



**NEW YORK BATTERY
AND ENERGY STORAGE
TECHNOLOGY CONSORTIUM**



BINGHAMTON
UNIVERSITY
STATE UNIVERSITY OF NEW YORK

new energy new york

Battery & Energy Storage Supply Chain
Opportunities for Growth in NYS
May 10, 2023, 1:00-2:00 pm



THE TEAM



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PROGRAM ASSOCIATE



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SENIOR
PROGRAM MANAGER



Agenda

- New Energy New York (NENY) Overview
- Battery Market Opportunities
 - Demand and Supply Growth
- NENY Supply Chain Team Objectives
- Battery and Energy Storage Systems:
 - Supply chain elements
 - Materials, components, systems and opportunities
- Supply Chain Database
- Assistance and Available Resources
- Next Steps



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THE INITIATIVES



BATTERY-NY TECHNOLOGY & MANUFACTURING CENTER

30MWh pilot
manufacturing line



SUPPLY CHAIN DEVELOPMENT

Database, supplier
qualifications,
company attraction



WORKFORCE DEVELOPMENT

Training programs &
wraparound services



EQUITY & JUSTICE

Marginalized and
underserved
community
empowerment



INNOVATION & ENTREPRENEURSHIP

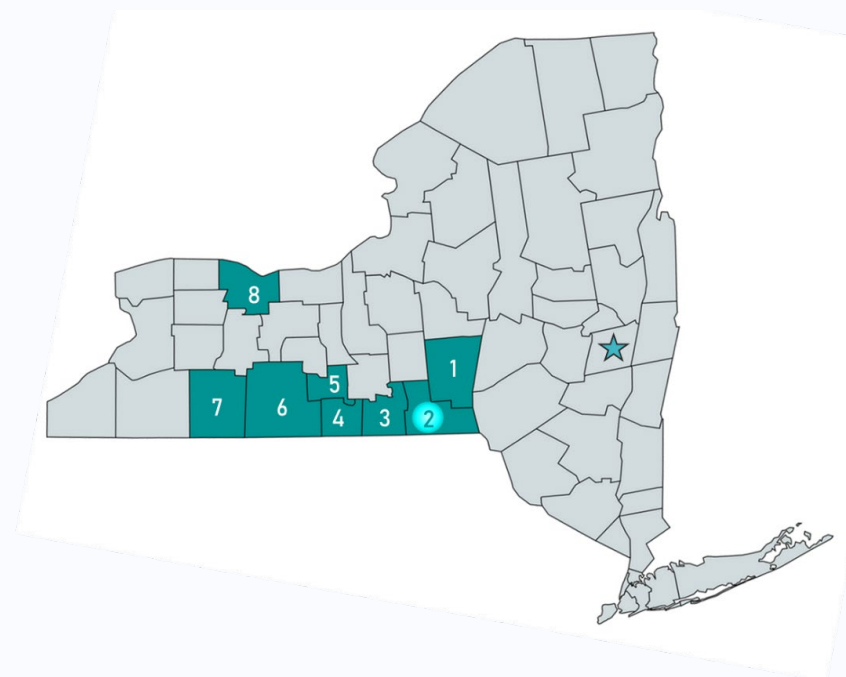
Technology transfer,
acceleration, startup
growth

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\$113 million program to support
battery manufacturing and
supply chain in the Southern Tier
and New York State

THE COALITION

16 members across academia,
non-profits, and government
organizations



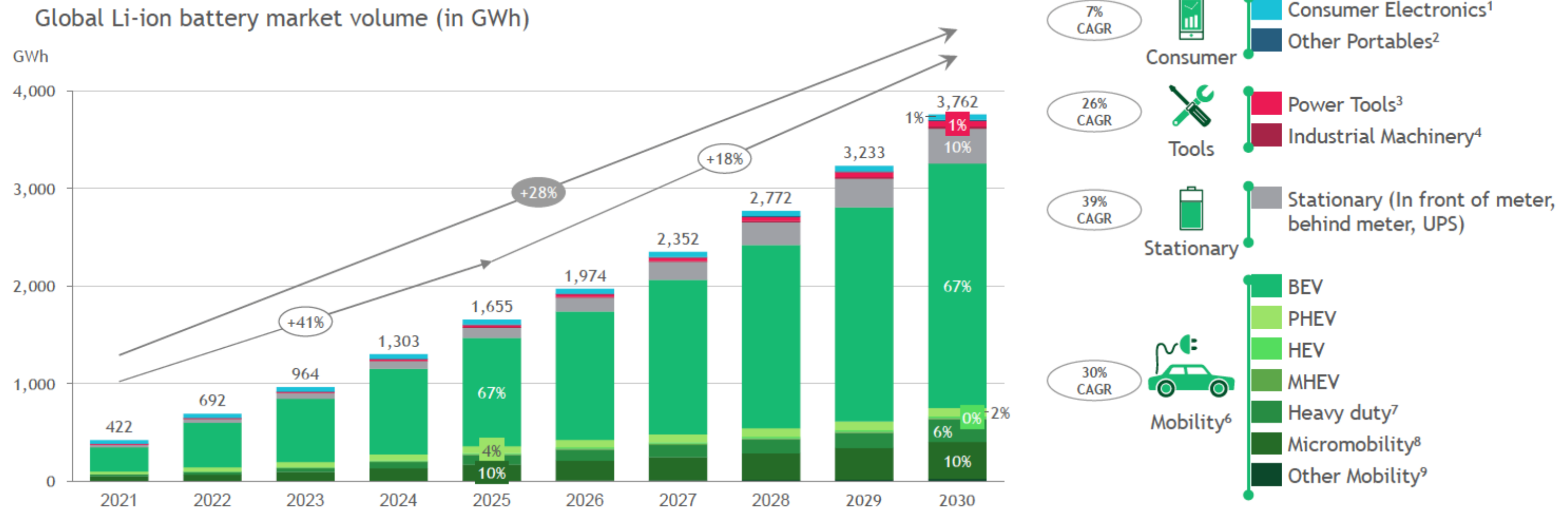
SOUTHERN TIER 8

Activate

THE BATTERY MARKET



Overview of demand | Demand for batteries growing fast with mobility (EV)
batteries demanding the largest market share

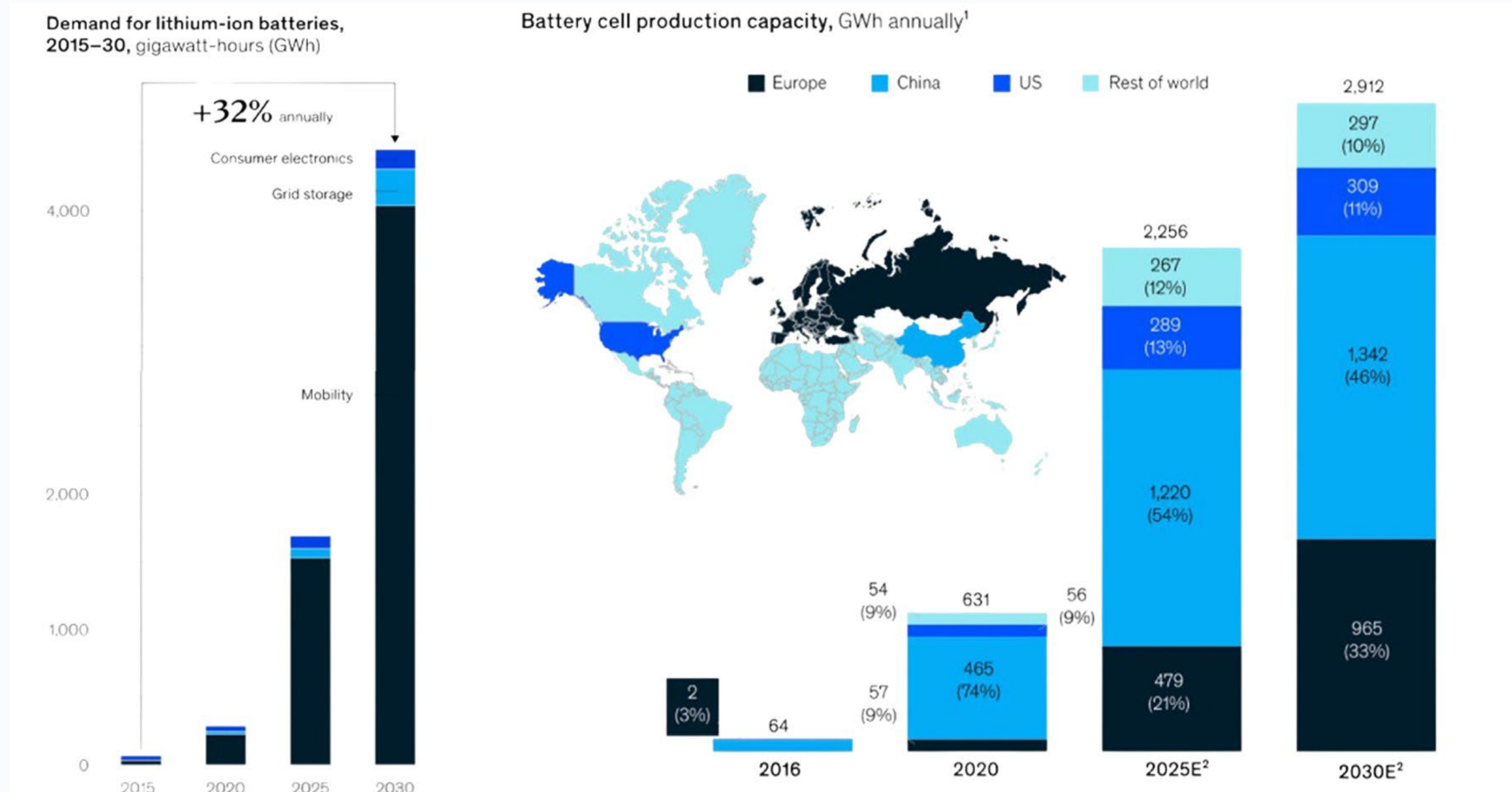


1. Mobile phones, Ultramobiles, Laptops. 2. Drones, Wearables. 3. Power tools, Garden tools. 4. Materials Handling, Construction Equipment, Airport Handling Vehicles, Robotics, Off-Road Utility Vehicles, Other Industrial Equipment. 5. Includes batteries for off-grid applications as well. 6. BEV, PHEV, HEV, MHEV, includes passenger and light commercial vehicles. 7. Medium- and heavy-duty trucks and busses. 8. E-Scooter, E-Bike, E-Kick, 2-Wheelers, 3-Wheelers. 9. Marine, Aviation.
Source: BCG analysis (Apr 2022)

THE BATTERY MARKET



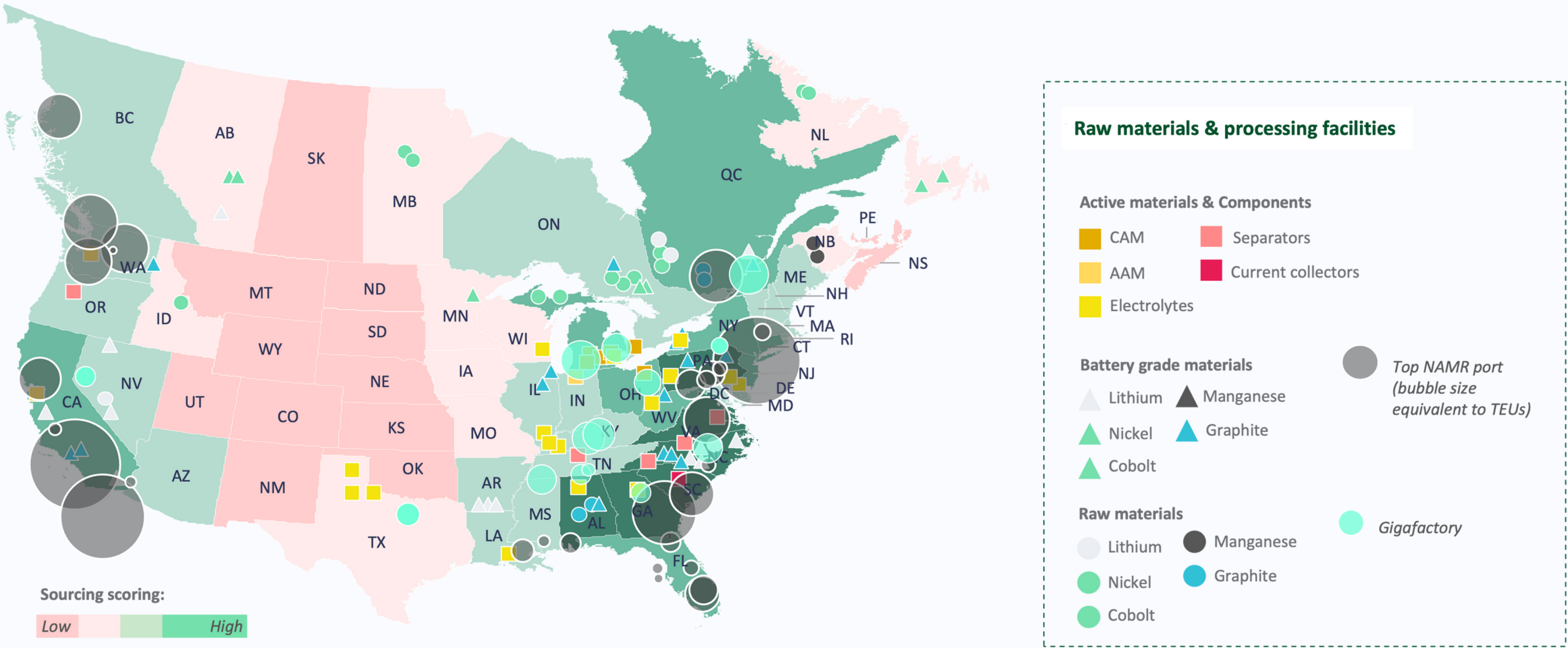
Demand and Supply Growth



Source: McKinsey & Company, October 2022

INDUSTRIAL CLUSTERS

Clear areas of opportunity emerge based on current or announced raw material processing facilities, Gigafactories, and OEMs



Source: NREL NAATBatt Li-ion Battery supply chain database; Desktop research; BCG analysis

SUPPLY CHAIN



Catalyze the Rapid Growth of the Energy Storage Industry

1. Empower and Expand the New York Energy Storage Ecosystem

- i. Map the supply chain for Battery Energy Storage.
- ii. Identify current/existing suppliers through research and outreach.
- iii. Identify regional / state companies with potential to enter sector.
 - i. Provide technical and programmatic assistance.
- iv. Facilitate business relationships for existing and new entrants.
- v. Company attraction from outside the region, state and country.
- vi. Market regional and state capabilities.

SUPPLY CHAIN



Catalyze the Rapid Growth of the Energy Storage Industry

2. Establish Supplier Qualification Resources and Certification Programs.
 - i. Assist with Identifying specific requirements for products at each stage of supply chain.
 - ii. Identify/Develop and implement battery cell scorecard program.
 - iii. Develop framework, guidance, and resources for certification programs.
3. Create and maintain online supply chain resource including local business, small business, and minority and women owned business identification.

CURRENT SUPPLY CHAIN



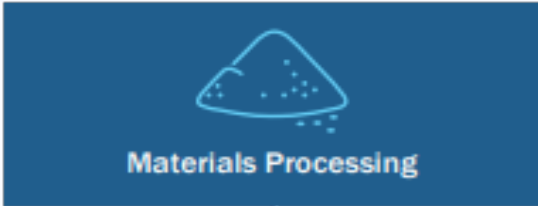
UPSTREAM

- ▣ Mining and extraction of materials including lithium, cobalt, nickel, and graphite



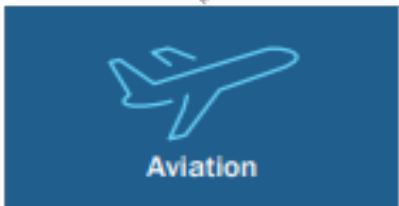
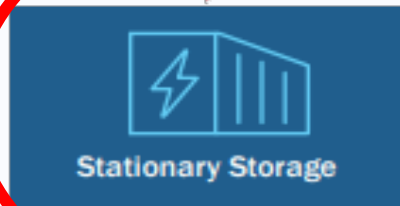
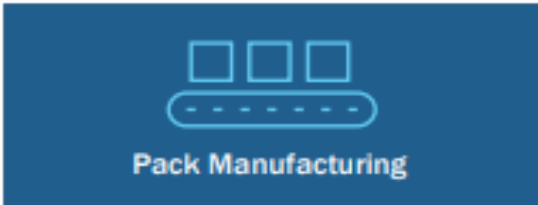
MIDSTREAM

- ▣ Additional processing for battery-grade materials
- ▣ Cathode/anode powder production
- ▣ Separator production
- ▣ Electrolyte production
- ▣ Electrode and cell manufacturing



DOWNSTREAM

- ▣ Pack manufacturing
- ▣ End-of-life recycling and reuse



ANOVION™

S.HOWES

iM3NY

electrovaya

Bren-Tronics, Inc.

ZINCS

Viridi

URBAN ELECTRIC POWER

RAYMOND

BAE SYSTEMS

CMP

Li-Cycle®

WHY ENERGY STORAGE?



- New loads = fast growing demands on Electricity/grid:
 - EVs and Charging Stations
 - Electrified Heat
- Renewable energy sources expanding quickly but are variable in supply:
 - Battery Energy Storage can fill the gaps
 - Most state locations are not yet equipped with BESS
 - Reduces reliance on fossil fuels
- Speed of Deployment
 - Faster and more cost effective than traditional “poles & wires” solutions

BATTERY ENERGY STORAGE SYSTEMS (BESS)



What makes up the Supply Chain?



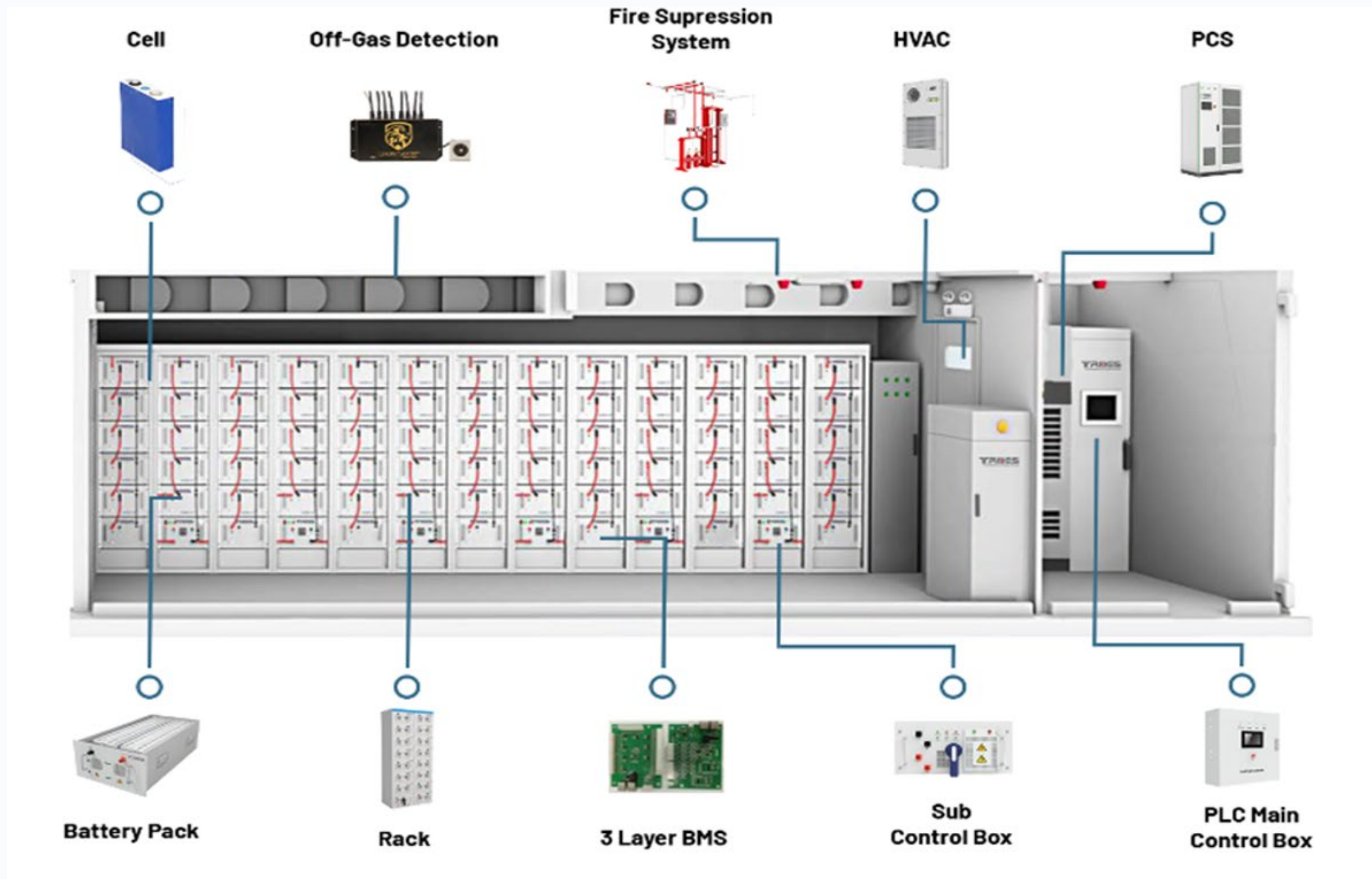
Large Grid Scale Deployment



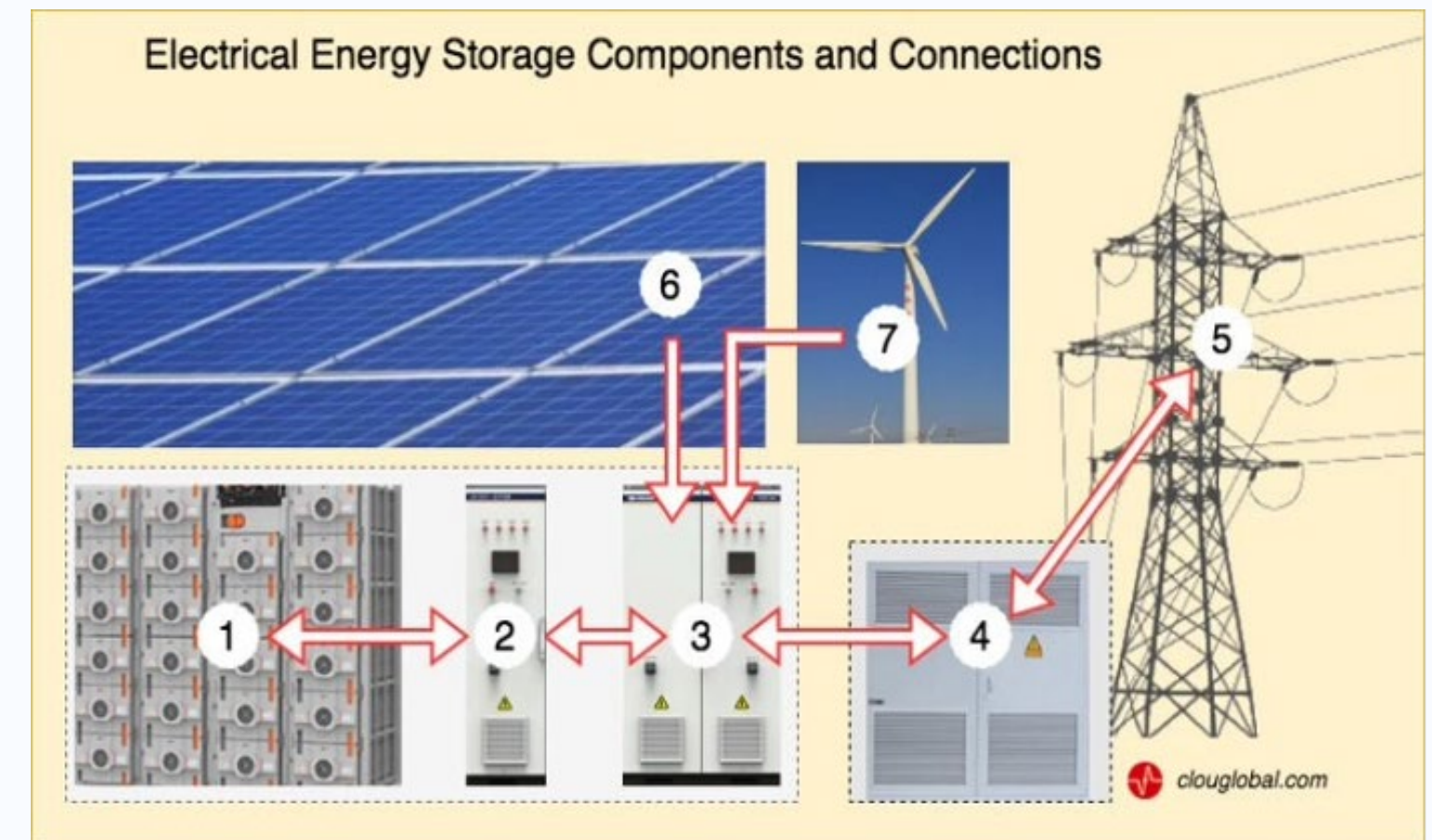
Residential Deployment

Sizes and types of deployment are very diverse

OVERVIEW OF A GRID SYSTEM



Many systems and sub-systems

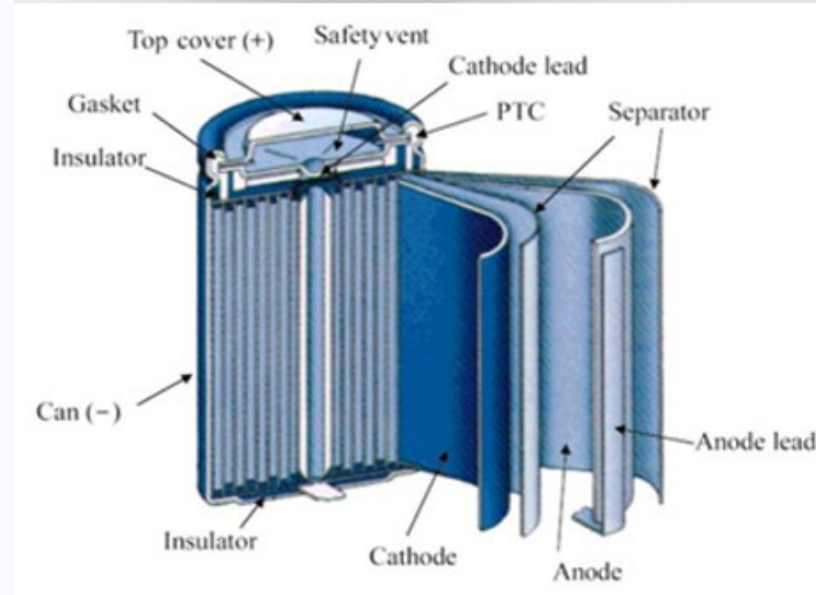


1. Battery Racks/Stacks
2. Battery Management System (BMS)
3. Power Conversion System (PCS)
4. Transformer
5. Power Grid
6. Solar Power Plants
7. Wind Turbines

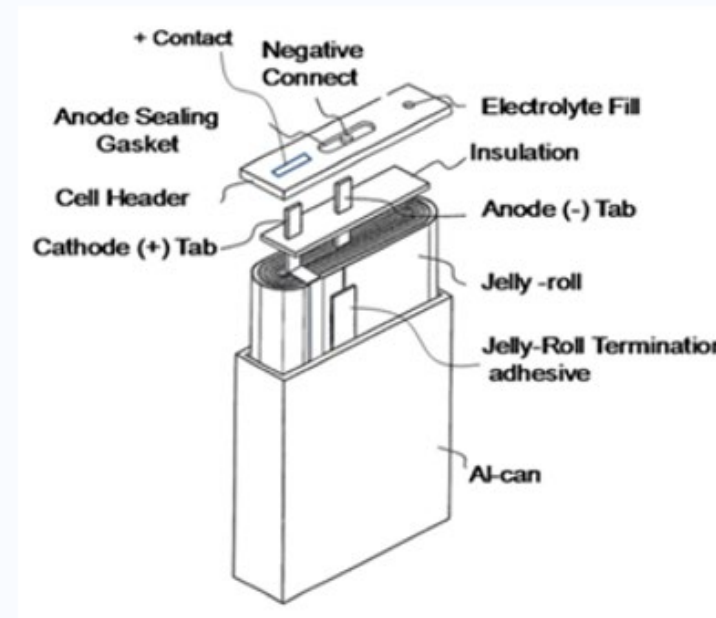
BATTERY CELLS

- Anode Material
- Cathode Material
- Electrolyte
- Separator
- Current Collector
- Battery Casing

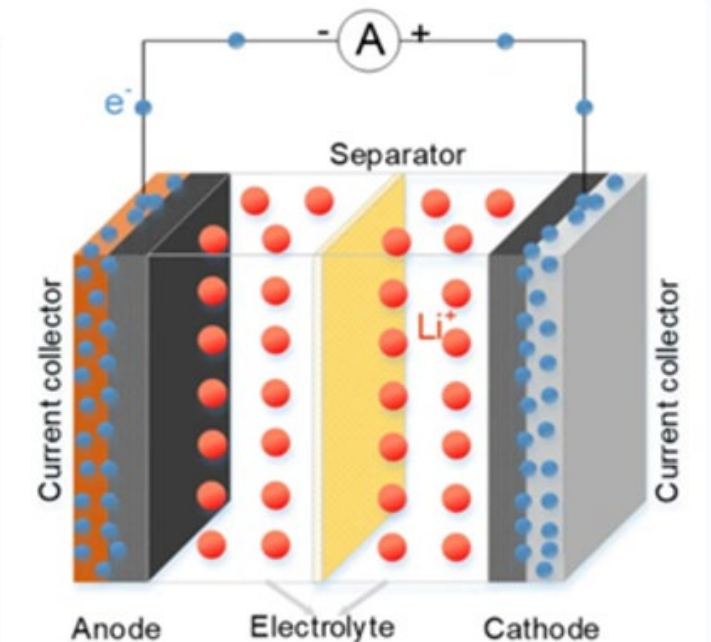
CYLINDRICAL



PRISMATIC

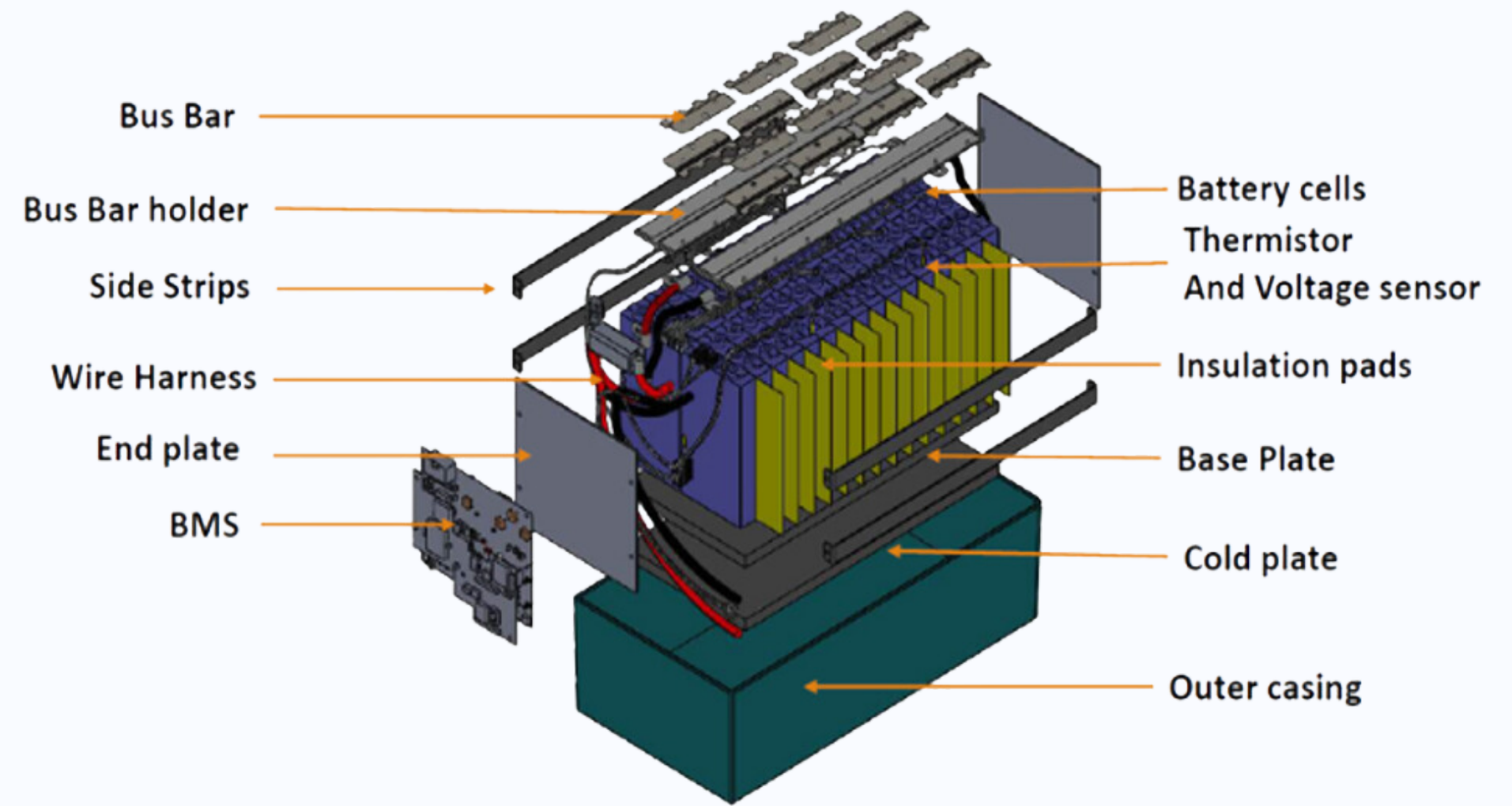
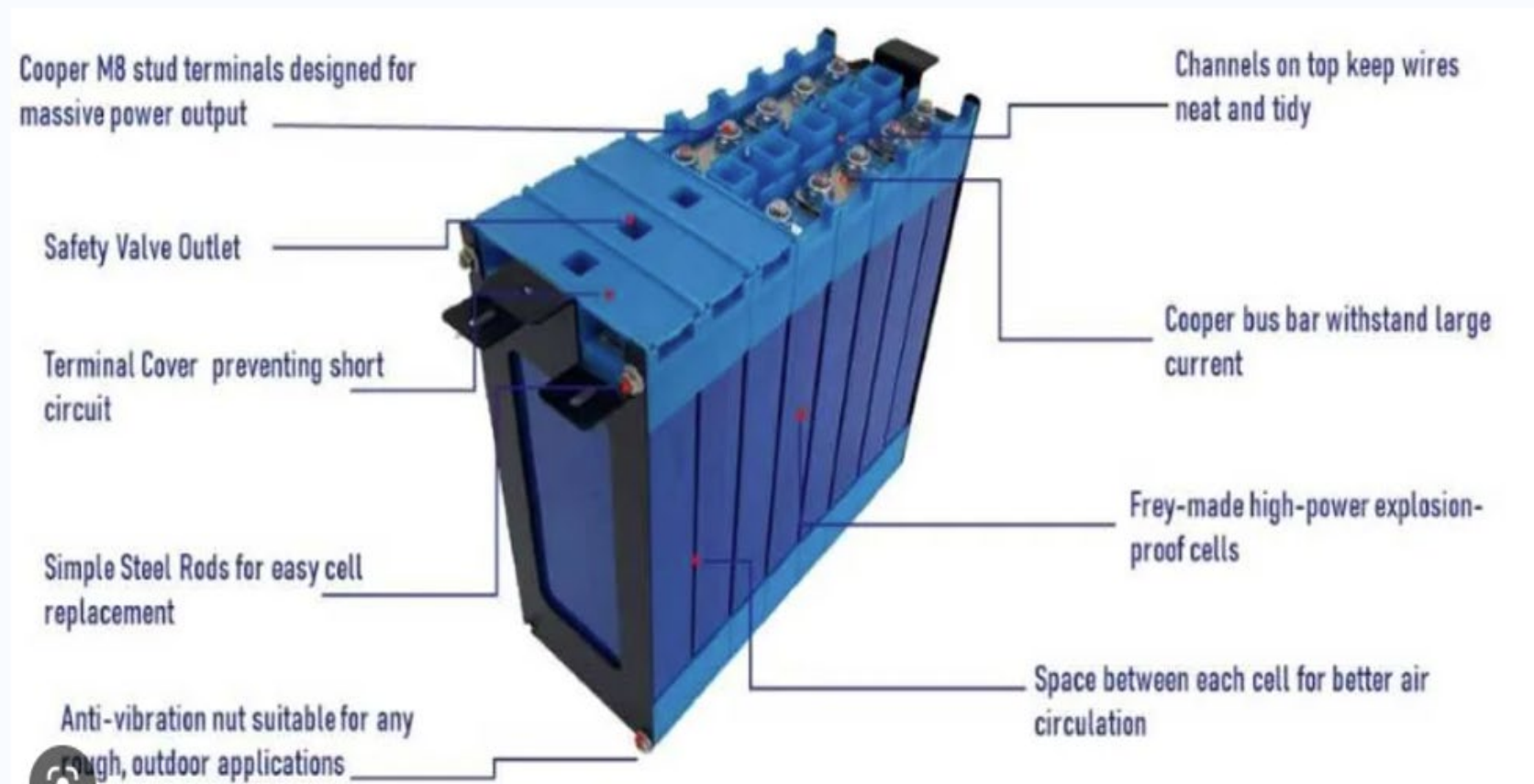


POUCH



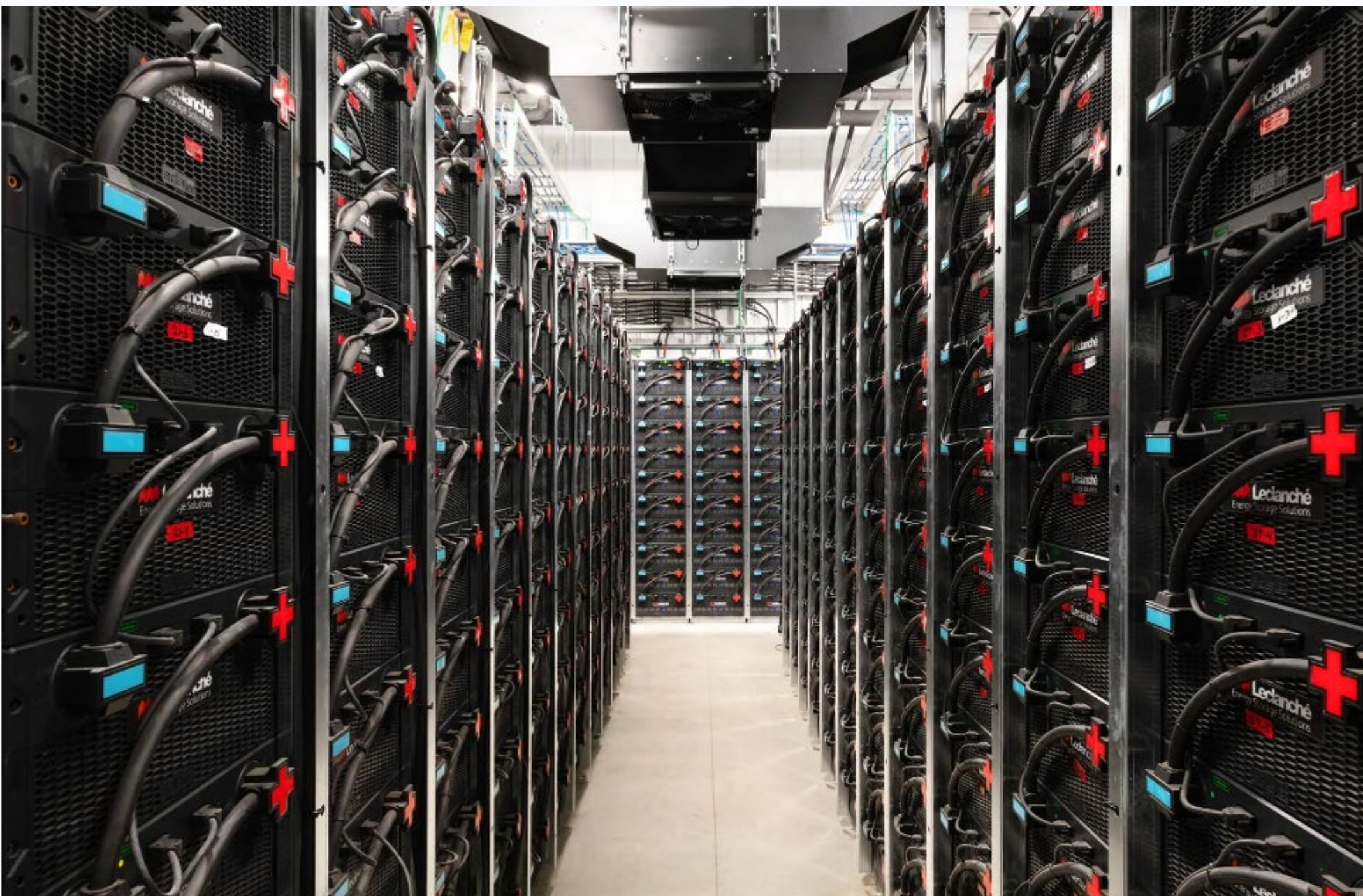
BATTERY MODULES/PACKS

VARYING CONFIGURATIONS



BATTERY STACKS

STORES THE ENERGY, READY TO BE DISPATCHED WHEN NEEDED.
MODULAR AND SERVICEABLE



BATTERY MANAGEMENT SYSTEM (BMS)

OPTIMIZING BATTERY PERFORMANCE AND SAFETY

- BMS functionality
 - Reporting
 - Cell voltage measurements
 - Temperature measurements
 - Cell balancing
 - Current limits
 - Fault detection
 - Over/under voltage, current, or temperature
 - Communications, installation, hardware, etc.



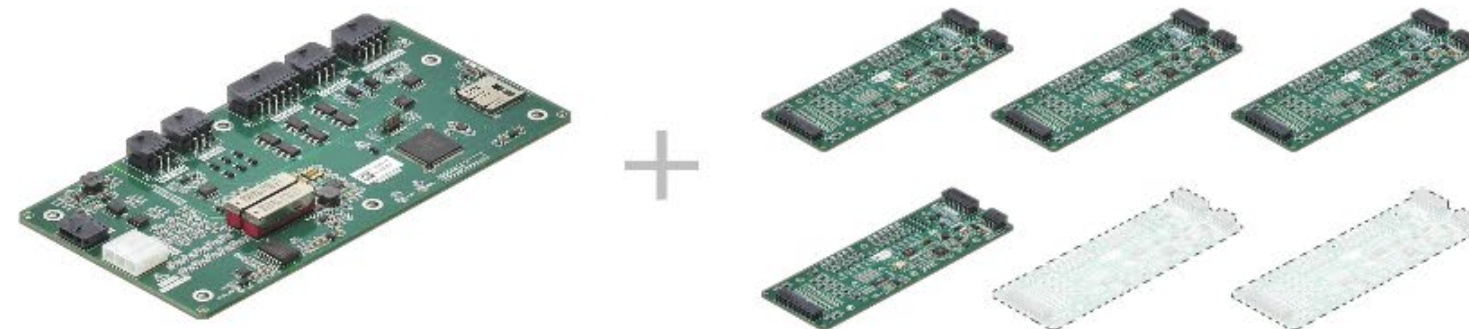
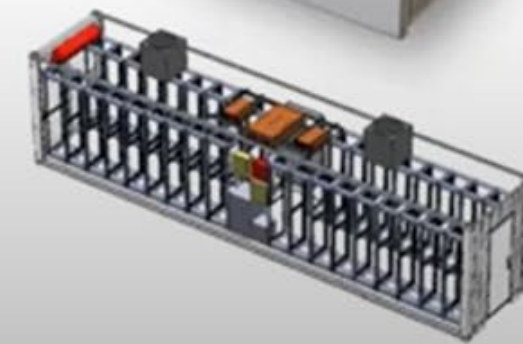
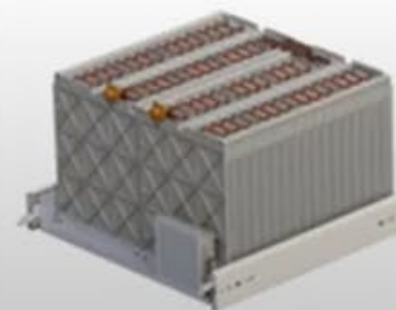
Cell Interface
Module BMS



Stack Switchgear
Stack BMS



Battery Control Panel
System BMS

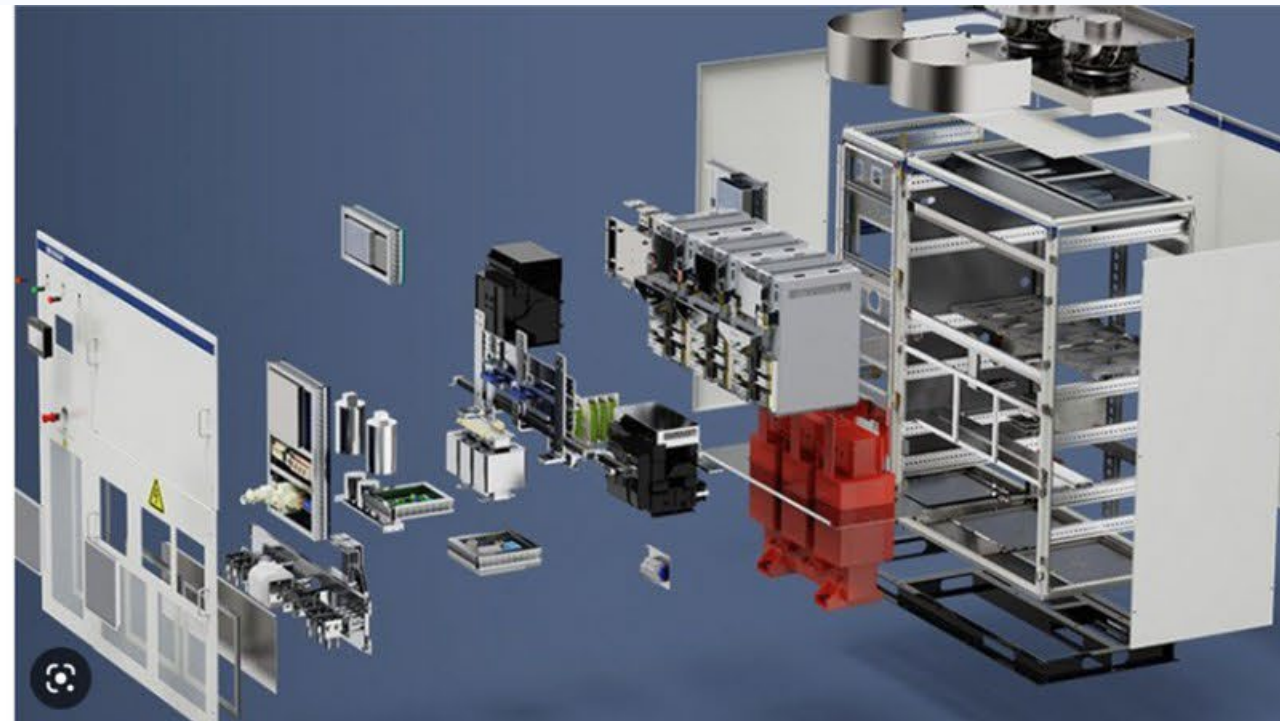


POWER CONVERSION SYSTEM (PCS)

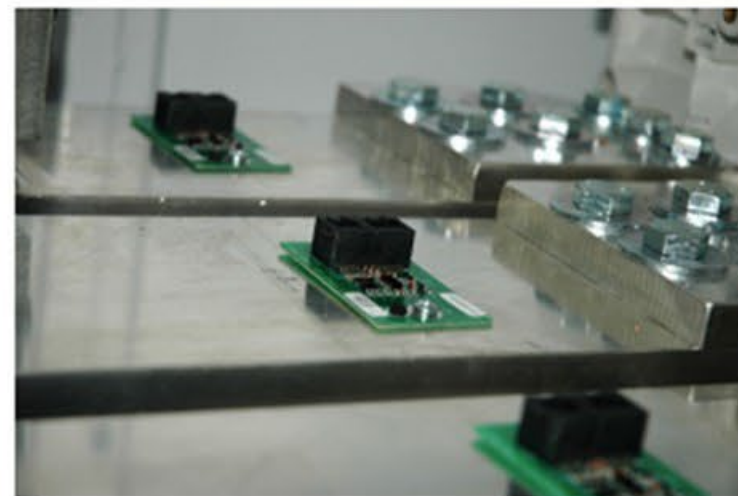
BIDIRECTIONAL CONVERSION OF ELECTRICAL ENERGY CONNECTED BETWEEN THE BATTERY SYSTEM, THE GRID, AND/OR LOAD



**Accessible
Capacitors**



**Replaceable Inductor
Modules**

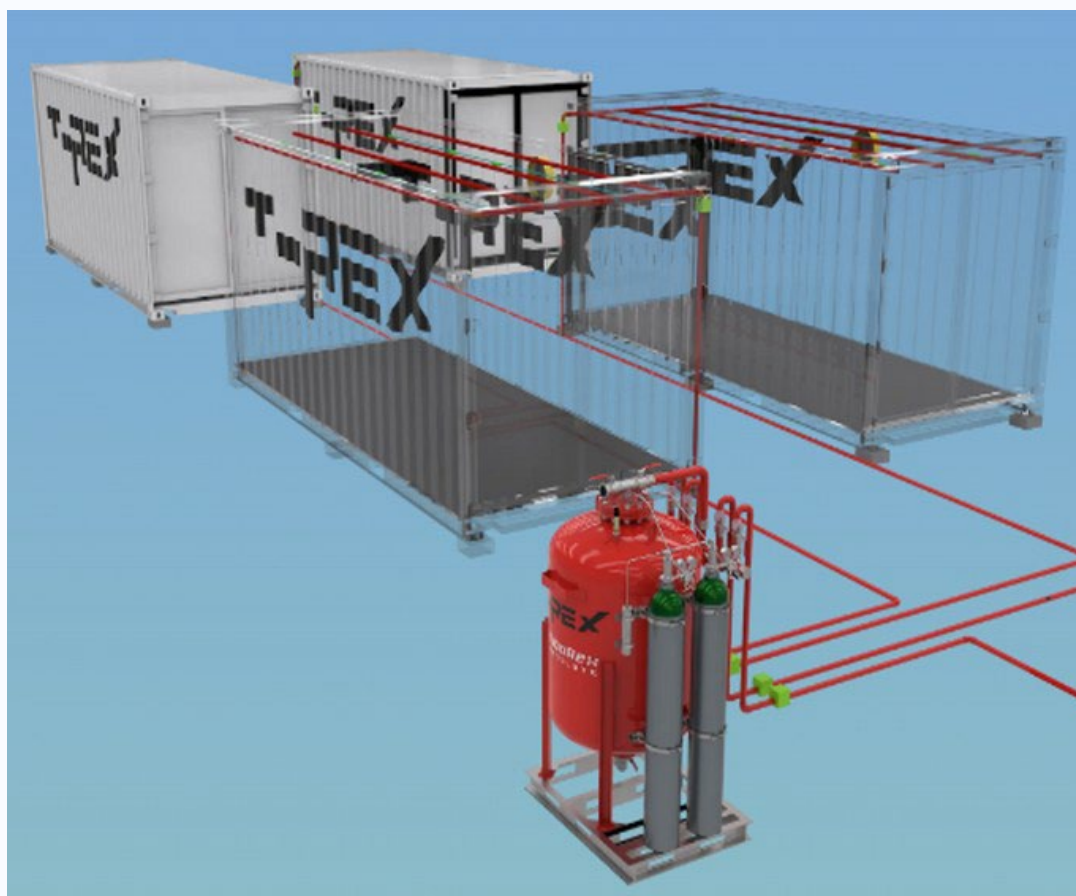


Internal Temperature Sensing



ENVIRONMENT, FIRE AND SAFETY DETECTION AND CONTROLS

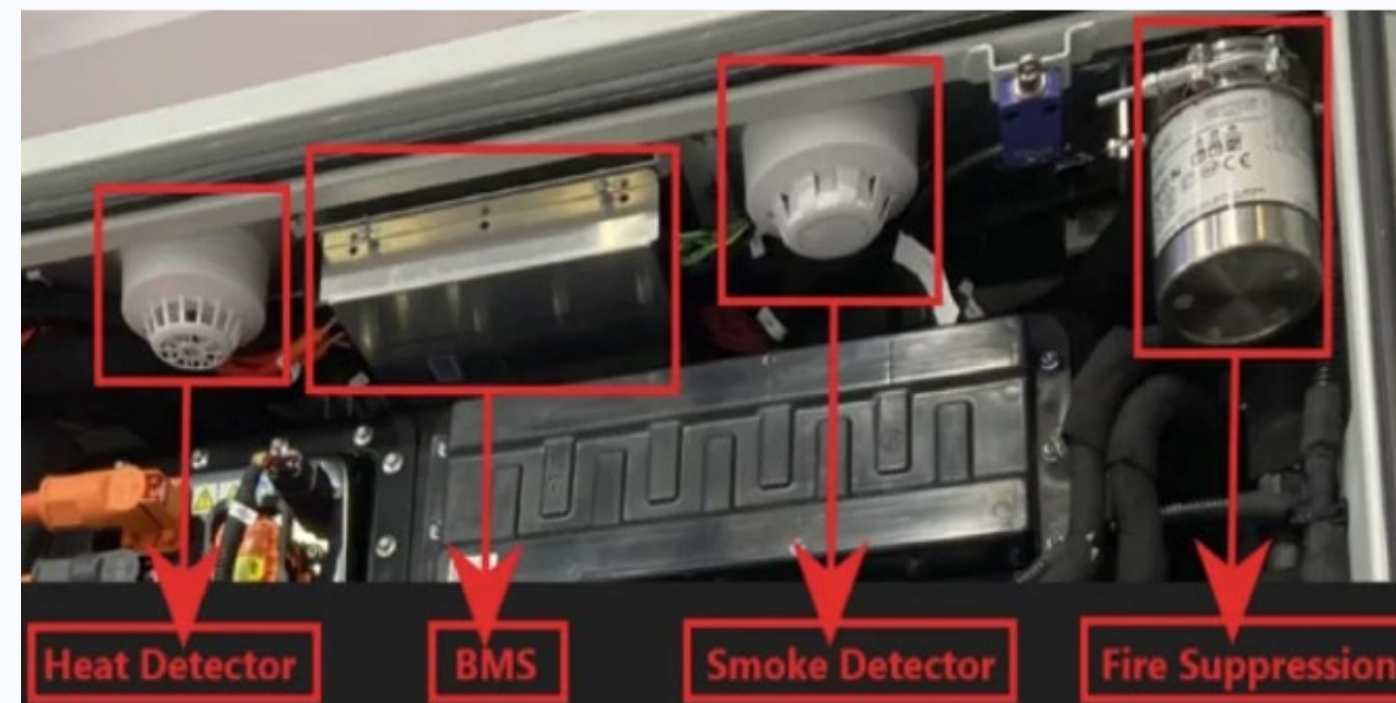
MUCH MORE THAN JUST A CONTAINER



Fire Suppression System



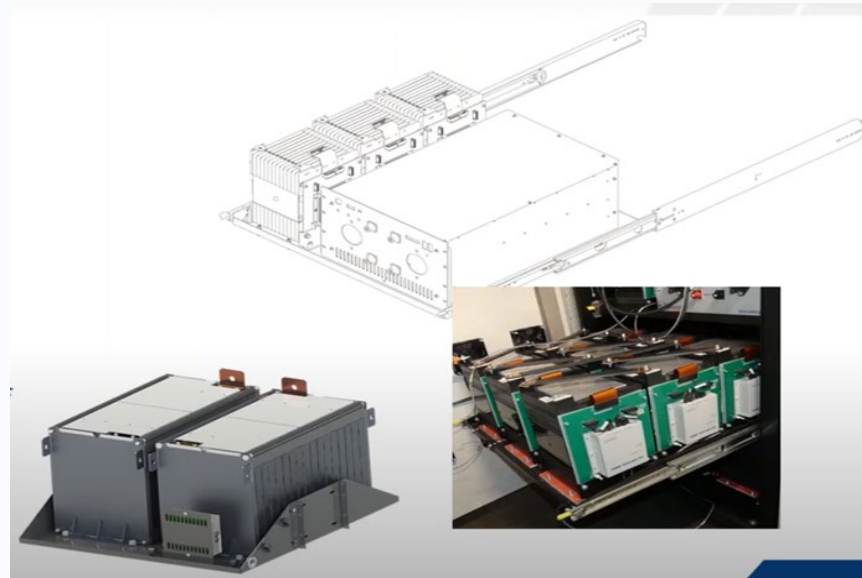
Gas Sensors



Temp. Control/HVAC

BESS SUB-SYSTEM COMPONENT EXAMPLES

Trays / slides



Enclosures/handles



Power Cables



Busbar / data Connectors



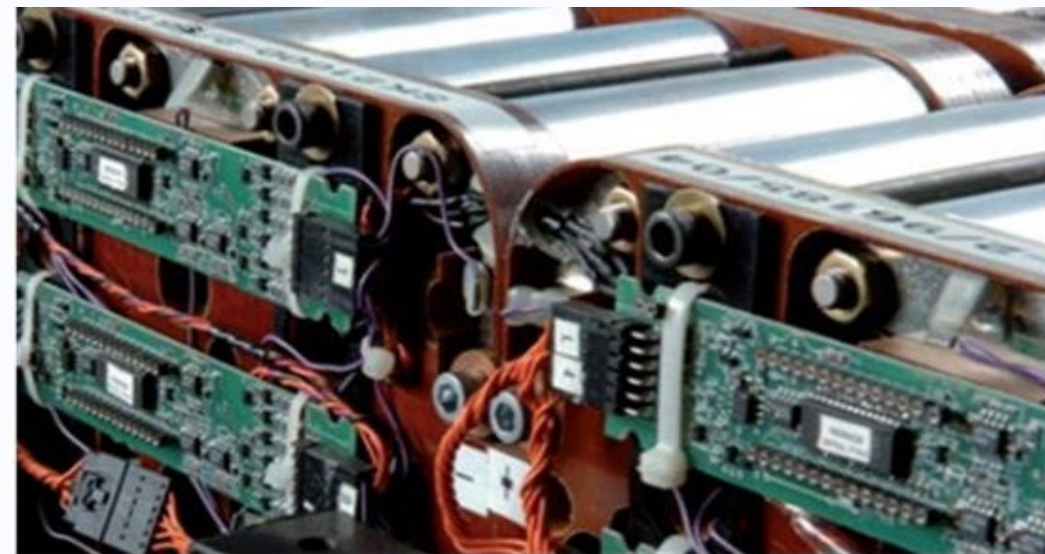
Fuses



Battery Connectors



Circuit boards and harnesses



Displays



Busbars



OTHER BUSINESS AND JOB GROWTH OPPORTUNITIES



- Test Equipment
- Testing and evaluation services
- Manufacturing equipment/automation
- Equipment service/maintenance
- Prototype support, machining, fabrication
- Recycling / material recovery/reclaim
- Energy Storage System design
- System Integration
- Commissioning services
- Site preparation/services
- Field engineering & installation
- Project management
- Security / security systems
- Software and modeling
- Distribution

SUPPLY CHAIN DATABASE



- Resource for connecting customers to current manufacturers, suppliers and service providers in battery and energy storage sector
- **FREE** Registration and Access
- Hosted by NY-BEST
 - <https://ny-best.org/page/NYBESTsupplychain>
- Registration now open
- Online public search page launch planned for mid-late May

SUPPLY CHAIN DATABASE



- Information needed to register
 - Website & Logo
 - Administrative and public contact
 - HQ and additional NY locations
 - Summary description of business
 - List of products and/or services related to batteries and ES
- Optional
 - Certification documents
 - Additional documents (data sheets, listing pages)

NY BES+ NEW YORK BATTERY AND ENERGY STORAGE TECHNOLOGY CONSORTIUM

Battery and Energy Storage Supply Chain Database
Hosted by New Energy New York (NENY) and NY-BEST

REQUIREMENTS OVERVIEW OFFERINGS REVIEW

Registration Requirements

This resource created through the New Energy New York (NENY) Supply Chain Program, led by NY-BEST and partnered with the Alliance for Manufacturing Technology (AMT) and Binghamton University, is intended to connect manufacturers, suppliers and service providers in the battery and energy storage industry with a presence or interest in New York State with customers. This tool will support the growth of the battery and energy storage supply chain throughout New York.

Companies that manufacture, distribute/resell and/or provide services who operate within New York State or with interests in the battery and energy storage ecosystem within New York State are eligible for inclusion in the database if they meet the following requirements.

Battery and Energy Storage Supply Chain Database Requirement Guidelines:

- ✓ Businesses with headquarters in a country deemed to be a Country of Particular Concern by U.S. Department of State will not be accepted for listing in the database.
- ✓ Manufacturer's representatives will not be accepted for their own listing in the database. Manufacturers may choose to list representatives under their company profile.
- ✓ Company must offer products or services applicable to the production and deployment of batteries and/or energy storage systems.

Companies meeting the requirements are encouraged to register below.

The following information and materials will be required for registration:

- ✓ General company information: organization name, website, administrative and public contact information, logo, headquarters location, New York State locations, approximate number of employees, summary description of company, lists of products and/or services offered applicable to batteries and energy storage

In addition, to bolster your listing you may want to provide:

- ✓ Documentation to demonstrate company has attained manufacturing and/or product standard certification/compliance/listing
- ✓ Additional materials that more fully describe your product/service offerings (such as product data sheets)

All registration submissions will be reviewed to ensure that requirements are met. Registrations lacking sufficient documentation may be required to revise and resubmit.

Both registration and access to the database of registered companies is provided free of charge and is supported by NENY through a grant from the U.S. Economic Development Administration.

IMPORTANT
If you are unable to fully complete the registration application at this time, you will be provided with a link via email to continue later.

Enter your email address

Email required to begin registration

Begin Registration

Battery and Energy Storage Supply Chain Database

Hosted by New Energy New York (NENY) and NY-BEST

Product Categories

Raw Materials	Commercial & Utility Scale Energy Storage Systems
Anode Materials	Electrochemical (Battery) ESS
Cathode Materials	Chemical (hydrogen fuel cells, other) ESS
Recycled Battery Grade Materials	Electrical (supercapacitors, magnetic) ESS
Cell Components	Mechanical (pumped hydro, compressed air, flywheel, gravity) ESS
Additives/Binders	Thermal Energy Storage System
Anodes	Commercial & Utility Scale ESS Components
Casings/Enclosures	Battery Management Systems (BMS)
Cathodes	Containers
Current Collectors	Energy Management Systems (EMS)
Electrolytes	Fire Protection Subsystems
Foil	Hardware Misc.
Separators	HVAC Subsystems
Battery Cells	Inverters
Coin Cells	Market Intelligence Software
Cylindrical Cells	Power Conversion Systems
Pouch Cells	Power Electronics/Drive Electronics
Prismatic Cells	SCADA
Battery Packs/Modules	Transformers
EV Battery Packs	Residential Energy Storage Systems
Material Handling Equip. Battery Packs	Residential ESS Components
Micro-Mobility Battery Packs	Equipment
Stationary System Battery Packs	Manufacturing Equipment
Battery Pack/Module Components	Service Equipment
Battery Management Systems (BMS)	Testing Equipment
Electrical Connectors (cables, wiring, busbars)	EOL (End Of Life)/Reuse
Module Casings/Housings	Black Mass
Plates (Insulation, Cooling, End)	EOL/Used Consumer Electronic Batteries
Stacks/Racks	EOL/Used EV Batteries
Stack/Rack Components	EOL/Used Stationary ESS Batteries
Battery Management System (BMS)	Reconditioned Batteries
Electrical Components (busbar, contactors, connectors, fuses, sensors, relays, cabling)	Electric Vehicle Supply Equipment (EVSE)
Hardware Misc.	
Housings	
Module Trays	

Add Product

* Please indicate if company is Manufacturer and/or Distributor/Reseller of Product

☒ Manufacturer

☒ Distributor / Reseller

* Product Category

Raw materials

* Product Type

Cathode Materials

* Product Description

test

Add Informative Documents/Links, Such As Product Spec Sheets, Listing Pages, Etc. Here:

Add Supporting Document

Is this product manufactured in New York State?

Select an Option

Does this product qualify as domestic content under IRA?

Yes

Does This Product Have A Certification?

Add Certification

SUPPLY CHAIN DATABASE



- Search Page
 - Company Name or Keyword
 - Product and Service Categories
 - ES Technology Type
 - Certifications
 - Ownership - MWBE or Veteran Owned
 - NY Location
- Company Page
 - Registration Information
 - “Click to Email Company”

ASSISTANCE AVAILABLE



The NENY Supply Chain Team Can Assist with:

- Assessment of Capabilities
 - Evaluate synergies, gaps, business case and technical/time challenges
- Connecting Businesses and Opportunities
- Workforce Resources / Training Programs
- Funding and Grant Assistance
- Possible Internships
- Technical Resources
- Supply Chain Database

RESOURCES & ECOSYSTEM PARTNERS

The NENY Supply Chain Team Can Connect you with:

- RIT Battery Prototyping Center
- DNV Battery Test and Commercialization Center
- Brookhaven NSLS Beam Line
- Strong Research Activities and Resources at Numerous Universities
- Kodak Pilot Coating Facilities
- Wide Array of Private Resources (Intertek Battery Test Lab)

NEXT STEPS



- We will be conducting other informational webinars, including IRA Incentives.
- If you're currently part of the Battery and Energy Storage Supply Chain, register in the NENY Database, <https://ny-best.org/page/NYBESTsupplychain>, hosted by NY-BEST.
- If you need help expanding, pivoting, or connecting to resources and suppliers contact NENY@amt-mep.org
- Questions?

THANK YOU!



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