



भारत सरकार / Government of India

विद्युत मंत्रालय / Ministry of Power

केंद्रीय विद्युत प्राधिकरण / Central Electricity Authority

ऊर्जा भंडारण प्रणाली प्रभाग / Energy Storage System Division

दिनांक: As signed

विषय: केंद्रीय विद्युत प्राधिकरण (विद्युत संयंत्रों और विद्युत लाइनों के निर्माण, संचालन और रखरखाव के लिए सुरक्षा आवश्यकताएं) (संशोधन) विनियम 2022 - ऊर्जा भंडारण प्रणाली संयंत्रों के सुरक्षा ऑडिट के संबंध में।

(Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electrical Lines) (Amendment) Regulations 2022 - Safety Audit of Battery Energy Storage System Plants – reg.)

As per the Regulation 12 of the Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) (Amendment) Regulations, 2022, External Safety Audit report is required to be submitted by all the generating stations to CEA (Authority) every two years. The Regulation No. 12 of the said regulations is reproduced below:

*“12. **Safety Audit.** – (1) Safety audit of generating stations shall be periodically carried out every two years by an accredited third party and the audit report shall be sent to the Authority.*

(2) Authority through a designated officer may verify such reports by physical site inspections as and when required.

(3) Safety Checks shall be site specific and shall include the minimum safety checks as identified in Schedule IV annexed to these regulations.”

2. In reference to the above, a sample format of BESS Audit report (**Annex-1**) along with a draft BESS specific technical checklist for audit (**Annex-2**) and the minimum procedure to be followed (**Annex-3**) have been prepared.

3. Comments are invited from the Stakeholders on all three documents (Annex-1, 2 & 3) as mentioned in Para-2 above. Please give your comments via return email to essd.cea@gov.in latest by 28.07.2026.

यह मुख्य अभियंता (ई.एस.एस.डी.), सी.ई.ए. के अनुमोदन से जारी किया जाता है।

संलग्न : **Annex-1, 2 & 3**

रवि कुमार सुमन
07/07/2026

रवि कुमार सुमन/Ravi Kumar Suman
(सहायक निदेशक-1/Assistant Director-I)

सेवा में,

1. All the stakeholders as per list attached at the e-mail.
2. All other Stakeholders via CEA website.
3. Head (NHPC, NVVN, SJVN) – with a request to get comments from the developers of the BESS VGF Scheme.
4. Head of Associations (FICCI, IEEMA, IESA).
5. IT Division, CEA – with a request to upload a copy of this letter on CEA website.

जानकारी हेतु प्रतिलिपि:

1. PS to Chief Engineer (ESSD), CEA.
2. PS to Chief Engineer (TETD), CEA.
3. Dr. Veepin Kumar, Deputy Director (ESSD), CEA.

Sample format for ‘BESS External Safety Audit Report’

S. No.	Items to be included in the Report
i.	Cover Page
ii.	Foreword (Duly signed by Project Head & Audit Agency)
iii.	Acknowledgement
1.	Section-1: Executive Summary
2.	Section-2: Introduction
2.1	Background
2.2	About the Project
2.3	Audit Team members credentials
2.4	Scope of Work
2.5	Objectives
2.6	Methodology
2.7	Opening Meeting along with members present in the meeting
2.8	List of Applicable Acts, Licenses & Clearances for operation of plant.
2.9	Study of Documents & Records (As per List Annex-B of IS 14489:2018)
2.10	Departments / Sites visited in BESS Plant
2.11	Concluding Meeting
3.	Section-3: Audit Report
3.1	OSH System (Checklist-Annex-C of IS 14489:2018) duly verified by Auditor(s)
3.2	Schedule IV of CEA Regulation duly verified by Auditor(s)
3.3	CEA BESS Check List (Technical) duly verified by Auditor(s)
4.	Section-4: Observations & Recommendations with Risk Category & Timeline for compliance by Project Authority
4.1	Observations & Recommendations: Documents & Records (As per Annex-B of IS 14489:2018)
4.2	Observations & Recommendations: Statutory Compliances of Acts, Licenses & Clearances.
4.3.	Observations & Recommendations: OSH SYSTEM (As per Annex-C of IS 14489:2018)
4.4	Observations & Recommendations: Schedule-IV of CEA Regulation
4.5	Observations & Recommendations: CEA BESS Check List
4.6	Observations & Recommendations: Field Visit of entire BESS Plant.
5.	Section-5: IS: 45001 Certificate
6.	Section-6: Conclusion
7.	Section-7: Annexures

Section-4 Format: Observations & Recommendations with Risk Category & Timeline for compliance by Project

Sl. No.	OBSERVATIONS	Risk category (Low/Medium/High)	RECOMMENDATION	Action Plan/timeline required for compliance
1				Annex, if required.
2				Annex, if required.
3				Annex, if required.
..	..	..	..	..

BESS Specific Technical Checklist

Please Note: -

1. **Construction Standards means** Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Amendment Regulations, 2026 dated 22.06.2026.
2. **Safety Standards means** Central Electricity Authority (Measures relating to Safety and Electric Supply) Amendment Regulations, 2026 dated 27.03.2026.
3. **MoP BESS Guidelines means** Guidelines for Procurement and Utilization of Battery Energy Storage Systems as part of Generation, Transmission and Distribution assets, along with Ancillary Services dated 10.03.2022 and Amendments thereof.
4. **CERC Connectivity Regulations means** Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022 and Amendments thereof.
5. **CEA Metering Regulations means** Central Electricity Authority (Installation and Operation of meters) Regulations 2006 and Amendments thereof.

I. Following items to be verified by the Auditor –

S. No.	List of Items	Check	Remarks	Regulation
1	Points to be checked	Yes/No	Approximate Distance, if available	Clause
	Whether site is near to:			Construction Standards Clause 106ZH
	a. Geological fault area			
	b. High flood zones area			
	c. High tide zones area			
	d. Avalanche prone area			
2	Points to be checked	Yes/No /NA	If yes, give details	
	BESS located in extreme weather and site conditions designed to withstand such conditions.			
3	Points to be checked	Yes/No	Remarks, if any	Clause
i	There is proper access or space for the movement of BESS equipment during installation, commissioning, and operation & maintenance.			Construction Standards Clause 106ZI (3)
ii	A minimum space separation has been provided for adjacent BESS enclosures as well as nearest building			Construction Standards Clause 106ZN (6)

iii	Adequate space in the control room has been provided for the operation and maintenance staff.			Construction Standards Clause 106ZP(2)
4	Points to be checked	Yes/No	Remarks, if any	Clause
	Each battery Rack has a provision to disconnect itself, if required, from the rest of the system.			Construction Standards Clause 106ZL 1(c)
5	Points to be checked	Yes/No	Give details of Fault isolation capability	Clause
	There is clear segregation between direct current bus, inverter and alternating current switchgear rooms.			Construction Standards Clause 106ZN (2)
6	Points to be checked	Yes/No	Remarks, if any	Clause
i	The BESS gives alarm when a container door is opened.			Construction Standards Clause 106ZO
ii	Following minimum parameters, as applicable, for BESS including transformer, switchyard equipment and transmission line, are accessible in real time via the operating interface display to SCADA at the control room:			Construction Standards Clause 106ZP
	a. DC input voltage and current.			
	b. Battery module and container temperature.			
	c. AC output voltage and current.			
	d. Output power (active & reactive).			
	e. Power factor.			
	f. Relative humidity.			
iii	The control panel or console also includes:			
	a. Meters			
	b. Indicators			
	c. Displays			
7	Points to be checked	Yes/No	Remarks, if any	Clause
	The data related to triggering data of LVRT and HVRT during tripping and protection operation is:			Construction Standards Clause 106 ZQ(2)
	a. Being stored for 90 days			
	b. Capable of capturing a minimum of 1000 samples per second.			
8	Points to be checked	Yes/No	Remarks, if any	Clause
i	BESS Auxiliary Power is derived from:			Construction Standards
	a. Utility or discom alternating current bus.			

	b. Low voltage side of inverter duty transformer.			Clause 106ZR (2)
	c. Tertiary winding of inverter duty transformer.			
ii	BESS has following to maintain battery performance for all climatic conditions at the site for the entire life of battery:			Construction Standards Clause 106ZR (4), Safety Standards Clause 122E (1)
	a. Heating			
	b. Ventilation			
	c. Air conditioning or chiller system			
9	Points to be checked	Yes/No	If yes, give details	Clause
	Surge-protection devices have been provided to protect against transient voltage surges from (in accordance with applicable standards)			Construction Standards Clause 106ZS (3)
	a. Lightning			
	b. Switching			
	c. Other similar causes			
10	Points to be checked	Yes/No	If yes, give details	Clause
i	BESS container has explosion protection, with a forced ventilation system and automated louvers for safe release of the flammable gases and maintain internal pressure within safe limits;			Safety Standards Clause 122C (1)
ii	Ingress protection has been provided as per the relevant standards;			Safety Standards Clause 122C (2)
11	Points to be checked	Yes/No	If yes, give details	Clause
i	Every battery container shall be provided with automatic fire suppression system as per relevant standard;			Safety Standards Clause 122F (2), (3)
ii	The components of the installed fire suppression system shall be protected from ambient conditions and unauthorised access while ensuring ease of accessibility for inspection and maintenance.			
iii	a. Battery is having acidic or basic aqueous electrolytes in liquid form.			Safety Standards Clause 122G
	b. If yes, the electrolyte spills have been contained as per relevant standards.			
12	Points to be checked	Yes/No	Remarks, if any	Clause

i	A separate emergency source of lighting has been provided in enclosed working spaces as per relevant standard.			Safety Standards Clause 122H
ii	If yes, does it have automatic initiation			
iii	Location & specification of lighting & signage, as per relevant standard, supports safe access & navigation to site.			
13	Points to be checked	Yes/No	If yes, give details	Clause
	Following have been installed:			Safety Standards Clause 122I (2)
i	CCTV			
ii	Motion sensors			
14	Points to be checked	Yes/No	If yes, give details	Clause
	Metering point established at InSTS / ISTS low-voltage bus bar;			MoP BESS Guidelines Sec.IV Cl.E.6

II. Following records to be maintained by the BESS Plants –

S. No.	Provisions	Record/Document Found, Yes or No	Remarks if any	Regulation
1	Cell-level test certificate available from ILAC-accredited laboratory – UL 1642 or IEC 62619 + IEC 63056 (for Li-ion cells)			UL 1642; IEC 62619; IEC 63056; MoP BESS Guidelines Appendix-2
2	Battery-level certification available – UL 1973 or (IEC 62619 + IEC 63056) for stationary auxiliary applications			UL 1973; IEC 62619; IEC 63056; MoP BESS Guidelines Appendix-2
3	Transport safety certification for Li-ion chemistries available – IEC 62281 / UN 38.3 certificate verified for batteries received / dispatched			IEC 62281; UN 38.3; MoP BESS Guidelines Appendix-2
4	BESS system-level certification available – UL 9540 or (IEC TS 62933-5-1 + IEC 62933-5-2) for grid-integrated EES safety			UL 9540; IEC 62933-5-1; IEC 62933-5-2; MoP BESS Guidelines Appendix-2

S. No.	Provisions	Record/Document Found, Yes or No	Remarks if any	Regulation
5	Thermal runaway characterization reports available for high energy-density battery technologies; characterization test conducted at ILAC-accredited lab			UL 9540A; MoP BESS Guidelines Appendix-2 Cl.B.3
6	PCS bi-directional grid-connected power converter certified to IEC 62909-1 (General requirements); IEC 62909-2 compliance verified if distributed energy resources interface is present.			IEC 62909-1; IEC 62909-2; MoP BESS Guidelines Appendix-2
7	PCS efficiency measurement procedure compliant with IEC 61683 Ed.1 (Photovoltaic systems – Power conditioners) if solar-coupled BESS.			IEC 61683; MoP BESS Guidelines Appendix-2
8	PCS electromagnetic compatibility (EMC) immunity verified as per IEC 61000-6-2 Ed.2 for industrial environments; emission compliance per IEC 61000-6-4 Ed.2.1			IEC 61000-6-2; IEC 61000-6-4; MoP BESS Guidelines Appendix-2
9	Anti-islanding protection test carried out as per IEC 62116 Ed.2 for utility-interconnected inverters; records maintained			IEC 62116 Ed.2; MoP BESS Guidelines Appendix-2
10	Environmental stress testing records available for equipment: cold (IEC 60068-2-1), dry heat (IEC 60068-2-2), temperature change (IEC 60068-2-14), damp heat cyclic (IEC 60068-2-30)			IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-14; IEC 60068-2-30; MoP BESS Guidelines Appendix-2
11	Safety clearance obtained from Central Electricity Authority (CEA) / Chief Electrical Inspector to Government (CEIG) prior to commissioning; certificate displayed /filed			MoP BESS Guidelines Sec.IV Cl.D; CEA Safety Standards
12	Transmission connectivity test (infirm power injection) conducted prior to commercial commissioning; test record submitted to CTU			MoP BESS Guidelines Sec.IV Cl.E.10; CERC Connectivity Regulations

S. No.	Provisions	Record/Document Found, Yes or No	Remarks if any	Regulation
	/STU within stipulated timeline			
13	Metering equipment calibrated and tested;			MoP BESS Guidelines Sec.IV Cl.E.6; CEA Metering Regulations
14	Metering record maintained for energy accounting and deviation settlement.			MoP BESS Guidelines Sec.IV Cl.E.6; CEA Metering Regulations

III. Following items to be self-certified by the BESS plant owner:

S. No.	Provisions			Regulation
1	Points to be self-certified	Yes/No	Give Service Life	Clause
	All structures and foundations are designed to commensurate with service life of BESS.			Construction Standards Clause ZI (1)
2	Points to be self-certified	Yes/No	Remarks, if any	
	BESS is seismically braced in accordance with the National Building Code.			
3	Points to be self-certified	Yes/No	Give max to min limits	Clause
	The battery container is able to withstand extreme parameters as per relevant standards, as given below:			Construction Standards Clause 106ZL 1(d)(i)
	a. Temperature			
	b. Pressure			
	c. Explosion			
	d. Vibrations			
	e. Any other			
4	Points to be self-certified	Yes/No	Give operating temperature range of the batteries.	Clause
i	Cooling arrangement of battery container is able to maintain temperature in between the operating temperature range of the batteries.			Construction Standards Clause 106ZL 1(d)(ii)

ii	The air handling and distribution system has been designed to maintain uniform temperature across all the components within the container.			Construction Standards Clause 106ZR (3b), (5)
5	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	The Battery container is:			Construction Standards Clause 106ZL 1(d)(iii), (iv)
	a. Weatherproof			
	b. Dustproof.			
ii	The Battery Container has provisions to prevent:			
	a. Moisture condensation			
	b. Ingress of water			
	c. Ingress of airborne salt.			
iii	Battery Container is corrosion resistant.			
6	Points to be self-certified	Yes/No	Give range of ambient temperature	Clause
	BESS has been designed to achieve its rated power output for full range of ambient temperature.			Construction Standards Clause 106ZM
7	Points to be self-certified	Yes/No	Remarks, if any	
	BESS has performance guarantee of at least: -			
	a. 90% output at the end of 5 years of use;			
	b. 80% output at the end of 10 years of use;			
	c. 70% output at the end of 15 years of use.			
8	Points to be self-certified	Yes/No	Give number of cycles, expected life, rated capacity of BESS	
	Number of cycles offered by BESS corresponds to the expected life of BESS at its rated energy capacity.			
9	Points to be self-certified	Yes/No	Give minimum depth of discharge	
	BESS provides minimum depth of discharge of 80%.			
10	Points to be self-certified	Yes/No	Give the efficiency	
i	PCS efficiency with isolation transformer is not less than 95%.			

ii	Round trip efficiency (alternating current to alternating current including auxiliary consumption) is not less than 70%.			
11	Points to be self-certified	Yes/No	Give Ramp Rate and number of cycles per day	
	Ramp rate and number of cycles per day has been designed as per the use case and application of BESS.			
12	Points to be self-certified	Yes/No	Give details	Clause
i	Protections must be layered and redundant.			Construction Standards Clause 106 ZN (1), (3), (4), (5)
ii	There is over-current protection, either on the alternating current or the direct current side, in cell strings.			
iii	The over current protection has been sized and coordinated so that currents from one string do not contribute to a fault in any other cell string.			
13	Points to be self-certified	Yes/No	Give maximum expected voltages	
	The cells, wiring, switch gear and all direct current electrical components have safety factor of two for the maximum expected voltages.			
14	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	There is an alarm and display system to notify the occurrence of abnormal conditions including			Construction Standards Clause 106ZO
	a. Over Temperature			
	b. Over Current			
	c. Over Voltage			
	d. Direct current ground fault			
	e. Smoke			
	f. Gas			
	g. Any other parameters			
ii	All the system-generated alarms have a provision to be acknowledged by the operator			
iii	The alarm trigger level is field adjustable.			
15	Points to be self-certified	Yes/No	Give details	Clause

i	The data related to triggering data of LVRT and HVRT during tripping and protection operation is being made available to RPC and control centers such as REMC or RLDC or SLDC, as the case may be.			Construction Standards Clause 106 ZQ(2)
ii	PCS and EMS are capable of:			
	a. Retaining data for ninety days.		(Write Number of Days)	
	b. Capturing a minimum of one thousand samples per second.		(Write samples per second)	
iii	The auxiliary power system provides for the capability to restart automatically after BESS shutdowns of several days.			Construction Standards Clause 106ZR (3b), (5)
16	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	BESS is capable of interrupting following:			Construction Standards Clause 106 ZS (1), (2), (4)
	a. Any fault current available at the point of common coupling or point of interconnection.			
	b. Fault current flowing in the equipment in either direction.			
ii	Faults due to malfunctions within BESS will be cleared by the protective devices.			
iii	Control and instrumentation system provided for BESS are consistent with the modern power station practices and in compliance with all applicable standards, guidelines and the relevant regulations notified by the Authority such as cyber security, safety and communication.			
17	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	BESS has been designed with two-fault tolerance to prevent catastrophic failures under all conditions, including but not limited to:			Safety Standards Clause 122B (2), (3), (4)
	a. Overcharge			
	b. Over-discharge			
	c. Short circuit			
	d. Operation outside specified temperature limits;			

ii	Testing of BESS has been carried out as per relevant standard;			
Iii	Fire and explosion protection at the following levels have been provided as per the relevant standards:			
	a. Cell			
	b. Module			
	c. Rack			
	d. Container			
	e. Site-specific installation			
18	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	BMS is able to monitor and record following:			Safety Standards Clause 122B (5)
	a. Voltage,			
	b. Temperature			
	c. Thermal runaway			
ii	BMS is able to monitor and record above values at following levels:			
	a. Cell,			
	b. Module			
	c. Rack level			
iii	BMS is able to monitor and record current at the rack level;			
iv	The audio-visual alarms are able to be activated in case above monitored parameters exceed the operating range as per original equipment manufacturer's specifications;			
v	BMS is able to stop charging and discharging of the battery when the temperature exceeds OEM's recommended values			
19	Points to be self-certified	Yes/No	Remarks, if any	Clause
i	PCS used for charging and discharging BESS has been designed for the chemistry of the battery to be charged.			Safety Standards Clause 122B (1)
ii	PCS is capable of fully automatic and unattended operation, including:			Safety Standards Clause 122B (5), (6)
	a. Synchronising with the electricity system			
	b. Disconnecting from the electricity system			
iii	PCS has self-protective and diagnostic features to protect itself from damage in the event of component failure and abnormal operating parameters;			

iv	The coolant lines are routed and secured to mitigate leakage on live electrical parts.			
iv	A failure of the liquid cooling system, including any fault in the cooling lines will not result in a leakage that can cause short circuiting of the cells inside the battery pack or lead to a hazardous condition.			
20	Points to be self-certified	Yes/No	Remarks, if any	Clause
	In the event of the mechanical ventilation system failure, the system shall initiate a shutdown to maintain the concentration of flammable materials in the battery container within safe limits.			Safety Standards Clause 122E (2)
20	Points to be self-certified	Yes/No	Remarks, if any	Clause
	BESS has hazard detection systems (as per relevant standard) for the following			Safety Standards Clause 122F (1)
	a. Smoke			
	b. Gas			
	c. Heat			
	d. Flame			
	e. Parameters from a to d can be monitored			
21	Points to be self-certified	Yes/No	If yes, give details	Clause
	Break glass sensors have been installed at appropriate locations.			Safety Standards Clause 122I (2)
22	Points to be self-certified	Yes/No	Give OEM's Specifications	Clause
	In case a safety issue or battery anomaly is detected, the affected section of BESS is able to automatically shut down within pre-set period as per OEM's specifications;			Safety Regulations Clause 122J (1)
23	Points to be self-certified	Yes/No	Give details	Clause
i	BESS equipment earthing is as per the relevant standard.			Safety Standards Clause 122K
ii	Direct current bus, inverter and alternating current switchgear rooms have fault isolation capabilities.			Construction Standards Clause 106ZN (2)

Minimum Procedure for ‘External Safety Audit of BESS Installations’ and subsequent preparation of the ‘BESS Audit Report’

Following procedure may at least be followed while carrying out the ‘External Safety Audit of BESS installations and subsequent preparation of the ‘BESS Audit Report’ which is to be submitted to CEA:

i. Audit Team:

- a. Audit team of the Agency should comprise of at least three (3) Auditors, one Auditor should have degree in Electrical Engineering, second Auditor should have degree in Mechanical Engineering & third auditor should have degree in Fire & Safety Engineering/Engineering degree with Diploma in Industrial safety.
- b. Out of the above three Auditors, one Auditor should be the ‘Lead Auditor’ as per IS-18001/ISO-45001 and one Auditor should have a minimum of 10 years of experience in Operation & Maintenance/Erection & Commissioning of Power Plant/Hazardous Process industry.
- c. External Safety Audit should be conducted for at least 3 days through field visit (Minimum nine Man days).

ii. External Audit for Occupational Health and Safety (OH&S):

- a. The OH&S External safety audit shall be conducted as per provisions of the Indian Standard “IS 14489:2018 (Occupational Health and Safety Audit-Code of Practice)”.
- b. External safety audit for OH&S may be done as per IS 14489-2018 and the observation/recommendations of auditor(s) against each record shall be part of the external safety audit report.

iii. External Audit (Technical):

- a. BESS specific checklist at **Annexure-I** shall also be part of the External Safety Audit Report to be submitted to CEA. Further, the Audit Agency will additionally verify whether the plant team is inspecting all the check points in their internal audit and are having the records.
- b. The Audit Agency to its discretion can add more points in the check list, if in its opinion the additional points can make external audit more effective.

iv. Field visit by Audit Agency:

- a. Field visit of all the facilities of the plant shall be carried out by the Audit Agency to assess the identified risks and test the effectiveness of existing safety aspects if they are operating correctly/efficiently and to assess potentially visible risk aspects.
- b. The observation/recommendations of the Audit Agency during the field visit shall be part of the external safety audit report.

v. External safety audit report:

- a. The external safety audit report, must tabulate all the key observations/deficiencies & recommendations of the audit agency for OH&S part, CEA Check list and field visit in a separate section.
- b. Further, Plants have to carry out categorization of Risk rating of observation/recommendations as high, medium or low risk category.
- c. Action Plan/timeline required for compliance for each observation/recommendation should also be mentioned in the BESS Audit Report.
- d. The External Audit report to be submitted to CEA must be signed by the Audit Agency and the BESS Plant Head.