

CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Petition No. 237/MP/2017
Along with I. A No.11/2018

Coram

Shri P. K. Pujari, Chairperson

Dr. M. K. Iyer, Member

Shri I.S. Jha, Member

Date of Order: 12.06.2019

In the matter of:

Petition under Section 94 (1) (f) of the Electricity Act, 2003 read with Regulation 111 and 116 of CERC (Conduct of Business Regulations),1999 for seeking extension of time prescribed for implementation of the Commission's Order dated 5.1.2016 in Petition No. 420/MP/2014 in the matter of 'Endangering grid security due to non-implementation of contingency demand disconnection scheme for sudden loss of wind generation, non-availability of LVRT protection, non-scheduling of wind generation as per CERC (Indian Electricity Grid Code) Regulations, 2010 (IEGC) 6.5.23 (i), lack of necessary demand estimation as per IEGC Regulation 5.3 and not providing real time SCADA data to LDC.', and for seeking relief to specific provisions of the aforementioned Order.

And

In the matter:

Suzlon Energy Limited,
One Earth, Opp. Magarpatta City, Hadapsar,
Pune, Maharashtra - 411028

.....PETITIONER

Versus

1. Southern Regional Load Despatch Centre
29, Race Course Cross Road,
Bangalore – 560 009
2. Tamil Nadu State Load Despatch Centre
Load Despatch and Grid Operation
144, Anna Salai, Chennai – 600 002
3. Karnataka State Load Despatch Centre
Kaveri Bhawan, K. G. Road,
Bangalore – 560 009



4. AP State Load Despatch Centre
Vidyut Soudh,
Hyderabad – 500 082
5. Telangana State Load Despatch Centre
Vidyut Soudh, Hyderabad – 500 082
6. Kerala State Load Despatch Centre
Vaidyuthi Bhavanam, Pattam,
Trivandrum – 695 009, Kerala
7. Indian Wind Power Association
Door – E, 6th Floor, Shakti Towers – 1
766, Anna Salai, Chennai – 600 002
8. Solar Energy Association
1/694, Chandrapuram,
Dharampuram Road, Tirupur – 641 608, Tamil Nadu
9. Central Transmission Utility
Saudamini, Plot No. 2,
Sector – 29, Gurgaon – 122 001, Haryana
10. Central Electricity Authority
Sewa Bhawan, R. K. Puram,
New Delhi – 110 022
11. Member Secretary,
Southern Regional Power Committee
29, Race Course Cross Road, Bangalore – 560 009
Karnataka

...RESPONDENTS

ORDER

The Petitioner, Suzlon Energy Limited (hereinafter to be referred as 'the Petitioner'), has filed the present Petition for seeking extension of time prescribed for implementation of the Commission's Order dated 5.1.2016 in Petition No. 420/MP/2014. The Petitioner has made the following prayers :

- (a) Revisit the Minimum capacity criteria for applicability of LVRT solution and may consider the WTGs having Rated Capacity above 1.25



MW and having residual life of more than 10 years on the date of final order;

(b) Redefine the criteria for LVRT requirement providing clarity about the features of the LVRT solution to be retrofitted;

(c) Redefine WTGs certification from Type certification to Statement of Compliance for LVRT solution by an international Certifying Agency like DNV – GL as per the CERC/CEA final guidelines;

(d) Stipulate the appropriate mechanism for reimbursement of the cost of Retrofitting for LVRT solution;

(e) Requested to extend the time line for implementation of LVRT, further by a minimum period of 2 years from January, 2018;

Submissions by the Petitioner

2. The Petitioner has mainly submitted as under :

a) Central Electricity Authority (CEA) had notified the CEA (Technical standards for Connectivity to the Grid) Regulations, 2007, (CEA Regulations, 2007) which was further amended vide notification dated 15.10.2013. As per the said amended Regulations Wind Turbine Generators (WTGs) were required to implement advanced Low Voltage Ride Through (LVRT) subject to technical feasibility and with mutual discussion between the Generator and the connected Licensee. Besides, the above conditions were made applicable for turbines connected at 66KV or higher voltage level.

b) The Commission had issued Order dated 5.1.2016 in the Petition No. 420/MP/2014 in the matter of 'Endangering grid security due to non-implementation of contingency demand disconnection scheme for sudden loss of wind generation as per the Commission's order dated 22.2.2014 in Petition



No.120/MP/2011 dated 22.2.2014, non-availability of LVRT protection, non-scheduling of wind generation as per Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (IEGC) 6.5.23 (i), lack of necessary demand estimation as per IEGC Regulation 5.3 and not providing real time SCADA data to LDC', filed by Southern Regional Load Despatch Centre (SRLDC) seeking various directives to SLDCs to comply with Technical Standards notified by the CEA.

c) The said Order mandates to comply with installation of LVRT within two years on wind turbines commissioned before 15.4.2014 having installed capacity equal to or more than 500 kW except 'Stall Type WTGs' and WTG whose life is going to expire within next 5 years.

d) The Petitioner has made sincere efforts since the Commission's Order dated 5.1.2016, for the development, testing and certification of LVRT prototype solution for various WTG models currently being owned and operated by its customers. However, Petitioner is facing various genuine challenges in offering and deploying the technology to all kind of WTG's and therefore, requires longer time for rollout of retrofitting of old turbines to make it LVRT compliant.

e) The turbine supplied by the Petitioner which require retrofitting consequent to the directives of the Commission vide aforesaid Order are the S-88 (2.1MW), S-82 (1.5MW), S-66 (1.25MW) and S-52 (600kW) models, which are referred to as the 'Classic Fleet' among the turbines offered by the Petitioner. While the Petitioner no longer manufactures turbines from its classic fleet, it continues to offer maintenance to ensure that its customers'



assets run smoothly.

f) There are more than 5500 turbines currently operational which are from the above four models, with an aggregate installed capacity of 7400 MW. In order to comply with the directives of the Commission's order dated 5.1.2016, each and every turbine would require retrofitting and is a quite humongous task, which would also require significant time for implementation.

g) While the technical solution for making the retrofitting of existing turbines LVRT compliant is ready for its turbine models S88 (2.1MW) and S82(1.5MW), and is awaiting field validation, the technical solution for the other two models is still under study.

h) The cost of retrofitting varies from model to model and is assessed to be in the range of ₹12 Lakh per MW to 51 Lakh per MW depending on the model. Considering the above complexities, the compliance to directives of the Commission's order dated 5.1.2016 would involve significant time and money. In addition, there exist various points for which need for clarification has arose during the phase of evolution of LVRT retrofitting prototype, which happened subsequent to the stipulated time period within which a review or clarification may be sought on the pertinent Order of the Commission.

i) A time period of minimum 2 years shall be required for implementation of LVRT solution on such a large fleet of WTGs after getting the sufficient clarity from the Commission and appropriate State Commission, on various crucial points.

3. The Petitioner has submitted that in order to operationalise various directions



enshrined in the Commission's order dated 5.1.2016 in Petition No. 420/MP/2014, there are few provisions which requires further clarification and/or modification to address implementation aspects as under:

- a) Redefine the criteria for LVRT;
- b) Clarity about the features of the LVRT solution;
- c) Clarity about the requirement of WTG Type certification;
- d) An appropriate mechanism for reimbursement of the cost of Retrofitting for LVRT solution; and
- e) Extension of time lines for implementation of LVRT solution.

4. The Petitioner has prayed for redefining the criterion of LVRT and has submitted as under :

a) As per Commission's Order dated 5.1.2016, every WTG having rated capacity of 500 kW and above and commissioned before 15.04.2014 is required to implement LVRT solution. The Commission may review the minimum capacity criteria of 500 kW and residual life of 5 years. Based on the assessment carried out by the Petitioner, it is observed that, the cost of retrofitting for LVRT solution would be very high for smaller capacity WTG i.e., WTGs below 1.25 MW capacity. The approximate t cost estimate for LVRT retrofitting of various models:

Item Description	Unit	Model – S82	Model – S88	Model – S52	Model – S6X
WTG Unit Size (kW)	Nos	1783	619	757	2351
Cost Estimate (Rs Lakh per WTG)	Simple solution (Rs L per WTG)	12,00,000	13,00,000	47,00,000	51,00,000

b) The cost of retrofitting of old models such as S52 and S6X are way too high compared to retrofitting relatively newer models of S82 and S88. This also signifies that for older models with lower residual useful life, there is no or relatively limited chance of recovery of this cost and thus incurring such additional cost in the fag end of the useful life of the turbine may not make economic sense. Thus, based on the above,



implementation of LVRT solution to WTGs which are having residual life less than 10 years will not be cost effective.

c) The Commission may revisit the Minimum capacity criteria for applicability of LVRT solution and may consider the WTGs having Rated Capacity above 1.25 MW (Suzlon model S82 & S88) and having residual life of more than 10 years on the date of final order.

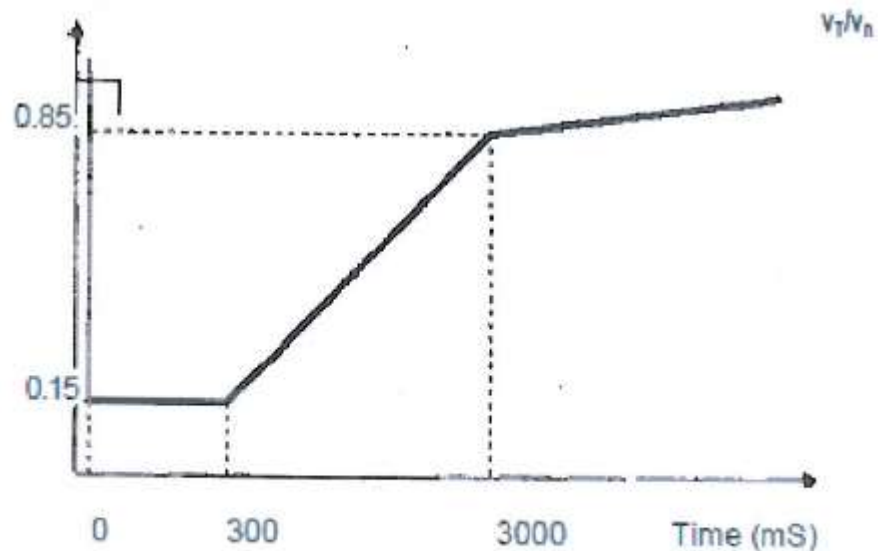
5. The Petitioner has sought clarity about the features of the LVRT solution and has submitted as under :

a) The sub-clause (3) clause B2, Part-II of Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations 2013, is reproduced as following:

“B2. For generating station getting connected on or after completion of 6 months from date of publication of these Regulations in Official Gazette

‘(1) and (2)...

‘(3) Wind generating stations connected at voltage level of 66 kV and above shall remain connected to the grid when voltage at the interconnection point on any or all phases dips to the levels depicted by the thick lines in the following curve.’”



Where

V_1/V_n is the ratio of the actual voltage to the nominal system voltage at the interconnection point

b) The above clause also mentions additional requirement highlighted as following:



“Provided that during the dip, the individual generating units in the generating station shall generate active power in proportion to the retained voltage;

Provided further that during the voltage dip, the generating station shall maximize supply of reactive current till the time voltage starts recovering or for 300 ms, which ever time is lower.”

c) The Clause B3, Part-II of 2013 Amendment to CEA Regulations, 2007 also mentions that all the parties shall mutually discuss and agree on the measures which can be taken to meet clause B2, subject to technical feasibility.

d) There is lack of clarity on the two counts. Firstly, Whether sub-clause (3) clause B2, Part-II of 2013 Amendment to CEA Regulations, 2007 requires wind turbines commissioned before 15.4.2014 excluding wind turbines rated at or below 500 kW rating, to have LVRT capability only? Secondly, whether wind turbines commissioned before 15.04.2014 is required to comply with the additional requirements of proportional active power generation and reactive current supply during the voltage dip?

e) The Petitioner is working towards developing the standard LVRT solution which would meet the provisions of the CEA Regulations, 2007. The Petitioner is working on two models i.e. Basic LVRT (only fault ride through, no active and reactive power control) and Advanced LVRT (including active and reactive power control).

f) Low Voltage Ride Through (LVRT) solution should be sufficient without the additional requirement of proportional active power generation and reactive power supply during the voltage dip for wind turbines commissioned before 15.4.2014 excluding wind turbines of rated power equal to or below 500KW rating. The standard LVRT solution which will be developed by Petitioner needs to be vetted or confirmed by a competent authority such as CEA. This confirmation to



the model solution and clarity on the interpretation of the provisions of the CEA technical standards are quite crucial for making any further progress in LVRT solution implementation.

6. The Petitioner has sought clarity about the requirement of WTG type certification and has submitted as under :

a) The Commission vide its Order dated 5.1.2016 in Petition No. 420/MP/2014 has observed as under:

"43. We are of the view that Type Test Certification for all WTGs as per applicable Standards should be made mandatory. The modalities for carrying out Type Test Certifications including timelines for completing the process for certification, cost sharing, etc. shall be finalized by the respective RPC in consultation with CEA."

b) The Commission has also stipulated timeframe of two years for retrofitting of LVRTs for old WTGs in Para 39 of the said Order.

c) There are no suppliers of LVRT as off-the-shelf product, as the LVRT needs to be designed, in case of retrofitting, for each model/type of turbine (as specified in Para 36 of the order in Petition No. 420/MP/2014). Therefore, Petitioner requests the indulgence of the Commission to review the requirement of Type Test after Retrofitting, taking into consideration the process required for the designing of LVRT, for each type/model of WTGs installed, and with the difficulties in obtaining the Type Test Certification for the WTGs which are already installed and in operation.

d) The WTGs are already Type Test Certified so instead of carrying out the Type Test Certificate again for the WTGs, if the CEA accepts the model wise standard LVRT Solution as proposed by the Petitioner in the Para 12 of the Petition, the individual WTGs would not require to be Type Tested after retrofitting. If turbine-wise type certification has to be done, it will amount to doing it for around 5500 numbers in case of



Suzlon turbines, let alone all the rest of the turbines constituting the total installed capacity to be retrofitted for LVRT compliance.

e) The LVRT solution needs to be implemented on the WTGs which are already in operation, the Type Testing after retrofitting needs to be carried out as and when required wind speed is available at individual sites. Hence Petitioner is of the view that, instead of carrying out the Type Test again for all the WTGs, Statement of compliance for LVRT solution should be obtained from any third party certifying agency approved by or acceptable to the Commission or the CEA.

7. The Petitioner has requested for specifying an appropriate mechanism for reimbursement of the cost of Retrofitting for LVRT solution and has submitted as under :

a) The Commission in its order dated 5.1.2016 in Para 40 has observed as under:

"40. Retrofitting WTGs with LVRT feature is a new requirement which did not exist at the time of bidding and may be considered under 'Change in Law'. State Electricity Regulatory Commissions are requested to consider to allow the cost of retrofitting WTGs with LVRT under the provision of 'Change in Law' in the respective PPA".

b) The existing WTGs for which LVRT solution is to be implemented have either entered into in Power Purchase Agreement (PPA) with Distribution Licensees are making of third party sale or are operating as Captive power plants. The WTG which are in PPA with Distribution Licensees are governed with the Levellised Tariff approved by SERCs vide their Wind Tariff Orders. While the Commission has not mentioned any particular mechanism for cost recovery of LVRT retrofitting, it has mentioned the need for such a mechanism to be in place. The Commission has acknowledged the requirement of commercial mechanism for cost recovery of retrofitting in Para 39 of the Order as below:

"39. According to SRPC and IWTMA, there are other types WTG where retrofitting of LVRT is technically feasible. However,



the Commission needs to devise a suitable commercial mechanism keeping in view the fact that huge amount of investment is involved in retrofitting. Perusal of the submission of IWTMA (filed during the hearing on 25.8.2015) reveals that retrofitting of WTGs with LVRT would cost in the range of Rs.25-50 lakh/turbine which include WTGs which are selling power at levelised tariffs to the distribution companies based on the capital cost assumed at the beginning of tariff period and are fixed for the tariff period, WTGs which are selling power through open access and WTGs used for captive usage. In all of the above cases, tariff need to be revised to make retrofitting with LVRT commercially viable. We are of the view that LVRT is a technical requirement from the point of view of safety and security of the grid and its usefulness cannot be overlooked in view of the cost involved in retrofitting of LVRT.”

c) The Commission in its Para 40 of the said Order has observed as under:

"40. We direct wind mill owners, which are selling power through open access/banking, to factor the capital expenditure incurred by them for retrofitting WTGs with LVRT feature while quoting price of electricity for sale through open access/banking.”

This would be applicable for contracts entered into subsequent to the Order. However, any compensation or mechanism of compensating such projects is not mentioned by the Commission.

d) At present none of the SERCs has come up with the commercial mechanism for recovery of cost of retrofitting. As most of the WTGs are operating under the jurisdiction of SERCs, and as such the SERCs should come up with a Commercial mechanism for compensation of the cost of Retrofitting considering the present case under ‘change of law’ in case of PPA signed in pursuance to Wind Tariff Order as approved by concerned SERC.

e) WTGs under both type of off-take arrangements would incur similar cost for retrofitting with LVRT but one group of WTGs (i.e., sale to discom) may be able to claim compensation under ‘Change of Law’ whereas the other group of WTG (i.e. under third party sale/captive route) would not be able to claim the same. The revision in price for sale for recovery thereof shall be



governed as per bilateral agreement between WTG and its third party off taker. Besides, the Petitioner likes to highlight that such bilateral off take arrangement shall be governed as per Section 49 of the Electricity Act, 2003 Act, wherein directions of the Commission may not be binding on the parties. Hence, it is unlikely that third party off taker would abide by such requirement to renegotiate the price for sale of power. The following table provides the break-up of Suzlon turbines with various generators which are under PPA route (sale to Discom) and under bilateral off take arrangement (3rd party/captive). The table shows that 36% of turbines are under 3rd party/captive sale.

STATE	Values	S82 (1500kW)		S88 (2100kW)		S5x (600kW)		1250kW		Total		Total
		Sale to Discom	TPS/ Captive	Sale to Discom	TPS/ Captive	Sale to Discom	TPS/ Captive	Sale to Discom	TPS/ Captive	Sale to Discom	TPS/ Captive	
Andhra Pradesh	No. of WTGs			83	5			2	6	85	11	96
	Installed Capacity (MW)			174	11			3	8	177	18	195
Gujarat	No. of WTGs	339	270	58	52	77	62	35	163	509	547	1,056
	Installed Capacity (MW)	509	405	122	109	46	37	44	204	720	755	1,475
Karnataka	No. of WTGs	170	23	28	23			277	16	475	62	537
	Installed Capacity (MW)	255	35	59	48			346	20	660	103	763
Kerala	No. of WTGs					31				31	-	31
	Installed Capacity (MW)					19				19	-	19
Madhya Pradesh	No. of WTGs	59	1	8		68	13		11	135	25	160
	Installed Capacity (MW)	89	2	17		41	8		14	146	23	169
Maharashtra	No. of WTGs	171	60	27	34	117	19	686	82	1,001	195	1,196
	Installed Capacity (MW)	257	90	57	71	70	11	858	103	1,241	275	1,516
Rajasthan	No. of WTGs	275	6	192	7	125	15	263	29	855	57	912
	Installed Capacity (MW)	413	9	403	15	75	9	329	36	1,219	69	1,288
Tamilnadu	No. of WTGs	157	252	48	54	40	190	120	661	365	1,157	1,522
	Installed Capacity (MW)	236	378	101	113	24	114	150	826	510	1,432	1,942
Total No. of WTGs		1,171	612	444	175	458	299	1,383	968	3,456	2,054	5,510
Total Installed Capacity (MW)		1,757	918	932	368	275	179	1,729	1,210	4,692	2,675	7,367

f) The cost of retrofitting of LVRTs should be funded through suitable mechanism such as PSDF/NCEF Green Fund and the Commission should



issue suitable directions to the concerned authorities. This arrangement would be equitable for all old WTGs irrespective of the nature of off take arrangement. It would also obviate the need for regulatory process to be followed for each case for scrutiny of cost and approval / determination of compensation requirement for LVRT retrofitting in each case under 'Change of Law' provisions.

g) As observed by the Commission in Para 40 of the said Order, "*In case the estimated cost of installing LVRT is substantially higher as compared to the capital investment in the turbine, ...*" the word 'substantially higher' does not clarify the exact quantum of amount which will receive a financial assistance from PSDF/NCEF/Green Fund for retrofitting purposes. Moreover, no agency has been identified which will monitor this arrangement. While it has been mentioned that RPCs may make a proposal for the arrangement of funds from PSDF/NCEF/Green fund, no specific time frame has been stipulated for completing this exercise. While there is condition for old WTGs to complete the retrofitting of LVRT and comply the requirement of LVRT installations, there is no clear timeline for how the cost would be funded, in case the same is required to be funded through PSDF/NCEF.

8. The Petitioner has requested for extension of time lines for implementation of LVRT solution and has submitted as under :

a) As per the Commission's Order, the LVRT solution has to be implemented on all WTGs mentioned in the Order, by January 2018. In view of the issues discussed in above paragraphs, the Petitioner proposes that, the Commission may extend the time line for implementation of LVRT, further by a minimum period of 2 years from January, 2018.

b) During the period of these two years, the Commission along with all SERCs may provide an appropriate solution for the genuine concerns raised by the Petitioner in this Petition and issue the appropriate directions to the concerned authorities including CEA.



Submissions by SRLDC

9. SRLDC vide its affidavit dated 14.3.2018 has submitted as under :

a) SRLDC/SRPC has conducted four special meetings on 5.2.2016, 18.4.2016, 5.7.2016 & 25.10.2017 apart from following up regularly in OCC & TCC/SRPC meetings to review / monitor the progress of compliance of directions in order no. 420/MP/2014.

b) SRLDC/SRPC has been submitting the quarterly reports regularly to the Commission in line with the directions in Petition No 420/MP/2014. The Quarterly report as on Q2 is as under :

Monitoring of installation of LVRT on WTGs commissioned before 15.04.2014)

Description	ANDHRA PRADESH	TELANGANA	KARNATAKA	KERALA	TAMIL NADU
WTGs Commissioned before 15.04.2014	745.39	0	2196.465	18.6	7185.86
WTGs LVRT enabled (Based on self-certification)	282	0	143.85	-	420
WTGs LVRT Available but to be enabled (Based on self-certification)	310.2	0		-	
WTGs design supporting LVRT but to be fitted		0	488.65	-	
WTGs LVRT to be retrofitted		0	1373.56	-	



Data yet to be received/LVRT not possible	153.19		190.405	-	6765.86
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c) It can be observed from the above table that for 6919.05 MW out of 10127.715 MW i.e. 68.3% of the capacity, data is yet to be received or LVRT implementation has not been possible even after lapse of two years. SRLDC/SRPC has been continuously pursuing to get the data. During the recent meeting on 25.10.2017, States were again requested to furnish complete details (details of type of WTG (Stall, Pitch etc.), voltage level and status of LVRT).

d) From the statistics submitted by the Petitioner, it can be observed that 37% of the Petitioner's machine will not be covered for the 4 models mentioned by the Petitioner. The aspect of cost recovery was considered by the Commission while passing of order dated 5.1.2016 in Petition No. 420/MP/2014 itself and accordingly 5 years and minimum capacity as per original directions in 420/MP/2014 may be retained.

e) There is no exemption of LVRT feature as per CEA standards for even below 500kW. However, as per the Commission's order, the implementation was advised for >500kW immediately and for those below 500kW. CEA was supposed to come with the technical feasibility studies. It is pertinent to mention that there clarity on the > 500kW machines both as per CEA standard as well as the CERC order in Petition No. 420/MP/2014. There is no ambiguity considering that in CEA Regulations 2007, B3 of Part II is referring to B2 in full which includes proportional active power generation and reactive



power supply during the voltage dip subject to the technical feasibility. It is clear that the petitioner has failed to implement the directions of the Commission in true spirit taking the shelter of lack of clarity.

f) The petitioner is expressing the difficulties on getting the type certification on all the WTGs considering around 5500 No's approximately as per the order. Considering the cost, feasibility and generally type tests are done on models only rather than all WTGS. In that case type test for the petitioner will be limited to 4 SEL models and the difficulties expressed by the petitioner should no more exist.

g) MNRE vide its OM No 293/8/2017 dated 1.3.2018 has notified the following for the models appearing in the RLMM list.

(i) Self-certification would be accepted till 31.3.2019 with the condition that concerned WTG manufacturer to apply for testing to any internationally accredited agency or NIWE by 15.3.2018, An affidavit for complying with CEA technical standards by 31.3.2019 and a bank guarantee of ₹1 Crore per model were to be provided by WTG manufacturers. A copy of the application was to be sent to MNRE.

(ii) WTG models for which self-certification was provided must obtain a certificate from NIWE for demonstrating the compliance of applicable CEA standards. NIWE will carry out the lab simulation for each of the WTG model testing their capabilities of complying with applicable standards and issue a certificate to that effect.

(iii) During the self-certification period, RLMM will have two tables one with wind turbines having statement of compliance / compliance statement and another with self-certification.



(iv) Penalty mechanism also has been devised viz. wind farm will be disconnected, OEM barred from installation in India for 5 years and Penalty to an extent of ₹ 2 Crore will be imposed.

(v) The stall wind generators and wind turbines of installed capacity less than 500kW connected at voltage level at 22kV / 11kV and below in the distribution generation (part of mixed feeder) are exempted from submitting SoS/CS.

h) Neither CEA Technical Standard nor the CERC orders exempt any WTGs for exemption of LVRT feature. Hence it is requested that no WTG should come without LVRT because the individual machine size may be small, but it may permit back door entry of WTGs of huge quantum without compliance of LVRT.

i) The Petitioner has requested time for extension for a minimum period of two years from January 2018 in this Petition and extend the timeline for implementation of the order dated 5.1.2016 passed by this Commission in Petition No. 420/MP/2014, till the disposal of the present petition through I.A. No. 11/2018. Sufficient time of two years has been given to the petitioner and any further extension will further delay the process. Hence it is requested that the petitioner may be advised to implement LVRT related directions immediately.

Rejoinder of the Petitioner

10. The Petitioner vide its affidavit dated 9.4.2018 has submitted as under :

a) Based on the assessment and studies, the Petitioner prayed before the Commission to review the minimum capacity criteria of 500 kW and



residual life of 5 years for LVRT compliance as provided under order dated 05.01.2016. The Petitioner has observed that the cost of retrofitting old models is way too high compared to retrofitting relatively newer models of S82 and S88 which signifies that for older models with lower residual useful life, there is no or relatively limited chance of recovery of this cost. Thus incurring such additional cost towards the end of the useful life of the turbine may not make economic sense. Further, it contributes 61% of the volume for 600 & 1250 kW as a cost towards LVRT compliance, hence the Petitioner requested to consider the capacity above 1250kW for the said compliance. Thus, based on the above, implementation of LVRT solution to WTGs which are having residual life less than 10 years will not be cost effective.

b) The Commission vide its order dated 5.1.2016, while addressing LVRT applicability (S.No.24), at page number 39, considered only LVRT curve, but other parts of CEA standards are not mentioned. It is stated that the draft second amendment to Regulations, 2007 proposes LVRT compliance only for existing wind turbines while other provisions would be applicable to new wind turbines commissioned on or after six months of publication of said new regulations. These draft regulations are not yet notified.

c) Since the issuance of order dated 5.1.2016, the Petitioner had not been sitting silent qua the ambiguities arisen from the said order. On the other hand, the petitioner had undertaken efforts in testing and validating LVRT solution as detailed in the main petition. The voltage ride through capability solution (without reactive power injection and active power



control) in S82 and S88 wind turbines have already been tested in Aug/Sept 2017 by internationally accredited testing agency “The UL International GmbH DEWI”, Germany. The retrofit solution can be certified and released for implementation once CEA/the Commission clarify the various aspects and accepts the proposed solutions.

d) After passing of the Commission’s order dated 5.1.2016; the Petitioner has completed the following activities for its S82 and S88 WTGs (covering more than 50% of Petitioner’s all India MW capacity requiring LVRT retrofitting):

(i) Load calculations, analytical calculations and turbine control software update;

(ii) Developed basic LVRT solution for models;

(iii) Implemented the LVRT solution in one S82 and one S88 turbine for field testing. The measurement agency has been engaged to perform LVRT tests;

(iv) LVRT laboratory has been made ready for conducting tests on S82 and S88;

(v) completion of basic LVRT solution (no active power control and reactive current injection during LVRT) testing by August/ September 2017 as explained above;

(vi) Targeted to achieve basic LVRT compliance statement by December 2017 subject to issuance of clear statement by CEA accepting basic LVRT as required solution (no active power control and reactive current injection during LVRT).

e) The Petitioner has made investment of approx. ₹30 crore for



development of these LVRT solutions.

f) The Petitioner has submitted that it has expressed difficulty in obtaining Type Certification for all WTGs which are more than 5000 in number. The Petitioner states that statement of compliance could be obtained for each turbine model and not for all turbines. However, these turbines are type certified according to old GL standards, and these standards are no longer valid. Hence, the Petitioner has proposed to provide statement of compliance in place of type certificate from an internationally accredited certification agency. Further, CEA standards for LVRT compliance are applicable to turbines connected to 66kV and above. It is possible that there could be number of turbines connected below 66kV voltage levels also. Hence, the Petitioner seeks clarity on, whether all turbines irrespective of voltage level need LVRT compliance or not.

g) In view of the complexities and ambiguities that have arisen out of the order dated 05.01.2016, the Petitioner seeks clarifications on certain aspects as mentioned hereinabove and as detailed in the accompanying petition. Unless, such clarifications are issued by this Commission, the Petitioner humbly prays for extension of time for implementation of order dated 5.1.2016 qua LVRT protection in WTGs.

Additional submissions by SRPC & SRLDC

11. SRPC vide its affidavit dated 1.3.2019 has additionally submitted as under :

a) In the Special LVRT Meetings, representations from IWP, IWTMA & NIWE (for certification) had also been sought to take along all the



stakeholders, besides apprising them of the compliance requirements. Representatives of IWPA, NIWE, were called as Special Invitees to the 34th SRPC Meeting held on 11.08.2018. Representative of IWPA is now attending most of the monthly OCC Meetings.

b) In Para 29 of the Order in Petition No. 420/MP/2014, it had been stated that after issue of necessary regulations/clarification by CEA with regard to voltage level above which LVRT would be mandatory, the same requirement shall be applicable even in the case of WTGs prior to 15.04.2014, keeping in view the safety and security of the grid.

c) Though the draft second amendment in CEA Regulations, 2007 was circulated during 2016-17, the final notification has been issued on 06.02.2019. As per this final notification, LVRT is not mandated for WTGs commissioned prior to 15.04.2014, irrespective of the voltage levels. WTGs commissioned after 15.4.2014 and connected at 66kV and above may not qualify for PSDF funding, since LVRT was a mandatory requirement.

d) In the draft 2nd Amendment issued by CEA (2016-17), it had been proposed that, 'it is clarified that only provisions with regard to LVRT as mentioned in point No. B (iv) above shall be applicable to all existing as well as new Wind & solar generating unit/stations. All other provisions shall be applicable to generating units commissioned on or after six months of publication of these Regulations'. However, in the final notified amendment, LVRT has not been envisaged for all Wind and Solar Generators and the provisions are applicable from a future date. Thus there is no provision in the CEA Regulations, 2007 for LVRT retrofitting for any of the existing WTGs.



Further as submitted above, as per the amendment in CEA Regulations, 2007 issued on 6.2.2019, LVRT is not mandated for WTGs commissioned prior to 15.4.2014, irrespective of the voltage levels.

e) The proposal for PSDF/ NCEF/ Green funding was only to be made in the case the estimated cost of installing LVRT was substantially higher as compared to the capital investment in the turbines. The Commission in its order dated 5.1.2016 in Petition No. 420/MP/2014 in Para 40 has mentioned that "...RPCs may make a proposal for arrangement of funding from PSDF/NCEF/Green Fund for retrofitting WTGs with LVRT." it is apparent that the Order of Commission on this matter was not unconditional and was dependent on a number of other matters.

f) CEA Regulations, 2007 (including amendments) have now clearly classified LVRT requirement for WTGs as per voltage levels and applicable time periods. Hence, presently there is no provision for mandatory retrofitting of LVRT for WTGs commissioned prior to 15.04.2014. Therefore, funding proposal from PSDF/NCEF/Green fund may not be tenable under the present circumstances.

g) In the 31st Meeting of SRPC held on 25. 2.2017, SRPC has noted that it may be prudent to await 2nd amendment to CEA Regulations, 2007 to move forward on the issues. Presently, 2nd Amendment to CEA Regulations, 2007 have been notified on 6.2.2019 which clearly classify LVRT requirements for WTGs as per the voltage levels and applicable time periods. There is no provision for mandatory retrofitting of LVRT for WTGs commissioned prior to 15. 4.2014.



12. The Commission vide its RoP of hearing dated 31.1.2019 issued the following directions :

a) The Commission directed the POSOCO to submit the States WTG-wise data containing population of wind turbines as per models, make and voltage levels, and details of LVRT enabled, LVRT design supported and fitted to be enabled, LVRT design supported but to be fitted and LVRT to be retrofitted.

b) The Commission directed the CEA to submit the study regarding technical feasibility of installation of LVRT in WTG in terms of the order dated 5.1.2016 in Petition No.420/MP/2014.

c) The Commission directed POSOCO to coordinate with the RPCs for taking up a consolidated case for funding from PSDF/Green Fund for retrofitting WTGs with LVRT in terms of order dated 5.1.2016 in Petition No. 420/MP/2014.

13. In compliance of the Commission's direction, SRPC vide its affidavit dated 1.3.2019 has submitted as under

a) The Petitioner had stated that RPCs were to make a proposal for funding from PSDF and NCEF Green Fund for retrofitting wind turbines with LVRT. As brought to attention, IWPA/IWTMA has been involved in the Special LVRT Meetings, SRPC Meetings and OCC meetings. Representative of the Petitioner was also present in the 3rd LVRT Meeting held on 5.7.2016.

b) Proposal for PSDF/NCEF/Green finding was to be considered only after the stakeholders had approached SERCs. Further, PSDF funding was to be considered cost for LVRT retrofitting was substantially higher. The specific



WTGs population requiring mandatory LVRT retrofitting, keeping in view the Order, CEA Regulations etc was also required to be ascertained.

c) POSOCO was thoroughly involved in all the associated activities and in all the meetings to ensure compliance of the Order of CERC. POSOCO was well aware of various issues such as clarification on voltage issues by CEA, PSDF/NCEF/Green funding only after stakeholders approach SERCs, issue in identification of eligible machines for LVRT retrofitting etc.

d) CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulation 2019 were notified on 6.2.2019. Para B3 of the same states the special provisions for certain Generating stations, 'The generating stations commissioned before the commencement of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 or commissioned within six months of such commencement shall comply with the provisions of these regulations as if they were not amended'. From a perusal of the CEA Regulations, the following can be kindly inferred:

(a) Period	(b) CEA Connectivity Regulations on LVRT
(c) Before 15.04.2014	(d) No mandatory provision of LVRT
(e) 15.04.2014– 06.08.2019	(f) B2 (3) Wind generating station connected at voltage level of 66kV and above.....
(g) After 06.08.2019	(h) As per the definition of the 'requester' 2(25) and 'user' 2(34) and Regulation B2 (3), LVRT would be required for wind generating station connected at voltage level of 33kV and above.



e) CEA (Technical Standards for Connectivity of Distribution Generations Resources) Regulations 2013 were notified on 30.09.2013 while the Amendment to CEA Regulation, 2007 was notified on 06.02.2019. There are no provisions regarding LVRT for DGR connected at voltage levels below 33kV.

f) The Commission in its Para 29 of the Order dated 5.1.2016 in Petition No. 420/MP/2014 has observed as under :

'We are of the view that LVRT should be implemented for all wind turbines commissioned before 15.04.2014 and connected to the voltage levels of 66kV and above except Stall Type WTGs, which are not technically feasible retrofitted with LVRT'.

Since there is no 'Change in Law' as per provisions of CEA Connectivity Regulations (including amendments) for WTGs commissioned before 15.04.2014, funding from PSDF/NCEF/Green funds is not envisaged.

14. In compliance of the Commission's direction vide RoP dated 31.1.2019, SRLDC has submitted as under :

a) In letter dated 11.2.2019 of SRPC to POSOCO, SRPC has requested POSOCO to furnish the following clarifications urgently.

(i) Complete clarity on the eligibility of the WTGs, which need to be retrofitted with LVRT.

(ii) During discussions in the LVRT meetings, it had also been noted that there would be other cases (apart from retrofitting) as stated by POSOCO which may need funding. These included LVRT design supported and fitted machines to be enabled and LVRT design supported but to be fitted.



(iii) How in the absence of clarity on the above issue (in the absence of regulatory backing) SRPC would be able to make any concrete proposal for PSDF funding.

(iv) In reference to Para No.4 of RoP of hearing dated 8.2.2019, Commission has directed POSOCO to submit the States WTG-wise data. It is requested that this data may kindly be shared with SRPC for further needful.

(v) It may also be clarified whether in the absence of amendment to CEA Regulations, 200 the WTGs qualifying for funding can be accurately classified.

(vi) Further, during the LVRT meetings conducted by SRPC, stakeholders had sought further clarity with regard to clause B 2(3) of CEA (Technical Standard for Connectivity to the Grid) (Amendment) Regulations, 2013. As noted in the 2nd LVRT meeting held on 18.4.2016, the voltage level of connection was indicated as 11kV, 22kV and 33kV for major quantum of WTGs in Tamil Nadu.

b) In letter dated 13.2.2019 of SRPC to TANGEDCO and TANTRANSCO: SRPC has submitted that there are about 120 Nos. of Substations in TN which pool wind energy. About 8,200MW capacity of wind energy generators are connected to these 120 substations. Nearly, 20 nos. of substations belong to private developers allowed under 10(1) sub-section. Balance 100 substations are owned by TANGEDCO/TANTRANSCO. The connectivity of all WTGs under TANTRANSCO & TANGEDCO substations are sanctioned by NCES wing of TANGEDCO at 11/22/33kV level. None of the WTG under the



substations connected in 10(1) substation are sanctioned by NCES wing of TANGEDCO at 33kV level. As per prevailing provision of CEA Regulations, 2007, “Wind generating stations connected at voltage level 66kV and above shall remain connected to the grid when voltage at the interconnection point on any or all phases dips up to the levels.....”. Since existing WTGs in Tamil Nadu are given connectivity below 66kV, the existing provisions of CEA Regulations, 2007 may not be applicable.

c) In letter dated 14.2.2019 of SRPC to POSOCO: SRPC submitted as under:

(i) Notification containing 2nd Amendment to CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007 has been issued on 6.2.2019.

(ii) As per the above notification, generating stations commissioned before commencement of CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulation, 2019 or commissioned within six months of such commencement shall comply with provisions of the Regulations, as if they were not amended.

(iii) It had earlier been noted by the forum that as per the Draft second amendment issued by CEA, it had been proposed that *'it is clarified that only provisions with regard to LVRT as mentioned in point No. B (iv) above shall be applicable to all existing as well as new Wind & Solar generating units/stations. All other provisions shall be*



applicable to generating units commissioned on or after six months of publication of these Regulations'.

(iv) Thus, it can kindly be noted that in draft second amendment, LVRT had been envisaged for all existing as well as new wind and solar generating stations.

(v) However, in the notified amendment, LVRT has not been envisaged for all existing wind and solar generation stations (except those that came up after 15.04.2014 and connected at 66kV and above voltage level).

(vi) Thus, it may be inferred that in case of wind and solar generating stations that had come up before 15.04.2014, there is absolutely no change in law.

(vii) In case there is no change in law, it is thus not understood whether such wind generating stations which have come before 15.04.2014 can qualify for funding under PSDF for any LVRT retrofitting / enabling etc.

(viii) It is also to be noted that wind generating stations feeding electricity into the electricity system at voltage level below 33kV are covered under CEA (Technical Standards for Connectivity of Distributed Generation Resources) Regulations.

(ix) Amendment in respect of CEA (Distributed Generation Resources) Regulations, 2013 has also been issued on 6.2.2019.



There are no provisions pertaining to LVRT under this Regulation. It is thus not clear whether generating resources covered under this Regulation (below 33kV) can qualify for PSDF funding.

(x) Generating station getting connected on or after completion of 6 months from date of publication of CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulation, 2013, which was notified on 15.10.2013 will not anyway qualify for PSDF funding (in case applicable only) since there is no change of law.

15. SRLDC vide affidavit dated 8.3.2019 w.r.t applicability of LVRT and other related issues has submitted as under :

(a) The ability of RE generators to successfully ride through faults in the transmission system is a key factor in ensuring grid security, particularly as the RE penetration increases in the system.

i. This feature commonly known as Low Voltage Ride Through (LVRT) was first introduced through the 15th October 2013 amendment to CEA, Regulations, 2007 and was applicable for all wind generators connected at 66 kV and above commissioned after 15.4.2014.

ii. Since a significant capacity (approximately 20 GW) still existed without this feature, the Central Electricity Regulatory Commission (CERC) had issued an order dated 5th Jan 2016 based on a petition filed by Southern Regional Load Despatch Centre (SRLDC) mandating incorporation of LVRT feature even



for units commissioned before 15.4.2014 (with some exceptions) and extending the same to solar generation.

- iii. The Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 have been notified on 6.2.2019 after previous publication of the draft regulations on 18th November 2016. This amendment has several provisions in respect of Renewable Energy (RE) generation which would be the key to successful integration of such generation into the Indian grid and the amendments would be applicable for all new generating units commissioned after 6th Aug 2019.

(b) The status of LVRT applicability through CEA Regulations and CERC orders is summarized in the Table below.

S.No	Regulations/Order	Date of order	Approximate wind plus solar capacity as on effective date of order*(All india level)	Applicability of LVRT to wind and solar generation
1	CEA Technical Standards for Connectivity to the Grid)Regulations, 2007	21-Feb- 2007	Wind: 7000 MW Solar: NIL	Silent about LVRT feature
2	CEA Technical Standards for Connectivity to the Grid)Amendment Regulations, 2013	15- Oct -2013 applicable for installations commissioned after 1 5th April 2014	Wind: 21132 MW Solar: 2632 MW	Applicable for wind generation connected at 66 kV and above



3	CERC order in Petition No. 420/MP/2014 filed by SRLDC	5-Jan-2016	Wind: 25088 MW Solar: 4879 MW	<ul style="list-style-type: none"> • LVRT to be retrofitted for all wind turbines rated 500 kW and above connected at 66 kV and above (except Stall Types) commissioned before 15th April 2014 and having more than 5 years' residual life. <ul style="list-style-type: none"> • CEA to issue clarifications regarding voltage level as well as study the technical feasibility for LVRT
4	Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019	6-Feb-2019 Applicable for installations commissioned after 6th August 2019.	Wind: 35288 MW Solar: 26026 MW likely to go up to 37500 MW and 32000 MW respectively by 6th Aug 2019	LVRT applicable at the interconnection point irrespective of voltage level to wind and solar, wind-solar hybrid as well as energy storage systems.

(c) The All India electricity grid may become extremely vulnerable due to the following.

a) As per Para 29 of the CERC order in Petition No 420/MP/2014,

.....“ After the issue of necessary regulations/clarification by CEA with regard to the voltage level above which LVRT would be mandatory, the same requirement shall be applicable even in case of IETGs installed prior to 15.4.2014 keeping in view the safety and security of the grid....”

In line with the same, CEA in its 2nd draft Amendment had proposed the following

“ It is clarified that only provisions with regard to LVRT as mentioned in point NoB(iv) above shall be applicable to all existing as well as new wind & solar generating units/stations. All other provisions shall be applicable to generating units commissioned on or after six months of these regulations”

However in the final notified amendment, LVRT has not been envisaged for all wind and solar generators and the provisions are applicable from future



date which is not in line with the CERC directions. The requirement of LVRT is emphasized in 2013 and 2019 amendment to CEA Regulations, 2017 as well as in Amendment Regulations 2019. Therefore, CEA may be advised for coming out with a plan for necessary retrofitting for All RE's commissioned before 15/04/2014 and All RE's connected below 66 kV level between 15.4.2014 and 6.8.2019.

b) 21132 MW wind capacity as on 15th April 2014 and any capacity that has come up or is likely to come up by 6th Aug 2019 at an interconnection point below 66 kV becomes exempt from the LVRT requirement as per the CEA Technical Standards.

c) Similarly, 32000 MW of solar capacity likely to be in place by 6th Aug 2019 would be legally exempt from LVRT provisions.

d) All solar projects which have been successfully bid out competitively before 6.2.2019 may also try to wriggle out from these provisions or file for compensation citing 'change in law' post competitive bidding.

e) All the new provisions other than LVRT such as frequency and voltage control would also not be applicable for more than 70 GW wind and solar.

(d) The Commission in its order dated 5.1.2016 in Petition No 420/MP/2014 had recognized the above vulnerability and had ordered for LVRT retrofits on many units commissioned before 15.4.2014 with provision for funding arrangements. The extracts as produced below

40 *Retrofitting WTGs with LVRT feature is a new requirement which did not exist at the time of bidding and may be considered under 'Change in Law' State Electricity Regulatory Commissions are requested to consider to allow the cost of retrofitting WTGs with LVRT under the provision of 'Change in Law' in*



the respective PPAs. We direct wind mill owners, which are selling power through open access, banking to factor the capital expenditure incurred by them for retrofitting WTGs with LVRT feature while quoting price of electricity for sale through open access, banking. In case the estimated cost of installing LVRT is substantially higher as compared to the capital investment in the turbine. RPCs may make a proposal for arrangement of funding from PSDF/NCEF/Green Fund for retrofitting WTGs with LVRT. In respect of WTGs, which have completed their useful life as on date of this order and those which are likely to complete their useful life in next two years should not be retrofitted with LVRT under PSDF/NCEF and should be taken out of service.

It is pertinent to mention the following w.r.t. funding proposal from PSDF/NCEF/Green Fund by RPCs

- a) None of the WTGs has approached SERC for filing petition. It can be inferred from the above that proposal for funding from PSDF/NCEF/Green Fund proposal can be made only if cost of retrofitting is substantially higher as compared to capital investment & after approaching SERC.
- b) It is also not clear whether funding from PSDF/NCEF/Green Fund can be extended to open access/ Banking which is connected before 15.04.2014 and connected at voltage level above 66kV.
- c) No progress has been made after elapse of three (3) years of this order.
- d) The matter further assumes complexity considering the fragmented ownership (approx. 2000 owners) as stated by Indian Wind Turbine Manufacturers Association (IWTMA) in the CERC order.

(e) Issue of authenticity and availability of detailed WTGs information:

- a) A related issue is detailed information availability in respect of the wind and solar capacity. Even if it is decided to fund the retrofits through PSDF or any other budgetary support, determining the ownership, voltage level, turbine capacities and number thereof for the wind capacity etc. is a



stupendous task constrained by lack of authentic information available centrally. The Southern Regional Power Committee (SRPC) Secretariat had convened several meetings in this regard. However, the full details could not be made available. The Regional Load Despatch Centres (RLDCs) are trying to collate this information but it would be a challenging task. CEA had initiated the National Level Data Registry System in early 2018 for registering all generating units of 0.5 MW and above in the country and assigning a unique registration number. Such Know Your Customer (KYC) initiative can be the only way to obtain authentic data in respect of wind generation.

16. POSOCO was directed vide RoP dated 31.1.2019 to submit the States WTG-wise data containing (i) population of wind turbines as per models, make and voltage levels, and (ii) details of LVRT enabled, LVRT design supported and fitted to be enabled, LVRT design supported but to be fitted and LVRT to be retrofitted:

a) In compliance to the afore-mentioned direction, all RLDCs viz ERLDC, NERLDC, NRLDC, SRLDC, WRLDC vide letters 1.3.2019, 6.3.2019, 5.3.2019 and 7.3.19 respectively have sought the detailed State wise WTGs data from the States (SLDC). The details from Rajasthan have been received and details of other States are awaited.

b) Earlier SRLDC/SRPC had conducted four special meetings on 05.02.2016, 18.04.2016, 05.07.2016 & 25.10.2017 apart from following up regularly in OCC & TCC/SRPC meetings to review / monitor the progress of compliance of directions (including collection of WTGs details) passed in the Petition No. 420/MP/2014. SRPC/TCC in 31st SRPC/30th TCC meeting has observed that it may be prudent to await 2nd amendment to CEA



Regulations, 2007 for moving forward on the issue. Valuable time of 3 years has elapsed between the dates of 2nd amendment by CEA viz. 6.2.2019 and date of order in Petitioner in 420/MP/2014 viz 05.01.2016.

17. The Commission directed POSOCO to coordinate with the RPCs for taking up a consolidated proposal for funding from PSDF/Green Fund for retrofitting WTGs with LVRT in terms of order dated 5.1.2016 in Petition No. 420/MP/2014. Pertinent issues with respect to PSDF funding was taken up by SRPC with POSOCO vide their letter dated 11.02.2019 and 14.02.2019. Further CEA was requested by POSOCO vide letter dated 05.03.2019 for providing the necessary guidance & advice on the issues wrt applicability of LVRT and the difficulty in obtaining & verifying the authenticated details of WTGs. CEA was also requested to issue directions to all concerned to get out of the logjam explained above in Para 4 to 8 to ensure reliable operation of the world's fourth largest synchronous electricity grid.

18. The Petitioner has also filed I.A No. 11/2018 seeking extension of the timeline for implementation of the Commission's order dated 5.1.2016 in Petition No. 420/MP/2014, till the disposal of the present petition, being Petition No. 237/2017. SRLDC vide its affidavit dated 14.3.2018 has filed its reply to I.A No 11/2018 and the same has been considered.

Analysis and Decision

19. Based on the submissions of the parties and the documents available on record, the issues that come up for consideration in this petition pertain to (a) Criteria for LVRT requirement i.e. the minimum installed capacity above which retrofitting is to be carried out; (b) Requirement of WTG Type Test Certification; (c) Stipulation of an appropriate mechanism for reimbursement of the cost of retrofitting and (d) Extension of time for



implementation. The issues are dealt with in subsequent paragraphs.

(a) Criteria for LVR retrofitting requirement:

20. The Petitioner has sought clarification on requirement of LVRT capability and additional requirements of proportional active power generation and reactive current supply during the voltage dip, on wind turbines commissioned before 15.4.2014, excluding wind turbines rated at or below 500 kW rating. The Petitioner has submitted that it is working towards developing the standard LVRT solution which would meet the provisions of the CEA Regulations, 2007. Further, it has been submitted that having Low Voltage Ride Through (LVRT) solution should be sufficient without the additional requirement of proportional active power generation and reactive power supply during the voltage dip. The Petitioner has also submitted that confirmation to the model solution and clarity on the interpretation of the provisions of the CEA technical standards are crucial for making progress in LVRT solution implementation.

21. SRLDC has submitted that there is no ambiguity in B3 of Part II of CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 as it is referring to B2 in full which includes proportional active power generation and reactive power supply during the voltage dip subject to the technical feasibility.

22. The Petitioner has submitted that the Commission may review the minimum capacity criteria of 500 kW and residual life of 5 years. Based on the assessment carried out by it, the Petitioner has observed that the cost of retrofitting for LVRT



solution would be very high for smaller capacity WTG i.e., WTGs below 1.25 MW capacity. Petitioner submitted that the cost of retrofitting old models (S52 and S6X) is way too high compared to retrofitting relatively newer models (S82 and S88). Thus, for older models with lower residual useful life, there is limited possibility of recovery of such cost and therefore incurring such additional cost may not make economic sense. Thus, based on the above, the Petitioner has submitted that implementation of LVRT solution to WTGs which are having residual life less than 10 years will not be cost effective.

23. SRLDC has submitted that from the statistics submitted by the petitioner it may be seen that 37% of the petitioner machines will not be covered under any of the 4 types of models mentioned by the Petitioner. Regarding revising the minimum capacity to rated capacity above 1.25MW instead of 500KW, it may be seen from the statistics submitted by the Petitioner that 53% of the petitioner machines will not be covered. Similar may be the case for other manufacturers also. Further, the issue of cost recovery had been considered in the Commission's order 420/MP/2014. Therefore, 5 years and minimum capacity as per original directions in 420/MP/2014 may be retained.

24. The Petitioner in its rejoinder to reply of Respondent No.1 has submitted that the Commission vide its order dated 5.1.2016 in Petition No. 420/MP/2014, while addressing LVRT applicability in Para No. 24, considered only LVRT curve and not other aspects of CEA standards. The draft second amendment in CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007 proposes LVRT compliance only for existing wind turbines while other provisions would be applicable to new wind turbines commissioned on or after six months of publication of said new



regulations. Further, in the final notified amendment, LVRT has not been envisaged for all wind and solar generators and the provisions are applicable from future date which is not in line with the CERC directions. The requirement of LVRT is emphasized in CEA Technical Standards for Connectivity to the Grid (Amendment) Regulations, 2013 as well as in the 2019 Amendment to CEA, Regulations, 2007. Therefore CEA may be advised for coming out with a plan for necessary retrofitting for All RE's commissioned before 15.4.2014 and All RE's connected below 66 kV level between 15.4.2014 and 6.8.2019.

25. SRPC has submitted vide its letter dated 1.3.2019 that from the perusal of the CEA Regulations, the following can be inferred.

Period	CEA Connectivity Regulations on LVRT
Before 15.4.2014	No mandatory provision of LVRT
15.04.2014– 06.08.2019	B2 (3) Wind generating station connected at voltage level of 66kV and above.....
After 06.08.2019	As per the definition of the 'requester' 2(25) and 'user' 2(34) and Regulation B2 (3), LVRT would be required for wind generating station connected at voltage level of 33kV and above.

(b) Requirement of WTG Type Test Certification:

26. The Petitioner has prayed to review the requirement of Type Test after retrofitting, taking into consideration the process required for the designing of LVRT, for each type/model of WTGs installed, and with the difficulties in obtaining the Type Test Certification for the WTGs which are already installed and in operation. Further, Petitioner has also submitted that instead of carrying out the Type Test again for all the WTGs, Statement of compliance for LVRT solution should be obtained from any third party certifying agency approved by or acceptable to the Commission or the



CEA.

27. SRLDC has submitted that type tests are done on models only rather than all WTGS. In that case, type test for the petitioner will be limited to 4 SEL models. Further, it has submitted that vide OM No 293/8/2017 dated 1.3.2018, MNRE has notified that for the models appearing in the RLMM list, self-certification will be accepted till 31.03.2019 with the condition that concerned WTG manufacturer should apply for testing to any internationally accredited agency or NIWE by 15.03.18. WTG's manufacturer is also required to submit an affidavit for complying with CEA technical standards by 31.03.2019 and a bank guarantee of ₹1 crore per model. Further, WTG models for which self-certification was provided must obtain a certificate from NIWE for demonstrating the compliance of applicable CEA standards. NIWE will carry out the lab simulation for each of the WTG model testing their capabilities of complying with applicable standards and issue a certificate to that effect. During the self-certification period, RLMM will have two tables, one with wind turbines having statement of compliance / compliance statement and another with self-certification.

(c) Appropriate mechanism for reimbursement of the cost of retrofitting:

28. The Petitioner has submitted that the existing WTGs for which LVRT solution is to be implemented have either entered into Power Purchase Agreement (PPA) with Distribution Licensees or third party sale or operating as Captive power plants. The WTG which have entered into PPAs with Distribution Licensees are governed with the Levelized Tariff approved by SERCs vide their Wind Tariff Orders. While the Commission has not mentioned any particular mechanism for cost recovery of LVRT retrofitting, it has mentioned the need for such a mechanism to be in place. The Petitioner has also submitted that the Commission in Para 40 of Order dated



5.1.2016 in Petition No. 420/MP/2014 had given direction to wind mill owners, which are selling power through open access/banking, to factor the capital expenditure incurred by them for retrofitting WTGs with LVRT feature while quoting price of electricity for sale through open access/banking, but the Commission did not give any observation pertaining to compensation mechanism.

29. The Petitioner has contended that most of the WTGs are operating under the jurisdiction of SERCs, and as such the SERCs should come up with a commercial mechanism for compensation of the cost of retrofitting, considering the case under 'change of law' in case of PPA signed in pursuance to Wind Tariff Order as approved by concerned SERC. The Petitioner has submitted that WTGs under both these type of off take arrangements would incur similar cost for retrofitting with LVRT but one group of WTGs (i.e., sale to discom) may be able to claim compensation under 'Change of Law' whereas the other group of WTG (i.e. under third party sale/captive route) would not be able to claim the same. The revision in price for sale for recovery thereof shall be governed as per bilateral agreement between WTG and its third party off taker. The Petitioner has highlighted that such bilateral off-take arrangement shall be governed as per Section 49 of the Act, wherein directions of the Commission may not be binding on the parties. Hence, it is unlikely that third party off taker would abide by any such requirement to renegotiate the price for sale of power. The Petitioner has therefore, submitted that the cost of retrofitting of LVRTs should be funded through suitable mechanism such as PSDF/NCEF Green Fund and the Commission should issue suitable directions to the concerned authorities. In addition, the Petitioner has submitted that as stated in paragraph 40 of Order dated 5.1.2016 in Petition No. 420/MP/2014, it has been mentioned that RPCs may make a proposal for the arrangement of funds from PSDF/NCEF/Green fund but no specific



time frame has been stipulated for completing this exercise.

30. SRLDC has submitted that from the submission of Petitioner, it comes out that around 64% of contracts are of levelized tariff viz. sale to DISCOM and remaining 36% are to 3rd party/captive sale. Further, the Commission has already clarified for consideration of “change in law”. However, the Petitioner has not approached concerned SERCs for revision of tariff, which would have covered majority, about 64%, of the WTGs.

31. SRPC, in its reply dated 1.3.2019, has submitted that SRPC in its letter dated 11.2.2019 has requested POSOCO to furnish the clarifications on the concrete proposal for PSDF funding in the absence of regulatory framework. Further, SRPC, in its letter dated 14.2.2019, requested clarification regarding qualification of wind generating stations commissioned before 15.04.2014 for funding under PSDF for any LVRT retrofitting / enabling etc., in case there is no “change in law”. SRPC also submitted that amendment in respect of Central Electricity Authority (Technical Standards for Connectivity of Distributed Generation Resources) Regulations has also been issued on 6.2.2019, which does not state any provisions pertaining to LVRT. Therefore, SRPC requested POSOCO to furnish clarification whether generating resources covered under this Regulation (below 33kV) can qualify for PSDF funding.

32. SRPC has submitted as under:

- (a) Applicability of CEA Connectivity Regulations, 2013- WTGs commissioned after 15.4.2014 and connected at 66kV and above may not qualify for PSDF funding, since LVRT was a mandatory requirement.



(b) Status prior to notification of amended CEA Regulations 2019- The 'Change in Law' as mentioned in Para 40 of CERC Order in Petition No. 420/MP/2014 and as referred to by POSOCO in the present RoP was likely for WTGs which are supplying power to distribution companies. Through various MOMs, stakeholders had been advised to approach SERCs in this regard. Further, WTGs under open access, had been advised to factor in the capital expenditure for retrofitting WTGs with LVRT features while quoting the price of electricity. Further, the proposal for PSDF/ NCEF/ Green funding was only to be made in case the estimated cost of installing LVRT was substantially higher as compared to the capital investment in the turbines. In Para 40 of CERC Order in Petition No. 420/MP/2014, it is also mentioned that "...RPCs may make a proposal for arrangement of funding from PSDF/NCEF/Green Fund for retrofitting WTGs with LVRT." Thus, the Order of Commission was not unconditional and RPCs were to make proposals.

(c) Status after notification of CEA Amendment Regulations 2019- CEA Regulations, 2007 (including amendments) have now clearly classified LVRT requirement for WTGs as per voltage levels and applicable time periods. Hence, presently there is no provision for mandatory retrofitting of LVRT for WTGs commissioned prior to 15.04.2014. Thus, funding proposal from PSDF/NCEF/Green fund may not be tenable under the present circumstances.

33. SRPC has also submitted vide its affidavit dated 1.3.2019 that CEA (Technical Standards for Connectivity of Distribution Generations Resources) Regulations 2013



were notified on 30.09.2013, while the Amendment Regulation was notified on 6.2.2019. There are no provisions regarding LVRT for DGR connected at voltage levels below 33kV. Since there is no 'Change in Law' as per provisions of CEA Connectivity Regulations (including amendments) for WTGs commissioned before 15.04.2014, funding from PSDF/NCEF/Green funds is not necessary.

(d) Extension of time for implementation of LVRT:

34. The Commission's order dated 5.1.2016 in Petition No. 420/MP/2014 at para 29 states as under:

"29. We are of the view that LVRT should be implemented for all wind turbines commissioned before 15.4.2014 and connected to voltage level of 66 kV and above except for Stall Type WTGs, which are not technically feasible to be retrofitted with LVRT. However, keeping in view the suggestions of IWTMA, we are of the view that presently LVRT should be implemented for all wind turbines (except Stall Types) commissioned before 15.04.2014 having installed capacity equal to or more than 500 KW. In case of wind turbines of less than 500 kW and installed before 15.04.2014 (except stall types), CEA is directed to conduct a study regarding technical feasibility of installation of LVRT in these turbines and submit a report to the Commission within 6 months of issue of this order. Representative of CEA submitted during the hearing that CEA was in the process of issuing clarification in regard to the voltage level above which LVRT provision would be mandatory. After the issue of necessary regulations/clarification by CEA with regard to the voltage level above which LVRT would be mandatory, the same requirement shall be applicable even in case of WTGs installed prior to 15.4.2014 keeping in view the safety and security of the grid. It is however clarified that WGTs whose useful life is going to expire in the next 5 years, shall be exempted from installation of LVRT".

It is observed from the above that direction was given pertaining to retrofitting of LVRT for all wind turbines (except Stall Types) commissioned before 15.04.2014 having installed capacity equal to or more than 500kW. As per the above order, the Petitioner is required to comply with the retrofitting of LVRT without any additional requirement of proportional active power generation and reactive power supply during the voltage dip.

35. It is observed that as per Para B3 of Part-II of CEA (Technical Standards for



Connectivity to Grid) (Amendment) Regulations, 2013 the generating company and the licensee of the electricity system to which the generating station is connected were required to mutually discuss and agree on the measures which can be taken to meet the standards specified in (B1) and (B2), to subject to technical feasibility". Para B3 is quoted as under:

B3. For generating units which are connected before and upto 6 months after the date of publication of these Regulations in the Official Gazette

The generating company and the licensee of the electricity system to which the generating station is connected shall mutually discuss and agree on the measures which can be taken to meet the standards specified in (B1) and (B2) subject to technical feasibility".

A reading of Para B3 makes it clear that WTG's commissioned before 15.4.2014 and connected at voltage level 66kV and above were required to provide active and reactive support subject to technical feasibility.

36. The Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 have been notified on 18.11.2016. In the said amendment, the Clause B3 of Part-II reads as follows:

"B3. Special provision for certain Generating stations:

The generating stations commissioned before the commencement of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2018 or commissioned within six months of such commencement shall comply with the provisions of these regulations as if they were not amended."

37. The Commission in its order dated 5.1.2016 in Petition No. 420/MP/2014 had observed that LVRT should be implemented for all wind turbines (except Stall Types) commissioned before 15.4.2014 having installed capacity equal to or more than 500 KW. The relevant portion of the said order is reproduced as under:

"However, keeping in view the suggestions of IWTMA, we are of the view that presently LVRT should be implemented for all wind turbines (except Stall Types)



commissioned before 15.04.2014 having installed capacity equal to or more than 500 KW. In case of wind turbines of less than 500 kW and installed before 15.04.2014 (except stall types), CEA is directed to conduct a study regarding technical feasibility of installation of LVRT in these turbines and submit a report to the Commission within 6 months of issue of this order. Representative of CEA submitted during the hearing that CEA was in the process of issuing clarification in regard to the voltage level above which LVRT provision would be mandatory. After the issue of necessary regulations/clarification by CEA with regard to the voltage level above which LVRT would be mandatory, the same requirement shall be applicable even in case of WTGs installed prior to 15.4.2014 keeping in view the safety and security of the grid. It is however clarified that WTGs whose useful life is going to expire in the next 5years, shall be exempted from installation of LVRT”.

38. As per the said Order, CEA was required to conduct a study regarding technical feasibility of installation of LVRT in the turbines having installed capacity less than 500 KW and submit a report to the Commission within 6 months of issue of this order. However, no such report has been submitted by CEA till date.

39. It is noticed that approximately three and half years have already elapsed since the issue of Order dated 5.1.2016 in Petition No. 420/MP/2014 by the Commission and still the Petitioner has not been able to implement the said order due to issues like requirement of criteria for LVRT retrofitting, requirement of WTG Type Test Certification for retrofitted turbines and mechanism for recovery of cost for retrofitting. We recognise the genuine difficulties faced by the Petitioner in implementation of the Order dated 5.1.2016 and we are of the view that it may not be proper to press the Petitioner to comply with the said order. It is observed that in the meanwhile, CEA has amended the Technical Standards for Connectivity to the Grid Regulations, 2007 on 8.2.2019. The said regulations specifies the connectivity standards applicable to the wind generating stations, generating stations using inverters, wind - solar photo voltaic hybrid systems and energy storage systems. We are of the view that it would be appropriate to direct all the WTGs to comply with the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019.



In case of any difficulty in implementation of the said regulations, the WTGs may approach CEA for necessary clarifications and directions. We direct accordingly.

40. Petition No. 237/MP/2017 along with I.A. No. 11/2018 are disposed of.

sd/-
(I. S. Jha)
Member

sd/-
(Dr. M. K. Iyer)
Member

sd/-
(P. K. Pujari)
Chairperson

