CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 91/MP/2014
I.A. No. 20/2014

Coram:
Shri Gireesh B. Pradhan, Chairperson
Shri A.K. Singhal, Member

Date of Order : 13.7.2016

In the matter of

Petition under Section 79 of the Electricity Act, 2003 read with clause 5.2 of the operating code under the Indian Electricity Grid Code and Regulations 12 and 13 of the Central Electricity Regulatory Commission (Unscheduled Interchange Charges and related matters) Regulations, 2009; Regulations 7(1) and (2), 12, 13 of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism And Related Matters) Regulations, 2014 and Regulations 111, 114 and 115 of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999.

And
In the matter of

The Southern India Mills Association,
Shanmugamandram, 4, Race Course Road,
Coimbatore- 641018, Tamil Nadu

….Petitioner

Vs

1. Power System Operation Corporation Limited,
   B-9, Qutab Institutional Area,
   Katwaria Sarai, New Delhi- 110016

2. Power Grid Corporation of India Limited,
   Saudamini, Plot No. 2, Sector 29, Near IFFCO Chowk,
   Gurgaon- 122001

3. State Load Dispatch Centre,
   Tamil Nadu Transmission Corporation Limited
   144, Anna Salai, Chennai- 600002

4. Southern Regional Load Dispatch Centre,
   29, Race Course Road, Bangaluru-560009
5. Tamil Nadu Generation and Distribution Corp. Ltd.,

144, Anna Salai, Chennai- 600002

6. Tamil Nadu Spinning Mills Association,
2, Karur Road, Near Beschi College,
Modern Nagar, Dindigul- 624001, Tamil Nadu

7. Indian Wind Power Association, Tamil Nadu
Door No. E, 6th floor, tower-I,
Shakthi Towers, No. 766, Anna Salai,
Chennai- 600002, Tamil Nadu

…Respondents

Following were present:

Shri M.G. Ramachandran, Advocate for the petitioner
Ms. Anushree Bardhan, Advocate for the petitioner
Shri A. Ponnambalan, Southern India Mill's Association
Shri S. Vallinayagam, Advocate, TANGEDCO
Shri V. Suresh, SRLDC
Ms. Jayantika Singh, POSOCO
Ms. Jyoti Prasad, POSOCO
Ms. Abilla Zaidi, POSOCO
Shri S.S. Barpanda

ORDER

The petitioner, Southern India Mills Association registered under the Tamil Nadu Registration Act, 1975, has filed the present petition seeking relaxation of the frequency band, namely 49.9 Hz – 50.05 Hz to 49.7 Hz - 50.3 Hz prescribed in Regulation 5.2 (m) of the Central Electricity Regulatory Commission (Electricity Grid Code) Regulations, 2010 (Grid Code) and grant of exemption to wind and solar projects from the application of deviation limit of 150 MW or 12% of the schedule whichever is lower, as provided in Regulation 7 (1) (a) and (2) of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 (Deviation Settlement Regulations). The petitioner has made the following prayers:

> ´(a) Admit the present petition and consider relaxation of the frequency band, namely, 49.9 Hz - 50.05 Hz to 49.7 Hz - 50.3 Hz and consider granting exemption from the application of deviation limit of 150 MW or 12%of the schedule whichever is lower, as

was prevalent earlier but restricted to the injection of power only from the wind or solar power projects which have the MUST RUN status under Regulation 5.2 (u) of the IEGC;

(a) To direct the Load Dispatch Centres, Regional as well as the State to allow injection of power from the Wind Power Projects and Solar Power Projects and not to restrict the same on the grounds of variation in the Grid frequency or the schedule and direct them to correspondingly back down conventional sources of generation to achieve both the objects, namely:

(i) maintenance of frequency band;

(ii) promotion of wind power and solar power being non conventional energy sources; and

(iii) to institute a mechanism for settlement of over/under drawl of power arising out of over /under injection of power from renewable sources in a manner that the Host States do not suffer any financial Losses;

(iv) issue a direction to SRLDC not to resort to any regulatory measures on the Host State due to any variation in schedule/frequency bandwidth arising due to variation in generation from renewable sources of power viz., wind and solar, and also direct them to impose appropriate regulatory measure on other States in the region as may be required to maintain grid stability.

(b) Pass ad-interim ex-parte orders in terms of prayers (a) and (b) above and confirm the same after notice to the Respondents; and

(c) Pass such further order or orders as this Hon'ble Commission may deem just and proper in the circumstances of the case."

2. The submission of the petitioner is as under:

(a) The amended frequency band and restricted deviation of 150 MW for each time block allowed for operation of the grid would seriously affect the injection of the wind power in the State of Tamil Nadu during wind season to be commenced from the middle of May to October of every year considering the following:

(i) State of Tamil Nadu has an installed capacity of 7300 MW and has still a potentiality to increase it to 14000 MW immediately, if situations are conducive. The said capacity is the 40% of the total average capacity of windmills in the country.

(ii) Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and SLDC, Tamil Nadu Transmission Corporation Limited (Tamil Nadu) have been encouraging the injection of wind power into the grid based on huge investment made by Wind Energy Generators. However, during the year 2013-14, the respondents are unable to schedule the wind power generation or maintain the then prevailing frequency band of 49.70 - 50.20 Hz as prescribed in the Grid Code and unable to accept all the wind power in the State and accordingly, have started discouraging the wind energy from 2013-14 onwards. During the year 2013-14 alone, due to the back downs of windmills enforced by the respondents, the total 4453 MW wind energy is lost which is nearly 33% of the total generation possible. During the year 2013-14, there was considerable reduction in wind energy evacuation on the ground that the frequency was high and as a result, significant wind power generation was lost causing severe financial losses to the investors of the State particularly, members of the Petitioner Association.

(iii) In the last few years, the Wind Energy Generators (WEGs) have been subjected to serious prejudices due to non-scheduling of wind power by SLDC, Tamil Nadu. In this regard, SLDC, Tamil Nadu has cited the reason of grid safety and security despite the fact that significant quantum of thermal power could be accommodated during the wind season. However, Grid Code provides for the special requirements for wind/solar

generators including the ‘Must Run’ status given to them.

(iv) During the financial year 2013-14, the WEGs were backed down significantly. The aggregate volume of wind power evacuated by TANGEDCO was only 49 MUs per day during the windy days as against 68.5 MUs per day in the year 2012-13. During the year 2012-13, the wind generation was 11308 MUs which was comparatively more than 7797 Mus during the previous year 2011-12. However, during the year 2013-14, it was 9192 MUs due to backing down of WEGs since June 2013. If the WEGs had not been backed down, the total generation from WEGs would have been around 13645 MUs and therefore, the estimated loss in generation from wind due to backing down would be around 453 MUs (33%).

(v) In the Grid Code, a special status has been given to wind power generation and WEGs have been treated as ‘Must-Run’ stations. However, SLDC, Tamil Nadu has not been scheduling such wind power generation on the alleged reason of grid instability, particularly, in the context of the frequency band being available only in the range of 49.70 Hz to 50.20 Hz.

(vi) In the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014, the Commission has further narrowed down the grid frequency range for improving efficiency of industrial equipment and appliances and its effect on consequential industrial output and country`s economy.

(b) The Commission had proposed and implemented the tightening of the frequency band to 49.9 Hz - 50.05 Hz in the context of all generating stations and has also retained the special status of wind power as 'Must Run' stations in the respective Grid Code. While, all other generating stations can reasonably predict the energy availability from the generating station and therefore, can give proper declaration of availability to enable the Load Dispatch Centers to schedule. However, the wind power and solar power cannot predict advance declaration of availability. This aspect has been recognized by the Commission while granting the special status of 'Must Run' power plants to solar and wind generators as well as while dealing with the scheduling and dispatch from the Wind Power Projects as provided in the Grid Code.

(c) As per Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 which came into effect from 17.2.2014, the generation of electricity has to be matched to the grid frequency of 49.9 Hz - 50.05 Hz along with deviation restriction of 12% of the schedule or 150 MW whichever is lower. The injection of power from the WEGs in the State of Tamil Nadu is dependent on the schedule to be given by SLDC. However, SLDC has not been scheduling the wind power due to uncertainty of generation in the relevant time blocks during which the wind power would be actually available and also due to the possibility of wind power being not available during the entire 96 time blocks in a day.

(d) The Commission, while considering the deviation from schedule under

Regulation 7 of Deviation Settlement Regulations and frequency band for operation under clause 5.2 (m) at 49.9 Hz-50.05 Hz, should give relaxation or deviation for the Wind Power and Solar Power Developers to enable the State Load Dispatch Centre to allow injection of power giving effect to the Must-Run status and also not being constrained by the frequency band of 49.9 Hz - 50.05 Hz or 150 MW.

(e) As per the Grid Code, certain categories of WEGs are required to be forecast and schedule the generation in advance. The relevant provisions of the Grid Code provide for a variation of +/- 30% from the schedule. In Tamil Nadu, during the peak wind season, the peak generation from wind may be as high as 4000 MW and normally is in the range of 2500-3000 MW. The variation in generation could be as high as 1000 MW - 1500 MW and in the absence of a State level forecasting system, such variation cannot be predicted in advance and needs to be handled with real time situation. Even if a forecasting system exists for the entire State, a 30% variation in Tamil Nadu during the peak season could be around 1000 MW. Therefore, the restriction of 150 MW deviation would be counterproductive for WEGs. According to SLDC, with the narrowing down of the frequency bandwidth, such large variation in wind generation would not be possible to be handled as it would lead to breaching the band and deviation limit. Therefore, the petitioner apprehends that large scale backing down of WEGs may be resorted to on this ground alone by SLDC in the ensuing season. Under these circumstances, the narrowing down of the frequency band and restricting the deviation limit to 12% or 150 MW, whichever is lower, would be inconsistent

with the provisions of the Act and Grid Code which confers 'Must Run' status on renewable sources of energy.

(f) The Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 (Deviation Settlement Regulations), cast an obligation on the Host States who have to pay for the overdrawl and under injection as well as over injection and under drawl,. Deviations Settlement Regulations also provides that the variation from schedule shall not exceed 12% or 150 MW, whichever is lower. Due to variation in generation from renewable sources such as wind and solar, there could be variation in excess of the set limits in both injection and drawl which may attract deviation charges. If the generation from wind is higher than the schedule resulting in over drawl by other States, the Host State may have some financial consequences as a result of difference between UI charges, and their cost of procurement of renewable power may act as a deterrent to promote renewable power. Therefore, the deviation charges arising out of variation in wind energy/solar energy being Renewable Energy Sources should be exempted from the purview of the Deviations Settlement Regulations and a suitable mechanism needs to be devised to neutralize any financial implication to the Host State on account of under injection or over injection due to variation in wind/solar generation compared to the schedule.

(g) Presently, Regional Load Dispatch Centre is resorting to regulatory measures due to variation in frequency or schedule exceeding the limits

irrespective of' the fact that such variation is caused by renewable sources or otherwise. Therefore, Regional Load Dispatch Centre should be directed not to impose any regulatory measures on any State due to variation in either the schedule or the frequency, if such variation has been caused by renewable sources of power, namely, Wind/Solar. Regional Load Dispatch Centre should resort regulatory measures on other sources of power as may be required on other States in the region to maintain the grid security so that the available renewable sources of power can be harnessed in consonance with the National Tariff Policy and the provisions of the Act.

(h) At present, TANGEDCO's generation is around 12500 MW out of which during the wind season, if the entire wind power is evacuated in full, its contribution would be 3500 MW which is 28% of the total demand. When the Southern Grid handles around **35000** MW, the share of wind energy in Tamil Nadu on the Southern Grid would constitute a maximum of 10%. Therefore, this would not create any instability in the Southern grid. Under the pretext of frequency band, curtailing wind generation is neither warranted technically nor justifiable in overall national interest. However, SLDC has been citing the frequency bandwidth restriction as the reason for backing down of the WEGs.

(i) State Load Dispatch Centre of the respective States can monitor the injection of power from different generating stations and different sources to ensure that the exemption of deviation limit of 150 MW and relaxation in the frequency band above 50.05 Hz are only utilized for the purposes of wind power

or solar power and not for any other generation.

(j) The other Wind Power Developers had approached State Commission through Petitions Nos M.P. No.14 of 2012, D.R.P. No. 28 of 2012, M.P.No.21 of 2014, M.P.No.22 of 2014, M.P.No.23 of 2014 and D.R.P. No. 45 of 2014. During the hearing of the said petitions, the petitioners requested the State Commission to issue urgent direction to enable smooth injection of power at least during the ensuing wind season, which was expected to commence in the middle of May 2014. However, no effective solution could be assigned at as representatives of TANGEDCO and State Load Dispatch Centre were unable to maintain the frequency at 49.9 Hz - 50.05 Hz or ensure the grid stability as per the provisions of the Grid Code.

3. The petitioner has filed IA seeking interim direction to SRLDC not to resort to any regulatory measures on the Host State due to any variation in schedule/frequency bandwidth arising due to variation in generation from renewable sources of power.

4. After admission of the petition, notices were issues to the respondents to file their replies. Replies to the petition have been filed by Power System Operation Corporation Limited (POSOCO) and State Load Despatch Centre, Tamil Nadu Transmission Corporation Limited.

6. SRLDC in its reply dated 2.6.2014 has submitted as under:

(a) The wind generators are neither forecasting nor scheduling despite being mandatory mandated in the Grid Code for the past four years.

(b) No LVRT protection has been provided by the WEGs.

(c) The prayer of the petitioner amounts to operation of about 7200 MW installed capacity of wind generation as infirm power injection in the grid without any control mechanism.

(d) Tamil Nadu has not implemented contingency demand disconnection scheme to meet sudden loss of wind generation, if any.

(e) On a number of occasions, the reason for backing down of wind generation by Tamil Nadu is attributable to commercial and evacuation difficulties of Tamil Nadu State network.

(f) Some of the generation loss may be due to transmission constraints in intra-State system. TANGEDCO should be asked to segregate generation loss due to transmission constraint and generation loss due to high frequency.

(g) Recently, certain grid disturbances have been experienced on account of wind energy on 28.5.2013, 7.6.2013, 2.6.2014 and 5.6.2014.

(h) Frequency band tightening is essential for secure operation of a large grid especially in the wake of the NEW-S integration. Lack of response from the protection systems of the wind mills has resulted in SPS operation recently on Sholapur-Raicher Transmission Line.

(i) The Host State can effect proper demand management by releasing the un-served load or back down generation by merit order and save fuel to accommodate wind generation. Instead of leaning on others, Host State/WEGs can take proactive action to maintain drawal/injection

schedule.

(j) WEGs and SLDC should ensure necessary Data Acquisition System to be made available and functioning. In the compliance with the Grid Code, SLDC should also carry out the necessary demand estimation based on the historical data and weather forecast and WEGs should carry out the forecast and scheduling as mandated in the Grid Code.

7. POSOCO in its reply dated 1.7.2014 has adopted the submissions made by SRLDC. In addition, POSOCO has submitted as under:

(a) With the implementation of Deviation Settlement Mechanism, volume limit for buyer and seller depending on their approved schedule, range of frequency has tightened and charges for UI or deviation have increased. This has been done to ensure a better demand forecasting as well as renewable energy generation by States, better scheduling of generating resources available to the State and to minimize deviations from the schedule.

(b) Deviation Settlement Mechanism seeks to improve the grid discipline and help the State to initiate forecasting of demand and schedule in more accurate and stringent manner. The relaxation for entities would only lead to defeating the objective of the Deviation Settlement Regulations and will have a grave impact on system security.

(c) As per the Deviation Settlement Regulations, limits prescribed are not difficult and can be practically implemented. However, in this regard, the following

aspects are important:

(i) 150 MW is average for 15 minutes,

(ii) Action can be taken by States to control drawl by changing own generation and load.

(iii) The States can change requisition from Central Generating Stations/ UMPPs giving one hour notice.

(iv) The States can procure power through intra-day contingency contract from the market.

(v) The States should not lean on the system to take care of all load / generation changes in their system.

(d) In respect of WEGs and State utilities, the following aspects are relevant:

(i) Wind generation of capacity 10 MW and above are required to forecast their generation as per Regulation 23 of the Grid Code. However, the same is not being done by them.

(ii) There is more certainty as we move closer to the day and instance of operation. Further wind generators are free to revise their schedule eight (8) times a day.

(iii) The Host States are free to back down its conventional generation as well as revise their requisitions from the Inter State Generating Stations (ISGS) and save fuel to accommodate extra wind generation. Therefore, rather than leaning on the grid, proactive decisions are required to be

taken at the intra-State level.

(iv) Wind generation loss due to backing down cited by the petitioner as a reason for relaxation under the Deviation Settlement Regulations could also be on account of intra-State transmission constraints. The petitioner as well as the Tamil Nadu State Load Despatch Centre, Tamil Nadu Transmission Corporation Limited and Tamil Nadu Generation and Distribution Corporation Limited must come out clearly with the figures regarding generation backing down on account of transmission constraints, backing down to conform to the schedules or any other reason such as high frequency.

(v) One of the issues is the single part tariff for wind generation. Backing down wind generation might be more economically beneficial for the Host State as compared to conventional fossil fuel generation having two part tariff.

8. State Load Despatch Centre, Tamil Nadu, vide affidavit dated 10.7.2014, has submitted as under:

(a) In view of the constraints in wind accommodation due to technical reasons, relaxing the tightened grid operating parameters while considering the commercial loss to the host State in accommodating wind power would certainly pave way for better management of wind power. However, the petitioner's request of 'Must Run' status irrespective of grid condition is not acceptable. The "Must Run" status is not absolute and it should be subjected to reasonable

restrictions on account of grid conditions and grid safety.

(b) The Indian Wind Power Association (IWPA) has approached TNERC seeking the status of "Must Run" to all the wind energy generators in Tamil Nadu and consequently direction to the respondents not to switch off or back down wind energy generators. IWPA had also approached the High Court of Madras with the similar prayers and the Hon`ble High Court after hearing the matter transferred the writ petition to TNERC. Since the order in the matter is awaited, the Commission may exclude the related issues raised in this petition.

(c) Tamil Nadu has an installed capacity of 7262 MW of wind power which is the highest in the country and is more than 40% in the total generating capacity of TANGEDCO.

(d) The wind power availability is only four months in a year (June to September) with intra-day variations up to 3000 MW. The intra-day wind variation during 2012-13 was 500-1500 MW for 175 days and 1500-3000 MW for 84 days. The State has no spinning reserve of large capacity to meet the sudden loss of huge wind power. While the intra-day variation is up to 3000 MW, the conventional hydro sources capacity available to balance this is only about 500 MW. There is no storage device with huge capacity to trap the sudden increase in wind availability.

(e) Injection of heavy wind power shoots up the system frequency beyond the 50.05 hz limit, which is 49.90-50.05 hz as per Regulation 5.2 (m) of the Grid

Code. There is deviation in drawal resulting constraints in accommodating the wind power even after taking all possible efforts due to the following constraints:

(i) Heavy wind season of June-September is the low demand period in the State due to South-West Monsoon.

(ii) During heavy wind season of June-September, only the hydro reservoirs are getting more inflows due to South West monsoon and the hydro stations are to be operated to the maximum extent to avoid surplus. During the above period only, the dams are opened for irrigation which also increases the availability from irrigation based hydro generating stations. With maximum storage, the capacity of hydro reservoirs is 2396 MUs or equivalent and TANGEDCO has to extract around 5000 to 6000 MUs in a year and it would be possible only by maximizing generation during June to September according to the performance of the South West monsoon.

(iii) The operation of pumped storage scheme with a capacity of 400 MW at Kadamparai in pump mode to absorb the excess wind power is also not possible during this period, since the inflow into the upper reservoir i.e. Upper Aliyar is to be fully utilized to avoid surplus of water by operating the machine in generator mode.

(iv) Addition of new generating capacity would also be the prime responsibility of TANGEDCO to mitigate supply-demand gap during non

wind season of 8 months in a year.

(v) Reduction in generation of thermal generating stations beyond certain limit is not technically feasible.

(vi) The meager natural gas resources in the State are radially connected to the gas turbine generating stations without any gas grid. Therefore, there is no scope of altering the power output from gas generating stations to neutralize the variability of wind generation. The fuel supply agreement with the gas suppliers has the provision for "take or pay" by which availing gas lesser than the committed quantity would attract penalty.

(f) After balancing the technical limitations, SLDC tries to accommodate maximum possible wind power by lifting the restriction and control measure, keeping the high cost of power projects at technical minimum/standby position availing to grid requirements and undertaking annual overhauling of 210 MW thermal units of TANGEDCO during wind season.

(g) The power purchase made by TANGEDCO through Medium Term Open Access (MTOA) is to augment base generation to ensure power to the consumers during non wind season also. The power purchase could not be made as and when required on intermittent basis like wind power since due to less availability of transmission capacity, the transmission lines have to be booked well in advance.

(h) As regards the petitioner's allegation that Tamil Nadu had not regulated the thermal power to evacuate the wind power, it has been stated that during wind season, 2 to 3 units of 210MW thermal units were released for Annual Over Hauling (AOH). In case the thermal power plants supplying firm power round the clock are made to shutdown to accommodate the wind power, at times of reduction in wind energy generation which is quite normal and very frequent, load shedding may have to be resorted to the extent of reduction in wind generation which would be against the interest of the consumers in the State.

(i) The Commission should consider to adopt the operating frequency bandwidth of 49.50 Hz to 50.20 Hz which was in vogue for long.

(j) The petitioner's prayer to direct RLDC/SLDC not to restrict the wind power on the grounds of variation in grid frequency or the schedule is not acceptable since "Must Run" status irrespective of system condition would leave room for the grid insecurity.

(k) The petitioner's prayer to institute a mechanism for settlement of over drawal/underdrawal of power arising out of over/under injection of power from renewable sources in a manner that the Host States do not suffer any financial losses, is the need of the hour and action is required in the existing regulatory provisions.

(l) The petitioner's prayer to issue directions to SRLDC not to resort to any regulatory measures on the Host State due to any variation arising in generation

from renewable sources and also to impose appropriate regulatory measures on other States in the region as may be required to maintain grid stability, would be remedial solution to ease problems in handling huge renewable power in the grid. SRLDC should treat the wind capacity of the region/spinning reserve as a whole and take necessary action accordingly in real time operation.

(m) POSOCO in its reply has contended that forecasting and scheduling of wind power with necessary Data Acquisition System would enable more accommodation of wind power. In this regard, the following has been submitted:

(i) Though clear visibility of the quantum of wind generation available and forecast helps the system operator for effective load generation balancing to some extent, accommodating the entire wind power with the technical and legal constraints and handling the deviation/fluctuation in wind power are the real challenges for the system operator which have not been addressed by POSOCO. Despite the fact that Tamil Nadu is inter-connected with larger grid and other States could come for rescue during wind fluctuation, the responsibility of handling the fluctuation in wind is left only with the Host State. The excess deviation is not allowed to be absorbed by others irrespective of frequency as per the existing limitations in overdrawal/underdrawal. In the same way when there is drop in wind generation, the State could not immediately arrange power through STOA due to corridor congestion. Therefore, merely scheduling of wind generation and online data monitoring facility would not help the

system operator to handle deviation in wind generation in real time. However, Ministry of New and Renewable Energy has already proposed to establish Renewable Energy Management Centre (REMC) in 8 States and the first one in Tamil Nadu and the work has been entrusted to CTU under KFW/Germany Funding. Tamil Nadu Electricity Board has offered the consultancy to M/s NEDO (New Energy and Industrial Technological Development Organization) of the Government of Japan to facilitate wind power.

(ii) The Commission has introduced the RRF mechanism in which the Wind and Solar power is brought under scheduling to sort out the problems being faced by the States having huge infirm renewable power. However, the most awaited RRF mechanism did not bring the needed respite to Tamil Nadu.

(iii) POSOCO`s averment that wind backdown in Tamil Nadu is mainly due to evacuation problem and other commercial reasons are wholly incorrect and denied. TNERC vide its order No. 1 dated 20.3.2009 has observed that as per Regulation 8.15, STU can intimate whether or not LTA can be allowed without further system strengthening. If system strengthening is essential, the same may be intimated to the WEGs. In the above juncture, some of the WEGs have agreed for temporary connectivity with an undertaking that the grid availability is subject to grid condition. Therefore, these generators are only subjected to backdown on account of evacuation problem which is very meager. It is also pointed out

that TANGEDCO is taking all possible efforts to put up various sub-stations subject to availability of funds to harness the wind generation. Wind mill can be erected within a period of three to six months, and on the contrary erecting a sub-station and associated lines takes a minimum period of two to three years. TANTRANSCO is establishing two 400 kV transmission corridors across the State at an estimated cost of ₹ 4,160 crore.

(iv) POSOCO has alleged that back down of wind power in Tamil Nadu is due to commercial reasons is not correct. Tamil Nadu was pioneer in developing wind energy, and presently, it has the highest installed capacity in wind mills with 7252 MW, which is more than 40% of the total generating capacity of TANGEDCO. The wind back down is mainly done to contain the underdrawal within 150 MW irrespective of frequency in line with Deviation Settlement Regulations and SRLDC has issued violation "u" messages to curtail underdrawal. However, the commercial aspects are inbuilt in the existing regulations which prevent full accommodation of wind energy. Therefore, SLDC should not be solely responsible to adopt these regulatory measures when the excess wind generation is locked as SLDC is acting only as per the provisions of the Grid Code and direction of SRLDC.

(n) Since the wind power is infirm in nature, it is not feasible to provide block-wise backing down details. The quantum which is being curtailed at one

time would not remain the same when it is again called back into the grid. For example, if 100 MW is backed down at 10:00 hrs, when it is normalized at 10:30 hrs, the generation may be only 20 MW. Therefore, accuracy of backing down details could not be obtained even when it is provided in 15 minutes block-wise. The Commission should consider the following aspects to facilitate more renewable power:

(i) Adopting the operating frequency bandwidth of 49.50 Hz to 50.20Hz which was in vogue for long period.

(ii) Since the Grid Code permits +/-30% wind variation i.e. 60%, the same must be permitted to be absorbed in the grid i.e. the host State having huge renewable power has to be allowed to inject (under drawal) +60% variation in wind power into the grid and the power thus injected should be allowed to be utilized by the needy States (over drawal) subject to the transmission availability without any commercial loss to the host State.

(iii) Host State should not suffer any financial loss to institute a mechanism for settlement of over drawal/under drawal of power arising out of over/under injection of power from renewable sources.

(iv) RLDCs should be asked to initiate action to facilitate accommodation of entire wind power by regulating the other generating sources in the region and spinning reserve available in the region.

(v) Power Exchange market mechanism should be modified to enable real time power purchase/sale. It is very essential since even if the forecasting and scheduling under RRF become successful, unless there is a way out to sell the extra power over and above forecasted and scheduled or to buy shortfall if any, the real fruits of scheduling and forecasting could not be realized.

(vi) Special priority in STOA allotment for region/State having more infirm wind power should be considered, since long term power purchase planning is not possible due to huge quantum of wind power available during heavy wind season from June to September.

(vii) Wind Power Forecasting/Scheduling should be made mandatory for all WEGs irrespective of quantum, connected voltage and commissioning date with proper commercial mechanism so that the host State is not affected on account of encouraging wind power.

(viii) Unless the issue of variability and intermittency is addressed, the Renewable Energy plants need not be accorded 'Must Run' status. The ‘Must Run’ status should not be absolute and should be subject to reasonable restrictions on account of grid conditions and grid safety.

9. The Commission appointed a Committee under the Chairmanship of Shri A.K. Saxena, the then Chief (Engg) to compile all data relating to the wind generation after consultation with the petitioner and respondents. The petitioner and the respondents

were directed to make available the required data to the Committee and provide necessary assistance as may be required. SLDC, Tamil Nadu was directed to submit the details as to how many times SLDC asked for backing down of wind energy and conventional energy. SLDC, Tamil Nadu was further directed to submit the following information:

(a) The details of backing down instructions issued by SLDC, Tamil Nadu to wind energy sources and conventional energy sources generators as per Annexure-I in Microsoft excel with soft copy.

(b) Details of availability of RTUs with each wind generator and communication of data from RTUs to SLDC;

(c) Whether scheduling of generation is done on sustained basis in respect of each wind generator from 15.7.2013?

(d) Details of wind generators who are not complying with CEA Metering Regulations and Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Grid Code);

(e) Action taken by it on the defaulting wind generators for non-compliance of CEA Metering Regulations and Grid Code; and

(f) Copy of one PPA with wind energy generator clearly indicating the provisions in the PPA regarding availability of metering/real time data.

10. The petitioner was directed to submit the following information:

(a) The details of backing down by wind energy generators during the period 2010-14 as per Annexure- II in Microsoft excel with soft copy;

(b) Details of availability of RTUs with each wind generator and communication of data from RTUs to SLDC; and

(c) Whether scheduling of generation is done on sustained basis in respect of each wind generator from 15.7.2013?

11. SLDC, Tamil Nadu, vide its affidavit dated 13.8.2014, has submitted the details of backing down of wind energy and conventional energy during the current wind season from June, 2014 as under:

Month/year	Wind Energy (No. of times)	Conventional Energy (No. of times)		
		Thermal	CPP	IPP
June, 2014	256	37	85	241
July, 2014	393	120	67	230
August, 2014 (till 9.8.2014)	103	14	42	84

12. SLDC, Tamil Nadu has submitted that the number of times wind generation backed down could not be compared with conventional firm power as the infirm power is backed down as and when wind generation increases and to restrict drawal of deviation within the limit of the Grid Code. Backing down of conventional firm power is single time per day whereas backing down of wind power is more times per day to achieve limit specified in the Grid Code due to its infirm, variable and intermittent nature.

13. SLDC, Tamil Nadu, vide its affidavit dated 22.11.2014, has further submitted as under:

(a) In regard to the backing down instructions issued by SLDC, Tamil Nadu to wind energy sources and conventional energy, SLDC, Tamil Nadu has furnished the details of wind season from June to September for the year 2010 to 2014, number of times backing down of wind energy and conventional energy details at Annexure-III of the affidavit. Whenever the wind generation is brought back into the grid, the exact quantum of back down wind power will not be realized and therefore, the actual quantum of backing down could not be ascertained. The operating range of frequency to be maintained is narrowed down between 49.90 Hz to 50.05 Hz as per the provisions of the Grid Code with effect from 17.2.2014. Further, each constituent has to restrict its drawal of power from the grid within a range of +150 MW to -150MW with reference to their share limit in Central Generating Station (CGS).

For example, if the Tamil Nadu's share from the Central Generating Stations is about 3000 MW, Tamil Nadu should utilize the minimum quantum of 2850 MW and should not overdraw beyond 3150 MW irrespective of frequency. If Tamil Nadu draws 150 MW less than its eligible share of CGS from the Grid (under drawal), TANGEDCO has to pay the cost of energy not utilized by it when the frequency is less than 50.1 Hz. If frequency is 50.10 hz and above, TANGEDCO has to pay a penalty of ₹ 1.78/unit apart from the cost of un-utilised energy. Apart from the above commercial implication, SRLDC may even isolate Tamil Nadu from the southern grid if the under-drawal limit is exceeded.

(b) As per the provisions of the Grid Code, all WEGs are required to provide RTUs. At present, some of the latest WEGs are provided with RTUs within their campus but are not connected with SLDC.

(c) Scheduling of generation is not done by the WEGs.

(d) As on 31.10.2014, the installed capacity of wind in Tamil Nadu is 7366.755 MW and the number of wind farm HT service are 9200 MW. As on 31.3.2010.i.e before issuance of Grid Code, the installed capacity of Tamil Nadu was 4889.765 MW and the number of wind farm HT services was 6719 MW and at that time, ABT meter was not installed. As of now, for 5633 the 0.2s class ABT meter have been provided for remaining 3567 wind farm HT service, notice had already been issued to the wind generators to provide ABT meter. Since, TANGEDCO had already taken steps to procure ABT meter with communication facility, therefore, stringent action could not be taken on the defaulter WEGs.

Analysis and decisions:

14. We have considered the submissions of the petitioner and the respondents and pursued documents on record.

15. The following issues arise for our consideration:

(a) Whether the wind or solar power projects should be granted relaxation of the frequency band, namely, 49.9 Hz - 50.05 Hz to 49.7 Hz - 50.3 Hz and exemption from the application of deviation limit of 150 MW or 12% of the schedule,

whichever is lower?

(b) Whether SLDCs are treating wind or solar power projects as 'Must Run' as provided under Regulation 5.2 (u) of the Grid Code?

(c) Whether a mechanism is required to be instituted for scheduling and forecasting of wind or solar power project and settlement of over/under drawal and injection of power from renewable sources?

The above issues have been dealt with as under:

Issue (a): Whether the wind or solar power projects should be granted relaxation of the frequency band, namely, 49.9 Hz - 50.05 Hz to 49.7 Hz - 50.3 Hz and exemption from the application of deviation limit of 150 MW or 12% of the schedule, whichever is lower?

16. The petitioner has submitted that as per Regulation 5.2 (m) of the Grid Code, all users, SEBs, SLDCs, RLDCs and NLDC were required to take all possible measures to ensure that the Grid frequency always remain within 49.70 Hz-50.20 Hz band. However, the Commission through the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 which came into force from 17.2.2014 has modified the frequency band for operation of the grid from 49.70 Hz-50.2 Hz to 49.90 Hz- 50.05 Hz. The Deviation Settlement Regulations provides that the deviation in injection/drawl shall not exceed the lower of the following values i.e.150 MW or 12% of Schedule for each time block. The relevant provisions of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 and Deviation Settlement Regulations are extracted as under.

Regulation 5.2 (m) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 provides as under:

"(m) All users, SEBs, SLDCs, RLDCs and NLDC shall take all possible measures to ensure that the Grid frequency always remain within 49.90 Hz - 50.05 Hz band."

Regulation 5.2 (u) of the Grid Code provides as under:

"(u) Special requirements for Solar/wind generators System operator (SLDC/RLDC) shall make all efforts to evacuate the available solar and wind power and treat as a must-run station. However, System operator may instruct the solar/wind generator to back down generation on consideration of grid security or safety of any equipment or personnel is endangered and Solar/ wind generator shall comply with the same. For this, Data Acquisition System facility shall be provided for transfer of information to concerned SLDC and RLDC.

(i) SLDC/RLDC may direct a wind farm to curtail its VAR drawl/injection in case the security of grid or safety of any equipment or personnel is endangered.

(ii) During the Wind generator start-up, the wind generator shall ensure that the reactive power drawal (inrush currents in case of induction generators) shall not affect the grid performance.

Regulation 7 of Deviation Settlement Regulations provides as under:

"7. Limits on Deviation volume and consequences of crossing limits
(1) The over-drawals/under drawals of electricity by any buyer during a time block shall not exceed 12% of its scheduled drawl or 150 MW, whichever is lower, when grid frequency is "49. 70 Hz and above":

Provided that no over drawal of electricity by any buyer shall be permissible when grid frequency is "below 49.70 Hz",

Explanation: The limits specified in this clause 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.

(2) The under-injection/over-injection of electricity by a seller during a time-block shall not exceed 12% of the scheduled injection of such seller or 150 MW, whichever is lower when frequency is "49.70 Hz and above"

Provided that:

(i) No under injection of electricity by a seller shall be permissible when grid frequency is "below 49.70 Hz" and no over injection of electricity by a seller shall be permissible when grid frequency is "50.10 Hz and above".

(ii) any infirm injection of power by a generating station prior to COD of a unit during testing and commissioning activities shall be exempted from the volume limit specified above for a period not exceeding 6 months or the extended time allowed by the commission in accordance with the Connectivity Regulations.

(iii) any drawal of power by a generating station prior to COD of a unit for the start up activities shall be exempted from the volume limit specified above when grid frequency is "49.700 Hz and above".

17. According to the petitioner, Tamil Nadu has an Installed Capacity (IC) of wind power of 7300 MW which is 40% of the total average capacities of windmills in the country and has still the potential to increase it to 14000 MW immediately, if situations are conducive. The petitioner has submitted that TANGEDCO and SLDC, Tamil Nadu have been encouraging the injection of wind power into the grid earlier based on which huge investment made in WEGs. However, during the year 2013-14, SLDC, Tamil Nadu, SRLDC and TENGEDCO projected their difficulties to schedule the wind power generation and maintain the then prevailing frequency band. Despite the fact that significant quantum of thermal power could be accommodated during wind season, SLDC, Tamil Nadu is not scheduling/evacuating the wind power citing danger to the grid stability. However, as per Regulation 5.2 (u) of the Grid, SLDC/RLDC are required to make all efforts to evacuate the available solar and wind power and treat them as "Must Run" stations.

18. We have considered the submissions of the petitioner and the respondents. In this petition, the petitioner is seeking relaxation of existing frequency band of 49.90 Hz-50.05 Hz prescribed in Regulation 5.2 (m) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 and is seeking exemption from application of deviation limit of 150 MW or 12% of the schedule, whichever is lower as specified in Deviation Settlement Regulations in respect of wind/solar power producers. The said Regulations have been amended/notified keeping in view the grid safety and security. Subsequently, while evolving the framework

on forecasting, scheduling and imbalance handling for variable renewable energy sources, taking note of forecasting errors and difficulties experienced by Renewable Energy Generators in adhering to the deviation limits specified in Deviation Settlement Regulations, the Commission has amended the Grid Code and DSM Regulations on 7.8.2015 whereby with altered error definition, wind and solar generators which are regional entities have been exempted from adverse commercial impacts within ±15% band. Therefore, no further relief can be granted to the petitioner.

19. Tripura State Electricity Corporation Limited had filed a similar Petition No. 6/RP/2014 inter alia seeking relaxation of provisions of Regulation 5 (1) (iii) and Regulation 7.3 of the Deviation Settlement Regulations. The Commission after considering the submission of the Review Petitioner, vide order dated 20.1.2015 observed that Deviation Settlement Regulations is a measure in right direction and should be complied with by all concerned. The relevant portion of the order dated 20.1.2015 is extracted as under:

> "54. It has been clarified by the Commission from time to time that Unscheduled Interchange (UI) should not be used as a route for trading of electricity. The Commission has also brought about substantial changes in the UI Regulations with the objective of encouraging the distribution utilities to go for planned procurement of electricity and creating an environment for investors to set up new power plants. The utilities have overlooked the need for planning generation adequacy over a period and have not gone for adequate capacity additions and relied on over-drawal from the grid to meet their consumer`s demands. This Commission is consistently of the view that the utilities should plan for procurement of power on long-term, medium-term and short term basis instead of resorting to over-drawls through UI. The Commission has also taken a strict view of the continued grid indiscipline by some State utilities and penalties have been imposed in certain cases after due regulatory process. The grid security is of paramount importance and cannot be compromised. Further, due to integration of regional grids, the economic cost of grid failures is too high which needs to be avoided at all cost.
>
> 55. In due consideration of the above, Commission repealed the UI Regulations and promulgated the Deviation Settlement Mechanism Regulations which calls for taking measures for enforcing grid discipline more stringently along with narrowing of grid frequency range from 49.7 Hz-50.2 Hz to 49.90 Hz to 50.05 Hz after following the due

process of stakeholder consultations. Safe, secure and economic operation of the grid being primary consideration, the Commission is of the view that Deviation Settlement Mechanism Regulation is a measure in right direction and should be complied with by all concerned."

20. In view of the above, we are not inclined to grant further relaxation in the schedule. However, Forum of Regulators (FoR) has brought Model Regulations for State in which deviation limit of 15% has been proposed in place of 12%. The Commission through Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Second Amendment) Regulations, 2014 and Deviation Settlement Regulations has allowed 15% exemption to wind/solar generator which are regional entities.

Issue (b): Whether SLDCs are treating wind and solar power projects as 'Must Run' in terms of Regulation 5.2 (u) of the Grid Code?

21. The petitioner has submitted that the Commission had tightened the frequency band for all generating stations but has also retained the special status of wind power as Must Run stations in the respective Grid Code. While, all other generating stations can reasonably predict the energy availability from the generating station and, therefore, can give proper declaration of availability to enable the Load Despatch Centers to schedule, the wind power and solar power cannot be predicted for giving advance declaration of availability. This aspect has been recognized by the Commission while granting the special status of "Must Run" plants to solar and wind generators as well as while dealing with the scheduling and dispatch from the Wind Power Projects in Regulation 5.2 (u) of the Grid Code including in the Commercial Mechanism contained in Annexure-1 to the Grid Code.

22. The petitioner has contended that the existing Grid Code requires certain categories of WEGs to forecast and schedule the generation in advance and the relevant

provisions provide for a variation of + or - 30% from the schedule. The petitioner has submitted that in Tamil Nadu, during the peak wind season, the peak generation from wind may be as high as 4000 MW and normally is in the range of 2500-3000 MW. The variation in generation could be as high as 1000 MW-1500 MW and in the absence of State level forecasting system, such variation cannot be predicted in advance and needs to be handled with real time situation. The petitioner has submitted that even if a forecasting system exists for the entire State, a 30% variation in Tamil Nadu during the peak season could be around 1000 MW. Therefore, the restriction of 150 MW deviations would be counterproductive for WEGs. *Per contra*, SLDC, Tamil Nadu has submitted that with the narrowing down of the frequency band, such large variation in wind generation would not be possible to be handled as it would lead to breaching the bandwidth and deviation limit and therefore, the petitioner apprehends that large scale backing down of WEGs may be resorted to on this ground alone by SLDC in the ensuing season. Under these circumstances, the revision narrowing down the frequency band and restricting the deviation limit to 12% or 150 MW whichever is lower, would be inconsistent with the provisions of the Electricity Act and Grid Code which confers Must Run status to renewable energy sources both of which have been framed to promote generation from renewable sources.

23. SLDC, Tamil Nadu has submitted that in view of the constraints in wind accommodation due to technical reasons, relaxing the tightened grid operating parameters duly considering the commercial loss to the Host State in accommodation of wind power would certainly pave the way for better management of wind power. However, the petitioner's request for 'Must Run' status irrespective of grid condition is

not acceptable to SLDC. The "Must Run" status is not absolute and it should be subjected to reasonable restrictions on account of grid conditions and grid safety. SLDC, Tamil Nadu has contended that Indian Wind Power Association (IWPA) has approached TNSERC seeking the status of "Must Run" to all the wind energy generators in Tamil Nadu and direction to the respondents not to switch off or back down wind energy generators. IWPA has also approached the Hon`ble High Court of Madras with the similar prayer and the High Court after hearing the matter, transferred the writ petition to TNERC. The same was taken up in the TNERC and order is awaited in this regard. SLDC, Tamil Nadu has contended that the related issues raised in present petition should be excluded. SLDC, Tamil Nadu has further submitted that the wind power availability is only for four months in a year (June to September) with intraday variations up to 3000 MW. The intraday wind variation during 2012-13 was 500-1500 MW for 175 days and1500-3000 MW for 84 days. While the intra-day variation is up to 3000 MW, the conventional hydro sources capacity available to balance the same is only about 500 MW. According to SLDC, Tamil Nadu, injection of heavy wind power shoots up the system frequency beyond the limit of 50.05 Hz as prescribed in the Grid Code and deviation in drawal resulting constraints in accommodating the wind power even after taking all possible efforts. SLDC, Tamil Nadu has submitted that as per Regulation 8.3.(b) of TNERC Grid Code, the merit order of utilization generating sources, wind power is in the 3rd priority and Run of river or canal based hydro stations in 1st priority and hydro generating stations with reservoir in the 2nd priority. During heavy wind season of June-September, only the Hydro reservoirs are getting more inflows due to South West Monsoon and the Hydro stations are to be operated to the maximum extent to avoid surplus, and during

this period, the dams are opened for irrigation which also increases the availability from irrigation based hydro generating stations. SLDC, Tamil Nadu has contended that since maximum storage capacity of hydro reservoirs is 2396 MUs equivalent, TANGEDCO has to extract around 5000 to 6000 MUs in a year and it would be possible only by maximizing generation during June to September according to the performance of the South West monsoon.

24. SLDC, Tamil Nadu has submitted that the power purchase made by TANGEDCO through Medium Term Open Access (MTOA) is to augment the base generation to ensure power to the consumers during non wind season also. The power purchase could not be made as and when required on intermittent basis such as wind power since the transmission lines has to be booked well in advance due to less availability of transmission capacity. In response to the allegation of the petitioner that Tamil Nadu had not regulated the thermal power to evacuate the wind power, SLDC Tamil Nadu has clarified that during wind season, unit 2 to 3 of 210 MW thermal generating station were released for AOH. In case, the thermal power plants supplying firm power round the clock are made to shutdown to accommodate the wind power, at the times of reduction in wind energy generation which is quite normal and very frequent load shedding may have to be resorted to the extent of reduction in wind generation which would be against the interest of the consumers in the State.

25. SLDC, Tamil Nadu has submitted that heavy wind season generally starts from the months of June to September which is the low demand period in the State due to South-West Monsoon and during this period only the hydro reservoirs are getting more inflows

and the hydro generating stations are to be operated to the maximum extent to avoid surplus. TANGEDCO has contended that to mitigate supply-demand gap during non wind season of 8 months in a year, addition of new generating capacity is also the prime responsibility of TANGEDCO. Accordingly, due to non-availability of natural gas, there is no scope to later the power output from the Gas based generating stations. Moreover, reduction in generation of thermal generating stations beyond a certain limit is technically not feasible. TANGEDCO has submitted that heavy penetration of infirm wind power during wind season shoot up the frequency beyond the limit on 50.05 Hz as specified in the Grid Code. TANGEDCO has submitted that Deviation Settlement Regulations restrict the quantum of drawal/injection and violation of which attracts penalties.

26. SLDC, Tamil Nadu has submitted that after balancing the technical limitations, it tired to accommodate maximum possible wind power by lifting restriction and control measures, keeping high cost independent power projects at technical minimum. Further, operating grid with more renewable power and facilitating the accommodation for variable power in an economic way without affecting the grid discipline is always a great task for those States having huge renewable power. In addition to tighten the operating parameters, more restriction in deviation in drawal, zero paise for each unit of underdrawal more than 150 MW even at frequency less than 50.05 Hz, penalty for underdrawal, etc., have further enhanced the difficulties in grid operation. SLDC, Tamil Nadu has stated that when there is restriction in underdrawal, the excess wind power could not be permitted into the grid which would otherwise result in violation and financial losses by way of injecting power at zero paise with additional penalty of ₹1.78/kWh by the host State.

27. TANGEDCO has submitted that the petitioner's prayer seeking direction to RLDC/SLDC not to restrict the wind power on the grounds of variation in grid frequency or the schedule and seeking directions them to corresponding back down of conventional source is not acceptable since 'Must Run' status irrespective of system condition would leave room for the grid insecurity. TANGEDCO has further submitted that solely depending upon the variable infirm power, the conventional sources could not be completely back down.

28. POSOCO has submitted that since deviation settlement mechanism seeks to improve the grid discipline and it would help the State to initiate forecasting of demand and schedule in more accurate and stringent manner, relaxation for entities would not only lead to defeat the objective of the Deviation Settlement Regulations but will have a grave impact on system security. According to POSOCO, in order to comply with the existing provision of the Grid Code and Deviation Settlement Regulations and to accommodate power generated from wind, the State can take action to control drawl by changing own generation and load. State can also change requisition from Central Generating Stations/UMPPs giving one hour notice and power can also be procured through intra-day contingency contract from the market. POSOCO has also submitted that wind generation loss due to backing down cited by the petitioner as a reason for relaxation of the provisions of the Deviation Settlement Regulations could also be on account of intra-State transmission constraints. POSOCO has stated that the petitioner, SLDC, Tamil Nadu and TANGEDCO must come out clearly with the figures regarding generation backing down on account of transmission constraints, backing down to

conform to the schedules or any other reason such as high frequency.

29. In response to the submission of POSOCO, SLDC, Tamil Nadu has contended that the averment made by POSOCO that wind back down in Tamil Nadu is mainly due to evacuation problem and other commercial reasons are wholly incorrect and denied. SLDC, Tamil Nadu has submitted that TANGEDCO is making efforts to construct various sub-stations subject to availability of funds to harness the wind generation. SLDC, Tamil Nadu has submitted that wind mill can be erected within a period of three to six months, and on the contrary erecting a sub-station and associated lines takes a minimum period of two to three years. SLDC, Tamil Nadu has stated that TANTRANSCO is establishing two 400 kV transmission corridors across the State at an estimated cost of ₹ 4,160 crore. Therefore, the allegation of POSOCO to the affect that back down of wind power in Tamil Nadu is due to commercial reasons is not correct. The wind back down is mainly done to contain the underdrawal within 150 MW irrespective of frequency in line with Deviation Settlement Regulations and SRLDC has issued violation "u" messages to curtail underdrawal. However, the commercial aspects are inbuilt in the existing regulations which prevent full accommodation of wind energy. Therefore, in adopting those regulatory measures when the excess wind generation is blocked, SLDC should not be solely responsible for it, as SLDC is acting only as per the provisions of the Grid Code. TANGEDCO has submitted that Power Exchange market mechanism should be modified to enable real time power purchase/sale and this is very essential since even if the forecasting and scheduling under RRF become successful, unless there is a way out to sell the extra power over and above forecasted and scheduled or to buy any shortfall if any, the real fruits of scheduling and forecasting should not be realized. According to

TANGEDCO, special priority in STOA allotment for region/State having more infirm wind power should be considered since long term power purchase planning is not possible due to huge quantum of wind power during heavy wind season from June to September i.e. for four months only. SLDC, Tamil Nadu has contended that wind power forecasting/scheduling should be made mandatory for all WEGs irrespective of quantum, connected voltage and commissioning date with proper commercial mechanism so that the host State is not affected on account of encouraging wind power.

30. We have considered the submissions of the petitioner and the respondents. SLDC, Tamil Nadu has contended that it has backed down conventional generation to the extent of technical minimum to accommodate wind generation. SLDC, Tamil Nadu vide RoP dated 22.7.2014 was directed to furnish details of backing down instructions issued by it to wind energy sources and conventional energy sources generators as per Annexure-I and details of backing down by wind energy generators during the period 2010-14 as per Annexure-II to ascertain whether the Regulation 5.2(u) of the Grid Code mandating Must Run status to wind and solar power projects have been complied with and whether SLDC backed down conventional generations when it backed down wind energy projects. However, SLDC, Tamil Nadu did not submit the reasons for backing down wind energy generation and the frequency during back down period. The petitioner has placed on record the details of backing down of wind energy sources and conventional energy sources. Perusal of the documents reveals that on 1.7.2010, between 2:00 hr to 3:00 hr and between 3:00 hr to 4:00 hr, the schedules of wind energy sources were 502 MW and 310 MW respectively. Out of 502 MW and 310 MW, 80 MW of wind power was backed down during both the periods. It is further noted that during

the same periods, 510 MW was scheduled from conventional sources out of which 120 MW was backed down. There are 29 instances from 1.7.2010 to 31.7.2010 where wind energy sources were backed down without backing down conventional energy sources. The details of these backing down is as under:

Details of Backing Down

From: SLDC

For Period: 2009-2014

Sl. No.	Date	Period of back down (time blocks)		Wind Energy Source: Scheduled Generation	Wind Energy Source: Quantum of Wind Generation backed down	Wind Energy Source: Reason(s) for backing down	Frequency during period of backing down	Conventional Energy Source: State Generating Station - MTPS: Scheduled	State Generating Station - MTPS: Whether backed down?	State Generating Station - MTPS: If yes, quantum of back down (Total MW)	State Generating Station - MTPS: whether backed down to technical minimum	State Generating Station - MTPS: Technical Minimum ± ...% of MCR/IC	State Generating Station - TTPS: Scheduled	State Generating Station - TTPS: Whether backed down?	State Generating Station - TTPS: If yes, quantum of back down (Total MW)	State Generating Station - TTPS: whether backed down to technical minimum	State Generating Station - TTPS: Technical Minimum ± ...% of MCR/IC
		(...Block No to ...Block No)		(MW)	(MW)	(Line Outage/High Frequency /Any other reason to be furnished)	(Hz)	(MW)	(Yes/No)	(MW)	(Yes/No)		(MW)	(Yes/No)	(MW)	(Yes/No)		(MW)	(Yes/No)	(MW)	(Yes/No)	
1	01-07-2010	0	1	578	80																	
2	01-07-2010	1	2	624	80																	
3	05-07-2010	10	11	468	50																	
4	05-07-2010	11	12	406	100																	
5	15-07-2010	20	21	874	10																	
6	15-07-2010	21	22	867	7																	
7	16-07-2010	10	11	1087	9																	
8	16-07-2010	11	12	1094	8																	
9	16-07-2010	12	13	1062	9																	
10	16-07-2010	13	14	1029	9																	
11	16-07-2010	17	18	1041	120																	
12	26-07-2010	9	10	981	17																	
13	26-07-2010	20	21	798	23																	
14	26-07-2010	21	22	771	18																	
15	26-07-2010	22	23	767	8																	
16	28-07-2010	7	8	686	9																	
17	29-07-2010	9	10	406	18																	
18	29-07-2010	10	11	887	20																	
19	29-07-2010	11	12	1045	10																	
20	29-07-2010	12	13	1000	10																	
21	29-07-2010	13	14	948	9																	
22	29-07-2010	14	15	989	9																	
23	29-07-2010	15	16	914	9																	
24	29-07-2010	16	17	1023	4																	
25	29-07-2010	17	18	988	9																	
26	30-07-2010	8	9	832	20																	
27	31-07-2010	7	8	756	13																	
28	31-07-2010	8	9	619	17																	
29	31-07-2010	9	10	709	9																	

31. We are of the view that the contention of SLDC, Tami Nadu to the effect that it first backed down conventional generation before backing down wind energy does not appear to be correct.

32. As per Regulation 5.2(u) of the Grid Code, system operator is required to make all efforts to evacuate the available solar and wind power and treat as a Must-Run station. The above regulation also provides that the system operator may instruct the solar/wind generator to back down generation on consideration of grid security or safety of any equipment or personnel is endangered and Solar/ wind generator shall comply with the same. We are of the view that SLDC, Tamil Nadu has not treated wind/solar power as

Must Run in terms of Regulation 5.2 (u) of the Grid Code. Accordingly, SLDC, Tamil Nadu has failed to comply with Regulation 5.2(u) of Grid Code as amended from time to time. We record our severe displeasure at the manner in which SLDC Tamil Nadu has tried to misrepresent the facts before the Commission and warn SLDC Tamil Nadu to be diligent about the factual veracity of the information submitted to the Commission.

Issue (c): Whether a mechanism is required to be instituted for scheduling and forecasting of wind or solar power project and settlement of over/under drawal and injection of power from renewable sources?

33. The petitioner has submitted that as per the provisions of Deviation Settlement Regulations, Host States are required to have an obligation to pay for the over drawl and under injection as well as over injection and under drawl. The petitioner has further submitted that Grid Code also provides that the variation from schedule shall not exceed 12% or 150 MW, whichever is lower. However, due to variation in generation from renewable sources such as wind and solar, there could be variation in excess of the set limits in both injection and drawl which may attract deviation charges. According to the petitioner, if the generation from wind is higher than the schedule resulting in over drawl by other States, the Host State should have some financial consequences as a result of difference between UI charges and its cost of procurement of renewable power which may act as a deterrent to promote renewable power. Therefore, the deviation charges arising out of variation in wind energy/solar energy being Renewable Energy Sources should be exempted from the purview of the Regulation 9 of the Deviation Settlement Regulations and a suitable mechanism should be devised to neutralize any financial implication to the Host State on account of under injection or over injection due to variation in wind/solar generation compared to the schedule.

34. POSOCO has contended that the Host State has the freedom to back down its conventional generation as well as revise its requisitions from the inter-State Generating Stations (ISGS) and thereby save fuel to accommodate extra wind generation. POSOCO has submitted that a related issue is the single part tariff for wind generation. Backing down wind generation might be more economically beneficial for the host state as compared to conventional fossil fuel generation, having two part tariff.

35. SLDC, Tamil Nadu has submitted that though clear visibility of the quantum of wind generation available and forecast helps the system operator for effective load generation balancing to some extent, accommodating the entire wind power with the technical and legal constraints and handling the deviation/fluctuation in wind power are the real challenges for the System operator which has not been addressed by the POSOCO. SLDC, Tamil Nadu has stated that despite the fact that Tamil Nadu is interconnected with larger grid and other States could come for rescue during wind fluctuation, the responsibility of handling the fluctuation is left only with the Host State. The excess deviation is not allowed to be absorbed by others irrespective of frequency as per the existing limitations in overdrawal/underdrawal. In the same way, when there is drop in wind generation, the State could not immediately arrange power through STOA due to corridor congestion. Therefore, merely scheduling of wind generation and online data monitoring facility would not help the system operator to handle deviation in wind generation in real time. However, MNRE has proposed to establish Renewable Energy Management Centre (REMC) in 8 States and first one in Tamil Nadu and in this regard, work has been entrusted to the CTU under KFW/Germany Funding. TNEB has offered the

consultancy to M/s NEDO (New Energy and industrial technological Development Organization) of the Government of Japan to facilitate the wind power. SLDC, Tamil Nadu has submitted that the Commission has introduced RRF mechanism to solve the problems being faced by the States having huge infirm renewable power. In the RRF mechanism wind and solar power has been brought under scheduling. However, the most awaited RRF mechanism did not bring the needed respite to Tamil Nadu.

36. We have considered the submissions of the petitioner and the respondents. The Commission in the 'Statement of Reasons' to '*Framework on Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar)*' had observed that the Commission is committed to helping States to implement a framework for forecasting, scheduling and deviation settlement for intra-State RE generating stations as well and will also create an enabling framework and frame model Regulations for the State level, which would be shared with the Forum of Regulators (FOR) for implementation/adaptation at the State level. The relevant para of Statement of Reasons' to '*Framework on Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar)* is extracted as under:

> "2.3.2 The Commission appreciates inputs on expanding the scope of these regulations. Indeed, the Commission is committed to helping states implement a framework for forecasting, scheduling and deviation settlement for intra-state RE generating stations as well. It may be noted that the framework proposed by the Commission fits well for an ABT compliant payment, scheduling and balancing system. Currently all States do not have ABT mechanism in place. As such, it would not be advisable to prescribe a one-size-fits-all framework. After instituting an inter-state framework, the Commission will also create an enabling framework and frame model regulations for the state level, which will be shared with the Forum of Regulators (FOR) for implementation/adaptation at the state level....."

37. The Commission has issued Draft Central Electricity Regulatory Commission

(Deviation Settlement Mechanism and related matters) (Third Amendment) Regulations, 2015 on 23.10.2015 to amend the relevant provisions of Deviation Settlement Regulations. The Explanatory Memorandum to draft Deviation Settlement Regulations, addresses the issue regarding forecasting, scheduling, and deviation settlement of solar and wind generators. The relevant portion of the Explanatory Memorandum is extracted as under:

> "For large-scale integration of solar and wind generators into State grids, the Forum of Regulators (FoR) has evolved a State Model Regulation, which outlines a model for operational and commercial management of variable RE sources. The proposed framework for forecasting, scheduling, and deviation settlement of solar & wind generators is similar to that notified by CERC for regional entities in August 2015. However, it is pertinent to explicate the commercial arrangement suggested for the States. In the Model Regulation, it has been recommended that if the State DSM pool goes negative due to implementation of the regulation, the States may approach national funds such as NCEF or PSDF for covering the deficit. It has been underlined that this would be only to the extent of deficit caused by RE generators. Hence, to qualify for such compensation, the States must undertake separate scheduling and energy accounting of all entities, as explained in the document. The Commission feels that this will address a major part of the problem, as currently stated by the RE-rich states."

38. The Forum of Regulators (FoR) has evolved a 'Model Regulations on Forecasting, Scheduling and Deviation Settlement of Wind and Solar Generating Stations at the State level' (Model Regulations), which outlines a model for operational and commercial management of variable RE sources. The objective of above Model Regulations is to facilitate large-scale grid integration of solar and wind generating stations while maintaining grid stability and security as envisaged under the Grid Code, through forecasting, scheduling and commercial mechanism for deviation settlement of these generators. The Model Regulations have been proposed to be applicable to all wind and solar generators which are connected to the State grid, including those connected via pooling stations, and selling power within or outside the State. The Model Regulations

provide ‘Forecasting and Scheduling Code’ (Part-2) and ‘Commercial and Deviation Settlement’ (Part-3). The ‘Forecasting and Scheduling Code’ provides that forecasting shall be done by wind and solar generators connected to the State grid or by QCAs (Qualified Coordinating Agency) on their behalf. It also provides that the concerned SLDC shall also undertake forecasting of wind and solar power which is expected to be injected into the State grid, by engaging forecasting agency(ies) if required. The relevant portion of the Model Regulations is extracted as under:

> “2.3. Forecasting shall be done by wind and solar generators connected to the State grid, or by QCAs on their behalf. The concerned SLDC is also mandated to undertake forecasting of wind and solar power that is expected to be injected into the State grid, by engaging forecasting agency(ies) if required. The forecast by the concerned SLDC shall be with the objective of ensuring secure grid operation by planning for the requisite balancing resources. The forecast by the QCA or wind and solar generator, as the case may be, shall be generator centric. The QCA or wind and solar generators will have the option of accepting the SLDC’s forecast for preparing its schedule or provide the SLDC with a schedule based on their own forecast. The QCA shall coordinate the aggregation of schedules of all generators connected to a pooling station and communicate it to the SLDC.
>
> 2.4. The QCA or the wind and solar generator shall submit a day-ahead and week ahead schedule for each pooling station or each generating station, as the case may be. Day-ahead schedule shall contain wind or solar energy generation schedule at intervals of 15 minutes (time-block) for the next day, starting from 00:00 hours of the day, and prepared for all 96 time-blocks. Week-ahead schedule shall contain the same information for the next seven days.
>
> 2.5. The schedule of wind and solar generators connected to the State grid (excluding collective transactions) may be revised by giving advance notice to the SLDC. Such revisions shall be effective from 4th time block, the first being the time-block in which notice was given. There may be one revision for each time slot of one and half hours starting from 00:00 hours of a particular day subject to maximum of 16 revisions during the day.”

39. Regulation 3.1 of the ‘Commercial and Deviation Settlement’ of the Model Regulations provide mechanism for settlement of over/under drawl of power arising out of over/under injection of power from renewable sources (wind/solar) selling power within the State or outside the State. The relevant portion of Regulation 3.1 of the Model

Regulations is extracted as under:

> "3.1. (a) The wind or solar generators connected to the State grid and selling power within the State shall be paid by the buyer as per actual generation.
>
> (b) The wind or solar generators connected to the State grid and selling power outside the State shall be paid by the buyer as per scheduled generation.
>
> 3.2. The wind and solar generator or the QCA, as the case may be, shall have the option of accepting the concerned SLDC's forecast for preparing its schedule or provide the concerned SLDC with a schedule based on its own forecast, and *such schedule* shall be used as reference for deviation settlement.
>
> 3.3. The QCA shall undertake all commercial settlement on behalf of the generator(s) connected to the respective pooling station(s). ……."

40. We are of the view that the Model Regulations on Forecasting, Scheduling and Deviation Settlement of Wind and Solar Generating Stations at the State level have been evolved to address the issues of forecasting, scheduling and settlement of over/under drawl of power arising out of over /under injection of power from renewable sources which are connected to the State grid and selling power within or outside the State. The State Electricity Regulatory Commissions are advised to implement these regulations in letter and spirit to ensure grid integration of huge renewable resources as envisaged to be connected to grid in next 5 to 7 years.

41. The petition and IA is disposed of in terms of the above.

Sd/-	sd/-
(A.K. Singhal)	**(Gireesh B.Pradhan)**
Member	**Chairperson**