ENERGY STORAGE IN TEXAS: What Regulators Need to Know

Chris Winland
Texas Energy Storage Alliance /Good Company Associates

TESA
Texas Energy Storage Alliance

Good Company
Associates

TESA

Texas Energy Storage Alliance

Full Members

AES

Beacon POWER

Xtreme Power

,

Haddington Ventures, L.L.C.

ALTAIR NANO

Associate Members

Prudent Energy
VRB™ Systems

IDEAL POWER CONVERTERS

exergysystems
Cool today. | Save tomorrow.

Good Company Associates

- Austin-based firm specializing in clean energy, primarily in Texas

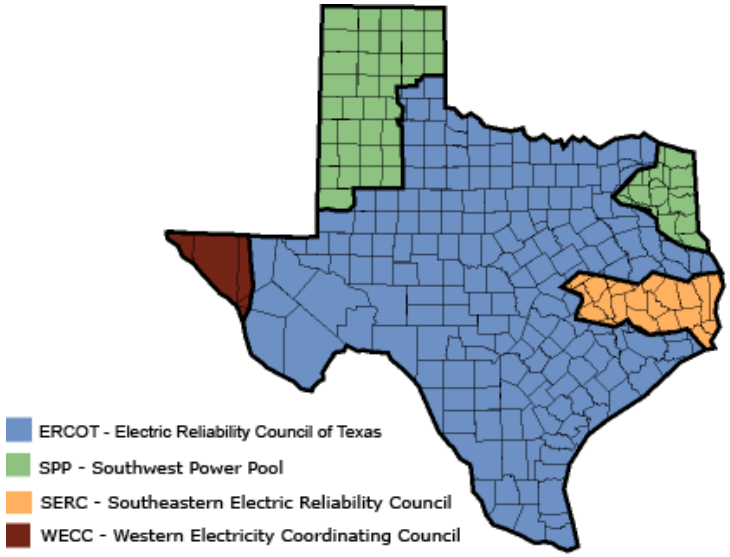
- Services include:
  - Policy & Regulatory
  - Business Development
  - Coalition Building
  - Analysis & Technical Consulting

- Industries include:
  - Energy Efficiency
  - Renewable Energy
  - Energy Storage
  - Smart Energy
  - Alternative Transportation

TEXAS MARKET BACKGROUND

Texas PUC Commissioners and Legislators Handle Issues That Are Handled By FERC Nationally

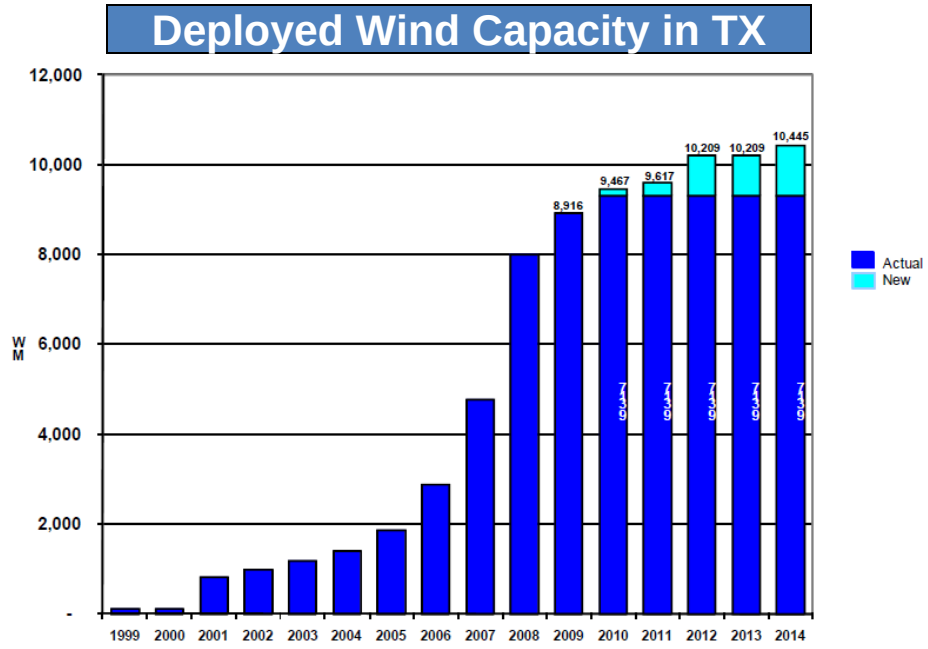
- The ERCOT ISO, which serves 75% of TX, is intra-state and therefore is not under FERC jurisdiction



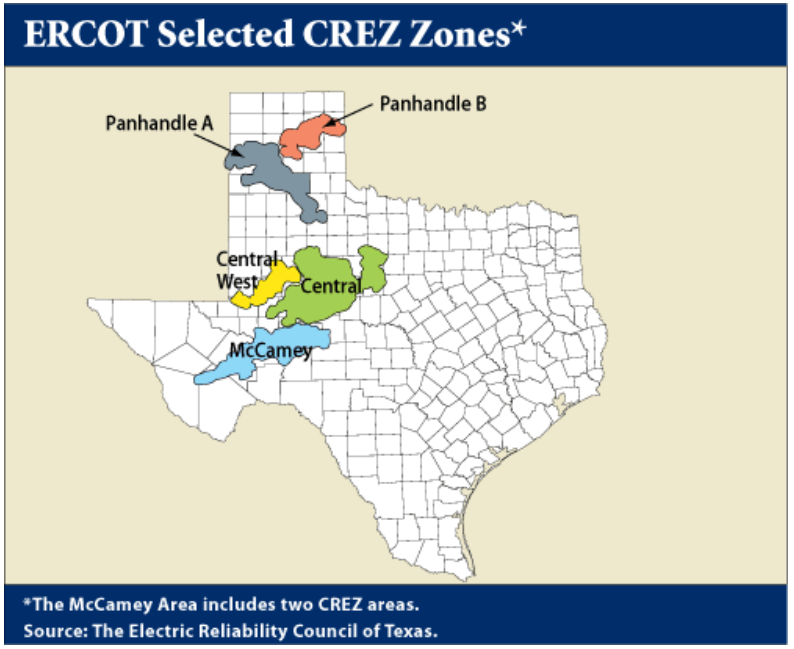
Texas Has a Partially De-regulated Electricity Market

- In “competitive” areas, utilities have been unbundled into generators, transmission/distribution utilities (TDUs), and retail electric providers (REPs)
- Austin, San Antonio, and other cities still have municipally-owned, vertically-integrated utilities
- Some areas are served by electric cooperatives or incumbent utilities

Texas Has Over 10,000 MW of Deployed Renewables with Plans to Increase to Over 18,000 MW Soon



Source: ERCOT System Planning Report to ROS for July 2010, p. 7.



Therefore our Texas regulators and legislators need to understand the capabilities, benefits, limitations, risks, and economics associated with various energy storage technologies…

Basic Knowledge

- Energy storage is viable today and has been commercially deployed
- It is not just one technology
- It can provide multiple services
  - *And to be economic or most useful to the grid, a device may need to be able to provide multiple services*
- Ancillary Services provided by storage can react quicker and more accurately
- All grid resources can benefit from storage
- Economics depend on applications and assumptions

TX Market Rules Were Designed By/For Traditional Technologies…

- ERCOT protocols reflect the capabilities and services that traditional generation resources are able to perform
  - Examples: products offered, testing requirements, market calls, zonal/nodal settlement
- In the competitive volumetric market there is no way for a REP to get credited for reducing load on demand

TX Market Rules Were Not Designed for Assets That Can Be Transmission and Generation…

- Transmission assets can still recover costs through regulated rates
- Generation assets must recover costs in the competitive markets
- In the competitive markets in Texas, TDUs are prohibited from owning generation or taking possession of electricity
- Different registration for generation/loads can lead to dual registration
  - 4 CP considerations

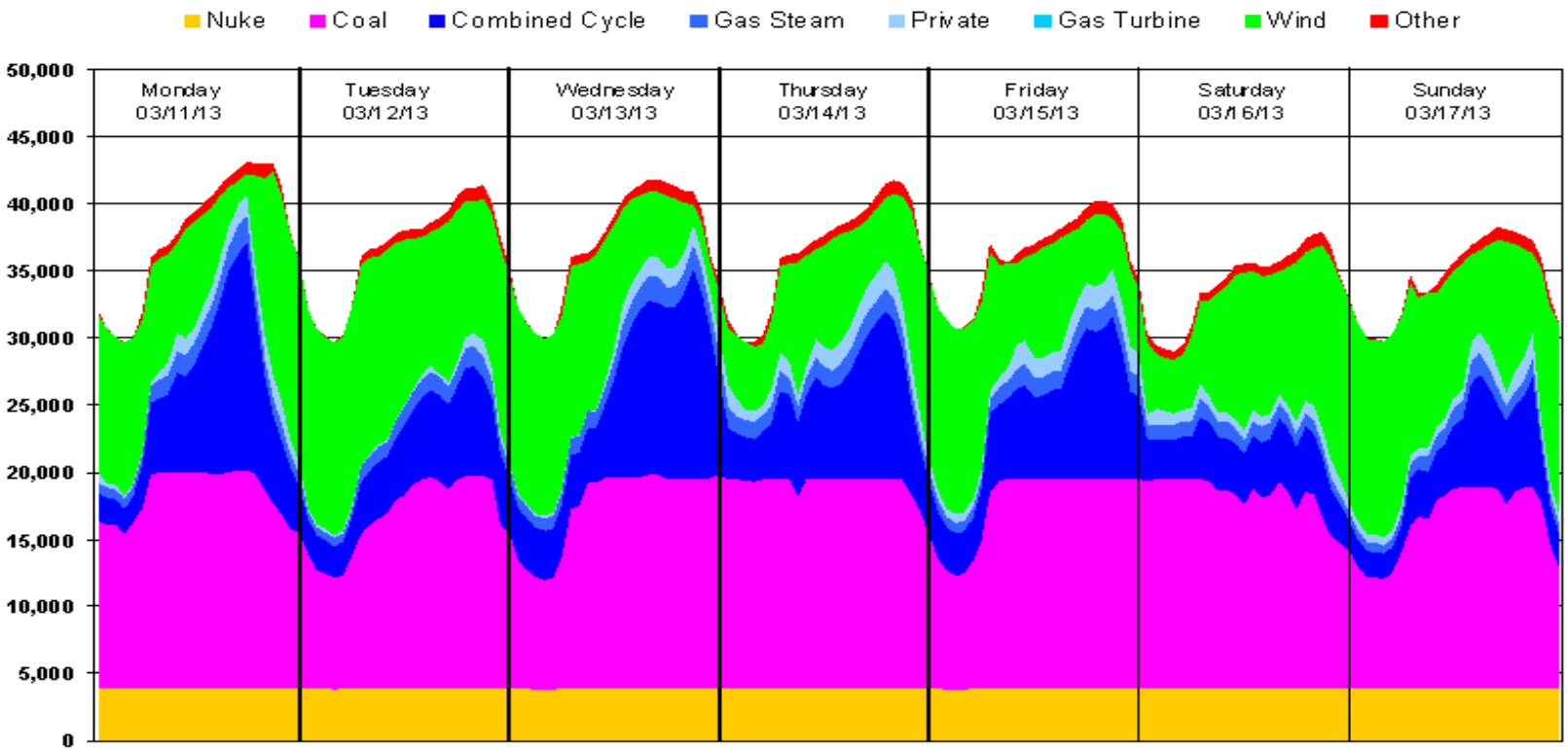
But Market Rules Change…

- Recent examples: combined-cycle gas, wind

Case Study: B.O.B. (Big Ol' Battery) in Presidio, TX

Storage Can Play a Key Role in Ensuring Grid Reliability…

2013 HIGH WIND WEEK - GENERATION BY FUEL TYPE



Dan Woodfin, Director, System Planning and John Dumas, Manager, Operations Planning , ERCOT, Key Challenges to Reliability with Increased Wind Penetration, PUCT Project 37339 Workshop 8/20/09

TESA Texas Energy Storage Alliance

Good Company Associates

The Road Ahead: Leadership Required

- Current market participants don’t have enough incentive to make the rule changes required to embrace new competitors
- FERC, PUCT, ERCOT, and others must provide vision and have the will to embrace new technologies that can benefit us all

Specific Issues

- Definitional:
  - What is the appropriate role of storage in a competitive market? Generation? Transmission? Both? Other?
- Operational:
  - Which protocols and market rules, if any, need to be modified to reflect the capabilities of storage, remove barriers, and/or optimize its potential benefits?
  - Who can own storage?
- Compensation:
  - How do you avoid issues regarding cross-subsidization, appropriate competition, and discrimination while keeping projects economic and fairly compensated?

For more information, please visit:

TESA
Texas Energy Storage Alliance

www.texasenergystorage.org

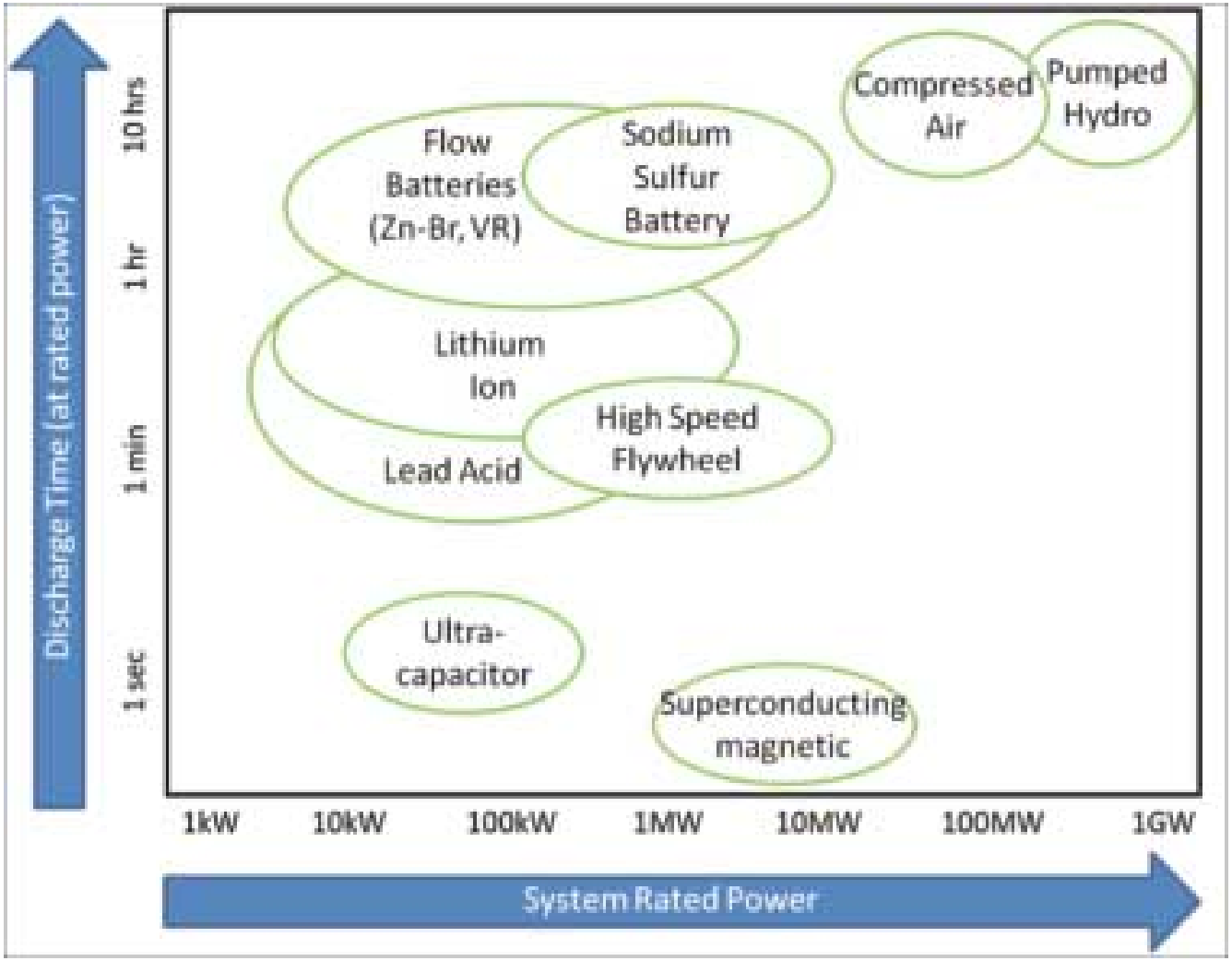
or

Good Company
Associates

www.goodcompanyassociates.com

Supplemental Slides

Energy Storage is Not Just One Thing…



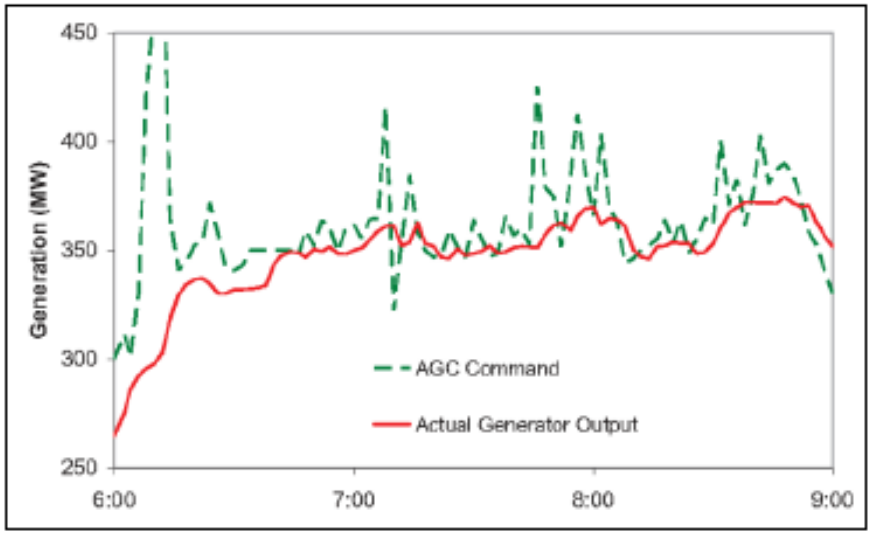
Source: GTM Research

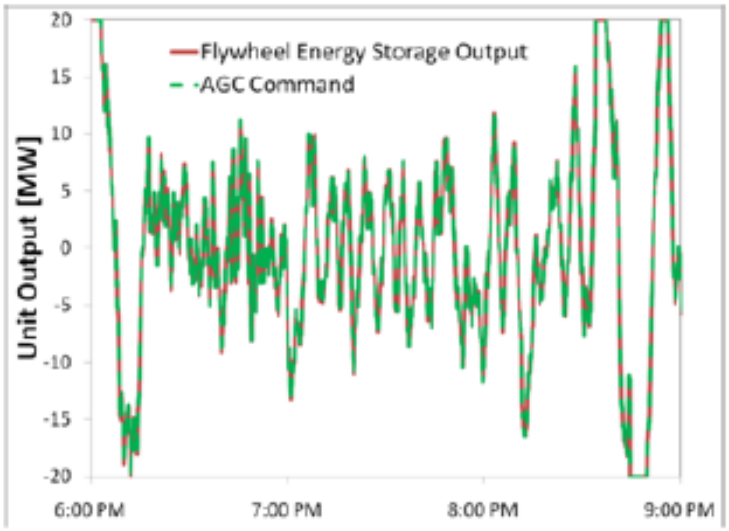
Storage Can Provide Multiple Services…

- Ancillary Services such as frequency regulation
- Local reliability/power quality
- Transmission-level reliability
- Other renewable integration services
- Peak shaving or arbitrage (time-shifting)

And to be economic or most useful to the grid, a device may <u>need</u> to be able to provide multiple services…

Ancillary Services Provided by Storage Can React Quicker…

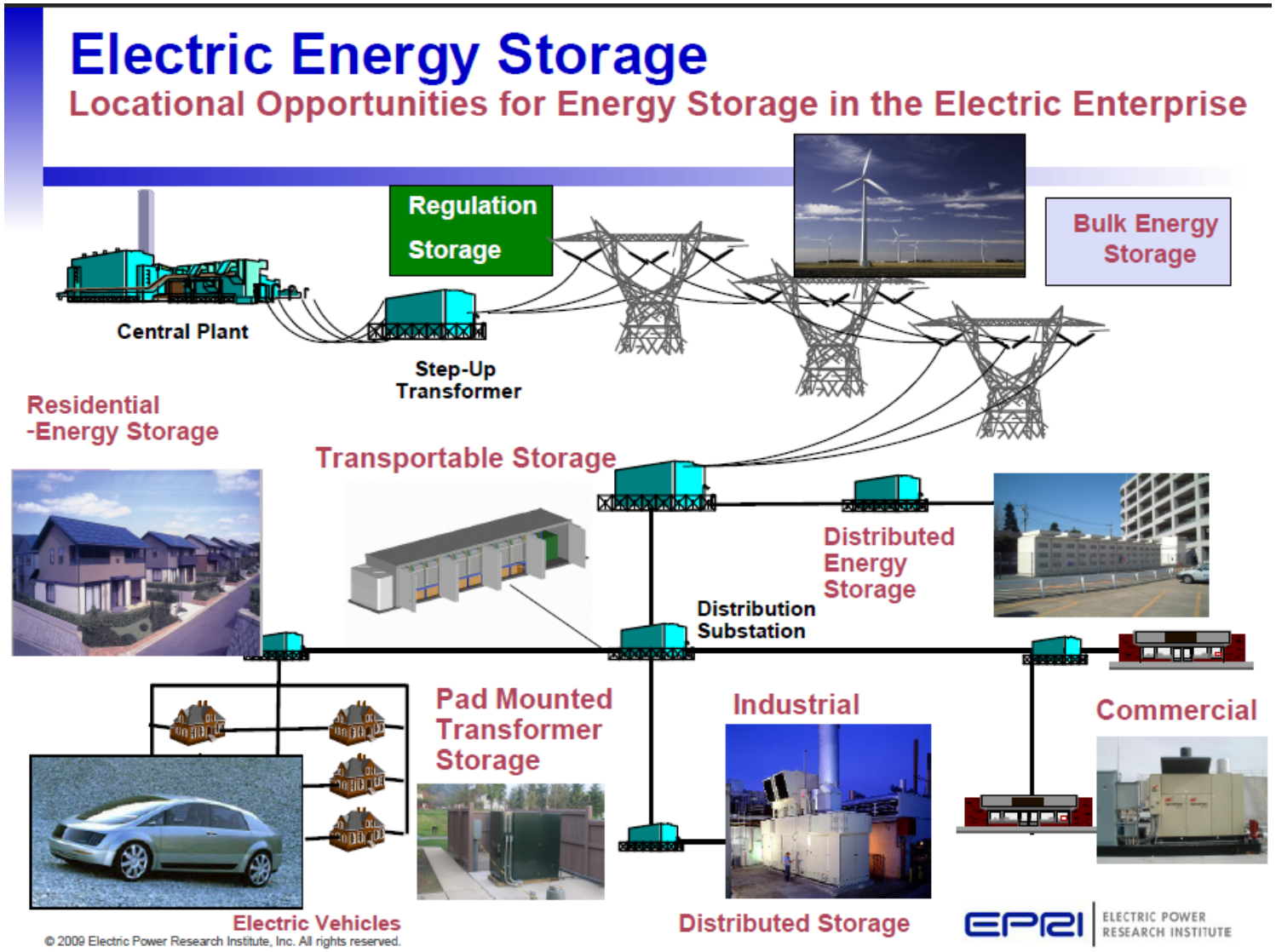




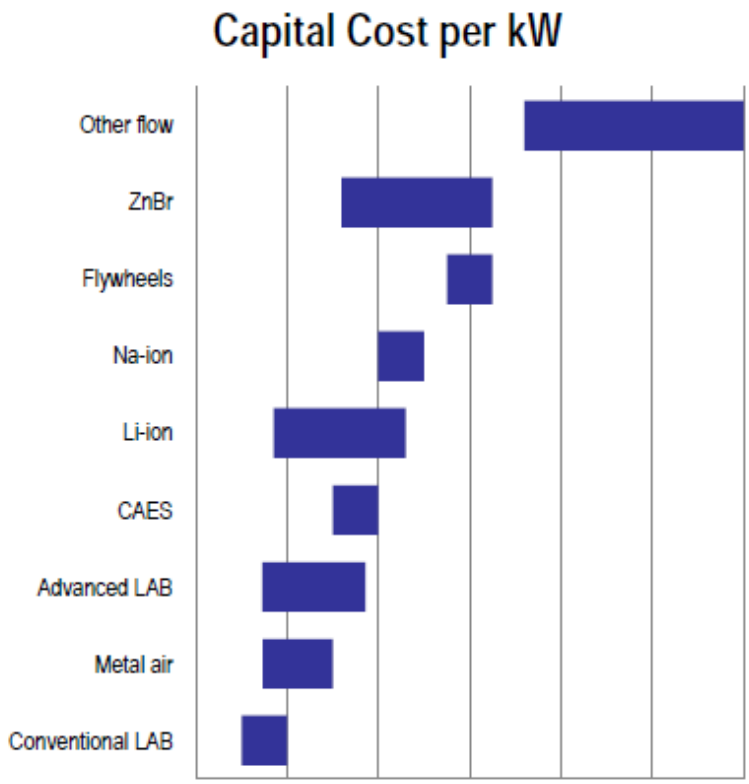
Slow ramping Generator vs. Advanced Energy Storage

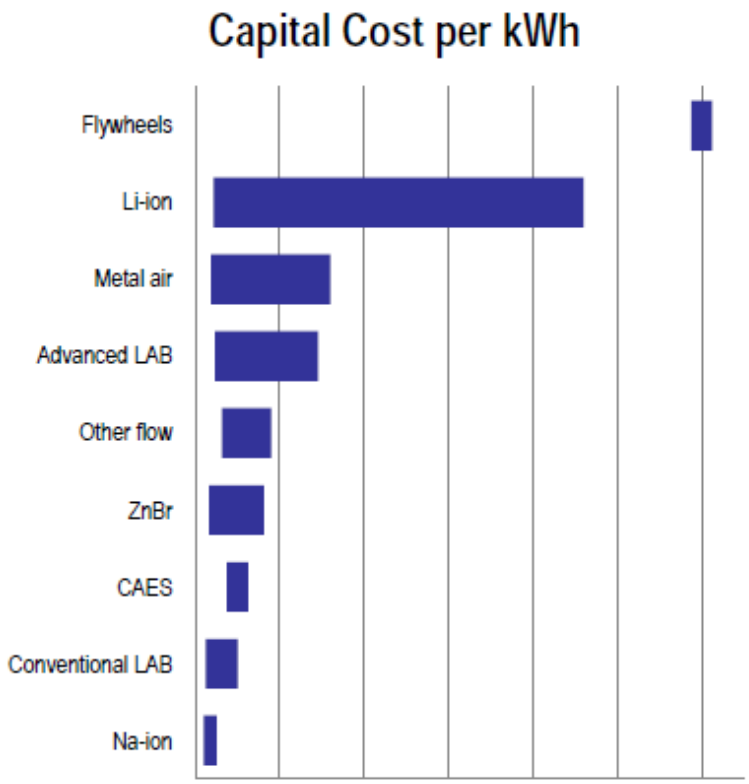
Advanced Storage provides “instantaneous” response to frequent and unpredictable changes in wind/solar

All Grid Resources Can Benefit from Storage…



Storage Economics Depend on Applications and Assumptions…





Source: Duke Energy Presentation to DOE