REGULATORY FLIPBOOK • CENTRAL ELECTRICITY AUTHORITY

CEA Technical Standards

Construction of Electrical Plants and Electric Lines

2022

Base Regulations

Principal technical standards

2025

Amendment

Right-of-Way / Schedule VII

2026

Amendment

Renewables + BESS

Gazette of India • Extraordinary • Part III—Section 4

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Regulatory Snapshot

Source-derived highlights from the three notifications

2022

BASE REGULATIONS

Principal technical standards for construction of electrical plants and electric lines — gencos, transmission & distribution licensees, CTU and STUs.

Effective from date of publication in the Official Gazette (23 Dec 2022).

2025

RIGHT-OF-WAY AMENDMENT

Amends Regulation 84(4) and substitutes Schedule VII for Right-of-Way values across voltage, conductor, terrain and approach-section configurations.

Different RoW values from new conductor configuration/technology need separate CEA approval.

2026

RE + BESS AMENDMENT

Adds BESS terminology and inserts Chapter VI covering solar, floating solar, onshore wind, offshore wind and BESS construction standards.

Comes into force on 1 April 2027.

2026 BESS PROVISIONS — SOURCE HIGHLIGHTS

- Use cases: renewable integration, firm capacity, price arbitrage, congestion management, end-user cost reduction, black-start
- ≥50 MW BESS: additional Automatic Generation Control, grid-forming inverter capability & black-start capability
- Performance guarantees, minimum depth of discharge, PCS & round-trip efficiency, ramp-rate and cycle provisions specified
- PCS & EMS data retention: 90 days, capturing a minimum of 1,000 samples per second

2022 Base Regulations

Applicability and chapter structure

Applies to generating companies, transmission licensees, distribution licensees, Central Transmission Utility (CTU) and State Transmission Utilities (STUs). In force from the date of publication in the Official Gazette — 23 December 2022.

CHAPTER I

General

Short title, applicability, definitions, general requirements for electrical plants and electric lines.

CHAPTER II

Thermal Generating Stations

Part A: common requirements; Part B: coal/lignite-based; Part C: gas turbine-based; Part D: internal combustion engine-based.

CHAPTER III

Hydro-Electric Generating Stations

Minimum technical requirements for construction of hydro-electric generating stations.

CHAPTER IV

Sub-stations & Switchyards

Design considerations for sub-stations and switchyards, including protection of 33 kV, 22 kV, 11 kV and LT systems.

CHAPTER V

Electric Lines

Electrical design parameters, design & construction of electric lines and associated equipment, routing of overhead lines.

HVDC STANDARDS

HVDC Technical Standards

Technical details of classical HVDC terminals/stations, converter configuration, system studies and performance requirements.

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2025 Right-of-Way Amendment

Amends Regulation 84(4); substitutes Schedule VII for RoW values

Voltage Class	Normal Route	Forest	Urban / Approach
1200 kV AC (Horizontal)	400 m	—	—
±800 kV HVDC (Horizontal)	400 m	—	—
765 kV D/C (Vertical)	400 m	300 m	250 m
400 kV D/C (Vertical)	400 m	300 m	250 m
220 kV D/C (Vertical)	350 m	300 m	200 m
132 kV D/C (Vertical)	320 m	200 m	150 m
66 kV (Vertical)	250 m	150 m	100 m

Illustrative values (ACSR Moose/Zebra/Panther, vertical configuration) — refer to the full Schedule VII for all conductor types, tower configurations and string arrangements.

Practical point: different RoW values arising from conductor configuration/type or new technology require CEA approval and a separate order for each case.

2026 RE + BESS Amendment

New Chapter VI — five parts covering renewable energy & storage

Part A	Part A1	Part B	Part B1	Part C
Solar Power Plant	Floating Solar Plant	Onshore Wind Power Plant	Offshore Wind Power Plant	Battery Energy Storage System

GENERAL REQUIREMENTS (REG. 106B) — APPLY ACROSS ALL FIVE PARTS

- Continuous operation within frequency, voltage & power-factor limits per CEA Connectivity Regulations, 2007
- As-built drawings, design memoranda, test results & type-test certificates kept at site
- Display board with plant name, capacity, location, coordinates & commissioning date
- Automatic Weather Station (WMO-compliant) for plants ≥10 MW installed capacity
- Phasor Measurement Units per Authority's Unified Placement Philosophy guidelines
- Power plant controllers for active/reactive power control, with remote set-point capability
- Reliable, redundant, secure communication system maintained through plant life
- Protection/control comms physically & logically segregated from SCADA/metering channels

Solar & Floating Solar

Part A & A1, Regulations 106C–106O

SOLAR POWER PLANT

Design life: not less than 25 years

- Site selection avoids fault zones, flood/tide zones, avalanche & landslide-prone areas
- 0.75 m clearance around inverters/DC-AC distribution boxes for ventilation
- 2.5 m spacing between arrays for maintenance access
- Arrays oriented to maximise annual energy yield
- Major equipment: PV panel/module, mounting structure, junction boxes, inverter, inverter-duty transformer, AC distribution board, metering, earthing, lightning arrestor, fire protection
- PV modules in corrosive/marine locations must pass salt-mist corrosion test; bypass diode required per module

FLOATING SOLAR PLANT

Additional requirements layered on solar standards

- Installed on a water body with a bund; panels at least 12 inches above water level, floaters 6 inches above
- Mooring & anchoring must adapt to variations in water levels
- Extra cable slack provided to accommodate water-level movement in cable routing
- Provisions to protect against animals, reptiles, rodents and birds
- Floaters with signage for identification of ropes/walkways as a safety measure
- All non-current-carrying metallic structures earthed at bed or shore

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Onshore & Offshore Wind

Part B & B1, Regulations 106P–106ZG

Design life for wind power plants (onshore & offshore), including associated turbines: not less than 25 years

ONSHORE WIND

- Site selection considers wind resource, terrain, access & environmental factors
- Wind turbine design & installation per relevant standards
- Major equipment: turbine, tower, nacelle, rotor assembly, transformers, auxiliary systems
- Wind speed & direction sensors installed at nacelle top
- Auxiliary transformer derives supply from the wind turbine generator
- Oil-filled transformers require higher flash point to minimise fire hazard

OFFSHORE WIND

- Site per National Offshore Wind Policy, 2015; layout conditions also per the same policy
- Blade tip: minimum 22 m clearance from mean high water spring
- Offshore AC substation with defined construction requirements
- Array cable voltage optimises power transfer; export cable buried underground to transition junction box
- Earthing rod connected to foundation earths all non-current-carrying metallic structures
- Access doors at tower base & top for entry into the tower

BESS — Use Cases & Capabilities

Part C, Regulation 106ZJ — Application and use cases

1 Grid integration of renewables	**2** Firm capacity from RE sources	**3** Price arbitrage (charge low, discharge high)	**4** T&D performance / imbalance offset	**5** Congestion cost avoidance
6 Substation auxiliary power	**7** Supply-demand balancing & voltage support	**8** End-user electricity cost reduction	**9** Black-start service	**10** Any other grid-interactive application

MANDATORY CAPABILITIES (ALL BESS)

Active power control • Reactive power & voltage control • Frequency response • Fault & frequency ride-through • Communication & control (SCADA/EMS integration) • Ramp-rate control • Night-mode operation

ADDITIONAL FOR ≥ 50 MW BESS

Automatic Generation Control (AGC)

Grid-forming inverter capability

Black-start capability

BESS — Technical Specifications

Regulation 106ZM — performance, efficiency & safety

PERFORMANCE GUARANTEE (MINIMUM OUTPUT)

90%	80%	70%
at 5 yrs	at 10 yrs	at 15 yrs

KEY SPECIFICATIONS

Min. Depth of Discharge	≥ 80%
PCS efficiency (with isolation xfmr)	≥ 95%
Round-trip efficiency (AC-AC, incl. aux.)	≥ 70%
Data retention (PCS & EMS)	90 days
Sampling rate (PCS & EMS)	≥ 1,000 / sec

SAFETY REQUIREMENTS

- Layered, redundant protections with fault isolation
- Clear segregation: DC bus, inverter & AC switchgear rooms
- Over-current protection on AC/DC side in cell strings
- Cells, wiring, switchgear & DC components: safety factor of 2
- Minimum space separation for adjacent BESS enclosures (Li-Ion, Ni-Cd, Lead Acid per relevant standard)

MAJOR EQUIPMENT

- Cell, battery module, battery rack, battery container
- Battery Management System (module/rack/container level)
- Power Conversion System (PCS)
- Energy Management System (EMS) — SCADA-integrated

Regulation Structure & Timeline

How the three notifications fit together

23 Dec 2022
Base Regulations notified
(in force on publication)

9 Oct 2025
Right-of-Way Amendment
(Reg. 84(4) & Schedule VII)

22 Jun 2026
RE + BESS Amendment
(in force 1 Apr 2027)

REGULATION MAP

Ch. I	General (applicability, definitions)
Ch. II	Thermal Generating Stations (Parts A–D)
Ch. III	Hydro-Electric Generating Stations
Ch. IV	Sub-stations & Switchyards
Ch. V	Electric Lines (incl. Schedule VII RoW)
Ch. VI	RE & BESS (Parts A, A1, B, B1, C) — 2026

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