

Functionalizing Energy Storage

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Topic: Regulatory | Vertical: Analytics
Strategic Pathway: Grow
Project start and finish: FY26-FY27

PROBLEM

- The electric grid is divided into three functions: generation, transmission, and distribution
- Each has its own rules, jurisdictional authority, and compensation
- Energy storage technologies are forced to abide by these rules, which constrain their growth
- In this project, we are exploring the potential for reclassifying energy storage as a grid function and related issues

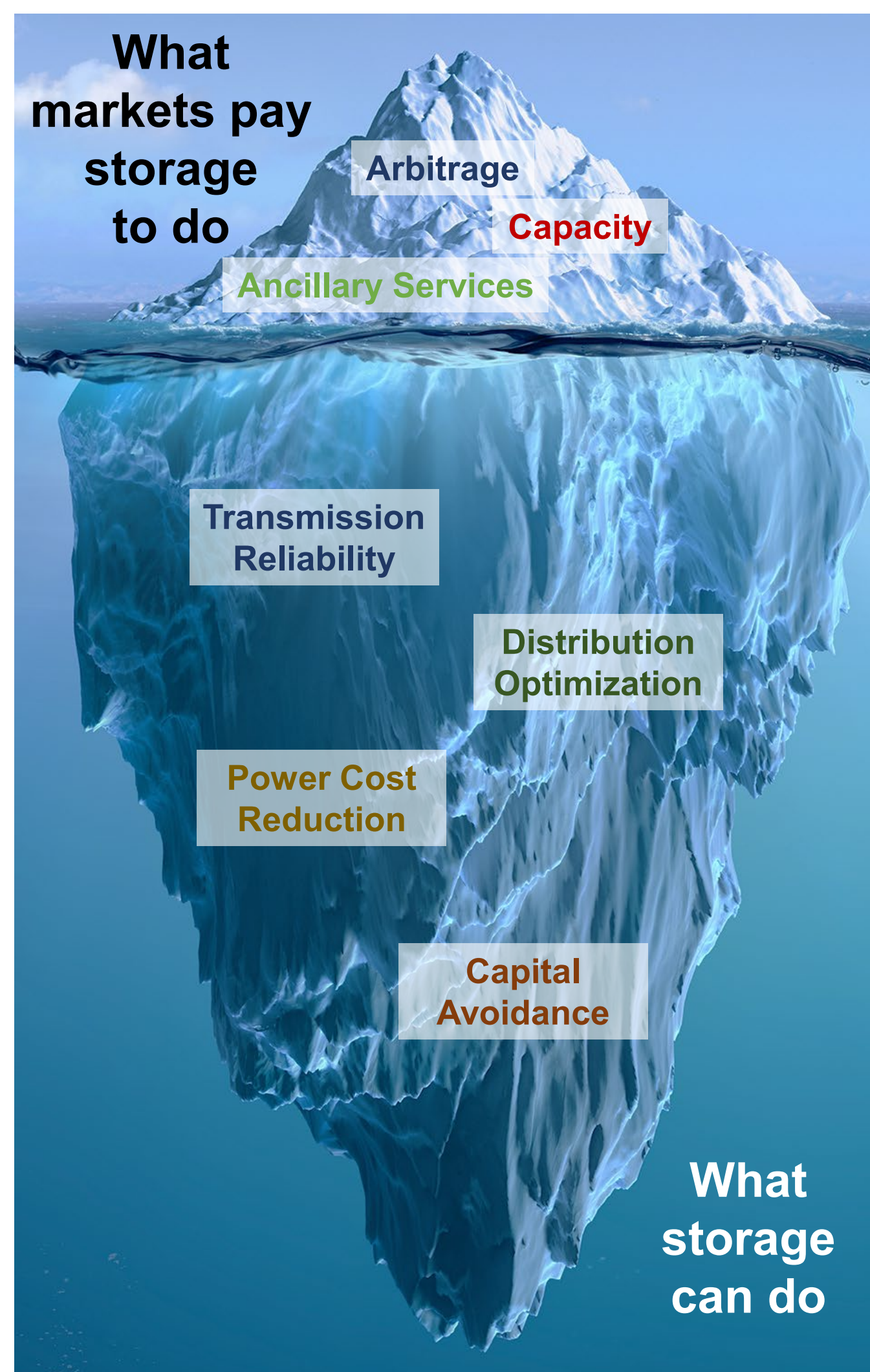


Fig. 1. Markets do not compensate many of storage's benefits

FINDINGS

Reforms to enable storage to participate in grid functions have had limited effect.

- Despite encouragement from the Federal Energy Regulatory Commission (FERC), storage is rarely considered in **transmission** planning
- Storage projects for **distribution** applications rarely exist outside of pilot programs
- FERC invited regional grid operators to develop mechanisms for storage to participate and be paid in **multiple functions**, but they have not done so
- Reforms targeted at the **generation** function have been more successful, but they require storage to rely on arbitrage and ancillary service revenues that have diminishing returns



Fig. 3. Storage does not fit well within other grid functions

APPROACH

The first phase of this work has four objectives:

- Understand how the three existing grid functions and their structures came to be
- Identify the limitations that those current structures place on storage technologies
- Describe how reclassifying storage as a grid function would remove those limitations
- Develop a road map for the reclassification of storage as a grid function

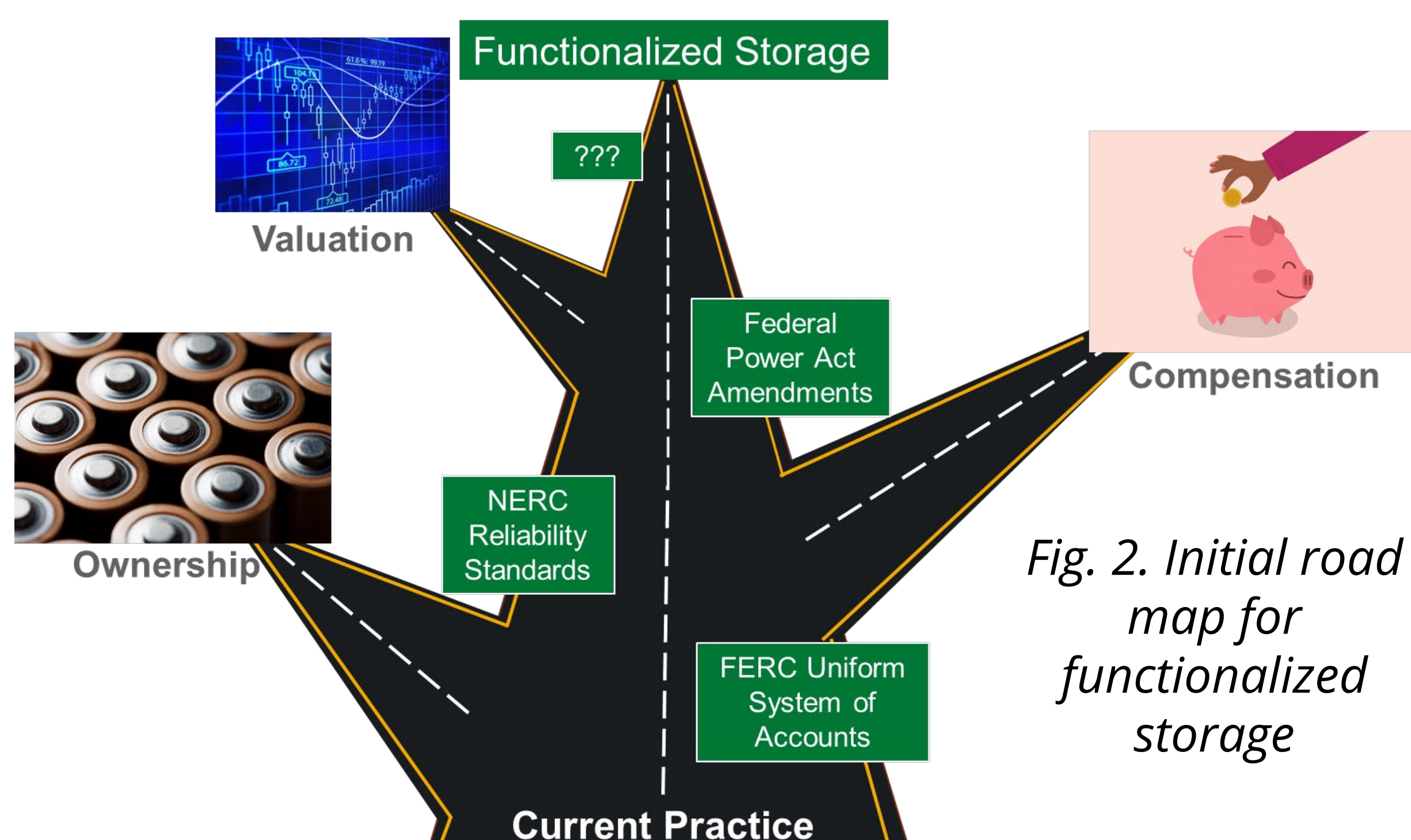


Fig. 2. Initial road map for functionalized storage

The largest benefits of energy storage are uncompensated in energy markets.

- Since the generation function has lower barriers to entry and clearer participation rules, almost all existing storage projects participate as generators
- Storage's largest economic benefits, related to deferring or eliminating the need for capital expenditures for new infrastructure, are not compensated in these markets
- **This means that the ability of storage to deliver its most significant benefits is dependent on its ability to prove cost-effective through generation revenues, and those revenues are diminishing**

CONCLUSIONS AND NEXT STEPS

Additional work in this project will study the ownership and compensation implications of functionalized storage and its potential grid benefits.

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