

Alternative Transmission Solutions: An Analysis of the Emerging Business Opportunity for the Advanced Transmission Technologies and FERC-Driven Requirements on Transmission Planning and Selection

Written by Jon Wellinghoff and Kerinia Cusick, November 2017

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<http://gridpolicy.com/content/articles/alternative-transmission-solutions/>

Executive Summary

There is an increasing disconnect occurring in transmission planning that, if unchecked, will result in the overbuilding of the electricity grid and stranded transmission costs.

Encouraged by state policy, enabled by dramatically decreasing prices, and increasingly selected as the preferred choice by consumers, distributed generation is proliferating as energy storage and automated load control become more common. Numerous projects using these technologies have already demonstrated that aggregated, dispatched, distributed resources can provide electric distribution service, in many cases more cost effectively than traditional distribution infrastructure.

This paper contends that similar solutions can be used to provide lower cost alternatives for transmission services. Yet, transmission planning has continued to rely solely upon traditional transmission solutions primarily composed of new transmission lines and substations even though the Independent System Operators (ISOs)/Regional Transmission Operators (RTOs) recognize their mission requires them to be technology neutral and the Federal Energy Regulatory Commission (FERC) has taken repetitive action over decades to open transmission to competition and require ISO/RTOs to choose the most efficient and cost-effective solution.

In short, while distribution planning is rapidly recognizing distributed resource alternatives, transmission planning is caught in a past of traditional transmission solutions. Developers are hesitant to invest in designing new alternative transmission solutions that include technologies other than the traditional ones since ISO/RTOs processes apparently don't yet fully accommodate or compensate these solutions despite FERC regulations that require them to do so. ISO/RTOs are cautious about adapting their processes to include new technologies, in part due to regulatory concerns, lack of familiarity with new technologies, and not being offered alternative transmission solutions by developers.

This analysis is written to help transmission planning break out of this limbo state. This analysis has three purposes, each organized into a major section of this document.

Section 1: Outlines the increasing trend and capability of alternative transmission solutions, and explains the transmission planning and compensation process to stakeholders who may be interested in developing solutions that provide transmission services and include technologies such as storage, distributed generation and load

control. This section also highlights the implications of previous FERC decisions on potential designs.

Section 2: Analyzes the legal obligations placed on the ISO/RTOs through federal legislation and regulation to consider alternative transmission solutions on a comparable basis regardless of technology, and the authority that has been provided the ISO/RTOs to select such alternative solutions and compensate them as transmission.

Section 3: Informs management and staff at ISO/RTOs who are tasked with the FERC-mandated responsibility to fully and fairly consider all alternatives to transmission problems in their transmission planning process of issues that need to be considered and identifies high level solutions.

This analysis uses “alternative transmission solution” as a legal term of art that is used expressly in FERC Order 1000. It is intended to mean a solution comprised of technologies that fall within the definition of “advanced transmission technology,” as set forth in Section 1223 of the Energy Power Act of 2005 (EPAAct 2005), and provides transmission services, as defined by FERC Order 888. These advanced transmission technologies effectively become “alternative transmission solutions” under FERC’s jurisdiction and are eligible for cost recovery in FERC approved tariffs. The term “alternative transmission solution” is in contrast to an “alternative to transmission” that may be provided by a “non-transmission” or “non-wires” alternative technology such as energy efficiency or other technologies not expressly falling within the EPAAct 2005 Section 1223 definition of advanced transmission technology and not expressly providing transmission services. Such non-wires solutions are not FERC jurisdictional and thus not eligible for cost recovery under FERC tariffs. The legislative and regulatory terms are explored in depth in this analysis in Section 2.

A short summary of each section is provided below.

Section 1: The Technical Capability and Business Opportunity of Alternative Transmission Solutions

In some states, local distribution utilities have been directed by state commissions to analyze alternatives to distribution system upgrades, using non-traditional solutions, such as aggregated and dispatched distributed energy resources (DER). This is done in lieu of upgrading the local distribution system. Additionally, energy storage and aggregated DER have been used to successfully replace retiring local generation. In these cases, distributed assets often sign a contract with the distribution utility, and agree to operate their assets following instructions, typically in the form of a signal, provided by the distribution utility. While there are both jurisdictional (e.g., FERC versus state commission) and physical (e.g., mesh versus radial networks) differences, these examples have demonstrated that non-traditional solutions can successfully provide distribution services. When appropriately configured these same aggregated DER can also provide transmission services.

In ISO/RTO regions, these independent organizations oversee all aspects of transmission planning and operation and are subject to FERC regulations. Transmission

planning follows a FERC-mandated process, to identify the need for future transmission, run procurements, select solutions, and finally to compensate the transmission provider via FERC-approved tariff based on revenue collected from the region. The tariff is designed to capture all of the costs associated with the transmission project, both capital and operating, spread over the life of the system, plus a FERC-authorized return. This is done in order to create a predictable, and thus financeable, stream of payments, in exchange for operating the project as a transmission asset providing transmission services.

Any party able to meet the ISO's qualification requirements can become a transmission owner. While most ISOs do have stringent qualification requirements, Munis, Coops, Community Choice Aggregators, Competitive Retail Suppliers, and independent developers backed by sizable financial institutions, should be able to meet these requirements and have done so in many instances for traditional transmission projects.

FERC has provided some clear guidance in the form of Declaratory Orders on the types of alternative transmission solutions they will allow, and some less definitive guidance in the form of Policy Statements.

Section 2: ISO/RTO Obligations and Authority to Consider Alternative Transmission Solutions

FERC Order 1000 is often considered to be a significant turning point in opening transmission to competition. It requires ISO/RTOs to evaluate both incumbent utility and third-party-provided solutions on an equal footing, and choosing among those solutions based on efficiency and cost effectiveness, regardless of technology. In fact, Order 1000 built on multiple Orders that preceded it, specifically Orders 888 and 890, amendments to the Federal Power Act (FPA) enacted by Congress in the EAct 2005, and Declaratory Orders requested by specific parties.

This analysis looks at **all** of the direction laid out in these multiple documents, and connects the links between them. This draws the conclusion that the ISO/RTOs have already been granted the authority by FERC to select an alternative transmission solution, regardless of technology, and to include that solution in their transmission plan, compensating that solution exactly as it does a traditional transmission solution.

Additionally, this analysis shows that the ISO/RTOs have an obligation to treat alternative transmission solutions comparably with traditional transmission proposals, as long as those solutions use advanced transmission technology defined in Section 1223 of EAct 2005. This comparable treatment is regardless of the party proposing the solution.

Section 3: Information for ISO/RTO Management/Staff and Interested State Commissioners/Staff

Thoughtful regulation takes time and should be implemented carefully. At the same time, ISO/RTOs and state utility commissions generally have an obligation to consumers to ensure rates are just and reasonable, while also ensuring reliability of the electricity delivery system. FERC intended in Order 1000 to use competition in the

transmission planning and project selection process as a mechanism to keep consumers' rates just and reasonable.

While Section 2 outlines the obligation and authority provided to the ISO/RTOs to choose an alternative transmission solution, if it meets the performance requirements more cost-effectively than other solutions, Section 3 identifies the regulatory ambiguities and inconsistencies that need to be addressed. Section 3 also reviews the processes that need to be updated, either by ISO/RTO personnel or state commissions, and proposes high-level solutions. For example, the qualification and evaluation criteria currently used by the ISOs in the Order 1000 planning process are designed for traditional transmission solutions only. High level suggested updates to these processes are outlined in this section.

The section concludes by offering individualized recommendations for stakeholders interested in proposing alternative transmission solutions, ISO/RTOs that are engaging in updating their processes, state commissions willing to support a transition in transmission planning, and finally suggestions to FERC to clarify areas of regulatory ambiguity.

Alternative Transmission Solutions: A Roadmap to the CAISO Transmission Planning Process

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Download the full report here:

<http://gridpolicy.com/content/articles/roadmap-caiso-transmission-planning-process/>

Executive Summary

The objective of this work is to enable the use of technologies such as distributed generation (DG), energy storage and load control to be selected, compensated and used as transmission assets in California, when they are found to be more effective and efficient solutions to transmission system needs. The California Independent System Operator (CAISO) is responsible for planning for the transmission system over which it has operational control. This report therefore focuses on the CAISO's annual transmission planning process (TPP) as the principal venue through which alternative transmission solutions (ATS) can be considered and selected. The CAISO TPP is subject to regulation by the Federal Energy Regulatory Commission (FERC), and therefore, CAISO processes and tariffs need to comply with FERC Orders.

This analysis of the CAISO TPP builds on a previous report which performed a complete analysis of the relevant FERC regulations and Federal Power Act (FPA) provisions.¹ That report concluded that FERC regulations and precedents require ISOs/RTOs to evaluate all technologies that can provide transmission services, and authorize the ISOs/RTOs to include a solution in their plan if it is found to be cost effective and efficient, regardless of technology.

The objective of this report is twofold. The first is to understand CAISO's transmission planning process and limitations or constraints that lead the CAISO towards selecting traditional, "wires-based" solutions. The second is to identify adjustments required to enable new processes that augment CAISO's options, and allow the CAISO to select alternatives such as renewable distributed generation, energy storage and load control, all of which fall into the category of preferred resources in California. This analysis does not imply that existing processes used by the CPUC and the California IOUs to procure preferred resources are not working. Given the state's goals for clean energy, all parties responsible for generating, transmitting and distributing electricity need to utilize all options available to maximize the use of preferred resources. Therefore, expanding the CAISO's options to select preferred resources as transmission, for assets that interconnect to the transmission system, complements the CPUC's efforts to encourage IOU selection of preferred resources at distribution.

¹ Wellinghoff, J. & Cusick, K., *Alternative Transmission Solutions: An Analysis of the Emerging Business Opportunity for Advanced Transmission Technologies and FERC-Driven Requirements on Transmission Planning and Selection*. November, 2017. <https://www.center4ri.org/publications/>

The report uses a series of use cases, defined by the point of interconnection to the electricity grid and the asset function, either as a dedicated transmission asset or not, to identify how the asset could be contracted by the CAISO as transmission. At the same time, it is recognized that CAISO's jurisdiction, at a high level, is limited to energy markets, transmission and reliability. Procuring generation and regulating distribution falls under the CPUC's jurisdiction. Therefore, the distribution connected use-cases outlined here would require an agreement between CAISO and CPUC to pursue that option, as well as provisions for coordination with the relevant distribution utility regarding the operation of the asset as transmission. Therefore, this report focuses primarily on uses cases that are within CAISO's jurisdiction and only briefly touches on the regulatory changes that would need to be agreed to by CAISO and the CPUC to enable distribution connected use cases.

Compensating assets that can perform a generation function as transmission may seem counter intuitive. Indeed, the report doesn't argue that all generation can suddenly be treated as transmission. First, the Federal Power Act clearly outlines the technologies that can be considered advanced transmission technologies (ATT). It includes distributed generation, energy storage and load control. Centralized generation is not included in that definition. Second, FERC regulations clearly define both the transmission functions these technologies would need to perform as well as the process the ISO/RTO must follow to evaluate and select those assets as transmission assets providing transmission services. Therefore, preferred resources must be able to act as transmission, and fulfill a need identified by the ISO during their transmission planning process in order to be selected, and compensated, as a transmission asset.

CAISO has already found a combination of energy storage, distributed generation and load control to be the more cost effective solution in highly congested urban areas where it is cost prohibitive to build new transmission or site a natural gas plant.² The 2017/2018 Transmission Plan concludes that reliability needs in Oakland and Moorpark are best served by a combination of solar, storage, load-modifying demand response and energy efficiency, and upgrades to existing transmission in lieu of new transmission. CAISO drew this conclusion even though their processes limit how they evaluate cost of Alternative Transmission Solutions and compare to "wires-based" solutions.

Given the need for alignment between the CPUC and CAISO to enable distribution-connected assets to be treated as transmission, the team focused primarily on use cases that fall clearly within the CAISO's operational control, and in particular those that would be subject to the CAISO's competitive procurement practices. For those use cases, the following challenges need to be resolved to ensure that alternative transmission solutions are evaluated on an equal footing:

- Lack of consistent and accurate cost and performance data for alternative transmission solutions, particularly for fast changing technologies such as energy storage or solar.

² <http://www.caiso.com/Documents/Presentations-2017-2018TransmissionPlanningProcessMeeting-Feb8-2018.pdf> at slide 33.

- Need to develop provisions for operating and compensating assets used in “multi-use” applications that include both transmission services and market participation.
- The CAISO’s inability to determine “net cost” (i.e. cost to ratepayer) vs “capital cost” (i.e. total system cost) for assets that are used to provide both transmission and market services, as well the allocation of risk associated with estimates of the asset’s future market revenues.
- Equitable metrics for comparing alternative and traditional transmission solutions with very different project life, depreciation, operational costs, etc.
- Lack of uniform bidding requirements that don’t bias evaluation criteria and past performance towards one type of technology over another.
- Inadequate data provided to develop alternative transmission solutions, versus typical data provide in reliability, economic or policy-driven studies.
- Lack of a contract structure that allows co-mingling of cost-based and market-based revenue streams while ensuring ratepayers aren’t subject to “double booking” of revenue.
- The need to develop new methods to dispatch assets receiving both cost and market-based revenues in a manner that guarantees markets won’t be skewed by ratepayer-subsidized assets.
- The need to develop new methods to dispatch multi-use transmission assets that maintain CAISO neutrality.

Enabled by the FERC policy paper allowing transmission assets to receive both cost-based and market-based revenue,³ and concurrent with this work effort, CAISO initiated a stakeholder process to enable energy storage to be used as a transmission asset. While the stakeholder process is designed to only address energy storage as a transmission asset, and does not include DG nor load control, it is an important first step towards ensuring that alternative transmission solutions are treated equitably in California.

³ <https://www.ferc.gov/whats-new/comm-meet/2017/011917/E-2.pdf>