

Bulk Energy Storage for the Nation's Electricity Grid

Coalition to Advance Renewable
Energy through Bulk Storage

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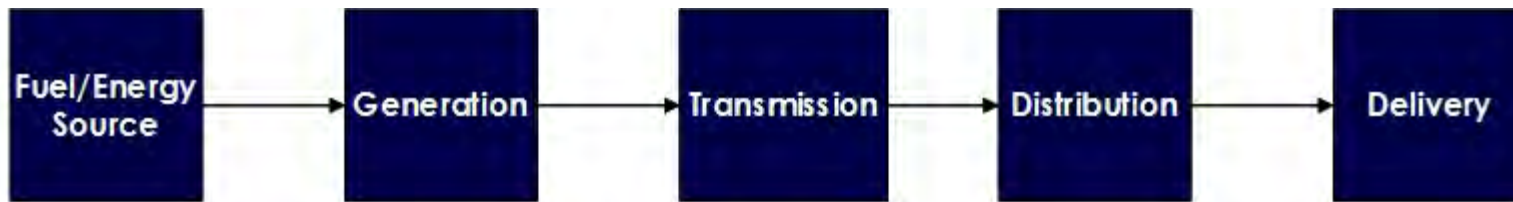
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The Mission

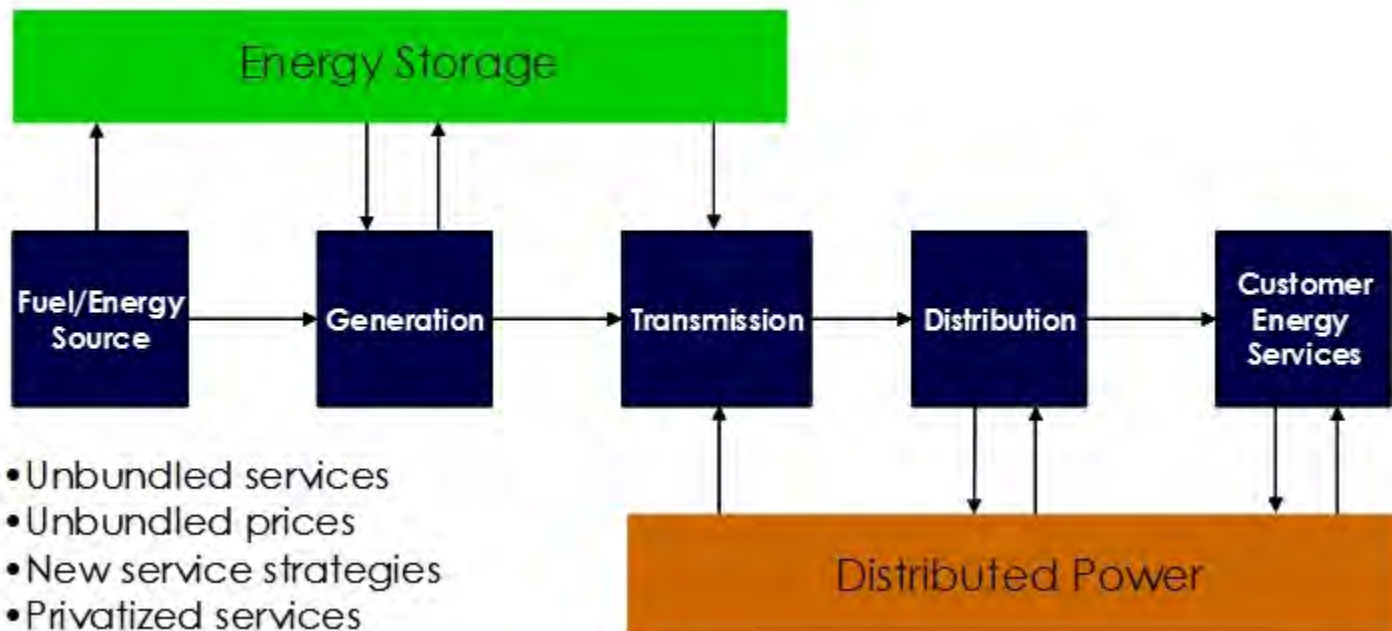
- Promote the benefits of bulk energy storage to enhance electricity grid operations, including integration of renewable energy, improved reliability and security, advanced market development, and cost efficiencies throughout the production and delivery value chain
- Shape and support federal policies affecting bulk energy storage and work with key state-level and storage organizations to advance energy storage generally
- Distinguish bulk energy storage from other storage options

Why Talk About Energy Storage?

- Electricity supply industry has precious little ability to “store” its product – just in time inventory
- Electricity has to be consumed as soon as it is produced!
- Renewable energy is extremely variable – at expected penetration levels, will change the way the grid has to operate
- The U.S. has less grid energy storage (~2%) than other developed countries (4-10%)



Traditional way: Regulated utility bundled functions.
One price does it all.



- Unbundled services
- Unbundled prices
- New service strategies
- Privatized services

Energy Storage...

- Can bring more renewable energy to more people more of the time – smooth variability in supply
- Enhances the reliability and the security of electricity supply
- Reduces the amount of fossil fuels consumed inefficiently to provide essential grid operating services (e.g., ancillary services)
- Adds flexibility to electricity supply and delivery – responds within minutes with large increments of capacity
- Can do for the electricity industry what natural gas storage did for the natural gas industry
- Stabilizes electricity markets

Bulk Energy Storage

- Scale – 10 MW – 700 MW individual units
- Connects to grid at transmission level voltages
- Pumped hydroelectric storage (PHS) – successfully operating for decades
- Underground compressed air energy storage (CAES) – demonstrated and commercially available
- Large scale batteries and flywheels - emerging

Bulk vs Distributed Storage

- Proven – 24,000 MW of traditional PHS operates today in U.S. and one CAES facility for over a decade
- Financeable – competitive with fossil-fuel systems for the same grid services
- Large – can accommodate large incremental additions of renewable energy facilities
- Comfort – electric utilities are familiar with these systems
- Cost – economies of scale in managing the grid on a regional basis. Countless studies show bulk storage technologies are cost effective now
- U.S. manufacturing base – a bulk storage industry creates jobs in this country NOW

An Emerging Policy Framework...



Layers of Legislation/Policy Supporting Storage

Federal Layer	FERC		DOE		EPA	CONGRESS		
	Electric Energy Storage Request for Comments	Variable Energy Resources Notice of Proposed Rule Making	ARRA Demo Funds ~ \$200 M	ARPA - E Funding (12% devoted to storage or \$49 M)	- Carbon Reduction - Emissions Rules on Peaking GTs?	Investment Tax Credit for Storage	Potential Clean Energy Standard	Clean Energy Development Bank (under discussion)
National Layer	NERC				Eastern Interconnect Planning Collaborative			
	- Issued Report from Variable Generation Task Force - Annual Long-term Reliability Assessment				Modeling Studies Include Bulk Storage			
ISO/RTO Layer	NY-ISO	PJM	MISO	CAISO	ERCOT	WECC	SPP	
	FERC Approved Energy Storage Tariffs for Day-ahead and Real-Time Regulation Service Markets (15 min. intervals)	- Ancillary Service - Frequency Regulation	- Ancillary Services Tariffs - Developing Ramping Product	- Approved Tariffs for Ancillary Services from Non-generators - Developing Ramping Product - Modeling Storage in Production & Forecasts	- Day-ahead Ancillary Services Tariffs and Market - Texas Nodal Market Beginning 2011	- Modeling Storage	Variable Energy Generation Policy Initiatives	
State Layer	NEW YORK	OHIO	CALIFORNIA		TEXAS	UTAH	KANSAS	
24 states currently have RPS policies. Other initiatives include:	- Storage R&D Program	- Storage Included in the PUCs Alternative Energy Portfolio Standard	- AB2514 Possible Storage Procurement Mandates - Storage Included in Integrated Resource Plan - SDGE Storage Rate Case		- Proposed PUC Rulemaking on Legislative Target of 500 MW of Non-wind Renewable Energy	- Storage RPS - Proposed Renewable Energy Zones Include Storage	Regulations to implement legislation supporting CAES	

What CAREBS asks for...

- Re-introduction of the storage investment tax credit (ITC) – Sen. Ron Wyden and others
- Appropriate subsidies and incentives that recognize storage as a cost-effective multiplier of renewable energy delivered through the grid
- Inclusion in the proposed Clean Energy Credit program
- FERC incentives similar to transmission assets
- Classification by FERC as a separate asset class with its own benefits to the grid
- Inducements to electric utilities and ISO/RTOs to evaluate bulk storage on an equal basis with generation and transmission assets

What you will hear about today

- A perspective on bulk energy storage from the largest, most liquid electricity market in the world - PJM)
- How Duke Energy, one of the largest U.S. electric utilities, has been using PHS for grid operations and management for decades
- Power South's (Alabama) experience with the pioneering full-scale application of CAES
- Iowa Stored Energy Project's development of a CAES bulk storage facility to serve Midwest wind energy
- Development of numerous PHS bulk storage projects (HDR Engineering)

To learn more, visit:
www.carebs.org

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