Electricity Advisory Committee

MEMORANDUM

TO: **Honorable Patricia Hoffman, Assistant Secretary for Electricity Delivery and Energy Reliability, U.S. Department of Energy**

FROM: **Electricity Advisory Committee**
Richard Cowart, Chair

DATE: **October 17, 2012**

RE: **Recommendations on Non-Wires Solutions**

Introduction & Overview

"Non-Wires Solutions" (NWS), sometimes referred to as Non-Wires Alternatives (NWA), is the umbrella term for ensuring that a portfolio of alternatives to transmission lines is analyzed and considered in the planning and possible permitting of such facilities. This NWS approach would apply to the proposed upgrade or construction of a distribution or transmission line. In essence, NWS is designed to identify the optimal approach to distribution and transmission enhancement, just as integrated resource planning practices are applied to analyzing the need for power generation projects. Thus, it is relevant for DOE to assist in stakeholder understanding and use of NWS, just as DOE has a role in assisting in transmission development, to ensure that all factors are appropriately considered.[1]

For this paper, NWS is defined as any action or strategy that could help defer or eliminate the need to construct or upgrade a transmission system and distribution sub-stations. The reasons for such NWS actions could include lowering costs, satisfying reliability goals, or meeting public policy objectives. The NWS options include, but are not limited to: demand response, dynamic retail pricing, distributed generation, energy efficiency, application of technologies to expand the capacity of the system, and alternative power dispatch options. Technology additions and

[1] Because the focus of the Electricity Advisory Committee (EAC) in this paper is on transmission, this discussion will not actively present recommendations regarding distribution projects. However, we will cite relevant distribution system examples where applicable to transmission situations.

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alternative dispatch strategies may include Volt/Var Control (including conservation voltage reduction), Capacitor Bank Monitoring, use of SCADA Systems, Energy Storage, and Advanced Power Electronics Devices. Dynamic retail pricing and demand response may include automated responses to the broadcast of current and indicative forward prices or control signals, end use devices that are programed to respond to local grid conditions, and the participation of service providers or devices in wholesale or retail energy markets.

The opportunities to consider the deferral or replacement of a proposed transmission upgrade or new construction project with NWS have not been common to date. The significant number of potential strategies, lack of granular data, and lack of tools to properly evaluate the impact of deferring transmission upgrades have presented substantial barriers to the implementation of NWS to date. Another challenge is traditional utility structures where Transmission staff and expertise for NWS may not be interacting. This integrated planning process is one that needs to be tested. Further, in order to manage a fully reliable transmission system, the adoption of NWS tools must be done in a manner that delivers equal confidence and reliability to the electricity system.

As described below, there are instances where pursuit of a NWS approach can deliver attractive savings, avoid significant environmental impacts, be available sooner, and mitigate the risk of stranded transmission investments due to less than full use of the line. On the other hand, there will be instances where NWS approaches, while feasible, would not yield comparable reliability, flexibility and power supply options to proposed transmission solutions. Thus, the EAC believes that every process that analyzes a proposed major transmission project should have a comprehensive analysis of NWS. For NWS to be viable, and comparable to wires approaches, the analysis and consideration of NWS must occur at the earliest stage of any proposed transmission project. This is because NWS may require a combination of many tools, some of which require extensive planning and implementation time (e.g., development of demand-side strategies).

Based on a review of state and regional practices nationwide, it is clear that the best planning process for NWS involves an initial high-level screening to determine which proposed transmission upgrades and construction options should be passed on for more detailed analysis. At this stage, factors such as the magnitude of NWS resources needed; alternative scenarios on key factors such as load growth and fuel prices; the availability of fuel sources for distributed generation; and the time frame when additional transmission is needed should be part of the NWS review, and such analysis may preclude further consideration of NWS. In this latter case driven by a timing need, early NWS analysis should generally preclude this issue, but for a sudden need, perhaps caused by natural disaster, then certain NWS just may not be viable. Other NWS, such as dynamic retail pricing, may provide an immediate response to such a sudden event, enhancing the resilience of the power system and facilitating the consideration of additional options.

For those proposed projects where a high level screening indicates that NWS may be viable, the relevant organization(s) should undertake a more detailed analysis to fully understand the specific options and costs. This analysis may require a multi-month process and require investment in experts familiar with NWS options. Because of the significant potential savings for projects where NWS is implemented, the relative cost to conduct the NWS detailed analysis should not be a burden. For a more detailed discussion of how this multi-step screening process can work, please visit the Bonneville Power Administration's discussion of NWS at http://transmission.bpa.gov/PlanProj/Non-Wires_Round_Table/. As explained below, the EAC believes that DOE can play an important catalytic role with key organizations in showing them how to bring NWS to the forefront for comparable consideration when transmission options are also on the table.

NWS is much more inclusive than just demand-side management (DSM) options. The tools available to consider whether to defer or delay a proposed transmission project are varied, and any NWS planning process should review the full suite of options available relative to the identified transmission need. By employing a comprehensive NWS approach, customers and other stakeholders may achieve a number of benefits, including:

- Avoid unnecessary construction,
- Best prioritize the use of capital for construction,
- Minimize the risk of stranded investment,
- Enhance capacity of existing systems through detailed analysis,
- Avoid unnecessary transmission cost increases, and
- Minimize environmental impacts of transmission enhancements.

DOE has already taken a number of initiatives to encourage the implementation of NWS. One such initiative was a paper on non-transmission alternatives that was prepared and released by the National Council on Electricity Policy in September 2009. The paper was titled "*Updating the Electric Grid: An Introduction to Non-Transmission Alternatives for Policymakers.*" Funded through a grant of the Office of Electricity Delivery and Energy Reliability, the paper was intended to inform non-technical government officials about the different types of NWS, their benefits and drawbacks, and the policy issues related to NWS.

The paper discussed five types of NWS - End-use efficiency, End-user demand response, Generation alternatives, Transmission system capability (including efficiency improvements within existing corridors), and Developing storage technologies. Through discussions on the cost of the NWS, tradeoffs, and examples of implementation, the authors attempted to bring forth some of the opportunities and remaining challenges for these NWS. Current state and federal policies that incentivize the development and deployment of each of the five NWS was also discussed in some detail. An overview of the processes and institutions in place for addressing the NWS in the New England states of Connecticut, Maine and Vermont and the Pacific Northwest was also provided. The paper concluded with a number of illustrations on the possible policy directions that can be taken for implementing NWS. These illustrations were largely based on a review of recently published reports that addressed the five NWS.

The remainder of this paper will discuss current U.S. DOE activities in the area of NWS, summarize current NWS activities around the U.S., discuss cost-recovery issues associated with NWS, and provide recommendations to U.S. DOE for further actions it should undertake in the NWS area.

Consideration of Non Transmission Alternatives (NTAs) or Non Wires Solutions (NWS) in Transmission Planning - Order Nos. 890 and 1000.

Both Order No. 890 (released by the Federal Energy Regulatory Commission (FERC) in 2007) and Order No. 1000 (released by FERC in 2011) have placed considerable emphasis on comparable treatment of NTAs or NWS (used interchangeably) in meeting the functions of the transmission planning process. The following is an excerpt from Order No. 890 where FERC agrees with the concept of treating NWS in transmission planning on a comparable basis to transmission solutions:

> "*Finally, several commenters assert that demand response resources should be considered in transmission planning. Some commenters note that certain regions currently are in the process of incorporating demand response into their transmission planning processes. Demand resources currently provide ancillary services in some regions, and this capability is in under development in some others. We therefore find that, where demand resources are capable of providing the functions assessed in a transmission planning process, and can be relied upon on a long-term basis, they should be permitted to participate in that process on a comparable basis. This is consistent with EPAct 2005 section 1223*".[2]

Order No. 1000 has a comprehensive discussion on the treatment of NWS in transmission planning. While the Order does not prescribe which NWS should be considered or what metrics should be used to compare the NWS against transmission solutions, it does require public transmission service providers to identify in their tariffs the methodology they intend to use for evaluation and selection of competing solutions and resources such that all the solutions are considered on a comparable basis. The following excerpt from Order No. 1000 reflects FERC's intention for comparable treatment of NWS:

[2] "*Preventing Undue Discrimination and Preference in Transmission Service,*" Federal Energy Regulatory Commission,72 Fed. Reg. 12266 (March 15, 2007) at Paragraph No. 479 (footnotes omitted),

> *"While we require the comparable consideration of transmission and non-transmission alternatives in the regional transmission planning process, we will not establish minimum requirements governing which non-transmission alternatives should be considered or the appropriate metrics to measure non-transmission alternatives against transmission alternatives. Those considerations are best managed among the stakeholders and the public utility transmission providers participating in the regional transmission planning process. However, we note that in Order Nos. 890 and 890-A, as well as in orders addressing related compliance filings, we have provided guidance regarding the requirements of the Order No. 890 comparability transmission planning. Specifically, public utility transmission providers are required to identify how they will evaluate and select from competing solutions and resources such that all types of resources are considered on a comparable basis."*[3]

Order No. 1000 also mentions that in compliance with Order No. 890, each public utility transmission provider has already put in place mechanisms to comparably evaluate all of the proposed solutions. It cites examples of Entergy, Florida Power and Light, ISO New England and Puget Sound Energy as the entities whose tariffs allow comparable treatment of NWS Solutions.

Through Order Nos. 890 and 1000, FERC requires comparable treatment of NWS solutions but does not prescribe any specific approach for such treatment. Rather they allow each region to develop and document its own mechanisms for comparable treatment of NWS solutions through a stakeholder process. In the next section, we discuss the treatment of NWS in major planning regions and organizations, as mentioned in their open access transmission tariffs and business process manuals.

Examples of Consideration of NWS in Regional Transmission Planning Processes

The table below presents a summary of how NWS are considered in the transmission planning processes of Eastern Interconnection Planning Collaborative (EIPC); Electric Reliability Council of Texas (ERCOT); ISO-New England (ISO-NE); PJM; Midwest ISO (MISO); Western Electricity Coordinating Council (WECC); and California ISO (CAISO). For the EIPC, WECC and ERCOT, the discussion focuses on the transmission planning process these entities have developed in response to the DOE grants they received for interconnection-wide transmission planning. For ISO-NE, PJM, MISO, and CAISO the summary is based on their current Order No. 890-compliant transmission planning processes as documented in their Business Process Manuals and Open Access Transmission Tariffs. There may well be additional changes based on the FERC Order No. 1000 filings due this October.

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[3] "*Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities,*" Federal Energy Regulatory Commission, 76 Fed. Reg. 49842 (August 11, 2011) at Paragraph No. 155 (footnotes omitted).

Table 1: Summary of Treatment of NWS in Regional Transmission Planning Processes

Planning Entity	How NWS are Considered in Transmission Planning
EIPC	- The objective of EIPC was to provide a high level estimate of the cost and location of generation and transmission resources that may need to be built under several distinct futures. - The project has two phases. Phase I is complete and Phase II is currently in progress. Phase I evaluated eight possible futures primarily differentiated by potential public policies, and selected three for detailed analysis in Phase II. - In Phase I, Demand Response (DR) and Energy Efficiency (EE) assumptions were modeled as hard values in the base cases. Only the power transfer capability between different regions and generation in each region was allowed to change while determining the least cost resource mix, and the transmission that would be needed to support this generation expansion, in each of the 8 scenarios. - One of the eight Phase I scenarios and one Phase II scenario has aggressive EE and DR assumptions. These should have the impact of reducing or deferring transmission expansion. However, there is no indication that NWS will be evaluated as alternatives to transmission expansion if the need for such an expansion is identified.
ERCOT	- ERCOT is using the DOE grant to augment and enhance its existing long term planning processes. - In the initial phases of the long-term study, as documented in the August, 2011 Project Status Report[4], ERCOT is actively trying to incorporate EE, DR and storage technologies in its analyses. However, similar to EIPC, these resources will be included as base case assumptions, and transmission expansion projects will be identified to cover for any remaining needs. ERCOT intends to expand on this methodology in later stages of the long-term study. Demand-side resources and possibly storage devices will be included prior to transmission needs analysis in later scenarios; the resulting changes in transmission needs will allow an assessment of the cost-effectiveness of these solutions.

[4] "*Long-Term Transmission Analysis 2010 – 2030, Interim Report, Volume 1: Project Status Update*", Long-Term Study Task Force Electric Reliability Council of Texas, Inc., August, 2011

ISO-NE	- The current ISO-NE Tariff does not require ISO-NE to consider NTAs in the Regional System Planning Process unless they satisfy the following criteria: ✓ NWS that have cleared in a Forward Capacity Auction pursuant to Market Rule 1 of the tariff. ✓ NWS that have been selected in, and are contractually bound by, a state-sponsored Request For Proposals. ✓ NWS that have a financially binding obligation pursuant to a contract. - ISO-NE is working with its stakeholders on developing a methodology for a thorough evaluation of NTAs as solutions for transmission expansion needs. As part of this effort, ISO-NE conducted a pilot study from November 2010 to May 2011. This study assessed the capability of NWS (such as generation or demand response) to address the reliability concerns identified in the Vermont/New Hampshire needs assessment.
PJM	- PJM's annual Regional Transmission Expansion Plan (RTEP) has a 15 year planning horizon and identifies upgrades that would be needed to maintain the reliable and economic operation of the PJM system over the next 15 years. - PJM includes the DR cleared in its Reliability Pricing Model (RPM) Auction in the baseline power flow cases that are used for the development of RTEP. Inclusion of DR has the potential to mitigate or delay the need for RTEP upgrades. - For any overload that results in transmission or ROW acquisition in years 6 through 16, PJM provides the level of new generation or DSM that would eliminate the need for the transmission or ROW acquisition. - For each efficiency upgrade identified in the RTEP, PJM determines the amount of generation or DSM that would eliminate the need for the transmission upgrade. Market participants can also propose alternative generation, transmission or DR projects that may address the market efficiency needs.
MISO	- As per the 2011 ISO/RTO Metrics report[5] and the 2011 MTEP report[6], impact of DR and EE in the transmission planning process is reflected in the cumulative demand and energy growth rates. - As per the 2011 ISO/RTO Metrics report, MISO may consider DR as a solution to an identified transmission need. - MISO is also currently evaluating how the impact of energy storage technologies can be incorporated in its planning models.
WECC	- WECC is using ARRA grant money to enhance its long-term transmission planning processes, focusing on greater analysis of electric demand, generation resources, energy policies, technology costs, impacts on transmission reliability, and emissions[7].

[5] "*2011 ISO/RTO Metrics Report*", ISO/RTO Council.

[6] "*MISO Transmission Expansion Plan 2011*", Midwest ISO.

[7] WECC, online, 2012.
http://www.wecc.biz/PLANNING/TRANMISSIONEXPANSION/RTEP/Pages/default.aspx

	- WECC is working with the Western Governors Association (WGA) whose State-Provincial Steering Committee (SPSC) has established the DSM Work Group to ensure that WECC's transmission planning studies accurately reflect existing and potential DSM programs, policies, and actions (i.e., energy efficiency, demand response, distributed generation).[8] - For WECC's 2011 10-Year Regional Transmission Plan, the DSM Work Group developed the "SPSC Reference Case" that provided state-adjusted load forecasts fully accounting for expected energy efficiency from existing programs and policies. The SPSC Reference Case amounted to a 4% reduction in annual energy and 5% reduction in non-coincident peak demand across WECC. These reductions were not the totality of planned EE savings but only the portion that was not already embedded in WECC forecasts. - The work group also developed a High DSM scenario that reflected acquisition of all cost-effective energy efficiency and aggressive demand response.[9] This resulted in a decrease of 8.6% in the coincident WECC peak demand and a 10% decrease in total energy relative to the Expected Future. - WECC is now developing the 2013 plan and will use an update to the SPSC Reference Case (reflecting full amounts of planned EE) for the 10 and 20 year study plans.
CAISO	- CAISO has an annual planning process with a 10 year planning horizon. The planning cycle is divided into three phases. Phase I of the planning process focuses on developing input assumptions for the base cases and putting a study plan in place. During this phase CAISO invites Demand Response programs, generation and other non-transmission alternatives projects for inclusion in the planning assumptions. - During Phase 2 of the transmission planning process, demand response or generation projects can be submitted for consideration as alternatives to transmission additions or upgrades. - The ISO applies the same criteria for determining whether to adopt a transmission solution or a non-transmission solution to meet an identified need. Costs of generation projects that are submitted as proposed alternative solutions to identified reliability needs are not recovered through the ISO's Transmission Access Charge.

[8] State/Provincial Steering Committee – Demand Side Management, online, 2012. http://www.westgov.org/sptsc/site/workgroups/dsmwg.htm Cal

[8] WECC, online, 2012. http://www.wecc.biz/PLANNING/TRANMISSIONEXPANSION/RTEP/Pages/default.aspx

[8] State/Provincial Steering Committee – Demand Side Management, online, 2012. http://www.westgov.org/sptsc/site/workgroups/dsmwg.htm Cal

[8] *Id*.

[9] *Id*.

Of considerable interest is the recommendation by PJM staff to eliminate from the PJM transmission plan two lines no longer needed for reliability due to slower economic growth and larger than anticipated demand side (EE and DR) resources since 2007.

The Bonneville Power Administration (BPA) has also been active with NWS. Initiating a Stakeholder Roundtable in 2002, BPA brought together regional and national experts on Transmission Planning to help guide this work. The first major product of this group was to identify and endorse alterations to BPA's Transmission Planning Process to more effectively screen for NWS. This resulted in a two-step NWS screening. First, annually BPA reviews all planned Transmission Projects against critical criteria to determine if NWS is a possibility. If that initial screening determines NWS may be a viable option, then a more comprehensive analysis and review is completed led by the Energy Efficiency Department of BPA, working closely with their Transmission brethren. More information on the BPA Roundtable and NWS area can be found at http://transmission.bpa.gov/PlanProj/Non-Wires_Round_Table/.

To date BPA has screened several projects for NWS options, with one project being pursued on the Southern Oregon Line in 2006. Installation of key equipment to enhance the capacity and flexibility of operations deferred a planned construction alternative. Several projects today are currently being analyzed or planned for a NWS option including the I-5 Corridor Upgrade, Jackson, Wyoming Line, and the need for enhance capacity of transmission on the Northern Olympic Peninsula.

The above table shows that, largely in response to FERC directives, there is significant consideration of NWS in transmission planning. However, there are areas of the U.S. still not incorporating NWS in the earliest stages of their transmission planning. At the same time, there is no single entity that is tracking the use of NWS in regional transmission planning. We encourage DOE to consider tracking such efforts and providing periodic updates on best practices and lessons learned.

We also note that some transmission additions are planned on a multi-value basis. However, in other instances, upgrades are based on projected reliability requirements given fixed assumptions regarding future demand and generation and not on an integrated economic framework that evaluates the economic benefits of the upgrade and reflects likely market responses to locational price differentials. We encourage the Department to evaluate best practices and support the development of integrated approaches that consider the economic value of wires and non-wires alternatives.

The experience in the DOE-funded planning effort supporting WECC's 2011 10-Year Regional Transmission Plan is particularly indicative. That work revealed that the inclusion of energy efficiency (and true also for demand response and distributed generation) is inconsistently applied in WECC's regional transmission planning.

Use of NWS is hampered because one must first understand what level of NWS is "embedded" within baseline forecasts in order to determine what additional amounts are available. The WECC effort has shown that the process of determining both the embedded amounts and the future potential is time-consuming and complex, but that the results of such an analysis can be significant.

Other regions have made significant progress in this regard. ISO New England has recently implemented an energy efficiency forecast, similar to that already utilized by NY ISO. The energy efficiency forecast is used to offset the base load forecast used for transmission planning. It is important to note that the base load forecast utilized by ISO New England already systematically includes the load impact of federal energy efficiency standards. Also, the demand resources - active demand response and passive energy efficiency- that have cleared the Forward Capacity Auction are included in the forward projection of regional resources needed to meet the load forecast. In this manner, the ISO is able to include NWS in meeting both market and transmission needs. There is one additional improvement that ISO New England has identified. Once the resource and load forecast has been adjusted as described above, the transmission planning process may identify a transmission reliability need. The ISO has recognized the potential need to make modifications to the wholesale market design to more specifically signal transmission security needs to NWS, so that they can be procured in a competitive manner. This is a complex topic that is described in a paper entitled "Aligning Markets and Planning" on the ISO New England website; http://www.iso-ne.com/committees/comm_wkgrps/strategic_planning_discussion/materials/mra_discussion_paper_06132012_vtransmit.pdf.

Examples of Consideration of NWS in Transmission Permitting by States before Issuing Certificates of Public Convenience and Necessity (CPCN)

The above sections focused on consideration of NWS in transmission planning. This section discussion considers NWS in transmission permitting and specifically by states in reviewing requests for CPCNs. No entity is currently responsible for tracking how NWS is considered in transmission permitting. Therefore, we have identified three examples of how NWS has been used in state transmission permitting:

- The Proposed Trans Allegheny Transmission Line (TRAIL), involving Penn, West VA, and VA.
- The New England East-West Solutions (NEEWS) project, involving CT, RI and MA siting councils.
- California's requirement for consideration of NWS specifically in CPCNs.

A. Trans Allegheny Transmission Line (TRAIL)

TRAIL is a 500 KV transmission line that extends from South-western Pennsylvania to West Virginia to Northern Virginia. The project is now complete (energized on May 19, 2011) and cost about $960 million[10]. TRAIL developers obtained a CPCN from the three states – Pennsylvania, West Virginia and Virginia. How the states went about considering NWS while granting CPCN to TRAIL is discussed next, separately for each state.

(i) West Virginia

While approving the CPCN for TRAIL, the West Virginia Public Service Commission (PSC) considered the feasibility of DSM and generator resources in mitigating the need for TRAIL. The PSC found that PJM had tried to incorporate the NWS to the extent practical. The commission also found PJM's methodology for including generators in the RTEP process and its DSM assumptions reasonable. The PSC did not find convincing the arguments regarding the ability of DSM to mitigate the need of TRAIL. The primary reason for this appears to be a lack of analytical proof that given higher levels of DSM, all the reliability violations that TRAIL intends to address will be resolved. The PSC further added that even if DSM were capable of resolving all the reliability violations, the need for TRAIL was driven by load centers outside of West Virginia, such as Northern Virginia and Maryland, and neither Allegheny Power nor the PSC had the authority to direct DSM development outside of West Virginia. The PSC also noted that PJM is similarly limited in its ability to direct DSM or generation development; it can however direct transmission development. For all the above reasons, the PSC did not find NWS to be capable and practical for addressing the reliability issues that TRAIL would address, and granted a CPCN for the West Virginia segments of TRAIL.[11].

(ii) Pennsylvania

The Pennsylvania Public Utilities Commission (the PUC) granted the Certificate of Public Convenience (CPC) to some of the proposed segments of TRAIL that were to be built in Pennsylvania. While granting the CPC, the commission considered whether DSM and energy efficiency alternatives would obviate the need for TRAIL. In fact, the PUC was appreciative of the efforts of the entities that proposed alternatives to TRAIL. Cost and the uncertainty associated with the proposed alternatives appear to be the primary reasons for the PUC's preference of TRAIL over the alternatives.

B. New England East West Solutions (NEEWS) Projects – CT, RI, and MA

A non-transmission alternatives (NTA) analysis was conducted for three components of the New England East-West Solutions (NEEWS) transmission project – a series of 345 kV and 230 kV lines. They are:

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[10] TRAIL Project website - http://www.aptrailinfo.com/index.php?page=overview

[11] "*CASE NO. 07-0508-E-CN – Commission Order*", PUBLIC SERVICE COMMISSION OF WEST VIRGINIA CHARLESTON, August 1st, 2008.

1. The Rhode Island Reliability Project (RIRP), located primarily in Rhode Island,
2. The Greater Springfield Reliability Project (GSRP) located primarily in Connecticut and Western Massachusetts, and
3. The Interstate Reliability Project (Interstate), which will run through all three states.

This NTA considered three non-transmission resources, combined heat and power (CHP), demand-side management (DSM), and central station generation. DSM included both passive resources such as energy efficiency, and active resources such as demand response. The NTA analysis included a number of steps:

- Assessing the reliability benefits of the proposed transmission. This entails preparing a reference case of the power system with and without the proposed transmission project and conducting power flow and contingency analyses to verify that the proposed project will resolve the reliability violations when the project is in service. This typically replicates the needs assessment that the utility or market operator performs for the project.

- Developing a forecast of economic or technical potential for non-transmission resources. This involves evaluating additional non-transmission resources above those in the reference case, which could be available during the study period. This usually involves relaxing assumptions regarding resources considered firm, or incentives to encourage resources that would otherwise not be developed. For example, this step could assume that the state(s) will implement more aggressive DSM programs such that additional DSM resources would enter the market.

- Incorporating the projections of incremental non-transmission resources into the reference case without the proposed project and conducting power flow and contingency analyses to determine if the non-transmission resources can resolve the reliability violations similar to the transmission project.

- If an NTA solution is found, performing a cost-benefit analysis to determine which option – the proposed project or the NTA solution – is more cost effective.

- If an NTA solution is not found, determine the incremental resources required to produce an NTA solution, e.g., pricing, controls, redispatch of power, distributed generation or other forms of curtailment. Assess the costs and benefit of this solution relative to the proposed project.

C. California

California Public Utilities Code section 1002.3 requires that the California PUC (CPUC) consider non-wires alternatives before issuing a Certificate of Public of

Convenience and Necessity (CPCN) for proposed transmission lines. Section 1002.3 requires the Commission to:

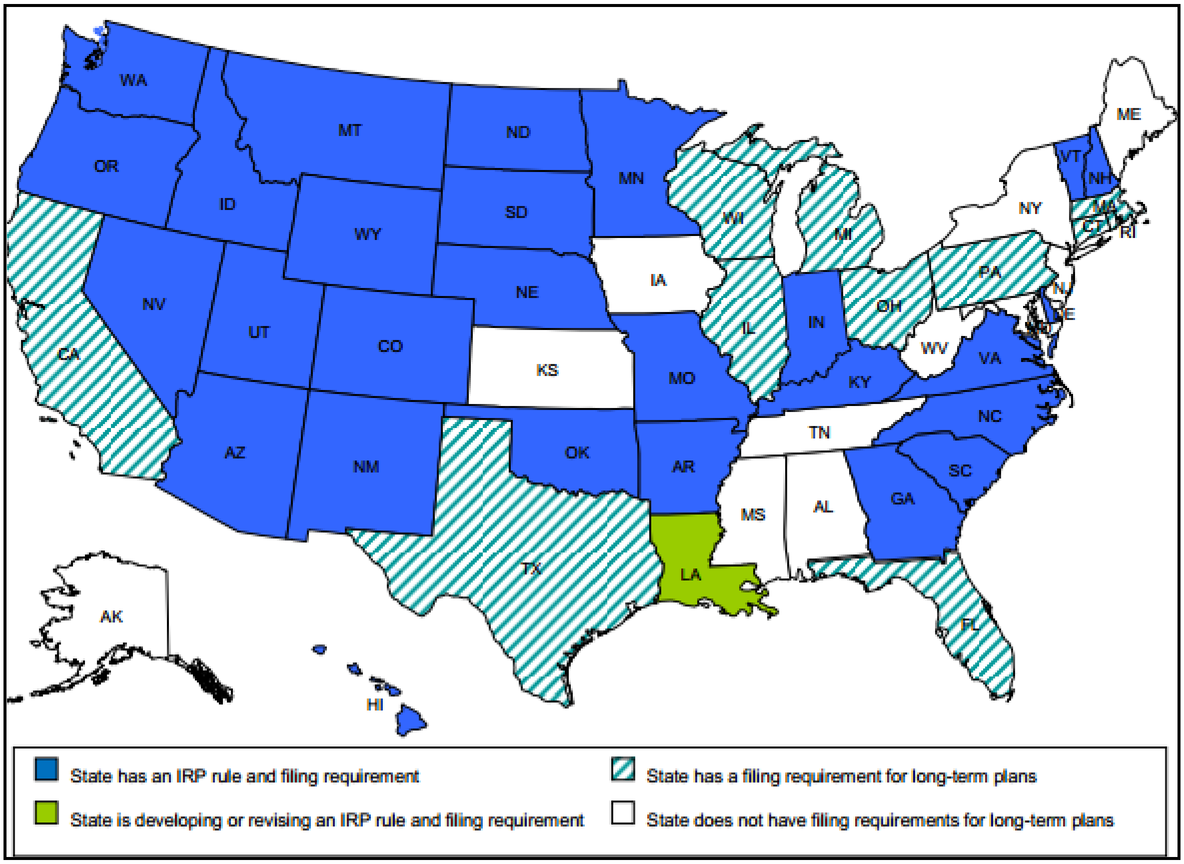
- Consider cost-effective alternatives to transmission facilities that meet the need for an efficient, reliable, and affordable supply of electricity, including, but not limited to, demand-side alternatives such as targeted energy efficiency, ultraclean distributed generation [cite omitted] and other demand reduction resources.

In practice, the CPUC takes into account EE, DR, and DG in the "baseline" forecast that it then uses to determine project need. The CPUC, as an example, used this approach in its 2008 CPUC decision granting San Diego Gas and Electric Company (SDG&E) a CPCN for the Sunrise Powerlink Transmission Project. The CPUC must also consider need and alternatives, including non-wire alternatives, under the California Environmental Quality Act (CEQA).

Status of Integrated Resource Planning (IRP) in different States and Consideration of NWS in IRPs

Prior to the restructuring of the electricity sector, utilities in most of the states were required to prepare integrated resource plans with the primary objective of meeting forecast demand with low cost and diverse energy sources. As restructuring gained momentum in the late 90s, IRP took a backseat in the states that adopted restructuring. Lately, many of the restructured states have again started showing interest in IRP or similar long-term procurement processes and many of them have put in place long term resource procurement plans. Utilities' growing interest in cost-effective energy efficiency investments and state mandates for renewable energy development and inability of market signals to spur generation development in certain regions are among the factors in this renewed interest in IRP or IRP type long term procurement planning processes. The following Exhibit shows the states that have IRP or any form of long term procurement planning processes in place.

Exhibit: Status of IRP across USA



Source: Synapse Energy Economics, Inc.[12]

From a review of some of the IRPs it appears that these processes generally consider demand-side resources, like energy efficiency, demand response, and distributed generation, when calculating the baseline demand but not when considering the optimum resource mix to reliably and cost effectively meet long term (10 -20 years) load requirements. While transmission projects and plans are used as inputs for the analyses that lead to the formulation of IRPs, they are not evaluated as competing alternatives to demand and supply side resources.

From a review of the Kentucky statute on IRP, and some of the recent IRPs prepared by the utilities in Georgia and Virginia, it appears that supply and demand side

[12] "A BRIEF SURVEY OF STATE INTEGRATED RESOURCE PLANNING RULES AND REQUIREMENTS", Synapse Energy Economics, Inc., April 28, 2011

resources are evaluated on a comparable basis in IRP. However, co-optimization of supply and demand side solutions on the one hand and transmission solutions on the other, to yield a least-cost supply-and-demand-side-transmission resource mix, is not performed.

It is worth noting here that recently NARUC issued a RFP which would identify the benefits that transmission and supply side co-optimization would yield and the challenges that exist in the development of tools that can implement such co-optimization. Although a plan that may result from such a co-optimization may be difficult to implement in multi-state ISO/RTO environment (transmission planning is performed by ISOs/RTOs; supply side resources are developed by market forces and the states), single state ISOs/RTOs (California and New York) and regulated states can implement integrated, co-optimized plans by ensuring close coordination between the retail pricing, demand-side management, transmission and supply resource planning entities. Even if not implemented, a co-optimized transmission and supply resource plan can be a good tool for informing the various stakeholders about the optimum generation and transmission development options.

Regulatory Incentives Affecting NWS Integration

An issue of continuing concern at both state and federal levels is the significant asymmetries in transmission providers' incentives to choose among alternative solutions for reliability and congestion problems. Conventional high voltage lines typically deliver earnings opportunities to transmission owners (especially if their projects are awarded transmission rate incentives), whereas most non-wires solutions either yield nothing comparable or (in the case of energy efficiency improvements) actually threaten revenues and earnings by potentially reducing electricity volumes transmitted over the system. As DOE's National Action Plan for Energy Efficiency (NAPEE) noted in 2006:

> Historically, regulatory policies governing utilities have more commonly compensated utilities for building infrastructure (e.g., power plants, transmission lines, pipelines) and selling energy, while discouraging energy efficiency, even when the energy saving measures might cost less.[13]

Moreover, some entities in a position to provide cost-effective NWS have no way to monetize the transmission system value of their resources. Non-utility providers of electricity and generation, for example, are typically compensated based solely on the value of avoided generation, not transmission and/or distribution.

Ideally, the optimal portfolio of transmission solutions needed to address any given system need would also be the optimal and fair financial alternative for all concerned, after balancing the needs of asset owners and retail customers. All grid

[13] U.S. Department of Energy and U.S. Environmental Protection Agency, National Action Plan for Energy Efficiency (July 2006), p. ES-7.

users share an interest in ensuring that their transmission service provider is rewarded for delivering value and minimizing the life-cycle cost of reliable grid services, not just for building transmission and boosting system-wide electricity throughput. Achieving that result will require cooperation among state and federal electricity regulators; promising forums include collaborative regional transmission planning initiatives and the successor to NAPEE, which continues under DOE auspices in the form of the State and Local Energy Efficiency Action Network.[14]

EAC Recommendations to the U.S. DOE

With regard to non-wires solutions, the EAC recommends that the U.S. DOE:

- Reach out to key organizations, including existing RTOs, regional transmission entities (e.g., WECC, WestConnect), NARUC, regional subgroups of NARUC (e.g., MACRUC, NECPUC), NRRI, National Conference of State Legislators, industry representatives, NASUCA, Council of State Governments and individual state regulatory commissions and siting councils to share the concepts outlined in this paper regarding the consideration of NWS. Conduct in-person meetings and webinars, and share papers on NWS approaches. Develop a plan for NWS outreach that first targets regions and states most active with regard to potential transmission projects. Coordinate with the FERC to ensure lessons learned and best practices can be considered in their regulatory role.

- Build upon the DOE's current activities and 2009 NCEP report by sponsoring the development of a planning guide in 2013 that presents lessons learned and case studies for incorporating full consideration of NWS into transmission planning. A number of the regional and state examples cited in this paper may be ones to cover in such a document. This planning guide would include such principles as conducting a high-level screen of NWS to determine the viability of such approaches before conducting a more detailed analysis.

- Continue to study, evaluate, document, and report on best practices in transmission planning and seek to integrate the development of integrated approaches that consider the economic value of wires and non-wires alternatives and likely market responses to locational price differentials.

- Continue to study, report on, and document the experience nationwide of NWS options such as Demand Response to help transmission planners and

[14] For illustrative proposals, see Environment Northeast, Escalating New England Transmission Costs and the Need for Policy Reforms (June 2011), available at http://www.env-ne.org/public/resources/pdf/ENE_EscalatingNETransmissionCostsandNeedforPolicyReforms_20110630_Final.pdf.

policymakers understand situations in which NWS can be an equally reliable approach as transmission lines to grid stability. Report and engage in discussion of such issues with the organizations identified in the first bullet above.

- Assess the evolution, operation and track record of specific non-wires techniques such as demand response in relevant markets. Based on the experiences at the state and regional level, share with relevant organizations such as those in the first bullet above options for how markets should be structured to ensure they do not obstruct NWS options. Sponsor a study that assesses the performance of a range of NWS options and the reliability of such options in utility-specific resource planning.

- Work with collaborative regional transmission planning initiatives and DOE's State and Local Energy Efficiency Action Network to identify potential solutions and share best practices in addressing existing financial barriers to the implementation of NWS when they are more effective than transmission solutions.

- Increase the R&D emphasis on NWS, e.g., use of synchrophasor measurement based tools and real-time thermal rating, to optimize the carrying capacity of existing and new transmission assets by providing better knowledge of the situation of the grid.

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