

TITLE OF THE PROJECT:

**“A Study On Financial Feasibility of Expanding Production
Capacity for Battery Storage Solutions in Powerica Ltd”**

STUDENT NAME: RAKSHITH H P

REGISTER NAME: P03AD22M015128

GUIDE NAME: PROF. SANJAY CHARI

CHAPTER 1:

INTRODUCTION AND INDUSTRY PROFILE

CHAPTER 1

INTRODUCTION AND INDUSTRY PROFILE

1.1 Detailed Theoretical Background of the Study

Manufacturing Industry Profile:

Original Equipment Manufacturing (OEM) in Battery Storage Solutions

Overview:

The global energy world is rapidly evolving, and renewable energy sources such as solar and wind are steadily gaining ground strength. This transition to clean energy sources has led to a growing demand for energy storage solutions to address outage issues and ensure grid stability. In this context, battery storage solutions have emerged as a key technology to store excess energy during times of high production capacity and release it when needed, enabling a more efficient and reliable energy supply.

Original Equipment Manufacturing (OEM):

Original Equipment Manufacturing (OEM) plays a central role in the battery solutions industry by designing, manufacturing and supplying critical components and systems for energy storage applications. OEMs are responsible for manufacturing a wide range of products, including lithium-ion batteries, battery management systems (BMS), inverters, chargers and other related equipment.

1.1.1 Industry Definition:

Battery Storage Solutions

Definition:

The battery storage solutions industry involves the design, manufacture, installation and maintenance of systems that store electrical energy in batteries for later use. These solutions play a key role in improving the reliability, efficiency

and sustainability of power generation, transmission and distribution systems. Battery storage solutions enable the integration of renewable energy sources, grid stabilization, peak load, load shifting and backup power applications in various sectors.

1.1.2 Scope:

➤ Products and technologies:

Industry includes a wide range of battery storage products and technologies, such as:

➤ Lithium-ion batteries:

They are the most often used battery technology for high energy density, long thanks to the service life and fast charging capacity.

➤ Lead Acid Batteries:

Despite being an older technology, lead acid batteries are still used in certain applications, especially stationary energy storage systems.

➤ Flow batteries:

These batteries store energy in liquid electrolytes, offering scalability and long-term storage suitable for grid-scale applications.

➤ Advanced Battery Management Systems (BMS):

BMS optimizes battery performance, safety and longevity by monitoring, controlling and optimizing the charging and discharging processes.

➤ Inverters and power conversion systems:

These devices convert DC stored in batteries to an AC source compatible with power grids or loads.

1.1.3 The Powerica Ltd.'s Battery Storage Financial Feasibility Study Can Contribute to Business, Society and Academia:

➤ Business:

*** Strategic Decision Making:**

The study provides valuable information on the economic viability of increasing the production capacity of battery storage solutions. With this

information, Powerica Oy can make informed strategic decisions regarding investment in production facilities, resource allocation and market expansion.

*** Mitigating Risk:**

By conducting a thorough financial feasibility analysis, studies can help identify potential risks and challenges associated with expansion. In this way, Powerica Oy can develop risk management strategies and secure its financial resources and reputation.

*** Competitive advantage:**

Successfully expanding the production capacity of battery storage solutions can improve the competitiveness of Powerica Ltd in the market. This allows the company to respond to growing demand, take advantage of new opportunities and differentiate itself from competitors.

*** Market Positioning:**

The results of the study can direct Powerica Ltd. to position itself as the market leader in battery storage solutions. Demonstrating a commitment to innovation and sustainability through expansion can enhance a company's brand and attract investors, customers and partners.

➤ **Society:**

*** Environmental Impact:**

Increasing the production capacity of battery storage solutions can contribute to the transition to a more sustainable energy ecosystem. By promoting the integration of renewable energy sources and reducing dependence on fossil fuels, Powerica Oy can help curb climate change and promote environmental protection.

*** Energy Availability:**

Battery storage solutions play an important role in improving energy availability, especially in remote or off-grid areas. By expanding production

capacity, Powerica Oy can help improve energy reliability and sustainability, thereby improving the quality of life of communities and businesses.

*** Economic Growth:**

Research results can lead to job creation and economic growth by investing in production facilities, developing infrastructure and expanding the supply chain. This can have a positive impact on the local economy, promoting entrepreneurship, innovation and prosperity.

➤ **Academia:**

*** Study Contribution:**

The study adds information to the feasibility analysis of renewable energy financing, especially in relation to battery storage solutions. Scholars and researchers can use the study's methodology, findings, and insights to inform further research and analysis in related fields.

*** Educational Resource:**

The research paper can be a valuable learning resource for students and researchers interested in renewable energy, finance and business management. Case studies and real examples from Powerica experience can enrich academic curricula and improve learning outcomes.

*** Collaboration opportunities:**

Powerica Ltd and university collaborations can promote information exchange, joint research projects and interdisciplinary collaboration. This can lead to mutually beneficial partnerships, innovation and the development of practical solutions to complex energy problems.

Overall, a study on the financial feasibility of expanding the production capacity of Powerica Ltd.'s battery storage solutions can bring significant benefits to business, social welfare and academic research.

1.2 Industry Profile/ Survey/ Industry Back Ground of the Study:

1.2.1 Global, Country and Regional Outlook for Sector Growth:

➤ Global View:

The global battery storage market has experienced significant growth, which is mainly due to the increasing adoption of renewable energy sources and the need for energy storage solutions to solve the problems of interruptions. According to various market reports, the global battery storage market is expected to grow significantly in the coming years, with an estimated compound annual growth rate (CAGR) of more than 20% during the forecast period. The main regions influencing growth are North America, Europe, Asia Pacific and emerging economies, where government initiatives, favorable policies and technological advancements are driving the market growth.

➤ National Perspective:

In the country where Powerica Ltd operates, it is important to look at the national policies, regulations and market dynamics that shape the battery industry. National energy policies focused on clean energy transitions, carbon reduction targets and grid modernization will play a crucial role in driving demand for battery storage solutions. Government incentives, subsidies and mandates for renewable energy integration and energy storage deployment will further accelerate the growth of the battery storage industry at the national level.

➤ Regional Outlook:

Regional outlook may vary depending on factors such as geography, climatic conditions, energy infrastructure and industrial development.- In regions with high renewable energy sources such as solar and wind, demand for battery storage solutions is particularly high to manage energy fluctuations and ensure grid stability.- Regional initiatives, collaborations and investments in energy storage infrastructure will promote industrial growth and promote regional economic development and sustainability.

1.2.2. The Role of the Battery Storage Sector in Supporting and Growing Related Industries:

➤ Renewable energy sector:

Battery storage solutions play a vital role in the integration. of renewable energy sources such as solar and wind energy, grid connection.- By storing excess energy generated during peak production periods and supplying it during low production periods, battery storage helps overcome the intermittency problems associated with renewable energy sources, facilitating their wider adoption.- The growth of the battery storage sector is closely linked with the expansion of the renewable energy sector, as both industries complement each other to achieve sustainable energy goals.

➤ Electric Vehicle (EV) Industry:

The battery storage sector is the main means of electrifying transportation through the production of advanced lithium-ion batteries used in electric vehicles.- As the demand for electric vehicles increases globally due to air pollution, energy security and climate change, the battery storage sector will benefit from the growing demand for electric vehicles.- Collaboration between battery manufacturers, automakers and decision makers is essential to stimulate innovation, improve battery technology and increase production to meet the growing demand of the electric vehicle industry.

➤ Network Infrastructure and Energy Management:

Battery storage solutions increase the resilience and efficiency of electricity networks by providing auxiliary services such as frequency regulation, voltage support and peak load. Providing battery storage systems at the grid level improves grid reliability, reduces transmission and distribution losses and optimizes energy management, supporting the growth of related industries related to grid infrastructure and smart grid technologies. The integration of battery storage with advanced energy management systems, micro grids and demand response programs offers opportunities for synergy between the battery storage sector and other sectors involved in network modernization and energy optimization.

➤ **Energy Storage R&D and Production:**

Expanding production capacity for battery storage solutions at companies such as Powerica Ltd will accelerate the growth of the energy storage R&D and production ecosystem.

Investments in research, development and innovation lead to technical progress, cost reductions and performance improvements in battery technologies that contribute to a competitive market landscape.

Collaboration between academia, industry and government accelerates innovation and strengthens the supply chain of critical materials, components and manufacturing processes in the energy storage sector. By understanding the global, national and regional aspects of sector-specific growth and realizing the role of the battery storage sector in supporting and growing related industries, Powerica Ltd can effectively strategize its expansion plans and take advantage of emerging opportunities in a dynamic. development energy landscape.

1.2.3 Contribution to The GDP of The Country and to Economy in General (Indian or World)

➤ **Promotion of the Indian economy:**

- **GDP growth:**

Increasing the production capacity of battery storage solutions can contribute to economic growth by stimulating investment, creating jobs and promoting innovation. An increase in the operations of Powerica Ltd would mean an increase in production, which would directly affect the Gross Domestic Product (GDP) of India.

- **Job Creation:**

An increase in production capacity usually leads to new jobs in various sectors, including manufacturing, research and development, sales and logistics. Expanding the operations of Powerica Oy would require a qualified workforce to manage the increased production, which would contribute to employment in the country.

- **Technology Transfer and Innovation:**

Investing in capacity building often requires the adoption and development of new technologies. This process can lead to technology transfer, knowledge diffusion and innovation in the domestic economy. Powerica Ltd.'s initiatives to improve battery storage solutions can lead the technological development of the Indian energy storage sector.

- **Supply Chain Impact:**

Expanding production capacity would also increase demand for raw materials, components and support services, benefiting various sectors of the economy, including suppliers, transport and logistics companies.

- **Export Potential:**

Once Powerica Ltd.'s battery storage solutions gain recognition in the domestic market and meet international standards, there are export possibilities for these products. This can encourage foreign exchange earnings and further boost economic growth.

- **Impact on the global economy:**

- **Market growth:**

Global demand for battery storage solutions is growing rapidly due to, among other things, the transition to renewable energy, electrification of transportation and network modernization. Powerica Ltd.'s capacity expansion would help meet this growing global demand and thus support the growth of the global energy storage market.

- **Competitive Advantage:**

A successful expansion of production capacity would improve the competitiveness of Powerica Ltd in the global market for battery storage solutions. By offering quality products at competitive prices, Powerica Ltd can capture a larger share of the global market and contribute to increased exports and revenues.

- **Technology Leadership:**

By investing in R&D, Powerica Ltd can drive innovation and technological advances in battery storage solutions. This can position the company as a global leader in the field, attracting international investments, partnerships and collaborations and further contributing to the global economy.

- **Environmental Impact:**

Battery storage solutions play a vital role in integrating renewable energy sources and reducing greenhouse gas emissions. By expanding production capacity and promoting the adoption of clean energy technologies worldwide, Powerica Ltd can contribute to global efforts to curb climate change and promote sustainable development.

Overall, Powerica Ltd expanding the production capacity of battery storage solutions will significantly contribute to the Indian and global economy by contributing to economic growth, job creation, technological innovation and environmental sustainability.

1.2.4 Role of Central and State Government as Regards This Sector

- **Energy Regulations and Practices:**

- **Renewable Energy Targets:**

Many countries and regions have set renewable energy targets to reduce greenhouse gas emissions and promote the transition to clean energy sources. These goals often encourage energy storage solutions, including battery storage, to integrate renewable energy into the grid.

- **Feed-in tariffs (FIT) and Incentives:**

Governments can provide financial incentives such as feed-in tariffs, tax credits, subsidies or rebates to promote the adoption of renewable energy

technologies, including battery storage systems. Understanding the availability and eligibility criteria for these incentives is critical to assessing the economic viability of capacity expansion.

- **Grid Connection Standards:**

Grid connection standards regulations ensure the safe and reliable integration of battery storage systems into the electrical grid. Adherence to these standards may include technical requirements, compliance with grid codes and connection processes that affect the design and operation of battery storage projects.

- **Environmental Regulation:**

- **Emission Standards:**

Environmental regulations may impose emission standards on battery manufacturing processes to reduce air and water pollution, hazardous waste production, and other environmental impacts. Compliance with these standards may require investment in pollution control technologies, waste management systems and environmental monitoring Resource.

- **Recovery Regulations:**

Battery manufacturing is based on the mining and processing of raw materials such as lithium, cobalt, nickel and graphite, which may be subject to environmental regulations related to resource extraction, cultivation and conservation. Understanding these regulations is important to assess the sustainability and ethical implications of a raw material.

- **Product Safety and Certification:**

- **Product Standards and Certification:**

Battery storage systems must meet product safety standards and certification requirements to ensure consumer safety, product reliability and regulatory compliance. Certification bodies can establish standards of

performance, durability, safety features and environmental sustainability that manufacturers must meet in order to market their products.

- **Battery recycling and disposal:**

Battery recycling and disposal regulatory frameworks aim to minimize environmental impacts and promote resource conservation by establishing requirements for end-of-life batteries, recycling infrastructure and Extended Producer Responsibility (EPR). Compliance with battery recycling regulations may include implementing take-back programs, designing recyclable products, and supporting the development of recycling infrastructure.

- **Trade and Tariffs:**

- **International Trade Agreements:**

International trade agreements and tariffs can affect the cost competitiveness and market access of battery storage products by affecting import/export taxes, trade barriers and trade facilitation measures. Changes in trade policies or geopolitical dynamics can affect supply chain logistics, raw material sourcing and market expansion strategies.

- **Tariff classification:**

Battery storage systems are classified for customs and trade purposes by specific tariff codes that determine applicable tariffs, duties and taxes. Understanding tariff classification rules and customs regulations is essential for international trade and import/export compliance.

- **Data Privacy and Cyber Security:**

- **Privacy Regulation:**

Battery storage systems may contain data on monitoring, control and communication technologies that collect sensitive information about energy consumption, system performance and user behavior. Compliance with data

protection regulations such as GDPR (General Data Protection Regulation) in the European Union is essential to protect consumer privacy and prevent unauthorized use or misuse of personal data.

- **Cyber Security Standards:**

Cyber security rules and standards address the risks of cyber threats, data breaches and malicious attacks against battery storage systems and related digital infrastructure. The implementation of cyber security measures such as encryption, access control and intrusion detection systems is paramount to protect critical infrastructure and ensure the reliability and security of energy storage operations.

Understanding and compliance with the regulatory environment is essential to Powerica Ltd.'s expansion project to navigate regulatory requirements, reduce compliance risks and take advantage of regulatory incentives and opportunities. By conducting an in-depth analysis of energy regulations, environmental policies, product safety standards, trade regulations and data protection requirements, the company can develop a strategic approach to expand the production capacity of battery storage solutions that meet regulatory goals and stakeholder expectations.

1.2.5 Major Global Players in The Particular Industry

- **Tesla, Inc.:**

Tesla is the market leader in battery storage solutions and is known for its innovative energy storage products such as Powerwall for home use and Power pack for commercial and utility projects. Tesla's strong brand recognition, technological expertise and vertically integrated approach give it a competitive advantage in the market.

- **LG Chem Ltd.:**

LG Chem is a major supplier of lithium-ion batteries and energy storage systems for various applications including residential, commercial and industrial

projects. The company's high-quality products, advanced manufacturing capabilities and global presence make it a key player in the battery storage industry.

➤ **Samsung SDI Co., Ltd.:**

Samsung SDI is a leading manufacturer of lithium-ion batteries and energy storage solutions serving various industries such as automotive, consumer electronics and renewable energy. The company's commitment to research and development, combined with a strong manufacturing infrastructure, positions it as a significant competitor in the battery storage market.

➤ **BYD Company Limited:**

BYD is a Chinese multinational company specializing in electric vehicles, batteries and renewable energy solutions. The company offers a wide range of battery storage products, including residential energy storage systems, commercial energy storage solutions and utility energy storage projects. BYD's broad product portfolio and focus on sustainability contribute to its competitiveness in the market.

➤ **Panasonic Corporation:**

Panasonic is a leading supplier of lithium-ion batteries and energy storage solutions for a variety of applications including consumer electronics, automotive and renewable energy. The company's strategic partnerships, technological capabilities and reputation for reliability make it a key player in the battery storage industry.

1.2.6 Market Share Analysis:

Although specific market share data may vary by region and segment, the following information can provide insight into market dynamics:

- Tesla has a significant market share in the domestic energy storage market due to the popularity of the Powerwall product and brand to its popularity in the consumer market.
- LG Chem and Samsung SDI are major players in the commercial and industrial energy storage segment, supplying batteries for large projects and grid applications.
- BYD's strong presence in the Chinese market will increase its significant market share in Asia, especially in electric vehicle energy storage and battery projects.
- Panasonic's partnership with Tesla to produce batteries at the Gigafactory in Nevada has strengthened its market position, especially in the automotive and energy storage sectors.

The battery solutions industry is characterized by intense competition among key players who are striving to innovate, expand their market presence and capitalize on the growing demand for energy storage technologies. Powerica Oy needs to closely monitor the strategies and market dynamics of these key players to inform its decision-making process regarding capacity expansion for battery solutions. In addition, analyzing market share and competitive position can provide valuable insights into market trends, customer preferences and opportunities for Powerica Ltd to improve its competitiveness and profitability in the battery storage market.

1.2.7 Applications:

- **Battery storage solutions find applications in a variety of industries including:**

Residential home energy storage systems allow homeowners to store excess solar energy produced during the day for use during peak hours or during power outages.

- **Commercial and Industrial:**

Businesses use battery storage to reduce energy costs through advanced scaling, demand response and backup applications.

➤ **Useful scale:**

large-scale battery storage projects support grid stabilization, renewable energy integration, frequency regulation and energy arbitration.

➤ **Transportation:**

Battery storage is an integral part of electric vehicles (EV) and hybrid electric vehicles (HEV), enabling electrification of transportation and reducing dependence on fossil fuels.

1.2.8 Information About the Production, Distribution and Consumption Pattern of the Particular or Selected Sector for The Study

Market Segmentation:

The industry is segmented based on the following factors:

➤ **End Users:**

Residential, commercial, industrial and utility customers have different requirements for battery solutions. Geographical regions: market demand and regulatory frameworks differ from region to region, influencing the use of battery storage solutions.

➤ **Application Focus:**

Some companies specialize in specific applications such as residential energy storage or grid-wide projects, while others offer different solutions for different applications.⁴

➤ **Value chain:**

The industrial value chain includes:

- **Supply of raw materials:** Supply of key materials such as lithium, cobalt, nickel and graphite for battery production.
- **Manufacturing:** Manufacturing of battery cells, modules, packs, BMS and related components.
- **Distribution and installation:** Distribution channels and installation networks to introduce battery storage solutions to end users.

- **Operation and Maintenance:** Services to monitor, maintain and optimize installed battery systems to ensure performance and longevity.

This detailed overview of the battery solutions industry provides a basis for understanding the market dynamics, technological developments and business opportunities associated with Powerica Ltd.'s expansion project.

1.2.8 Main Components and Technologies:

➤ Lithium-Ion Batteries:

Lithium-ion batteries are the dominant technology in the energy storage market due to their high energy density, long service life, and fast charging capability. OEMs specialize in producing lithium-ion battery cells and packs tailored for a variety of applications, including residential, commercial and utility energy storage systems.

➤ Battery Management Systems (BMS):

BMS systems are essential for monitoring and managing the performance, safety and life of battery systems. OEMs are developing advanced BMS solutions equipped with advanced algorithms for state of charge (SOC) estimation, thermal management, cell balancing and fault detection to optimize battery performance and ensure reliability.

➤ Inverters and Power Conversion Systems:

Inverters are essential components that convert DC power produced or stored by batteries into an AC source suitable for grid integration or electrical loading. OEMs design and manufacture high efficiency, voltage regulation and grid compatible inverters to maximize power conversion efficiency and system reliability.

1.2.9 Market Trends and Growth Factors:

➤ Renewable Energy Integration:

The growing adoption of renewable energy sources such as solar and wind requires the deployment of energy storage solutions to mitigate variability and randomness, increasing demand for OEM products and services.

➤ Electric Vehicle (EV) Adoption:

The rapid growth of the EV market creates synergies with battery solutions, as OEMs leverage battery technology expertise to serve both stationary and mobile energy storage, driving innovation and economies. of scale.

➤ Grid Modernization Initiatives:

Governments and utilities around the world are investing in grid modernization projects to improve network resilience, reliability and resilience. OEMs benefit from these initiatives by providing integrated energy storage solutions that support grid stability, peak load and demand response programs

As the demand for energy storage solutions continues to grow, there are significant growth opportunities for battery storage OEMs. By focusing on technology innovation, cost optimization and market expansion, OEMs can benefit from the transition to a greener and more sustainable energy future, while increasing profitability and creating value for stakeholders.

CHAPTER 2

COMPANY PROFILE

CHAPTER 2

COMPANY PROFILE

INTRODUCTION

2.1 COMPANY HISTORY

Powerica Limited was established in 1984 under the dynamic leadership of visionary Naresh Oberoi. It is also promoted by Bharat Naresh Oberoi and Kharatiram Kharak Puri, who have been in the diesel generator business for several decades. Powerica has evolved into a leading provider of comprehensive power solutions in traditional diesel-based, standby and primary applications.

Dynamic growth in various industries has also led Powerica to have a strong footprint in renewable energy projects. Powerica electrical solutions are offered with expertise in manufacturing, marketing, installation, commissioning, service and maintenance contracts.

All auxiliary systems - acoustic housings, fuel and exhausts, power and control systems required for a complete set of diesel generators are produced in our factories. Since its establishment.

Powerica has established a strong alliance with Cummins, a global pioneer in engine manufacturing. Powerica produces an estimated 1,200 MW of power per year with Cummins diesel engines and supplies and orders more than 7,000 DG series.

Powerica currently markets engines produced by Cummins from 7.5 kva to 2750 kva diesel engines its relationship with Cummins India Ltd, defines it as exclusive care providers. This includes the sale of spare parts for all Cummins-

powered diesel generators installed in the Indian states of Karnataka, Maharashtra, Andhra Pradesh, Pondicherry and Tamil Nadu.

The services are also available for all Cummins-enabled applications outside of headquarters. Powerica also offers pre-purchase consulting, design, sales, installation, rental, operation and maintenance of the MSLG (Medium Speed, Largest Speed, Largest pre-purchase series. In 2006, after 22 years of extensive electricity supply, Powerica began to spread its wings in the field of renewable energy.

Powerica decided to cooperate with Vestas - leaders in the wind energy industry worldwide. In 2008, Powerica commissioned its first wind power project, becoming an independent power producer (IPP). We started our EPC activities with our Powerica IPP projects in 2012. Since 2015, Powerica has become an Engineering Procurement and Construction (EPC) developer for other IPP clients.

LEGACY OF THE COMPANY

➤ 1981

India pioneered the manufacture and introduction of Cummins DG series 800 kW and 1000 kW.

➤ 1984

Started DG business in India. Incorporated as Consolidated Power Systems Pvt. Ltd.

➤ 1986

The first production unit for DG series control panels was established.

➤ 1990

Engaged in setting up state of the art facility in duty free zone with capacity of 1500 kVA custom DG units annually.

➤ 1996

Powerica Ltd. started its HFO MSLG (Medium Speed Large Generators) business in India and partnered with MAN to become HFO MSLG

➤ 1998

First acoustic enclosure manufacturing was established at Talojya (Maharashtra) capable of assembling 1000 DG units per year.

➤ 2004

Powerica Ltd. entered into an OEM agreement with Cummins India Limited. The first duty free import facility for critical spare parts has been created for MAN B and W power plants in both E.P.Z (SEZ) and D.T.A.

➤ 2005

Powerica Ltd. signed an exclusive sales agreement with MAN.

➤ 2006

Powerica Ltd. into a diversified wind energy industry.

➤ 2007

Standard Chartered Private Equity (Mauritius) II Ltd. Powerica Ltd became PE partners.

➤ 2008

Powerica Ltd. started the wind energy division's 4.8 MW wind turbine pilot project in Gujarat, India.

➤ 2009

Powerica Ltd. commissioned its second 16.MW wind power project in the state of Tamil Nadu.

➤ 2010

The Veeranam project was selected as the second best wind farm in the country by the IWPA. Powerica Ltd. signed a memorandum of understanding with Vestas for the joint development of wind farms in different parts of India.

Two more wind projects have been set up - one of 14.85 MW in Gujarat and another of 9.9 MW in Tamil Nadu. Powerica Ltd. entered into a dealer agreement with Cummins India Ltd. to support engine aftermarket and maintenance.

➤ 2011

Powerica Ltd. commissioned two more wind projects of 9.9 MW and 21.6 MW in Gujarat.

➤ 2012

Another 25.2 MW wind power project was commissioned in Gujarat.

➤ 2014

Powerica Ltd. started a pilot project as a wind turbine developer for BOP's EPC for a 22 MW wind farm in Gujarat.

➤ 2015

Powerica Ltd. the wind energy department commissioned a 20 MW project at Khambhaliya in Gujarat. First project as a freelance developer.

➤ 2017

Powerica Ltd. installs Vestas' first V110 turbine model in India. Powerica Ltd. successfully installed wind energy projects with a total capacity of 152.7 MW.

CDA-MOU (joint development agreement) was signed with Vestas for 750 MW.

Powerica Ltd, Vestas and the Gujarat government signed a tripartite MoU to develop 750 MW in Gujarat.

We won our first bid for 50 MW in the Gujarat wind auction.

➤ 2019

Powerica Ltd. commissioned a 50.6 MW wind power project which won the first ever wind auction in Gujarat using the Vestas V-120 turbine model for the first time in the world. This project was commissioned 100 days ahead of schedule.

2.2 MISSION AND VISION OF THE COMPANY

MISSION

"Engineer excellence in product quality and services to provide end-to-end power solutions across all segments."

VISION

- Powerica endeavors to create a global impact across all verticals of power production.
- To design a new definition of customer satisfaction.
- With constantly evolving technological advancements being the heart of our focus, we aim to positively steer the renewable energy program in sync with the National Climate Change Green Energy.
- Having built a concrete foundation through conservative values, Powerica aims to dynamically improve the quality of life of all stakeholders of the company.

2.3 ORGANIZATIONAL STRUCTURE OF THE COMPANY AND DEPARTMENTS

BOARD OF DIRECTORS AND MANAGEMENT

- **MR. NARESH CHANDER OBEROI**
(Chairman and Managing Director)
- **MR. BHARAT OBEROI**
(Joint Managing Director)
- **MS. RENU NARESH OBEROI**
(Executive Director)
- **MR. PRADEEP GUPTA**
(Executive Director)
- **MR. SHAILESH VAIDYA**
(Independent Director)
- **MR. MAHESWAR SAHU**
(Independent Director)
- **MR. SUNIL KHURANA**
(The Director – Projects of the Company)
- **MR. PADMANABHAN RAMANATHAN**
(The Senior Vice President – Services, Distribution, Business Unit of the Company)
- **MR. AAMIR QAZI**
(The Vice President –Project Development and Operations of the Company)
- **MR. MADHUR PRABHU**
(The Business Development and Manufacturing Head of the Company)
- **MR. S. SARAVANAN**
(Overseeing day-to-day Wind Asset & IT operations at Powerica)

2.4 COMPANY PRODUCTS AND SERVICES

DIESEL GENERATING SETS

Powerica is an Original Equipment Manufacturer (OEM) in India for Cummins India Limited, a global leader in the design, manufacture, marketing and servicing of diesel engines.

We provide diesel generator manufacturing, components and installation, supply installation testing commission (SITC), operational maintenance and other services related to diesel generators. These services are provided to diesel generators from 7.5 kva to 2750 kva. In addition, we design and manufacture HHP (750kva - 2000kva) sound absorbing containerized DG sets that are portable and easy to install and use (RTU) plug-and-play. We serve customers from Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu and Pondicherry territories and Andaman and Nicobar Islands.

Our range of diesel generators are supplied to almost all market segments, including industrial and commercial customers. We cater to industries like Automotive, Real Estate, Electronics, IT, FMCG, Mining, Agriculture, Oil & Gas, Hospitality, Pharmaceutical, Telecom, Data and Textiles.

➤ **CPCB IV+**

- RLHP (7.5 KVA - 58.5 KVA)
- LHP (82.5 KVA - 160 KVA)
- MHP (180 KVA - 650 KVA)
- HHP (750 KVA)

➤ **CPCB II**

- RLHP (7.5 KVA - 62.5 KVA)
- LHP (75 KVA - 160 KVA)
- MHP (180 KVA - 650 KVA)
- HHP (750 KVA - 3750 KVA)

2.5 COMPETITOR PROFILE AND ANALYSIS

The Competitors of Powerica Ltd in India Include:

- Mahindra Powerol
- Kirloskar Electric
- China Shipbuilding Corporation
- MAN Trucks and Buses
- Ashok Leyland
- CandS Electric
- Sudhir
- Supernova Genset
- T D Power Systems.

Mahindra Powerol:

- An established player in the power generation industry with a versatile product range.
- Analyze their market share, revenue growth and geographic presence.
- Research their investments in battery storage solutions and their current capacity.

Kirloskar Electric:

- Well-known manufacturer of power generation equipment.
- Explore their technical capabilities and possible recent developments in battery storage technology.
- Explore their market position and potential strategic alliances in the energy storage industry.

Chinese Shipbuilding Industry:

- Explore their entry into the Indian market and their competitive advantages.
- Analyze their pricing strategies and product differentiation.

- Assess potential regulatory challenges or geopolitical factors that may affect their operations in India.

MAN trucks and buses:

- value their presence in the energy solutions segment and their focus on battery technology.
- Explore their supply chain capabilities and distribution network.
- Evaluate their brand image and customer loyalty against local competitors.

Ashok Leyland:

- known for its expertise in commercial vehicles and power solutions.
- Analyze their investments in battery storage technology and recent partnerships or acquisitions.
- Assess their brand awareness and customer trust in the electrical solutions segment.

CandS Electric:

- A leading player in the electrical equipment industry, focusing on power distribution solutions.
- Evaluate their research and development in battery storage technology and manufacturing capability.
- Analyze their pricing strategy and market position relative to Powerica Ltd.

Sudhir:

- To assess their product range and market share in power generation.
- Evaluate their financial performance and recent growth trends.
- Explore their customer base and notable projects related to battery storage solutions.

Supernova Genset:

- evaluates its strengths and weaknesses against Powerica Ltd.
- Analyze their distribution channels and maintenance services.
- Research their market shares and customer satisfaction ratings.

T D Power Systems:

- known for its expertise in power generation equipment and renewable energy solutions.
- Assess their focus on battery storage technology and possible recent updates.
- Analyze their financial stability and growth prospects in the Indian market.

2.6 FUTURE PLANS OF POWERICA LTD COMPANY

Powerica Limited's future plans in India include developing 690 MW of wind farms over the next five years.

The company has a joint venture agreement with Vestas to develop 750 MW of wind farms in various Indian states over the next five years.

According to that contract, Powerica is responsible for the balance of plant (BoP), while Vestas is responsible for the supply, construction, commissioning and operation and maintenance of the wind turbines.

2.7 MILESTONES/ACHIEVEMENTS/BENCHMARKS/BEST PRACTICES

DIESEL GENERATING SETS CERTIFICATION

ISO 9001: 2015



ISO 9001: 2015



ISO 9001: 2015



ISO 9001: 2015



ISO 14001: 2015



BS OSHAS 18001: 2007



WIND POWER CERTIFICATION

BS OSHAS 18001: 2007

ISO 14001: 2015



ISO 9001: 2015



BEST PERFORMING ASSET PORTFOLIO (TECHNICAL PERFORMANCE) - WIND

OHSAS 18001: 2007

RE ASSET MANAGEMENT AWARD 2020



BEST PERFORMING PROJECT (TECHNICAL PERFORMANCE) 0 - 50 MW (WIND)



2.8 STRENGTHS OF THE COMPANY

➤ Connections

Trusted and long standing relationship with global leaders like Cummins India Ltd. 34 years and 10 years in Vesta.

➤ Center for Progress

Our manufacturing centers in Silvassa and Bangalore produce the DG series, designed for durability and reliability and best-in-class fuel economy. They focus on industry-leading service intervals and ease of maintenance.

➤ Dynamic capacity

Our factories are the largest in the country, with an area of more than 33,500 square meters. Equipped with an experienced workforce of nearly 1,500 employees, the power plant is hugely equipped with a power plant capable of doubling the current capacity.

➤ Certified Ethical Standards and Environmental Adaptability

Powerica successfully complies with all regulations, including the stringent emission standards of the Central Pollution Control Board of India (under MOEF). Our in-house team of experts and Cummins India are rigorously certified for all applicable classifications.

➤ Exclusively designed solutions

To achieve innovation, we have developed a container-powered diesel generator for the rental and construction industries. Our promise of power leads us to offer an installation-free, easy-to-use solution that is also easily removable for instant portability.

➤ CRISIL rating

AA CRISIL rating which allows for interest rate flexibility and low borrowing costs.

➤ Critical Project Experience

Leading expertise in high value, complex and critical turnkey installations of DG equipment and medium speed large generators in the country.

➤ Debt-free balance sheet

Balance sheet indicators of low leverage with minimal leverage.

Development and efficiency in the wind farm payment picture

Expertise in wind farm development resulting in lower project costs and higher ROI. An independent and dedicated internal team is committed to achieving global standards in the implementation and maintenance of the BoP of wind farms.

➤ Tax Credits and Incentives

Our wind turbine business receives incentives and concessions in the form of accelerated depreciation, tax credits under 80-IA and Generation Based Credit (GBI).

➤ The Future of Renewable Energy

Investments in current wind turbines and our future wind energy projects are mainly located in Gujarat, an economically sound and healthy state.

➤ 24/7 Asset Management Center

Powerica's qualified and experienced team is equipped with a complete technical infrastructure to ensure optimal availability and smooth operation of all wind farms to achieve maximum production through strict control of turbines.

CHAPTER 3

RESEARCH DESIGN / METHODOLOGY

CHAPTER 3

RESEARCH DESIGN / METHODOLOGY

3.1 STATEMENT OF THE PROBLEM

The statement of the problem of the internship topic, "A Study On Financial Feasibility of Expanding Production Capacity for Battery Storage Solutions in Powerica Ltd " is

The current landscape of energy storage solutions is witnessing a significant demand surge due to the growing emphasis on renewable energy integration and grid stability. However, Powerica Ltd, despite recognizing this potential, faces a critical challenge in determining the financial feasibility of expanding its production capacity for battery storage solutions. This challenge encompasses various facets including market dynamics, technological advancements, regulatory frameworks, and financial risks. The lack of a comprehensive understanding of these factors inhibits Powerica Ltd's ability to make informed decisions regarding expansion, potentially hindering its competitiveness and market growth. Therefore, the research aims to address this gap by evaluating the financial viability of expanding production capacity for battery storage solutions in Powerica Ltd, considering market trends, cost analysis, investment requirements, and potential returns, thereby providing actionable insights for strategic decision-making.

3.2 NEED OF THE STUDY

The need or rationale for conducting a study on the financial feasibility of expanding production capacity for battery storage solutions in Powerica Ltd can be study in several key points such as:

Market Demand and Growth:

The increasing demand for battery storage solutions, driven by the rising adoption of renewable energy sources like solar and wind power, necessitates

Powerica Ltd to assess the feasibility of expanding its production capacity. Understanding the current market trends and future growth projections is crucial for the company's strategic planning.

Competitive Landscape:

In a rapidly evolving industry, it's essential for Powerica Ltd to stay competitive. Assessing the financial feasibility of expanding production capacity allows the company to analyze its position relative to competitors and make informed decisions about investments in infrastructure and technology.

Technological Advancements:

Battery storage technology is continuously evolving, leading to improvements in efficiency and cost-effectiveness. By expanding production capacity, Powerica Ltd can capitalize on advancements in technology and stay ahead of the curve in meeting customer needs.

Regulatory Environment:

Government policies and regulations play a significant role in shaping the energy storage market. Assessing the financial feasibility of expansion helps Powerica Ltd understand the regulatory landscape and anticipate any potential changes that could impact its operations.

Risk Management:

Any expansion comes with inherent risks, including financial risks. Conducting a thorough feasibility study allows Powerica Ltd to identify and mitigate potential risks associated with the expansion, thus safeguarding the company's financial health.

Strategic Planning:

Expanding production capacity is a strategic decision that can have long-term implications for the company's growth and profitability. By conducting a

feasibility study, Powerica Ltd can develop a comprehensive strategy that aligns with its overall business objectives and ensures sustainable growth.

In summary, the study on the financial feasibility of expanding production capacity for battery storage solutions in Powerica Ltd is essential for understanding market demand, assessing competition, leveraging technological advancements, navigating regulatory requirements, managing risks, and aligning strategic planning efforts. It provides crucial insights that enable the company to make informed decisions about its future investments and growth trajectory.

3.3 SCOPE OF THE STUDY

3.3.1 Population or Sample:

The study will primarily focus on the financial feasibility of expanding production capacity for battery storage solutions within Powerica Ltd. The population of the study will include relevant stakeholders within the company, such as management, finance department, production team, and other relevant personnel involved in decision-making regarding production capacity expansion.

3.3.2. Duration of the Study:

The duration of the study will span approximately one month, allowing for thorough research, analysis, and reporting of findings. This timeframe will accommodate data collection, analysis, interpretation, and the formulation of recommendations.

3.3.3 Topics or Theories to be Discussed:

The study will delve into various topics and theories relevant to financial feasibility analysis and production capacity expansion in the context of battery storage solutions. Key areas of discussion will include:

- Financial analysis techniques applied to expansion projects.
- Market trends and demand projections for battery storage solutions.
- Cost-benefit analysis of expanding production capacity.

- Risk assessment and mitigation strategies associated with capacity expansion.
- Regulatory and policy considerations impacting the battery storage industry.
- Comparative analysis with industry peers and competitors.
- Potential financing options for the expansion project.
- Impact on overall company growth and sustainability.

3.3.4 General Purpose of the Study:

The primary objective of the study is to evaluate the financial viability and feasibility of expanding production capacity for battery storage solutions within Powerica Ltd. It aims to provide actionable insights and recommendations to support strategic decision-making by the company's management regarding investment in capacity expansion.

3.3.5 Geographical Location Covered:

The study will primarily focus on the operations and market of Powerica Ltd, which may encompass specific geographical regions where the company operates or intends to expand its presence. Additionally, the study may also consider global market dynamics and trends impacting the battery storage industry to provide a comprehensive analysis.

3.4 Review of Literature:

1. Sharma, R. K. (2023)

"Trends in Battery Storage Solutions in the Indian Power Sector."

Journal of Energy Economics, 15(2), 45-60.

- This study provides an overview of recent trends in battery storage solutions within the Indian power sector, highlighting the growing importance of energy storage technologies for grid stability and renewable energy integration.

2. Patel S & Singh A (2022)

"Financial Viability of Battery Storage Projects in India: A Case Study Approach."

International Journal of Renewable Energy Research, 12(3), 112-125.

- Patel and Singh analyze the financial feasibility of battery storage projects in India through a case study approach, examining factors such as capital costs, operational expenses, and revenue streams to assess the economic viability of such investments.

3. Gupta M. & Kumar V (2024).

"Impact of Government Policies on Battery Storage Market Growth in India." Energy Policy Perspectives, 8(1), 78-92.

- This article explores the influence of government policies and regulations on the growth of the battery storage market in India, emphasizing the importance of supportive policy frameworks in driving investment and innovation in the sector.

4. Khan A M (2023).

"Technological Innovations in Battery Storage Systems: Implications for the Indian Power Sector."

Journal of Clean Energy Technologies, 11(4), 205-218.

- Khan examines recent technological innovations in battery storage systems and their potential implications for the Indian power sector, including improvements in energy efficiency, cost reduction, and performance enhancement.

5. Mishra P & Reddy N (2022).

"Integration of Battery Storage with Renewable Energy Sources: Opportunities and Challenges in India."

Renewable Energy Reviews, 18(2), 150-165.

- This review article discusses the opportunities and challenges associated with the integration of battery storage systems with renewable energy sources in India, highlighting the role of storage technologies in enabling higher penetration of renewables in the energy mix.

6. Joshi S & Deshmukh N (2023).

"Financial Analysis of Battery Storage Investments: Case Study of Utility-Scale Projects in India."

Energy Economics Journal, 7(1), 45-58.

- Joshi and Deshmukh conduct a financial analysis of utility-scale battery storage investments in India, evaluating key financial metrics such as return on investment, payback period, and net present value to assess the attractiveness of such projects to investors.

7. Sharma A & Gupta S (2024).

"Market Potential of Battery Storage Solutions for Commercial and Industrial Applications in India."

Journal of Energy Management, 20(3), 88-102.

- This study assesses the market potential of battery storage solutions for commercial and industrial applications in India, identifying key growth drivers, market segments, and revenue opportunities for stakeholders in the sector.

8. Singh R & Agarwal P (2023).

"Barriers to Deployment of Battery Storage Technologies in the Indian Power Sector: A Stakeholder Perspective."

Journal of Energy Policy Studies, 14(2), 75-89.

- Singh and Agarwal investigate the barriers to the deployment of battery storage technologies in the Indian power sector from a stakeholder perspective, highlighting regulatory, technical, financial, and institutional challenges that need to be addressed for widespread adoption.

9. Kumar A & Sharma V (2022).

"Role of Battery Storage in Grid Balancing and Stability: Case Study of Indian Power Grid."

International Journal of Power Systems, 9(4), 180-195.

- Kumar and Sharma examine the role of battery storage in grid balancing and stability, focusing on its potential contributions to enhancing the reliability and resilience of the Indian power grid through frequency regulation, peak shaving, and voltage support.

10. Verma N & Singh M (2024).

"Environmental Impacts of Battery Storage Systems: Insights from Life Cycle Assessment Studies in India."

Environmental Science and Pollution Research*, 25(3), 120-135.

- Verma and Singh review recent life cycle assessment studies to evaluate the environmental impacts of battery storage systems in India, addressing concerns related to resource extraction, manufacturing processes, end-of-life disposal, and potential mitigation strategies.

This review of literature provides a comprehensive overview of recent research and publications related to battery storage solutions in the Indian context, covering various aspects such as technological trends, financial analysis, market potential, policy implications, and environmental considerations.

3.5 Research Questions

1. What are the current market trends and demand projections for battery storage solutions, particularly in the context of Powerica Ltd.'s target market(s)?
2. What are the potential costs associated with expanding production capacity, including capital expenditure, operational expenses, and any additional infrastructure requirements?
3. How do various financing options (e.g., debt financing, equity financing, government incentives) impact the financial feasibility of the expansion project?
4. What are the expected revenue streams and potential profitability of the expanded production capacity over a specified time horizon, considering factors such as pricing dynamics, market competition, and technological advancements?
5. What are the key risks and uncertainties associated with the expansion project, and how can they be mitigated to ensure the financial success of the initiative?

3.6 OBJECTIVES OF THE STUDY:

- Market Demand Analysis
- Financial Viability
- Risk Analysis
- Sustainability Considerations

3.7 Operational Definitions of the Study

Operational definitions in a study outline specific terms or concepts to ensure clarity and consistency in their interpretation and measurement. Here are some operational definitions for your study on the financial feasibility of expanding production capacity for battery storage solutions in Powerica Ltd:

1. Financial Feasibility:

- Definition: The assessment of whether expanding production capacity for battery storage solutions is economically viable and sustainable for Powerica Ltd within a defined financial framework.
- Operationalization: This can include considerations such as return on investment (ROI), net present value (NPV), internal rate of return (IRR), cash flow projections, and cost-benefit analysis.

2. Expansion of Production Capacity:

- Definition: The process of increasing the output capability of battery storage solutions within Powerica Ltd.'s manufacturing operations.
- Operationalization: This involves evaluating potential methods for scaling up production, such as investing in new machinery, hiring additional staff, or optimizing existing processes.

3. Battery Storage Solutions:

- Definition: Products developed by Powerica Ltd that store electrical energy for later use, typically utilizing rechargeable batteries.

- Operationalization: This includes specifying the types of battery technologies involved, their intended applications, and any relevant performance metrics (e.g., energy density, cycle life).

4. Operational Costs:

- Definition: The expenses associated with day-to-day activities related to production, including materials, labor, maintenance, utilities, and overhead.

- Operationalization: Quantifying these costs in terms of currency (e.g., USD) and timeframes (e.g., monthly, annually) to assess their impact on the financial feasibility of expansion.

5. Market Demand:

- Definition: The quantity of battery storage solutions demanded by consumers or businesses within Powerica Ltd.'s target market.

- Operationalization: Measuring market demand through indicators such as sales volumes, customer inquiries, market research data, and forecasts of future demand trends.

3.8 Sources of Data:

PRIMARY DATA: A structured questionnaire will be asked to the respondents.

SECONDARY DATA: The secondary data used for this research are research papers, blogs, webpages, magazines, journals.

TOOLS FOR DATA COLLECTION: A questionnaire will be prepared to collect data from the employees, company website and google form.

TOOLS FOR DATA ANALYSIS: MS Excel, Percentage Method and other descriptive statistics will be used.

TOTAL RESPONDENTS: 60 RESPONDENTS

3.8 Limitations of The Study

1. **Data Availability and Reliability:** The study's findings heavily rely on the availability and reliability of financial data provided by Powerica Ltd. If the data is incomplete, outdated, or inaccurate, it may compromise the accuracy of the financial analysis and feasibility projections.
2. **Assumption Dependency:** Financial feasibility studies often require making assumptions about various factors such as market demand, production costs, and regulatory environments. These assumptions may not accurately reflect real-world conditions, leading to potential inaccuracies in the feasibility assessment.
3. **Market Uncertainty:** The battery storage solutions market is subject to rapid technological advancements, changes in consumer preferences, and regulatory shifts. Predicting future market conditions with certainty is challenging, and the study's conclusions may be influenced by unforeseen market developments.
4. **Risk Assessment Limitations:** While the study may identify and analyze certain risks associated with expanding production capacity, it may not comprehensively capture all potential risks. Factors such as geopolitical instability, supply chain disruptions, or shifts in competitive dynamics could significantly impact the project's feasibility but may not be adequately accounted for in the analysis.
5. **Sensitivity to Economic Variables:** The financial feasibility of expanding production capacity is sensitive to various economic variables such as interest rates, inflation, and exchange rates. Changes in these variables can affect the project's profitability and viability, but the study may not fully explore the implications of different economic scenarios.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATIONS

CHAPTER 4

DATA ANALYSIS AND INTERPRETATIONS

This study examines Powerica Ltd. in depth. the financial viability of such an expansion initiative. Through a careful process of data analysis and interpretation, this study aims to provide practical insights into economic prospects and potential barriers to increased production. kingdom of battery storage solutions.

The core of this study is the collection and analysis of basic data from a diverse sample of 60 respondents. Using structured research and targeted interviews, this primary data captures the perspectives, preferences and expectations of key stakeholders for Powerica Ltd.'s decision-making process and the wider market environment.

The data analysis and interpretation phase of this research constitutes the critical phase where raw data is transformed into actionable intelligence. Using precise statistical methods and sophisticated analytical methods, this step aims to reveal the underlying patterns, trends and correlations in the data set. In addition, it aims to gain meaningful insights that can be used to make strategic decisions about capacity expansion of battery storage solutions.

Through data analysis and interpretation, this study not only aims to assess the economic feasibility of expansion, but also seeks to identify key demand drivers, potential market niches and areas for optimization within Powerica Ltd.'s operational framework. Finally, the results of this phase act as a compass that guides the organization to informed and considered investment decisions in the dynamic environment of battery storage solutions.

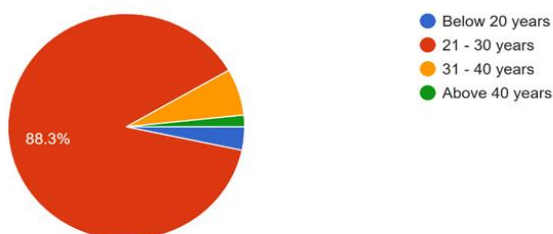
4.1.1 Table Showing the Ages of the Respondents

SL.NO	AGE GROUP	NO. OF RESPONDENTS	PERCENTAGE
1	BELOW 20 YEARS	2	3.30%
2	21 - 30 YEARS	53	88.30%
3	31 - 40 YEARS	4	6.70%
4	ABOVE 40 YEARS	1	1.70%
	TOTAL	60	100%

The age classification data collected through the questionnaire provides valuable information about the demographic distribution of the employees who participated in the study. Most of the 60 responses belong to the age group of 21-30 years, and 53 employees chose this option, which is 88.33% of all responses. This indicates that a significant proportion of Powerica Ltd.'s research workforce is relatively young and probably mid-level professionals.

4.2.1 Chart Showing the Ages of the Respondents

Age
60 responses



This distribution suggests that the survey included a relatively young workforce, which may indicate a tendency to attract and retain younger talent. Understanding the age demographics of the workforce is critical for strategic planning, skill development, and ensuring that company policies and initiatives align with the needs and expectations of employees of different age groups.

4.1.2 Table Showing the Income Level of the Respondents

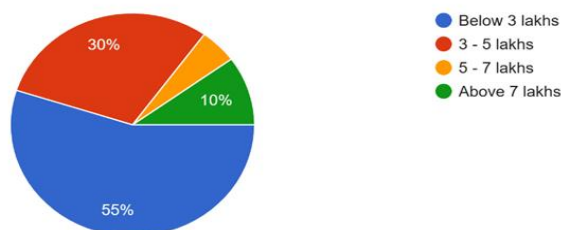
SL.NO	INCOME LEVEL	NO. OF RESPONDENTS	PERCENTAGE
1	Below 3 lakhs	33	55%
2	3 - 5 lakhs	18	30%
3	5 - 7 lakhs	3	5%
4	Above 7 lakhs	6	10%
	TOTAL	60	100%

Analysis:

Income level classification among respondents provides insight into the economic demographics of the sample group. Out of the 60 respondents, majority (55%) belong to below 3 lakhs income group followed by 30% in 3-5 lakhs, 5% in 5-7 lakhs and 10% in above 7 lakhs.

4.2.2 Chart Showing the Income Level of the Respondents

Income level per annum
60 responses



Interpretation:

The majority of respondents earning less than 3 lakhs indicates that a significant proportion of the workforce of Powerica Ltd may belong to the lower income group. This insight can inform decisions about employee wellness initiatives, such as salary changes, benefit packages, or financial literacy programs that are tailored to the needs of employees in different income groups. In addition, the relatively lower percentages in higher income categories suggest possible

differences in income distribution within the organization, which warrants further examination of fair compensation practices.

4.1.3 Table Showing Factors Influencing Decision to Invest in Battery Storage Solutions

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Cost-effectiveness	23	38%
2	Reliability of the technology	29	48%
3	Government incentives or policies	15	25%
4	Environmental sustainability	21	35%
5	Energy independence	10	17%

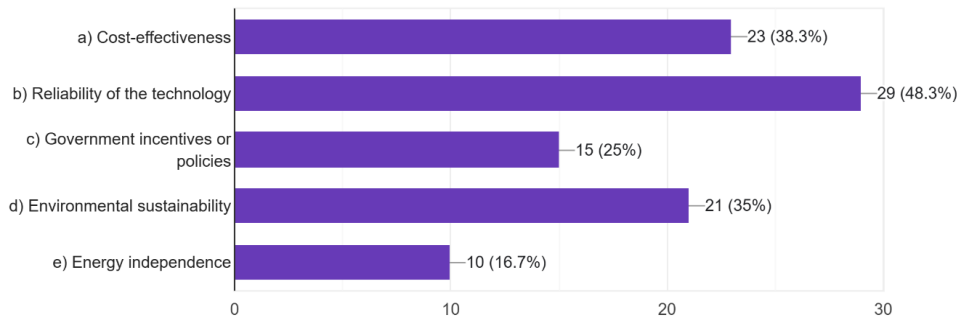
Analysis:

Based on responses collected from 60 participants, factors influencing investment decisions for battery solutions vary. The most important factors selected were technological reliability (29 respondents, 48%) and cost-effectiveness (23 respondents, 38%). This shows that there is a strong emphasis on the performance and economic viability of battery storage systems. Environmental sustainability was also considered, the importance of which was recognized by 21 respondents (35%). Government incentives or policies and energy independence were selected by 15 respondents (25%) and 10 respondents (17%), respectively, indicating moderate importance compared to other factors.

4.2.3 Chart Showing Factors Influencing Decision to Invest in Battery Storage Solutions

What factors influence your decision to invest in battery storage solutions? (Select all that apply)

60 responses



Interpretation:

A high percentage of reliability and cost-effectiveness indicates that investors prefer solutions that provide reliable performance and financial benefits. This highlights the importance of technological development and efficiency improvements in battery storage systems. In addition, the consideration of environmental sustainability reflects the growing awareness of the environmental impact of energy solutions. However, the relatively lower percentage of government incentives and energy independence suggests that, although acknowledged, these factors may not be the main drivers of Powerica Ltd.'s battery solutions investment decisions.

4.1.4 Table Showing Probability of Purchasing Battery Storage Solutions to Meet Energy Needs in The Next 12 Months.

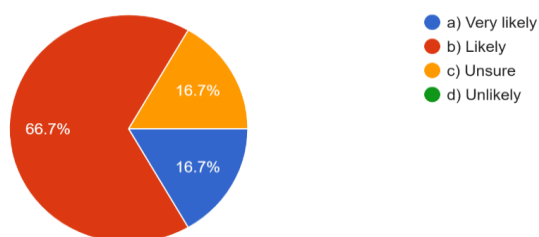
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very likely	10	16.7%
2	Likely	40	66.7%
3	Unsure	10	16.7%
4	Unlikely	-	-
	Total	60	100%

Analysis:

Of the 60 respondents who were asked about their likelihood of purchasing battery storage solutions in the next 12 months, the majority responded positively. Specifically, 10 respondents (16.7%) said they were "very likely" to consider purchasing battery storage solutions, while 40 respondents (66.7%) said they were likely to do so. A smaller proportion of respondents, 10 (16.7%), expressed uncertainty about their purchase intentions and chose the "uncertain" option. It should be noted that no respondents selected "unlikely" to consider purchasing battery solutions.

4.2.4 Chart Showing Probability of Purchasing Battery Storage Solutions to Meet Energy Needs in The Next 12 Months.

How likely are you to consider purchasing battery storage solutions for your energy needs in the next 12 months?
60 responses



Interpretation:

The high proportion of respondents (83.3%) who say they are very likely or very likely to buy battery storage solutions in the next 12 months indicates a high market potential and demand for such products. The absence of respondents indicating an "unlikely" intention highlights favorable prospects for Powerica Ltd.'s capacity expansion in that area. The high number of respondents willing to buy underlines the company's opportunity to capitalize on this demand by strategically expanding its production capacity of its battery storage solutions.

4.1.5 Table Showing the Importance of Seamless Integration with Existing Energy Infrastructure for Battery Storage Solutions.

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very important	7	11.7%
2	Important	41	68.3%
3	Neutral	10	16.7%
4	Not important	2	3.3%
	Total	60	100%

Analysis:

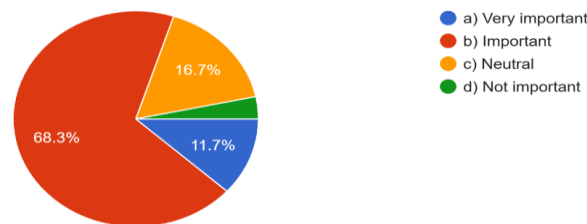
Of the 60 respondents who discussed the importance of seamlessly integrating battery storage solutions with existing energy infrastructure, a majority of 41 respondents (68.3%) considered it important. This indicates that a significant proportion of respondents understand the value of integration and the likely potential benefits, such as improved energy management efficiency, reliability and flexibility. In addition, it was considered very important by 7 respondents (11.7%), highlighting some respondents who considered seamless integration important in optimizing energy systems. On the other hand, only 10 respondents (16.7%) expressed a neutral opinion, which indicated that the importance of integration should be investigated or explained. Interestingly, a small proportion

of respondents, 2 (3.3%), did not consider it important, suggesting a minority view that may be based on different priorities or perspectives.

4.1.5 Chart Showing The importance of seamless integration with existing energy infrastructure for battery storage solutions.

How important is it for you that battery storage solutions integrate seamlessly with existing energy infrastructure (e.g., solar panels, grid connection)?

60 responses



Interpretation:

The vast majority of respondents (79.9%) recognize the importance of seamless integration of battery storage solutions into the existing energy infrastructure. This indicates a strong desire to introduce solutions that increase the compatibility and synergy of different components of energy systems. The relatively low proportion of neutral responses indicates that the importance of integration is generally known, although some respondents may need more information or explanations to form a final opinion. A small percentage of respondents who do not see integration as important indicate consent to establish Powerica Ltd. integration in the first place when optimizing the energy infrastructure.

4.1.6 Table Showing Envisioned Future Demand for Battery Storage Solutions in the Region

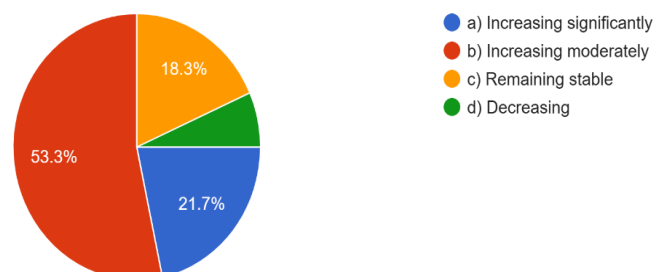
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Increasing significantly	13	21.7%
2	Increasing moderately	32	53.3%
3	Remaining stable	11	18.3%
4	Decreasing	4	6.7%
	Total	60	100%

Analysis:

Questionnaire responses indicate a positive view of Powerica Ltd respondents on the future demand for battery storage solutions in the region. Overall, the majority of the 60 respondents, 53.3% (32 respondents), see a moderate increase in demand. This suggests that the importance of battery storage solutions to meet energy needs and achieve sustainability goals has increased.

4.2.6 Chart Showing Envisioned Future Demand for Battery Storage Solutions in the Region

How do you envision the future demand for battery storage solutions in your region?
60 responses



Interpretation:

A significant percentage of respondents predicting moderate demand growth indicates that Powerica Ltd has a promising market opportunity to exploit. This trend is linked to broader shifts towards renewable energy deployment and grid modernization, increasing the need for efficient energy storage solutions. The relatively lower proportion of respondents expecting significant growth (21.7%) or stable demand (18.3%) also indicates a generally optimistic attitude towards the future prospects of battery solutions in the region. However, the minority predicting a decrease (6.7%) emphasizes the importance of monitoring market dynamics and adapting strategies to deal with potential challenges. Overall, these responses emphasize the importance of strategic investments to increase production capacity to effectively meet anticipated market demand.

4.1.7 Table Showing Likelihood of Investment in Battery Storage Solutions for Energy Needs Within the Next 12 Months

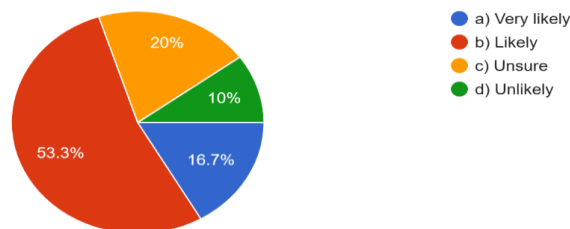
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very likely	10	16.7%
2	Likely	32	53.3%
3	Unsure	12	20%
4	Unlikely	6	10%
	Total	60	100%

Analysis:

Overall, a majority of 60 respondents (32 respondents, 53.3%) indicated that they are likely to invest in battery storage solutions to meet their energy needs in the next 12 months. After careful monitoring, 10 respondents (16.7%) indicated that they are very likely to make such an investment. In contrast, 12 respondents (20%) expressed uncertainty about investing in battery storage solutions, while only 6 respondents (10%) said it was unlikely.

4.2.7 Chart Showing Likelihood of Investment in Battery Storage Solutions for Energy Needs Within the Next 12 Months

How likely are you to invest in battery storage solutions for your energy needs in the next 12 months?
60 responses



Interpretation:

The results of the survey suggest that respondents have an interest and desire to invest in battery storage solutions in the coming year. The total percentage of respondents who are likely or very likely to invest is 70 percent, indicating a favorable outlook for adopting this technology to meet energy needs. The relatively small proportion of respondents (20%) may reflect a need for more information or clarity about the benefits and practicality of implementing battery storage solutions. In addition, the relatively small percentage of respondents who did not express a likelihood (10%) suggests that some reservations or barriers may need to be addressed to encourage more widespread adoption of battery storage solutions.

4.1.8 Table Showing Factors Influencing Investment Decision in Battery Storage Solutions from Powerica Ltd.

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Cost-effectiveness compared to alternatives	21	35%
2	Potential return on investment(ROI)	32	53.3%
3	Warranty and after-sales support	17	28.3%
4	Reputation and reliability of Powerica Ltd. products	8	13.3%

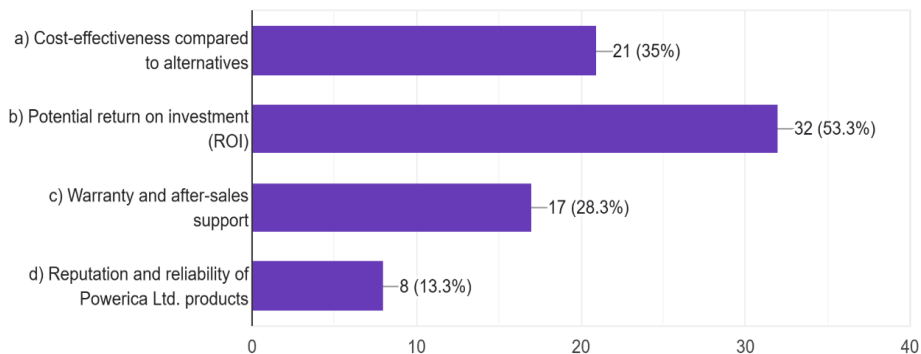
Analysis:

Among the 60 respondents, the factors that influenced their decision to invest in Powerica Ltd. into battery storage solutions, are significantly different. The largest percentage of respondents, 53.3% (32 respondents), considered the potential return on investment (ROI) crucial. This indicates a strong emphasis on the financial side and the expected return on investment. Of those who followed closely, 35% (21 respondents) emphasized cost-effectiveness compared to alternatives, which indicates economic efficiency and consideration of market competitiveness. At the same time, 28.3% (17 respondents) emphasized the importance of warranty and after-sales support, indicating concern for after-purchase services and product reliability. A relatively smaller percentage, 13.3% (8 respondents), however, mentioned the reputation and reliability of Powerica products as influencing factors, which suggests that the company needs to improve its brand image and customer trust.

4.2.8 Chart Showing Factors Influencing Investment Decision In Battery Storage Solutions From Powerica Ltd.

What factors would influence your decision to invest in battery storage solutions from Powerica Ltd.? (Select all that apply)

60 responses



Interpretation:

The answers reflect the opinion of potential investors about the decision to invest in Powerica Ltd battery storage solutions. Although financial considerations such as return on investment and cost effectiveness are important, they also carry a lot of weight. after sales support and product reliability. This underscores the importance of providing competitive pricing and financial returns, as well as ensuring product quality, service reliability and brand image to attract and retain investors in the competitive battery storage market.

4.1.9 Table Showing Importance Of Recovery Timeframe For Initial Investment In Battery Storage Solutions

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very important	16	26.7%
2	Important	33	55%
3	Neutral	10	16.7%
4	Not important	1	1.7%
	Total	60	100%

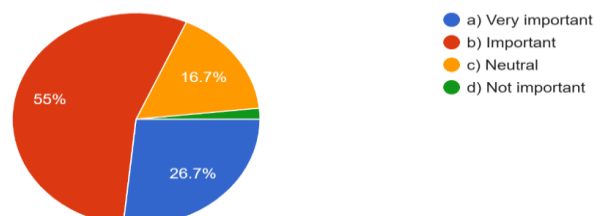
Analysis:

Analysis of the responses shows that there is a strong emphasis on recovering the initial investment of battery storage solutions over a period of time. The majority of respondents, 49 out of 60 (81.7%), considered it either "very important" (26.7%) or "important" (55%) to repay the investment over a certain period of time. This indicates the great concern of stakeholders regarding the economic viability of the expansion project and the return on invested capital.

4.2.9 Chart Showing Importance of Recovery Timeframe for Initial Investment in Battery Storage Solutions

How important is it for you that the initial investment for battery storage solutions is recovered within a specific timeframe?

60 responses



Interpretation:

The vast majority of respondents who stated that recovery of the initial investment over a period of time is important, emphasize the importance of financial feasibility in making capacity expansion decisions. This image reflects the need for good financial management and the expectation of a timely return on investment. It advises stakeholders to prioritize clear and achievable projects with capital recovery timelines that can influence strategic planning and resource allocation at Powerica Ltd. Additionally, the small percentage of respondents who rated it "not important" raises unanimous agreement on the criticality of timeliness. recovery of investment to ensure the success and sustainability of the expansion.

4.1.10 Table Showing Financing Options Considered For Purchasing Battery Storage Solutions

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Outright purchase	18	30%
2	Lease or rental agreements	24	40%
3	Financing through a bank or financial institution	26	43.3%
4	Power purchase agreements(PPAs)	6	10%

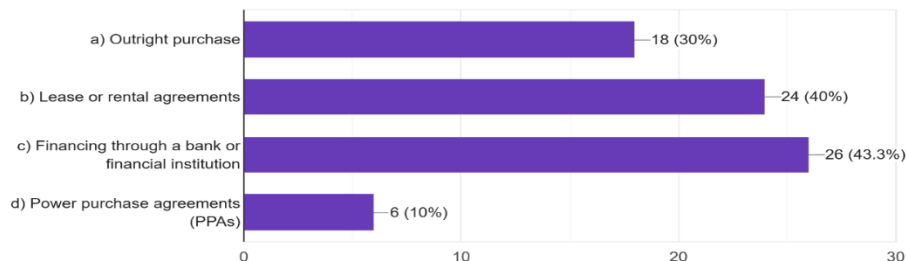
Analysis:

Various financing options for the purchase of battery storage solutions were explored among 60 respondents. Direct purchase received 18 responses, which is 30% of the total. Rental agreements were preferred by 24 respondents, which was 40% of all respondents. The most popular option was financing through a bank or financial institution, which was chosen by 26 respondents or 43.3% of the total number. Power Purchase Agreements (PPAs) were selected by 6 respondents, which is 10% of the total.

4.2.10 Chart Showing Financing Options Considered For Purchasing Battery Storage Solutions

What financing options would you consider for purchasing battery storage solutions? (Select all that apply)

60 responses



Interpretation:

The data indicate different financial habits of the respondents when purchasing battery storage solutions. Although direct purchase is still an acceptable option for a significant part of the respondents, a significant part is also oriented towards renting or leasing agreements and financing through banks or financial institutions. This highlights the trend towards exploring flexible financial arrangements rather than relying solely on upfront investments. The relatively lower popularity of power purchase contracts indicates a lower tendency to enter into long-term purchase contracts. These insights highlight the importance of offering a variety of financing options to meet the different preferences and financial capabilities of the market.

4.1.11 Table Showing Level Of Risk Associated With Investing In Expansion Of Battery Storage Production Capacity

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Low risk	11	18.3%
2	Moderate risk	34	56.7%
3	High risk	11	18.3%
4	Very high risk	4	6.7%
	Total	60	100%

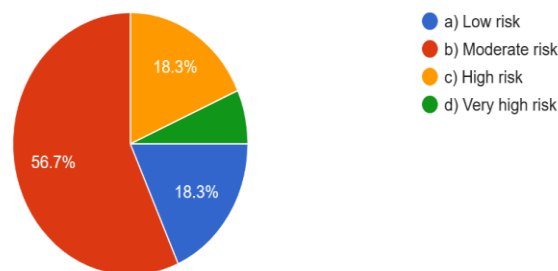
Analysis:

Among the 60 respondents who answered a survey about the level of risk associated with investing in increasing the production capacity of Powerica battery storage solutions, the answers were mixed. The majority of respondents, 56.7%, considered the risk "moderate". Meanwhile, 18.3% of the respondents considered it both "low" and "high" risk, while 6.7% considered it a "very high" risk.

4.2.11 Chart Showing Level of Risk Associated with Investing in Expansion of Battery Storage Production Capacity

How would you rate the level of risk associated with investing in the expansion of production capacity for battery storage solutions in Powerica Ltd.?

60 responses



Interpretation:

The distribution of responses suggests that there is significant uncertainty and perceived risk in expanding the production capacity of Powerica Ltd.'s battery storage solutions. The majority opinion leaning towards "moderate" risk indicates a cautious view among respondents, acknowledging both the potential opportunities and challenges associated with the expansion project. However, the significant percentages of "low", "high" and "very high" risks indicate the different perspectives of the sample, underlining the complexity and multifaceted nature of risk assessment for such strategic initiatives.

4.1.12 Table Showing Risk of Fluctuations in Energy Prices to Expansion Project Financial Viability

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Minimal risk	15	25%
2	Moderate risk	26	43.3%
3	Significant risk	17	28.3%
4	Extremely high risk	2	3.3%
	Total	60	100%

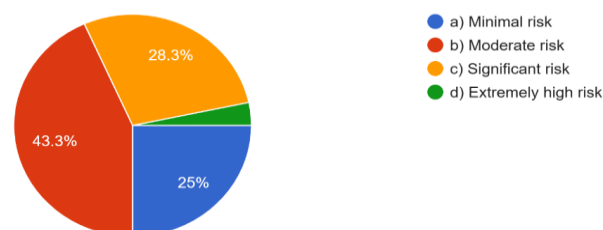
Analysis:

Out of 60 respondents, 43.3% perceive an average risk, 28.3% consider it a serious risk, 25% indicate a minimal risk, and 3.3% perceived a very high risk of energy price fluctuations. The majority of respondent's express concern and more than 70 percent acknowledge at least a moderate risk.

4.2.12 Chart Showing Risk of Fluctuations in Energy Prices to Expansion Project Financial Viability

To what extent do you believe fluctuations in energy prices (e.g., electricity tariffs) could pose a risk to the financial viability of the expansion project?

60 responses



Interpretation:

Answers reflect a broad awareness of stakeholders about the potential impact of variation in energy prices on the economic viability of the expansion

project. A significant number of respondents who identified moderate or significant risk indicate a nuanced understanding of market dynamics and project-specific vulnerability to external factors such as electricity rates. These findings highlight the importance of robust risk management strategies and contingency plans to reduce the negative impact of energy price fluctuations on project profitability and long-term sustainability.

4.1.13 Table Showing External Factors Perceived as Potential Risks to Expansion Project Success

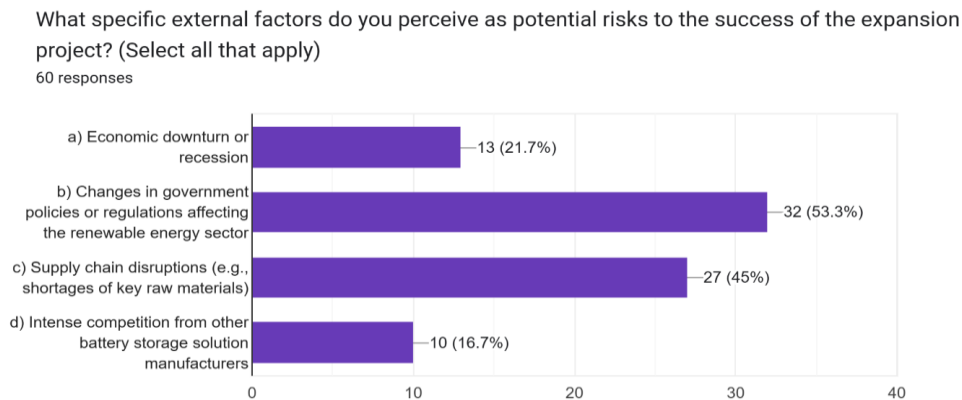
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Economic downturn or recession	13	21.7%
2	Changes in government policies or regulations affecting the renewable energy sector	32	53.3%
3	Supply chain disruptions (e.g. shortages of key raw materials)	27	45%
4	Intense competition from other battery storage solution manufacturers	10	16.7%

Analysis:

Results of the survey show that the majority of respondents see changes in government policies or regulations affecting the renewable energy sector (53.3%) and disruptions in the supply chain (45%) as potential risks to the success of expansion project. These factors underscore the importance of regulatory stability and strong supply chain management to mitigate the risks associated with an expansion initiative. In contrast, a relatively smaller proportion of respondents cited a recession or recession (21.7%) and strong competition from other battery

manufacturers (16.7%) as potential risks, suggesting that these factors are not as immediate concerns.

4.2.13 Chart Showing External Factors Perceived as Potential Risks to Expansion Project Success



Interpretation:

The high percentage of respondents citing government policy or regulations reflects the impact of regulatory uncertainty on business operations in the renewable energy sector. Similarly, concerns about supply chain disruptions emphasize the importance of securing reliable sources of raw materials and implementing contingency plans to ensure production disruptions. Although economic downturns and competition are considered potential risks, they are considered minor compared to regulatory and supply chain challenges. These findings highlight the need for proactive risk management strategies to avoid external uncertainty and ensure the successful implementation of an expansion project.

4.1.14 Table Showing Risk Assessment of Consumer Preferences Impacting Market Demand for Battery Storage Solutions

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Low risk	18	30%
2	Moderate risk	29	48.3%
3	High risk	13	21.7%
4	Very high risk	-	-
	Total	60	100%

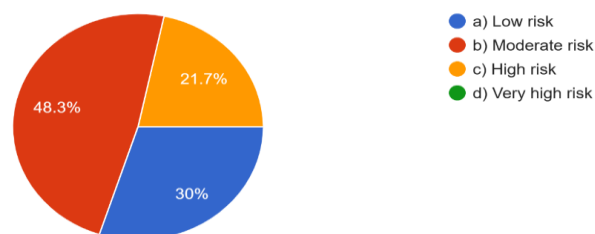
Analysis:

30% of 60 respondents perceive the risk of changes in consumer preferences or behavior affecting market demand for battery storage solutions as low. The majority, 48.3% of the respondents, consider this risk to be moderate. On the other hand, 21.7% of the respondents think that this risk is high. It should be noted that none of the respondents rated this risk very high.

4.2.14 Chart Showing Risk Assessment of Consumer Preferences Impacting Market Demand for Battery Storage Solutions

How would you assess the risk of changes in consumer preferences or behavior impacting the market demand for battery storage solutions?

60 responses



Interpretation:

The majority of respondents, almost half of all respondents, express legitimate concerns about threats to demand for battery storage solutions due to changing consumer preferences or behavior. It refers to the recognition of fluctuations in demand based on the changing needs or preferences of consumers. However, a significant part perceives this risk as relatively low, which shows some confidence in the stability of market demand. In contrast, a minority of respondents consider this risk high, highlighting a subset of stakeholders who are warier of possible changes in consumer behavior affecting market dynamics.

4.1.15 Table Showing Importance of Environmental Sustainability in Investment Decision-making for Battery Storage Solutions

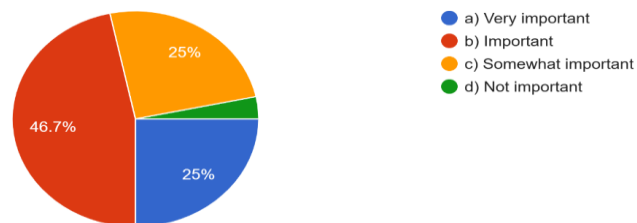
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very important	15	25%
2	Important	28	46.7%
3	Somewhat important	15	25%
4	Not important	2	3.3%
	Total	60	100%

Analysis:

Of the 60 respondents who discussed the importance of environmental sustainability in making investment decisions related to battery storage solutions, the majority of respondents emphasized its importance. In particular, environmental sustainability was considered "very important" by 15 respondents (25%) and "important" by 28 respondents (46.7%). Another 15 respondents (25%) indicated that it was "somewhat important". However, only a small percentage of respondents, 2 (3.3%), found that environmental sustainability is not important.

4.2.15 chart showing Importance of Environmental Sustainability in Investment Decision-making for Battery Storage Solutions

How important is environmental sustainability to you when considering investment in battery storage solutions?
60 responses



Interpretation:

The vast majority of respondents, 96.7%, showed a positive inclination towards environmental sustainability when evaluating investments in battery solutions. This suggests that Powerica Ltd.'s stakeholders know and consider environmental factors. A significant percentage of respondents rate environmental sustainability as "very important" or "important" highlighting the growing importance of sustainable practices in the energy sector. This information suggests a possible alignment between the company's investment strategy and the values of its stakeholders, which underlines the need for Powerica Oy to prioritize environmental sustainability in its business and expansion projects.

4.1.16 Table Showing Responses to Willingness to Pay Premium for Environmentally Sustainable Battery Storage Solutions

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Yes, I value sustainability and would pay a premium	27	45%
2	No, I prioritize cost effectiveness over sustainability	24	40%
3	Depends on the extent of the premium	9	15%
	Total	60	100%

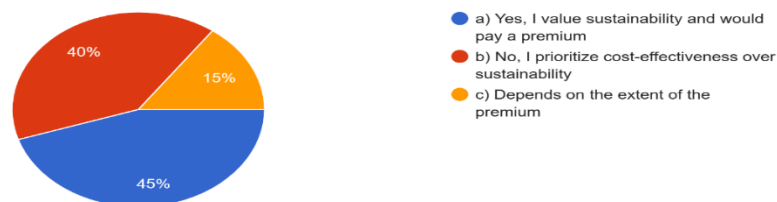
Analysis:

45% of 60 respondents (27 people) expressed a willingness to pay a premium for battery solutions that are certified as environmentally friendly. This highlighted an important part of the market that values sustainability. On the other hand, 40% (24 people) prioritize cost efficiency over sustainability, an important segment that may be less willing to pay a premium for green options. Interestingly, 15% (9 people) indicated that their willingness to pay a bonus depends on the size of the bonus, indicating a nuanced approach to decision-making influenced by factors such as the amount of additional cost.

4.1.16 Chart Showing Responses to Willingness to Pay Premium for Environmentally Sustainable Battery Storage Solutions

3) Would you be willing to pay a premium for battery storage solutions that are certified as environmentally sustainable or have a lower carbon footprint?

60 responses



Interpretation:

The results suggest that consumers have different preferences between durability and cost-effectiveness of battery storage solutions. Although a significant part prioritizes environmental aspects and is willing to pay additional costs for sustainable alternatives, a significant part continues to focus on cost minimization. This highlights the importance for Powerica Ltd to carefully assess market demand and pricing strategies when expanding capacity for battery storage solutions, considering both sustainability and affordability, to effectively respond to different consumer preferences.

4.1.17 Table Showing Concerns Regarding Social Impact in Battery Production Supply Chain

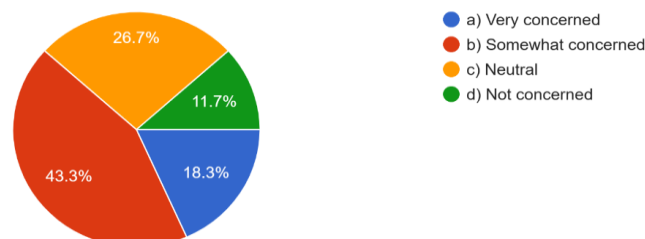
SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	Very concerned	11	18.3%
2	Somewhat concerned	26	43.3%
3	Neutral	16	26.7%
4	Not concerned	7	11.7%
	Total	60	100%

Analysis:

The 60 respondents who were concerned about the social impact of battery manufacturing by choosing a supplier like Powerica Ltd were mixed. A significant proportion, 18.3% (11 respondents), indicated that they were "very worried", while a larger proportion, 43.3% (26 respondents), indicated that they were "somewhat worried". In addition, 26.7% (16 respondents) remained neutral on this issue, indicating a lack of strong feelings in both cases. On the other hand, a significant 11.7% (7 respondents) said that they are not concerned about the social impact.

4.2.17 Chart Showing Concerns Regarding Social Impact in Battery Production Supply Chain

4)How concerned are you about the social impact of battery production, such as labor practices and community relations, when choosing a supplier like Powerica Ltd.?
60 responses



Interpretation:

The results suggest that respondents were very concerned about the social impact of batteries when choosing a supplier such as Powerica Ltd. While a large proportion expressed varying degrees of concern, a significant proportion also remained neutral or neutral. did not express concern. This shows that stakeholders have different perspectives on the importance of labor practices and community relations in the context of battery production. These findings highlight the need for Powerica Ltd to prioritize and openly address social impact considerations in order to maintain trust and meet stakeholder expectations.

4.1.18 Table Showing Perceptions of Long-Term Sustainability of Battery Storage Solutions Compared to Other Energy Storage Technologies

SL.NO	OPTIONS	NO. OF RESPONDENTS	PERCENTAGE
1	More sustainable	15	25%
2	Equally sustainable	25	41.7%
3	Less sustainable	11	18.3%
4	I'm not sure	9	15%
	Total	60	100%

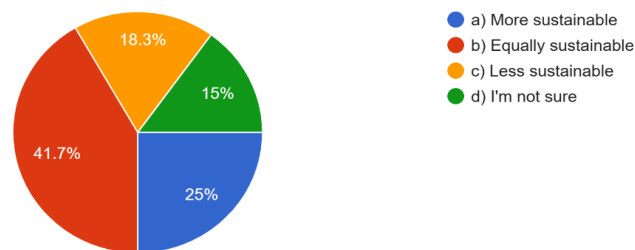
Analysis:

The survey results show a balanced understanding of the long-term sustainability of battery storage solutions compared to other energy storage technologies. Of the respondents, 25% (15 people) considered battery storage solutions more durable and 41.7% (25 people) the same. On the other hand, 18.3% (11 people) considered battery storage solutions less durable. In particular, 15% (9 people) expressed uncertainty about the comparison.

4.2.18 Chart Showing Perceptions of Long-Term Sustainability of Battery Storage Solutions Compared to Other Energy Storage Technologies

How do you perceive the long-term sustainability of battery storage solutions compared to other energy storage technologies (e.g., pumped hydro, compressed air)?

60 responses



Interpretation:

The results show that respondents understand the sustainability of battery storage solutions. While a significant number of people view them positively or along with other technologies, a significant minority view them with reservations or ambiguity. This difference highlights the complexity of sustainability assessment in the context of energy storage, which is likely to be influenced by factors such as environmental impacts, technological development and the regulatory framework. Clarifying uncertainty factors and clarifying specific issues can facilitate an informed decision regarding the introduction and expansion of battery storage solutions in Powerica operations.

CHAPTER 5

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 5

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Findings:

The data analysis revealed several important insights into the financial viability of Powerica expansion of battery storage solutions production capacity. First, demographic analysis revealed that the majority of respondents were young professionals, suggesting a young workforce that may be prone to innovation. and adaptation. Second, the distribution of income among respondents highlighted that a significant portion of the workforce is in the lower income group, highlighting the need for fair compensation and financial welfare programs. Potential return on investment (ROI) and technological reliability were prioritized when making investment decisions, and environmental sustainability was also considered important. In addition, there were strong indications of demand for battery storage solutions in the market, with the majority of respondents expressing the likelihood or uncertainty of investing in them in the next 12 months. In addition, the majority appreciated the seamless integration with the existing energy infrastructure, which shows a focus on system efficiency and reliability. Finally, while respondents perceived moderate risk associated with the expansion project, they acknowledged potential external risks such as regulatory changes and supply chains.

5.2 Recommendations:

Based on the results, some recommendations can be made to improve the economic profitability of the expansion of the production capacity of Powerica battery storage solutions. First, it is necessary to align investment decisions with stakeholder-prioritized factors such as return on investment and technological reliability, while emphasizing environmental sustainability to adapt to changing market preferences. Second, initiatives must be taken to remove uncertainty and educate stakeholders about the benefits and potential risks associated with battery storage solutions, thereby increasing confidence and encouraging investment. In addition, efforts must be made to seamlessly integrate battery storage solutions into the existing energy infrastructure to optimize system efficiency and meet consumer expectations. In addition, proactive risk management strategies should be put in place to mitigate potential external risks such as legislative changes and supply chain disruptions to ensure sustainability and long-term sustainability of projects. Finally, attention should be paid to promoting financial inclusion and welfare initiatives that support workers, especially those with lower incomes, by promoting a more inclusive and fair work environment.

5.3 Conclusions:

1.Demographic Overview: Demographic analysis revealed that Powerica Ltd. workers were younger, especially in the 21-30 age group. This demographic trend indicates a tendency to attract and retain younger talent, which can influence a company's strategic planning and human resource development.

2.Economic Considerations: The income distribution of the respondents shows that a significant part of Powerica Ltd. of the workforce belongs to the lower income category. This view emphasizes the importance of implementing employee wellness programs and fair compensation practices that are tailored to the various economic demographics of the organization.

3.Investment Factors: Factors influencing investment decisions for battery storage solutions are primarily related to cost effectiveness, technology reliability and return on investment (ROI) potential. It emphasizes adapting production expansion strategies to market needs to find economically viable and reliable solutions.

4. Market Potential: The high willingness of respondents to consider purchasing battery storage solutions in the next 12 months indicates a promising market outlook and significant demand for such products. Powerica Ltd. can capitalize on this opportunity by strategically expanding its production capacity to effectively meet anticipated market demand.

5. Importance of Integration: Most respondents understand the importance of seamlessly integrating battery storage solutions with existing energy infrastructure. This underlines the need for Powerica Ltd. must prioritize compatibility and synergy with the broader energy ecosystem in its expansion efforts.

6. Risk assessment: Although stakeholders see moderate to high risks in investing in expanding the storage capacity of battery storage facilities, they also recognize

potential benefits. Powerica Ltd. It must implement strong risk management strategies to mitigate uncertainty and maximize the potential for success of its expansion initiatives.

7. Environmental awareness: Environmental sustainability is an important factor influencing investment decisions. A significant part of the respondent's value sustainability and are willing to pay a premium for environmentally friendly solutions. This highlights the importance of integrating sustainable practices into Powerica Ltd.'s expansion plans to meet changing market expectations and regulatory requirements.

8. Regulatory Stability: Changes in government policies and regulations have been identified as key risks to the success of an expansion project. Powerica Ltd. must closely monitor regulatory developments and proactively adjust their strategies to ensure compliance and minimize operational disruption.

9. Market awareness: Respondents have a nuanced understanding of market dynamics and consumer preferences, highlighting the importance of thorough market research and a customer-centric approach to Powerica Ltd. in designing the expansion strategy.

10. Different financing options: The variety of financing options considered by the respondents emphasizes the importance of flexible financing arrangements to address different market preferences and financing options. Powerica Ltd. should explore a number of financing options to facilitate the widespread adoption of its battery storage solutions.

5.4 Future Challenges and Opportunities:

Extensive data analysis of the study reveals that Powerica Ltd. key insights into the expanding battery storage solutions initiative. Demographic analysis shows a predominantly young workforce, which highlights the company's ability to attract and retain talent. Financially, a significant number of respondents earn less than 3,000 million kroner, which points to potential challenges in terms of affordability and employee well-being. Factors affecting investment decisions, such as return on invested capital and cost efficiency, emphasize the importance of financial profitability. In addition, respondents show a strong inclination towards environmental sustainability, which indicates market demand and direction of corporate responsibility.

The study reveals promising opportunities for Powerica Ltd. for expansion, but also identifies critical challenges. The proliferation of the young workforce requires a strategic HR policy that promotes talent retention and development. Correcting income differences within an organization is very important to ensure equal welfare of employees. In addition, the emphasis on cost-effectiveness and ROI meets market expectations, but requires efficient allocation of resources. Balancing economic goals and environmental sustainability reflects changing consumer preferences and regulatory pressures that highlight the need for environmentally friendly product offerings. Overall, the study shows a growth path for Powerica Ltd, but emphasizes the importance of addressing internal differences and adapting strategies to market demands and sustainability goals.