CORPORATE FINANCE
INTERNATIONAL

Battery Energy Storage Systems- India’s Outlook- February 2025

AarayaaAdvisoryServices

CORPORATE FINANCE
INTERNATIONAL

India is deeply committed to its transition away from traditional fossil fuels and building its non fossil fuel capacity to at least 500 GW by 2030. The country's cumulative renewable energy capacity totals to 209.4 GW as of December 2024, With solar energy contributing 47% of the capacity, followed by wind energy (23%) & Large hydro Projects (22%), and the rest being generated through Bio Power (5%) and Small hydro projects (3%).

The rapid expansion of renewable energy capacity will drive higher penetration of renewables into the power grid, which may lead to grid stability challenges. At 20% penetration, grid stability becomes more difficult to maintain, while at 30%, instability becomes a significant concern. Coupled with the intermittent generation patterns of solar and wind energy, this poses a critical challenge for the Indian government in achieving its 2070 net-zero emissions target.

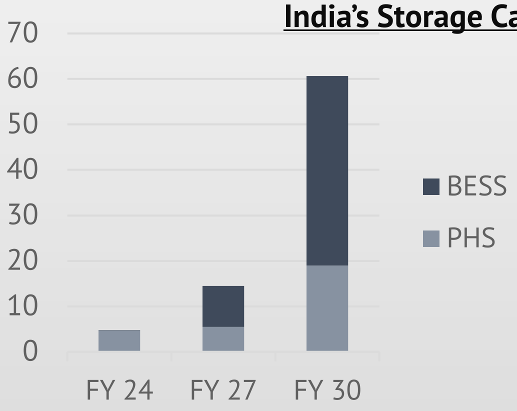
Energy storage systems (ESS) play a crucial role in smoothening out this intermittency and enabling a continuous supply of energy when needed. Thus, for sustainable renewable energy growth, a concurrent growth of ESS capacity is imperative. In line with this, the recent statement by Mr. Prashant Singh, Secretary of the Ministry of New and Renewable Energy, indicates that the government may mandate 10% battery storage for new renewable energy projects, which is expected to further accelerate growth in the ESS sector.

Energy Storage Systems

Energy Storage Systems (ESS) are designed to store surplus energy generated from renewable sources, which can be deployed during periods of peak demand. ESS are crucial for stabilising the grid by reducing fluctuations in renewable energy generation. They store energy for use during peak demand, support grid stability, and enable greater renewable energy integration. ESS also help reduce peak energy costs, lower carbon emissions, defer infrastructure investments, and enable energy trading, contributing to a more efficient and sustainable energy system.

Battery-based Energy Storage Systems (BESS) and Pumped Hydro Storage (PHS) are the most widely used and commercially viable storage solutions. While other technologies exist, BESS and PHS dominate the market and are expected to complement each other, each playing a key role in supporting renewable energy growth and enhancing grid stability.

India's Storage Capacity (GW)



- Storage capacity in India will grow faster than the Indian RE capacity. This is due to low penetration of storage in India.
- While PSP currently dominates in terms of capacity, this will soon change with BESS constituting a large share by FY30, mirroring global trends

Evolution of Renewable Energy Trends in India

Plain Vanilla → Hybrid → Hybrid + ESS → Round the Clock Power (RTC) → Firm and dispatchable RE (FDRE)

About CFI

Corporate Finance International (CFI) is a global group of middle-market investment banks and corporate finance advisory boutiques specialising in cross-border acquisitions, divestitures, capital raising, and related services all over the world having 16 Member firms, 30 offices across 20 countries and 300+ professionals.

Raj Shroff
Partner, Managing Director, India

Pooja Motani
Vice President, India

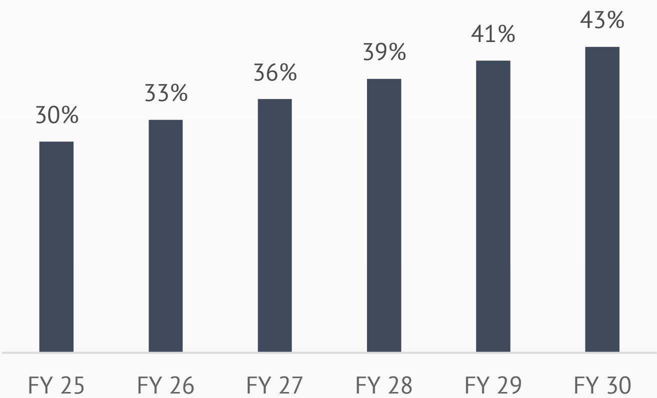
- *Ranked 7th in India in terms of number of deals for the 9 months CY 2024 - Thomson Reuters mid market League Table*
- *Ranked 18th in Europe in terms of number of deals for the 9 months CY 2024 - Thomson Reuters mid market League Table*

Sources: SBICAPS Report, MNRE

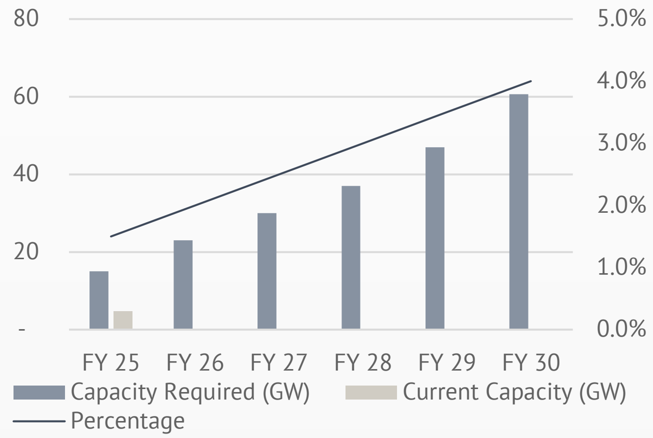
Growth Potential

The Ministry of New and Renewable Energy (MNRE) has prescribed state wise Renewable Purchase Obligations (RPOs) which mandate specified percentage of electricity to be sourced from Renewable Energy sources for Distribution Companies (DISCOMs). Similarly, Energy Storage Obligations (ESO) have been prescribed to secure grid stability, as the share of RE goes up.

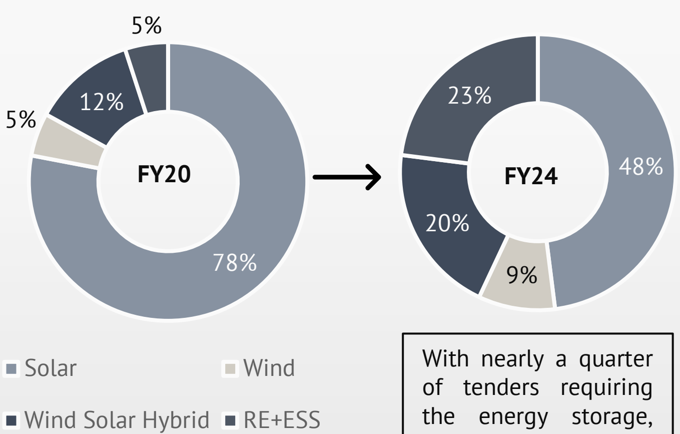
Renewable Purchase Obligation (% of Electricity purchased by DISCOMS)



Energy Storage Obligation (% of Electricity purchased by DISCOMS)

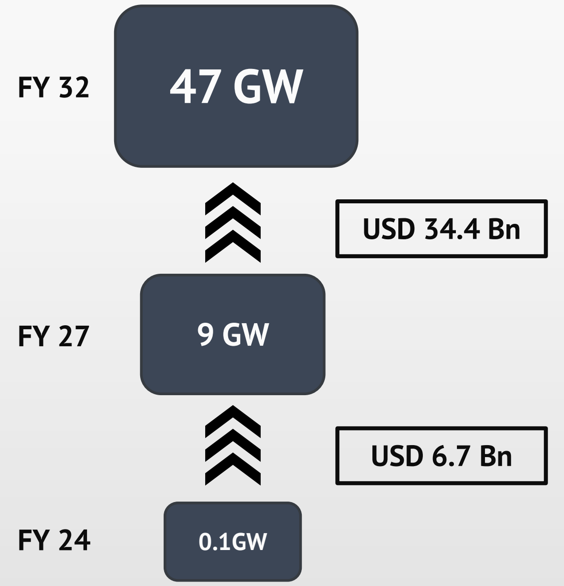


Share of Renewable Energy Tenders by Type



With nearly a quarter of tenders requiring the energy storage, the demand for ESS is gaining momentum

BESS to Lead the Charge with a USD 42 Bn Opportunity



Due to the low gestation period and low space requirements, the growth of Energy storage Systems will be lead by BESS and supported by PHS.

Constraints for BESS growth

- High Cost and Unavailability of Batteries
- Inadequate Infrastructure and High Cost
- Insufficient demand and storage facilities
- Limited Funding Opportunities

A Scheme Viability Gap Funding of USD 1.1 Bn marks the Government's commitment towards curbing these constraints for large scale BESS projects

Viability Gap Funding (VGF) to aid Growth

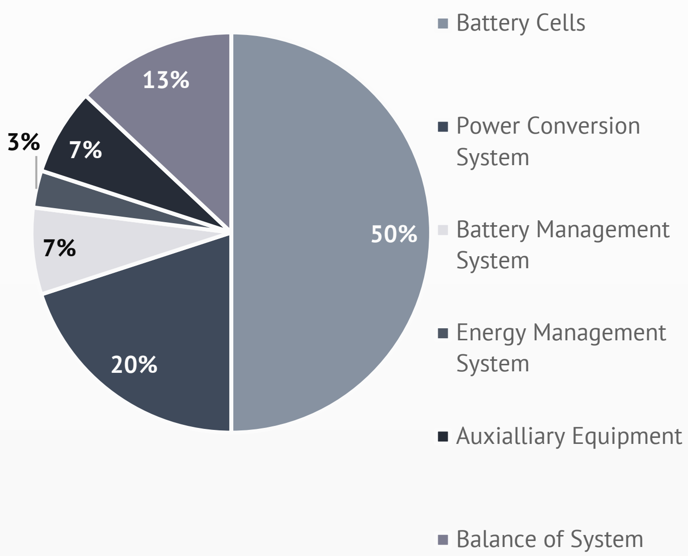
- Development of 4 GwH of BESS Projects by FY31
- Financial support up to 40% of the capital cost
- Initial outlay – USD 1.1 Bn & Budgetary support –USD 440 Mn
- Targets achieving a LCOS* of Rs. 5.5-6.6/unit
- Disbursement in five tranches linked with implementation
- Minimum of 85% of the capacity available to DISCOMs

Sources: SBICAPS Report, MNRE

**LCOS- Levelized Cost of Storage*

Cost Analysis and Financing Parameters

Cost Breakup of a BESS Project



- It is expected that battery prices will crash further, and there will be increased puissance of higher capacity 4h and 6h batteries vs. 2h batteries. These will be contingent on building scale for which a complete domestic ecosystem is needed.
- A shared ecosystem with the Electric Vehicle space will give BESS both synergy and larger scale.
- EV batteries, through not directly usable for BESS can be recycled and used for BESS due to multiple common supply chain elements.

Cost of a Typical BESS Project

2 Hr Discharge	USD 0.15 Mn/ MWh
4 Hr Discharge	USD 0.21 Mn/ MWh
6 Hr Discharge	INR 0.22 Mn/ MWh

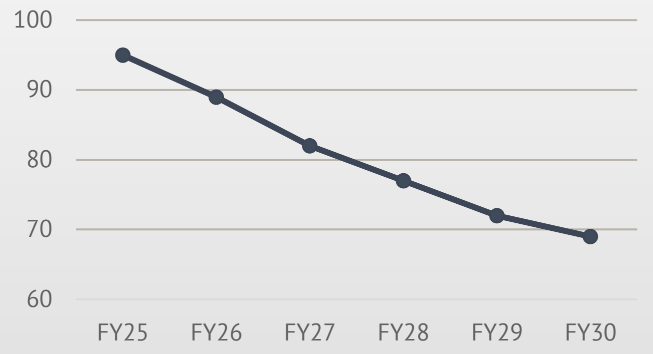
Key Financing Considerations for BESS Projects

- Availability of Land and Project Approvals
- Cell Cost, Technology, Discharge Period/Life cycles
- PPA Tenure & Tariff
- Counterparty/ Receivable Risk
- Counterparty compliance to ESO and RPO targets
- Cost of Input Power
- Synergies with Group RE Policies
- Colocation and Presence of Transmission Ecosystem

Propellors of upcoming battery technology

- Leading and emerging players are investing heavily in advancing battery technologies like Lithium Nickel Manganese Cobalt (LI-NMC), Li-Iron Phosphate (Li-LFP), and other innovations. This creates significant investment opportunities worth USD 500 Mn in the coming year.

Estimated Battery Prices (USD/ kWh)

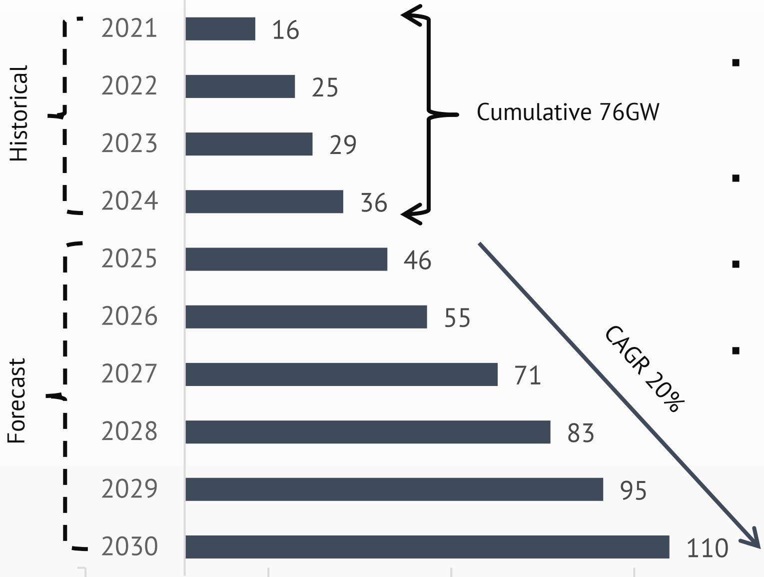


- Battery Cells/ packs contribute 50% to the cost of setting up a BESS Project. The Costs of cells are expected to Decline from USD 95/ kWh in FY 2025 to USD 68/kWh in FY 2030. This will make BESS Projects more affordable in the near future.
- Over the past 10 years, battery costs have fallen over 82%, due to economies of scale and improvements in technology leading to an increase in life and discharge periods.

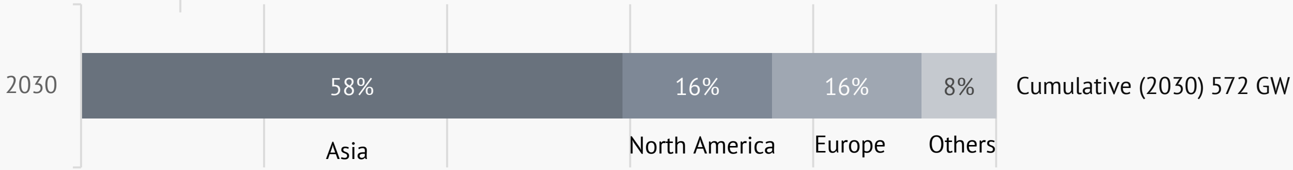
Sources: SBICAPS report, MNRE

Future trends and Investment Opportunity

Global Capacity Additions and Investment opportunities



- With significant growth opportunities in terms of capacity additions towards BESS, Asia is poised to be the largest contributor contributing to about 58% of the total capacity additions.
- RECAI* currently ranks India as the 7th most attractive market in terms of renewable energy investment and deployment opportunities.
- India is the second highest ranked nation is Asia and is on its path towards achieving 500GW of renewable energy capacity by 2030.
- Considering its growth rate and the attractiveness of the market, India offers potential investment opportunities worth USD 42 billion by 2032 in the entire BESS Value chain, making it an attractive destination for both Domestic and International Private Equity Funds and Corporates.



BESS's Future in India

Largest BESS Tenders in India

Agency	Size	VGF Support
Solar Energy Corporation of India (SECI)	1000MW/2000 MWh	No
NTPC Vidyut Vyapar Nigam	500MW/ 1000 MWh	Yes
Rajasthan Rajya Vidyut Vyapar Utpadan Nigam	500MW/ 1000 MWh	No
Gujarat Urja Vikas Nigam Limited	400MW/ 800 MWh	Yes

Recent BESS Developments in India

- IndiGrid, British International Investments, and Norfund form $300 million platform to develop greenfield transmission and BESS projects in India
- BSES Rahdhani Power Limited (BRPL) and Global Energy Allaince for People and Plant (GEAPP) together have launched India's first ever commercial standalone BESS, expected to go live by March 2025.
- In 2024, tenders to develop projects with 3625 MW/8100 MWh of Standalone BESS were floated by various agencies in India.
- GEAPP is targeting 1 GW of BESS commitments in India by 2026, aligning with India's ambitious goal of deploying 47 GW of BESS by 2032.
- NTPC has invited bids to replace diesel generators with BESS (420MW/ 1680MWh) at the NTPC Dadri Thermal power station

- Government support through Viability Gap Funding for Utility scale BESS tenders can prove to be the catalyst for quick and sustainable growth of BESS in India
- The BESS market in India is on the cusp of unprecedented growth, driven by the country's ambitious renewable energy goals and the critical need for grid stabilisation.
- The integration of BESS with electric vehicle charging infrastructure will catalyze urban storage demand, reinforcing India's clean energy transition
- India's energy landscape will transform in the next five years, driven by Battery Energy Storage Systems (BESS) supporting renewable projects. This shift will position India as a global leader in energy storage innovation.
- India's renewable energy and battery storage industry are pivotal in the country's quest for energy security, economic growth, and environmental sustainability. With ambitious targets and supportive policies, India continues to lead the global renewable energy transition, positioning itself as a key player in the renewable energy landscape.

Sources: GEAPP, Mercom India, EY RECAI Report **RECAI- Renewable Energy Country Attractiveness Index*

About the CFI Group

CFI through its global offices brings specialised knowledge, extensive networks, and transactional expertise that are instrumental in driving M&A and fundraising initiatives for companies in renewable energy sector. By partnering with us, renewable energy companies can capitalise on growth opportunities, optimise capital deployment, and navigate complex financial landscapes effectively.

Our Energy Transition team provides best-in-class, cross-border M&A advisory services to family and entrepreneurially owned companies, private equity funds, family offices, venture capitalists, start-ups and publicly traded companies.

Our professionals have global relationships with leading renewable energy companies and financial investors. Thoughtful advice, extensive experience in structuring and negotiating complex transactions, and a sector focus that supports in-depth understanding of trends and developments impacting our clients, has resulted in a track record of long-term relationships with clients seeking extraordinary value.

We hope you find this newsletter informative, and we would encourage you to reach out to our sector specialists (Raj Shroff and Pooja Motani) if you would like to discuss our perspective on current sector trends and M&A opportunities or our relevant sector and transaction experience.

Select Transactions in Energy, Environment and Natural Resources

TOKYO GAS
has acquired minority shares of
RENOVA
buy-side

INFRONEER Holdings Inc.
has acquired
Energy for Tomorrow JWD Japan Wind Development Co., Ltd.
held by
BainCapital
buy-side

TOHO GAS
has sold a minority share to
JPS PHUC SANG MINH GAS ENGINEERING CO., LTD
sell-side

ENVIRONNEMENT RECYCLING
has been acquired by
Ub United
sell-side

amag
has acquired
Helion
from
BOUYGUES ENERGIES & SERVICES
buy-side

SIEMENS Gamesa RENEWABLE ENERGY
Valuation and Fairness Opinion
Valuation

eolos
raised 12M€ growth equity and sold a portion of its shares held by
PRORSUM CAPITAL, eit InnoEnergy, sorigué
to
nazca
capital raising

URBAN CANOPEE
has raised funds with
ARaymond
capital raise

CFI Energy Transition Team

India
Raj Shroff
E: raj.shroff@thecfigroup.com
M: +91 98200 31761

Germany
Andre Wassmann
E: andre.wassmann@thecfigroup.com
D: +491 511 296 1732

Finland
Jaakko Sassi
E: jaakko.sasi@thecfigroup.com
T: +35 840 772 3556

France/ Japan
Mikinao Ikarashi
E: mikinao.ikarashi@thecfigroup.com
M: +33 6 3820 2467

Poland
Piotr Chorzewski
E: piotr.chorzewski@thecfigroup.com
M: + 48 607 196 987

India
Pooja Motani
E: pooja.motani@thecfigroup.com
M: + 91 98191 72225

Spain
Manuel Uribarri Zaranzz
E: manuel.uribarri@thecfigroup.com
M: +34 615 026 526

India
Bharat Kanani
E: bharat.kanani@thecfigroup.com
M: + 91 96190 73529

China
Ning Zhou
E: ning.zhou@thecfigroup.com
D: +861 581 126 9335

Belgium
Dries Bossuyt
E: dries.bossuyt@thecfigroup.com
D: +32(0) 478 389 396

Disclaimer

This market overview is not an offer to sell or a solicitation of an offer to buy any security. It is not intended to be directed to investors as a basis for making an investment decision. This market overview does not rate or recommend securities of individual companies, nor does it contain sufficient information upon which to make an investment decision.

CFI Group its affiliates and/or associated companies will seek to provide investment banking and/or other services to one or more of the companies mentioned in this market overview.

CFI Group, its affiliates and/or associated companies, and/or the analysts who prepared this market update, may own securities of one or more of the companies mentioned in this market overview.

The information provided in this market overview was obtained from sources believed to be reliable, but its accuracy cannot be guaranteed. It is not to be construed as legal, accounting, financial, or investment advice. Information, opinions, and estimates reflect Aarayaa Advisory Services', its affiliates' and/or associated companies' judgment as of the date of publication and are subject to change without notice.

CFI Group, its affiliates and/or associated companies undertakes no obligation to notify any recipient of this market overview of any such change.

Any index included in the document may not be inclusive of all companies in the relevant industry and is not a composite index of that relevant industry's sector returns. Index and sector returns are past performance which is not an indicator of future results.

This market overview is not directed to, or intended for distribution to, any person in any jurisdiction where such distribution would be contrary to law or regulation, or which would subject Aarayaa Advisory Services, its affiliates and/or associated companies to licensing or registration requirements in such jurisdiction.