

Rajasthan Electricity Regulatory Commission

Petition No. 2048/2022

Petition under Section 86 of Electricity Act, 2003 read with Rajasthan Electricity Regulatory Commission (Rajasthan Electricity Grid Code) Regulations 2008 seeking directions to Respondents to comply with Grid Code and take permanent measures to overcome the issue of consistent voltage tripping at the 220kV Bhadla Grid Sub-station and to compensate the Petitioners towards loss of revenue.

Coram:

Dr. B.N. Sharma, Chairman

Sh. Hemant Kumar Jain, Member

Dr. Rajesh Sharma, Member

Petitioners:

1. ACME Jodhpur Solar Power Pvt. Ltd.
2. ACME Rewa Solar Energy Pvt. Ltd.
3. ACME Solar Holding Pvt. Ltd.

Respondents:

1. Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (RVPN)
2. State Load Despatch Centre (SLDC)
3. Saurya Urja Company of Rajasthan Ltd. (SUCRL)
4. Northern Regional Load Despatch Centre (NRLDC)
5. Northern Regional Power Committee (NRPC)
6. Solar Energy Corporation of India (SECI)

Date of Hearing: 18.10.2022, 15.11.2022, 03.01.2023, 05.04.2023, 01.06.2023 and 01.08.2023.

Present :

1. Sh. Vishrov Mukerjee, Advocate for Petitioners.
2. Sh. Yashaswi Kant, Advocate for Petitioners.
3. Sh. Umang Gupta, Advocate for Respondents RVPN & SLDC.
4. Ms. Tanya Sareen, Advocate for Respondent SECI.
5. Sh. Arijit Maitra, Advocate for Respondent SUCRL.

Order Date:**01.09.2023****ORDER**

1. ACME Jodhpur Solar Power Pvt. Ltd. ("ACME Jodhpur" / "Petitioner No. 1"), ACME Rewa Solar Energy Pvt. Ltd. ("ACME Rewa" / "Petitioner No. 2") and ACME Solar Holdings Private Limited ("ASHPL" / "Petitioner No. 3") had filed this Petition on dated 15.09.2022 seeking directions to Respondents to comply with Rajasthan Electricity Grid Code Regulations 2008 (as amended from time to time), Indian Electricity Grid Code Regulations 2010 (as amended from time to time) and take permanent measures to overcome issue of consistent voltage tripping at the 220 kV Bhadla Grid Sub-station along with payment of compensation towards loss of generation.
2. Further, the Applicant has also filed IA having No. 01/2022 seeking interim relief of directions to Respondent Nos. 1 and 2, to provide for a temporary arrangement to ensure uninterrupted evacuation of power from Applicants Solar Power Projects at the point of interconnection i.e., 220 kV Bus of the Bhadla Grid Sub-Station.
3. The matters were listed on 18.10.2022, 15.11.2022, 03.01.2023, 05.04.2023, 01.06.2023 and finally heard on 01.08.2023. Sh. Vishrov Mukerjee and Sh. Yashaswi Kant, Advocates appeared for Petitioners, Sh. Umang Gupta, Advocate appeared for Respondents RVPN and SLDC, Ms. Tanya Sareen, Advocate appeared for Respondent SECI and Sh. Arijit Maitra, Advocate appeared for Respondent SUCRL.

4. Respondents RVPN and SLDC filed its preliminary reply on dated 16.11.2022. Further RVPN filed their replies on dated 31.12.2022 and on 27.07.2023, Respondent Solar Energy Corporation of India (SECI) filed their reply on dated 21.11.2022, Respondent Saurya Urja Company of Rajasthan Ltd. (SUCRL) filed their reply on dated 28.02.2023 and written submission on dated 05.08.2023 and Petitioners filed Rejoinders on dated 19.04.2023 and written submissions on dated 07.08.2023.
5. Petitioners M/s ACME Jodhpur Solar Power Pvt. Ltd. and ors. in its Petition, rejoinder, written submission and during hearing has submitted as under:
 - 5.1 ASHPL incorporated ACME Jodhpur and ACME Rewa as Special Purpose Vehicles for development of 100 MW Solar Power Project by each SPV ("Projects"), located at Bhadla Phase- III Solar Park, Rajasthan operated by SUCRL.
 - 5.2 The Projects supply power through a dedicated line which is connected to SUCRL's 33/200 kV Pooling Sub-Station ("Pooling Sub-Station"/ "PSS") located at Bhadla, Phase-III, Solar Park which has been designated by SUCRL as the interconnection of the Projects with the Grid.
 - 5.3 The Pooling Sub-Station is connected to Respondent No. 1 RVPN, 400/220 kV Grid Sub-Station ("Bhadla GSS") through two 220 kV transmission lines.
 - 5.4 However, since 2018, the Petitioners have been facing extreme over-voltage and under-voltage at the Bhadla GSS leading to abnormal tripping of solar inverters, damage to electrical components and loss in generation. Due to consistent under-voltage issues, the power generation, is getting affected and is unable to generate at its optimum level. Despite raising the issue and seeking redressal, there has

neither been any improvement in the situation nor has Respondent No.1, taken any steps to remedy the situation.

- 5.5 The Petitioners have been following all the prudent industry practices in its operations and the relevant regulations for the scheduling of power. However, due to frequent Grid-system constraints including Grid Disturbance, Voltage Tripping, Shutdown from Respondent No. 1's end relay and jumper Damage etc., which are beyond the Petitioners control, the Petitioners Projects have been drastically impacted resulting in generation losses.
- 5.6 The grid disturbances / low voltage issues at the Bhadla GSS have occurred on account of non-availability of a safe and reliable transmission system, which was the obligation of RVPN and SLDC under the Act, IEGC, REGC, CEA Regulations and RERC OA Regulations.
- 5.7 Due to continuous revenue loss on account of tripping and low generation owing to consistent low voltage at the 220 kV Bhadla Grid Sub-Station, the Petitioners have written several letters to the Respondents. Vide aforesaid letters, the Petitioners requested Respondent No. 1 to intervene and direct the concerned authorities to resolve the said issue by taking permanent measures.
- 5.8 Despite repeated requests and acknowledgment of such events of grid disturbances involving voltage tripping, Respondent No.1 and 2, have failed to undertake measures to resolve such issues. Such events are severely impacting the energy generation by the Petitioners. Further, due to said inaction, the Petitioners are losing generation and unnecessary stress is being created on the substation equipment, which is making operations of the Projects challenging day by day.
- 5.9 The Petitioners have maintained all the necessary telemetering, SCADA and the relevant data at its Projects end which is connected to SUCRL's Pooling Sub-station.

- 5.10 SUCRL is obligated to provide telemetering, SCADA and the relevant data at the interconnection points, if the same is felt necessary by RLDC / SLDC. The Petitioner is not privy to any correspondence exchanged between SUCRL and RVPN/ RLDC/SLDC seeking the aforesaid requisite details, if any.
- 5.11 The issue of voltage tripping has been recognised by SUCRL, which has written letters requesting Respondent No.1 to address the issues relating to under voltage and over voltage. However, till date Respondent No.1 has failed to take any remedial measures in this regard.
- 5.12 100 MW of Petitioners Project is continuously getting tripped for more than 5-7 hours in a day from the past one week owing to under voltage/ tripping in the Grid. The Petitioners are incurring huge losses as entire generation is lost due to such under voltage / tripping, which is beyond the control of the Petitioners. This also results in wastage of natural resources and denial of clean power to the consumers of the State of Rajasthan.
- 5.13 The Petitioners in compliance of SLDC's advice and with the aim to comply with (Technical standards for Connectivity to the Grid) (Amendment) Regulations, 2013 for injecting MVAR (Reactive Power) are operating their projects in voltage control mode and at a Power Factor of 0.95. Further, the Petitioners have been delivering Reactive Power (Q (MVAR)) equivalent to 31.3% of Active Power (P (MW)) at the Point of Injection, i.e., within the prescribed limit in terms of the Regulations. However, despite such measures, the issue of low voltage is recurring at the Bhadla GSS.
- 5.14 At the outset, the direction for change in configuration was directed by RVPN vide e-mail. Further, even after rectification and configuring reactive power settings in all the Petitioners inverters, the low voltage issue persists at the Bhadla GSS during peak generation hours, till today.

Further, the Petitioners are operating at the Power Factor of 0.95 and in order to provide the reactive energy support to the grid. However, due to the recurring low voltage at the Bhadla GSS, the Petitioners are unable to operate at the optimum level for no fault on their behalf.

- 5.15 It is the statutory duty of RVPN to monitor the grid operation, operate the grid and despatch of electricity in an economic manner.
- 5.16 Respondents have failed to show what 'force majeure/ outage conditions are responsible for trippings at Bhadla GSS nor the Respondents have placed on record any document to show steps taken by the Respondents to overcome such force majeure / outage conditions.
- 5.17 RVPN's contention that no tripping have been observed at 220 kV GSS RVPN Bhadla end on the 220 kV SUCRL Line 1 and 2 from April 2021 to October 2022 except due to supply fail from 220 kV Bap and Badsid GSS, is incorrect. The Petitioners Projects have been drastically impacted on account of fluctuations in voltage at Bhadla GSS resulting in generation loss to the Petitioners.
- 5.18 RVPN's reliance on Petition No. RERC/1783/2020 to contend that there has been no issue of under/low voltage and generation loss due is incorrect. The issue involved in Petition No. 1783 of 2020 was distinct and separate from the issues involved in the present Petition.
- 5.19 The Petitioners had engaged Hitachi Energy India ("Hitachi") to carry out steady state analysis, find out the cause of under voltage and make recommendations. In terms of the Hitachi's Steady State Analysis Report, the cause of this evacuation constraint/tripping is due to issues at the Bhadla GSS, which is under the control and management of the Respondent No. 1 and 2.

- 5.20 As a permanent measure Respondent No.1 had verbally confirmed installation of 500 MVA Transformer at 400 kV Bhadla GSS.
- 5.21 It is relevant to note that: (a) installation of additional 400/220 kV transformer between the Bhadla 400kV bus and the Bhadla 220kV Bus-B was already a solution suggested by the Petitioners in terms of the Hitachi Report; (b) installation of Static Synchronous Compensator ("STATCOM") was also a suggested solution.
- 5.22 However, despite having been sanctioned since August 2022, there has been no progress regarding installation of the foregoing transformer and STATCOM. The Commission ought to direct the Respondents to provide a status report as regards the same.
- 5.23 SECI is a necessary and proper party for adjudication of the present dispute. SECI by way of its Reply has placed on record, the PSA between SECI and Rajasthan Urja Vikas Nigam Limited.
- 5.24 It is evident that the transmission arrangement is to ensure the successful supply of power from the Projects (in terms of the PPAs and PSAs) to the beneficiaries (RUVNL herein) through the Transmission Licensee (RVPN herein). Thus, any under-voltage scenario faced by the Petitioners on account of the transmission arrangement will have a cascading effect on the Petitioners obligations under the PPAs for ensuring the supply of power up to the contracted capacity to SECI.
- 5.25 The Transmission Arrangement and the PPAs executed between the Petitioners and SECI is for the common purpose, i.e., supply of power from the Project through ISTS to the beneficiary Discoms. Therefore, the relief sought due to the continued lower voltage at the Bhadla GSS, which is beyond the control of the Petitioners, would also impact the rights and obligations of the parties under the PPAs executed between the Petitioners and SECI.

- 5.26 Reliance placed by SECI on judgment in Appeal No. 256 of 2019 titled Parampujya Solar Energy Private Ltd. & Anr. v. CERC & Ors. ("Parampujya Case"), and Order dated 02.05.2019 of CERC passed in Petition Nos. 342/MP/2018 and 343/MP/2018. The issue involved in Parampujya Case were claims under 'Change in Law'. Similarly, in Order dated 02.05.2019, the jurisdiction of Ld. CERC was confined to adjudication on Change in Law claims. Therefore, the dispute involved in the aforesaid cases pertained to a contractual dispute. Whereas, in the present case, the Petitioners are inter-alia seeking directions to Respondents i.e., the State Transmission Utility and the State Load Despatch Centre to comply with their statutory duty in terms of the Grid Code and take permanent measures to overcome the issue of consistent voltage tripping at the 220kV Bhadla Grid Sub-station, which also impacts SECI and RUVNL.
- 5.27 Respondent No. 4, Northern Regional Load Despatch Centre ("NRLDC") in the minutes of meeting, has provided a list of plants who are in violation of the CEA (Technical Standards for Connectivity to the Grid) (Amendment), Regulations, 2013 wherein Petitioners names are not included in the list.
- 5.28 Respondent Nos. 1 and 2 is misrepresenting facts by contending that NRLDC in its meeting, gave specific instructions to SUCRL and M/s ACME to comply with the CEA (Technical Standards for Connectivity to the Grid) (Amendment), Regulations, 2013.
- 5.29 Commission has the power to direct payment of compensation in terms of the following judgments:
- (a) Hon'ble Supreme Court Judgment in Energy Watchdog vs. CERC & Ors. reported as (2017) 14 SCC 80, wherein Hon'ble Supreme Court held that electricity regulatory commissions continue to have general regulatory power over tariff;
 - (b) Hon'ble Supreme Court Judgment in Maharashtra State Electricity Distribution Company Limited vs. Maharashtra Electricity Regulatory

Commission & Ors. (2022) 3 SCC 657, wherein Hon'ble Supreme Court held that regulatory commissions continue to exercise continuous regulatory supervision.

(c) Hon'ble Appellate Tribunal for Electricity Judgment dated 12.08.2021 in IA No. 1258 of 2020 in Appeal No. 126 of 2020 titled Tata Power Renewable Energy Limited vs. Andhra Pradesh Electricity Regulatory Commission & Ors. wherein Hon'ble Tribunal relied on the "Must-Run Rules" to hold that the even in the event of curtailment, compensation has to be paid.

5.30 In considerations to above the Petitioners prayed:

- i. Direct the Respondents to take action pursuant to the Grid Code and devise permanent measures/ system - strengthening, expeditiously in a time bound manner, to overcome the issue of voltage tripping at 220 kV Transmission line connected with Respondent No.1's 220 kV Bhadla GSS.
- ii. Direct the Respondent Nos. 1 and 2 to pay compensation of Rs. 5,80,04,148/- to the Petitioners comprising Rs. 64,04,148.00 (for the period October 2018 to July 2022), towards loss of revenue due to tripping at the 220 kV Bhadla Grid Sub-Station and Rs. 5.16 Crore (calculated till July 2022) towards loss of revenue on account of low generation owing to consistent low voltage at the 220 kV Bhadla Grid Sub-Station, along with interest till date of payment.

6. Respondent No. 1 Rajasthan Vidyut Prasaran Nigam Ltd. (RVPN) and Respondent No. 2 State Load Despatch Centre (SLDC) in its preliminary reply, replies and during hearing has submitted as under:

6.1 SLDC discussed the issue of Low voltage & tripping of 220 kV transmission lines (for evacuation of generation of M/s. Acme) from 33/220 kV Pooling Sub Station of M/s Saurya Urja to RVPN's 220 kV Bhadla GSS in detailed with the representative of M/s. Saurya Urja (SPPD) Respondent No.3 and following direction was issued by SLDC:

- In order to avoid unnecessary trippings of M/s. ACME's solar generation, the under voltage protection installed on the 220 kV transmission lines from 33/220 kV Pooling Sub Station (PSS) of M/s Saurya Urja to RVPN's 220 kV Bhadla GSS must be disabled as there is no provision in IEGC to trip a feeder under low voltage condition.
- The tap position of 33/220 kV step up transformers at Pooling Sub Station (PSS) should be brought down to normal tap position to improve voltage on 220 kV side.
- ACME representative was advised to make sure to inject reactive power in grid by operating their inverter in voltage control mode for compliance of Central Electricity Authority (Technical Standards for Connectivity to the grid) (Amendment) Regulations, 2013, Part-II, clause B2, Sub-clause (1) "must be made by Solar Developers / Generators.

6.2 Some tripping on 220 kV line-1 (PSS to RVPN Bhadla GSS) that occurred, due to enabling of under voltage protection of the line by respondent No.3, cannot be attributed to Respondent No. 1 & 2. After the compliance of CEA, Regulation, 2013 and directions of SLDC by the Solar generators of the petitioner and SUCRL respondent No-3, the 220 kV voltages at both RVPN's 220 kV Bhadla GSS and 220 kV Pooling S/S of M/s Saurya Urja has improved. Since 08.09.2022, full solar generation is being recorded and no under voltage trippings are being observed.

6.3 Northern Regional Load Dispatch Center (NRLDC) held a meeting with the RE developers connected to PG's GSS to discuss low voltage issues, tripping offline ICTs/Inverters of RE plants, Dip in RE generation in transient over voltage and Oscillations in RE pocket of NR grid. In said meeting, it was directed that all the RE developers must adhere to provisions as stipulated in CEA Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2013. It was also pointed out at 2(d) under "RE Plants connected pooling at 765/400/220 kV

- Bhadla(PG)" that ACME Chittorgarh is operating under PF control mode and absorbing MVAR even under low voltage condition at 220kV Bhadla (PG).
- 6.4 NRLDC stated that it is clear from the Plot that Surya Urja Pvt. Ltd. in operating under PF control mode and absorbing around 90-100MVAR even when voltage is below 210 - 215kV at 220kV Bhadla (PG).
- 6.5 It was further discussed and suggested to the RE Generators to review the over-voltage settings and further to disable unnecessary over voltage settings of 220 kV Lines, 220/33 kV ICTs & 33 kV Feeders.
- 6.6 In order to deliberate and resolve issues in relation to low voltage and voltage fluctuations, the Respondent No.1 via its letter apprised the Respondent No. 3 that the NRLDC had vide its meeting had suggested that the solar generators may opt for inverter mode operation/voltage control mode or sufficient capacitor bank may be installed.
- 6.7 Many times it is observed that generator does not support the grid by injecting reactive power when grid voltage is low and drawing reactive power when grid voltage is high. Instead of supporting the grid, the generator draws the reactive power from the grid, when grid voltage is low. Solar plants are not providing required MVAR support. Plants are generally operating in P.F. control mode and not in voltage control mode.
- 6.8 SLDC vide an e-mail had stated that "As low voltage is being recorded at Bhadla GSS (186 KV) and you are drawing 13.10 MVAR, the solar generators at your pooling sub-station may be directed to operate in voltage control mode in order to inject MVAR and maintain the voltage, otherwise solar generation may be restricted up to 80% generation". The said conduct of the Respondents shows the readiness, willingness and promptness to maintain the voltage so that the solar generators get proper and uninterrupted evacuation of power.

- 6.9 There were no tripping at 220 kV GSS RVPN Bhadla end on the 220 kV Saurya Urja Line 1 and 2 from the months of April-2021 to Oct-2022 except due to supply fail from 220 kV Bap and Badsid GSS.
- 6.10 Further, tripping details data of generator M/s ACME Solar connected to pooling sub-station, Saurya Urja w.e.f 18th September 2022 to 15th November 2022 is being duly furnished which clearly depicts that these tripping were duly caused due to cable faults and other reasons which were not under the control of RVPN and SLDC. From the m/o November 2022 to 03 July 2023, tripping has been observed only on four occasions which demonstrates that the plant has been operating without any issues.
- 6.11 Petitioner, ACME had filed a petition No. RERC/1783/2020 before RERC against Respondent No. 3, i.e., Saurya Urja Company of Rajasthan Ltd. (SPPD) on the restriction by SUCRL on "over injection" of solar generation beyond contracted capacity of ACME in the same period (2019-2020 & 2020-2021) as that of the present petition. As such, it is evident from the above petition that there has been no issue of under/low voltage and generation loss due to under voltage during peak solar hours.
- 6.12 Further, It is stated that the technical report filed by the Petitioners has been prepared by "Hitachi Energy India Ltd." which is a private agency who at the behest of the Petitioners.
- 6.13 The Mitigation techniques suggested by the agency along with the response are as follows:-
- (a) Operate in closed Bus Coupler condition: It is not feasible as it may lead to higher fault level at 220 kV Bus and may also reduce system reliability.
 - (b) Introduction of additional 400/220 KV transformer: RVPN has already sanctioned augmentation of 1x500 MVA, 400/220 kV

transformer at 400 kV GSS Bhadla, wherein connectivity to M/s ACME Rewa Solar Private Limited and M/s ACME Jodhpur Solar Private Limited has already been given.

(c) Rearrange the bay: The said mitigation technique suggested by the agency is not practically feasible.

(d) Reactive power compensation agreement: RVPN has sanctioned installation of 98 MVAR (18x5.43 MVAR) shunt capacitors in this region for reactive compensation. RVPN has sanctioned installation of +300MVAR, 400 kV STATCOM at 400 kV GSS Bhadla and +100MVAR, 220 kV STATCOM at 220 kV GSS Phalodi.

7. Respondent Saurya Urja Company of Rajasthan Ltd (SUCRL) in its reply and during hearing has submitted as under:

7.1 Saurya Urja company of Rajasthan Limited (SUCRL) has developed 1000 MW Solar Park in Bhadla Village of Jodhpur District in Rajasthan State. 500 MW is connected to 220 kV GSS Bhadla (STU) through 1 No D/C 220 kV Transmission line Owned, constructed and maintained by SUCRL. Circuit-1 is connected with 200 MW and Circuit-2 is connected with 300 MW.

7.2 Steady State voltage requirement as per CEA Grid Standard is violated with 194 kV as Minimum voltage in Line-01. From May, 22 to January, 23, the minimum voltage recorded is lower than the specified limit of 198 kV in Line 01.

7.3 The real time reactive power injection/absorption support during under/over voltage conditions has improved but not to the requirement of reactive power to be injected as per CEA regulation mentioned in Technical standards for connectivity to the grid for Line-01 in which under voltage is persistent from long time.

- 7.4 There is no compliance towards reactive power support for the Line-02 till December 2022 from Solar Generators (SPD).
- 7.5 With reference voltage of below 200 kV the step-down voltage would be below 30 kV. The recorded range of voltage during solar generation hours is in the range between 170 -190 kV which translates to 25.50 - 28.50 kV. This range of voltage at normal tap position will not allow Central solar inverters to operate in Voltage/PF control mode with full capacity.
- 7.6 Many incidents are recorded when the grid voltage was less than 186 kV, due to which inverters go to sleep mode till required reference voltage is not received.
- 7.7 Setting up of a committee with involvement of SPD/SPPD/SLDC/RVPNL/NRLDC for physical verification and assessment of parameter setting in Solar inverters for supporting reactive power compensation.
- 7.8 Considering Over/Under voltage at Line-01, the Commission may kindly direct RVPN to install STATCOM (Static Synchronous Compensator) for improvement of grid voltage during peak generation. For continued stability in voltage the option of installation of Variable L-C Compensator at 33kV Feeders to be installed at Solar Generators. This will avoid solar generators in losing energy and tripping of Solar inverters. SUCRL had requested for installation of 2x25 MVar Shunt reactor for managing U/O Voltage condition at Pooling substation connected to Main Bus with development cost absorbed by SPD's.
- 7.9 RVPN by its reply dated June 2023 has provided mitigation measures. However, RVPN has not specified:
- a. The timelines for implementation of the above mitigation measures. Whether the proposed new 500 MVA transformer at 400 kV GSS, will

evacuate the 500 MW capacity connected with 220 kV GSS Bhadla. The changes in the network or at substation level (220 kV GSS and 400 kV GSS Bhadla) have not been clarified.

b. Installation of shunt capacitors;

Main problem is at Phalodi due to wind generation affecting the entire power flow.

7.10 Hence, the Commission may kindly direct RVPN to:

a. Implement the above mitigation measures in a time bound schedule;

b. Installation of shunt capacitors at Phalodi.

8 Respondent Solar Energy Corporation of India(SECI) in its reply and during hearing has submitted as under:

8.1 SECI is not a proper party for adjudication of relief sought for by the Petitioner. Any issue involving SECI and RUVNL in the matter is subject to the jurisdiction of the Central Commission as per the law settled by the Hon'ble APTEL in judgement in Appeal no 256 of 2019 and batch in matter of Parampujya Solar Energy Private limited and Another Vs CERC and others.

8.2 The Central Commission has already exercised jurisdiction in regard disputes such as Change in Law claims concerning the petitioners under the PPA and PSA. SECI has submitted the order of CERC passed in petition no 342/MP/2018 and 343/MP/2018 in the matter of ACME Rewa Solar Energy Private V Solar Energy Corporation of India limited and ors.

8.3 SECI has submitted that it should be deleted from array Respondent in the matter.

Commission's view

- 9 Commission has considered the submissions, replies, rejoinders, written submissions and oral arguments made on behalf of the Petitioners and Respondents.
- 10 Petitioners submitted that since 2018, they have been facing extreme over-voltage and under-voltage at the Bhadla GSS leading to abnormal tripping of solar inverters, damage to electrical components and loss in generation. Due to consistent under-voltage issues, Petitioner is unable to generate at its optimum level. Petitioners are connected and exporting power through 33 kV lines to 33/220 kV pooling station of SUCRL(Saurya Urja Company of Rajasthan Ltd.) which ultimately is connected through 220 kV line to Bhadla GSS. Therefore, Petitioner is entitled for compensation of Rs. 5.80 Crore from RVPN for extreme voltage variation.
- 11 Petitioners also submitted that installation of additional 400/220 kV transformer between the Bhadla 400 kV bus and the Bhadla 220kV Bus-B and installation of a Static Synchronous Compensator ("STATCOM") was a solution agreed upon by them which is not being implemented.
- 12 Per contra, RVPN submitted that SLDC discussed the issue of low voltage & tripping of 220 kV transmission lines (for evacuation of generation of M/s. Acme) from 33/220 kV Pooling Sub-Station to RVPN's 220 kV Bhadla GSS in detail and certain directions were issued by SLDC.
- 13 SLDC directed to disable the under voltage protection as there is no provision in IEGC to trip a feeder under low voltage condition, tap position of 33/220 kV step up transformers at Pooling Sub Station (PSS) should be brought down to normal tap position to improve voltage on 220 kV side and to inject reactive power into the grid by operating their inverter in voltage control mode for compliance of Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2013.

- 14 RVPN further submitted that it has already sanctioned augmentation of 1x500 MVA, 400/220 kV transformer at 400 kV GSS Bhadla, wherein connectivity to M/s ACME Rewa Solar Private Limited and M/s ACME Jodhpur Solar Private Limited has already been given and RVPN has sanctioned installation of +300MVAR, 400 kV STATCOM at 400 kV GSS Bhadla and +100MVAR, 220 kV STATCOM at 220 kV GSS Phalodi.
- 15 Respondent Saurya Urja Company of Rajasthan Ltd (SUCRL) submitted that the real time reactive power injection/absorption support from generator during under/over voltage conditions is not up to the requirements of the CEA Regulations. They further suggested that 2x25 MVar Shunt reactor should be installed at pooling substation by generators.
- 16 The Commission observes that Petitioners have raised the issue of grid disturbances / low voltage at the Bhadla GSS and compensation thereof Rs. 5.80 Crore towards loss of revenue. Whereas Respondent partly held generators responsible for this as required reactive support is not being provided by generators.
- 17 For analysing the issue, Commission looked into the Central Electricity Authority (Technical Standard for Connectivity to the Grid) Amendment Regulations, 2013, Part-II, clause B2, Sub-clause (1), which is reproduced below:
- "The generating station shall be capable of supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading."*
- 18 As per the above provision, dynamically varying reactive support by generators is necessary to ensure a reliable voltage level. Voltage and reactive power control have a significant impact on system stability. An

Imbalance of reactive power, i.e., draw during low voltage supply, can lead to voltage instability.

- 19 It is expected that reactive power should not be drawn from the EHV grid under low voltage conditions. In order to improve the overall voltage profile, the generating station shall supply / absorb reactive power so as to have counter balancing action corresponding to low/high grid voltage and to bring it towards the nominal value. Therefore, the Commission directs that Petitioners should make appropriate arrangement to inject or draw reactive power as per Central Electricity Authority Regulations.
- 20 Further, Commission observes that the Respondents RVPN and Saurya Urja Company of Rajasthan Ltd. has submitted that the real time reactive power injection/absorption support from generator during under/over voltage conditions is not up to the requirements of the CEA Regulations. As responsibility is partly held upon the petitioner, therefore, compensation can not be granted to the Petitioner.
- 21 In order to maintain the security of the Power System in day to day operation Grid Parameters, i.e., frequency and voltage should remain close to nominal values. To improve the Grid Voltage, RVPN submitted that they have already sanctioned augmentation of 1x500 MVA, 400/220 kV transformer at 400 kV GSS Bhadla, therefore RVPN is directed to commission the transformer within the specified time.
- 22 The Commission also looked into the Central Electricity Authority (Grid Standard), 2010, which is reproduced below:

"3. Standards for Operation and Maintenance of Transmission Lines.- (1) All Entities, Appropriate Load Despatch Centres and Regional Power Committees, for the purpose of maintaining the Grid Standards for operation and maintenance of transmission lines, shall,-

(a)...

(b) maintain the steady state voltage within the limits specified below in Table 1”

- 23 Further, clause 6.6.4.2 of Rajasthan Electricity Regulatory Commission (Rajasthan Electricity Grid Code) Regulations 2008 also provide as under:

“The SLDC, and the Users shall ensure that the grid voltage remains within the following operating limits as specified in IEGC:

Nominal System Voltage (kV rms)	Grid Voltage (kV rms)	
	Maximum (kV rms)	Minimum (kV rms)
765	800	728
400	420	380
220	245	198
132	145	122
33	36	30

”

- 24 In view of above, it is clear that Grid Voltage should remain within the operating limits as specified in the above Regulations and the responsibility to maintain the Grid Voltage pertains to the Petitioners, Saurya Urja Company of Rajasthan Ltd., RVPN as well as of SLDC.
- 25 Therefore, the Commission directs RVPN and SLDC to take all appropriate and necessary actions to maintain voltage within the specified limits.
- 26 Petition along with IA is disposed of accordingly.

(Dr. Rajesh Sharma)
Member

(Hemant Kumar Jain)
Member

(Dr. B.N. Sharma)
Chairman