

# **Cloud Virtualization Software Market Shares, Strategies, and Forecasts, Worldwide, 2011 to 2017**

<https://marketpublishers.com/r/CFF654CE5B1EN.html>

Date: October 2011

Pages: 971

Price: US\$ 3,600.00 (Single User License)

ID: CFF654CE5B1EN

## **Abstracts**

WinterGreen Research announces that it has a new study on Cloud Virtualization Software Market Strategies, Market Shares, and Market Forecasts, 2011-2017. EMC/ VMware, IBM, Microsoft, Oracle, Citrix, and dominate the markets for cloud architecture. IBM SOA services oriented architecture is the base for enterprise cloud virtualization initiatives leveraging middleware to implement the cloud.

The 2011 study has 971 pages and 255 tables and figures. Worldwide markets are poised to achieve significant growth as globally integrated enterprises worldwide move to implement more cost efficient IT systems. Transaction process and Internet workload computer processing delivery modalities depend on the efficiencies of scale achievable using cloud computing.

Virtualization is the fundamental aspect of cloud computing. Virtualization permits enterprises to achieve modernization of IT by consolidating workloads onto fewer platforms and to optimize the management of those workloads with automated process. The aim of computer virtualization is to increase the utilization of systems in the data center and at the line of business.

Most workloads being virtualized are the Microsoft applications used in the data center. Scale out Web applications, with each application located on a separate server are being consolidated at a rapid pace. Each application is being packaged as an image that runs on a larger server, with 10 to 15 images per server being achieved for consolidation in the distributed platform environments, and 100 to 500 images per IFL being achieved on the mainframe Linux class servers.

Cloud computing has three virtualization aspects: Software as a Service (SaaS),

Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Business software as a service SaaS applications and cloud computing models have matured and adoption has become an issue for every IT department. These models are offered as solutions targeted top different types of application delivery. These solutions all adapt to virtualized environments.

Microsoft solutions are being virtualized to increase the utilization and density of server processing. VMware a virtualization solution commonly used. It facilitates the creation of virtual machines on the Windows XP, Windows Vista and Windows Server 2003 operating systems, creating multiple images of single servers on a larger server. Server virtualization creates economies for running the data center.

Virtual machines are created and managed through a VMware or tother web-based interface. A utility is used to mount multiple server images on a single more powerful server, consolidating workloads and saving hardware costs. Running Linux In Virtual Machines IBM z/VM offers the ability to run Linux in virtual machines on IBM System z. IT needs to run Linux in virtual machines for enterprise computing. Linux in virtual images is evolving rapidly. Data centers have to meet ever increasing demands with flat budgets. IBM System z delivers a unique hybrid computing model.

Virtual machines are created and managed through a VMware or tother web-based interface. A utility is used to mount multiple server images on a single more powerful server, consolidating workloads and saving hardware costs. Running Linux In Virtual Machines IBM z/VM offers the ability to run Linux in virtual machines on IBM System z. IT needs to run Linux in virtual machines for enterprise computing. Linux in virtual images is evolving rapidly. Data centers have to meet ever increasing demands with flat budgets. IBM System z delivers a unique hybrid computing model.

According to Susan Eustis, 'Customers consolidating on System z virtualized systems are benefiting from the reliability, availability and serviceability of IBM System z servers. z/VM offers platforms for consolidating select UNIX, Windows, and Linux workloads on a single physical server.'

Virtualization software for a cloud service market forecasts indicate that markets at \$5.8 billion in 2010 are anticipated to reach \$16 billion by 2017.

WinterGreen Research is an independent research organization funded by the sale of market research studies all over the world and by the implementation of ROI models that are used to calculate the total cost of ownership of equipment, services, and

software. The company has 35 distributors worldwide, including Global Information Info Shop and Thompson Financial.

## Contents

### **LITHIUM-ION BATTERY, LITHIUM POLYMER, THIN FILM AND ZINC AIR BATTERY EXECUTIVE SUMMARY**

Lithium-Ion Battery Market Driving Forces  
Comparison Of Battery Performances  
Lithium-Ion Batteries  
Lithium Ion Battery Market Shares  
Lithium Ion Battery Market Forecasts

### **1. LITHIUM ION BATTERY MARKET DESCRIPTION AND MARKET DYNAMICS**

- 1.1 Lithium Ion Batteries
  - 1.1.1 Lithium Ion Battery Target Markets
- 1.2 Lithium-Ion Battery Electric Vehicle Target Markets
  - 1.2.1 NEC/Nissan Alliance
  - 1.2.2 Largest Target Market, The Transportation Industry
  - 1.2.3 Electric Grid Services Market
  - 1.2.4 Portable Power Tools
  - 1.2.5 World Economy Undergoing A Transformation
  - 1.2.6 Transportation
  - 1.2.7 Electric Grid Services
  - 1.2.8 Commercial Applications For Advanced Batteries
  - 1.2.9 Challenges in Battery and Battery System Design
- 1.3 Types of Batteries
  - 1.3.1 Lead-Acid Batteries
  - 1.3.2 Nickel-Based Batteries
  - 1.3.3 Conventional Lithium-ion Technologies
  - 1.3.4 Advanced Lithium-ion Batteries
  - 1.3.5 Thin Film Battery Solid State Energy Storage
  - 1.3.6 Ultra capacitors
  - 1.3.7 Fuel Cells
- 1.4 Lithium-Ion Battery Technologies: Transportation Industry Target Market
- 1.5 Energy Storage For Grid Stabilization
  - 1.5.1 Local Energy Storage Benefit For Utilities
- 1.6 Applications Require On-Printed Circuit Board Battery Power
  - 1.6.1 Thin-film vs. Printed Batteries
- 1.7 Smart Buildings/Energy Harvesting

- 1.7.1 Permanent Power for Wireless Sensors
- 1.8 Battery Safety/Potential Hazards
- 1.9 Thin Film Solid-State Battery Construction
- 1.10 Battery Is Electrochemical Device
- 1.11 Battery Depends On Chemical Energy
  - 1.11.1 Characteristics Of Battery Cells
  - 1.11.2 Batteries Are Designed Differently For Various Applications

## **2. LITHIUM-ION BATTERY, LITHIUM POLYMER, THIN FILM AND ZINC AIR BATTERY MARKET SHARES AND MARKET FORECASTS**

- 2.1 Lithium-Ion Battery Market Driving Forces
  - 2.1.1 Polymer Film Substrate for Thin Flexible Profile
  - 2.1.2 Comparison Of Battery Performances
  - 2.1.3 Lithium-Ion Batteries
- 2.2 Lithium Ion Battery Market Shares
  - 2.2.1 Samsung SDI
  - 2.2.2 Panasonic Rechargeable Lithium Ion Batteries
  - 2.2.3 LG Chem
  - 2.2.4 BYD
  - 2.2.5 BAK
  - 2.2.6 B&K Customer Base
  - 2.2.7 Sony
  - 2.2.8 Saft
  - 2.2.9 Toshiba
  - 2.2.10 DIEHL & Eagle Picher
- 2.3 Lithium Ion Battery Market Forecasts
  - 2.3.1 Lithium-ion Battery Target Market Segments
  - 2.3.2 Cell Phone Battery Market Forecasts, Dollars, Worldwide, 2011-2017
  - 2.3.3 Lithium-Ion and Lithium Based Small Electronics Battery Markets Forecasts
  - 2.3.4 Camera/Power Tool Battery Market Forecasts
  - 2.3.5 PC/Notebook/Tablet Battery Market Forecasts
  - 2.3.6 Lithium-Ion and Lithium Based Small Electronics Battery Markets Forecasts
- 2.4 Lithium-Ion Cells For Electric Vehicles
  - 2.4.1 Automotive Demand Rapidly Growing
  - 2.4.2 Lithium-Ion Battery (LIB) Key Element Of EV Propulsion
  - 2.4.3 Lithium-Ion Battery Production Capacity For New Materials Manufacture
  - 2.4.4 BYD
  - 2.4.5 BYD Auto Business

2.4.6 BYD/Daimler AG/BYD Company Limited and Daimler AG Joint Venture Contract to Develop Electric Vehicle

2.4.7 BYD/Samsung/LG

2.4.8 Bosch and Samsung

2.4.9 LG

2.4.10 Tata

2.4.11 Tata/Bentley

2.4.12 NEC

2.4.13 Nissan/NEC

2.4.14 NEC/Nissan Battery Businesses

2.4.15 Planar Energy/General Motors

2.4.16 Li-Tec Strategic Partners: Evonik and Daimler

2.4.17 Toyota

2.4.18 Argonne National Laboratory

2.4.19 A123

2.4.20 A123 MIT Carbon Nanotube Electrodes

2.4.21 A123 MIT Very High-Power Lithium-Ion Batteries

2.4.22 Johnson Controls-/ Saft Advanced Power Solutions

2.4.23 Ford

2.4.24 Ford, Compact Power (CPI), a Subsidiary of LG Chem, BYD

2.4.25 BMW, Johnson Controls,-Saft Advanced Power Solutions –

2.4.26 BAK/BMW

2.5 Electric Vehicle Battery Initiatives

2.6 Rechargeable Battery Market

2.6.1 Production Dilemma

2.6.2 Nanotechnology Thin Film and Lithium-Ion Batteries

2.7 Silver Nano plates Silicon Strategy Shows Promise For Batteries

2.7.1 Argonne Scientists Watch Nanoparticles

2.8 Thin Film Battery Market Driving Forces

2.8.1 Thin Film Battery High Power & Energy Density, Specific Power & Energy

2.8.2 Thin Film Battery Technology Market Shares

2.8.3 Lithium-ion Product Definitions

2.8.4 Thin Film Batteries Deposited Directly Onto Chips Or Chip Packages

2.9 Thin Film Batteries Market Shares

2.9.1 Infinite Power Solutions

2.9.2 Cymbet Corporation

2.9.3 Planar Energy Devices

2.9.4 Poly Plus

2.9.5 Johnson/Excellatron

- 2.9.6 Eveready Battery Company/Blue Spark Technologies
- 2.9.7 Solicore
- 2.9.8 Leonhard Kurz/PolyIC
- 2.9.9 ITN Solid-State Lithium Battery
- 2.9.10 Nokia to add NFC
- 2.9.11 Architecture Of The Prieto Battery Has Nanowires To Make Up The Anode
- 2.9.12 Printed Electronics
- 2.10 Thin Film Batteries Market Forecasts
  - 2.10.1 Thin Film Batteries Deposited Directly Onto Chips Or Chip Packages
  - 2.10.2 Thin Film, Solid State Printed Electronics Battery Market:- Bigger than the Silicon Chip
  - 2.10.3 Remote Sensors
  - 2.10.4 Sensor Network Thin Film Battery Forecasts
- 2.11 Nanotechnology Next Generation Systems
- 2.12 RFID and Small Thin Film Batteries
- 2.13 Nanotechnology to Drive Thin Film Lithium-Ion Batteries Market
  - 2.13.1 Arotech Corporation Lithium-Ion, Lithium Polymer, Zinc Air
  - 2.13.2 ITN Solid-State Lithium Battery
  - 2.13.3 Infinite Power Solutions
  - 2.13.4 Cymbet Corporation
  - 2.13.5 Planar Energy Devices
- 2.14 Thin-film Battery Market Forecasts
- 2.15 Lead-Acid Battery Manufacturers
- 2.16 Electrochromics
- 2.17 Printed Electronics/Silicon Chips
- 2.18 Li-Ion (Lithium-Ion) Battery Prices
  - 2.18.1 Lithium Ion Battery Prices
- 2.19 Geographical Region Analysis
  - 2.19.1 Geographical Region Analysis
  - 2.19.2 Japan
  - 2.19.3 Korea
  - 2.19.4 Chinese Lithium Ion Battery Revenue
  - 2.19.5 A123 Micro-Hybrid Battery Applications
  - 2.19.6 Saft International Presence

### **3. LITHIUM-ION BATTERY AND LITHIUM BATTERY PRODUCT DESCRIPTION**

- 3.1 NEC/Nissan/AESC (Automotive Energy Supply Corporation)
- 3.2 Toshiba

### 3.3 Sony

#### 3.3.1 Sony Thin Film And Lithium Ion Batteries For Electronics

### 3.4 ThinkPad Edge Thin Film And Lithium Ion Batteries For RFID Tags To Micro Medical Devices

### 3.5 Prieto Battery

#### 3.5.1 Prieto Battery Reducing The Thickness Of The Electrode Results In Lower Energy Capacity And Shorter Operating Time

#### 3.5.2 Prieto Battery Nanowires Make Up The First Key Piece Of The Battery, The Anode

#### 3.5.3 Proposed architecture of the Prieto battery

### 3.6 Saft Lithium-thionyl Chloride (Li-SOCl<sub>2</sub>)

### 3.7 Enerdel

### 3.8 Electric Vehicle Thin Film And Lithium Ion Batteries

### 3.9 Johnson Controls-Saft Advanced Power Solutions

#### 3.9.1 Hybrid And Electric Vehicles Market: An Industry Comes To Life

#### 3.9.2 Johnson Controls-Saft Rapidly growing demand

#### 3.10.1 Saft Hybrid Marine Propulsion

#### 3.10.2 Saft Total Battery Reliability

#### 3.10.3 Saft Worldwide Reputation

### 3.11 A123 Systems

### 3.12 BYD/Samsung

#### 3.12.1 BYD EV

#### 3.12.2 BYD Company Limited and Daimler AG Joint Venture Contract to Develop Electric Vehicle

#### 3.12.3 BYD/Warren Buffett/Berkshire Hathaway

### 3.13 Panasonic Rechargeable Lithium Ion Batteries

### 3.14 Li-Tec Battery GmbH Joint Venture of Evonik Industries AG and Daimler AG

#### 3.14.1 Li-Ion Fab I

#### 3.14.2 Li-Tec Strategic Partners: Evonik and Daimler

### 3.15 Samsung Lithium Ion Battery

### 3.16 SB LiMotive/Bosch and Samsung SDI

### 3.17 NEC/Nissan

#### 3.17.1 NEC Automotive Lithium-Ion Rechargeable Battery

#### 3.17.2 NEC/Nissan/AESC (Automotive Energy Supply Corporation)

#### 3.17.3 Nissan/Toda Kogyo

### 3.18 Hitachi Vehicle Energy, Ltd.

### 3.19 Matsushita/Panasonic/Sanyo

### 3.20 ReVolt Technologies

#### 3.20.1 ReVolt Technologies Button Cell Air Electrode



- 3.20.2 ReVolt Technology Partners With BASF
- 3.21 LG
  - 3.21.1 LG Lithium-ion Cylindrical Battery
  - 3.21.2 LG Lithium-ion Polymer Battery
  - 3.21.3 LG Lithium-ion Cylindrical Battery
  - 3.21.4 Lithium-ion Polymer Battery
  - 3.21.5 LG Lithium-ion Polymer Battery
  - 3.21.6 LG Lithium-ion Cylindrical Battery
- 3.22 BYD Lithium-ion Battery
- 3.23 Thunder Sky Battery Limited
- 3.24 Mitsubishi Motors/Litcel
- 3.25 GS Yuasa Battery/Mitsubishi
- 3.26 GS Yuasa Battery/Honda
- 3.27 Leo Motors Tesla Roadster Fuel Cell Batteries
- 3.28 Panasonic EV Energy (PEVE)
- 3.29 Degussa AG/Enax
- 3.30 Oak Ridge Micro-Energy, Inc.
  - 3.30.1 Oak Ridge Micro-Energy Manufacturing Process
- 3.31 Cymbet Energizing Innovation
  - 3.31.1 Cymbet Products
  - 3.31.2 Cymbet Rechargeable EnerChips and Effective Capacity
  - 3.31.3 Cymbet Development Support
  - 3.31.4 Cymbet Solid State Energy Storage for Embedded Energy, Power Back-up and Energy Harvesting
  - 3.31.5 Cymbet Energy Harvesting
  - 3.31.6 Cymbet Zero Power Devices
  - 3.31.7 ComtexCymbet EnerChip Thin-Film Batteries
- 3.32 Infinite Power Solutions (IPS)
  - 3.32.1 Infinite Power Solutions High-Volume Production Line for TFBs
  - 3.32.2 Infinite Power Solutions Solid-State, Rechargeable Thin-Film Micro-Energy Storage Devices
  - 3.32.3 Infinite Power Solutions IPS THINERGY MEC Products
  - 3.32.4 Infinite Power Solutions THINERGY MEC
  - 3.32.5 Infinite Power Solutions, Inc. Recharge From A Regulated 4.10 V Source
  - 3.32.6 Infinite Power Solutions, Inc. SRAM Backup Guidelines
  - 3.32.7 Infinite Power Solutions, Inc. SRAM Backup Power Solution
  - 3.32.8 Infinite Power Solutions Recharging THINERGY Micro-Energy Cells
  - 3.32.9 Infinite Power Solutions Charging Methods
  - 3.32.10 Infinite Power Solutions, Inc. THINERGY MECs

3.32.11 MicroGen Systems and Infinite Power Solutions Wireless Sensor Network (WSN)

3.32.12 Maxim Integrated, Infinite Power Solutions IC to Integrate All Of The Power-Management Functions For Ambient Energy Harvesting

3.32.13 Maxim Integrated Products (Nasdaq:MXIM) MAX17710 IC Integrates Power-Management

3.32.14 Maxim/Infinite Power Solutions, Inc. (IPS) THINERGY(R) Solid-State, Rechargeable MEC Battery Products

3.32.15 Maxim introduces MAX17710 PMIC: Uniquely enables Energy Harvesting with THINERGY MECs

3.33 Planar

3.33.1 Planar Energy Devices

3.33.2 Planar Energy's Solid State Batteries New Deposition Process

3.33.3 Planar Energy PrintGuide to Recent Battery Advances

3.33.4 Planar Lithium Manganese Dioxide Nanotechnology

3.33.5 Planar Energy Devices PowerPlane MXE Module

3.34 Altair Nanotechnologies

3.35 Axion Power International (AXPW.OB)

3.36 Energy Harvesting Devices

3.37 Researchers at MIT

3.37.1 Cymbet's EnerChip and Energy Harvesting Solutions

3.37.2 Cymbet EnerChip Solid State Battery Energy Harvesting (EH)/TI's LaunchPad Development Kit

3.37.3 Micropelt Energy Harvesting:

3.37.4 Millennial Net Wireless Sensor Network:

3.38 ITN's Lithium Technology

3.38.1 ITN Lithium Electrochromics

3.38.2 ITN Solid-State Lithium Battery

3.38.3 ITN Lithium Air Battery

3.39 Solicore

3.39.1 Solicore RFID

3.39.2 Solicore Commercializes Its Revolutionary Battery Technology

3.40 Rogers

3.41 PS iTHINERGY ADP

3.41.1 IPS and ITT

3.42 Shenzhen B&K Rechargeable Battery

3.43 Danionics

3.43.1 Danionics' Batteries

3.44 Diehl & Eagle-Picher

3.45 Advanced Battery Factory

3.46 E2-Tec

3.47 Edan Technology

3.48 GS Yuasa

3.49 Polyplus

3.49.1 PolyPlus Lithium water

3.49.2 PolyPlus Lithium/Air Couple

3.50 Johnson Research Product Development

3.51 Excellatron

3.51.1 Excellatron Polymer Film Substrate for Thin Flexible Profile

3.51.2 Excellatron Thin Film Batteries Deposited On A Thin Polymer Substrate

3.51.3 Excellatron High Rate Capability

3.51.4 Excellatron Thin Film Battery High Power & Energy Density, Specific Power & Energy

3.51.5 Excellatron Polymer Film Substrate for Thin Flexible Profile

3.51.6 Excellatron Unique Proprietary Passivation Barrier and Packaging Solution

3.51.7 Excellatron High Capacity Thin Film Batteries

3.51.8 Excellatron Next Generation Of Lithium Batteries

3.51.9 Excellatron High Rate Deposition Process (Plasma Enhanced Chemical Vapor Deposition)

3.52 NEC

3.52.1 NEC Radio tags

3.52.2 NEC RFID Tag

3.52.3 NEC Nanotechnology Thin And Flexible Organic Radical Battery (ORB)

3.53 Fuel Cell Batteries

3.54 GMB Power

3.55 Power Air Disposable Zinc Fuel Cell

3.56 Umicore Thin Film Materials

3.57 BrightSource Energy Molten Salt

## **4. LITHIUM ION BATTERY TECHNOLOGY**

4.1 Lithium Ion Batteries

4.1.1 Thin Film Battery Timescales and Costs

4.2 Battery Breakthroughs

4.2.1 MIT Thin Film Battery Researchers

4.2.2 A123 MIT Very High-Power Lithium-Ion Batteries

4.2.3 A123 MIT Carbon Nanotube Electrodes

4.2.4 ORNL Scientists Reveal Battery Behavior At The Nanoscale

- 4.2.5 Rice University and Lockheed Martin Scientists Discovered Way To Use Silicon To Increase Capacity Of Lithium-Ion Batteries
- 4.2.6 Rice University 50 Microns Battery
- 4.2.7 Next Generation Of Specialized Nanotechnology
- 4.3 Silicon Strategy For Batteries
- 4.4 Zinc Air Batteries And Fuel Cells
- 4.5 John Bates Patent: Thin Film Battery and Method for Making Same
  - 4.5.1 J. B. Bates, a N. J. Dudney, B. Neudecker, A. Ueda, and C. D. Evans Thin-Film Lithium and Lithium-Ion Batteries
- 4.6 MEMS Applications
  - 4.6.1 MEMS Pressure Sensors
- 4.7 c-Si Manufacturing Developments
  - 4.7.1 Wafers
  - 4.7.2 Texturization
  - 4.7.3 Emitter Formation
  - 4.7.4 Metallization
  - 4.7.5 Automation, Statistical Process Control (SPC), Advanced Process Control (APC)
  - 4.7.6 Achieving Well-controlled Processes
  - 4.7.7 Incremental Improvements
- 4.8 Ascent Solar's WaveSol Flexible And Lightweight Thin-Film PV Technology
- 4.9 Liquid radio
- 4.10 TAU battery
- 4.11 Flexible Energy Storage Devices Based On Nanocomposite Paper
- 4.12 Transition Metal Oxides, MnO
- 4.13 Battery Cell Construction
- 4.14 Impact Of Nanotechnology
  - 4.14.1 Nanotechnology
  - 4.14.2 Why Gold Nanoparticles Are More Precious Than Pretty Gold
  - 4.14.3 Lithium Ion Cells Optimized For Capacity
  - 4.14.4 Flat Plate Electrodes
  - 4.14.5 Spiral Wound Electrodes
  - 4.14.6 Multiple Electrode Cells
  - 4.14.7 Fuel Cell Bipolar Configuration
  - 4.14.8 Electrode Interconnections
  - 4.14.9 Sealed Cells and Recombinant Cells
  - 4.14.10 Battery Cell Casing
  - 4.14.11 Button Cells and Coin Cells
  - 4.14.12 Pouch Cells
  - 4.14.13 Prismatic Cells

- 4.15 Naming Standards For Cell Identification
  - 4.15.1 High Power And Energy Density
  - 4.15.2 High Rate Capability
- 4.16 Comparison Of Rechargeable Battery Performance
- 4.17 Polymer Film Substrate
- 4.18 Micro Battery Solid Electrolyte

## **5. LITHIUM-ION BATTERY COMPANY PROFILES**

- 5.1 A123
  - 5.1.1 A123 Transportation Industry Is The Largest Target Market
  - 5.1.2 A123 Cylindrical Batteries
  - 5.1.3 A123 Energy Storage Solutions That Improve The Reliability And Efficiency Of The Electric Power Grid
  - 5.1.4 A123 Supports Grid Operators
  - 5.1.5 A123 Cathode Costs, Powder, Manufacturing, Foil, and Additives
- 5.2 Advanced Battery Factory
- 5.3 Arotech
  - 5.3.1 Arotech's New SWIPES Product Named One of the U.S. Army's Ten Greatest Inventions of 2011
  - 5.3.2 Arotech's Battery and Power Systems Division
  - 5.3.3 Electric Fuel Battery Corporation
- 5.4 Altair Nanotechnologies Inc.
  - 5.4.1 Altair Nanotechnologies Reports Second Quarter 2011 Revenue
- 5.5 ATL
- 5.6 Avnet Abacus
- 5.7 Axion
- 5.8 BAK
- 5.9 B&K
  - 5.9.1 B&K Customer Base
- 5.10 Bosch
  - 5.10.1 Bosch Group's Solar Energy Division
  - 5.10.2 Bosch Malaysia Marketing
- 5.11 BYD
  - 5.11.1 BYD Revenue
  - 5.11.2 BYD Auto Company
  - 5.11.3 BYD e6 Taxi Project
  - 5.11.4 BYD/Berkshire Hathaway
- 5.12 Citic Guoan

- 5.12.1 MGL One Of The Biggest Cathode Material (LiCoO<sub>2</sub>) Manufacturers in China
- 5.12.2 MGL Total Battery Production Capacity
- 5.12.3 MGL Company Profile
- 5.13 Cymbet
  - 5.13.1 Cymbet Team:
  - 5.13.2 Cymbet Investors:
  - 5.13.3 Cymbet Investors
  - 5.13.4 Cymbet Partners, Sales and Distribution:
  - 5.13.5 Cymbet Manufacturing:
  - 5.13.6 Cymbet to Open World's Highest Volume Solid-State Battery Manufacturing Facility
  - 5.13.7 Cymbet Partnering with X-FAB
  - 5.13.8 Cymbet/X-FAB, Inc.
  - 5.13.9 Cymbet Expanding in Minnesota
  - 5.13.10 Cymbet/LEDA
  - 5.13.11 Cymbet/Avnet Abacus
  - 5.13.12 Cymbet EnerChip EP Universal Energy Harvesting Evaluation Kit
  - 5.13.13 Cymbet Secures \$31 Million in Private Financing
- 5.14 Danionics
- 5.15 Delphi
  - 5.15.1 Delphi Revenue 2010
- 5.16 Dust Networks
  - 5.16.1 Dust Networks Self-Powered IPV6 Wireless Sensor Network
- 5.17 Infinite Power Solutions, Inc.
- 5.18 Eagle Pither
- 5.19 Edan Technology
  - 5.19.1 Edan Technology Corporate Description
  - 5.19.2 Edan Technology Customers
  - 5.19.3 Edan Technology Partners
- 5.20 Enerdel
  - 5.20.1 Enerdel Contract with Russia's Mobile GTES
- 5.21 EnOcean GmbH
- 5.22 Evonik Industries AG/Li-Tec Storage Technology
- 5.23 Excellatron
- 5.24 GMB Power
- 5.25 GS Nanotech
- 5.26 Gee ES Nanotech
  - 5.26.1 Gee-Es Nanotech Centre for Research and Production of microelectronics
- 5.27 Geely
- 5.28 GS Caltex/GS Yuasa

- 5.28.1 GS Battery (USA) Inc.
- 5.29 Huanyu
- 5.30 Infinite Power Solutions
  - 5.30.1 Infinite Power Solutions Solid-State, Thin-Film Batteries
  - 5.30.2 Infinite Power Solutions Micro-Energy Storage Devices
  - 5.30.3 Infinite Power Solutions Battery Applications
  - 5.30.4 Infinite Power Solutions And Tokyo Electron Device Global Distribution Agreement
  - 5.30.5 Infinite Power Solutions Raises \$20.0m In Series C Financing
- 5.31 Inventec
- 5.32 ITN Lithium Technology
  - 5.32.1 ITN's Lithium EC sub-Division Focused On Development And Commercialization of EC Thin-Films, and EC-Enabled Windows
  - 5.32.2 ITN's SSLB Division Thin-Film Battery Technology
  - 5.32.3 ITN Lithium Air Battery
  - 5.32.4 ITN Fuel Cell
  - 5.32.5 ITN Thin-film Deposition Systems
  - 5.32.6 ITN Real Time Process Control
  - 5.32.7 ITN Plasmonics
- 5.33 Konka
- 5.34 Johnson Controls Products & Solutions
  - 5.34.1 Johnson Controls Power Solutions
  - 5.34.2 Johnson Controls Hybrid And Electric Vehicles Market: An Industry Comes To Life
- 5.35 Johnson Research
  - 5.35.1 Johnson Research Environmental Energy Products
  - 5.35.2 Johnson Research/Excellatron Solid State
- 5.36 KSW Microtec
  - 5.36.1 KSW Microtec Efficient Flexible, Producer of RFID Components
- 5.37 Leo Motors
- 5.38 Li-Tec
- 5.39 LG Chem
  - 5.39.1 LG Chem Produces Lithium-Ion And Lithium-Ion Polymer Rechargeable Batteries
  - 5.39.2 LG Batteries
- 5.40 Lishen
- 5.41 Makita
- 5.42 Matsushita/Panasonic/Sanyo/Sanyo Solar
  - 5.42.1 Panasonic Corporation Revenue



- 5.42.2 Sanyo
- 5.42.3 SANYO 2011 Sales Of Solar Photovoltaic Systems
- 5.42.4 Panasonic Full Year Revenue
- 5.42.5 Panasonic/Sanyo Solar Ark
- 5.42.6 Panasonic /Sanyo Solar Stone Brewing Company Reference Account
- 5.42.7 Panasonic/Sanyo Solar lumenHAUS Reference Account
- 5.42.8 InSpec/SANYO
- 5.42.9 SANYO and InSpec Group Partnership Generates Multiple Solar Installations in Oregon
- 5.43 Maxcell
- 5.44 Maxim/Dallas (MXIM:Nasdaq)
  - 5.44.1 Maxim acquires Energy Measurement Company Teridian
  - 5.44.2 Maxim/Dallas Semiconductor Revenue
  - 5.44.3 Maxim/Dallas Semiconductor Revenue
  - 5.44.4 Maxim/Dallas Semiconductor Principal Competitors
  - 5.44.5 Maxim/Dallas Semiconductor
  - 5.44.6 Maxim/Zilog
  - 5.44.7 Maxim/Vitesse
- 5.45 McNair
  - 5.45.1 McNair Enterprise Technique Center
- 5.46 MicroGen
- 5.47 Micropelt
- 5.48 Mitsubishi Electric
  - 5.48.1 Mitsubishi Motors/Litcel
  - 5.48.2 Mitsubishi Electric Group Energy and Electric Systems
  - 5.48.3 Mitsubishi Electric Power Module for Electric Vehicles
  - 5.48.4 Mitsubishi Electric Group Power Module Test Samples Specifications
- 5.49 NEC Corporation
  - 5.49.1 NEC Global Business Activities/Achievements
  - 5.49.2 NEC Group Vision 2017
  - 5.49.3 NEC C&C Cloud Strategy
  - 5.49.4 NEC Expand Global Business
- 5.50 Oak Ridge National Laboratory
- 5.51 Oak Ridge Micro-Energy
  - 5.51.1 Oak Ridge Micro-Energy, Inc.
- 5.52 Planar Energy Devices –
  - 5.52.1 DOE Selects Planar Energy for Oak Ridge National Laboratory Collaborative R&D Program to Advance Next-Generation Battery Development
- 5.53 PolyPlus



- 5.53.1 Poly Plus Lithium Water
- 5.54 Prieto
- 5.55 PS5-
- 5.56 ReVolt Technology
  - 5.56.1 Executives of BMW and Gould Join ReVolt's Advisory Leadership Team
- 5.57 SB LiMotive/Bosch and Samsung SDI
- 5.58 Saft
  - 5.58.1 Saft, Building For Future Growth
  - 5.58.2 Attractive Market Positioning In High-End Niche Markets
  - 5.58.3 Saft Launches Lithium-Ion Battery Industrial Production At Jacksonville US Plant
- 5.59 Samsung
  - 5.59.1 Samsung 2010 Significant Strategic Change
  - 5.59.2 Samsung Apps
  - 5.59.3 Samsung Display and Information Technology Innovations
  - 5.59.4 Samsung Cameras: Consumer-Inspired Design
  - 5.59.5 Samsung Creating a Future Home Entertainment TV
- 5.60 SNC
- 5.61 Solicore
- 5.62 Sony Corporation
  - 5.62.1 Sony Technology
- 5.63 STMicroelectronics
  - 5.63.1 STMicroelectronics Product Technologies
  - 5.63.2 ST Custom and Semi-Custom Chips
  - 5.63.3 ST Secure ICs
  - 5.63.4 ST Application Specific Discretes (ASD)
  - 5.63.5 ST In-Check "Lab-on-Chip"
  - 5.63.6 ST Multi-Segment Products
  - 5.63.7 ST Microcontrollers
  - 5.63.8 ST Smart Power Devices
  - 5.63.9 ST Standard Linear and Logic
  - 5.63.10 ST Discretes
  - 5.63.11 ST Protection Devices
  - 5.63.12 ST Sensors
  - 5.63.13 ST RF
  - 5.63.14 ST Real-time Clocks
- 5.64 Texas Instruments (TXN:NYSE)
  - 5.64.1 Texas Instruments
- 5.65 Thunder Sky Battery Limited

5.66 Tokyo Electron Device

5.67 Umicore Thin Film Products

5.67.1 Umicore Materials Technology Group

5.68 Wha Fat Technological Co., Ltd

5.69 Zibo Dison

5.70 Battery Manufacturers

## List Of Tables

### LIST OF TABLES AND FIGURES

Table ES-1 Lithium Ion Battery Market Driving Forces
Table ES-2 Comparison Of Battery Performances
Figure ES-3 Thin Film Battery Energy Density
Table ES-4 Lithium-Ion Battery Market Shares, Dollars, Worldwide, First Three Quarters 2011
Figure ES-5 Lithium-Ion Battery Market Forecasts Dollars, Worldwide, 2011-2017
Table 1-1 Lithium Ion Battery Target Markets
Figure 1-2 Fleet Driving Favors Electric Vehicles
Table 1-3 Principal Features Used To Compare Rechargeable Batteries
Table 1-4 Challenges in Battery and Battery System Design
Figure 1-5 BMW's Mini E Electric Car Powered By A Rechargeable Lithium-Ion Battery
Table 1-6 Examples of Hybrid Electric Vehicles
Figure 1-7 Typical Structure Of A Thin Film Solid State Battery
Table 1-8 Characteristics Of Battery Cells
Table 2-1 Lithium Ion Battery Market Driving Forces
Table 2-2 Comparison Of Battery Performances
Figure 2-3 Thin Film Battery Energy Density
Table 2-4 Lithium-Ion Battery Market Shares, Dollars, Worldwide, First Three Quarters 2011
Table 2-5 Lithium-Ion Battery Market Shares, Dollars, Worldwide, 2010 and First Three Quarters 2011
Figure 2-6 Johnson Controls/Saft Battery Update
Figure 2-7 Lithium-Ion Battery Market Forecasts Dollars, Worldwide, 2011-2017
Table 2-8 Lithium-Ion Battery Market Forecasts Dollars, Worldwide, 2011-2017
Table 2-9 Lithium-Ion Battery Market Forecasts Dollars, Worldwide, 2011-2017
Table 2-10 Lithium Ion Battery Selected Industry Market Segments
Figure 2-11 Lithium-Ion and lithium based Cell Phone Battery Market Forecasts, Dollars, Worldwide, 2011-2017
Figure 2-12 Lithium-Ion and Lithium Based Small Electronics Battery Markets Forecasts Dollars, Worldwide, 2011-2017
Figure 2-13 Lithium-Ion and lithium based Camera/Power Tool Battery Market Forecasts, Worldwide, Dollars, 2011-2017
Figure 2-14 Lithium-Ion and lithium based PC/Notebook/Tablet Battery Market Forecasts, Worldwide, Dollars, 2011-2017
Figure 2-15 Lithium-Ion and lithium based Small Electronics Battery Market Forecasts,

Worldwide, Dollars, 2011-2017

Table 2-16 Electric Vehicle (EV) Lithium Ion and Lithium Based Battery, Market Forecasts Dollars, Worldwide, 2011-2017

Figure 2-17 Lithium Ion Transportation Market Opportunity

Table 2-18 Constitution of Conventional Lithium-Ion Cell Materials

Table 2-19 Lithium-Ion Cells Material Unit Accounting For Percentage Of The Battery Cost

Table 2-20 Production Capacity For New Materials Manufacture

Figure 2-21 A123 Systems High Growth Target Markets

Table 2-22 Lithium Ion Market Issues

Figure 2-23 A123 Assessment of Key Industry Participants in 2015

Figure-24 Silver Nanoplates

Table 2-25 Thin Film Battery Market Driving Forces

Figure 2-26 Thin Film and Printed Battery Market Shares, Dollars, 2010

Table 2-27 Thin Film and Printed Battery Market Shares, Dollars, Worldwide, 2010 and First Three Quarters 2011

Figure 2-28 Thin Film and Printed Battery Markets Forecasts Dollars, Worldwide, 2011-2017

Table 2-29 Thin Film and Printed Battery Market Forecasts Dollars, Worldwide, 2011-2017

Table 2-30 Thin Film and Printed Battery Markets Forecasts Dollars, Worldwide, 2011-2017

Table 2-31 Thin Film and Printed Battery Market Industry Segments, Percent, Worldwide, 2011-2017

Figure 2-32 Sensor Network Thin Film Battery Forecasts

Table 2-33 Thin Film Battery Unique Properties

Figure 2-34 A123 Lead Acid Battery Replacement Target Market Size, 2013

Figure 2-35 Selected Lithium Ion Battery Prices

Figure 2-36 Power Tool Lithium Ion Battery Prices

Figure 2-37 Wha Fat Technological Co., Ltd 10440 AAA Series Lithium Ion Rechargeable Battery Prices

Figure 2-38 Lithium Ion Battery Pricing and Margin Improvement

Figure 2-39 Lithium-Ion and Other Lithium Battery Regional Market Segments, Shipments, First Three Quarters 2011

Table 2-40 Lithium-Ion and Other Lithium Battery Regional Market Segments, Shipments, First Three Quarters 2011

Figure 2-41 Chinese Lithium Ion Battery Revenue By Technology

Figure 2-42 A123 Micro-Hybrid Battery Applications By Region

Figure 2-43 Saft International Presence

Table 3-1 Sony VAIO Notebook Batteries

Table 3-2 Sony Devices Using Lithium Ion Batteries

Figure 3-3 Sony Laptop Battery

Figure 3-4 Prieto Battery Nanowires Li-ion Batteries Using A 3D Structure

Table 3-5 Prieto Battery Features

Table 3-6 Saft Non Rechargeable LHS Battery Main applications

Table 3-7 Saft Non Rechargeable LS-W Battery Main applications

Table 3-8 Transportation Advanced Battery Market Segments

Table 3-9 Saft Li-ion Energy Storage Technology Features

Table 3-10 A123 Chemistry Systems Battery Cycle Life

Figure 3-11 A123 Systems Flat Voltage Curve

Figure 3-12 A123 Systems Battery Cap, Can, and Core

Figure 3-13 A123 Cell Products using Nanophosphate

Figure 3-14 A123 Systems Nameplate vs. Usable Energy

Figure 3-15 A123 Battery Systems Innovation

Figure 3-16 A123 Systems Lithium-Ion vs. Lead Acid Battery

Figure 3-17 A123 Systems 12 Volt Nanophosphate Engine Start Battery

Figure 3-18 A123 Nanophosphate Technology

Figure 3-19 A123 Systems Surface Area Increases Power and Usable Energy

Figure 3-20 A123 Systems Flat Voltage Curve

Figure 3-21 A123 Systems Technology

Table 3-22 BYD-Developed Fe Battery Features

Figure 3-23 BYD-Developed Fe Battery

Figure 3-24 Panasonic Manganese Lithium Rechargeable Batteries

Table 3-25 Li-Tec Battery CERIO Product Lines Applications

Table 3-26 Samsung Lithium Ion Battery Features

Figure 3-27 SB LiMotive Co. Ltd is a 50/50 Joint Venture Between Bosch and Samsung SDI

Figure 3-28 ReVolt TechnologieszFab Battery

Table 3-29 ReVolt Button Cell Air Electrode

Table 3-30 ReVolt Technology Partnership With BASF Target Markets

Figure 3-31 LG Lithium-Ion Cylindrical Battery Models

Figure 3-32 LG Battery Models

Figure 3-33 LG Li-ion Prismatic Battery

Figure 3-34 LG Lithium-ion Prismatic Battery

Table 3-35 BYD Lithium-Ion Batteries Main Features

Table 3-36 BYD Lithium-Ion Batteries High Energy Density

Figure 3-37 BYD Typical Lithium Ion Performance Charge Characteristics Discharge Characteristics

Figure 3-38 BYD Typical Lithium Ion Cycle Characteristics Temperature Characteristics

Figure 3-39 BYD Typical Lithium Ion Battery Structure

Figure 3-40 BYD Typical Lithium Ion Cylindrical Battery Structure

Figure 3-41 BYD Typical Li-Polymer Battery Structure

Figure 3-42 BYD Products Specification

Figure 3-43 BYD E-Bike Battery Solutions

Table 3-44 BYD Battery Issues

Figure 3-45 Oak Ridge Micro-Energy Discharge of a Thin-Film Lithium Battery At Current Densities of 0.02, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, and 10.0 mA/cm<sup>2</sup>

Figure 3-46 Discharge of a Thin-Film Lithium-Ion Battery At Current Densities of 0.02, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, and 10.0 mA/cm<sup>2</sup>

Figure 3-47 Ragone Plots Graph Of Energy vs. Power Per Unit Area Of The Cathode From The Discharge Data For The Lithium And Lithium-Ion Batteries

Table 3-48 Oak Ridge Micro-Energy Manufacturing Process For Thin Film Batteries

Figure 3-49 Oak Ridge Micro-Energy Ceramic Wafer

Table 3-50 Oak Ridge Micro-Energy ORLI.0.5.CL Battery Features

Table 3-51 Oak Ridge Micro-Energy Consumer and Industrial Products

Table 3-52 Oak Ridge Micro-Energy Sensors

Table 3-53 Oak Ridge Micro-Energy Implantable Medical Products

Table 3-54 Oak Ridge Micro-Energy Government Applications

Table 3-55 Cymbet Solid State Energy Storage Energizing Innovation Target Markets

Table 3-56 Cymbet Solid State Energy Storage products

Table 3-57 Cymbet EnerChip Solid-State Product Line

Table 3-58 Cymbet's EnerChip Benefits

Figure 3-59 Cymbet EnerChip CBC3105-BDC:

Table 3-60 Cymbet EnerChip CBC001-BDC: Target Markets

Table 3-61 Cymbet Energy Harvesting Applications

Table 3-62 Infinite Power Solutions THINERGY Product Family

Table 3-63 Infinite Power Solutions, Inc. Maxim Energy Management Chips

Table 3-64 Infinite Power Solutions, Inc. Applications for energy harvester

Table 3-65 Infinite Power Solutions Charging Methods

Table 3-66 Wireless Sensor Network Applications

Figure 3-67 Planar Energy's Solid State Batteries Spraying Materials Onto A Metal Substrate

Figure 3-68 MIT Energy Harvesting Device Converts Low-Frequency Vibrations Into Electricity

Table 3-69 ITN's SSLB Solid-State Lithium Battery Target Markets

Table 3-70 ITN's SSLB Technology Advantages

Table 3-71 ITN Technologies



Figure 3-72 ITN Capabilities To Develop And Deliver A Quality, Fully-Functional, Nanoscale Product

Figure 3-73 B&K Target Markets

Figure 3-74 B&K Products

Figure 3-75 B&K Model and Capacity

Figure 3-76 Advanced Battery Factory Batteries a

Figure 3-77 Advanced Battery Factory Batteries b

Figure 3-78 Advanced Battery Factory Batteries c

Figure 3-79 Advanced Battery Factory Batteries d

Figure 3-80 Advanced Battery Factory Batteries e

Figure 3-81 Advanced Battery Factory Batteries f

Figure 3-82 Advanced Battery

Figure 3-83 E2-Technologies Battery

Figure 3-84 E2-Tec Battery Advantages

Figure 3-85 E2-Tec Battery Applications

Figure 3-86 PolyPlus Lithium Metal Electrodes Compatible With Aqueous And Aggressive Non-Aqueous Electrolytes

Figure 3-87 PolyPlus Air and Water Stable Lithium Electrode

Figure 3-88 Thin Film Solid State Battery Construction

Figure 3-89 Excellatron Charge/Discharge Thin Film Battery Profile At 25°C

Figure 3-90 Excellatron Charge/Discharge Thin Film Battery Profile At 150°C

Figure 3-91 Excellatron Capacity Charge/Discharge 150°C

Figure 3-92 Excellatron Capacity And Resistance Of Thin Film Battery As A Function Of Temperature

Figure 3-93 Excellatron Battery High Rate Pulse Discharge

Figure 3-94 Excellatron Pulse Discharge

Figure 3-95 Excellatron's Battery (0.1 mAh) High Rate Pulse Discharge Was By A 100 mA Pulse at 80°C

Figure 3-96 Excellatron Long term Cyclability Of A Thin Film Solid State Battery

Figure 3-97 Excellatron Discharge Capacity Of Thin-Film Batteries

Table 3-98 Excellatron Comparison Of Battery Performances

Figure 3-99 Excellatron Polymer Film Substrate Battery

Figure 3-100 Excellatron Unique Proprietary Passivation Barrier and Packaging Solution

Figure 3-101 Voltage And Current Profile of a 10 mAh Excellatron Battery

Table 3-102 Excellatron Batteries Practical Advantages

Figure 3-103 NEC ORB Thin, Flexible Battery Technology

Figure 3-104 NEC ORB Battery

Figure 3-105 NEC ORB Flexible Battery

Table 3-106 NEC Nanotechnology Thin And Flexible Organic

Radical Battery (ORB) Characteristics Of The Technologies

Figure 3-107 NEC Organic Radical Battery

Figure 3-108 GMB Power EV Battery & System

Figure 3-109 Power Air Fuel Cell

Table 4-1 Thin Film Battery Unique Properties

Figure 4-2 Department of Energy's Oak Ridge National

Laboratory Battery Behavior At The Nanoscale

Figure 4-3 Rice Researchers Advanced Lithium-Ion

Technique has Microscopic Pores That Dot A Silicon Wafer

Figure 4-4 Rice University 50 Microns Battery

Figure 4-5 Silver Nanoplates Decorated With Silver Oxy Salt Nanoparticles

Figure 4-6 John Bates Patent: Thin Film Battery and Method for Making Same

Table 4-7 Approaches to Selective Emitter (SE) Technologies

Figure 4-8 TAU Thin Films Of Lithium And Pyrite Separated By A Film Of Composite Polymers

Figure 4-9 Nano composite Paper Energy Storage

Figure 4-10 XRD Patterns of MnO Thin Films

Figure 4-11 Nanoparticle Illustration

Table 2-12 Comparison Of Battery Performances

Table 4-13 Common Household-Battery Sizes, Shape, and Dimensions

Table 4-14 Thin Films For Advanced Batteries

Table 4-15 Thin Film Batteries Technology Aspects

Table 4-16 Thin Film Battery/Lithium Air Batteries Applications

Figure 4-17 Polymer Film Substrate Thin Flexible battery Profiles

Figure 4-18 Design Alternatives of Thin Film Rechargeable Batteries

Figure 5-1 A123 Systems 20Ah Cell

Table 5-2 A123 Aims For Cathode Cost Reductions

Figure 5-3 A123 Cell Cost Breakdown

Figure 5-4 A123 Cell Cost Drivers

Figure 5-5 A123 Revenue Q2 2011

Figure 5-6 A123 Systems Revenue

Figure 5-7 A123 Commercial Applications

Figure 5-8 A123 Transportation Applications

Figure 5-9 A123 Projects LiB Market Share in 2015

Figure 5-10 A123 Projects Trucks and Buses Market Share in 2015

Figure 5-11 A123 Systems Transportation Market Positioning

Figure 5-12 A123 Systems Commercial Fleet Market Positioning

Figure 5-13 A123 Systems Addressable Market for Grid Storage

Figure 5-14 A123 Systems Grid Storage ROI Variables



Figure 5-15 A123 Lead Acid Replacement Target Market  
Figure 5-16 A123 Revenue Mix  
Figure 5-17 A123 Pricing and Margin Improvement  
Figure 5-18 A123 Nanophosphate Advantage  
Figure 5-19 Amperex Technology Limited (ATL) Locations  
Figure 5-20 ATL Battery Applications  
Table 5-21 Axion PbC Prototype Key Performance Advantages  
Figure 5-22 BAK Battery Manufacturing Facilities  
Figure 5-23 Bosch Solar Energy Target Markets  
Figure 5-24 Bosch Solar Cell  
Figure 5-25 Bosch Solar Cells: Production  
Figure 5-26 Delphi Corporate Transformation  
Figure 5-27 Delphi Positioning  
Table 5-28 Excellatron Solid State Market Positioning  
Table 5-29 GS NANOTECH  
Figure 5-30 GS Nanotech Thin Film Battery  
Figure 5-31 GS NANOTECH Thin Film Battery  
Figure 5-32 GS Nanotech Nanotechnology  
Table 5-33 GS NANOTECH Thin Film Battery Advantages  
Figure 5-34 Gee ES Nanotech Russia  
Figure 5-35 Gee ES Nanotechnology Components  
Table 5-36 Gee-Es Nanotech Products  
Figure 5-37 Huanyu Batteries  
Figure 5-38 Catalog of Huanyu Batteries  
Table 5-39 ITN Technologies  
Figure 5-40 ITN Thin Film Battery Technology  
Figure 5-41 ITN Battery  
Figure 5-42 ITN Thin-Film Deposition Systems  
Figure 5-43 ITN's Thin-Film Deposition Systems  
Table 5-44 ITN Thin-Film Deposition Systems Products and Services Offered  
Figure 5-45 ITN Thin-Film Deposition Systems  
Figure 5-46 ITN Thin Film Plasmonics  
Figure 5-47 ITNIYN Fuel Cells  
Table 5-48 Johnson Research Products Available For License  
Figure 5-49 Lishen Lithium-Ion Batteries Cylindrical Cell  
Figure 5-50 Panasonic/Sanyo Solar HIT Garage Roof Panels  
Figure 5-51 Panasonic/Sanyo Solar HIT Roof Panels  
Figure 5-52 Panasonic/Sanyo Solar HIT Panels  
Table 5-53 Maxim Major End-Markets

Figure 5-54 Mitsubishi Electric Power Module for Electric Vehicles  
Table 5-55 Mitsubishi Electric Group J-Series Features  
Table 5-56 Mitsubishi Electric Group Automotive-Grade Quality And Functionality  
Table 5-57 Mitsubishi Electric Group J-Series T-PM  
Table 5-58 Mitsubishi Electric Group Power Module Test Samples Specifications  
Table 5-59 Oak Ridge National Laboratory ORNL Advance Battery Materials And Processing Technology Contracts  
Table 5-60 Oak Ridge National Laboratory And Battery Manufacturers Energy Materials Program Aspects  
Figure 5-61 Saft Revenue H1 2011  
Figure 5-62 Saft Industrial Battery Group Description  
Figure 5-63 Saft Specialty Battery Group Description  
Figure 5-64 Johnson Controls/Saft Battery Update  
Figure 5-65 Saft Opportunities in Lithium Ion Markets  
Figure 5-66 Saft Grid Projects  
Figure 5-67 Saft Revenue 2009  
Figure 5-68 Saft International Presence  
Table 5-69 Umicore Business Areas  
Figure 5-70 Umicore Thin Film Products  
Figure 5-71 Wha Fat Technological Lithium Ion Battery  
Figure 5-72 Wha Fat Technological Lithium Ion Batteries  
Figure 5-73 Wha Fat Technological Co., Ltd LED Flashlight

## I would like to order

Product name: Cloud Virtualization Software Market Shares, Strategies, and Forecasts, Worldwide, 2011 to 2017

Product link: <https://marketpublishers.com/r/CFF654CE5B1EN.html>

Price: US\$ 3,600.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/CFF654CE5B1EN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:  
Last name:  
Email:  
Company:  
Address:  
City:  
Zip code:  
Country:  
Tel:  
Fax:  
Your message:

**\*\*All fields are required**

Customer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970

