

POLICY AND REGULATORY FRAMEWORK TO ACCELERATE ENERGY STORAGE DEPLOYMENT IN INDIA

Recommendations from Businesses



Knowledge Contributors



A member of PETRONAS group



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1. Introduction

As the Government of India is in an early stage of shaping the policy and regulatory framework for energy storage in the country, this brief collates inputs from businesses on ways to strengthen the framework and policy measures to ultimately accelerate the energy transition. The recommendations in this brief are directed at the central government.

With a population of 1.4 billion people and significant economic development underway, India is forecasted to account for 40% of the world's additional energy demand by 2040¹ and plans to meet a large majority of this growing energy demand from renewable energy sources. The share of renewable power in the electricity mix has increased from 15% in 2016 to 41% of total installed power plants capacity in 2022 and India targets to increase this figure to 50% by 2030. The next challenge that India faces, like most other countries across the world with increasing share of variable renewable generation sources, is to ensure stability and resilience of the power grid. To handle the expected increase in supply and demand variability, energy storage is seen as a quintessential solution and is increasingly being adopted by countries across the world, led by China, the US and Europe.

Ensuring flexibility, i.e., the ability of electrical grids to balance variable supply and demand cost-effectively at all timescales, is an even bigger challenge for India than most other countries leading the energy transition. According to IEA's World Energy Outlook 2021, the increase in supply and demand side variability is expected to result in a three-fold increase in flexibility needs for the Indian power system between 2020 and 2030 as compared to a 40% increase in other markets like the US, the EU and China.

At the same time, leading businesses in India have set ambitious net-zero emission targets, and cost-effective paths to net-zero emission include sourcing a high percentage of power requirements from renewable sources. The routes and timely action to achieving the national as well as individual corporate targets are intertwined with each other and will require concerted efforts by businesses, policy makers, regulators as well as local stakeholders.

Several analytical studies² in the last two years have focused on solutions to the grid stability challenge in India. Energy storage is seen as a critical part of the portfolio of solutions recommended by these

- 1 International Energy Agency (2021, February), India Energy Outlook 2021 <https://www.iea.org/reports/india-energy-outlook-2021>
- 2 Central Electricity Authority (2020), Report on Optimal Generation Capacity Mix for 2029-30 https://cea.nic.in/old/reports/others/planning/irp/Optimal_mix_report_2029-30_FINAL.pdf;
Abhyankar N., Deorah S., Phadke A., (2021, December), Least-Cost Pathway for India's Power System Investments through 2030, Lawrence Berkeley National Laboratory https://eta-publications.lbl.gov/sites/default/files/fri_india_report_v28_wcover.pdf
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Prayas (Energy Group). (2021, October). PIER: Modelling the Indian energy system through the 2020s. <https://www.prayaspace.org/peg/publications/item/512>

studies to enhance grid flexibility in addition to solutions like demand side response and flexible operation of existing fossil-fuel based power plant fleet.

The Government of India has already started to put in place a strong policy and regulatory foundation to support the growth of energy storage. This includes an energy storage obligation similar to the renewable purchase obligation for renewable power at the national level, revising the ancillary services regulation in 2022, issuing large-scale standalone energy storage as well as hybrid renewable power and energy storage tenders, and proposing relevant changes to India's Energy Grid Code (IEGC) in Draft IEGC 2022 with respect to resource adequacy reserves required for grid balancing.

2. Our Approach

In May 2002, India Energy Storage Alliance (IESA) and World Business Council for Sustainable Development (WBCSD) formed a partnership to focus on the policy and regulatory aspects of the energy storage market. We worked with power generation, transmission and distribution companies, power end-users, energy storage service providers and financial organizations to collate their recommendations to support and strengthen the early-stage development of the policy and regulatory framework for energy storage deployment in the country.

This brief presents the collective policy and regulatory recommendations from over 25 companies on priority action areas for the central government to accelerate energy storage deployment.

The actions are presented in order of priority, agreed by the contributing companies through a survey and in-person discussions. The inputs submitted by the businesses have been reviewed by former policy regulators, including Mr Rakesh Nath, former Chairman, Central Electricity Authority (CEA), as well as civil society organizations with a policy expertise, including the Regulatory Assistance Project and Trilegal.

The participating companies were mobilized through the WBCSD-led collaborative platform comprising companies across the renewable energy and energy storage value chains in India, which helps businesses collaborate and find solutions to common issues faced in the deployment of energy storage systems.

3. Policy and Regulatory Recommendations by Businesses

1. A strict compliance framework for implementation of energy storage obligations

The recent Ministry of Power guideline has defined a year-on-year energy storage obligation for distribution utilities, open access consumers and captive power producers across the country - starting from 1% in 2023-24 and reaching 4% of their total electricity consumption by 2030. This is a welcome step in providing a clear market direction. To ensure that this target guides market growth and is adhered to by obligated entities, more needs to be done.

Recommended actions for the central government:

- a) The Ministry of Power in collaboration with the national electricity system operator, the Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FoR) should encourage state governments and state energy regulatory commissions to revise their renewable purchase obligations (RPOs) to include energy storage obligations over and above the minimum required targets set by the central government and aligned with the respective state's renewable power growth trajectory before the end of 2022.
- b) Put in place a strict compliance framework with a combination of appropriate incentives and penalties for obligated entities to act on the set obligations. For instance, the central government could offer a capital incentive to support the first few energy storage installations by obligated entities in the country to encourage early-stage adoption. A penalty can be linked to the level of achievement of the obligation target and should be imposed strictly.

2. Lower barriers to market entry

Currently, a combination of basic customs duty (20%), goods and services tax (GST) (18%) and a social welfare cess (2%) on li-ion batteries, which are majorly being used in all new energy storage installations in India, has a dampening effect by further increasing the cost of energy storage systems at a time when the technology is in its initial stage of adoption. As new technologies and market applications of energy storage are emerging, cost barriers for all types of energy storage technologies should be kept at the minimum level possible. This may be required for an initial period of 2-3 years to boost the confidence of entities looking to invest in energy storage while the market is still at a nascent stage of development.

Reduction of import duties from 20% to 5% and GST from 18% to 5% would result in a net reduction of around 25% in project costs in the case of li-ion batteries. This is likely to provide the distribution utilities with a commercially viable way to meet their energy storage obligation and make renewable

power combined with energy storage cost competitive with commercial and industrial tariffs in most states.

Moreover, the market to provide energy storage as a service should be opened to all stakeholders, including renewable energy developers. While the Green Open Access rules 2022 put in place a framework for energy storage to be provided as a service, various renewable energy developers are still not eligible to provide this service to clients, like in the case of renewable energy through corporate power purchase agreements. Allowing renewable energy developers to provide this service will, in turn, let commercial and industrial consumers aggregate demand to access the cheapest source of energy storage solution through a purchase contract.

Recommended actions for the central government:

- a) Import duties on batteries to be used in energy storage systems should be reduced from the existing level of 20% to 5% at least during 2023-2025, while domestic manufacturing capacity is expected to be built in line with the approved bids for advanced chemistry cell manufacturing in India under the Government of India's production linked incentive scheme. Once domestic capacities are operational, the import duty could be increased in a gradual and phased manner to reach the existing level of 20%.
- b) Applicable GST on batteries and other energy storage technologies should be at 5% to start with and can gradually increase as and when the market matures or after a couple of years, just like it was done in the case of solar power equipment.
- c) Tweak the definition of 'intermediary procurer' in guidelines for procurement and utilization of battery energy storage systems (BESS) issued by the Ministry of Power in March 2022 to allow developers and solution providers to provide battery-as-a-service to multiple end consumers as part of the same agreement.

3. Implementation of safety standards reflective of Indian climatic conditions

Appropriate safety standards are critical to guide new product development and propagation of existing technologies. While India has adopted the relevant International Electrotechnical Commission (IEC) and Underwriters Laboratories (UL) standards for energy storage systems, effective implementation of safety standards relevant for tropical climatic conditions in India is quintessential. This will help in avoiding instances of battery fires and safety hazards related to other technologies and will help boost consumer confidence in relevant energy storage technologies. The new standards should be applicable to all existing and emerging energy storage technologies.

The Bureau of Indian Standards (BIS) has established the Electrotechnical Department (ETD) 52 as a committee for improving safety standards for energy storage systems, battery management systems and li-ion cells. At present, BIS has adopted IS 16046 (Part 2):2018/ IEC 62133- 2:2017 for secondary cells and batteries containing alkaline or other non-acid electrolytes, IS 17092 for electrical energy storage systems and IS 17387:2020 for battery management systems.

Recommended actions for the central government:

- a) There is a need for BIS to revise safety standards for energy storage systems in line with the operating conditions in India with immediate effect. For instance, relevant technical requirements for the operation of energy storage systems in tropical climates must be added to the existing standards.

- b) There is also a need to ramp up capacities of existing testing facilities and add new ones to certify energy storage systems to ensure effective implementation of the revised safety standards. The central government should collaborate with research institutes and business to put in place the testing facilities and encourage the private sector to also do the same.

4. Opening up of ancillary services market

India does not have a well-functioning open market to incentivize the adoption of technology solutions that can offer grid balancing support. There is a need to ensure effective functioning of the ancillary services market, not only to encourage energy storage deployment but also to ensure that right technologies and solutions can support the grid at the time of requirement. The CERC revised the ancillary services regulations earlier in 2022. While the revised regulation allows a market-based mechanism for rewarding services as part of tertiary reserves, it does not provide that for secondary reserves and keeps primary reserves out of its scope. The government has indicated its intent to allow participation of energy storage systems in the primary reserve category through the draft India Electricity Grid Code (IEGC).

Recommended actions for the central government:

- a) Ensure timely implementation of draft IEGC 2022 that allows for storage to be a part of primary reserve.
- b) Put in place a market-determined pricing mechanism for services as part of secondary and primary reserves based on the performance and response time of various technology solutions, albeit with provisions to switch to a regulated framework in cases of emergency.
- c) Learn from other countries' experience concerning the payment mechanism to encourage uptake of the most suitable technology on the grid.

For instance, to reward technologies as per their response time appropriately, India could adopt a similar detailed approach as taken by the UK by defining response times to the seconds. The payment mechanisms for ancillary services in the UK are directly linked to performance factors, which are dependent on the availability of the service. The services are paid as per the quality of service provided. Moreover, services are well categorized as per the response times—sub-second, 1 second, 10 seconds, 30 seconds, 5 minutes and 30 minutes.

5. Integration of energy storage in grid planning

Planning for energy storage systems should be well integrated with power transmission, distribution and generation planning in India. The draft IEGC 2022 already puts in place a mechanism for states to plan for adequate primary, secondary and tertiary reserves in the power system for frequency control. However, there is a need to ensure that states are equally involved with grid planning at the central level and that their respective grid requirements are considered.

Recommended actions for the central government:

- a) The Central Electricity Authority (CEA) and FoR should encourage collaboration and joint grid planning by national, regional and state load dispatch centers and distribution utilities.
- b) Penalties should be mandated for load-shedding by distribution utilities to encourage them to actively participate in the grid planning exercise and keep adequate reserves to balance variability in the power system rather than resort to load-shedding.

6. End-of-life treatment norms of energy storage systems

The Ministry of Environment, Forest and Climate Change released the revised Battery Waste Management Rules 2022 in August 2022. This was a much-needed revision of the 'Batteries (Management and Handling) Rules 2001', which were only applicable to lead-acid batteries.

Putting in place appropriate recycle, reuse and disposal rules for energy storage systems right when the market is beginning to develop ensures that manufacturers can take required measures at the system design stage. This also avoids a waste problem at the end of product life for energy storage systems. Now that the standardized rules are in place, the same can be included in contracts signed between supply and demand side companies.

There is a high reuse potential of batteries used in electric vehicles for stationary applications. The energy storage market could improve material use efficiency if used batteries could be safely adopted for stationary applications. This could alleviate critical material shortages in both the short and long term and boost the sustainability of energy storage systems.

Recommended actions for the central government:

- a) The Ministry of Environment, Forest and Climate Change, Ministry of Power and Ministry of New and Renewable Energy should collaborate to put in place clear norms for the reuse of second life batteries, required licenses and appropriate procedures to be followed.

7. Supply chain security assessment at the national level

Nations across the globe are facing supply chain issues threatening to impact growth strategies of various economies. Having a clear assessment of supply chain risks and a definite plan for material procurement is also very relevant for India while planning to adopt energy storage to progress on its energy transition and provide a clear outlook of the energy storage market to all stakeholders.

Recommended actions for the central government:

- a) The government should undertake a material security study to evaluate the country's short, medium and long-term access to raw materials required for energy storage systems and other new energy technology solutions.

5. Call to Action

Energy storage solutions are needed to meet the flexibility needs of the power system in India. They are critical to ensure grid stability and reliance as the share of renewable power increases in the power mix, and so does absolute electricity demand and its variability. Given that new storage technologies and market applications are emerging rapidly, it is crucial for the government and industry to collaborate while setting the policy and regulatory framework for energy storage deployment in India. The table below summarizes action points, as recommended by businesses and civil society organizations, for various ministries and stakeholder like the CEA and FOR at the central government level to improve the existing policy and regulatory framework.

The private sector has shown high interest and eagerness to support progress in the energy storage market as evident from the oversubscription of energy storage tenders and advanced chemistry cell manufacturing tenders for batteries. A collaborative approach between the government and business can go a long way in ensuring sustainable growth for the energy storage market.

Table: Business recommendations to the Government of India to accelerate energy storage deployment

S. No.	Recommendations – Key action points	Key government stakeholders (and the initiating organization in bold text)	Need for close coordination with state authorities
Policy framework			
1.	Lower entry barriers for technologies and stakeholders: Import duty reduction, GST reduction, opening energy as a service market to renewable energy developers and solution providers	Ministry of Power, GST Council	
2.	Safety standards reflect operating conditions in India: Addition of technical specifications for operation of energy storage systems in tropical climatic conditions in India	Bureau of Indian Standards	
3.	Integration of energy storage in grid planning: Collaboration of national load dispatch centers with regional and state dispatch centers for grid planning; penalties for load shedding	Central Electricity Authority, Forum of Regulators, Distribution Utilities, National Load Dispatch Center, State Load Dispatch Center	✓

S. No.	Recommendations – Key action points	Key government stakeholders (and the initiating organization in bold text)	Need for close coordination with state authorities
4.	Appropriate norms and procedures for use of second life batteries in stationary energy storage applications	Ministry of Environment, Forest and Climate Change; Ministry of Power, Ministry of New and Renewable Energy	
5.	Supply chain resilience assessment: Evaluation of raw material needs for energy storage systems in the short, medium and long term	Ministry of Power, Ministry of New and Renewable Energy	
Regulatory Provisions			
1.	Compliance framework for energy storage obligations: Encourage states to include storage obligations in revised RPOs; putting in place a strict compliance framework for meeting storage obligations	Ministry of Power, National Load Dispatch Center, Central Electricity Regulatory Commission, Forum of Regulators, Distribution Utilities	✓
2.	Opening up of ancillary services market: Allowing energy storage to provide primary reserve; market-determined mechanism for services provided as part of secondary and primary reserves	Central Electricity Regulatory Commission, Ministry of Power	

6. Partners for this Report



We Mean Business is a global non-profit coalition working with the world's most influential businesses to take action on climate change. Together we catalyse business leadership to drive policy ambition and accelerate the transition to a low-carbon economy. Our mission is to ensure that the world economy is on track to avoid dangerous climate change by 2020 while delivering sustainable growth and prosperity for all.

CLIMATE GROUP

Climate Group drives climate action. Fast. Our goal is a world of net zero carbon emissions by 2050, with greater prosperity for all. We focus on systems with the highest emissions and where our networks have the greatest opportunity to drive change. We do this by building large and influential networks and holding organisations accountable, turning their commitments into action. We share what we achieve together to show more organisations what they could do. We are an international non-profit organisation, founded in 2004, with offices in London, New Delhi and New York.

Acknowledgements



India Energy Storage Alliance (IESA) is a leading industry alliance focused on the development of advanced energy storage, green hydrogen, electric mobility and microgrid technologies in India. Founded in 2012, by Customized Energy Solutions (CES), IESA's vision is to make India a global hub for R&D, manufacturing, and adoption of advanced energy storage, e-mobility, and green hydrogen technologies.

Over the years, IESA has worked diligently with policy makers, industry stake holders and consumers to create awareness of energy storage technologies for transforming India's electric grid in coming decade. IESA also provides insights on the policy landscape, business opportunities and market entry support in this space in India through frequent interaction with all key stakeholders.

The alliance has been at the forefront of efforts seminal in shaping an enabling policy framework for the adoption of energy storage, electric mobility, green hydrogen, and emerging clean technologies in India. IESA closely work with MNRE, MoP, CEA, CERC, DHI, Ministry of Mines, DST, MoEFCC, MoRTH, NITI Aayog and other state and central government organisations.

Today IESA is a proud network of 160+ member companies, encompassing industry verticals from energy storage, EV manufacturing, EV charging infrastructure, green hydrogen, microgrids, power electronics, renewable energy, research institutes & universities, and cleantech start-ups. IESA also closely work with 30+ global partners. With close to a decade of experience, IESA provides its member network a holistic eco-system to network and grow their business in India and world-over by providing in-depth analysis of the market, facilitating dialogue between industry and government stakeholders, and providing the latest skill-development training.

For expanding the industry, IESA have launched 15+ new initiatives, including MICRO (Microgrid Initiative for Campus and Rural Opportunities), MOVE (Moving Onward Vehicle Electrification), IESA Academy (Skill Development Initiative), MIGHT (Mobility and Infrastructure with Green Hydrogen Technology), Industry-Academic Partnership, Global Start-up Cohort Program (Innovation and Start-up), IESDB (India Energy Storage Database), IESA Store (Online Product Portfolio), IESA- Lead acid Battery Forum (I-LAB), Energy Storage Safety & Standards Taskforce, IRR (IESA Recycle & Reuse Initiative), Beyond Batteries Initiative (Mechanical, Thermal, Gravity), Global Energy Storage Index (GESI), Make In India (IESA Manufacturing, raw materials, components and equipment focused Initiative), ESSMEET (Energy Storage Adoptions for C&I Consumers), IESA EV Adaptors Club (IESA-EAC) and IESA-Women in Energy Network (IESA-WE), India Battery Supply Chain Council (IBSCC), etc. These initiatives support IESA member companies to stay ahead of the curve.

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WBCSD's work on Energy Storage

WBCSD's project on 'Accelerating energy storage deployment in India' has put in place a collaborative platform for over 25 companies across the renewable energy and energy storage value chain in India. This report has been based on inputs received from these companies and our partner organizations. This work is funded by We Mean Business.

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About WBCSD

WBCSD is the premier global, CEO-led community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net zero, nature positive, and more equitable future.

We do this by engaging executives and sustainability leaders from business and elsewhere to share practical insights on the obstacles and opportunities we currently face in tackling the integrated climate, nature and inequality sustainability challenge; by co-developing "how-to" CEO-guides from these insights; by providing science-based target guidance including standards and protocols; and by developing tools and platforms to help leading businesses in sustainability drive integrated actions to tackle climate, nature and inequality challenges across sectors and geographical a regions

Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD \$8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. Since 1995, WBCSD has been uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability, united by our vision of creating a world in which 9+ billion people are living well, within planetary boundaries, by mid-century.

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