Introduction to SVOLT Energy Technology

NAATBatt Annual Meeting & Conference
March 11 – 14, 2019

Jeff Yambrick
Vice President of International Sales & Marketing and Business Development
THE BIRTH OF SVOLT ENERGY TECHNOLOGY
Our focus is the Battery Industry

"The Automotive Industry is Going Through an Unprecedented Transformation"
SVOLT Energy Technology Company Limited is an energy company dedicated to series production of premium Lithium-Ion batteries products from raw material, to cells, modules, BMS, packs, as well as ESS and Solar. SVOLT Energy is committed to promoting safe, efficient, clean, low-carbon footprint, and smart eco-system for mobility and the society’s energy revolution. SVOLT Energy will start series production at its site in Changzhou, Jiangsu Province in 2020 with a planned cell capacity of 60GWh locally and additional 40GWh globally by 2025. Utilizing investments in the complete supply chain, SVOLT Energy is determined to be a global powerhouse for premium LIB that meets customer requirements in automotive, heavy duty, industrial, ESS, and other applications.

### Key Figures

- **1,367** R&D Talents (2019.Q1)
- **830** Foreign/Experienced Industry Experts (2019.Q1)
- **>300** Manufacturing Facility Till 2025
- **$4.5B USD** Manufacturing Facility Till 2025
- **$200M USD** R&D Investment (2018-2020)
- **$240M USD** R&D Facilities (2016-2020)

### Vision

- **Make it easy for people to access and use sustainable energy**

### Mission

- **Committed to promoting safe, efficient, clean, and intelligent ecological services and energy social revolution**

### Value

- **Advancing by innovation**
SVOLT ENERGY TECHNOLOGY
Global Presence and Planning

Manufacturing Site, Europe
20GWh @2025
Possible Locations:
Eastern European and
B&R Initiative Countries

Manufacturing Site, China
60GWh @2025
North: Baoding, Total Vehicle +PACK Assembly, Operational
East: Changzhou, 30GWh, 2020-2025
West: Chengdu/Chongqing, 15GWh, 2023
South: Guangzhou / Zhongshan, 15GWh, 2024

Manufacturing Plant, US
20GWh @2025
Targeted Area:
US: Southeast / Midwest
Mexico: Northeast

- R&D Centers
- R&D Centers (Planned)
- Manufacturing
- Manufacturing Capacity

10 Countries
7 R&D Centers
5 Plants (4 in Planning)
SVOLT R&D Facilities in Baoding

- **Testing & Validation Centers:** Conduct Tests Based on GB, IEC, SAE, ISO, USABC and Other Chinese and International Standards, including Global OEMs

- **Performance Testing Center & HIL:** Capable to Conduct Electrical Performance and Reliability Testing on Cell (6,960), Module (30), and Packs / Systems (17) as well as a HIL Lab

- **Analytical Center:** Analysis of Chemical / Physical / Mechanical Performance, Content, Properties, Structural and Mechanism.

- **Cell, Module & Pack Pilot Line:** 3 Pilot Production Lines with a capacity of 50MWh (Cells) and 30MWh (Modules / Packs)

- **Material & Advanced Battery Labs:** Focuses on Current, New and Alternative Materials, Solid State Technology, Lithium Sulfur and other advanced chemistries
LEADING INTELLIGENT Manufacturing Plant

World’s First High-Speed Stacking Prismatic Cell Manufacturer

SOP@2020

Jintan District Changzhou, China
CREATING THE NEW ENERGY ECO-SYSTEM
Complete Supply Chain Integration

**Upstream Raw Materials**
- Mineral Resources (Ni/Co/Mn/Li/Graphite)
- Materials for Electrode (LiOH)

**Mid-Stream Product & Applications**
- First Use Vehicle Battery Systems
- Second Use Energy Storage Systems

**Downstream Recycling**
- Recycle Electrode Materials and Other Metal

**Operational**
- Research/Planned

**Operational**
- Could Enter Into Second Use
- Could Not Enter Second Use
- Recycle Materials

**Operational**
- Module Teardown
MEET CUSTOMER REQUIREMENTS
With Competitive Products

Safety First | High E/D | Fast Charge | Long Cycle Life | Wide Operating Range

Drive at Ease | Long Range | Flexible | Perfect for Commercial Vehicles | Driving in All Climates

SVOLT Energy | Company Introduction
**PRODUCTS**

Chemistry, Cells, Modules, BMS & Complete Systems

**Prismatic & Pouch:**
Current 811 based Chemistry and looking to the future / upwards of 265+Wh/kg

**BMS:** Industry Standard SOH & SOC Accuracy & designed in accordance with 262626

**Advanced Chemistries & Materials:** SiO / SiC / Li Metal / Li Rich / Solid State w the Target of 360+Wh/kg

**Prismatic & Pouch:** Structural Optimization / Integrated with Vehicle Body / 76% Efficiency

**Modules:** Standard Industry Designs / 90% Assembly Efficiency
FULL INDUSTRY CHAIN  
Technical Solutions

**Advanced Materials**
- R&D Capabilities on Material Surface Characteristics and Cell Reactions Mechanism Analysis.
- In-House NCM 811 Cathode Reaches Global Leading Level.
- E/L Recipe Design and Additive Synthesis Capability
- Material Mechanics Simulation Capability

**Cell Design**
- Lithium Air, Lithium Sulfur, Solid State Batteries, and other new chemistries R&D
- Electrode Recipe, Electrode and Cell Mechanical Design
- Cell Simulation Model
- Cell Pilot Production

**System Integration**
- Structural Simulation Capability, Results Match 95% to Real-Life Testing
- Battery Thermal Model, PACK Internal Flow Field, Temperature Field Simulation Capabilities, Results Match 95% to Real-Life Testing

**BMS Development**
- Functional Safety, Systems, Hardware, and Software Design Capability
- Hardware Simulation Capability
- SOX High Accuracy Algorithm Development Capability
- Based on Autosar, Bottom Layer Software Development Capability
- Based on V Process, BMS Testing and Calibrations Capability
### SVOLT Battery Experts Know Automobiles

Completed, Ongoing, and Planned

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