauling plan.

2) Impact of sale / purchase under short term open access:

The net schedule under the short term transactions varying by more than 150 MW between two consecutive blocks is quite common. It leads to variation on State periphery and it would be extremely cumbersome to monitor this and plan to control the variations in each of such blocks. The details of such variations are furnished in Annexure-2.

3) Impact of large sized unit tripping:

It is an accepted fact that one or the other generating unit of 210 MW capacity and below from different generating stations trip from time to time resulting in State over drawl by more than 150 MW. In case of large sized unit tripping, State over drawl increases significantly. The data for few such cases are furnished below.
### Impact of large sized unit tripping on DSM

<table>
<thead>
<tr>
<th>Unit</th>
<th>Capacity</th>
<th>Date</th>
<th>Tripping Time</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Previous block</td>
</tr>
<tr>
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<tr>
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<td>31-03-2014</td>
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<td>27</td>
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<tr>
<td>EPGL 2</td>
<td>500</td>
<td>23-04-2014</td>
<td>20.56</td>
<td>-171</td>
</tr>
<tr>
<td>UTPS 6</td>
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<td>14.02</td>
<td>102</td>
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<td>APL 6</td>
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<td>24-06-2014</td>
<td>18.13</td>
<td>-241</td>
</tr>
</tbody>
</table>

Also, SLDC-Gujarat is looking after scheduling of 1980 MW (3 x 660 MW units No. 7, 8 & 9 of M/s. APL, Mundra) in which State Discoms have no share. Even if any of these units trips, there is substantial over drawl at State periphery which attracts penalty for no fault of any of the State entities. Also, SLDC-Gujarat has to resort to picking up even costly gas based generation or load shedding by a substantial quantum which is not at all in the interest of the consumers of the State. Data recorded of such events on typical days are as under:

### Impact of APL Stage - 3 Unit tripping
(Gujarat Discoms have no share)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Capacity</th>
<th>Date</th>
<th>Tripping Time</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Previous block</td>
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<td>08-03-2014</td>
<td>19.56</td>
<td>104</td>
</tr>
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<td>APL 9</td>
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<td>2.00</td>
<td>273</td>
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<tr>
<td>APL 7</td>
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<td>20-03-2014</td>
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<td>12.13</td>
<td>-237</td>
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<td>-6</td>
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<td>660</td>
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<td>APL 9</td>
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<td>30-05-2014</td>
<td>16.51</td>
<td>150</td>
</tr>
<tr>
<td>APL 7</td>
<td>660</td>
<td>02-06-2014</td>
<td>10.28</td>
<td>-91</td>
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</table>
4) Impact of schedule variation (APL – Haryana):

Haryana State has substantial share of 1424 MW from units No. 7, 8 & 9 (each of 660 MW) of M/s. APL, Mundra. Whenever Haryana revises their share or M/s. APL revise their despatch to Haryana due to any reason whatsoever may be, there is variation in schedule which affects the drawl schedule at State periphery.

Such revisions in schedule by APL is inevitable whenever unit having allocation of Haryana trips. This plant is being located in the periphery of Gujarat impacts Gujarat State in form of over drawl during the intervening period of minimum three blocks. In those cases, wherein Haryana State is revising the schedule, it has an impact on Gujarat in form of under drawl & over drawl as the case may be for reduction or increase in schedule. Data recorded of such events on typical days are as under:

![Impact of schedule revision due to APL](image1)

![Impact of schedule variation by Haryana](image2)
Following humble request of SLDC-Gujarat are to be given due contemplation:

1) It is necessary that Gujarat State has to be endowed with reserve capacity of fast ramping up and ramping down gas based generation capacity at affordable rates so as to minimize the deviation quickly and at the same time, RRF mechanism which is provisionally suspended must be reintroduced.

2) It is requested to revise the over drawl and under drawl deviation limit of 12% of schedule or 150 MW whichever is higher for Gujarat State periphery.

We once again request CEA and Hon’ble CERC to consider our request based on the operational experience of the Gujarat State grid from the date of implementation of DSM.

Thanking you,

Yours faithfully,

For Gujarat Energy Transmission Corporation Ltd

(S. K. Negi)
Managing Director

Encl: As above and details are attached in soft copy through mail.

Copy to:

1) The Secretary,
   Central Electricity Regulatory Commission,
   3rd & 4th Floor, Chanderlok Building, 36, Janpath, New Delhi- 110001

2) The Secretary,
   Gujarat Electricity Regulatory Commission,
   6th Floor, GIFT ONE, Road 5C, Zone 5, Gift City, Gandhinagar - 382355

3) The Member Secretary,
   Western Regional Power Committee,
   F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri (East), Mumbai - 400 093

4) The Chairman,
   Gujarat Energy Transmission Corporation Limited,
   Sachivalaya, Gandhinagar - 382355

5) The Chief Engineer (SLDC),
   State Load Dispatch Centre,
   Gujarat Energy Transmission Corporation Limited,
   Gotri Road, Vadodara – 390 021
More than 1500 MW wind energy injection variation in a day

Wind energy injection more than 50 MUs in a day

Maximum wind injection more than 2500 MW in a day
<table>
<thead>
<tr>
<th>Date</th>
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<th>DSM</th>
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**Annexure - 2**

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