

Renewable-Plus-Storage Projects: Bridging Regulatory Gaps

By **Seth Lucia** (March 31, 2020, 5:30 PM EDT)

Renewable developers and utilities are increasingly pursuing "renewable-plus-storage" projects, either as integrated hybrid projects or by colocating storage to existing generation facilities. Interconnection queues in organized markets bear out this trend.[1]

Despite the market momentum for these hybrid projects, gaps in the regulatory and market landscape persist. To address these gaps, some of the organized markets have initiated efforts to revise their market rules.



Seth Lucia

For its part, the Federal Energy Regulatory Commission has shown that it is capable of taking on storage-related issues, as it did with the issuance of Order No. 841. And the increased push to site energy storage with renewable projects may prompt FERC to address hybrid projects sooner rather than later.

Market Drivers

Various market and commercial drivers have created momentum in recent years for increased deployment of hybrid projects. On price alone, significant decreases in the cost of both renewable and storage technology means that bids of large front-of-the-meter hybrid projects are being selected in various utility solicitations for power supply contracts.[2]

In addition to these falling costs, hybrid projects are often favored by offtakers that prioritize dispatchability and quick start capabilities available to hybrid resources. Separately, the Internal Revenue Service has provided guidance in recent years on the application of the federal investment tax credit to hybrid solar-plus-storage projects.

As a result, applying the federal ITC to the storage portion of a hybrid storage project has become standard practice for project finance practitioners, provided that the colocated solar generation provides 75% or more of the battery's charge for the first five years of operation. Various states also have programs with incentives to deploy smaller hybrid projects.[3]

Finally, hybrid projects can create certain economic efficiencies in their use of interconnection service by injecting onto the grid during times that the (variable) renewable resource would otherwise generate below the interconnection service limits.

Regulatory Gaps

Notwithstanding the push in the market toward hybrid deployments, there are gaps in the market rules and regulatory structure that can complicate market participation by hybrid projects.

FERC took a big step to advance energy storage participation in wholesale markets with the issuance of Order No. 841, which specifically directed regional transmission organizations, or RTOs, and independent system operators, or ISOs, to develop participation models for stand-alone storage resources to participate in organized markets. However, hybrid facilities have a distinct set of complexities that differ from stand-alone storage issues, and Order No. 841 did not address hybrid projects specifically.

In short, hybrid projects generally participate in wholesale markets, not through a participation model designed for them, but instead by operating under some combination of market rules that were designed for other resources, e.g., for stand-alone storage, generation or load.

While organized markets and other transmission providers understandably may wish to preserve a certain amount of flexibility to fashion the details of how hybrid projects participate in their markets, some overarching issues could benefit from industry-wide directives or guidance.

Interconnection and Material Modifications

Specific guidance for hybrid interconnection is currently absent from FERC's rules, and RTOs/ISOs and other transmission providers can take widely differing approaches to requests to add storage to existing interconnection requests.

The question of "material modifications" provides an example. The addition of storage facilities to a renewable project with an existing queue position may be considered a material modification to the pending project, triggering the project's loss of queue position and substantially resetting the interconnection process.

FERC directed interconnection reforms in Order No. 845 so that certain technological updates to project equipment in pending interconnection requests could escape being labeled as a material modification (and avoid loss of queue position). But these reforms do not directly address whether hybrid projects should be considered a technological advancement or a material modification.

FERC has stated that technological advancements that do not exceed the requested interconnection rights, or cause any reliability concerns, are generally not material modifications^[4] — a standard that

might be met when a storage facility is colocated with a renewable project, includes a limiting scheme to maintain output of the project within the limits of the original interconnection request, and does not create reliability concerns.

However, to the extent that colocating storage with a renewable project is understood to change the electrical characteristics of the existing interconnection request, FERC expects the transmission provider to scrutinize whether such a change constitutes a material modification to the existing interconnection request.[5] Under Order No. 845, the individual transmission providers are the entities that ultimately determine whether seeking to add storage to a pending renewable project is a permissible technological advancement of the original project, or instead a material modification that triggers a loss of queue position.[6]

Studies and Metering

The colocated storage and renewable portions of a hybrid project are often required to be separately studied and metered, even when there is only one point of interconnection to the grid. This means the different portions of the hybrid project often must complete separate interconnection or study processes, rather than undergoing an integrated process for the combined project. Any segmented interconnection process can add expense and time to the project.

In the case of battery storage, the different charging options may also trigger different rules. For example, in the California Independent System Operator Corporation, or CAISO, market, if a hybrid battery project that manages its state of charge chooses to retain the option of charging from the grid, then the project must go through a separate interconnection process as a load resource, in addition to other interconnection requirements to inject onto the grid as a generation resource.

Dispatchability

Market rules do not always clearly address the dispatchability of renewable projects when paired with storage. Various organized markets have developed dispatch rules to accommodate the participation of renewables as intermittent or variable energy resources.

The addition of storage to such renewable projects can complicate the dispatchability of the renewable resource. The Midcontinent Independent System Operator, or MISO, and CAISO have both noted that existing rules do not easily provide for the dispatch of a single hybrid resource, when the capability of that resource is driven in part by a forecasted value, and the charging behavior of a hybrid resource may cause increases in forecasting errors.[7]

Current RTO/ISO Efforts

Some RTOs/ISOs have begun addressing these and other gaps in their own market rules to more directly facilitate hybrid participation in their markets.

NYISO

In January, the New York Independent System Operator, or NYISO, announced its hybrid storage model effort to develop a specific model for bringing large front-of-the-meter hybrid projects in as participants in the NYISO's wholesale markets.

Among other things, NYISO is considering modeling hybrid projects to receive a single dispatch schedule, and for a single hybrid project to act as both a generation resource and load — a model that is not currently permitted by NYISO's market software.

CAISO

In the summer of 2019, CAISO initiated the development of market rules for hybrid resources. Among other things, the CAISO hybrid initiative is seeking to revise the definition of hybrid resources to align with other market rules, and to revise its rules related to configuration, metering, operations and market settlements for hybrid projects.

MISO

In December 2019, in response to recommendations of an energy storage task force, MISO initiated efforts to develop a hybrid resource participation model, with the goal of creating rules that more easily allow hybrid resources to participate in MISO's wholesale markets.

Potential FERC Action

FERC has not yet taken formal action to directly address the participation of hybrid projects in wholesale markets. But that could change.

In past orders, FERC has nibbled at the edges of reforms, but generally declined to directly address issues affecting a hybrid project's participation in wholesale markets. For example, FERC addressed the participation of standalone storage in organized wholesale markets in Order No. 841. Some of the reforms of Order No. 841 may inform the development and operation of hybrid projects, but FERC did not directly address issues particular to hybrid projects in Order No. 841, as noted above.

Elsewhere, in Order No. 845, FERC declined to act on proposals to include interconnection reforms for storage resources^[8] and declined suggestions to address hybrid interconnections as part of the compliance filings directed by Order No. 845.^[9]

FERC's awareness of these issues, along with the clear market shift toward these projects and the efforts of various organized markets to refine their rules to ease the participation of hybrid projects in wholesale markets, may prompt FERC to hold a technical conference or initiate other formal steps in the near future to directly address the participation of hybrid projects in wholesale markets.

Seth T. Lucia is of counsel at Morrison & Foerster LLP.

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[1] As one example, the California Independent System Operator Corporation detailed in 2019 that approximately 41% of the capacity seeking interconnection in CAISO was for hybrid resources. See CAISO, “Hybrid Resources Issue Paper,” at 3 (July 18, 2019), available at <http://www.caiso.com/InitiativeDocuments/IssuePaper-HybridResources.pdf>.

[2] For example, Xcel Energy detailed at the end of 2017 that its all-source solicitation received bids whose medians were \$21/MWh for wind-plus-storage and \$36/MWh for solar-plus-storage. In 2019, the Los Angeles Department of Water and Power approved an 840 MW solar-plus-storage project priced at \$33/MWh.

[3] For example, the Solar Massachusetts Renewable Target program provides a “storage adder” rate that is additional to the solar unit’s base compensation for colocated storage with eligible solar facilities up to 5 MW in size. See Solar Massachusetts Renewable Target Program regulations, 225 C.M.R. § 20.00 et seq. Facilities in the SMART program may participate in wholesale markets.

[4] See Reform of Generator Interconnection Procedures and Agreements, 163 FERC ¶ 61,043 at P 531 (2018) (“Order No. 845”).

[5] Order No. 845 at P 530.

[6] Order No. 845 at P 521; see also Reform of Generator Interconnection Procedures and Agreements, 166 FERC ¶ 61,137 at P 155 (2019) (“Order No. 845-A”) (“the final decision as to whether or not a proposed technological change is a material modification will remain with the transmission provider”). The transmission provider’s evaluation is based on the definition of a permissible technological advancement and technology change procedures in its tariff, which are also developed by the transmission provider. See Order No. 845 at PP 518, 530.

[7] CAISO, “Hybrid Resources Issue Paper,” (July 18, 2019) at 13; MISO, “Issue Tracking - Enhanced Hybrid Resource Participation Model,” available at <https://www.misoenergy.org/stakeholder-engagement/issue-tracking/hybrid-resource-participation-model/>.

[8] Order No. 845 at PP 8, 286 and 544.

[9] See, e.g., New York Independent System Operator Inc., 170 FERC ¶ 61,117 at PP 91, 95, 100 (2020).