

Energy Storage Technologies in Utility Markets Worldwide



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Energy storage systems provide the ability to balance power demand and supply, reduce electric surges and sags, maintain power frequency, and ensure power remains available for critical loads when power outages occur. They can also provide enough power to maintain operations until systems can be shut down in an orderly fashion or provide enough power until other on-site generation sources come on-line. Energy storage solutions additionally afford several strategic benefits such as improved flexibility for grid operators, increased national energy security, and reduced environmental impact.

The financial benefits of energy storage within the generation, transmission, and distribution system are numerous. With the incorporation of energy storage into the grid, the utility sector and customers can expect reduced financial losses due to outages and poor power quality. Energy storage solutions can improve the efficiency of, and thus reduce the costs associated with, load following, frequency regulation and provision of reserves. They can also improve the return on renewable energy generation investments, enable profitable power market arbitrage, enable the deferral of electric infrastructure investments, and reduce end-user electricity costs.

Current and future demand for high quality, reliable electricity exceeds the supply capabilities of current infrastructure. Energy storage solutions can help to maximize the capacity of current infrastructure while improving power quality and reliability. Demand for energy storage solutions is expected to further benefit from the growing trends in the adoption of renewable energy generation and microgrid solutions. The significant public and private investments currently being made are also expected to bolster the growth of energy storage solutions in the utility sector. However, a number of challenges remain, including the need to further improve the cost/performance of current technologies, the relative lack of technical and commercial maturity of many energy storage solutions, and regulatory and monetization issues.

With electric grids around the world struggling to meet the rising demand for more and higher quality power in a cost effective and environmentally conscious manner, utilities and other service providers responsible for reliable electricity service are continuing to identify and evaluate a range of technically and economically viable solutions. Energy storage technologies including CAES, pumped hydro, batteries and capacitors which offer solutions to many of the common problems and emerging needs of the industry have been successfully tested and deployed. Energy storage technologies can offer benefits such as prompt start-up, modularity, easy siting, limited environmental impact, and flexibility to be used for multiple applications.

Ongoing growth in renewable generation, the emergence of microgrids, substantial public and private investments, and continued R&D that improves the cost/performance of energy storage technologies are expected to drive even stronger growth over the next several years. The global market for energy storage solutions in the utility sector is expected to grow by 15.8% per year to over \$10 billion in 2015. Meanwhile, the value of energy storage solutions in the United States is forecast to increase 26.6% per year to nearly \$2 billion in 2015.

Table of Content

CHAPTER 1 - EXECUTIVE SUMMARY

Introduction

The Grid and Energy Storage

Applications of Energy Storage Solutions

Table 1-1 Functional Categorization of Utility Energy Storage Applications

Energy Storage Technologies

Pumped Hydro Storage

Compressed Air Energy Storage

Electrochemical Capacitors

Flywheels

Batteries

Lead-Acid Batteries

Lithium-Ion Batteries

Molten Salt Batteries

Flow Batteries

Other Technologies and Solutions

Drivers of Demand for Energy Storage Systems

Limiting Factors

Current and Projected Market Size

Figure 1-1 Global and US Value of Energy Storage Market for Utility Applications, 2006-2015 (\$ billion)

Figure 1-2 Value of Global Energy Storage Market for Utility Applications by Technology, 2010 (in \$ million)

Figure 1-3 Pumped Hydro Storage Capacity by Region, 2010 and 2015 (Gigawatts)

Figure 1-4 Global Compressed Air Energy Storage Market for Utility Applications, 2010-2015 (\$ million)

Figure 1-5 Global Batteries and Capacitors Market for Utility Applications, 2010-2015 (\$ million)

Figure 1-6 Global Energy Storage Market for Flywheels and Other Systems in Utility Applications, 2010-2015 (\$ million)

Energy Storage Developers/Suppliers

Table 1-2 Energy Storage Technology Developers/Suppliers by Technology

Table 1-3 Energy Storage Technology Developers/Suppliers by Technology (cont.)

Table 1-4 Energy Storage Technology Developers/Suppliers by Technology (cont.)

Report Scope

Report Format

Report Methodology

Abbreviations and Definitions

Table 1-5: Abbreviations Utilized in Report

Table 1-5: Abbreviations Utilized in Report (cont.)

CHAPTER 2 - UTILITY SECTOR ENERGY STORAGE APPLICATIONS

Introduction

The Electric Grid

Figure 2-1 The Electric Grid

Source: US Department of Energy

Power Generation

Figure 2-2 Load Curves for a Typical Electrical Power Grid

Power Transmission

Power Distribution

Grid Operations

Microgrids

The Grid and Energy Storage

Applications of Energy Storage Solutions

Table 2-1 Functional Categorization of Utility Energy Storage Applications

Generation and Supply Applications

Table 2-2 Energy Storage Requirements for Black Start Applications

Table 2-3 Energy Storage Requirements for Spinning Reserve Applications

Table 2-4 Energy Storage Requirements for Load Following Applications

Table 2-5 Energy Storage Requirements for Regulation Control Applications

Table 2-6 Energy Storage Requirements for Load Shifting Applications

Table 2-7 Energy Storage Requirements for Renewables Integration Applications

Transmission and Distribution Applications

Figure 2-3 Classification of Grid Stability Applications

Table 2-8 Energy Storage Requirements for Angular Stability Applications

Table 2-9 Energy Storage Requirements for Voltage Stability Applications

Table 2-10 Energy Storage Requirements for Frequency Excursion Suppression Applications

Table 2-11 Energy Storage Requirements for Distribution Power Quality Applications

Energy Storage System Requirements by Application

Table 2-12 Energy Storage Requirements by Application

Energy Storage Technologies by Application

Table 2-13 Energy Storage Technologies by Application

CHAPTER 3 - ENERGY STORAGE TECHNOLOGIES

Introduction

Pumped Hydro Storage

Figure 3-1 Pumped Hydro Storage Facility

Table 3-1 Technology Developers/Suppliers, Pumped Hydro Storage

Compressed Air Energy Storage

Figure 3-2 Compressed Air Energy Storage System

Table 3-2 Technology Developers/Suppliers, Compressed Air Energy Storage

Electrochemical Capacitors

Figure 3-3 Electrochemical Capacitor

Table 3-3 Technology Developers/Suppliers, Electrochemical Capacitors

Flywheels

Table 3-4 Technology Developers/Suppliers, Flywheels

Batteries

Figure 3-4 Basic Rechargeable Battery Design

Lead-Acid Batteries

Figure 3-5 Representative Flooded Lead-Acid Battery

Table 3-5 Technology Developers/Suppliers, Lead-Acid Batteries

Lithium-Ion Batteries

Figure 3-6 Representative Lithium-Ion Battery

Table 3-6 Technology Developers/Suppliers, Lithium-Ion Batteries

Molten Salt Batteries

Figure 3-7 Representative Sodium-Sulfur Battery

Table 3-7 Technology Developers/Suppliers, Molten Salt Batteries

Vanadium Redox Flow Batteries

Figure 3-8 Schematic of Vanadium Redox Flow Battery

Table 3-8 Technology Developers/Suppliers, Vanadium Redox Flow Batteries

Zinc-Bromine Batteries

Table 3-9 Technology Developers/Suppliers, Zinc Bromine Batteries

Other Emerging Technologies and Solutions

Superconducting Magnetic Energy Storage

Thermal Storage

Vehicle to Grid

Conclusion

Figure 3-9 Illustrative Positioning of Energy Storage Technologies

CHAPTER 4 - DEMAND FACTORS AND MARKET SIZE

Introduction

Demand Drivers

Growing Electricity Demand

Figure 4-16 Electricity Production Estimates, 2005-2030 (trillion kWh)

Electric Power Supply Constraints

Figure 4-1 Major Disturbances in Electricity Delivery, 2005-2009 (# disturbances)

Rising Grid Investment Needs

Rising Electricity Rates

Figure 4-2 US Retail Electricity Prices by Sector, 2004-2012 (?/kWh)

Figure 4-3 Retail Electricity Prices in Germany by Sector, 2004-2009 (€/kWh)

Growing Renewable Generation

Figure 4-4 World Net Electricity Generation from Renewables, 2006-2015 (trillion kWh)

Emergence of Microgrids

Public and Private Funding

Limiting Factors

Cost Competitiveness

Table 4-1 Energy Storage Cost Comparison

Supply Constraints

Regulatory and Monetization Issues

Commercial Maturity

Current and Projected Market Size

Figure 4-5 Global and US Value of Energy Storage Market for Utility Applications, 2006-2010 (\$ billion)

Figure 4-6 Global and US Value of Energy Storage Market for Utility Applications, 2010-2015 (\$ billion)

Figure 4-7 Global Energy Storage Market for Utility Applications by Technology, 2006-2015 (\$ million)

Pumped Hydro

Figure 4-8 Pumped Hydro Storage Capacity by Region, 2010 and 2015 (Gigawatts)

Table 4-2 Recent and Planned PHS Projects

CAES

Table 4-3 CAES Facilities Planned for Completion 2010-2015

Figure 4-9 Global Compressed Air Energy Storage Market for Utility Applications, 2010-2015 (\$ million)

Batteries and Capacitors

Figure 4-10 Global Batteries and Capacitors Market for Utility Applications, 2010-2015 (\$ million)

Figure 4-11 Global Energy Storage Market for Batteries and Capacitors by Technology, 2006-2015 (\$ million)

Flywheels and Other Systems

Figure 4-12 Global Energy Storage Market for Flywheels and Other Systems in Utility Applications, 2010-2015 (\$ million)

Electricity Storage Benefits

Utility Generation/Supply Benefits

Utility Transmission and Distribution Benefits

Utility Customer Benefits

CHAPTER 5 - PARTICIPANT PROFILES

Overview

Table 5-1 Description of Companies Profiled

Altair Nanotechnologies, Incorporated

Table 5-2 Altair Nanotechnologies, Incorporated Profile

Corporate Background

Product Portfolio

Table 5-3 Altair Nanotechnologies, Inc. Product and Brand Portfolio, Lithium Ion Batteries

Performance

Figure 5-1 Altair Nanotechnologies, Incorporated Revenues, 2005-2009 (\$ million)

Innovation

Personnel Changes

Alstom Power

Table 5-4 Alstom Power Profile

Corporate Background

Product Portfolio

Table 5-5 Alstom Power Product Portfolio, Pumped Hydro

Performance

Figure 5-2 Alstom Power Sector Revenues, 2005-2010 (€ million)

Acquisitions and Divestitures

Innovation

Personnel Changes

Axion Power International, Incorporated

Table 5-6 Axion Power International, Incorporated Profile

Corporate Background

Product Portfolio

Performance

Figure 5-3 Axion Power International, Incorporated Revenues, 2005-2009 (\$ million)

Innovation

Personnel Changes

Beacon Power Corporation

Table 5-7 Beacon Power Corporation Profile

Corporate Background

Product Portfolio

Performance

Figure 5-4 Beacon Power Corporation Revenues, 2005-2009 (\$ thousand)

Innovation

Personnel Changes

Dresser-Rand

Table 5-8 Dresser-Rand Profile

Corporate Background

Product Portfolio

Table 5-9 Dresser-Rand Product and Brand Portfolio, CAES Equipment

Performance

Figure 5-5 Dresser-Rand Revenues, 2005-2009 (\$ billion)

Acquisitions and Divestitures

Innovation

Personnel Changes

GE Energy

Table 5-10 GE Energy Profile

Corporate Background

Product Portfolio

Table 5-11 GE Energy Product and Brand Portfolio, CAES Equipment

Performance

Table 5-12 GE Energy Operating Segment Associated Business Units

Figure 5-6 GE Energy Revenues, 2005-2009 (\$ billion)

Acquisitions and Divestitures

Innovation

Personnel Changes

GEMx Technologies, LLC

Table 5-13 GEMx Technologies, LLC Profile

Corporate Background

Product Portfolio

Table 5-14 GEMx Technologies, LLC Product and Brand Portfolio, Sodium Metal Halide Batteries

Performance

Acquisitions and Divestitures

Innovation

Maxwell Technologies, Incorporated

Table 5-15 Maxwell Technologies, Incorporated Profile

Corporate Background

Product Portfolio

Table 5-16 Maxwell Technologies, Inc. Product and Brand Portfolio, Electrochemical Capacitors

Performance

Figure 5-7 Maxwell Technologies, Incorporated Revenues, 2005-2009 (\$ million)

Acquisitions and Divestitures

Innovation

Personnel Changes

Prudent Energy, Incorporated

Table 5-17 Prudent Energy, Incorporated Profile

Corporate Background

Product Portfolio

Performance

Acquisitions and Divestitures

Innovation

Personnel Changes

ZBB Energy Corporation

Table 5-18 ZBB Energy Corporation Profile

Corporate Background

Product Portfolio

Performance

Innovation

Personnel Changes

APPENDIX - SELECTED CORPORATE ADDRESSES

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