

UP NEXT...

***THE PROMISE AND CHALLENGES OF
ENERGY STORAGE:
ORDER 841 AND
THE STATES' ROLE***

NARUC  Summer
Policy Summit

Electricity Committee

Energy Resources and the Environment Committee

***THE PROMISE AND CHALLENGES OF
ENERGY STORAGE:
ORDER 841 AND
THE STATES' ROLE***

Moderator:

- Hon. Edward S. Finley, Jr., North Carolina

Panelists:

- Jeff Burleson, Southern Company
- Judy Chang, Brattle Group
- Kelly Speakes-Backman,
Energy Storage Association
- Charlie Bayless, NCEMC

The Storage Story

**WHAT CAN STATES DO TO CONSIDER
STORAGE RESOURCES?**

PRESENTED TO
NARUC Summer Policy Summit

PRESENTED BY
Judy Chang

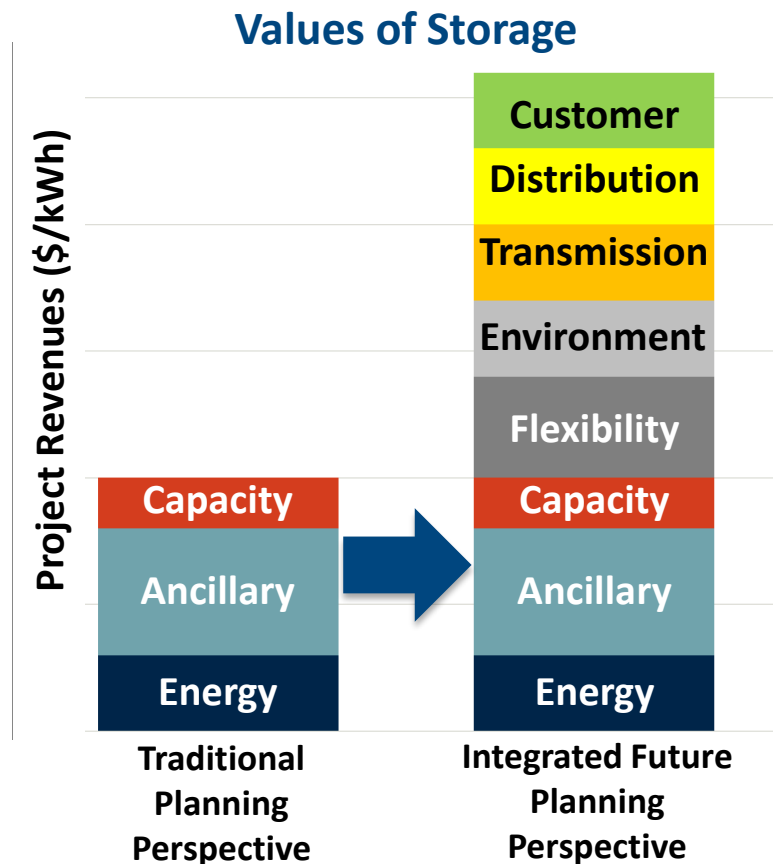
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THE **Brattle** GROUP

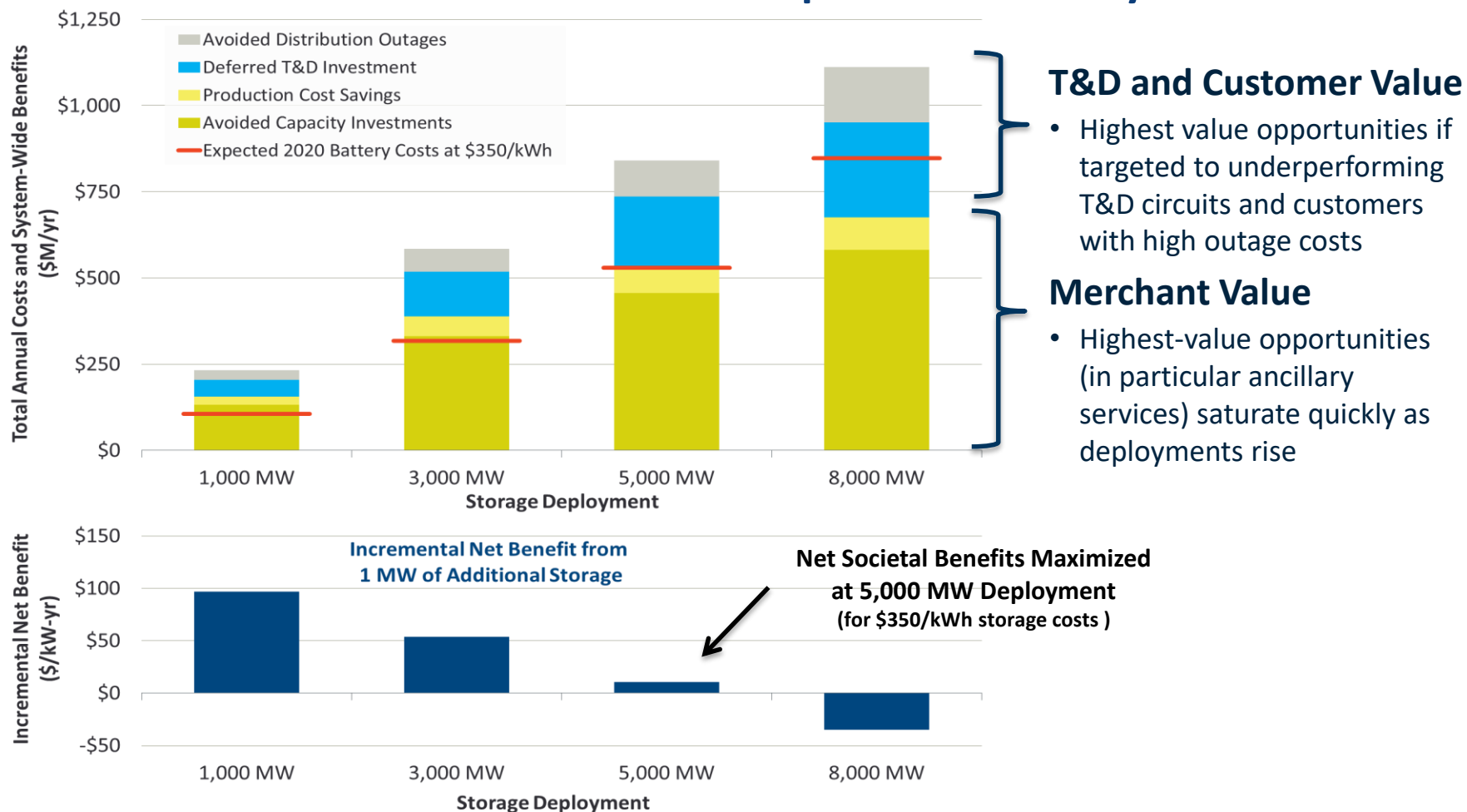
Considering the Value of Storage

- Storage provides a **variety of potential benefits**
 - Utilities do not yet consider in traditional resource planning framework
 - Considering all of the benefits is essential
 - May require new modeling paradigm and tools to capture benefits
- **Traditional services:** energy arbitrage, fast-response capabilities, and avoided capacity
- **Clean energy support:** additional value from higher-quality ancillary services, other flexibility and clean energy products
- **Deferred or avoided investments in transmission and distribution** infrastructure
- **Additional reliability** to specific customer groups or sites



Quantifying Values of Storage in Texas

**Incremental system-wide benefits exceed incremental costs for up to 5GW.
~40% of benefits from T&D deferral and improved reliability.**



States' Role and Objectives in Storage

State plans that include storage should clarify objectives and goals.

Are there reliability goals that storage is uniquely positioned to provide?

Regulators could ask:

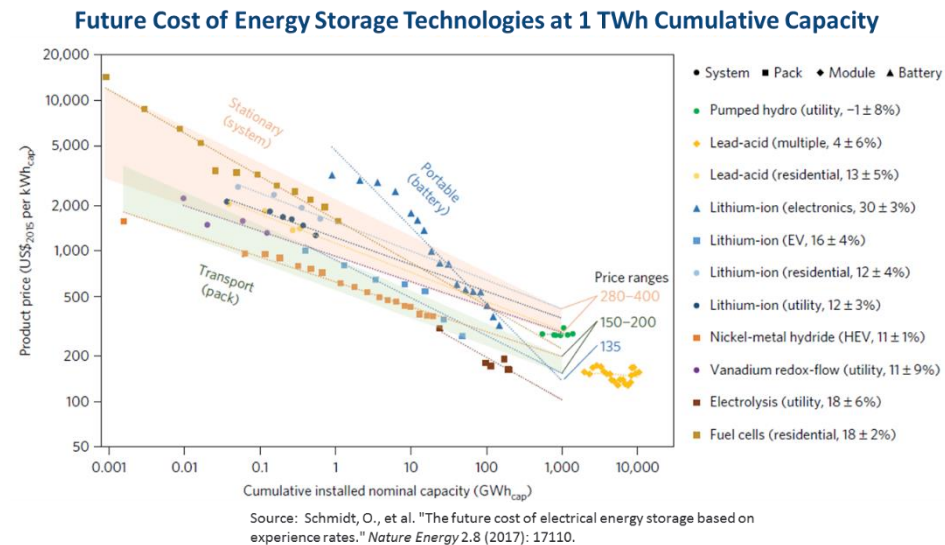
- “How does storage fulfill the need?”
- “Why renewable + storage?”
- “What are the alternatives?”
- “How do the cost of the portfolio change with storage?”



Various Use Cases for Storage

Storage can provide wholesale and retail market values, increase utilities efficiency, and improve reliability.

- Storage + renewable energy resources can efficiently integrated renewable generation
- Distribution-level storage initiatives can increase system and customer reliability
- Transmission-level storage investment can help reduce congestion
- Behind-the-meter storage investments can reduce customer costs, but may create challenges for utilities



Difficult Questions for Regulators

How can states help advance storage investments?

- Openly discuss the potential value of storage in terms of states' energy infrastructure and environmental goals
- Identify state's objectives in advancing storage
- Clarify the roles of the utilities in meeting the objectives
- Consider customers' storage investment potential when designing retail rates and programs
- Set future trigger points to update the roles of utilities and state targets



Brattle Experience in Storage Analyses

Asset Valuation

- Valuing and sizing renewables + storage facilities
- Valuing storage across multiple value streams
- Developing bid/offer strategies to maximize value
- Accommodating storage into IRPs
- Supporting due diligence efforts of investors

Market Intelligence

- The state and federal policy landscape
- Electricity market fundamentals and opportunities
- Storage cost and technology trends
- Current and emerging business models

Policy, Regulatory, and Market Design

- Wholesale market design
- Market and regulatory barriers
- Utility ownership and operation models
- Retail rate implications of distributed storage
- Implications of storage on wholesale markets

PRESENTED BY

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Ms. Judy Chang is an energy economist and policy expert with a background in electrical engineering, and has over 20 years of experience in advising energy companies on regulatory and financial issues, with a focus on power sector investment decisions in clean energy, electric transmission, and energy storage. Ms. Chang has submitted expert testimonies to the U.S. Federal Energy Regulatory Commission, and U.S. state and Canadian provincial regulatory authorities on topics related to resource planning, power purchase and sale agreements, and transmission planning, access, and pricing. She has authored numerous reports and articles on the economic issues associated with generation and transmission investments, clean energy development, energy storage investments, and systems planning. In addition, she has led teams of energy company executives and board members in comprehensive organizational strategic and business planning.

Ms. Chang holds a Bachelor of Science in Electrical Engineering and Computer Science from University of California, Davis and a Master of Public Policy from Harvard Kennedy School. She is a former board member of the Massachusetts Clean Energy Center.

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