



**ZBB**  
energy corporation



The Focus of Advanced Energy Storage Systems



# ENERGY STORAGE FOR TOMORROW'S GENERATION

Energy-related issues have become some of the most significant challenges we face today. While only a component in larger plans and systems, ZBB's energy storage technologies will be key in addressing and clearing some of the hurdles in integrating renewable energy generation, 'smart grid' deployments and providing for an electricity-based transportation future.

## *...today*



### **The questions to look now for answers include:**

- Higher penetrations of renewable energy sources on an over-taxed grid
- Relieving and shifting loads from peak times on the grid and large end-users
- Improving the reliability of all types of generation for users on and off the grid.

**ZBB Energy Corporation** is an industry-leading innovator of energy storage products and systems used by utility companies, universities, wireless networks and renewable energy developers and operators in a growing list of applications and sites around the world. ZBB's offerings enable the solutions we all will need for reliable, conventional and alternative energy systems both for tomorrow and today.



**ZBB ENERGY**

**STORING A  
SUSTAINABLE**

**FUTURE  
WITH GREEN,**

**RELIABLE  
POWER**

**ZBB** starts with the modular design of its zinc-bromine flow batteries in mind to lighten the footprint they will leave on the environment. As each customer configures their ZBB system to a high level of customization, there is no 'over-sizing' and little waste.

When compared to either traditional battery or to new, emerging energy storage chemistries, the active and structural materials that ZBB uses are easy on the environment, relatively abundant and completely recoverable at the end of their service life.

Designing in safety, efficiency, scalability and renewable resources, ZBB minimizes the impact of our products on the environment, while maximizing their potential benefits to our customers. That is our brand promise.

# ZBB Energy Storage and Distribution Products for a “Smart-er Grid”

The 21st Century electric grid of tomorrow, but needed here today will have to be more flexible, resilient and dynamic than the proven architecture that has served so well during the 20th Century



In one word, it will need to be “smart-er;” meaning that ZBB’s modular, configurable energy storage and distribution products will be positioned at many places on this brave, new grid. They will be there to accept energy when it is in surplus and hold it until it is needed or more highly valued.

ZBB products will be found in places like renewable energy generation sites, to high-voltage transmission and distribution substations, at many large commercial users of electricity, out in neighborhoods and even at our homes.

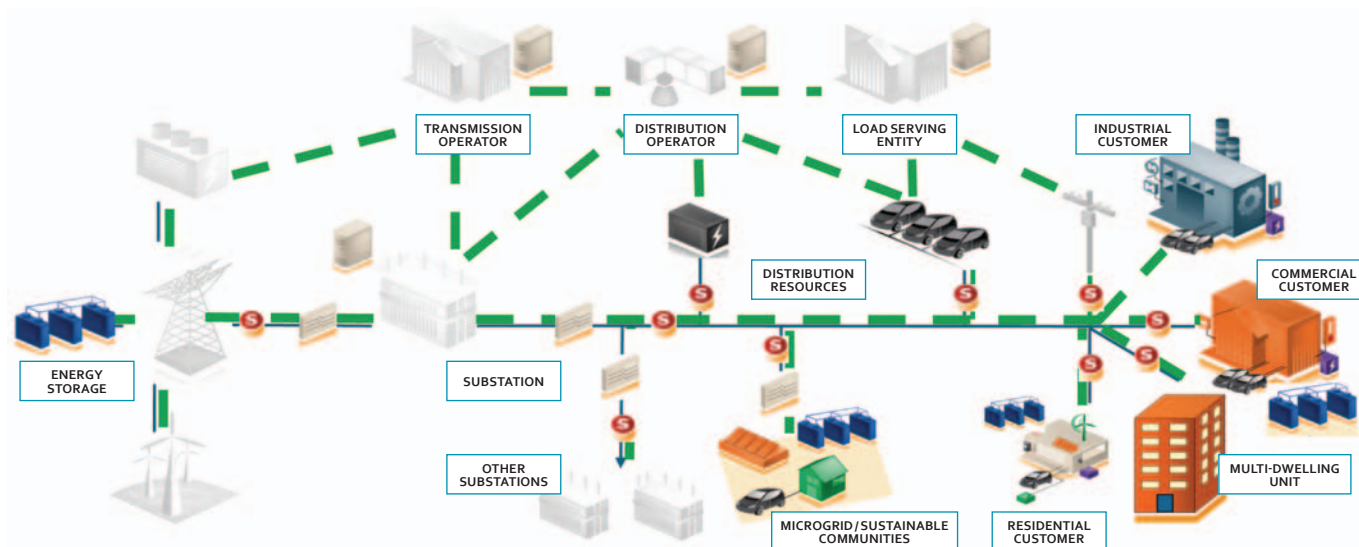


Diagram courtesy of PG&E

# ZBB ZESS POWR™

## Better Technology For Energy Storage Products and Systems



### ZESS 50

- 50kWH with 25kW max discharge rate & 12.5kW max charging rate
- Modular design from the cell stacks up
- NEMA 1 or NEMA-3R enclosures
- Direct grid-connect\* or parallel-unit\*\* product designs available

### ZESS 500

- 500kWH with 250kW max discharge rate & 125kW max charging rate
- Modular architecture & components
- NEMA 1 or NEMA-3R enclosures
- Direct grid-connect\* or parallel-unit\*\* product designs available



\* ZESS POWR™ ACG Inverter Option.

\*\*ZESS POWR™ PECC System connected.

## ZESS (Zinc Energy Storage System)

*See zinc-bromine flow battery*

- *20 + years Service Design Life*
- *1000's of Deep discharge cycles over the Service Lifetime*
- *Easily transportable with high power density*
- *Environmentally friendly; made from highly-recyclable materials*

ISO 9001 Certified  
USA Manufactured

# ZBB ZESS POWR™

## Connecting Energy Storage To The World



### ZESS POWR ACG

#### Grid-connect AC Power Conversion Units

- Factory-integrated as single unit
- NEMA 1 or NEMA-3R enclosures
- Remote Power Commands for energy dispatch when it's needed for building, campus, micro-grid or grid-scale loads

#### Low Power

10 and 25kW  
for ZESS 50

#### High Power

125 and 250kW  
for ZESS 500

### ZESS POWR PECC

#### Power & Energy Control Centers

- Modular, configurable system architecture capable of integrating multiple AC or DC power inputs, loads, energy storage and inverter units
- Patented 'energy flow leveling' DC bus inter-connection to all devices in system with 'max power point tracking' for renewables
- Grid-connect and off-grid modular and redundant inverter systems with remote communications
- NEMA 1, NEMA-3R or containerized enclosures

#### Low Power

10 to 75kW-rated  
for ZESS 50 systems

#### High Power

125kW to 2MW-rated  
for ZESS 500 systems



## ZESS (Zinc Energy Storage System)

*Are DC-ready too...*

**ZESS 50 & 500 units can connect readily with many inverter designs and manufacturers!**

*"Future-proof" your power requirements and energy storage needs with ZBB's modular and configurable products and systems.*

# ZBB ZESS POWR™

**Energy  
Storage &  
Distribution  
Systems  
Working  
Together at:**



## Utility & Grid-scale

- Peak Load Management
- Transmission and Distribution Support
- A Distributed and Dispatchable Resource
- Substation Upgrade Deferral



## Renewable Generation

- PV
- Wind
- Fuel Cells
- Hydro
- Plant sizes from 10 kW to 2MW / 50 kWh to 8MWH



## Commercial & Community

- Maximize Onsite Renewable Generation
- Emergency and Critical Power Integration
- Demand Response / Peak Shaving Asset
- CO<sub>2</sub> Reduction Resource and PH – EV Charging 'Off-grid'



## Remote Area Power (RAPS)

- Supports Multiple Renewable Generation Sources
- Diesel Fuel Cost and Run-time Reduction
- Remote Diagnostic and Polling Capabilities
- Integrate Into Telecom, Climate Monitoring, Mining and Agricultural Applications



## **Manufacturing and Corporate Headquarters**

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## **Research**

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