



SOLAR GRID
storage

Renewable Energy Storage

March 6, 2014

Northeast Sustainable Energy
Association | G338

Growing Challenges = Opportunity

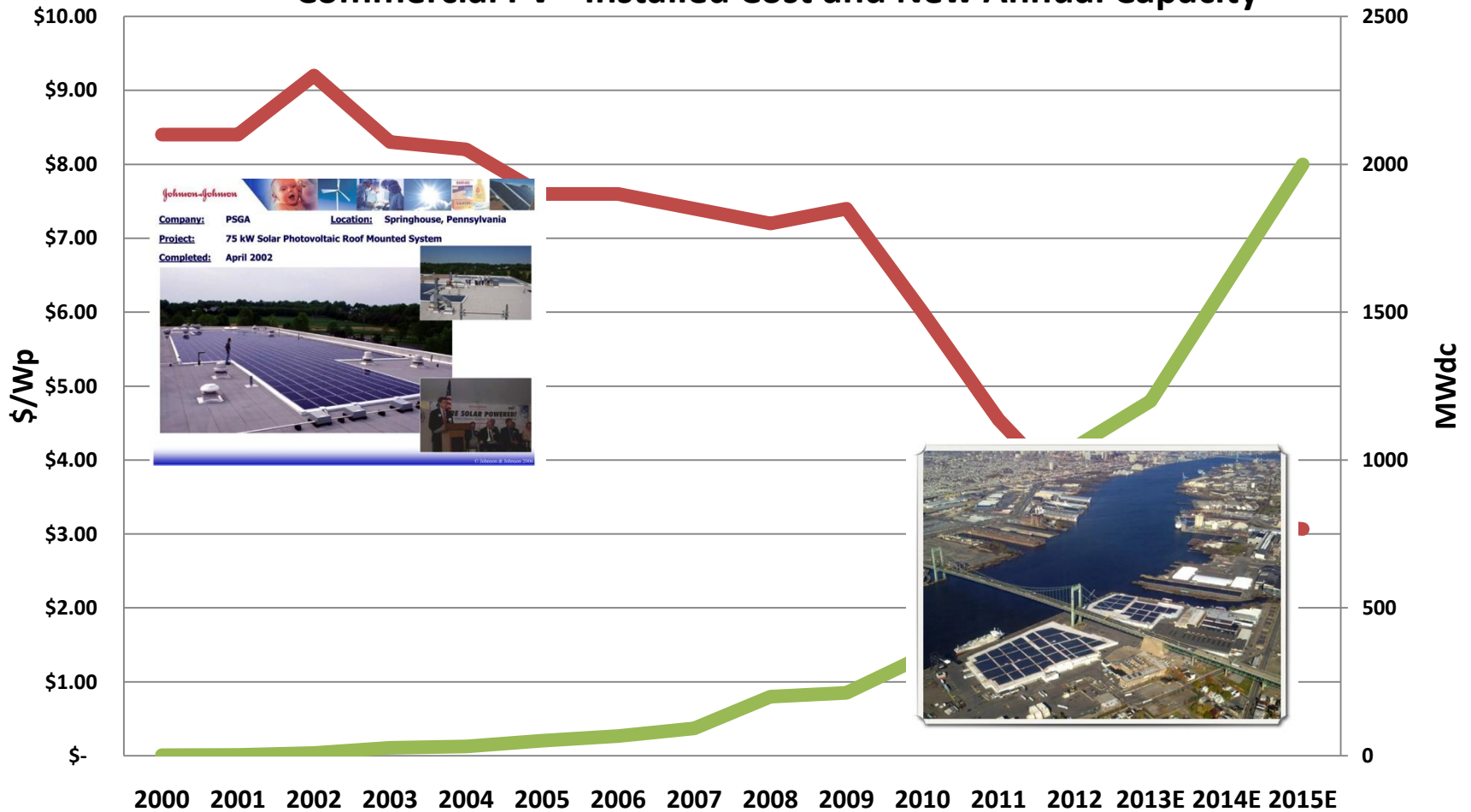
- ✓ Consumers are increasingly demanding emergency backup for power outages including with solar
- ✓ Increased penetration of intermittent solar power and other renewables causes utility grid operators to search for additional power balancing technologies
- ✓ Fierce competition in the solar industry drives solar companies to find ways to differentiate themselves with lower costs and more benefits



Financed Storage = Cost Reduction, Emergency Power, Grid Stability

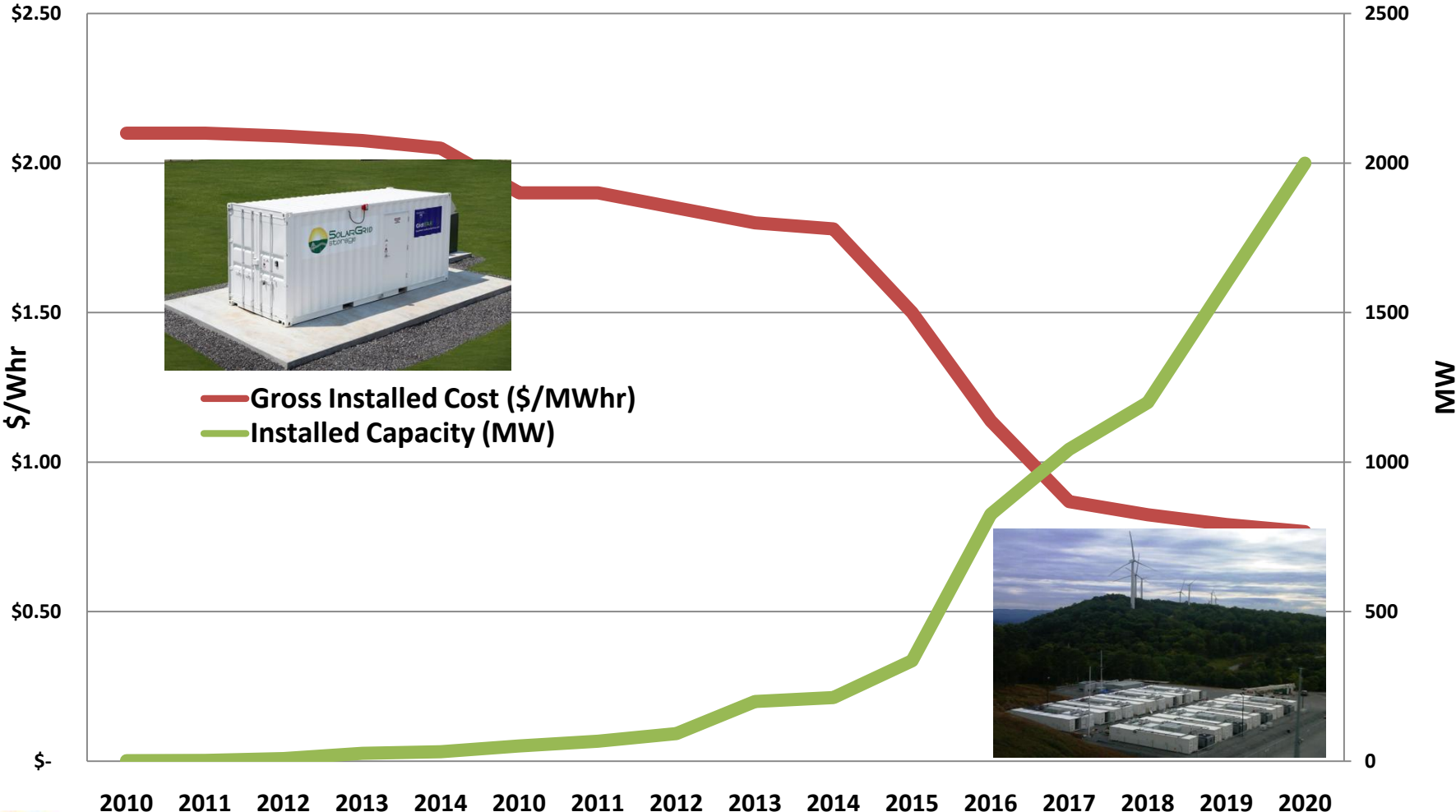
Falling Costs Accelerate Deployment

Commercial PV - Installed Cost and New Annual Capacity



Falling Costs and *Value* Accelerate Deployment

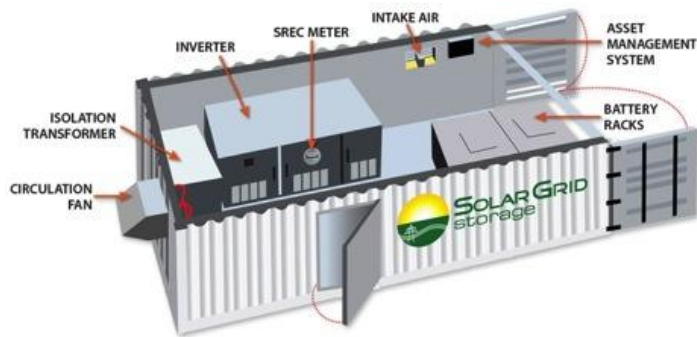
Solar Storage - Installed Cost and Annual Capacity



Breakthrough in Delivering Affordable Storage

Storage can now be delivered with products and business models that for the first time enable storage to be added to solar projects

Cost Reduction and Solar Finance Models



“If you want to see the future of renewable energy in the U.S., you should check out the large container sitting next to a nondescript office building off the I-95 corridor in Maryland.”

Business Insider, November 2, 2013

Solar Storage Solutions

Inverter Storage Systems Benefit Multiple Parties

Solar Developer - offers the inverter with multiple uses dramatically *increasing the value* of the system and *differentiating* them from competitors

Host/Customer - reduces PV system cost and includes **backup power** (UPS quality) that enables solar to work *even during power outages*

Utility – provides local distribution system benefits including voltage and VAR control; storage systems can be fully SCADA enabled

Grid - grid operators can use storage for an array of ancillary services

PV Industry - *accelerates solar deployment*



So Many Benefits

Creating Resiliency Assets *with* Identifiable Cost Benefits

Opportunities for *direct* cost recovery

- *Inverter services to PV owner*
- *Emergency backup services to building occupant*
- Ancillary services
- FR; Spinning Resv; Blackstart
- 30% ITC + depreciation

Unique Utility ratepayer benefits

- Local Voltage/VAR
- Smart Grid data
- Ckt voltage refinement
- Microgrid operations
- Ckt based PV power optimization
- Distribution investment deferral



Sample Projects

Penn State GridSTAR Center
Philadelphia Navy Yard – 150kW



Konterra Headquarters
Laurel, MD – 500kW



WP Properties
Hackettstown, NJ – 250kW



WP Properties
Denville, NJ – 200kW

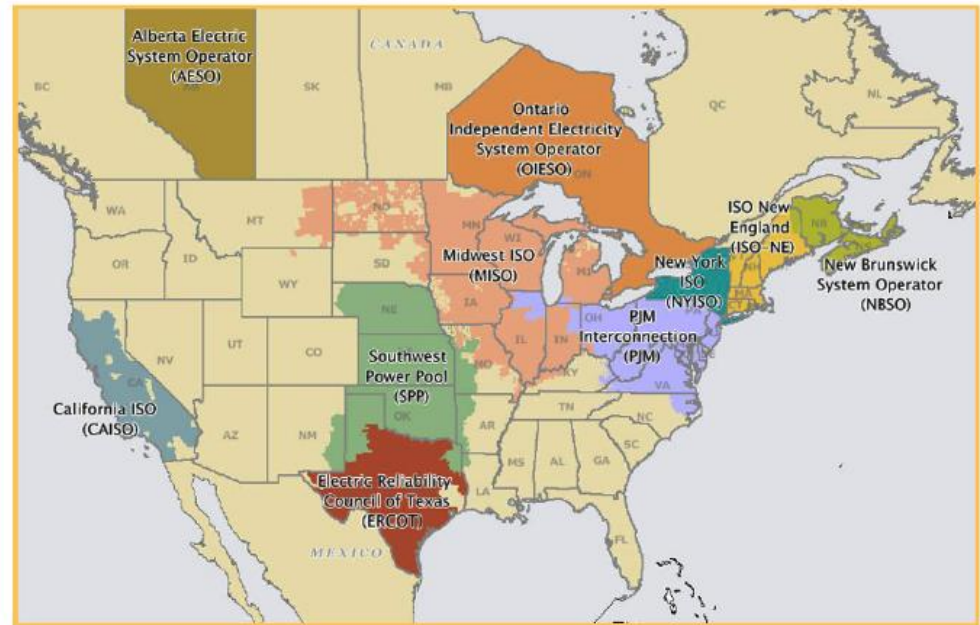


The Market

US solar power industry has developed at breakneck speed now the fastest growing new electric generation source

- FERC has mandated utilities and system operators to implement standardized rules that pay for fast-responding technologies, **supporting the solar storage** business models and a rapid expansion in the on-site storage market
- Current grid-tied solar solutions do not provide energy back-up

North American Regional Transmission Organizations



Intense Interest and Media Attention

The New York Times



BUSINESS INSIDER



CHICAGO SUN-TIMES

GIGAom

GreenBiz
.com

ENGINEERING.COM ELECTRONICS
THE GUTS BEHIND THE GADGETS

Solar Industry

greentechmedia:

THE HUFFINGTON POST
THE INTERNET NEWSPAPER: NEWS BLOGS VIDEO COMMUNITY

Forbes®

keystoneedge

ELECTRIC LIGHT & POWER



Thank You

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