

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 265/MP/2012

Coram:

Shri V.S Verma, Member

Shri M. Deena Dayalan, Member

Date of Hearing: 05.03.2013

Date of Order : 20.02.2014

In the matter of

Miscellaneous petition for approval under Regulations 24, 111 and 113 of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 and under section 79(c), (d), (i) and (k) of Electricity Act, 2003 for seeking direction for implementation Grid Security Expert System (GSES) on all India basis.

And in the matter of

Power Grid Corporation of India Limited
B-9, Qutab Institutional Area,
Katwaria Sarai, New Delhi- 110016

...Petitioner

Vs

1. Bihar State Electricity Board
Vidyut Bhawan, Bailey Road,
Patna- 800001
2. West Bengal State Electricity Board
Vidyut Bhawan, Bidhan Nagar
Block-DJ, sector-11, Salt Lake City,
Calcutta- 700091
3. Grid Corporation of Orissa Limited
Shahid Nagar,
Bhubaneswar- 751007
4. Damodar Valley Corporation
DVC Tower, Maniktala,
Civic Tower, VIP Road, Calcutta- 700054.



5. Power Department
Govt. of Sikkim,
Kazi Road, Gangtok -737101

6. Jharkhand State Electricity Board
Doranda, Ranchi- 834002

7. Assam State Electricity Board
Bijulee Bhawan, Paltan Bazar
Guwahati- 781001

8. Meghalaya State Electricity Board
Short Round road, Shillong- 793001

9. Government of Arunachal Pradesh
Itanagar , Arunachal Pradesh

10. Department of Power and Electricity
Govt. of Mizoram,
Aizwal -796001

11. Electricity Department
Govt. of Manipur, KEISHAMPAT
Imphal -795001

12. Department of Power
Govt. of Nagaland,
Kohima -79700, NAGALAND

13. Tripura State Electricity Corporation Limited
Banamalipur, Aratala- 799001, TRIPURA

14. Rajasthan Rajya Vidyut Prasaran Nigam Ltd
Vidyut Bhavan , Vidyut Marg, Jaipur- 302005

15. Ajmer Vidyut Vitran Nigam Ltd
Old Power House, Hathi Bhata, Jaipur Road
Ajmer, Rajasthan.

16. Jaipur Vidyut Vitran Nigam Ltd
Vidyut Bhawan, Janpath, Jaipur- 302005.

17. Jodhpur Vidyut Vitran Nigam Ltd
New Power House, Industrial Area, Jodhpur, Rajasthan

18. Himachal Pradesh State Electricity Board



Vidyut Bhavan , Kumar House,
Complex building II,
Shimla-171002

19. Punjab State Electricity Board
The Mall, Patiala- 147001.

20. Haryana Power Purchase Centre
Shakti Bhawan, sector-6, IInd Floor,
Panchkula (Hayana)- 134109

21. Power Development Department
Govt. of Jammu and Kashmir,
Mini Secretariat, Jammu, J&K

22. Uttar Pradesh Power Corporation Limited
Shakti Bhawan, 14, Ashok Marg,
Lucknow- 226007.

23. Delhi Transco Limited,
Shakti Sadan, Kotla Marg,
New Delhi-110002

24. Chandigarh Administration,
Sector- 9, Chandigarh

25. Uttarakhand Power Corporation Limited,
Urja Bhawan, Kanwali Road,
Dehradun

26. BSES Yamuna Power Limited
Shakti Kiran Building, Karkardooma,
Delhi-110 092.

27. BSES Rajdhani Power Limited
BSES Bhawan, Nehru Place,
New Delhi-110 019

28. North Delhi Power Limited
Cennet Building, Adjacent to 66/11 kV Pitampura-3,
Grid Building, Near P Jewellers
New Delhi- 110034

29. NDMC, Mezzanine Floor
Palika Kender,
New Delhi- 110001



30. North Central Railway,
Allahabad

31. Karnataka Power Transmission Corporation Limited
Cauvery Bhavan,
Bangalore- 560009.

32. Bangalore Electricity Supply Company Limited (BESCOM)
Corporate Office,
K. R. Circle, Bangalore- 560001, Karnataka

33. Gulbarga Electricity Supply Company Limited (GESCOM),
Station Main Road, Gulbarga, Karnataka

34. Hubli Electricity Supply Company Limited (HESCOM)
Navanagar, PB Road,
Hubli, Karnataka

35. Mangalore Electricity Supply Company Limited (MESCOM)
Corporate office, Paradigm Plaza, AB Shetty Circle,
Mangalore-575 001, Karnataka

36. Chamundeshwari Electricity Supply Company Limited (CESCOM)
927, LJ Avenue, Ground Floor, New Kantharaj Urs Road,
Saraswatipuram, Mysore-570 009

37. Transmission Corporation of Andhra Pradesh Limited
Vidyut Soudha, Hyderabad- 500049, Karnataka

38. Eastern Power Distribution Company of Andhra Pradesh Limited
P&T Colony, Seethammadhara,
Visakhapatnam, Andhra Pradesh

39. Southern Power Distribution Company of Andhra Pradesh Limited (APSPDCL)
Srinivasa Kalana Mandapam Backside,
Tiruchanoor Road, Keshvayana,
Gunta, Tirupati- 517501, Chittoor District,
Andhra Pradesh

40. Central Power Distribution Company of Andhra Pradesh Limited (APCPDCL)
Corporate office, Mint Compound,
Hyderabad- 5000063,
Andhra Pradesh

41. Northern Power Distribution Company of Andhra Pradesh Limited (APNPDCL)
Opp. NIIT Petrol, Chethanyapuri, Kazipet,
Warangal- 506004, Andhra Pradesh

42. Kerala State Electricity Board
Vaidyuthi Bhavanam,
Pattom, Thiruvananthapuram- 695004

43. Tamil Nadu Electricity Board
800, Anna Salai,
Chennai- 600002

44. Electricity Department
Govt. of Pondicherry,
Pondicherry-605001

45. Electricity Department
Govt. of Goa,
Viyut Bhavan, 3rd Floor,
Panji, Goa.

46. Madhya Pradesh Tradeco
P.O. Box 34, Rampur
Jabalpur- 482008

47. Madhya Pradesh Audyogik Kandra Vikas Nigam Limited
3/54, Press Complex, Agra- Bombay Rad
Indore- 452008

48. M/s Jindal Power Limited, International Home Deco Park
Plot No. 7, sector no. 127,
Taj Express Way,
Noida- 201301.

49. Maharashtra State Electricity Board
Prakashgad, 4th floor,
Bandra, Mumbai- 400052

50. Gujarat Urja Vikas Nigam Ltd
Sardar Patel, Vidyut Bhawan,
Race Course Road, Vadodra- 390007.

51. Electricity Department, Daman and Diu
Daman – 396210.

52. Electricity Department,

Dadar and Nagar Haveli
U.T. Silvassa -396230

53. Chhattisgarh State Electricity Board
P.O. Sunder Ngr, Dangania, Raipur,
Chhattisgarh- 492013

54. Northern Regional Power Committee
Central Electricity Authority,
18-A, Qutab Institutional Area, Shaheed Jeet Singh Marg,
Katwaria Sarai, New Delhi- 110016

55. Eastern Regional Power Committee
Central Electricity Authority,
14, Golf Club Road, Tollygunge,
Kolkata- 700033.

56. North Eastern Regional Power Committee
Central Electricity Authority,
Meghalaya State Housing Finance Co-operative Society Limited Building
Nongrim Hills, Shillong- 793003.

57. Southern Regional Power Committee
Central Electricity Authority,
No. 29, Race Course Cross Road,
Bangalore- 560009

58. Western Regional Power Committee
Central Electricity Authority,
F-3, MIDC Area, Andheri, Mumbai- 400093.

59. CEO, POSOCO
B-9, Qutab Institutional Area,
Katwaria Sarai, New Delhi- 110016

60. CMD, NTPC
CORE-7, Scope Complex,
Lodhi Road, New Delhi

61. CMD, BBMB,
Sector-19 B, Madhya Marg,
SLDC Complex,
Industrial Area, Phase-I
Chandigarh- 160019.



62. CMD, THDC India Limited
Ganga Bhawan, Pragatipuram, Bypass Road,
Rishikesh- 249201.

63. CMD, SJVN Limited
Himfed Building,
New Shimla- 171009

64. CMD, NHPC
Office complex, sector- 33, Faridabad- 121003

65. CMD, NEEPCO
Brookland Compound,
Lower New Colony, Shillong- 793003

66. CMD, Nuclear Power Corporation of India Limited
16th floor, Centre-I, World Trade Centre,
Cuffe Parade, Colaba, Mumbai- 400005.

67. CMD, Neyveli Lignite Corporation Limited,
No. 135, Periyar E.V.R. High Road, Kilpauk,
Chennai- 600010

68. CMD, DVC
DVC, Headquarters
DVC, Tower, VIP Road,
Kolkata – 700054

69. Central Electricity Authority,
Sewa Bhavan,
R.K. Puram Sector-I
New Delhi- 110066.

.....Respondents

Following were present:

1. Shri Sunil Kumar, PGCIL
2. Shri A.S. Kushwaha, PGCIL
3. Shri N. Nallarasana, NLDC
4. Smt. Jyoti Prasad, POSOCO
5. Shri S. Konar, ERLDC
6. Shri V.Suresh, SRLDC

7. Shri R.B. Sharma, Advocate JSEB and BRPL
8. Shri Uday Shankar, NTPC
9. Shri P.P. Francis, NTPC
10. Shri S. K. Sharma, NTPC
11. Shri Rohit Chhabra, NTPC
12. Shri A.K. Mukherjee, NTPC
13. Shri Somes Bandjopadhyaya, NTPC
14. Shri A. Basu Roy, NTPC
15. Shri Harpreet Sethi, NTPC
16. Ms. Shilpa Aggarwal, NTPC
17. Shri B.S. Bairwa, NRPC
18. Shri S. K. Meena, NHPC

ORDER

The petitioner, Power Grid Corporation of India Limited has filed the present petition seeking approval for implementation of Grid Security Expert System (GSES) on all India basis in consequent to Grid Disturbance on 30.7.2012 and 31.7.2012. The petitioner has made following prayers:

- "(a) Grant approval for implementation of Grid Security Expert System by POWERGRID in all five regions;
- (b) For recovery of the investment as per decision of the Commission in respect of SLDC system for POWERGRID in petition No. 68/2010; and
- (c) Pass such other relief as the Commission deems fit and appropriate under the circumstances of the case and in the interest of justice".

2. The scheme proposed by the petitioner in the present petition is divided into two parts, namely first part is relating to installation of Automatic Defense Mechanism equipped with computer hardware and software and communication system and second part is relating to installation of Fibre Optic Cabling System comprising of OPGW, Approach Cable, Joint Box and associated software for GSES.

3. Consequent to Grid Disturbances, a meeting was taken by Minister of Power with Chief Ministers and Power Ministers of different States of the Northern States on 6.8.2012 where in following was resolved that:

"States will prepare their islanding schemes in consultation with PGCIL, CEA and NRPC within the next three months and ensure their implementation within next 6 months.....Independent third party audit of the protection system shall be carried out within one month and the RPCs shall monitor the same. PGCIL would find and carry out the audit in the first instance."

4. The petitioner has submitted that it had prepared a Detailed Project Report (DPR) for implementation of above scheme through project named as Grid Security Expert System (GSES) based on the inputs given by POSOCO. The project involves installation of knowledge based SCADA System, numerical relays and RTUs up to 132 kV Stations and the reliable OPGW communication system.

5. The gist of the Detailed Project Report is as under:

(a) Objective: The objective of the project is implementation of the Automatic Defense Mechanism to have reliable and secured grid operation.

(b) Project Highlights:

Project	Implementation of Automatic Defense Mechanism and Communication System associated with implementation of GSES
Location of the Project	Pan India
Beneficiary States	All Generators, Transmission Utilities, Distribution companies of India connected to Grid
Project Cost	₹ 1202.11 crore
Monthly Fixed Charges	₹ 21.87 crore
Commissioning Schedule	30 months from the date of Investment Approval

(c) Scope of Work: The scope of work under the project to be implemented as GSES system in all five Regions is as under:

- (i) Installation of Grid Security Expert System equipped with Computer Hardware and Software at each SLDCs, RLDCs and NLDC.
- (ii) Installation of Remote Terminal Units (RTUs cum PLCs), Relays, Digital Tele-Protection Couplers (DTPC) etc. for disconnection of the load/generation.
- (iii) Integration of Numerical relays, DTPC with RTU cum PLCs and in turn to SCADA/EMS system of SLDC, RLDC and NLDC.
- (iv) Installation of Numerical Relays for under Frequency, df/dt relays.
- (v) Installation of Network management System with Hardware/Software at each SLDCs, RLDC and NLDC to monitor the healthiness of equipments including Under Frequency and df/dt relays being installed under this project.
- (vi) Integration with
 - SCADA/EMS system of SLDCs, RLDCs and NLDC.
 - Power System Simulator to Engineering (PSSE) off-line system studies package of SLDCs, RLDCs and NLDC
 - Wide Area Measurement System (WAMS) system of Unified Real Time Dynamic State Management (URTDSM) Project
- (vii) Installation of Fiber Optic Cabling System comprising of Optical Ground Wire (OPGW), Approach Cable, joint Box and Associated hardware.

(viii) Installation of Communication Equipment comprising SDH, Multiplexers and Auxiliary Power Supply.

(ix) Network Management System.

(x) Engagement of Consultant: The GSES system to be implemented at Control centre shall be a knowledge based sensitive module which is not readily available as the off-the-shelf product in the market. Hence a product development module and provision of engagement of consultant is also being kept.

Since the equipments installed at Control Centers for decision making shall be installed in the existing Control Centers of SLDCs/RLDCs, therefore, any major additional support facilities are not required. Similarly, installation of numerical relays, PLCs, DTPC are required to be installed in the existing substations of State Utilities/Generating Utilities, therefore no additional facilities would be required. The actual nos. of relays, sub-stations, feeders etc. covered under the scope of subject project may vary substantially during implementation, as the network of constituents are changing dynamically.

(d) Target Beneficiaries: The proposed GSES scheme would be used primarily as automatic defense mechanism to have reliable and secure Grid operation. The target beneficiaries would be all Generators, Transmission Utilities, Distribution companies of India connected to Grid.

(e) Project Strategy: The project shall be implemented in the similar way as that of any SCADA/EMS system of ULDC phase-II and tariff on the investments for the same shall be recovered from the beneficiaries as per CERC Regulations.

(f) Legal Framework: The project is to be executed as per provisions contained in the Electricity Act, 2003 and rules made thereunder and the Indian Electricity (Supply) Act, 1910 and 1948, Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010, and CERC order in so far as these are applicable.

(g) Project Cost Estimate: The Estimated cost of the project for implementation of automatic defense mechanism based on August, 2012 price level is as under:

S No.	Description	Total Cost (₹ in crore)
1	Basic Cost (incl. IEDC)	334.36
2	Interest during Construction (IDC)	20.10
	TOTAL	354.46

(h) The estimated cost of the project for implementation of communication system based on October, 2012 price level is as under:

S No.	Description	Total Cost (₹ in crore)
1	Basic cost (incl. IEDC)	799.59
2	Interest during Construction (IDC)	48.06
	TOTAL	847.65

(i) The region-wise estimated cost based on the feeders identified by POSOCO including IDC shall be as follows:

S No.	Subject	Northern	Southern	Western	Eastern	North-Eastern	All India
1	Estimated DPR cost of GSES (₹ in crore)	82.59	42.13	124.85	55.42	49.47	354.46
2	Number of Feeders	1064	763	1502	503	410	4242
3	Estimated DPR Cost of OPGW based Communication System (₹. in crore)	141.61	368.37	174.24	83.18	80.42	847.82
4	Length of OPGW	4967	14706	6111	2868	2688	31340
		224.20	410.50	299.09	138.60	129.89	1202.30

(j) The petitioner has also submitted that the actual quantity may vary during implementation depending upon the number of feeders and sub-stations included in the project.

(k) The petitioner has submitted that one of the 12 – points resolution adopted in the meeting (Point 11) was as under:

“POSOCO would evolve a contingency load shedding protocol, especially when non-frequency related load shedding is required.”

(l) The draft template of the same has been prepared considering various scenarios when the system could be under stress. There could be ten different scenarios as under:

i.	Over draws > 12% of schedule or 150 MW
ii.	Under draws > 12% of schedule or 150 MW
iii.	Voltage < 200 kV for more than 5 minutes

iv.	ICT / Line loading crossing limits
v.	Flow crossing TTC and Over drawal
vi.	Loss of generation > 1000 MW
vii.	Angular difference
viii.	Under frequency relays
ix.	df/dt relays
x.	Islanding

(i) **Overdrawals:** All constituents shall normally maintain their withdrawal from the Grid strictly as per schedule. In the event of any deviation of actual withdrawal from schedule greater than a set amount when the system frequency is falling below 50Hz, predetermined radial load/feeders constituting in different identified Groups shall be automatically disconnected on rotational basis by the command automatically generated from the Programmable Logic Controller (PLC) based Expert System located at SLDCs/RLDCs.

(ii) **Over-injection/under-drawal:** Power generating stations shall normally maintain their injection into the Grid strictly as per schedule. In case of State utilities, the under-drawal is also not desirable as it could lead to problems in other parts of the grid. Manual generation reduction through secondary control may be resorted to in Stage-I followed by an automatic signal sent from PLC based Expert System installed at SLDCs/RLDCs to the power stations within the State which can be used for automatically reducing the generation.

(iii) **Under-voltage:** For maintaining system voltage above the minimum limits specified as per Grid Code, Automatic under Voltage Load Shedding scheme

(AUVLS) shall be effected. Bus voltage of 400 kV and 220 kV nodes shall be monitored for this purpose. The UVLS shall be a multi-stage scheme and would trip the designated group of load in case voltage falls below 200 kV/380 kV at the node.

(iv) Line loading crossing set limits: Whenever a trunk line loading crosses normal operation limits endangering system security, designated loads shall be disconnected by operational of System Protection Schemes (SPS). In Stage-I, Manual disconnection shall be resorted to by SLDCs/RLDCs. In Stage-II, automatic load disconnection shall be effected through PLC based Expert System.

(v) Power flows exceeding Total Transfer Capability (TTC): Automatic load disconnection shall be effected in case inter-area flows exceed TTC limits by greater than 100 MW. Based on measurements obtained at RLDCs, SCADA automatic load shedding or generating reduction shall be effected.

(vi) Loss of generation exceeding 1000 MW or loss of high capacity transmission corridor: In case of sudden loss of generation in excess of 1000 MW or loss of high capacity transmission corridor, automatic control action to be initiated through System Protection Schemes (SPS).

(vii) Angular Separation: In case of angular separation between any two identified set of nodes exceeding the cut off value (based on system studies with data obtained from PMUs/WAMS), automatic load disconnection of Groups on rotational basis would be automatically generated from PLC based Expert System located at NLDC/RLDCs.

(viii) Flat frequency Under Frequency Relays (UFRs): Four stages of Automatic UFR load relief as decided in respective RPC forum with Stage-I set at 49 Hz, Stage-II set at 48.8 Hz, Stage-III set at 48.6 Hz and Stage-IV set at 48.4 Hz.

(ix) Rate of Change of frequency or df/dt relays: In case of sudden major loss of generation or isolation of part or full regional system especially of such grid/system is importing power from adjacent systems, the rate of change of frequency protection system shall automatically disconnect pre-identified feeders in its control area.

(x) Islanding schemes: Automatic islanding schemes at 47.9 Hz or below through UFRs to isolate power stations with matching load and dynamic reactive reserves as finalized in respective RPC forums.

6. The petitioner has submitted that GSES shall take the various inputs as listed below:

(a) **The load/generation relief expected.** The data of MW, MVAR, kV, Frequency, Voltage, UI calculation available from real-time SCADA system.

(b) Simulation study save cases for various conditions resulting into knowledge based data-base for the actions required to be taken based on the prevailing conditions.

(c) **Phasor data-** Through PDC installed at RLDC.

7. The expert system shall match the loads/generation and send the command signal to different loads/ generation for getting the relief. The expert System shall be deployed at each SLDC and RLDC. The expert system shall have the knowledge data-base for different simulation conditions and different logic for disconnection. The GSES system shall match the real-time data with knowledge data-base and whenever the condition matches it will trigger the command with the best match conditions of the databank and real time data. While triggering the command it will check the real-time data for the load/generation to be disconnected. In case of load disconnection the command shall be initiated from SLDC and in case of non-functioning of command from SLDC within a stipulated time-frame, the command shall be executed from RLDC.

8. The petitioner has submitted that the communication system have to be reliable, dedicated and fully secured system. It should be monitored and operated in real time.

Therefore, a fast and dedicated communication network based on fiber optics would be required.

9. The Commission vide Record of Proceedings dated 10.1.2013 directed all the Regional Power Committees to discuss the issue of 'implementation of the Automatic Demand Management Scheme at SLDC/distribution company level' as an agenda item within one month and file decisions on affidavit within one week thereafter, after serving the copies thereof on all the constituents of the respective RPC.

10. During the course of hearing on 10.1.2013, the Regional Power Committees of all regions were directed to take up issue of 'implementation of Grid Security Expert System' as an agenda item and file their decisions, after serving copies thereof on all the constituents of the respective RPC.

11. In response, replies have been filed by Maharashtra State Electricity Distribution Company Limited (MSEDCL), Northern Regional Power Committee (NRPC), NTPC Limited, Uttar Pradesh Power Transmission Corporation Limited (UPPTCL), Jammu and Kashmir Power Development Corporation (JKPSDCL), Himachal Pradesh Load Despatch Society, NHPC Limited, Delhi Transco Limited (DTL), Haryana Vidyut Prasaran Nigam Limited (HVPNL), Power Transmission Corporation Limited of Uttarakhand (PTCUL), Uttar Haryana Bijli Nigam Limited, Punjab State Transmission Corporation Ltd (PSPCL), Southern Regional Power Committee (SRPC), North Eastern Regional Power Committee (NERPC), Western

Regional Power Committee (WRPC), Eastern Regional Power Committee (ERPC), Eastern Regional Load Despatch Centre (ERLDC), Damodar Velly Corporation (DVC), Odhisha Power Transmission Corporation Limited, Odisha Power Generation Corporation Limited, Calcutta Electricity Supply Co. Ltd. (CESC), Durgapur Project Ltd. (DPL), Jharkhand State Electricity Board (JSEB) and BSES Rajdhani Power Limited (BRPL).

12. Maharashtra State Electricity Distribution Company Limited (MSEDCL) in its reply dated 21.1.2013 has submitted as under:

(a) In past, there have been huge variations in the estimated completion cost of the various sub-stations and transmission lines by the petitioner. The petitioner should adopt a prudent procedure to make cost estimates of different elements more realistic. CERC may carry out prudence check for various parameters as submitted by the petitioner to determine the monthly tariff for GSES.

(b) O&M Norms for GSES/ Communication System: According to the O&M, it is the responsibility of respective NLDC/RLDC/SLDCs etc. However, the petitioner has not considered any O&M Cost for entire project. O&M is an integral part of tariff and tariff should include the O&M component. CERC may provide the O&M norms for the communication system while framing the proposed regulation for communication system.

(c) Time Line for installation of Communication System: According to the petitioner the project will be commissioned within **30 months** from the date of investment proposal. Therefore, useful life/depreciation rates of these equipments need to be evaluated considering the degree of obsolescence.

(d) Apportionment of Monthly Charges: The petitioner has submitted all users of the communication system including the transmission licensee should share the tariff as the communication system would also be used to transmit operational data of the assets of the users. In this regard, MSEDCL has submitted that sharing of charges for communication system may be based on certain parameters such as capacity handled, length of OPGW, expected benefits and other similar parameters so that unnecessary charges will not be passed on the beneficiary without getting the intended benefits. The details about sharing of charges by the beneficiaries should be clearly specified in the order itself.

13. NTPC Ltd in its replies dated 13.2.2013 and 16.4.2013 has submitted as under:

(a) The present petition is regarding Grid operations which are under the functions of RLDC at Section 28 (b) of the Act. Further, POSOCO has been created for independent system operation of the National Load Despatch Centre (NLDC) and Regional load Despatch Centres (RLDCs). The petition for designing and managing grid operations is being filed by the petitioner, whereas the same is

a function of POSOCO. Therefore, the present petition is not maintainable under the Electricity Act, 2003.

(b) The resolution of the meeting of Chief Ministers of Northern Region was to "evolve a contingency load shedding protocol". However, the present proposal of the petitioner covers number of issues such as generation shedding, including several of which are being addressed separately in various forums such as islanding. The coverage of the proposal may be limited to the resolution made and applicable to Northern Region only. However, the proposal of the petitioner/POSOCO covers all regions and States.

(c) The petition doesn't cover global experience in regard to various suggestions in the petitions such as SPS, Load shedding, Generation tripping at high frequency and has not been backed up by any research work or study from any independent technical expert institution. Several suggestions made in the petition in regard to a complex Grid having multi users and several stakeholders are unilateral and without necessary background work at various technical sub-committees of RPC.

(d) Automatic reduction in load may not be advisable as its units are not working at state of art technology and load adjustment is from the control desk. Abrupt variation in load without the assessment of the healthiness of the unit may

lead to unforeseen failures. All process control loops are not working on auto which necessitates manual intervention for any change in load.

(e) GSES is being conceived as a protection system for several grid conditions which can pose a threat to the security of the Grid. Instead a control system to take care of the current chaos situation needs to be considered. Especially when it is proposed to spend large sums of money we must move in the direction of our long term goal rather than adopt simplistic solutions for the immediate problem.

(f) The intent of operating the grid in a reliable and secure manner would require designing, implementing and refining a control system for constant frequency operation to make the Grid reliable by taking various proactive control measures in normal situations so that they do not mature into emergency conditions in place of reactive emergency protection actions. Addressing credible contingencies through optional planning as mandated in the Grid Code and through revised scheduling and despatch.

(g) Analyzing the root causes of the recent grid failures and comprehensively reviewing the grid protection philosophies which may have become irrelevant in present level of grid interconnections.

14. U.P. Power Transmission Corporation Limited (UPPTCL) in its reply dated 8.2.2013 has submitted that the list of feeders, which may be opened in case of

emergency for Grid Security, was finalized and submitted in the meeting by NRLDC on 8.8.2012. UPPTCL further submitted that since Automatic Demand Management scheme (ADMS) and GSES system are to be implemented in the whole region for security of grid, these scheme should be introduced since the unified scheme, as SCADA has been developed, for uniformity of the scheme. UPPTCL has stated that GSES scheme is silent for high voltage grid contingency which should also be taken care of.

15. Jammu and Kashmir Power Development Corporation (JKSPDCL) has submitted that all the generating stations should lower the generations proportionately to their capacities in the event of load throw, which would result in high frequency and over voltage or otherwise norms should be fixed for implementation by the generating companies. JKSPDCL further submitted that the sudden load throw in the event of opening of lines, etc. due to over-drawals of power by the different entities connected with the system would result in loss to the generating companies. Especially in the case of ROR hydel scheme where spillage of water means a direct loss of revenue. It requires to be seen in the perspective of the long term/short term PPA which it has with other utilities through PTC. Further, the negligence on part of one entity would cause revenue loss to the generating company for no fault of theirs.

16. Himachal Pradesh Load Despatch Society (HPLDS) has submitted as under

(a) Logic: Two groups A and B have been proposed. Since, other sub-station are of lower capacity. To have higher capacity, adjoining sub-station may be grouped and made additional node pts.

(b) Under voltage problem is quite rampant during paddy season i.e. the months of July and August which is largely due to reactive power compensation and it should be taken care of.

(c) HPLDS is agree with the proposals of line loading crossing set limits, power flows exceeding total transfer capacity (TTC) , ICT/line load crossing normal operating limits, flow crossing TTC, Angular difference exceeding cut-off value and UFRs and dt/dt.

(d) With regard to sudden loss of generation, HPLDS has submitted that Himachal Pradesh has only hydro power and its power cannot be increased instantly.

17. NHPC Limited vide its replies dated 6.2.2013 and 4.3.2013 has submitted its comments on draft scheme of GSES as under:

(a) It has been noticed that majority of grid disturbances are due to overdrawal of load and not due to over injection. There is a shortfall of energy and under the present scenarios, backing down of generation of any power station is improper. Further, with the integration of national grid would easily meet the shortfall in any region from the other region.

(b) The generation from power stations is already covered under FGMO/RGMO as stipulated in IEGC. The schedules are being given by RLDC's

and machines are being operated accordingly. Controlling of generation either by SLDC or RLDC is highly unsafe and complicated issue when being done through Remote system.

(c) The proposed "Digital Tele Protection Coupler" (DTPC) shall be implemented with the help of optic fibers and hence consequent cyber security/sabotage aspects cannot be completely ruled out.

(d) In case of ROR schemes, reduction of power shall always cause spillage of water and loss of zero cost energy. Further, backing down of generation may force the machines into unwanted zone of operation which will cause excessive vibration and subsequent damage to the machine. In case of Hydro machines, control of generation from each unit may only be done by the operator of the Power Station. By any other system, units can only be tripped as an Emergency Shut Down.

(e) To control all the generators by SLDC/RLDC from a single remote point is not practical. There should be management of power, strictly as per requirement of grid and creating an alarm in case of violation.

(f) In the first stage, the load shedding control scheme by disconnecting the feeders may be adopted as a pilot project by SLDC's/RLDC's and further action taken accordingly based on the feedback of pilot project.

18. Delhi Transco Limited (DTL) in its reply dated 12.2.2013 has submitted that with reference to the meeting held on 7.2.2013 at NRPC on implementation of GSES and ADMS, in which the representatives of SLDC, Delhi, Delhi STU and Delhi Discoms were present, views of distribution companies have already been expressed and the details provided by TPDDL on behalf of Delhi Discoms are as under:

(a) Almost all mechanisms proposed under the GSES mainly suggest for load management at Discom end to control grid parameters. There seems to be an indication that load management is the only solution to safeguard grid from any disturbance. There is no mechanism proposed for:

(i) Automatic control over Generators ramp-up/ramp-down as per system requirement (as per IEGC)

(ii) Automatic controlling reactive power consumption devices and OLTCs at transmission level.

(iii) Automatic opening and closing of transmission lines as per prevailing voltage conditions.

(iv) Automatic reactive power compensation by generators.

(b) GSES, as proposed by POSOCO, mainly appears to be a duplication of already existing defense mechanism in the system. In Delhi, "State of the Art Load Management Scheme" as provided in the Grid Code have already developed and successfully tested by Discoms. These schemes have been

designed in such a way that most of the critical and important loads have been exempted from shedding. Any new mechanism will not only be an additional burden to Delhi consumers but may also disrupt supply to critical installations.

(c) There is no necessity of additional control for above activities rather it is required to improve following areas.

- (i) Accuracy and timely updation of Scheduling by NRLDC/ SLDC.
- (ii) Accuracy of measurement of grid parameters
- (iii) Connectivity and data transfer by expediting interconnection of SLDC and Discom SCADA for better monitoring.

(d) There are provisions of automatic load disconnection at Discom level to limit overloading of elements inside the Discom Limits. Since, all the loads are managed through centralized control centre, there is no delay in execution of load disconnection in case of any element overloading in the system. Further, SPS have been implemented in Delhi system whenever required.

(e) The Delhi Islanding scheme has been finalized and necessary requirements are being met by all the Discoms, therefore, an additional system would only complicate the existing system.

19. Haryana Vidyut Prasaran Nigam Limited (HVPNL) in its submission dated 20.2.2013 has submitted that since all ten scenarios of GSES (Over-drawals, Over-injections/ Under-drawal, Under voltage, Line loading crossing set limits, Power flows

exceeding total transfer Capability, Loss of Generation exceeding 1000 MW or loss of high capacity transmission corridor, Angular separation, Flat under frequency relays, df/dt relays and Islanding Schemes) involve automatic feeders disconnection, there is no need of implementing automatic demand management scheme by the States where the scheme is yet to be implemented. GSES is to be implemented by POSOCO in three years time and if States also proceed with separate automatic demand management scheme it may result in duplicity and financial loss. HVPNL has further submitted that the backing down in generation would be implemented by sending a signal or alarm (indicative provision only) by GSES and there would be no automatic variation of generation which will be done manually by generating station on receiving the signal. The same can be intimated telephonically also and there is no need of GSES to give signal only to generating station.

20. Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL) in its submission dated 12.2.2013 has submitted that at present the Discoms are manually shedding the load as per the system requirement, ISGS and the provisions of Grid Code. Efforts are being made to minimize the response time. However, Automatic Load Shedding is implementable at 66 kV and above level by providing PLC as indicated in Grid Security Expert System of Automated Defense Plan for secure operation of Grid as calculated by POSOCO. UHBVNL has further submitted that demand forecasting and power planning is being done for long term, medium term and short term (day ahead basis) in consultation with HVPNL.

21. Power Transmission Corporation Limited of Uttarakhand (PTCUL) in its submission dated 5.2.2013 has submitted that Automatic Demand Disconnection Scheme can be implemented, -

(a) After receiving information, SLDC will re-arrange four or more groups of 33 kV sub-stations as per the list of the point No.-2, so that each group shall give a relief of 50 MW in one time without affecting loading pattern of primary sub-stations.

(b) SLDC will fix the priorities and the number of hours of opening the load in consultation with UPCL.

(c) PTCUL shall continue their control and monitoring officers/officials group which will work in co-ordination with SLDC and will monitor drawal and schedule of Uttarakhand State in real time round the clock.

(d) Whenever there is a significant gap between demand and schedule (more than 12% of schedule in block of 15 minutes) SLDC will flash message to control and monitoring group as constituted by PTCUL to reduce load by opening groups of 33 kV secondary sub-stations. This load dis-connection can also be implemented by PTCUL on their own decision without waiting for our instructions under intimation to SLDC while monitoring demand schedule gap.

(e) This load disconnection shall be implemented by PTCUL by giving messages to concerned EE/SDO/JE and SSO in-charge of the secondary sub-stations as per the framed group.

(f) The procedure of flashing messages to concerned EE/SDO/JE and SSO in-charge of PTCUL shall be simultaneous computer generated to reduce load relief time.

(g) SLDC will watch that even after 5-10 minutes of instructions given to reduced load, if the desired relief is not obtained, SLDC will pass message to primary sub-stations for opening the feeders.

(h) After exercising the load disconnection scheme as designed above, if the sufficient relief is not obtained and frequency goes below 49.5Hz, SLDC will implement its own contingency plan for getting relief by opening 132 kV sub-stations as per plan.

(i) PTCUL shall ensure that overdrawal does not exceed beyond prescribed limit as per the relevant regulation.

22. Punjab State Transmission Corporation Limited (PSTCL) has submitted as under :

- (a) GSES scheme should only be limited to the load shedding. To reduce the generation, a remote command may interfere with RGMO/FGMO mode of operation of machines.
- (b) The selection of feeders for under voltage load shedding should be limited to high MVAR drawing feeders. The existing load shedding schemes already in existence need to be reviewed in the above context.
- (c) The feeders already covered under each SPS Scheme should also be wired for Stage-I automatic load shedding under GSES.
- (d) Load shedding should only be carried out through the proposed GSES Scheme. The control of Generating Units should remain at plant level on manual mode or through FGMO mode.
- (e) The selection of feeders for angular displacement should be as per the requirement of the system instead of opening of groups on rotational basis.
- (f) The setting of UFR should be reviewed w.r.t. the existing operating range of system frequency. GSES logic should be applied to the existing UFR based feeder for stage-I load shedding. The existing UFR relays should remain to be wired for a back up stage-2 load shedding.

(g) GSES scheme logic should be applied to the existing df/dt based load shedding feeders and should be wired for stage-II load shedding.

(h) Islanding scheme is being dealt separately.

23. Southern Regional Power Committee vide its affidavit dated 15.2.2013 has submitted that in the special meeting of Technical Co-ordination Committee (TCC) held on 11/12.2.2013 on implementation of Grid Security Expert System, the following decisions were taken:

(a) Implementation of GSES in Southern Region was agreed by the utilities in principle ;

(b) In view of the protocol issues involved, ELDC should have over riding powers to decide the feeders etc.;

(c) Funding of GSES proposed to be carried out through PSDF. States expressed their inability to fund the scheme on account of severe financial constraints.

(d) Detailed engineering of GSES should be done in consultation with the States for finalization of Bill of Quantities (BoQ);

(e) SLDC should have over riding powers to decide the feeders etc.;

- (f) On account of enormity of communication requirements, Power Grid could explore any other alternative with due redundancy;
- (g) Detailed State-wise meetings are to be held with the utilities as part of the detailed engineering;
- (h) In case of existing SCADA systems at SLDCs, only the up-gradation part along with associated communication system needed to be carried out;
- (i) The State of Kerala suggested tripping of feeders at 11 kV level also to increase the number of feeders and also to minimize the effect on any distributed generation;
- (j) Some of the generating units may not be adaptable for accepting control signals for participation in GSES;
- (k) Intermittency of wind generation vis-a-vis requirement not to change drawal by more than 100 MW was a huge challenge;
- (l) Overlapping of four groups of interruptible loads was inevitable; and
- (m) The following decision were taken in TCC of SPRC:
 - (i) Implementation of GSES in Southern Region was agreed in principle.

- (ii) Funding of GSES requested to be carried out through PSDF.
- (iii) Detailed engineering of GSES to be done in consultation with the States for finalization of BoQ
- (iv) SLDC should have over riding powers to decide the feeders etc.

24. North Eastern Regional Power Committee (NERPC) in its submission dated 13.2.2013 has submitted that following decisions were taken in TCC of NERPC:

- (a) All constituents agreed in principle to the technical requirement of the GSES scheme for NER Grid.
- (b) The basic infrastructure at most of the sub-station like circuit breakers, protection relays, etc. are not adequate for implementation of the scheme.
- (c) There are no full fledged SLDC's in Arunachal Pradesh, Manipur, Mizoram and Nagaland.
- (d) Funding is major concern as NER States are financially weak.
- (e) The quantum of UFR based load shedding needs to be relooked for NER States.
- (f) More deliberations on technical and commercial issues are required before formulation/implementation of the scheme.

25. Western Regional Power Committee in its submission dated 28.2.2013 has submitted that in the 22nd WRPC meeting held on 26.2.2013 on implementation of ADMS at SLDC/Discom level and Grid Security Expert System, the following decisions were taken:

- (a) WRPC agreed to the implementation of GSES and ADMS in principle.
- (b) Since ADMS is a subset/part of GSES, same will be implemented along with GSES.
- (c) Settings of frequency based defense mechanisms and quantum of load shedding etc., needs to be co-ordinate with other regions of NEW grid.
- (d) Manual load shedding, automatic load shedding by demand management and load shedding under AUFLS and df/dt of GSES requires being co-ordinated with appropriate agencies to avoid overlap and have clear distinction between manual actions and automatic control actions.
- (e) Logic, technology, communication facilities, funding and controlling agencies needs to be addressed.
- (f) Possibility of including WAMS data in the above schemes requires to be explored.

(g) To discuss the above issues, a group comprising of representatives of concerned agencies at appropriate levels shall be formed and recommendations of the group shall be submitted to WRPC for vetting and approval.

26. Eastern Regional Power Committee in its submission dated 1.3.2013 has submitted that on 5.2.2013, a separate meeting on ADMS and GSES was held and the following deliberations were made during the meeting:

(a) The house was informed that on recent grid disturbances on 30/31.7.2012 the subject matter carved out its own niche in today's' complex grid scenario.

(b) House noted that CERC direction has put further urgency to the implementation of the same.

(c) The representatives of ERLDC and the petitioner gave presentations on ADMS and GSES scheme. During presentation speakers elaborated the importance of ADMS for grid security and requested significance attention from all stakeholders. It was understood that ADMS and GSES are more or less synonymous terms.

(d) Threadbare deliberations were held. Several queries/doubts raised by the constituents were answered by honorable Speakers. Constituents were agreed in-principle for implementation of ADMS and GSES.

(e) It was decided that all utilities will submitted their views by 17.2.2013 on NLDC document regarding "Automatic Defense Plans for the All India Electricity Grids" (already uploaded in ERPC website) which same will be discussed in ensuring OCC meeting to be held on 18.2.2013.

(f) Constituents requested the petitioner to submit case studies on the subject in ensuing OCC meeting to be held on 18.2.2013 to appreciate the benefits of ADMS and the petitioner was agreed for the same.

27. Eastern Regional Power Committee further submitted that in 82nd OCC meeting held on 18.2.2013 on ADMS and GSES, following deliberations were made :

(a) ERLDC gave the presentation on behalf of the petitioner.

(b) Constituents felt that without effective automation in SLDC control area the implementation would not be feasible and unless exact schemes with objective set-up are finalized/placed it would not be possible to assess the fund requirement for this automation. OCC felt that under present day complex grid scenario, automation operation is necessary. However, before finalizing, detail deliberation is required considering technical feasibilities along with the cost-benefit analysis of ADMS and GSES.

(c) OCC requested all the constituents to send their views on NLDC document of "Automatic Defense Plans for the All India Electricity Grids" to CERC with a copy to ERPC positively by 28.2.2013.

28. Damodar Valley Corporation Limited (DVC) has submitted that there are following constraints in the proposed scheme:

S. No	Remarks	Constraints
1	<p>(a) DVC has an existing plan for carrying out load-shedding/load-regulation at CLD in four (4) groups. Such scheme is implemented rotationally on daily basis based on generation-demand short-fall (Partly frequency related, $f < 50\text{Hz}$) but manually.</p> <p>(b) Again at what frequency ($< 50\text{Hz}$) "Auto-DMS should start not specifically indicated.</p>	<p>(a) The load of DVC system is fluctuating of the order of 70-80 MW due to connection of Large Steel Plant like, Bokaro steel plant, Durgapur steel plant, IISCO, Tisco & Jindal as well as Railways feed at 9-points.</p> <p>Variation more than 12% of schedule is a natural tendency and is being experienced daily.</p> <p>(b) Total Power cut (through PLC) to steel industries, (other than large ones) may create huge loss to the industries. DVC imposes only load restriction up to 90% to such other steel industries as a measure of 'Demand control'. Therefore, State load feeders (JSEB+WBSEDCL) of around 350 MW including UFLS feeders is available for Auto-DMS.</p> <p>If UFLS feeders are to be excluded from Auto-DMS then no feeders will be left to put under Auto-DMS scheme.</p> <p>(c) Most of the sub-stations are comprised of different categories of load such as coal mines, gassy mines, other steel industries, JSEB/WBSEDCL State feeders and Railways etc. So, large number of relays would be required for segregation at each sub-station (DVC has 10 nos. 220 KV sub-station, 17nos. 132 KV sub-station, 27 nos. 33 KV sub-station and receiving sub-station).</p> <p>(d) Who is to develop such Auto-DMS scheme?</p> <p>(e) Additional expenditure for such scheme is</p>

		<p>difficult to arrange at present by DVC, as DVC is under high financial stress for huge capacity addition. It is proposed that PSDF or similar such fund may be arranged by ERLDC/ERPC/MOP for DVC, if such Auto-DMS is to be implemented.</p> <p>(f) $\Delta P > 150\text{MW}/12\%$ of schedule at $< 50\text{Hz}$ is not feasible in DVC system for reason stated above. However, DVC carry out load shedding as required under low frequency ($f < 49.8\text{Hz}$) and/or above 12% over-drawl as per regulation/IEGC.</p>
2	Power station like DSTPS and MTPS-B are running in FGO/RGMO mode. Unit-4, 5 and 6 of Mejia –A can be run on RGMO mode.	Units-1, 2 and 3 of Mejia-A need modification of its C and I and EHG system to make it compatible for FGMO/RGMO mode of operation. While introduction of EHG and C and I system for other power stations such as CTPS, BTPS and DTPS is not feasible and for which DVC has approached CERC for exemption.
3	For Voltage $<$ IEGC band, VAR generation is sought from generators or load shedding carried out as required. However, such occasions are rare and getting minimum day by day.	Technical possible but again lot of investment is required.
4	When ICT/Line loading is crossing normal operating limits, DVC carry out required shedding to relief such ICT/Line loading, but manually	Technically possible but again lot of investment is required and too much such automatic control in respect of $P > 150\text{MW}/f < 50\text{Hz}$, Voltage $<$ IEGC band and ICT/Line over-loading may create problem, specifically for very limited number of feeders available for shedding in DVC.
5	Flow crossing TTC may entail introduction of 'SPS' to DVC generators. Earlier also such proposal was undertaken by ERLDC, but commissioning of few new 400 KV lines in ER relieved DVC from such 'SPS' scheme.	Technically possible but again investment is required. However, if 'SPS' is genuinely required in future, DVC may invest.

6	Sudden loss of generation > 1000 MW or of high capacity corridor may entail DVC to take measure in the form of 'SPS'.	Technically possible but again investment is required. However, if 'SPS' is genuinely required in future, DVC may invest.
7	While 'Angular difference exceeding cut off value' actions to be taken by SLDC not very clear at this point of time.	<p>(a) Clarification in respect of following are required:</p> <p>(b) Locations of primary sensors (Synchrophasor) and PDC across DVC network in conjunction with CTU network and cut-off value of 'Angular difference'.</p> <p>(c) Who is to design and develop the scheme?</p> <p>(d) The role of ERLDC for ER network and role of SLDC.</p>
8	UFR 1: 49.0 Hz UFR 2: 48.8 Hz UFR 3: 48.6 Hz UFR 4: 48.4 Hz	Such UFR scheme is already implemented with a little difference in frequency. Is this one separate?
9	Df/dt: 49.9 Hz plus 0.1, 0.2 Hz/sec. This is not clear.	Df/dt relay is included in the proposed Islanding scheme of CTPS-A only.
10	Islanding at 47.9 Hz.	CTPS-A: Islanding at 47.8 Hz and 47.5 Hz has been approved by TCC and ERPC forum

29. Odisha Power Transmission Corporation Limited has submitted as under:

(a) Intra-State ABT in the State has been implemented with effect from 1.4.2012 for all the distribution licensees.

(b) Since the Discoms do not have adequate infrastructure for implementation of demand management by their own, demand regulation if required, is being made from the Grid sub-stations of OPTCL by isolating 33/11 kV feeders on rotational basis as per the advice of Discom(s). Accordingly, demand management schedule has been prepared for 33/11 kV feeders for implementation whenever required.

(c) Besides the above, numeric Under Frequency Relays have been installed at grid sub-stations as contingency arrangement for facilitating demand disconnection in case of falling frequency. These are in addition to the Under Frequency Relays for isolation of State's share of load at different stages of frequencies.

(d) In case of outage of major generating unit(s) (State/ISGS) and under other contingency conditions, some of the 132 kV feeders have been identified for manual disconnection. However, this disconnection is being done apportioning to the respective Discom share to have equitable distribution of restriction. The list of such feeders has already been submitted to ERPC.

(e) Automatic Demand Management Scheme by applying the required logic to isolate the identified in case of over drawal under falling frequency condition is under examination.

30. Odisha Power Generation Corporation Limited (OPGCL) in its submission dated 28.2.2013 has submitted that OPGCL had examined NLDC documents on 'Automatic Defense Plans for the All Indian Electricity Grids. The islanding scheme for IBTPS is already implemented and exists using LADR technique. However, there is no islanding scheme implemented so far. LADR technique may not work properly. It has been constantly following up with OPTCL and SLDC to implement the islanding scheme based on over/under frequency combined with rate of change of frequency as per set value normally followed for other generating units.

31. Calcutta Electricity Supply Company Limited (CESPL) in its submission dated 13.2.2013 regarding ADMS has submitted as under:

(a) As per the Grid Code, the scheduling/rescheduling of drawal/injection from the grid is done on a regular basis and close liaison is maintained round the clock.

(b) Automatic shedding of matching load in case of tripping of generating unit has been arranged. It prevents sudden and unwanted overdrawal from the grid.

(c) Islanding generation system with matching load in case of very low or very high frequency and /or major fault/instability in the grid has been provided.

(d) There are other stages of under-frequency based on load shedding as per requirement of grid to prevent any system collapse.

(e) There are provisions of Special Protection Scheme by which loads are automatically shed and also arrangement for automatic shedding of bulk load in case of tripping.

(f) The switching off selected feeders at all major sub-stations from Control Room through SCADA is possible.

(g) In case of emergency shedding bulk load (entire sub-station) from Control Room through push button could be done.

(h) Communication arrangements for all the above schemes are through our own optical fibre cables.

32. Durgapur Project Limited (DPL) in its submission dated 1.2.2013 has submitted that it maintain its own generation comprising of industrial and domestic load in the ratio of 85:15. In the event of shortage in generation, it procures power from WBSEDCL as per agreed schedule to supplement the shortage and over drawl are immediately controlled in order to maintain system stability. DPL has submitted that for the demand

management purpose, it has identified the following areas for unscheduled load shedding/ load restriction depending on quantum of load over drawl:

- (i) Shedding of domestic load (WBSEDCL Bhiringi and DPL area) to the tune of 30-40 MW from DPL sub-stations.
- (ii) Imposing load restriction/unscheduled load shed of selective industrial feeders from the sub-stations.

33. During the course of hearing on 5.3.2013, the representative of NERPC submitted that on 9.2.2013 following decisions were taken in the TCC meeting of NERPC:

- (a) All constituents agreed in-principle to the technical requirement of GSES scheme for NER grid;
- (b) There are no full fledged SLDCs in Arunachal Pradesh, Manipur, Mizoram and Nagaland;
- (c) Funding of the scheme was considered a major concern as NER States are financially weak;
- (d) The quantum of UFR based load shedding needed to be relooked for NER States; and
- (e) More deliberations on technical and commercial issues are required before formulation/implementation of the scheme.

34. Learned counsel for JSEB and BRPL submitted that the petition is premature due to following reasons:

(a) Maintaining grid security is the responsibility of POSOCO. However, present petition has been filed by CTU.

(b) There are issues of duplicity and funding of the scheme;

(c) As the defense system already exists, there is no need for putting more defense systems.

(d) POSOCO is not implementing the relevant regulations to make the grid secure.

(e) Cost of scheme has not been approved by the Board of the petitioner.

(f) Cost benefit analysis has not been furnished by the petitioner to the respondents.

35. During the hearing, the Commission observed that all the technical issues should have been discussed and sorted out at RPC level. JSEB/BRPL were directed to file their submissions on maintainability of the petition. If number of constituents submit similar objections, NRPC shall discuss the issue in the Technical Committee Meeting and resolve them. CTU was directed to submit the following information/clarification:

(a) Clear demarcation between Automatic Demand Management Scheme and GSES, indicating voltage level at which both the schemes will operate; and

(b) Duplicity, if any, between the two schemes, in general and particularly with reference to optic fibre network proposed in Unified Load Despatch and Communication scheme.

36. The representative of NTPC submitted that in any power system there are two levels of action to ensure safe and secure operation of the Grid viz. a layer of control system and a protection system. The power system is designed considering credible contingencies and the control system as designed should ensure that the system operates with the desired degree of reliability. The protection system comes into play only when the control system fails to achieve its function or when events far in excess of the credible contingencies occur. Various reactive emergency protection actions identified in the petition should rather be handled through proactive measures in normal situations so that such emergencies do not occur. Therefore, emphasis should be to evolve an adequate control system comprising adequate secondary controls.

37. NTPC was directed to file the technical issues, which need to be clarified, by CTU and discuss them in NRPC. NTPC and Distribution Companies were further directed to send their views to the petitioner, with advance copy to NRPC Secretariat. NRPC Secretariat was directed to discuss these issues in its technical Coordination Committee meeting and submit the deliberations and conclusions to the Commission

38. The petitioner vide its affidavit dated 13.5.2013, in response to the queries of the Commission vide ROP dated 5.3.2013, has submitted as under:

(a) As per Regulation 5.4.2 (d) of the Grid Code, Automatic Demand Management Scheme is to be implemented by SLDCs through SEB/Distribution licensee which may be linked with the tariff also. In the proposed GSES system mostly 132 kV and above sub-stations as identified by RLDCs based upon the information available with them have been included which are subject to change based upon the comments of SLDCs/STUs.

(b) The petitioner through GSES scheme has proposed for automation of the scheme from SLDC/RLDC in line with the Regulation 5.4.2 (c) and (h) of the Grid Code within the area of CTU and STUs. Under this GSES scheme, in place of issuing direction to STUs, the feeders of STUs shall be automatically disconnected or the signal shall be sent to generators for backing down from SLDC/RLDC after expiry of time limit defined by the Grid operator under contingency conditions. Hence, GSES logic had provided for time delays; so if ADMS and distress manual actions were effective this logic of GSES is expected to come into play only in very rare cases.

(c) The present process is manual and by the time RLDC instructions are passed on the lowest level in the hierarchy where the actions is to be taken the grid parameters further deteriorates in many cases. GSES shall enable centralized action thereby considerably reducing the time of action. GSES shall

facilitate the tripping of feeders from SLDCs/RLDCs manually as well as automatically. The operation shall be kept automatic as long as logics required to trip a particular feeder can be accurately defined as is being done presently in SPS schemes. GSES envisages that whenever the measures taken by the distribution companies are not adequate for secure grid operation, SLDC can disconnect the feeder automatically through GSES system. In case, SLDC fails to do so due to any reason the feeder disconnection can be done from RLDC.

(d) The comparison of the Automatic Demand Management Scheme (GSES) system has been summarized in table given below:

S No.	Subject	Automatic Demand Management	Grid Security System
1	Responsibility	Distribution Licensees	RLDC/CTU/SLDC/STU
2	Voltage level	Distribution level	STU/CTU system level
3	Operation Frequency	Routine and emergency Exercise based on demand and Forecast mismatch, day to day mismatches, etc.,	Emergency Situation based on Grid Parameters violation
4	Operation Elements	Opening of distribution feeders	<ul style="list-style-type: none"> • Opening of radial EHV line • Feedback to Generators for increasing or decreasing generation
5	Tools Required	SCADA, Load Forecasting	SCADA System Study, PMU data, Numerical relays for UFR, df/dt, Remote Tripping.
6	Real time monitoring	Available in some DISCOM	Centralized scheme for monitoring the defense mechanism like health check. Coordinated Relay settings from one location. Not available at present.

(e) The under frequency and df/dt relays are installed widely to provide the relief to the grid in case of emergency. It is essentially required that under frequency relays are kept under healthy condition so that they operate whenever required and these relays are required to be continuously monitored which is not possible manually. The GSES shall facilitate monitoring of these relays from SLDCs/RLDCs in real time and shall generate alarm the moment a relay becomes faulty.

39. With regard to the second query regarding duplicity between two scheme, the petitioner has submitted that the Fiber Optic links proposed under GSES has not been included under any other scheme. During implementation, it shall be again verified in consultation with State utilities that there is no duplication. In case of GSES, all the Fiber shall be installed on constituent's lines only and the constituents can also verify under any stage that there is no duplicity. SCADA/EMS system installed under ULDC Scheme cannot take care of monitoring of the Numerical relays and software support for logic development required under GSES. However, the proposed GSES software shall be integrated with ULDC. GSES shall involve automatic disconnection of large number of feeders which shall require development and modification of logics it would be prudent to have separate system SCADA system for GSES. The petitioner has further submitted that DPR for GSES has been prepared based on the details given by NLDC which further require review by all the constituents at RPC level. The petitioner requested the Commission to direct constituents to finalise the feeders and generators on priority so that implementation process may be started.

40. BSES Rajdhani Power Limited (BRPL) vide its affidavit dated 5.4.2013 has submitted that the need for the GSES and its justification as provided in the Detailed Project Report (DPR) GSES Project is enclosed with the petition. The relevant portion is reproduced below for ready reference as under:

"It may be observed that in spite of consistent efforts by RLDCs, it has not been possible to get the desired supports in terms of load relief from State Utilities or Generator Utilities. In the recent CERC order dated 30/07/2012 as elaborated above, RLDCs has been authorized to take the necessary steps for operating of the feeders. In view of the recent Grid disturbances, failures of self defence mechanism system like Under Frequency relays, df/dt relays, free governor operation it is the need of the hour that a GSES is implemented to automatically disconnect the loads or the generation depending upon the criticality of Grid based upon Real Time information. Under this proposal Generation disconnection has invariably been used for the backing down of the Generators or Tripping of the Units similar to SPS implemented in all the Indian Power System. This GSES system shall be implemented in all the five regions of the country which shall enable all SLDCs and RLDCs/NLDC to manage the load disconnection/generation disconnection automatically."

As it is evident from the above, the desired supports in terms of load relief from State Utilities of Generator Utilities is not forthcoming owing to the failure of self defense mechanism system like Under Frequency relays, df/dt relays, free governor operation. Accordingly, a GSES needed to be implemented to automatically disconnect the loads or the generation depending upon the criticality of Grid. This is most strange argument of the Petitioner as the alleged failure of oneself defense mechanism should not automatically lead to provide another self defense mechanism with a heavy capital cost. The petitioner in its anxiety to get regulatory approval to the proposal has not even given any consideration to the relay settings, their co-ordination, upkeep and maintenance of the self defense mechanism system like Under Frequency relays df/dt relays, free governor operation.

41. BRPL has further submitted that under section 28 of the Electricity Act, 2003 Regional Load Dispatch Centre/POSOCO are required to maintain the grid security in real time mode. This Statutory function cannot be entrusted to the petitioner by allowing it for implementation of GSES. At the best, CTU can provide communication links for GSES. Thus, the role of the petitioner-CTU in the implementation of the GSES is very limited.

42. BRPL has submitted that the problems faced in the implementation of GSES are some fundamental technical and legal issues, which have been left unanswered in the petition. Even the consensus could not be arrived in NRPC forum for implementation of GSES as brought out in the Record of Proceedings of the hearing held on 5.3.2013 in the petition. This is, inspite of the fact that the meeting of the Hon'ble Chief Ministers/Power Ministers of different States of Northern Region adopted 12 resolutions as mentioned in the petition. The petitioner, under these circumstances, cannot be vested with the implementation of the GSES with huge capital investment of ₹ 1202.30 crore.

43. In response to BRPL reply, the petitioner in its rejoinder dated 27.5.2013 has submitted as under:

- (a) DPR submitted for proposed GSES system shall have facility to monitor the status of relays from SLDCs/RLDC. In GSES system Numerical Relays has

been proposed and this would have facility to coordinate the relay setting from SLDC.

(b) O&M philosophy proposed for GSES system is similar to practices being followed for Unified Load dispatch and Communication System as decided by CERC in its order dated 8.12.2011 in Petition No. 68/2012.

(c) As per Section 38 of Electricity Act, 2003 the functions of CTU is to discharge all functions of planning and co-ordination relating to inter-State transmission as well as to ensure development of an efficient, co-ordinate and economical system of inter-State transmission lines for smooth flow of electricity from generation stations to the load centers; GSES system flow of electricity security of the Grid in case of contingency so that smooth flow of electricity from generation station to the load centers is ensured with minimum interruption. Accordingly, CTU is discharging its responsibility. Further, CTU is implementing the up-gradation of SCADA/EMS system. Communication system and SPS etc. for SLDCs and RLDCs are similar in nature and covered under the mandate of Section 38 of Electricity Act, 2003.

44. The petitioner in its rejoinder dated 28.5.2013 to the replies of NTPC, BRPL and MSEDCL has submitted as under:

(a) The Commission in its order dated 3.5.2013 in Petition No. 47/MP/2012 has already dealt the issue in detail. The root cause of the Grid disturbance

occurred on 30/31.7.2012 has been investigated by the enquiry committee constituted by Government of India. The issues raised by the respondents are also being considered by CERC in Petition No. 167/SM/2012.

(b) The tripping of generators was discussed in the special meeting for GSES at NRPC level on 7.2.2013 in which representative of NLDC clarified that reduction in generation at ISGS was not envisaged under 2nd scenario namely over-injection/under-drawal. However, reductions in generation might be a requirement under scenario 5 and 6 (system Protection Schemes). NLDC clarified that to begin with even the generation of State's generating stations will not be regulated from remote but only a signal will be communicated and operations for reduction of generation will have to be carried out by the operators at power stations. The representative of NLDC added that with the advancement of technology and consent of generating utilities, in future the issues of automatic reduction in generation might be considered.

(c) GSES system shall be designed to have enough flexibility to accommodate the changed regulatory requirements and future augmentation programs. Some provision has been made in the DPR for engagement of consultant during project execution under the scope of work.

(d) Discussions on GSES have been held in all RPCs in various Committees like OCC, Special Meeting for GSES, and TCC at RPC level and respective RPCC has submitted their outcomes of discussion to CERC.

(e) The system shall be designed to have enough flexibility to accommodate the changed regulatory requirements and future augmentation programs as decided by system operators. The petitioner would comply with the Commission's directions while implementing the scheme.

(f) The estimated cost has been calculated based on the recently awarded cost of the SCADA/EMS and communication projects being executed by Power Grid which is the normal practice being followed for such kind of projects. The Commission in its order dated 8.12.2011 in Petition No. 68/2010 has already directed to its staff to frame the regulations for the communication systems for new projects.

(g) The O&M philosophy proposed for GSES system is similar to practices being followed for Unified Load Dispatch and Communication System as decided by the Commission in its order dated 8.12.2011 In Petition No. 68/2012.

Analysis

45. We have considered the submissions of the petitioner and the Respondents and perused the documents on record.

46. It is noted that the petitioner has not responded to the query of the Respondent JSEB in respect of GSES.

47. UPPTCL raised the issue that ADMS and GSES system are to be implemented in the whole region for security of grid. We have considered the submission. Regulation 5.4.2 of the Grid Code deals with Demand Disconnection. Regulation 5.4.2 of the Grid Code provides as under:

“(a) SLDC/SEB/distribution licensee and bulk consumer shall initiate action to restrict the drawal of its control area, from the grid, within the net drawal schedule.

(b) The SLDC/SEB/distribution licensee and bulk consumer shall ensure that requisite load shedding is carried out in its control area so that there is no over-drawl.

(c) Each User/STU/SLDC shall formulate contingency procedures and make arrangements that will enable demand disconnection to take place, as instructed by the RLDC/SLDC, under normal and/or contingent conditions. These contingency procedures and arrangements shall regularly be/updated by User/STU and monitored by RLDC/SLDC. RLDC/SLDC may direct any User/STU to modify the above procedures/arrangement, if required, in the interest of grid security and the concerned User/STU shall abide by these directions.

(d) The SLDC through respective State Electricity Boards/Distribution Licensees shall also formulate and implement state-of-the-art demand management schemes for automatic demand management like rotational load shedding, demand response (which may include lower tariff for interruptible loads) etc. before 01.01.2011, to reduce overdrawal in order to comply para 5.4.2 (a) and (b) . A Report detailing the scheme and periodic reports on progress of implementation of the schemes shall be sent to the Central Commission by the concerned SLDC.

(e) In order to maintain the frequency within the stipulated band and maintaining the network security, the interruptible loads shall be arranged in four groups of loads, for scheduled power cuts/load shedding, loads for unscheduled load shedding, loads to be shed through under frequency relays/df/dt relays and loads to be shed under any System Protection Scheme identified at the RPC level. These loads shall be grouped in such a manner, that there is no overlapping between different Groups of loads. In case of certain contingencies and/or threat to system security, the RLDC may direct any SLDC/ SEB/distribution licensee or bulk consumer connected to the ISTS to decrease drawal of its control area by a

certain quantum. Such directions shall immediately be acted upon. SLDC shall send compliance report immediately after compliance of these directions to RLDC.

(f) To comply with the direction of RLDC, SLDC may direct any SEB/ distribution licensee/bulk consumer connected to the STU to curtail drawal from grid. SLDC shall monitor the action taken by the concerned entity and ensure the reduction of drawal from the grid as directed by RLDC.

(g) RLDCs shall devise standard, instantaneous, message formats in order to give directions in case of contingencies and /or threat to the system security to reduce deviation from schedule by the bulk consumer, SLDC/State Utility/ISGS/Regional Entity/Injecting Utility at different overdrawal/under-drawal/over-injection/under-injection conditions depending upon the severity. The concerned SLDC/Other regional entity shall ensure immediate compliance with these directions of RLDC and send a compliance report to the concerned RLDC."

48. Regulation 6.4.7 of the Grid Code deals with 'demarcation of responsibilities' which provides as under:

"The SLDC, SEB/distribution licensee shall always restrict the net drawal of the state from the grid within the drawal schedules keeping the deviations from the schedule within the limits specified in the Deviation Settlement Mechanism Regulations. The concerned SEB/distribution licensee/User, SLDC shall ensure that their automatic demand management scheme mentioned in clause 5.4.2 acts to ensure that there is no over-drawal. If the automatic demand management scheme has not yet been commissioned, then action shall be taken as per manual demand management scheme to restrict the net drawal from grid to within schedules and all actions for early commissioning of Automatic Demand Management Scheme (ADMS) shall be initiated".

As per said regulation, SLDC is required to ensure its ADMS acts to ensure that there is no over-drawal. From the submissions of all the Regional Power Committees (RPCs) it is found that some of the Discoms in different regions of the country have implemented ADMS and the other Discoms are taking initiatives to implement ADMS. The Commission in its orders dated 19.12.2013 and 3.1.2014 in Petition No.

249/MP/2012, 250/MP/2012, 251/MP/2012 and 264/MP/2012 had directed all the SLDCs to implement ADMS in accordance with the provisions of the Grid Code and to comply with the directions of the Commission in order to restrict the over drawal from the grid. The Commission, vide its order dated 18.12.2013 in Petition No. 208/SM/2011, had directed to initiate action under Section 142 of the Act against the officers in-charge of STUs/SLDCs of the defaulting States for non-compliance with the Commission`s directions and the provisions of the Act and the Grid Code. ADMS is needs to be implemented by the State Transmission Utilities/Distribution Licensees first, GSES may also be required for automatic load shedding in the State as a backup, if required. It is preferred that physical actions to maintain load-generator balance are taken by the entity having control jurisdiction over its control area.

49. Section 28 of the Act deals with the functions of the Regional Load Despatch Centre. Sub-section (1) to (3) of section 28 of the Act provides as under:

"Section 28. (Functions of Regional Load Despatch Centre): ---

(1) The Regional Load Despatch Centre shall be the apex body to ensure integrated operation of the power system in the concerned region.

(2) The Regional Load Despatch Centre shall comply with such principles, guidelines and methodologies in respect of the wheeling and optimum scheduling and despatch of electricity as the Central Commission may specify in the Grid Code.

(3) The Regional Load Despatch Centre shall -

(a) be responsible for optimum scheduling and despatch of electricity within the region, in accordance with the contracts entered into with the licensees or the generating companies operating in the region;

(b) monitor grid operations;

- (c) keep accounts of quantity of electricity transmitted through the regional grid;*
- (d) exercise supervision and control over the inter-State transmission system; and*
- (e) be responsible for carrying out real time operations for grid control and despatch of electricity within the region through secure and economic operation of the regional grid in accordance with the Grid Standards and the Grid Code."*

Regional Load Despatch Centres have been vested with the function of the apex body to ensure integrated operation of the power system in the concerned region. Moreover, it is responsible to exercise supervision and control over the inter-State transmission system. By virtue of the statutory authority assigned to the RLDCs to exercise control and supervision over the inter-State transmission system under section 28(3) (d) of the Act, the RLDCs have the necessary authority to control the State network which is incidental to the inter-State transmission of electricity.

50. Section 29 of the Act provides as under:

"(1) The Regional Load Despatch Centre may give such directions and exercise such supervision and control as may be required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control.

(2) Every licensee, generating company, generating station, sub-station and any other person connected with the operation of the power system shall comply with the directions issued by the Regional Load Despatch Centres under sub-section (1).

(3) All directions issued by the Regional Load Despatch Centres to any transmission licensee of State transmission lines or any other licensee of the State or generating company (other than those connected to inter State transmission system) or sub-station in the State shall be issued through the State Load Despatch Centre and the State Load Despatch Centres shall ensure that such directions are duly complied with the licensee or generating company or sub-station."

(4) The Regional Power Committee in the region may, from time to time, agree on matters concerning the stability and smooth operation of the integrated grid and economy and efficiency in the operation of the power system in that region.

(5) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the regional grid or in relation to any direction given under sub-section (1), it shall be referred to the Central Commission for decision:

Provided that pending the decision of the Central Commission, the directions of the Regional Load Despatch Centre shall be complied with by the State Load Despatch Centre or the licensee or the generating company, as the case may be.

(6) If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (2) or sub-section (3), he shall be liable to a penalty not exceeding rupees fifteen lakh."

As per the above provisions, RLDC are empowered to give directions to ensure stability of grid operations. The directions of the RLDC are to be implemented through SLDC and it is mandatory for SLDC to ensure compliance with the directions by the licensee or generating company or sub-station. This is a normal protocol to be followed for regulation of inter-State transmission of electricity. However, in a case where the SLDC fails to implement and ensure compliance with the directions of RLDC, the provisions of Section 29 (3) becomes in-operative. In such a situation, the RLDCs have to act under Section 28 (3) (d) of the Act in exercise of its statutory obligations to supervise and control the inter-State transmission system and issue necessary directions to the licensees of the State transmission line or any other licensee of the State or generating company or sub-station in the State to ensure compliance with its orders. Any control action through GSES in the control area of a State may have to be explored after establishing the fact that actions for managing the load/demand of a state initiated by SLDC were not sufficient to control its over drawal. The feeders which

are to be opened to curtail over-drawal in real time are also to be decided by SLDC. Hence, SLDC is required take necessary actions within its control area before any action/control is initiated by GSES.

51. Section 32 of the Act provides that the State Load Despatch Centre shall be the apex body to ensure integrated operation of the grid in the State. SLDCs can operate as the apex body and discharge their obligations under the Act efficiently only when they are made financially and functionally independent. As regards the non-compliance of the directions of SLDC by the distribution companies, attention of all concerned is drawn to sub-sections (2) to (4) of Section 33 of the Act which are extracted as under

"(1) The State Load Despatch Centre in a State may give such directions and exercise such supervision and control as may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of power system in that State.

(2) Every licensee, generating company, generating station, sub-station and any other person connected with the operation of the power system shall comply with the directions issued by the State Load Despatch Centre under sub-section (1).

(3) The State Load Despatch Centre shall comply with the directions of the Regional Load Despatch Centre.

(4) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State grid or in relation to any direction given under sub-section (1), it shall be referred to the State Commission for decision:

Provided that pending the decision of the State Commission, the directions of the State Load Despatch Centre shall be complied with by the licensee or generating company."

It is apparent from the above provisions that in case of non-compliance of the directions

of SLDCs and RLDC, by any of the licensees or generating company or any person connected with operation of the power system within the State, the SLDCs have the option to approach the concerned State Commission for appropriate directions. Unless the SLDCs take appropriate steps against the defaulting entities to ensure compliance of their directions through the available legal options, grid discipline cannot be achieved. Hence, SLDC is required to take necessary actions within its control area before any action/control is initiated by GSES.

52. In the present petition, the petitioner has claimed around ₹ 847.65 crore for communication system, which includes 31,340 km length of OPGW to be laid down for communication system depending upon the number of feeders and sub-stations included in the project. However, petitioner in Petition No. 129/MP/2012, had proposed around 11,000 km length OPGW at 581 sub-stations and 3199 transmission lines under STU and ISTS network at 400 kV and above level and 220 kV generation switchyard for execution of Unified Real Time Dynamic State Measurement (URTDMS). The total scheme was divided into two phases-Phase-I to implement Phasor Measurement Units (PMUs) at those locations where fibre optic communication link is either available or would be made available under microwave frequency vacating programme and Phase-II of the Scheme mainly involves laying down of optic fibre cables. The relevant portion of said order dated 6.9.2013 in Petition No.129/MP/2012 for implementation of URTDMS is as under:

"Phase-II of the scheme mainly involves laying down of Optical Fibre Cables. Communication being backbone of power system operation, the petitioner is granted liberty to file a composite scheme for laying of OPGW required for

execution of URTDSM and GSES as proposed by the Petitioner in Petition No 265/MP/2012, as well as other communication requirements. The Petitioner shall provide full details in respect of OPGW of aforementioned schemes to enable due priority to the communication system for power system operation. CEA may also be consulted before submitting the scheme to the Commission. The Commission also accords in-principle approval for providing PMU for Phase-II commensurate with the approval of OPGW for the said phase. The Petitioner is directed to appraise the Commission the progress and benefit of Phase-I along with the updated cost estimates of PMUs for Phase-II."

As directed in above order, the petitioner has so far not submitted details of OPGW that is to be laid for the implementation of URTDSM and GSES. In the absence of optimization of Communication System, the scheme proposed in the present petition cannot be approved.

53. This type of defense mechanism does not appear to have been implemented anywhere in the world. Thus, prior experience of this type of scheme is not available. The petitioner, has in the present petition, also not submitted the technical details of the automatic defense mechanism of the equipment that is to be installed for grid reliability and security.

54. We note that the instances of violation of overdrawal in the NEW Grid and Southern Grid after the Grid Disturbance on 30/31/7/2012 have come down. The Commission has, in the mean time framed, new Regulations, namely Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 and has also amended the Grid Code. In these regulations, volume limit on deviation from schedule have been specified at all frequencies with

deviation charges linked to frequency and graded additional deviation charges payable on violation of volume limits depending on degree of deviation. The Commission is of the opinion that maintaining reserve within a control area to meet the demand may be examined first to assess its cost effectiveness vis-à-vis to GSES.

55. Synchronous inter-connection of NEW Grid and Southern Grid will help in smooth flow of power from surplus to deficit regions/States, thereby reducing the extent of over-drawal by power deficit States, which is in turn expected to improve grid discipline and reduce over-drawal by States.

56. System Protection Scheme (SPS) is to preserve the integrity of the electric system by using automatic measures that are simple, reliable and safe for the system as a whole and to provide the most extensive coverage against all possible extreme credible contingencies. The Summary of SPS both inter/Intra regional which are in-service, and no of schemes approved are detailed below:

S No	Region	No. of Schemes in Service	No. of Schemes approved (yet to be Operationalized)	No. of Schemes under discussion	Remarks
1	Northern Region	11	16	1	Inclusive of ER-NR and WR-NR corridor
2	Eastern Region	3	1		Inclusive of ER-SR grid
3	Western Region	4		4	Inclusive of WR-NR corridor
4	Southern Region	11	4	2	Inclusive of ER-SR Grid
5	North	1	-	-	-

	Eastern Region				
	Total	30	25	3	58

It is understood that around 30 SPS scheme are in service and majority of them are in Northern Region and Southern Region. Further, over 2 dozen schemes have been approved in different regions and they are likely to be operationalized very soon. Accordingly, RPCs are directed to co-ordinate implementation of SPS and ensure their operationalisation as per the system requirement.

57. Considering the above, we are of the view that the performance of Grid in regard to parameters envisaged to be controlled under GSES scheme should be monitored for six months before considering the scheme for implementation of GSES. The petitioner is directed to file performance of Grid after 6 months from the date of issue of the order indicating necessity of GSES, even after implementation of ADMS, SPS, AUFERS. If the situation warrants need for implementation of GSES, the petitioner is at liberty to approach the Commission along with technical details of defense mechanism equipment, comprehensive scheme of OPGW, etc in accordance with law.

58. The petition No. 265/MP/2012 is disposed of with the above.

Sd/-

(M. Deena Dayalan)
Member

sd/-

(V.S.Verma)
Member