



# EnerSys Thin Plate Pure Lead

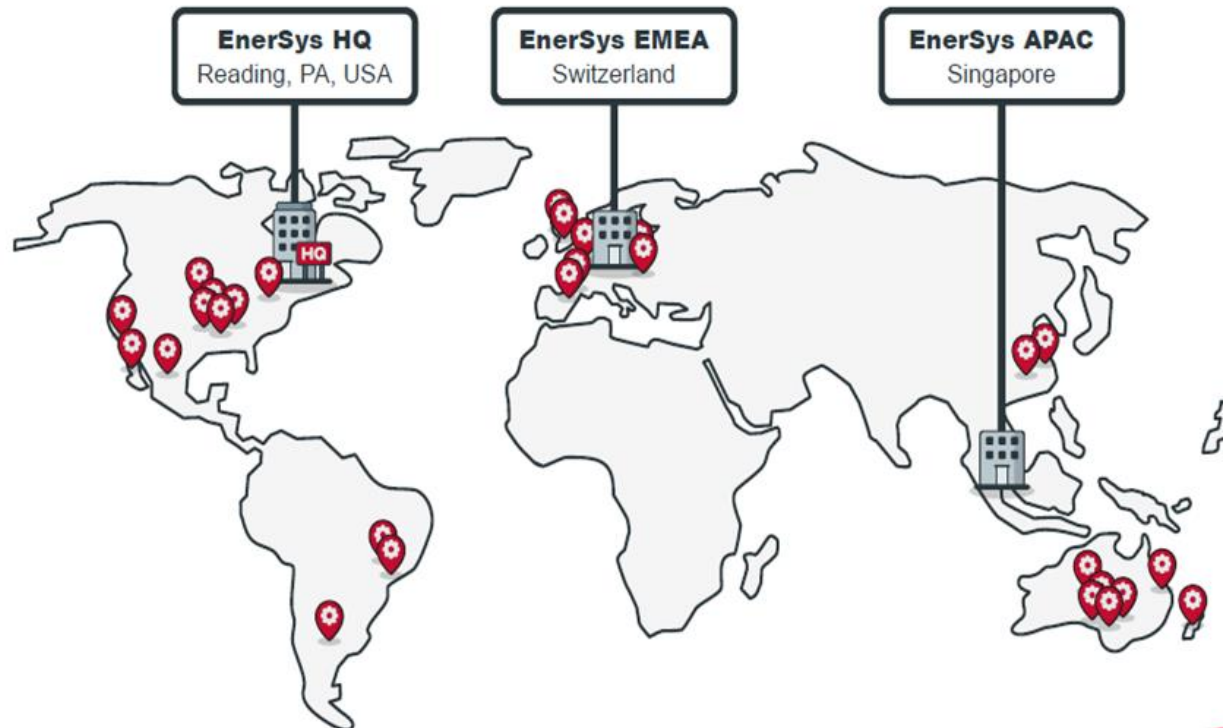
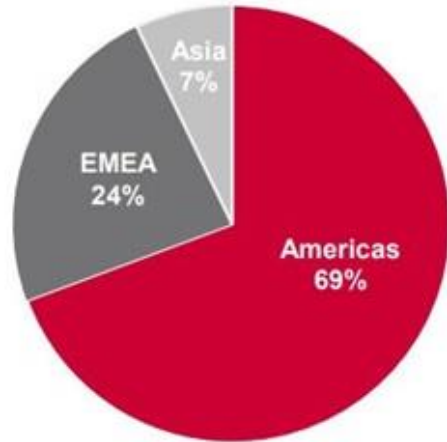
**Creighton Brown**  
Engineering Manager

# EnerSys at a Glance (NYSE: ENS)

LEADING PROVIDER OF DIFFERENTIATED ENERGY SOLUTIONS

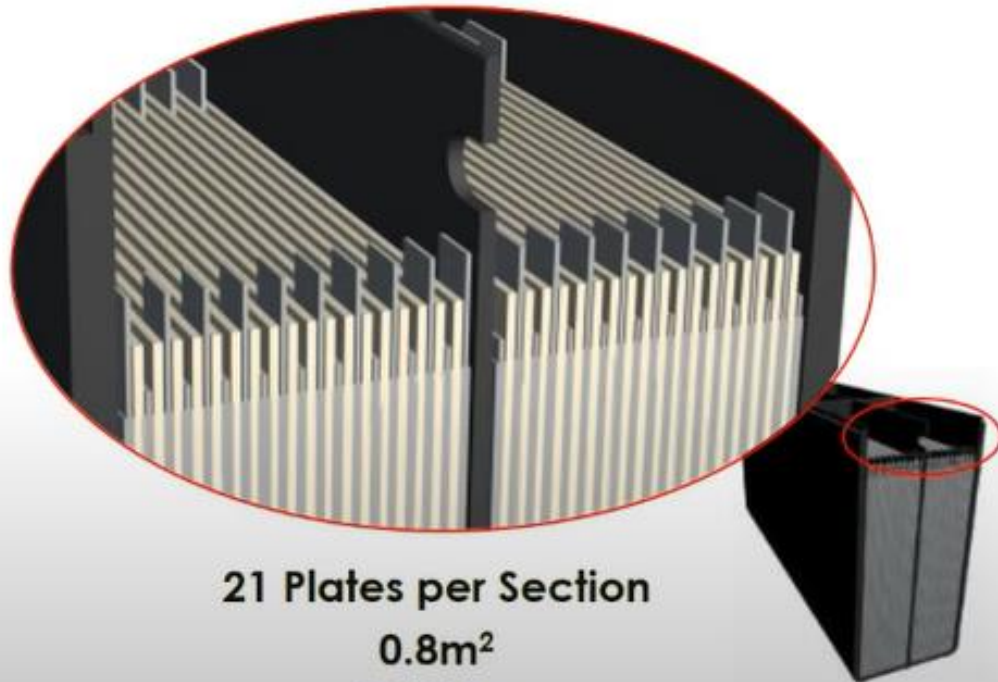
<b>\$3.4bn<sup>1</sup></b> Sales	<b>7.9%<sup>1</sup></b> Adj. Operating Margin	<b>\$4.47<sup>1</sup></b> Adj. Diluted EPS	<b>~11.4k<sup>1</sup></b> Total Employees	<b>10k+<sup>1</sup></b> Customers	<b>22%<sup>1</sup></b> Market Share <sup>2</sup>
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## FY'22 SALES BY GEOGRAPHY



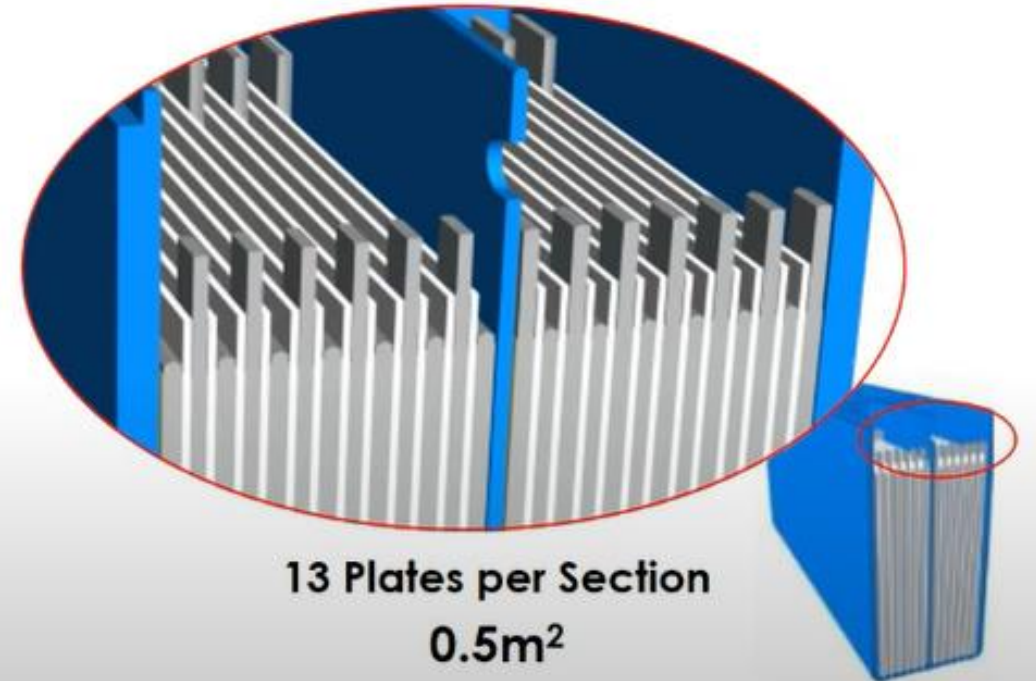
# Advanced Thin Plate Design differences

## Thin Plate Pure Lead



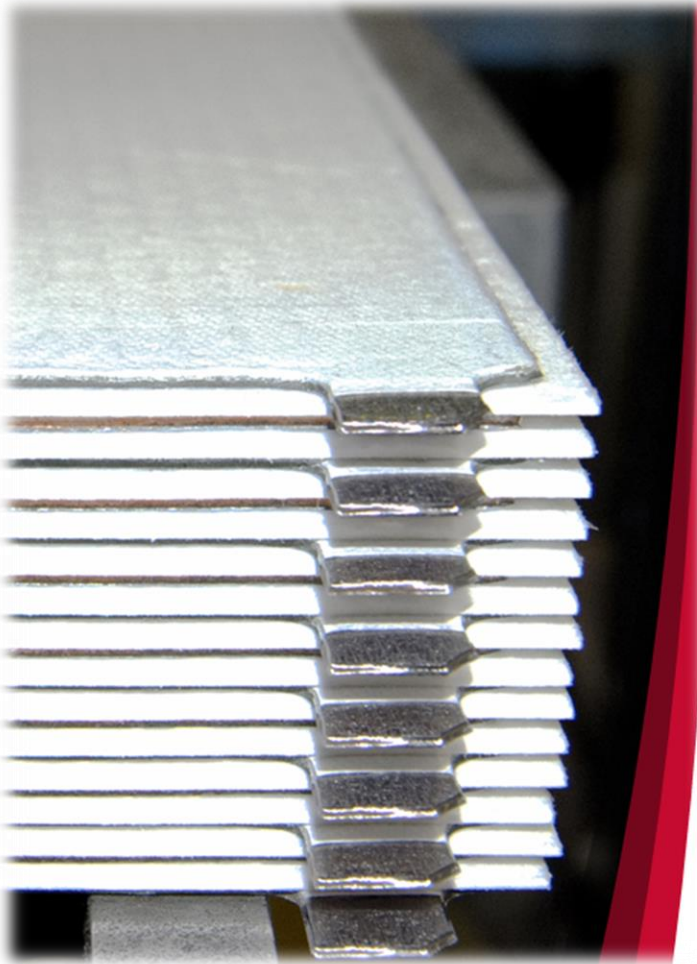
21 Plates per Section  
0.8m<sup>2</sup>  
706Wpc  
(15min to 1.67Vpc @ 25°C)

## Standard AGM book-mold casting



13 Plates per Section  
0.5m<sup>2</sup>  
550Wpc  
(15min to 1.67Vpc @ 25°C)

# Advanced Thin Plate Pure Lead (TPPL Overview)



## Unique Attributes

- Proprietary thin flat plate electrodes
- Pure lead, medical grade acid, and carbon technology for extended life in all temperatures
- Smart Technologies capabilities

## Flexibility

- Excels in Float and/or cyclic applications
- Added Carbon option enhances performance in Partial SOC applications
- Fast Recharge – ideal for opportunity charging

## High Power Density

- Thin plates provide more reactive area for improved capacity and performance
- Provides exceptional usable capacity (100 to 160% energy throughput in 24 hrs)
- Rapid Recharge – charge to 80% SOC in around 50 minutes

## Applications

- Motive Power-Fork trucks, cleaning machines
- Truck/Bus/Tank Batteries - engine start + onboard electronics
- Reserve power – Datacenter UPS, Telecom, Renewable

# Aerospace and Defense Applications

## LAND APPLICATIONS

- Applications
  - Submarine
  - Air
  - Tactical vehicles
  - Tanks
- Benefits
  - Virtually Maintenance free
  - High Starting power
  - Deep Reserve power
  - Performs in extreme Temps
  - Up to 900+ cycles at 40% DOD



# Energy Storage Markets

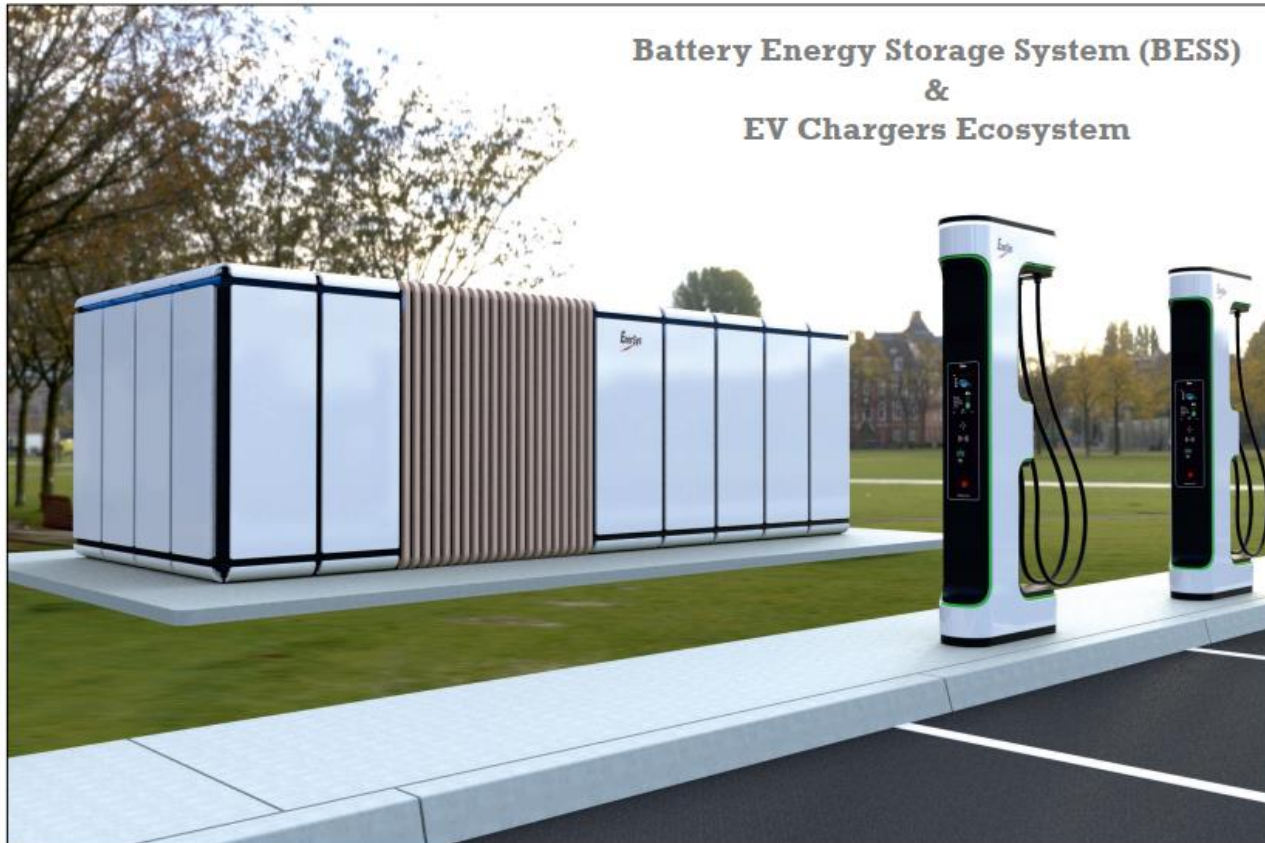
## BATTERY ENERGY STORAGE

- Current Needs - Predominately Lead based
  - Telecom - 48Vdc 4-8hour rate
  - Industrial Space – 120V Various load profiles
  - Data Center UPS - 480vdc 15 Min Discharge
  - Residential Backup power – 48V 24+ hours backup
  - Motive Power
  - Increased energy needs in all of these sectors are pushing the limits of ESS technology
- Emerging needs
  - DC Fast Charge
  - Grid Scale Battery Energy Storage



# DC Fast Charge with Energy Storage

**Electrification** is transforming the transportation industry and EnerSys has a line of products and services which are leading the industry

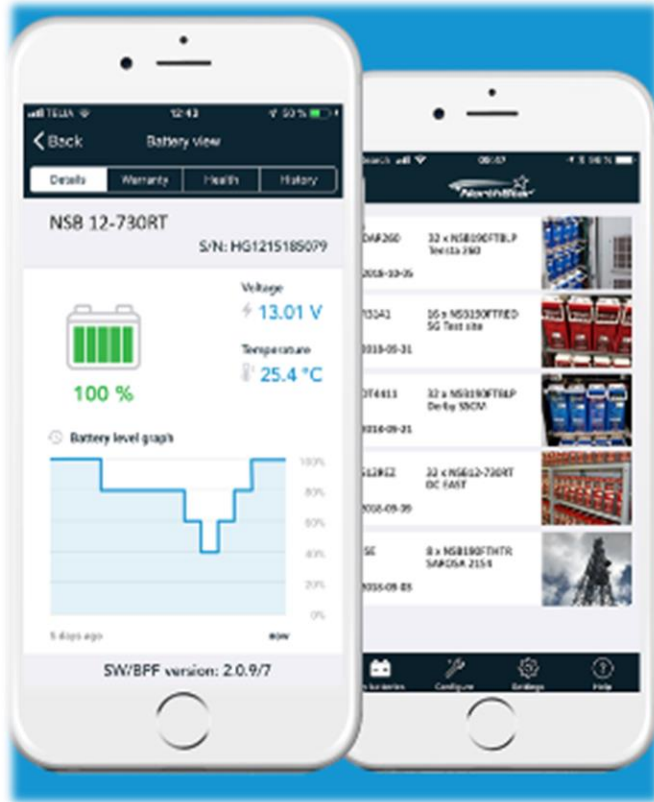


## ***BESS System Key Features***

- Battery support with 200kWh to 1MWh
  - TPPL or Lithium Ion
- 300KW Grid Interconnection
- Reduce electricity demand charges (Peak Shaving)
- Support Demand Response Activities
- Provides Grid Resiliency
- Fully compatible with Solar Arrays
- Designed to Work Seamlessly with State-of-the-Art Level 3 DC Fast Charge pedestals

# Battery Monitoring With ACE

(Advanced, Connected, Energy)



## Embedded sensor chip

- Designed to monitor battery from cradle to grave
- Sensor sealed in epoxy inside battery
- Unique serial number for each battery

## Wireless Communication

- Easily access battery information using smart phone or tablet
- Uses Bluetooth Low Energy (BLE) to wirelessly communicate

## Measures Voltage and Temperature

- Removes the need for external monitoring Devices or costly wiring add-on installations
- To conserve energy the battery only communicates when spoken to

## Logs Battery information over time

- The sensor will store key data throughout life of battery
- Data can be analyzed for future optimization
- Logging is done automatically







**Thank you for your time.**

**Creighton Brown**

**[www.enersys.com](http://www.enersys.com)**