

Market Research Report

 India

BESS Ecosystem Series

Examining the BESS Market Potential for the Commercial & Industrial Consumers in India to aid the Go-to-Market (GTM) for BESS Manufacturers

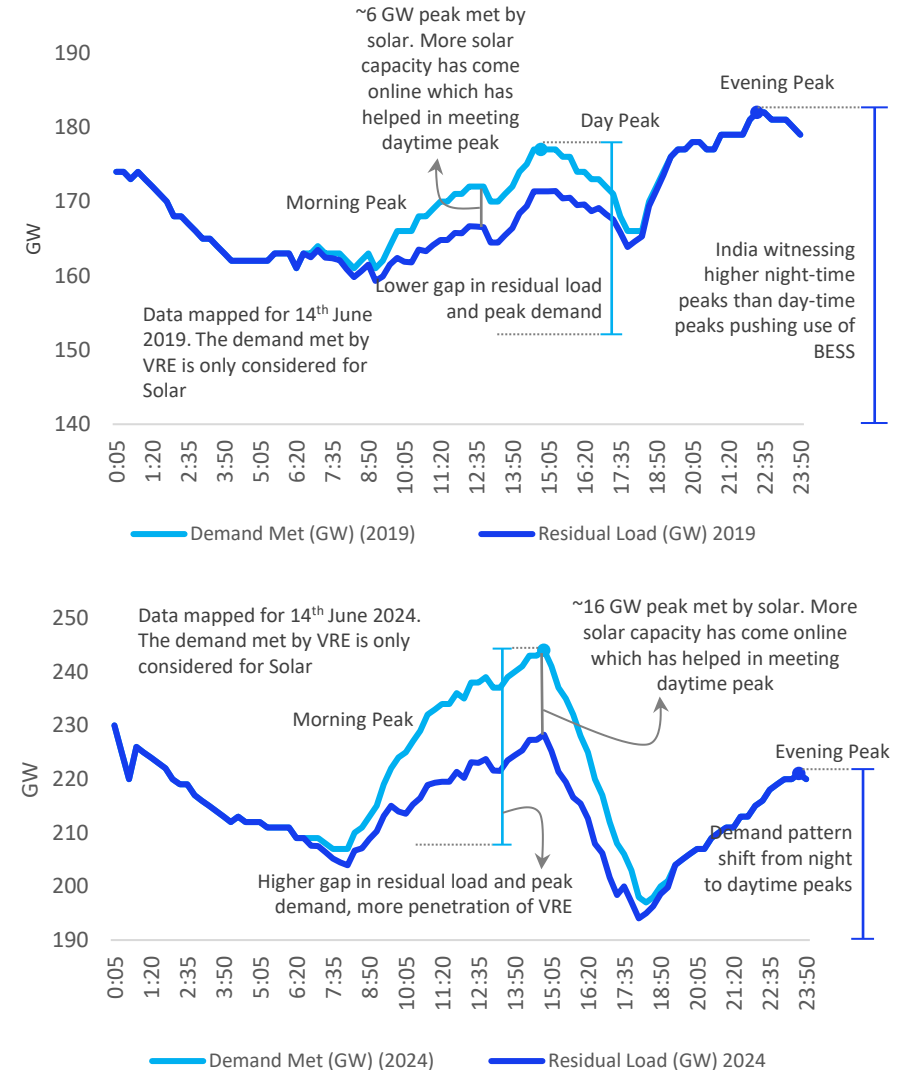
Publishing On: November 2024

Why this market research report?

The contribution of Variable Renewable Energy (VRE) in addressing peak demand has shown steady growth, with India experiencing a shift in demand patterns from predominantly high nighttime peaks in 2019 to more pronounced daytime peaks by 2024. This adjustment in demand and the increasing influence of VRE, particularly solar energy (the focus of this analysis), is clear between 2019 and 2024 in India. We have analyzed the peak demand and the residual load on a specific day in July of both 2019 and 2024, along with the amount of solar generation on that day, and its role in meeting the peak demand. The peak demand shaving has grown nearly 10 GW in a time-span of 5 years from 2019 to 2024.

The business case for energy storage is thus strong in the India especially if the focus is upon the C&I consumers. The evening peak shift also indicate greater C&I consumer off-take in daytime apart from a shift observed in the agricultural load patterns in the last 5 years. India has shown considerable growth in demand from C&I consumers and the off-take through open access route has been on the rise in past few years. But the concern through OA route has been the reliability of RTC power which can be addressed through more reliable battery energy storage systems (BESS). For behind-the-meter applications BESS can be adapted on wider scale as the cost of BESS systems have been going down despite the demand-fulfilment ratio (DFR) of 80%-90% being maintained. The use case of BESS for C&I consumers could be further enhanced due to lowering costs and the possibilities to reduce contracted demand from the distribution utilities thereby increasing their savings upon the demand charges in electricity bills. Furthermore, with growing RE capacity the increase in their utilization is anticipated in the country which can be best supported by ESS only.

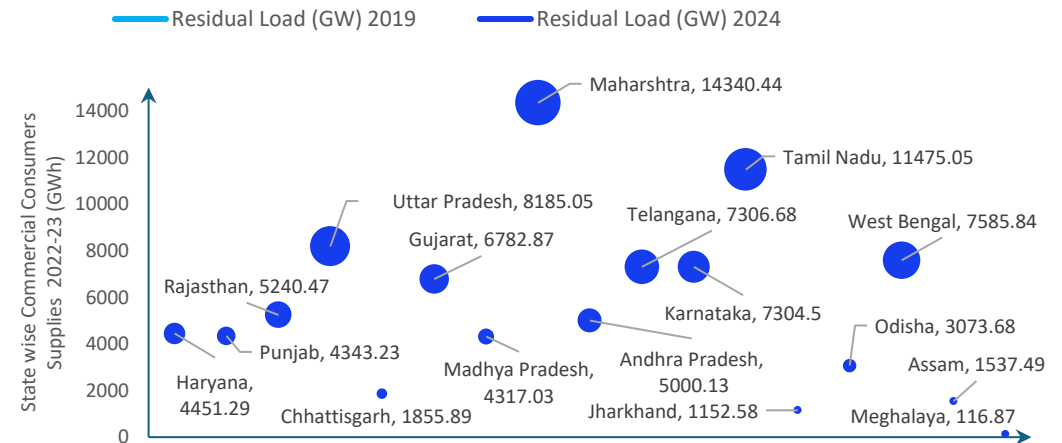
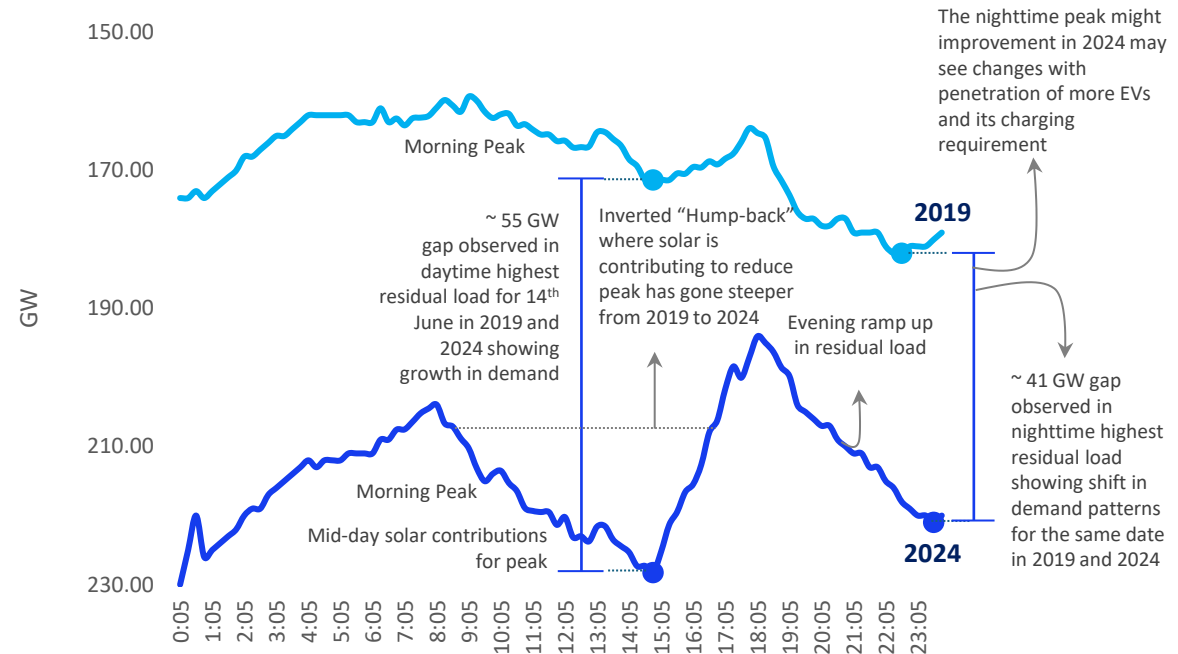
The key objective of the report is to identify the demand pockets for BTM BESS application in India for C&I Consumers requirement from 30 kWh to 10 MWh and FTM application of more than 10 MWh. Also, to conduct the cost benefit analysis for BESS application for C&I consumers with 'Decision-to-Invest' (D2I) Model



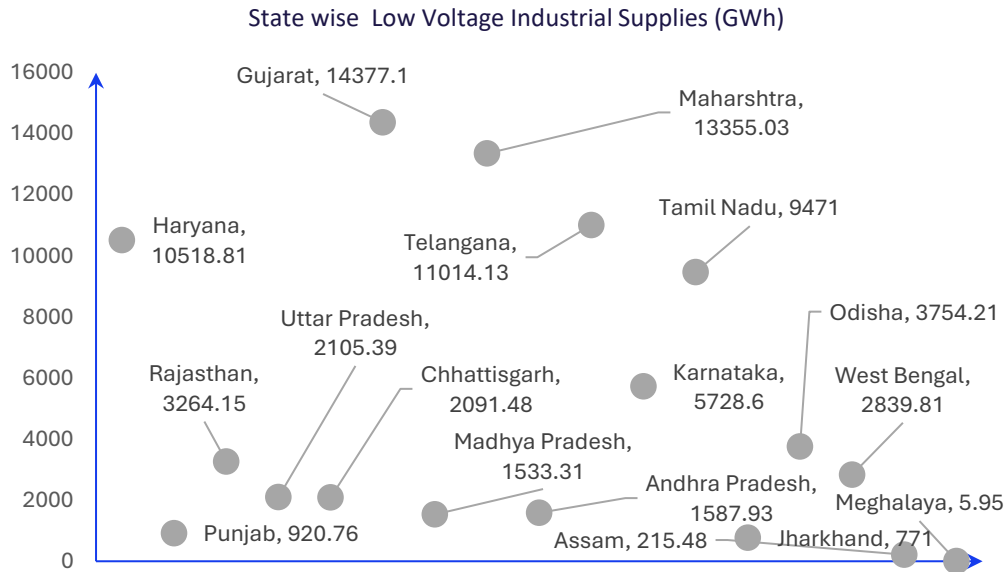
Why can BESS be a game changer for C&I Consumers in India?

India has consistently seen the rise in power demand through 2019 to 2024 and interestingly despite the nighttime load shifts to daytime in 2024, the gap in the nighttime peak is whopping 41 GW. With the advent of electrification in the transportation mix the nighttime peak might rise faster than anticipated which may further put pressure on the must-run plants to run round-the-clock and thereby forcing the additions from fossil backed plants. This in turn shall lead to a cascading impact of low utilization of existing and upcoming renewable energies, amidst greening of the grid drive by Gol and higher contributions from fossil-based plants due to the lack of suitable energy storage systems whether standalone BESS, pumped hydro stations or any other form. The challenge is more prominent at nighttime when the evening ramp up is required at fast pace if the fossil plant is not under must run status, then acute power demand-supply gap can be witnessed which can be countered by energy storage systems aptly.

Moreover, with almost all the state's where the manufacturing is on the rise the demand of power from C&I consumers are also rising consequently. Ideally, majority of these C&I consumers should have been grid connected by a shift is observed in the pattern with more C&I consumers preferring open access route from renewables at large due to savings and benefits of using green power. Particularly, the said route is gaining fast popularity among consumers in less than 10 MW size for which BESS solutions shall be ideal in behind-the-meter applications. For the BESS OEMs/developers the opportunity beckons in very large spectrum in states of Gujarat, Maharashtra, Tamil Nadu and Karnataka etc. Also, it is anticipated that the BESS would be suited for commercial and low voltage industrial consumers first and then gradually may see applications for the higher voltage industrial consumers.

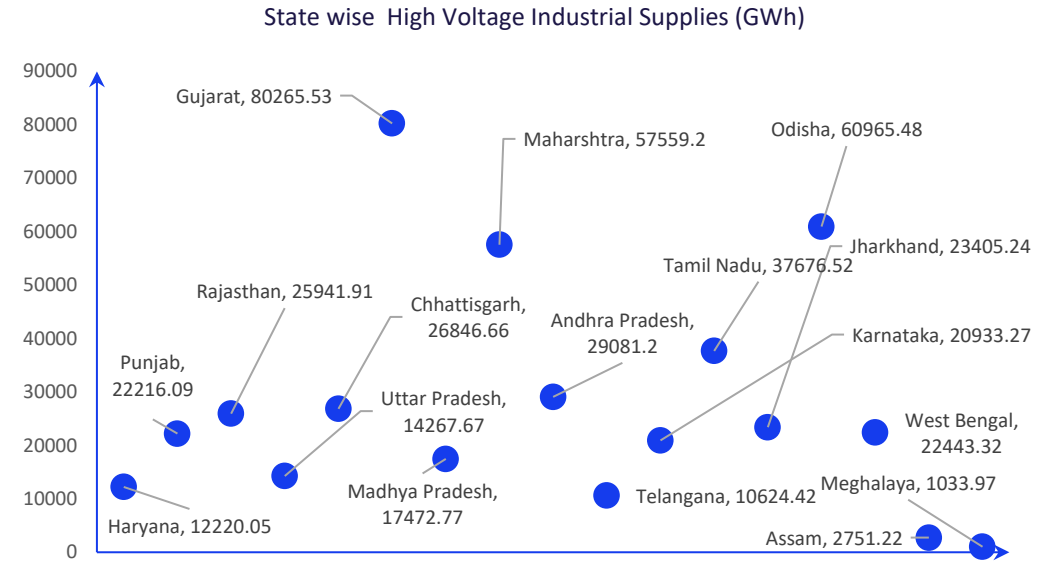


Growing base for C&I consumers shall be a determining force for BESS market applications in India



Source: POSCO, CEA, eninrac research & analysis

The growing market size for C&I consumers as evaluated under three categories of commercial consumers, low voltage industrial consumers and high voltage industrial consumers and their respective supplies in GWh reveal that Gujarat, Maharashtra, Odisha, Tamil Nadu & Andhra Pradesh evolve as top five states. States of Rajasthan, Karnataka, West Bengal, Chhattisgarh & Telangana follow in as next five. It is quite evident that OA route is also getting a spike in terms of procurement in these state's and with rising commercial and low voltage industrial consumers north bound growth signals significant opportunity for BESS BTM application. The suitability for LDES and FTM application are favorable for Gujarat, Maharashtra, Odisha, Tamil Nadu, Andhra Pradesh, Chhattisgarh and Rajasthan. The deployment of BESS should follow a cohesive approach by developers in order suit their requirement.



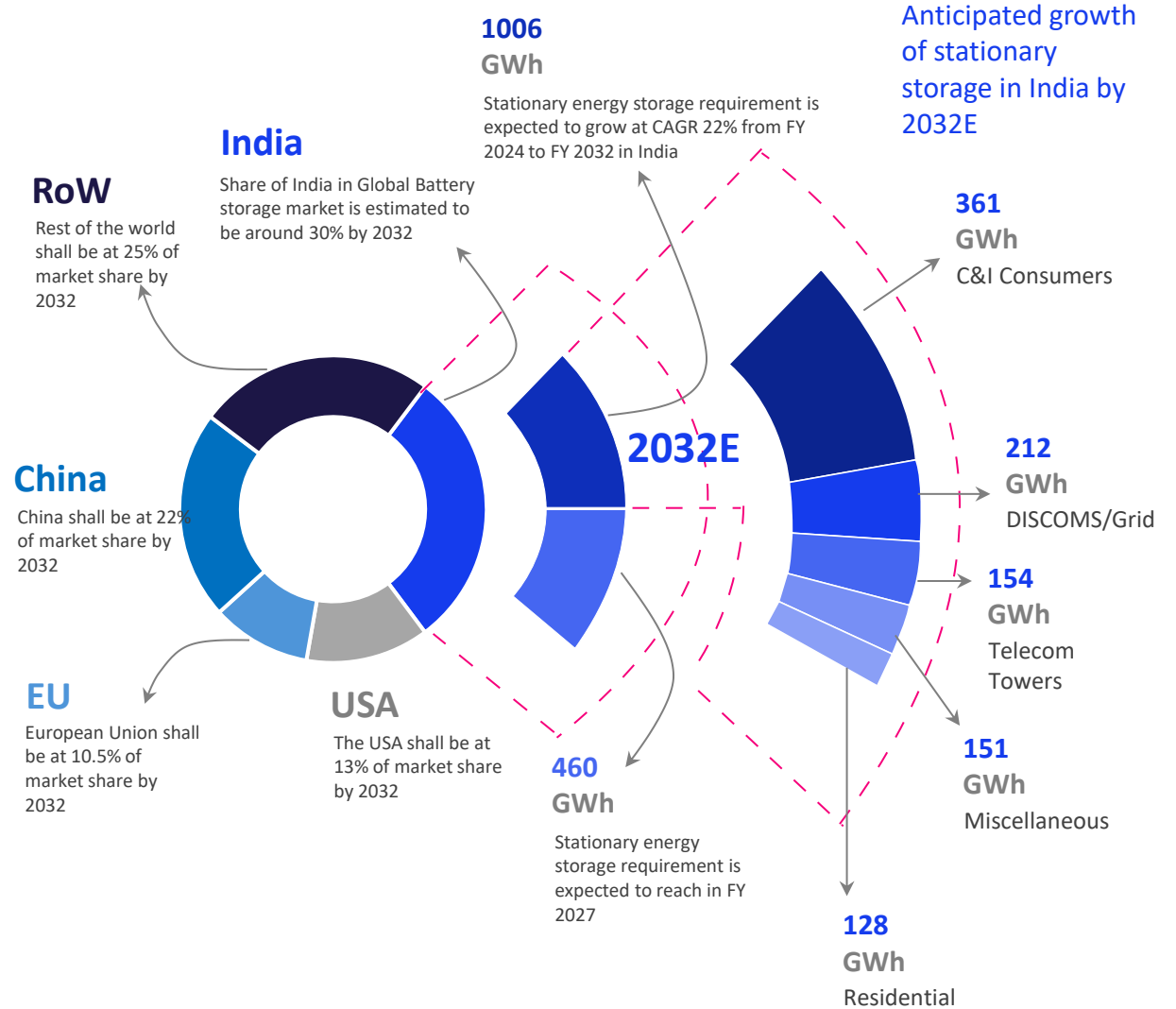
Source: POSCO, CEA, eninrac research & analysis

Furthermore, the opportunity size for BESS applications of >10MWh size shall be state's where the high voltage industrial consumers are more in numbers. For, instance Haryana still powers a huge chunk of industrial consumers through utilization diesel based captive power units which is not fit for environment. The advent of open access route has been there in Haryana, but the regulations are somewhat unfavorable for the route to completely prosper with the regulations favoring intra-state OA route as compared to inter-state. However, the state has also shown progress in adapting renewables as source of energy generation coupled with intrastate OA. With BESS systems the need for FTM applications shall be on the rise at the developers end and need for setting up captive facilities may witness a rise supporting BESS adaptation by renewable power plant developers especially by state's having more industrial consumers.

Key Signpost - India is estimated to be the largest stationary storage market globally by 2032

India is expected to lead the battery storage market over the long-term on the back of robust renewable targets especially solar power and strong growth of customer-end demand. As per estimates from IEA and eninrac analysis India is anticipated to be around 30% of the global market share by 2032 whereas China is anticipated to be at 22% of the global market. In India, the growth coming from C&I consumers shall be driving the growth of stationary storage in the country. It is anticipated that the country shall witness around 460 GWh of stationary storage capacity by 2027 and 1006 GWh by 2032. However, these rates appear to be very optimistic given the current capacity of stationary storage in the country and its deployment. Although, in near future the momentum may rise for the BESS additions and even if we reach nearly 50%-60% of the forecasted capacities by 2032 it would have a significant market for BESS OEMs to expedite.

The commercial & industrial use case for stationary storage in India is anticipated to reach around 361 GWh by 2032, followed by Grid requirement of around 212 GWh, replacement of DG sets in telecom towers through BESS shall see a demand of 154 GWh and residential demand contributing to 128 GWh by 2032, respectively. Also, the cost economics shall play a key role as per duration of stationary storage and for a high demand growth country like India the stationary storage systems shall be ideally fit for systems designed for 4 hours or more.



Source: IEA, eninrac research & analysis

Eninrac's Difference Margin for Market Research on BESS for C&I Consumers

Prima facie lack of credible market information is another challenge poised to be addressed and at eninrac our focus is to aim for studying the markets which are multi-layered and have challenges for each core segment of market be it input, process or output. Therefore, we are channelizing our resources to deliver an industry first dossier of its kind for BESS market for C&I consumers in India which covers market sizing for BESS in India, growth potential of BESS with ecosystem infrastructure focus, demand pockets in India with state wise focus for behind the meter (BTM) application as per BESS size, demand pockets in India with state wise focus for front to meter (FTM) application as per BESS size, examining suitability of BESS adaptation by C&I consumers on regional basis and cost benefit analysis of BTM and FTM applications in the country etc. aligned with a database of C&I consumers willing to adapt to BESS for both BTM and FTM application.



What's eninrac's difference margin for market research?



1 Our Market Research Coverage Range



2 Our Market Research DNA & Team of Domain Specialists



3 Our Satisfied Patrons and Retention rate of over 97.6% on yoy basis

- Assessing business case of BESS for C&I consumers in India
- BESS BTM market location fitment analysis in India
- Evaluating cost competitiveness BTM BESS applications in India – Decision to Invest Model
- BESS FTM market location fitment analysis in India
- Evaluating cost competitiveness FTM BESS applications in India – Decision to Invest Model

- We boast a highly qualified and experienced team of market research professionals having experience of working in top companies across different domains
- Our focus on nurturing industry connect is paramount which helps us generate high quality robust market feed which is filtered and sourced through from different levels
- Any market research report follows strict turn-around-time procedures with cross-vetting from our Knowledge Grid Experts which adds immense value to our research credentials for the deemed subject

We have been bestowed with a phenomenal client retention rate and many satisfied clientele. Our clients have been from wide variety of industry domains and from different geographic locations across the globe. Eninrac consulting is a trusted market research partner and an objective resource augmenting value for more than 557+ group companies & 1252+ market research delivered

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Potential in India

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Chapter 01	Executive Summary
Chapter 02	Assessing Market Size of BESS in India
Chapter 03	Examining BESS Market Growth Potential in India
Chapter 04	Demand Pocket Identification for Behind-the-Meter (BTM) BESS Application in India
Chapter 05	Demand Pocket Identification for Front-the-Meter (FTM) BESS Application in India
Chapter 06	Assessing Suitability of BESS Adaptation for C&I Consumers in Northern India
Chapter 07	Assessing suitability of BESS adaptation for C&I consumers in Southern India

Chapter No.	Chapter Name
Chapter 08	Assessing suitability of BESS adaptation for C&I consumers in Eastern India
Chapter 09	Assessing suitability of BESS adaptation for C&I consumers in Western India
Chapter 10	Understanding C&I Consumers Operational Requirement for BESS Deployment
Chapter 11	Cost Benefit Analysis for BTM BESS Application in India (>30 kWh < 100 kWh)
Chapter 12	Cost Benefit Analysis for BTM BESS Application in India (≥ 100 kWh < 1 MWh)
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Chapter 14	Cost Benefit Analysis for FTM BESS Application in India (≥ 10 MWh)
Chapter 15	Use case determination for BESS applications for BTM consumers (≥ 100 kWh <1 MWh)



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Chapter 16	Use case determination for BESS applications for BTM consumers (≥ 100 kWh < 1 MWh)
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Chapter 18	Cost Benefit Analysis for FTM BESS Application in India (≥ 10 MWh)
Chapter 19	Cost reduction plan & innovative revenue channels with sustainable business models for BTM BESS players
Chapter 20	Demand Pocket Identification for Front-the-Meter (FTM) BESS Application in India
Chapter 21	VoC Compendium
Chapter 22	C&I Database for BESS BTM & FTM Application
Chapter 23	Conclusion



Key Highlights for BESS Market Potential for the C&I Consumers in India to aid the GTM for BESS Manufacturers

1. Assessing market size for BESS in India
2. Examining BESS market growth potential in India
3. Demand pocket identification for Behind-the-Meter (BTM) BESS application in India
4. Demand pocket identification for Front-the-Meter (FTM) application in India
5. Cost benefit analysis for BTM BESS application in India
6. Cost benefit analysis for FTM BESS application in India
7. Assessing key consumer suitability for BESS adaptation
8. Identifying opportunities for peak shaving and load shifting using BESS for C&I consumers
9. Quantifying financial benefits for BESS deployment
10. State wise use case customization with sensitivity integrated such as – state energy policy, grid concerns & RE penetration



Differentiating Insights for Market Research on BESS Market Potential for the C&I Consumers in India

1. Developing a decision-to-invest model for the C&I consumers
2. Evaluating revenue generation opportunities for the consumers
3. C&I database for BESS BTM & FTM application
4. Operational flexibility assessment
5. Voice of consumer survey to identify consumers specific requirements & challenges
6. Determination of use cases where BESS can maximum value – (a) demand response (b) power backup solutions (c) RE integration
7. Identifying the cost reduction plan & innovative revenue channels with sustainable business models for BTM & FTM BESS players
8. Quantifying financial benefits for BESS deployment
9. Cost reduction plan & innovative revenue channels with sustainable
10. Use case determination for BESS applications for BTM consumers



Must Buy For

- RE Developers
- BESS Developers
- Power Generation Companies
- Commercial Players
- Industrial Players
- Datacenters
- Lithium-ion Battery Cells Manufacturers
- Battery System Manufacturers
- System integration service providers
- Consulting Agencies
- Government Agencies
- SECI
- Discoms
- Regulatory Authorities
- Investment Banks
- Funding Bodies



For Queries

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Companies Mentioned

- Tata Power
- Fluence
- EnerTech – Ener Cube
- AES Corporation
- HBL Systems
- Toshiba Corporation
- Siemens
- ABB India
- Gensol Engineering
- Hero Future Energy
- Ayana Power
- Delta Electronics
- Amara Raja Group
- KORE Power
- Battrixx
- EVE Power
- Good Enough Energy
- Replus Engitech
- Cygni Energy
- XDLE
- Ballard Power System

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