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Energy Storage: Where Are We Now?

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Selected Developments in U.S. Energy Storage

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Our panel on *Energy Storage: Where Are We Now* will discuss, among other things, emerging solutions to the legal challenges that energy storage projects have encountered, as well as issues that have yet to be resolved. This paper offers a survey of several significant legal, policy and market developments affecting energy storage in the United States and identifies resources that may be useful to the practitioner considering the legal and policy issues affecting energy storage.

The increasing penetration of intermittent solar and wind resources is one of several reasons that energy storage is becoming increasingly attractive, but perhaps one of the most important. Sub-second energy storage can be used to smooth energy coming from n intermittent renewable resource by storing energy for periods less than a second, while short-duration storage (30 minutes or less) can be used to smooth ramps--in the case of solar, for example, managing the increases and decreases in generation that occur as cloud formations pass overhead. Long duration energy storage systems can be used to shift generation from peak generating hours to peak load hours--for example, solar energy generated in the middle of the day can be shifted to the late afternoon or early evening when solar generation declines and load increases.

Energy storage systems use a wide range of technologies, including large scale, grid-connected facilities such as pumped storage hydroelectric and compressed air energy storage (CAES), mechanical devices like flywheels, thermal storage using ice makers or water heaters, turbine inlet cooling, and batteries of various chemistry and design (e.g., lithium ion, lead acid, flow). Some of these technologies have an established track record, while others are making the transition to commercial deployment. Each energy storage system has unique characteristics relating to, among other things, the length of time it can discharge the electricity it has stored, the number of charge and discharge cycles it is expected to achieve during its useful life, the speed at which the system can be charged or discharged, and the depth to which it can be discharged. Not surprisingly, a key

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component of an energy storage system is often software that uses sophisticated algorithms to determine the optimum time to charge or discharge.

Energy storage systems can offer a range of valuable services, including capacity, frequency regulation and other ancillary services, peak shifting, peak shaving, demand response, reliability improvements and the deferral of transmission and distribution upgrades. Storage can be interconnected with the grid, installed at the distribution level, or placed behind a customer's meter. The technology is neither fish nor fowl in that it constitutes both generation (when discharging) and load (when charging), and it possesses characteristics that enable it to serve as part of a transmission or distribution system. The unique features of energy storage, its diverse value stream, and the lack of standardization among technologies and integration systems pose interesting questions for lawyers and regulators alike.

1. Federal

a. Federal Energy Regulatory Commission.

i. FERC Order 755.

In this order, the Commission found that the frequency regulation compensation practices in the organized markets (the RTOs and ISOs) resulted in rates that were unjust, unreasonable and unduly discriminatory because they failed to recognize the greater amount of frequency regulation service provided by faster-ramping resources such as energy storage devices. The Commission's final rule required RTOs and ISOs to file compliance tariffs that would compensate frequency regulation resources based on the actual service those resources provide, including a "capacity payment: that includes the marginal unit's opportunity costs and a "performance payment" that reflects the quantity of frequency regulation service supplied by a resource when it accurately follows a dispatch signal. *See generally Frequency Regulation Compensation in the Organized Wholesale Power Markets*, 137 FERC ¶ 61,064 (2011).

ii. FERC Order 784.

This order emerged from the Commission's ongoing effort to foster transparency and competition in the ancillary services markets. The bulk of the order addresses changes to the Commission's *Avista* policy, which governs the sale of ancillary services at market-based rates to public utility transmission providers.

Among other things, Order 784 requires each public utility transmission provider to add to Schedule 3 of its Open Access Transmission Tariff (OATT) a statement that the transmission provider will take into account the speed and accuracy of regulation resources in determining reserve requirements for Regulation and Frequency Response service (including when it considers whether a self-supplying customer has made "alternative comparable arrangements" as required by Schedule 3). This order extends to the unorganized markets in the United States some of the concepts developed in Order 755. In