California Energy Commission
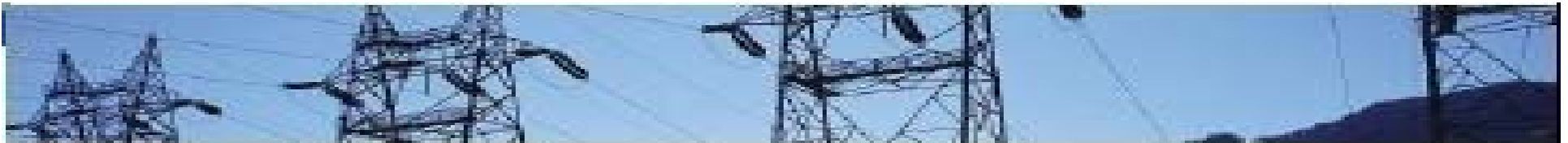# Energy Storage Workshop
April 2nd 2009

Robert Parry – Chief Executive Officer
ZBB Energy Corporation.

ZBB
energy corporation

Zinc Energy Storage Systems - ZESS

50kWh

Modular and Transportable

ZESS 50

ZESS 500

ZBB's Target Market

Electric Utilities	Renewable Energy	Smart Grid	Electric Vehicle

- Transmission and Distribution (T&D) Support
- Renewable Energy - Optimization
- Smart Grid – Energy Efficiency
- Electric Vehicles – Recharge Stations

Utility Applications for T&D Network Support

- Mitigates congestion
- Defers Sub-Station Capex
- Distributed Energy Resource
- Implement peak shaving
- Manage cost efficiency
- Reduce grid vulnerability

Renewable Energy

- Store and re-supply generated power during high-demand periods

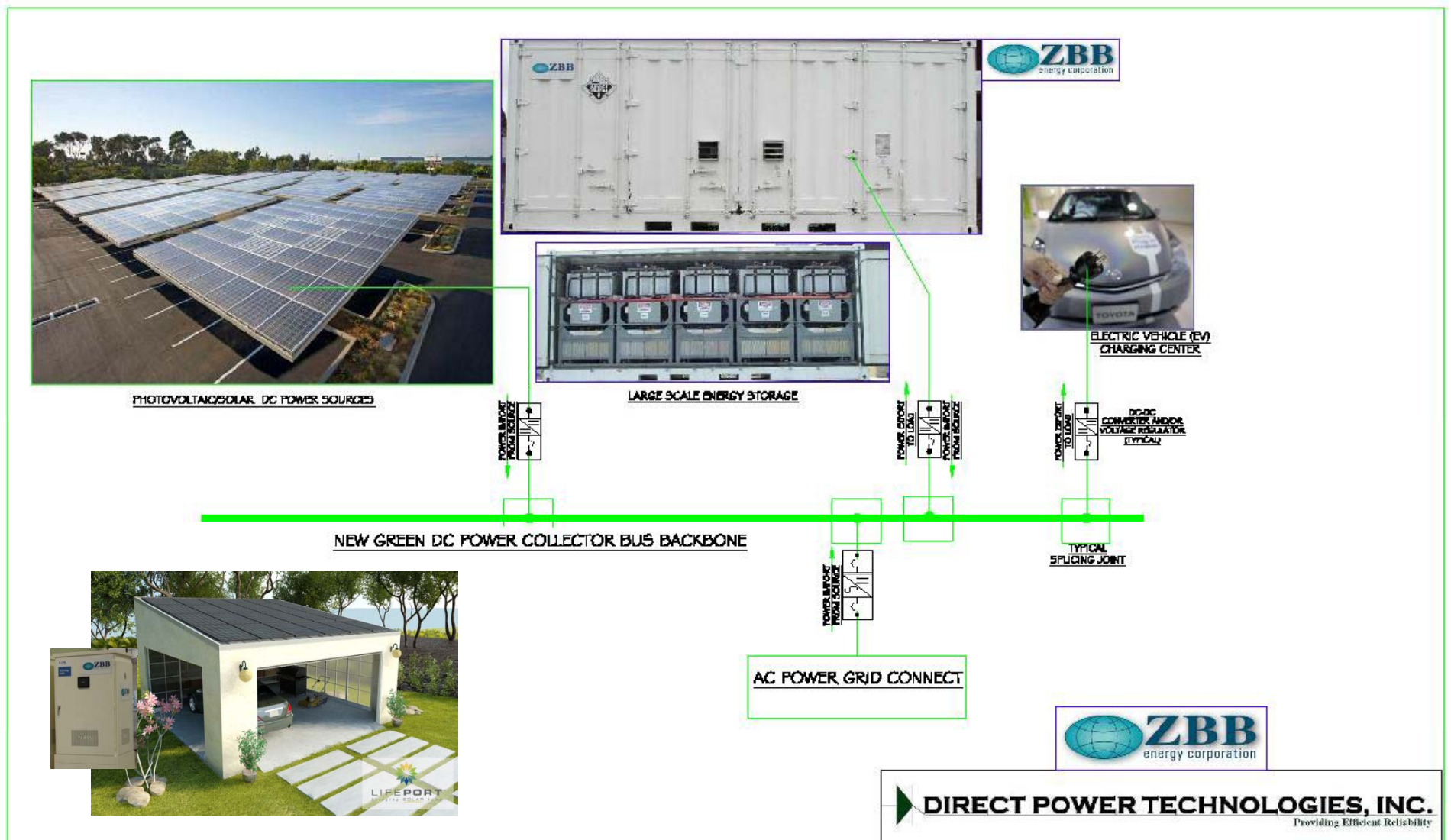- Smooth power delivery from the generator to the grid

Smart Grid

- Goal of the Smart Grid - to maximize the efficiency of existing generating facilities and accommodate the integration of renewable power resources.

- Evolution of the Smart Grid will depend on cost effective energy storage

Electric Vehicles – The Recharging Solution

PHOTOVOLTAIC/SOLAR DC POWER SOURCES

LARGE SCALE ENERGY STORAGE

ELECTRIC VEHICLE (EV) CHARGING CENTER

POWER EXPORT FROM SOURCE

POWER EXPORT TO LOAD

POWER EXPORT FROM SOURCE

POWER EXPORT TO LOAD

DC-DC CONVERTER AND/OR VOLTAGE REGULATOR (TYPICAL)

NEW GREEN DC POWER COLLECTOR BUS BACKBONE

TYPICAL SPLICING JOINT

POWER EXPORT FROM SOURCE

AC POWER GRID CONNECT

DIRECT POWER TECHNOLOGIES, INC.
Providing Efficient Reliability

Barriers / Challenges to Energy Storage Adoption

- Recognize the complete (true) "Value" of storage throughout the generation, transmission and distribution chain. Multiple Benefits from 1 source.
- Acceptance of new technology solutions to replace existing traditional methods. Think next generation.
  - Predictability – the "Value" of controlled renewable energy sources
  - Grid stability achieved with Predictable (controlled) renewable energy
- Regulatory measures that recognize storage as a "recoverable cost" solution. Incentives to support new tech solutions.
- Cultural change in thinking and acceptance.
  - Through education and bold legislation
    - Smart Grid
    - Distributed Resources VS Centralization
    - Awareness Programs to highlight both strengths and weakness of renewable energy and all possible solutions
    - Installed capacity DOES NOT achieve RPS goals. Efficient usage of generated renewable energy DOES achieve RPS goals.

- Acceptance leads to Volume.   Volume leads to Cost Reduction.

Thank You

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