

Assessing the Development of **Battery Energy Storage Systems** in India



2025

Credits

Authors

Mr Jaideep Saraswat, Associate Director - Clean Power, Electric Mobility and Emerging Technologies, Vasudha Foundation

Mr Nikhil Mall, Senior Manager - Clean Energy, Electric Mobility and Power Sector, Vasudha Foundation

Mr Varun BR, Manager - Power Sector, Vasudha Foundation

Mr Saksham Goel, Assistant Manager - Clean Power & Green Hydrogen, Vasudha Foundation

Mr Tushar Katiyar, Senior Policy Officer - Clean Energy, Vasudha Foundation

Mr Karan Deep Sood, Policy Officer - Clean Energy, Vasudha Foundation

Reviewer

Mr Amit Kumar Singh Parihar, Director, Shakti Sustainable Energy Foundation

Mr Srinivas Krishnaswamy, Chief Executive Officer, Vasudha Foundation

Mr Tanay Tarany, Senior Programme Manager, Shakti Sustainable Energy Foundation

Editorial

Ms Malvika Solanki, Manager - Strategic Outreach & Communication, Vasudha Foundation

Layout Design

Mr Aman Kumar, Assistant Manager - Graphic Design, Vasudha Foundation

About Vasudha Foundation

Vasudha Foundation is a non-profit organisation set up in 2010. We believe in the conservation of Vasudha, which in Sanskrit means the Earth, the giver of wealth, with the objective of promoting sustainable consumption of its bounties. Our mission is to promote environment-friendly, socially just and sustainable models of energy by focusing on renewable energy and energy-efficient technologies as well as sustainable lifestyle solutions.

Copyright

© 2025, **Vasudha Foundation**

D-2, 2nd Floor, Southern Park, Saket District Centre,

New Delhi-110 017, India

For more information, visit www.vasudha-foundation.org

Contents

1. Introduction	1
2. Policy Landscape	3
2.1 National Level Initiatives	3
2.2 State Policy Provisions	5
3. BESS Value Chain	9
3.1 Policy and Regulatory Bodies	9
3.2 Enablers	10
3.3 Implementers	10
4. Stakeholder Insights	11
4.1 Overview of Key Challenges Identified	11
4.2 Recommended Solutions	12
Annexures	13
Figures	
Figure 1: Stakeholder groups in the BESS ecosystem	9
Tables	
Table 1: National level policy provisions	3
Table 2: State policy provisions for BESS	5







1. Introduction

Globally, the transition to clean energy is accelerating to reduce emissions and combat climate change. Central to this shift is the expansion of renewable energy (RE) to help decarbonise the electricity grid. India has witnessed a significant transformation in its energy sector, with installed RE capacity increasing from 58 GW in 2010-11 to 228.2 GW as of March 2025, making it the fourth-largest in the world in terms of installed RE capacity¹. This growth aligns with the country's ambitious target of achieving 500 GW of non-fossil fuel capacity by 2030².

Solar and wind energy dominate India's RE landscape, accounting for 61 percent and 29 percent of the total installed RE capacity (excluding large hydropower plants), respectively¹. Unlike fossil fuel-based thermal power, RE sources are inherently intermittent, posing grid stability and reliability challenges. To address these issues, energy storage solutions and advanced grid management techniques have been identified as key enablers for ensuring a stable RE power supply. As the share of renewables in the energy mix continues to grow, scaling up these support systems becomes increasingly crucial. According to the National Electricity Plan (NEP) 2023³ by the Central Electricity Authority (CEA), energy storage requirement is projected to be 82.37 GWh in the year 2026-27, with 47.65 GWh being contributed from Pumped Storage Plants (PSP) and 34.72 GWh from Battery Energy Storage Systems (BESS). By 2031-32, this requirement is projected to increase to 73.93 GW (411.4 GWh), with PHS contributing 26.69 GW (175.18 GWh) and BESS contributing 47.24 GW (236.22 GWh).

While Pumped Hydro Storage (PHS) projects have a higher gestation period and struggle with site availability, BESS is a preferred solution for short-term energy storage goals. Complemented by modular technology as well as a shorter project implementation timeline, BESS has been given much importance over the past few years. A total of 39 tenders have been released for the installation of BESS projects in India with a standalone BESS capacity of 37,140 MWh from June 2021 to January 2025. Out of this, around 19,020 MWh is in various stages of the tendering process, whereas 11,444 MWh of capacity of projects are in the pipeline⁴. More recently, from the period of Jun-24 to Feb-25, we observe that projects with a cumulative capacity of 11,900 MWh have been tendered with a VGF support of 30 percent. This has aided in further bringing down the tariff to INR 2.19 lakhs/MW/year⁴ for standalone BESS projects. Additionally, tenders are now being released for energy storage along with RE projects in the form of Firm and Dispatchable Renewable Energy (FDRE) and hybrid project tenders.

As of December 2024, the installed BESS capacity in India hovered at around 0.11 GW⁵ against the forecasted requirement of 236.22 GWh by 2031-32, underscoring the need to analyse the BESS ecosystem and identify various gaps, involving all the stakeholders. This report captures the issues highlighted by various government implementing agencies, BESS developers, and Original Equipment Manufacturers (OEMs), including possible solutions, which shall lead to increased deployment of BESS to cater to India's energy storage requirements by 2030.

1 <https://iced.niti.gov.in/>

2 <https://pib.gov.in/PressReleaseframePage.aspx?PRID=2073038>

3 <https://pib.gov.in/PressReleaseframePage.aspx?PRID=1928750>

4 Vasudha Analysis

5 https://cea.nic.in/wp-content/uploads/notification/2025/02/Advisory_on_colocating_Energy_Storage_System_with_Solar_Power_Projects_to_enhance_grid_stability_and_cost_efficiency.pdf

2. Policy Landscape

As the urgency to combat climate change grows, effective policy and regulatory frameworks play a crucial role in accelerating the shift to cleaner energy. Clear guidelines, incentives, and stable regulations help de-risk investments, attracting both domestic and global players to drive RE and energy storage deployment and progress toward net-zero emissions. In fact, 84 percent of global utility-scale renewable capacity growth from 2024-2030 is expected to be policy-driven⁶. Well-defined policies not only set long-term targets but also create investor confidence by ensuring clarity in implementation.

India's RE landscape has evolved through continuous policy adaptation at both the national and state levels. These reforms are now expanding to address storage integration, ensuring smoother grid balancing and higher RE penetration, positioning the country to achieve its target of 50 percent cumulative electric power capacity from non-fossil fuel sources by 2030⁷. This section highlights key national-level policy and regulatory initiatives on BESS, followed by a comparative analysis of policies across 10 Indian states⁸ that together represent over 72 percent of the country's renewable energy potential.

2.1 National Level Initiatives

Table 1 captures the key national-level policy initiatives that have been introduced to promote BESS projects. The initiatives have been described on their key features, financial layout, expected impact, and implementation timeline.

Table 1: National level policy provisions

Initiative	Objective	Key Features	Financial Support	Impact (Achieved/Expected)	Implementation Timeline
Exemption of Basic Customs Duty (BCD) ⁹	Reduce the manufacturing cost of the battery and provide a boost to domestic manufacturing	No import duties on 35 capital goods used to make Electric Vehicle (EV) batteries	NA	Battery manufacturing cost reduction	Announced in the budget of 2025
Co-location of ESS with Solar Projects ¹⁰	Ensure grid stability and peak demand management	10% of installed solar project capacity to have storage	NA	~14 GW/28 GWh energy storage by 2030 ¹¹	Since February 2025
VGF for BESS ¹²	Support BESS deployment for grid stability	13,200 MWh BESS projects, 85% of BESS capacity to be prioritized for DISCOMs	INR 46 lakhs/MWh (or 30% of capital cost) with a total approved budgetary allocation of INR 3,760 crores	Expected to drive BESS LCOS lower for enhanced BESS adoption	From 2023-24 to 2030-31

6 <https://iea.blob.core.windows.net/assets/17033b62-07a5-4144-8dd0-651cdb6caa24/Renewables2024.pdf>

7 [https://pib.gov.in/PressReleaseframePage.aspx?PRID=2073038#:~:text=The%20solar%20photovoltaic%20\(PV\)%20sector,the%20end%20of%20the%20year.](https://pib.gov.in/PressReleaseframePage.aspx?PRID=2073038#:~:text=The%20solar%20photovoltaic%20(PV)%20sector,the%20end%20of%20the%20year.)

8 States Studies- Andhra Pradesh, Gujarat, Rajasthan, Odisha, Tamil Nadu, Karnataka, Telangana, Uttar Pradesh, Maharashtra, Madhya Pradesh

9 https://www.indiabudget.gov.in/doc/Budget_Speech.pdf

10 https://cea.nic.in/wp-content/uploads/notification/2025/02/Advisory_on_colocating_Energy_Storage_System_with_Solar_Power_Projects_to_enhance_grid_stability_and_cost_efficiency.pdf

11 https://cea.nic.in/wp-content/uploads/notification/2025/02/Advisory_on_colocating_Energy_Storage_System_with_Solar_Power_Projects_to_enhance_grid_stability_and_cost_efficiency.pdf

12 <https://pib.gov.in/PressReleaseframePage.aspx?PRID=2118325>

Initiative	Objective	Key Features	Financial Support	Impact (Achieved/Expected)	Implementation Timeline
Waiver of Interstate Transmission Charges ¹³	Promotion of RE deployment and reduction of tariffs for Solar, Wind and BESS projects	Battery energy storage systems that achieve commercial operation on or before June 30, 2025, will be eligible for a 12-year waiver on transmission charges. For projects commissioned post this date, partial charges shall be levied	N/A	Lower tariffs from BESS projects	For projects commissioned till 30 June 2028
Bidding process for the procurement of FDRE power with ESS ¹⁴	To provide firm and dispatchable power to the DISCOMs from renewable energy sources	To provide for a framework for the inter-state/ intra-state, long-term, sale-purchase of power as a further measure to derisk the sector	N/A	To facilitate renewable capacity addition and fulfilment of Renewable Purchase Obligation (RPO)/ Storage Power obligations (SPO). requirement of DISCOMs	Notified by MoP in June, 2023
Battery waste management rules ¹⁵	To promote circular economy in the battery ecosystem	The rules lay out the obligation a manufacturer faces with regard to extended producer responsibility for the battery. The rules also lay out the minimum recycled content to be used for new battery production	N/A	Utilisation of atleast 40% of recycled raw materials in the total dry weight of the battery by 2027-28	Notified in August, 2022
Energy Storage Obligation (ESO) ¹⁶	Ensuring dispatchability of RE	The order requires states to procure energy from Energy Storage Projects, which must utilise at least 85% of their annual energy input for system charging The order mandates states to procure energy from energy storage projects. Such projects shall be utilising minimum 85% of energy, annually, to charge the system	N/A	Promotes procurement of power from BESS projects, leading to increased installation of BESS projects in the states	Notified by MoP in July 2022
Guidelines for Procurement and Utilisation of BESS Battery Energy Storage Systems as part of generation, transmission and distribution assets, along with ancillary services ¹⁷	To facilitate the procurement of BESS for ancillary services, grid support and grid flexibility, and as well as for utilisation of transmission and distribution network	Framework to ensure transparency and fairness in procurement processes	N/A	Expected to provide standardisation and uniformity in processes and a risk-sharing framework for various stakeholders involved in the energy storage ecosystem	Notified in March, 2022

13 <https://powermin.gov.in/sites/default/files/uploads/Orders/B.4.3.pdf>

14 <https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2024/08/202408141698313944.pdf>

15 <https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2023/08/20230828622434477.pdf>

16 https://powermin.gov.in/sites/default/files/Renewable_Purchase_Obligation_and_Energy_Storage_Obligation_Trajectory_till_2029_30.pdf

17 <https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2023/08/202308281880799825.pdf>

Initiative	Objective	Key Features	Financial Support	Impact (Achieved/Expected)	Implementation Timeline
National Programme on Advanced Chemistry Cell (ACC) Battery Storage	Support the manufacturing of advanced chemistry cells used in battery packs	Beneficiary firm has to ensure achieving a domestic value addition of at-least 25% and raise it to 60% within 5 years	Total financial outlay of INR 18,100 crore for a capacity of 50 GWh for a period of 5 years	Boost domestic manufacturing and reduce import dependence	Since 2021



2.2 State Policy Provisions

BESS is increasingly being integrated into state-level renewable energy strategies, but the maturity of policy frameworks varies significantly across the ten states under consideration, as observed in Table 2. Andhra Pradesh leads with a clear target to achieve 25 GWh of BESS by 2030 with comprehensive support for Round-The-Clock (RTC) supply, EV charging, and peak load management backed by exemptions on electricity duty, stamp duty, and SGST. However, it lacks clarity on end-of-life disposal and recycling. Rajasthan is the only state offering detailed tariff-related incentives, including graded exemptions on transmission and wheeling charges based on storage integration level, as part of a broader target of 10 GW of ESS by 2029-30.

Telangana has a sizable BESS target (5.45 GW by FY 2034-35) but does not specify supported use-cases or detailed incentives beyond land and SGST-related benefits. Uttar Pradesh provides a capital subsidy of INR 2.5 crore/MW for utility-scale and standalone solar-powered BESS, linking support directly to capacity and storage duration, though broader regulatory mechanisms are absent.

Meanwhile, Karnataka and Madhya Pradesh include BESS as an enabler for grid balancing and RE firming, but fall short on targets and financial incentives. Gujarat, Odisha, and Maharashtra acknowledge storage only in a limited form, with minimal or indirect provisions. Notably, none of the states have yet developed Extended Producer Responsibility (EPR) norms or disposal frameworks, exposing a critical regulatory gap for managing battery circularity and sustainability. Overall, while the policy intent is strong in a few states, actionable and bankable BESS frameworks remain underdeveloped in most, especially around circularity and long-term operational viability.

Table 2: State policy provisions for BESS

Category	Battery Energy Storage Systems				
	Parameter	Inclusion of BESS in policy or storage roadmap	Target	BESS use-cases supported (e.g., grid support, RE firming, EV charging, commercial storage)	Incentives for BESS (Capital Subsidy, Interest Subvention, VGF, etc.)
Andhra Pradesh	Yes. BESS is explicitly included and promoted for firming RE, peak shifting, and supporting RTC supply	25 GWh by 2030	Yes. Use cases include RE integration, RTC supply, peak load management, and EV charging ecosystem support	Yes. BESS projects are eligible for all RE developer incentives, including exemptions on electricity duty, stamp duty, and SGST imbursements	Not mentioned. There is no specific mention of battery disposal, recycling, or EPR guidelines in the policy
Gujarat	Mentioned indirectly via compliance with MoP's energy storage obligations and grid codes	N/A	Storage for grid support and renewable integration acknowledged	Not detailed in policy	Not discussed

Battery Energy Storage Systems						
Category	Parameter	Inclusion of BESS in policy or storage roadmap	Target	BESS use-cases supported (e.g., grid support, RE firming, EV charging, commercial storage)	Incentives for BESS (Capital Subsidy, Interest Subvention, VGF, etc.)	Disposal and recycling Guidelines / Extended Producer Responsibility (EPR)
Karnataka		Yes. BESS is recognised as a key technology for RE integration, particularly for grid balancing, frequency regulation, and RE firming	N/A	Yes. Use cases include RE firming, peak load management, and frequency regulation. Integration with EV charging infrastructure is encouraged.	Not specifically mentioned in terms of financial incentives like VGF or subsidies. However, the policy encourages adoption and integration into RE projects	Not mentioned in the policy document
Madhya Pradesh		Yes, BESS is recognised as a key part of RE integration, grid stabilisation, and flexibility enhancement in the state's energy vision	N/A	Supported use-cases include grid support, RE firming, ancillary services, and round-the-clock power supply	No direct mention of capital subsidy, VGF, or interest subvention specific to BESS projects in the policy	Not mentioned. The policy does not include any provisions related to EPR or recycling/disposal of battery systems
Maharashtra		N/A	0.05 GW by 2025	Grid Support	N/A	N/A
Odisha		Yes	N/A	N/A	OERC shall support battery storage incorporation with a suitable and feasible promotional tariff design	N/A
Rajasthan		Yes, BESS is included explicitly under the storage plant section	Overall ESS target of 10 GW by 2029-30	Use-cases mentioned include grid stability, reliability enhancement, RE firming, and EV charging	<p>Transmission and wheeling charge exemptions for BESS:</p> <ol style="list-style-type: none"> RE-integrated BESS (up to 2,000 MW or by 2030): <ul style="list-style-type: none"> » 75% exemption for BESS up to 5% of RE capacity (for 7 years) » Additional 1% exemption per 1% storage capacity increase beyond 5%, up to 30% » 100% exemption for BESS above 30% of RE capacity Standalone BESS: <ul style="list-style-type: none"> » 100% exemption on transmission and wheeling charges for 7 years for power supplied during peak or non-solar hours BESS at 11kV/33kV substations: <ul style="list-style-type: none"> » 100% exemption on transmission and wheeling charges for 7 years 	No specific mention of disposal, recycling, or EPR norms for BESS in the policy
Tamil Nadu		N/A	N/A	N/A	N/A	N/A

Battery Energy Storage Systems						
Category	Parameter	Inclusion of BESS in policy or storage roadmap	Target	BESS use-cases supported (e.g., grid support, RE firming, EV charging, commercial storage)	Incentives for BESS (Capital Subsidy, Interest Subvention, VGF, etc.)	Disposal and recycling Guidelines / Extended Producer Responsibility (EPR)
Telangana		Yes, it is included	3.39 GW by FY 29-30 5.45 GW by FY 34-35	Not mentioned explicitly	<ol style="list-style-type: none"> 1. Deemed non-agricultural status will be accorded for land utilised for the development of projects 2. 100% reimbursement of stamp duty will be given for land purchased to set up PHP projects 3. Exemption from the Land Ceiling Act 4. Supervision charges levied by TGTRANSCO/TGDISCOMs will be reimbursed to the PHP developer 5. 50% net SGST reimbursement will be given for fixed capital investment incurred for the project 	N/A
Uttar Pradesh		Mentioned in the 2022 Solar Policy under 'Solar Power Project with Storage Systems'	N/A	N/A	Capital state subsidy of INR 2.50 crore per megawatt will be provided to utility- scale solar power projects set up with 4 hours battery storage system of 5 MW capacity or above and a standalone battery storage system (energised by solar energy only) for sale of power to distribution licensee/UPPCL	N/A



3. BESS Value Chain

To understand the challenges that persist in BESS project implementation and to find targeted solutions, it is necessary to take stock of the various stakeholders participating in the ecosystem. As depicted below in Figure 1, three primary categories of stakeholders influence BESS project implementation.

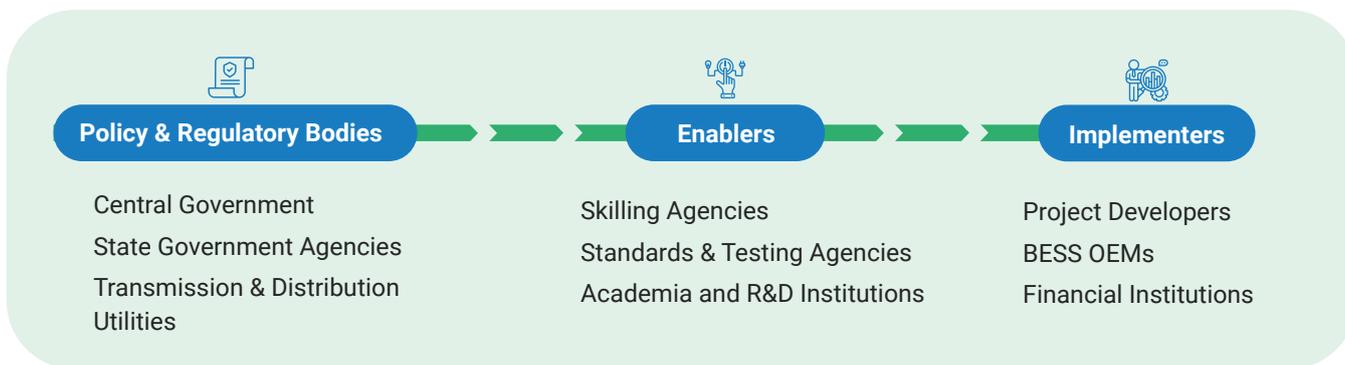


Figure 1: Stakeholder groups in the BESS ecosystem

3.1 Policy and Regulatory Bodies

As detailed in the previous chapter, a stable policy and regulatory framework is of utmost importance for de-risking RE and energy storage projects, driving more investment into the sector, ensuring smoother implementation of the projects, and thereby leading to faster adoption in the country's energy mix. There are three major stakeholder groups concerning policy and regulatory affairs:

» Central Government Bodies

The central government bodies play an important role in formulating India's policy and regulatory frameworks. The centre is expected to draw guidelines, launch subsidies, and release mandates, nationwide, for the states to gain guidance and make their state-wise policies for the implementation of RE and energy storage projects. Schemes and policies, as discussed in the above section, are created by the central bodies with the interest of the project developers/consumers in mind. The central authorities, such as Solar Energy Corporation of India (SECI) and other Renewable Energy Implementation Agencies (REIAs), are also responsible for project tendering and implementation on a national scale. The central government agencies approached for this study include the Ministry of New and Renewable Energy (MNRE), and the Solar Energy Corporation of India (SECI).

» State Government Agencies

State agencies oversee the entire project lifecycle, from tendering to commissioning. Their responsibilities include potential assessment, forecasting future demand, formulating state-specific RE policies, allocating land for projects, introducing state-level subsidies, and managing project tendering and implementation in alignment with projected demand. The state government agencies considered as part of this study are shown in Annexure-1.

» **Transmission and Distribution Utilities**

Transmission and distribution utilities play a crucial role in shaping the RE landscape of the country. As the custodians of the electricity grid, they are responsible for the efficient evacuation of power from RE plants and providing off-taker guarantees to RE projects. Reliable power facilitated through energy storage systems not only facilitates the integration of more RE into the grid but also helps Distribution Companies (DISCOMs) reduce their dependence on fossil fuels, enabling them to procure green energy from RE projects for supply to both domestic and commercial consumers in their regions. Annexure-2 captures the list of stakeholders operating at the state level and considered for our study..



3.2 Enablers

While policy and regulatory bodies create a favourable environment for the development of BESS projects, the continued growth of the BESS sector also depends on a skilled workforce, ongoing research into new technologies, and robust testing processes to ensure the quality of power. Organisations that offer skilling programmes for the workforce and those involved in the research and development of emerging BESS technologies have been identified, as shown in Annexure-3.



3.3 Implementers

While policy-making organisations and enablers lay the foundation for the future of RE in India and work towards developing a skilled workforce, the role of implementers is crucial in turning the country's RE potential into reality through energy storage project development. For the requirements of this study, participation was sought from institutions captured in Annexure-4.





4. Stakeholder Insights

In-person interactions with various stakeholders of the BESS ecosystem were conducted to gain a holistic view of the BESS ecosystem in India. The stakeholders belonged to various facets of the ecosystem, as described in the previous section. These interactions played a crucial role in identifying the gaps in the ecosystem, and coming up with solutions that may be deployed to counteract the same, leading to an accelerated deployment of BESS projects.



4.1 Overview of Key Challenges Identified

- 💡 **Lack of Installed Capacity Data:** Since the technology is still in its initial stages of deployment, there is a lack of clarity regarding the installed projects in India. The lack of a central repository for tracking the installed projects, akin to other RE technologies, such as wind and solar energy, is a gap identified by the industry.
- 💡 **High Cost of BESS System:** Although the global cost of BESS has declined, it remains relatively high in the Indian context, posing challenges for widespread adoption. In 2023, the government of India came out with VGF for BESS, which aims to reduce the cost of storage for DISCOMs and consumers. However, stakeholders remain cautious about the overall landed cost of BESS and how the ecosystem will respond once the VGF support is phased out.
- 💡 **Lack of BESS Production Units in India:** The lack of BESS production units in India is a key challenge, as BESS units are currently being imported as complete systems rather than assembling them locally. While a few battery companies have plans to set up BESS assembly units in the future by importing Li-ion cells and other components, they are hesitant to establish their own cell manufacturing facilities due to the lengthy approval process and the rapidly evolving nature of BESS technology.
- 💡 **Lack of Regulatory Clarity:** Developers are still unclear about various market mechanisms for battery as a service and the applicability of GST on power supplied via BESS projects.
- 💡 **Lack of Tendering Regime/State Targets for BESS Capacity:** A review of clean energy policies across various states reveals that while many have set targets for the installation of renewable energy technologies, most lack specific targets for BESS. Additionally, only a few states have undertaken studies to estimate their energy storage system (ESS) requirements by 2030.
- 💡 **Rapid Technological Evolution:** The fast-paced advancements in BESS technologies pose challenges for manufacturers and developers. Keeping up with technological changes requires continuous investment in research and development, and flexibility in project planning.
- 💡 **Lack of Clarity on Ancillary Services Market:** There is insufficient clarity regarding how BESS can be compensated for providing ancillary services, such as black start capability, reactive power injection, frequency control, and voltage control. This ambiguity hampers the ability of the BESS operators to tap into additional revenue streams and impacts the economic viability of storage projects.
- 💡 **Unclear Integration Guidelines for BESS with Solar Rooftop Systems:** There are no clear guidelines or frameworks for integrating BESS with solar rooftop systems, leaving developers and consumers unsure of the feasibility, technical requirements, and regulatory hurdles involved at the decentralised/distributed level. This lack of clarity creates uncertainty in the design and deployment phases of projects.



4.2 Recommended Solutions

- ⚡ Establishing a central repository to track the progress of BESS projects at the national-level would enhance transparency and build confidence among developers and financial institutions.
- ⚡ The government should lead by installing more pilot-scale BESS projects across various regions. These projects can serve as demonstration units, helping validate the technology's feasibility, reduce uncertainties, and guide future large-scale deployments. It will also provide insights into the performance of BESS systems in diverse conditions.
- ⚡ Forum of regulators should look into the alternative use-cases of BESS apart from just energy arbitrage. Effective guidelines with regard to the utilisation of BESS for the same should be looked into, and market mechanisms should be devised keeping the same in mind.
- ⚡ To address the lack of clarity around compensating BESS for ancillary services, regulatory frameworks should be established to define how BESS can contribute to grid stability, including reactive power, frequency regulation, and voltage control. Proper compensation structures and market incentives should be set up to ensure that BESS providers are adequately rewarded for their role in maintaining grid reliability.
- ⚡ Clear guidelines and technical standards should be developed for integrating BESS with solar rooftop systems. These guidelines should focus on both the technical feasibility of such integrations and the regulatory process involved, ensuring that rooftop owners can maximise their energy storage capabilities while adhering to grid requirements. Additionally, the government can offer incentives to encourage this integration and smooth the deployment process.
- ⚡ To enhance grid stability, the PM-Surya Ghar Yojna should mandate high-consumption residential consumers to integrate energy storage solutions equivalent to their connected capacity, as a prerequisite to avail subsidies. This will improve self-consumption and reduce grid stress.



Annexure-1

State authorities stakeholder mapping

State	State Nodal Agency
Andhra Pradesh	New & Renewable Energy Development Corporation of Andhra Pradesh Ltd
Gujarat	Gujarat Energy Development Agency
Karnataka	Karnataka Renewable Energy Development Limited
Madhya Pradesh	Madhya Pradesh Urja Vikas Nigam Ltd
Maharashtra	Maharashtra Energy Development Agency
Odisha	Odisha Renewable Energy Development Agency
Rajasthan	Rajasthan Renewable Energy Corporation Limited
Tamil Nadu	Tamil Nadu Green Energy Corporation Ltd
Telangana	Telangana Renewable Energy Development Corporation
Uttar Pradesh	Uttar Pradesh New and Renewable Energy Development Agency

Annexure-2

State distribution utility and state transmission utility stakeholder mapping

State Distribution Utility Stakeholder Mapping		
State	Organisation Type	Organisation Name
Andhra Pradesh	State Distribution Utility	Andhra Pradesh Southern Power Distribution Company Limited
	State Transmission Utility	Transmission Corporation of Andhra Pradesh
Gujarat	State Distribution Utility	Gujarat Urja Vikas Nigam Limited
	State Transmission Utility	Gujarat Energy Transmission Corporation Limited
Karnataka	State Distribution Utility	Bangalore Electricity Supply Company Limited
	State Transmission Utility	Karnataka Power Transmission Corporation Limited
Madhya Pradesh	State Distribution Utility	MP Paschim Kshetra Vidyut Vitran Company Limited
	State Transmission Utility	Madhya Pradesh Power Transmission Company Ltd.



State Distribution Utility Stakeholder Mapping		
State	Organisation Type	Organisation Name
Maharashtra	State Distribution Utility	Maharashtra State Electricity Distribution Company Ltd.
	State Transmission Utility	Maharashtra State Electricity Transmission Company Limited
Odisha	State Distribution Utility	TP Central Odisha Distribution Limited
	State Transmission Utility	Odisha Power Transmission Corporation Limited
Rajasthan	State Distribution Utility	Jaipur Vidyut Vitran Nigam Limited
	State Transmission Utility	Rajasthan Rajya Vidyut Prasaran Nigam Limited
Tamil Nadu	State Distribution Utility	Tamil Nadu Power Distribution Corporation Ltd
	State Transmission Utility	Tamil Nadu Transmission Corporation Limited
Telangana	State Distribution Utility	Telangana State Northern Power Distribution Company Ltd
	State Transmission Utility	Transmission Corporation of Telangana Limited
Uttar Pradesh	State Distribution Utility	Noida Power Company Limited
	State Transmission Utility	UP Power Transmission Corporation Limited

Annexure-3

BESS enablers stakeholder mapping

Battery Energy Storage	
Skilling Agencies	Skill Council on Green Jobs
	National Institute of Solar Energy
Standards & Testing Agencies	TUV SUD
Research and Development & Academia	National Institute of Solar Energy
	India Energy Storage Alliance

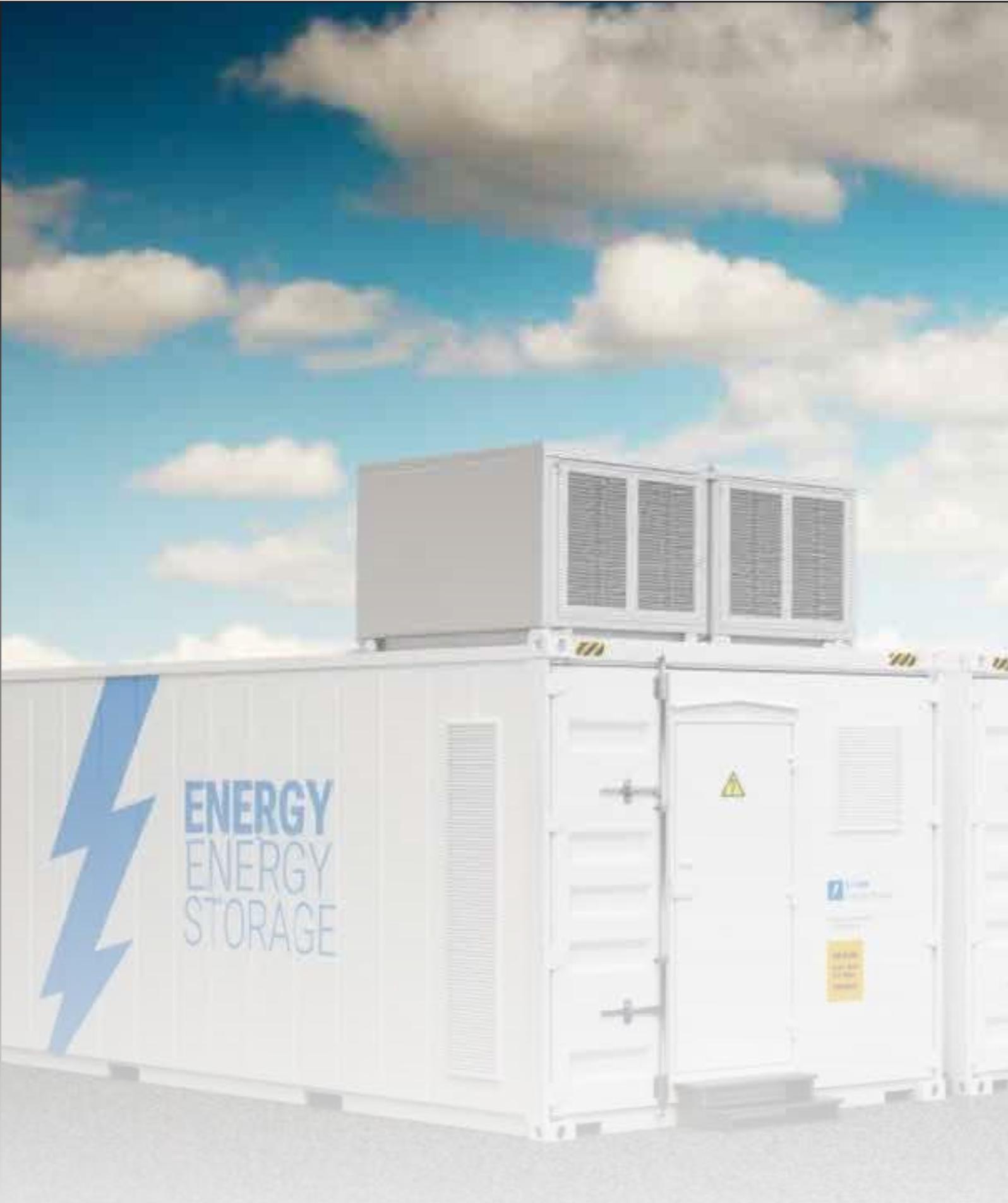
Annexure-4

BESS implementers stakeholder mapping

BESS Developer	Anvi Power
Battery Manufacturer	SuKam
	Cygni Energy
BESS Consultancy	India Energy Storage Alliance
Financial Institutions	Asian Development Bank
	World Bank



NOTES



• **Vasudha Foundation**
• D-2, 2nd Floor, Southern Park,
• Saket District Centre, New Delhi-110 017, India
• www.vasudha-foundation.org