TECHADYANT LABS
RESEARCH

India Grid-Scale Battery Storage Supply Chain 2026–2035

Market outlook, cell dependence, industrial capability and supplier economics

THE STORAGE ILLUSION

India can procure and integrate battery storage faster than it can build a competitive domestic cell industry. The gap between deployment and production is the central industrial question: how much value, technical learning and supply security can local firms capture as the market scales?



FIRST EDITION | November 2026 | Evidence cut-off: 28 October 2026

Scope: grid-connected stationary BESS, including standalone systems and renewable co-location. Pumped storage is excluded from battery-market totals.

Evidence labels:

[V] primary-source fact [V1] single-source or scope-limited observation [M] analyst model or scenario [H] hypothesis requiring further evidence

TECHADYANT LABS | RESEARCH

India Grid-Scale Battery Storage Supply Chain 2026–2035

Market outlook, cell dependence, industrial capability and supplier economics

First edition · November 2026 · Evidence cut-off: 28 October 2026

India Grid-Scale BESS Market Report 2026–2035: Supply Chain, Cell Localization & Project Economics

An analytical review of India's stationary battery energy storage deployment, domestic ACC manufacturing gaps, policy milestones, and value-capture strategies

India can procure and integrate battery storage faster than it can build a competitive domestic cell industry. The gap between deployment and production is the central industrial question: how much value, technical learning and supply security can local firms capture as the market scales?

Scope: grid-connected stationary battery energy storage systems (BESS), including standalone systems and renewable co-location. Pumped storage is considered as a competing flexibility resource and excluded from battery-market totals.

Evidence labels: [V] primary-source fact; [V1] single-source or scope-limited observation; [M] analyst model or scenario; [H] hypothesis requiring further evidence.

Copyright. © 2026 Techadyant Labs (Techadyant Private Limited). All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form without the prior written permission of the publisher.

Disclaimer. This report is strategic research. It is not investment, legal or engineering advice, nor an offer or solicitation. Modeled outputs [M] are editable scenarios, not forecasts. Official figures are reproduced with their source dates; readers should verify current status before committing capital.

Companion files. India Grid-Scale BESS Supply Chain 2026–2035 Data Workbook (.xlsx) and the India BESS Figure Pack (SVG).

Suggested citation. Techadyant Labs (2026), India Grid-Scale Battery Storage Supply Chain 2026–2035, first edition, November 2026. labs.techadyant.com

Table of Contents

Executive summary 6
Method, scope and evidence labels 8
Part I The market 9
1 Why storage, why now 10
2 Demand model to 2035 13
3 Technology and chemistry 17
4 Pricing and project economics 19
Part II Supply chain and dependence 21
5 Anatomy of a BESS and value capture 22
6 The cell gap 26
7 Upstream materials 31
8 Power electronics, software and balance of system 33
Part III The industry 35
9 Manufacturer and integrator landscape 36
10 Policy, regulation and standards 38
11 Geography and clusters 41
Part IV Risk and opportunity 43
12 Risk and stress tests 44
13 Opportunity surfaces 46
Part V Outlook 48
14 Scenarios to 2035 49
15 Roadmap and recommendations 51
Appendix A Quotable definitions 53
Appendix B Workbook boundaries 55
Appendix C Source register 56
Appendix D Next-edition data checklist 58
Appendix E Scenario outputs and interpretation 59
Appendix F Frequently asked questions 60
Appendix G Evidence tables and analytical boundaries 62
Appendix H Tender architecture cases 64
Appendix I Model definitions and calculation map 65
Appendix J Evidence register and publication gates 67

List of Figures

Figure 1. CEA planning requirement by storage technology, 2031–32. [V] 10
Figure 2. Annual deployment pathways in the companion workbook. These are editable scenarios, not official forecasts. [M] 13
Figure 3. Officially reported BESS development pipeline by stage at 30 June 2026. Stage buckets are not aggregated. [V] 15
Figure 4. Worked project economics example and model boundary. [M] 19
Figure 5. Illustrative system cost shares by supply-chain layer. Assumption-based; not a sourced project bill of materials. [M] 22
Figure 6. Illustrative weighted domestic value contribution by layer; not a measured national localization rate. [M] 23
Figure 7. Capacity evidence ladder used to separate announcements from qualified output. [V1] 26
Figure 8. Pack-to-Cell Gap Ratio definition and evidence conditions. No national point estimate is published. [V1] 27
Figure 9. PLI ACC awards compared with reported installed plant capacity. Installed nameplate is not equivalent to qualified commercial output. [V] 29
Figure 10. Selected policy support measures by instrument and reporting date. Measures are not additive commissioned capacity. [V] 38

List of Tables

Table 1. Key numbers: headline metrics, reported values and interpretation. 6
Table 2. Decision implications by reader. 7
Table 3. Demand drivers, transmission mechanisms and measurable indicators. 10
Table 4. Project-stage definitions and the counting errors to avoid. 13
Table 5. Officially reported BESS pipeline by stage at 30 June 2026. 14
Table 6. Candidate chemistries: potential fit and qualification evidence. 17
Table 7. Supply-chain layers, functions and capability questions. 23
Table 8. ACC PLI beneficiaries: awarded capacity, reported installed capacity and evidence boundary. 29
Table 9. Policy support measures by instrument: verified position and watch points. 38
Table 10. Risk register: transmission channels and controls. 44
Table 11. Opportunity registry: buyer value and entry tests. 46
Table 12. Scenario pathways: deployment, value path and failure conditions. 49
Table 13. Watch-list indicators for annual review and why they matter. 51
Table 14. Scenario outputs at 2035: annual additions, domestic value capture and illustrative system value. 59
Table 15. Project-stage definitions and minimum evidence. 62
Table 16. Manufacturing evidence snapshot: reported values and source boundaries. 63
Table 17. Tender architecture cases: published scope, duration boundaries and analytical lessons. 64
Table 18. Model definitions and calculation map: concepts, inputs and caveats. 65
Table 19. Evidence register: claim areas, current evidence and publication gates. 67

Executive summary

The short answer

India's grid-scale BESS market has moved beyond a purely prospective policy signal: the Ministry of Power reported 15.75 GW / 42.53 GWh under construction, 11.75 GW / 38.43 GWh awarded and 19.19 GW / 67.57 GWh under tendering as of 30 June 2026. These are distinct project-stage buckets, not commissioned stock, and they should not be added until a project-level reconciliation rules out overlap. CEA's plan still sets a 47.24 GW / 236.22 GWh BESS requirement for 2031–32. The gap between pipeline, commissioning and usable operating energy is now the central market question. [1,14]

The industrial opportunity is broader than cell manufacturing. India can build valuable capability in integration, PCS, controls, thermal management, fire protection, testing, operations and recycling. Yet domestic cell manufacturing remains an execution challenge: MHI reported 40 GWh awarded under ACC PLI and 1.4 GWh of installed plant capacity in July 2026, with investment and direct employment reported through May. Installed nameplate does not establish stable output, yield or customer qualification. MHI's earlier parliamentary response identified technology availability, skilled manpower, critical equipment imports and upstream components as implementation challenges. [16,21]

Our conclusion is conditional: deployment can scale before local cells do, and the current official pipeline suggests that project execution is now as important as tender creation. Announcements alone cannot close the manufacturing gap. Buyers should underwrite contracted demand, grid connection, charging rights, performance and augmentation. Policymakers should tie support to auditable factory milestones and output while preserving technology flexibility. Investors should distinguish tender volume from bankable contracts and plant nameplate from qualified production.

Key numbers

Table 1. Key numbers: headline metrics, reported values and interpretation.

Metric	Value	Interpretation
BESS requirement in 2031–32	47.24 GW / 236.22 GWh [V]	CEA NEP base case; planning estimate, not procurement commitment.
Total storage need in 2031–32	73.93 GW / 411.4 GWh [V]	Includes 26.69 GW / 175.18 GWh pumped storage.
VGF-supported BESS capacity	43.8 GWh [V]	Two programmes cited by MoP in March 2026; not necessarily commissioned.
ACC PLI outlay	₹18,100 crore [V]	50 GWh target; MHI reported 40 GWh awarded in Feb 2025.
ACC grid-storage round	10 GWh [V]	Global RFP issued July 2026; no award verified at evidence cut-off.
Storage obligation trajectory	1% to 4% [V]	FY2023–24 to FY2029–30 share of electricity consumption procured from renewable energy through storage.
2026–35 market size	Scenario-dependent [M]	Workbook scenarios are analyst assumptions, not official forecasts.
BESS pipeline at 30 Jun 2026	15.75 GW / 42.53 GWh under construction; 11.75 GW / 38.43 GWh awarded; 19.19 GW /	Separate reported stages; not operating stock and not summed.

	67.57 GWh tendering [V]	
BESS additions reported during 2026	2,668.54 MW / 7,785.6 MWh [V]	Government-reported addition figure; reporting period/basis requires reconciliation with monthly series.
ACC PLI capacity reported installed	1.4 GWh [V]	MHI July 2026 statement; installed plant nameplate, not saleable annual output.

Five findings

1. The planning signal is concrete.

CEA links storage to a system plan and specifies energy as well as power. A GW target without duration is an incomplete battery-market estimate.

2. Procurement support is ahead of commissioning evidence.

Development, award, financial close, construction, commissioning and reliable operation are distinct milestones. Track each separately.

3. Cell localization is a production question.

Capacity headlines mix proposals, construction, trials and output. A sovereignty metric must use qualified production and imported input content.

4. Value capture can rise before cell self-sufficiency.

Integration, PCS, controls, enclosures, fire systems and service create local value with imported cells. Measure each layer.

5. Execution and bankability determine the realized market.

Payment security, grid connection, dispatch rights, degradation guarantees, augmentation and safety govern pipeline conversion.

Implications by reader

Table 2. Decision implications by reader.

Reader	Decision implication
Developers and utilities	Evaluate duration, dispatch, augmentation, efficiency, availability and payment terms together.
Manufacturers	Prioritize yield, qualification, serviceability and repeat orders. Separate nameplate from output.
Investors and lenders	Use milestone-weighted pipeline and downside cash flows; treat uncontracted revenues as risk.
MSMEs and startups	Target controls, thermal, fire, testing, diagnostics, cyber and recycling with clear qualification paths.
Policymakers	Publish consistent tender and commissioning data; tie support to auditable output and value addition.

Method, scope and evidence labels

This independent market-structure analysis covers grid-connected stationary batteries in India. [V] is a primary-source fact; [V1] a single-source or scope-limited observation; [M] an analyst model, assumption or scenario; [H] a hypothesis requiring further evidence. A citation supports only the claim and date stated beside it.

Evidence cut-off is 28 October 2026. This edition incorporates Ministry of Power and CEA reporting available through the cut-off, including the June 2026 project-stage snapshot and 2026 manufacturing programme updates. The latest September CEA dashboard entry is listed, but its underlying project rows had not been reconciled at the cut-off, so this edition uses the June 2026 snapshot. Sources include CEA planning and status publications, Ministry of Power and Ministry of Heavy Industries programme records, procurer tenders and selected primary notices. Company claims remain separate from verified operating output.

The companion workbook is a transparent planning instrument, not yet a completed tender-by-tender diligence database. Its demand, BOM, value-capture and project-economics outputs are modeled assumptions unless an input is explicitly tied to a primary source. The report incorporates the latest official pipeline figures as dated status buckets but does not sum them without project-level deduplication. A national import bill, measured domestic value share, plant-level yield series and empirical PCGR remain outside this edition’s verified fact base.

EDITION NOTE — This first edition is an evidence-led market-structure analysis, not a market census. Official project stages are reproduced with source dates; tender-level deduplication, supplier output/yield, comparable project pricing, state scores and measured local value added remain open research items, tracked in Appendices D and J for future editions. [V] indicates source-backed data, [M] an analyst assumption, and [V1] a scope-limited source observation.

Part I The market

1 Why storage, why now

Storage has value when electricity has a time or location problem. Solar output concentrates in daylight; demand, ramping needs and renewable availability do not always align. A battery can shift energy, provide fast response or support local congestion management, but the service determines duration, cycling, connection and revenue. There is no single BESS demand curve without specifying these services.

CEA's NEP base case estimates 73.93 GW / 411.4 GWh of total storage by 2031–32, including 47.24 GW / 236.22 GWh BESS and 26.69 GW / 175.18 GWh pumped storage [V]. The implied energy-to-power ratios are about five hours for BESS and 6.6 hours for pumped storage. These are aggregate planning ratios, not universal project durations.

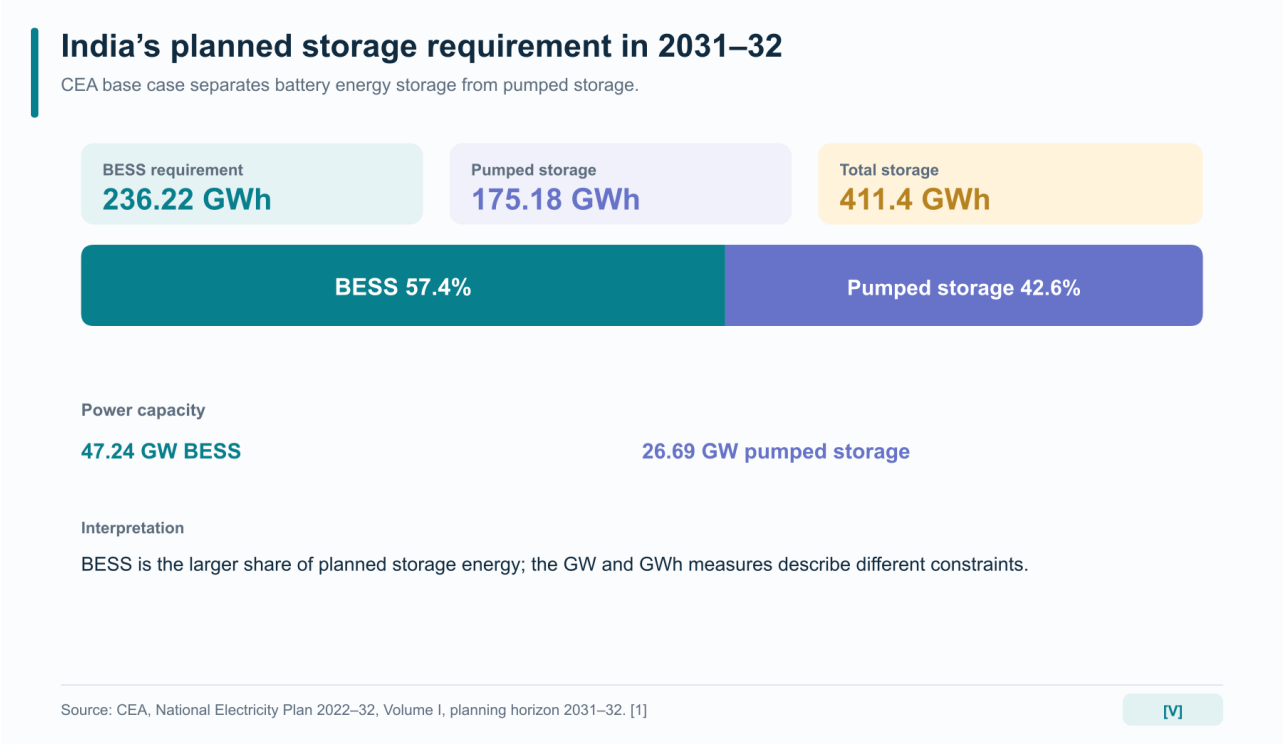


Figure 1. CEA planning requirement by storage technology, 2031–32. [V]

The National Framework records an Energy Storage Obligation (ESO) rising from 1% in FY2023–24 to 4% by FY2029–30 [V]. In February 2025, CEA advised that future solar tenders incorporate at least two-hour co-located storage equal to 10% of installed solar capacity [V]. An advisory is not a universal statutory mandate. A blanket July 2027 mandate claim needs an operative notification.

Data centres may add local reliability and power-quality needs. Treat them as a separate buyer segment, rather than automatically adding their backup batteries to grid-scale energy shifting.

Table 3. Demand drivers, transmission mechanisms and measurable indicators.

Driver	Mechanism	Measure
Renewable integration	Shift output and reduce curtailment.	Co-location, dispatch window, curtailed and delivered energy.
Resource adequacy	Meet evening peak and contingency needs.	Firm contribution, duration and peak availability.
Network	Defer local transmission or distribution upgrades.	Node-specific congestion, upgrade cost and connection schedule.
Ancillary services	Fast frequency and balancing	Eligibility, telemetry, response and

	response.	settlement.
C&I reliability	Support critical loads or manage demand charges.	Load profile, outage value and tariff.

System need is a service question

A storage target is not a single product specification. The CEA planning case separates BESS from pumped storage, but the implied aggregate durations, about five and 6.6 hours respectively, do not prescribe the configuration of each project. A battery sized for evening peak reduction, a renewable shifting contract and a fast ancillary service can have different power-to-energy ratios, cycling expectations and connection requirements. [1,12]

The near-term signal is also material. The same planning series places BESS at 8.68 GW / 34.7 GWh and pumped storage at 7.45 GW / 47.6 GWh for 2026–27. These are system-planning quantities, not a project schedule. They nevertheless show why a forecast framed only around 2031–32 risks missing the procurement and factory decisions that must be taken sooner. The correct analytical question is not whether one technology wins the total, but which service each can provide at a node and when it can be delivered. [12]

Batteries are modular and can respond quickly, but their usable energy declines with state-of-charge limits, auxiliaries, temperature and aging. Pumped storage can offer long-duration shifting and system-scale inertia but has longer development lead times, site and water constraints, and substantial civil works. Transmission, demand response, flexible thermal generation and interregional trade also compete for some flexibility needs. A least-cost portfolio compares these resources against the same reliability service, time horizon and network boundary rather than comparing battery capex with a hydro project headline.

A practical hierarchy for reading demand

Three levels of evidence should stay visible. A planning requirement indicates a modeled system need under stated assumptions. A procurement notice identifies a buyer, service and procurement route. An operating asset demonstrates that a project has connected and can deliver usable energy under actual dispatch. Each step adds evidence but also introduces a distinct conversion risk: resource adequacy and budget, tender design and participation, award and contract, land and grid, financing and construction, then commissioning and performance. The market narrative becomes credible when these levels are shown side by side.

The February 2025 CEA advisory recommends that future solar tenders incorporate at least two-hour co-located storage equal to 10% of installed solar capacity. It creates a procurement signal but leaves implementation to tendering authorities and individual bid documents. Its impact therefore depends on whether tenders actually specify the storage block, whether the energy is dispatchable at the required hours, how charging is treated, and whether the buyer can pay for the resulting service. The advisory should not be described as a statutory obligation applying automatically to every renewable project. [2,12]

A buyer should begin with the problem statement: expected peak shortfall, renewable curtailment, ramp or reserve requirement, network deferral opportunity, or critical-load reliability. Translate it into location, power, energy, dispatch windows, cycles, response time and availability. Only then compare BESS with alternatives. That sequence avoids a common procurement error: specifying a battery by a headline MW target while leaving duration and charging rights undefined.

What changes for decision makers

Utilities and system planners need to link storage procurement to their ten-year resource adequacy plans and local network studies. Developers need to verify the connection, charging source and dispatch rights

before securing equipment. Lenders need to distinguish contracted capacity payments from uncertain merchant revenues. Manufacturers need a view of procurement timing and standard interfaces, but should not treat the planning stock target as a guaranteed factory order book. Policy support can accelerate a project; it cannot substitute for a technically useful location or a creditworthy revenue arrangement.

The central thesis is therefore narrower and more testable than a generic ‘storage boom’ claim: India’s planning and procurement pipeline is expanding, while execution and domestic electrochemical production remain separate bottlenecks. The question for this report is how much of the announced system requirement can become commissioned BESS, and how much value can be captured locally at each step. We evaluate that question using dated official planning and programme data, an explicitly modeled scenario layer and a capacity ledger that does not count announcements as output.

2 Demand model to 2035

A bottom-up model builds from buyer need through procurement, award, financing, construction and commissioning. Every project record should include MW, MWh, duration, buyer, authority, tariff basis, location, dates and latest status. Aggregate once by project key so an original tender, retender, amendment and award do not become four projects.

The workbook's Constrained, Base and Accelerated cases represent slower delivery, steady execution and stronger procurement/localization respectively. Annual figures are editable assumptions, not point forecasts. Project-level conversion should be calibrated by cohort when a complete register exists.

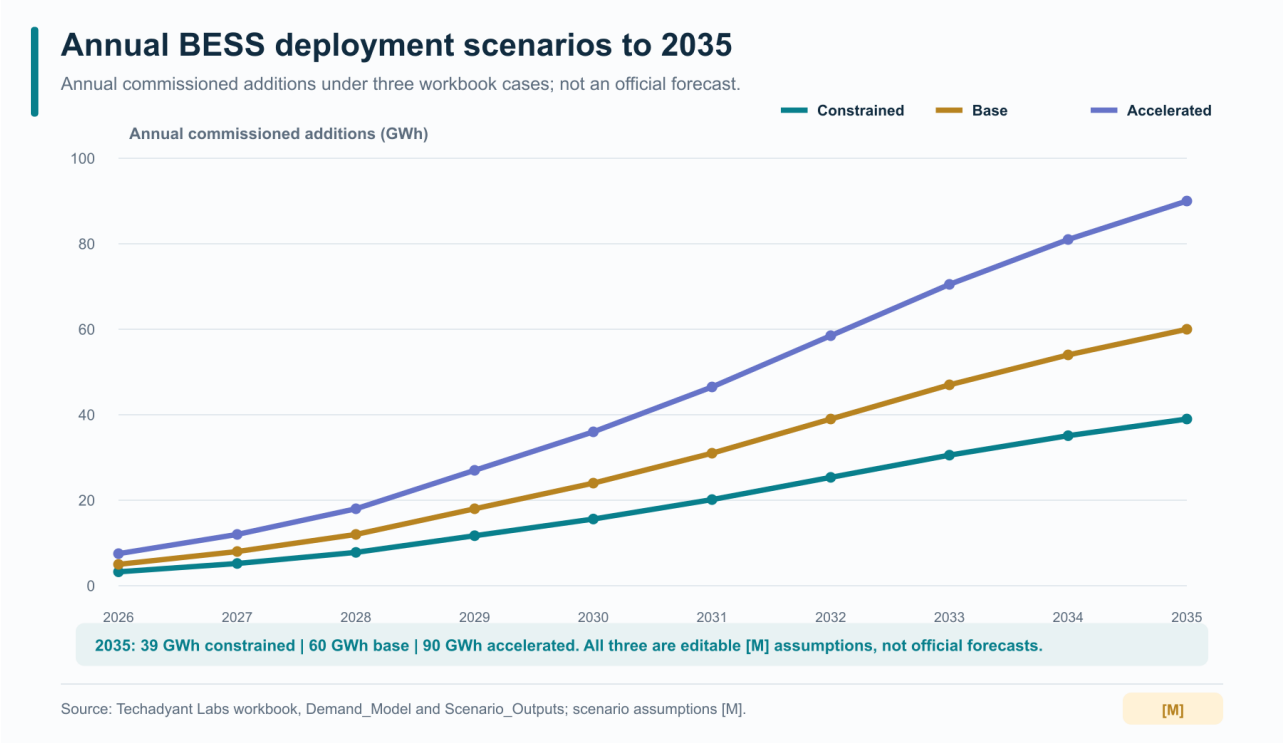


Figure 2. Annual deployment pathways in the companion workbook. These are editable scenarios, not official forecasts. [M]

Separate need, tendered, awarded, construction and commissioned capacity. Where a tender specifies MW but not MWh, duration is unknown; do not impute it without labeling the assumption. Track cancellations, delays and retenders against stable project IDs.

Table 4. Project-stage definitions and the counting errors to avoid.

Stage	Definition	Counting error
Need	Plan or buyer requirement.	Treating it as funded procurement.
Tendered	Procurement notice and scope.	Counting repeated/cancelled capacity twice.
Awarded	Letter of award or selection.	Assuming COD or financial close.
Under construction	Identifiable physical execution.	Adding cell, pack and system capacities.
Commissioned	Commercial operation reported by competent source.	Counting trial output as full capacity.
Operating	Usable capacity with performance evidence.	Equating nameplate to available AC energy.

The pipeline has become large enough to require stage discipline

The Ministry of Power reported that, as of 30 June 2026, 15,754 MW / 42,530 MWh of BESS was under construction, 11,747 MW / 38,425 MWh had been awarded and 19,192 MW / 67,574 MWh was under tendering. These are large figures relative to the 236.22 GWh CEA 2031–32 planning requirement, but they are not interchangeable with operating stock. The three reported buckets should not be summed until a project-level reconciliation confirms common definitions, no overlap, and treatment of cancelled or retendered scope. [14]

The implied duration of each reported bucket differs: about 2.7 hours for under-construction capacity, 3.3 hours for awarded capacity and 3.5 hours for tendered capacity. This is a useful warning against using MW alone to describe the market. It may reflect the mix of tenders and project designs, but it is not a statistically clean duration series unless each denominator is confirmed to include paired MW and MWh for the same lots. Energy capacity is the more direct measure of shifting potential; power is essential for peak and response services. Both belong in the model.

The government also reported 2,668.54 MW / 7,785.6 MWh of BESS capacity added during 2026 in an August 2026 reply. The reply does not specify a precise cut-off or reconciliation rule in the reported sentence. We therefore treat it as a dated government-reported addition metric and do not merge it with the June stage snapshot or derive a growth rate from it. A publication-grade time series should reconcile CEA's monthly project list, commissioning dates and project scope. [13]

Pipeline snapshot and interpretation

The table below reproduces the June 2026 status buckets as a dated snapshot. It is not a claim that each megawatt-hour will commission by a specific year. The pipeline is a leading indicator of market activity; the conversion rate is an empirical result that should be estimated only after tender lots are tracked through status changes.

For planning, the relevant ratios are stage conversion and time-to-stage, cohort by cohort. A project that moves from tender to award is not equivalent to a project that reaches COD. A tender may be annulled, retendered, downsized or reconfigured; an award may be delayed by contract finalization or grid availability. The workbook's annual additions scenarios remain [M] until a complete project ledger calibrates these transition rates.

Table 5. Officially reported BESS pipeline by stage at 30 June 2026.

Reported stage (30 Jun 2026)	Power	Energy	Interpretation
Under construction	15,754 MW	42,530 MWh	Execution is reported; commissioning and usable output remain future evidence.
Awarded	11,747 MW	38,425 MWh	Selection/award does not establish financial close or COD.
Under tendering	19,192 MW	67,574 MWh	Procurement in progress; not a committed project.
All three stages	Not summed	Not summed	Reconcile project IDs and category definitions before aggregation. [14]

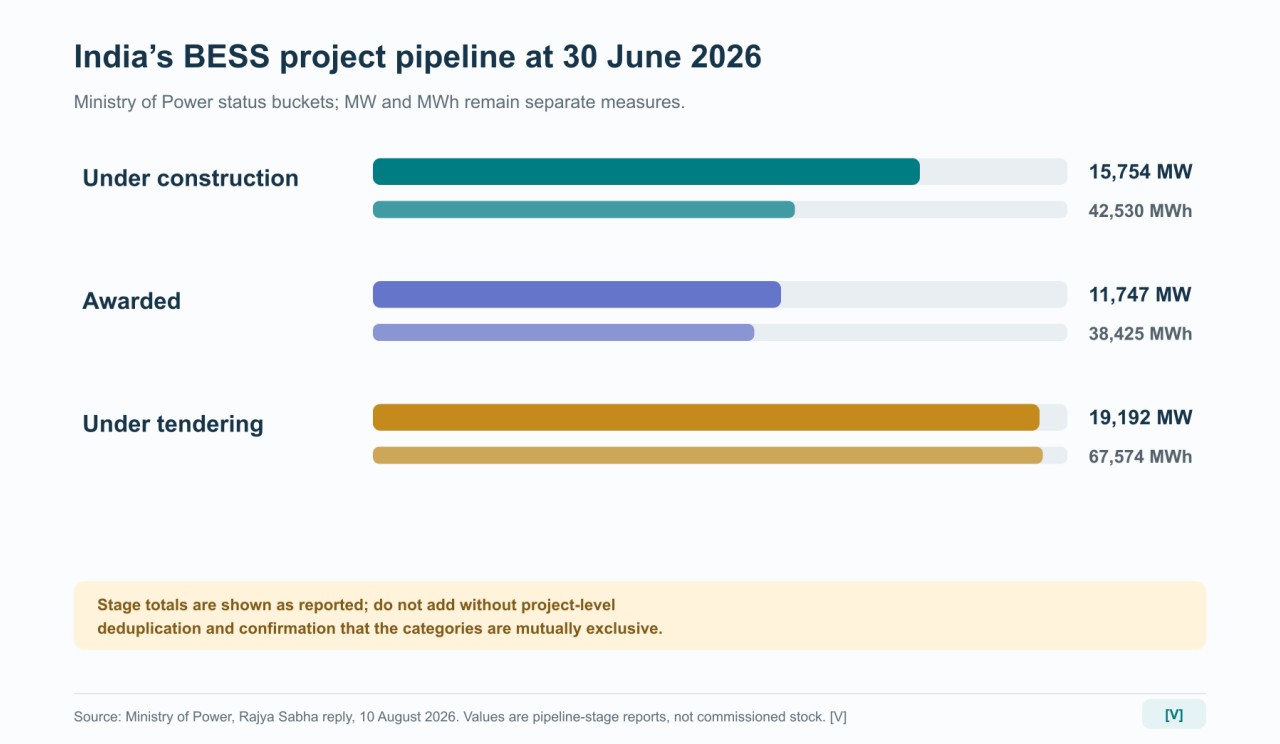


Figure 3. Officially reported BESS development pipeline by stage at 30 June 2026. Stage buckets are not aggregated. [V]

From tender architecture to executable demand

Procurement architecture affects which suppliers can compete and where risks land. A standalone BESS tender can award a storage service with the buyer responsible for charging or can procure capacity plus charging-energy arrangements. A renewable-plus-storage tender may buy firm or time-shaped power rather than storage capacity itself. An EPC or supply package separates equipment delivery from the long-term service obligation. These structures create different revenue risks, performance guarantees and opportunities for local integration. The database must classify the product being procured, not merely use a ‘BESS’ label.

SECI’s 2025 procurement illustrates the importance of component boundaries: it published a 600 MW / 1,200 MWh BESS supply package with 15 years of comprehensive service and maintenance as a DC package, separately from a balance-of-system package for the project. The tender record contains amendments, clarifications, interface documents and a result notice. A market analyst should read those documents together. The headline capacity alone does not tell us who owns AC conversion, grid connection, performance liability or lifetime service. [18]

SECI also listed a 125 MW / 500 MWh Odisha standalone BESS procurement supported through PSDF in December 2025. The four-hour configuration and funding instrument can be compared with other projects only after recording the tender’s buyer, connection, service, duration, VGF conditions and eventual result. For each tender, the register should preserve both the original scope and the final awarded scope. A tender ID may refer to multiple lots, and the same project can appear in a national status file and a procurer’s portal. [19]

Demand model design and interpretation

A useful demand model separates four quantities: annual tendered energy, annual awards, annual commissioning and installed stock. Let commissioned additions in year t equal the portion of the prior tender cohorts that survive cancellation, win award, reach financing and complete construction. Installed stock then equals prior stock plus newly commissioned energy minus retired or unavailable capacity,

adjusted for the scope definition. A single ‘market size’ number obscures these transitions and can multiply the same pipeline several times.

The existing workbook’s 39 / 60 / 90 GWh of 2035 annual additions are deliberately stylized [M] cases. These values are not derived from the June 2026 stage buckets and should not be interpreted as a probability-weighted forecast. In the Base case, the model should be calibrated to project cohorts once status history is collected; the Constrained case should show weaker conversion and longer delays; and the Accelerated case should require stronger financing, grid readiness, procurement and factory qualification. Scenario differences should arise from named drivers, not a generic percentage uplift.

The data cut-off for this edition is 28 October 2026. The official dashboard lists a 30 September 2026 status report, but its underlying table had not been extracted and reconciled at the cut-off, so this edition retains the June 2026 figures. The next update will refresh the CEA monthly dataset and record its release date. This avoids presenting a newer dashboard date as though the underlying project data have already been independently audited. [8]