

## DOCKETED

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## **On RETI 2.0 Plenary Report**

This Document Supersedes TN 215232

*Additional submitted attachment is included below.*

January 11, 2017

Dear Sir/Madam:

The National Renewable Energy Laboratory (NREL) submits these comments on the review draft of the Renewable Energy Transmission Initiative 2.0 Plenary Report. NREL is a federally funded research and development center under the U.S. Department of Energy, operated under contract by the Alliance for Sustainable Energy, LLC<sup>1</sup>. These comments, as well as NREL's participation in other parts of the RETI 2.0 proceeding, are within the laboratory's scope of work for the U.S. Bureau of Land Management<sup>2</sup>. Comments are included below:

1. It would be useful for the Plenary Report to have a map for reference early on in the report, i.e. in the executive summary section on page 5 when TAFAs are first mentioned. The map that is shown in Figure 2-1 on page 27 of the Plenary Report is a good candidate and should get moved forward in the doc.
  - a. It would be good to note the difference (in specificity) of the Figure 2-1 Plenary Report map which appears to show geographic boundaries and the more general TAFAs with intertie potentials shown in Figure 1-1 in the Transmission Report as colored ovals.
  - b. Why not label the import-export corridors on the map with Path numbers as is done in Table 2-2? That would be helpful.
  - c. The map in Figure 7 on page 54 of the Western Outreach Project report showing OOS projects should also be included in the Plenary Report around page 52. It is difficult to digest the info without seeing a geographic representation.
  - d. It would be great to have one map somewhere that summarizes the OOS transmission with the TAFAs and import-export paths, i.e. one map the shows schematic representations and labels without showing the hypothetical study range amounts.
2. While reading through the Table 2-1 considerations and conclusions, it seems like the deck is stacked in favor of a few (Imperial Valley, Riverside East, Tehachapi, San Joaquin Valley) and against most others. Would it make sense to come up with some ranking or broad categorization (e.g., red, yellow, green or high, medium, low) so that readers don't have to jump back and forth to line up the conclusions boxes on the strength of its comments? Or is it intentional to avoid any more explicit favoring of TAFAs?
3. On page 4 under the "Optimized portfolio issues," one issue is:

<sup>1</sup> NREL contributors include Barbara O'Neill, David Hurlbut, Greg Brinkman, and Dave Corbus.

<sup>2</sup> NREL is supporting the U.S. Bureau of Land Management for services and support related to RETI 2.0 under Interagency Agreement No.L14PG00274.

*Access to low-cost renewable resources both within California and out of state, especially wind and geothermal resources with generation profiles complementary to California solar generation, as well as access to energy markets outside California, can increase the diversity of renewable resources, provide markets for excess generation, and reduce ratepayer costs.*

There is no mention of the uncertainty of whether out of state renewables will count toward the CA RPS. We acknowledge that the report mentions that renewables are now being built on a cost basis and not to meet utility targets (indeed, CA IOUs are almost all long for RE's until the mid-2020's). However, in the 2030 horizon, with the expiration of the PTC and the sunset of the ITC, it is possible that utility-scale renewable project developers in other states would need a guaranteed off-take that might be conditioned on RPS designation. This should be pointed out as a source of uncertainty for how best to optimize the portfolio.

4. Another issue that should be mentioned as an "Optimized portfolio issue" is the probable further expansion of the EIM and the possible expansion of CAISO as a wider balancing area. While this is directly related to OOS projects, it also impacts TAFA's, both related to geographic placement of resources (e.g., southern CA) and moving RE from other areas (e.g., the Pacific Northwest). More broadly, any rendition of a new RTO or market affecting participants in the west would have at least some impact on this assessment. In fact, operational issues that would make any transmission system work more efficiently could be highlighted. These include a) making sure flows are optimal through more efficient scheduling practices, b) addressing balancing area seams issues, c) eliminating bilateral contract preference such that imports and curtailments can exist simultaneously, and d) other institutional changes that more accurately reflect the nature of power flow.
5. The Outreach report highlights the need to study reverse flows e.g. Path 49 west to east. While we don't think there is much likely revenue in CA export sales to significantly impact the cost assumptions of upgrading transmission, we do acknowledge the need to look at reverse power flow from a reliability perspective. We think this general point to consider export markets and reverse power flow technical consideration is not highlighted strongly enough in the Plenary report (it is only noted in the Existing TAFA's issue summary).
6. There is a recently released technical report by NREL entitled *Reducing Wind Curtailment through Transmission Expansion in a Wind Vision Future*. This study takes the high wind penetrations from the national Wind Vision study and runs an hourly production dispatch model to consider these scenarios (on the order of 37% wind generation) in the west to look at curtailment levels. Curtailment is reduced by about half (from 15.5% in reference case to 7.8%) with four proposed OOS projects built out (MSTI from MT to ID, Zephyr, SunZia, and TransWest Express). Other transmission project build outs are modeled to further decrease curtailment. While it may not be as comprehensive as the other studies listed on page 24 of Other Portfolio Studies, because its nature is specific to the benefits of transmission build out, it may be worth mentioning. It can be found at <http://www.nrel.gov/docs/fy17osti/67240.pdf>

7. With respect to the work that was done in the Navajo Generation Study (see *Navajo Generating Station & Federal Resource Planning Volume 1: Sectoral, Technical, and Economic Trends* at <http://www.nrel.gov/docs/fy17osti/66506.pdf>), we have a comment regarding re-purposing existing transmission outside California from coal to renewables. While the Outreach report has some detail on this, the Plenary Report provides only a passing mention. With coal retirements, LADWP has a major interest in two such existing 500 kV lines (from Navajo Generating Station in Arizona to Eldorado, and Intermountain in Utah to San Bernardino). Concerns about triggering the Desert Area Constraint are predicated on new transmission affecting Path 46, but it is not clear whether repurposing LADWP's two existing lines would lead to the same outcome. It would be our recommendation to have CAISO and LADWP conduct a study case specifically on repurposing LADWP's existing transmission in conjunction with expected retirement or reductions at existing coal plants.
8. Regarding the Low Carbon Grid Study (<http://www.nrel.gov/docs/fy16osti/64884.pdf>) summary, we thought you did a good job of characterizing it. However, and this is not critical, it might be worth noting the premise and assumptions. In particular, LCGS used the TEPPC common case with respect to assumed transmission build-out, but also added a three projects to access probably out of state renewable resources. From page 9:

*One line connects the Wyoming wind project to the terminus of the Intermountain Power Project DC line in Delta, Utah; this is a simple radial line. Another line connects the New Mexico wind project with the Four Corners region. This region has coal resources that will be retiring or no longer providing specified power to California, so this allows room for new wind imports. There is also a line in the Target cases connecting southern Idaho to southern Nevada. This line improves power-transfer capability between the northern and southern portions of the Western Interconnection. It reduces flows on California's otherwise heavily loaded Path 26. Improved power-transfer capability between the northern and southern portions of the WECC grid is important for cases with significant solar resources in California and Arizona—generation from resources in these areas needs to be moved northward where there is an economic use for the energy. Deliverability of renewable energy from Imperial Irrigation District (IID) is assumed to be possible due to approved transmission projects that will provide up to 1,800 MW of incremental transmission deliverability (CAISO 2015), and also due to changing flow patterns with reduced imports of gas-fired electricity into California.*

9. Regarding the coverage of 368 Corridors, we think the work ANL has done describing the overlap and considerations of pertinent corridors is great. However, there is no suggestion or recommendation to align any TAFE system expansions with those 368 Corridors. If applicable, and acknowledging the stance of an unbiased review, we would like to see a comment on the usefulness and desirability of utilizing 368 Corridors where possible to more efficiently concentrate energy infrastructure.
10. You requested some comment on metrics; by that, we assume you mean the \$million per MW for Western Transmission Projects as shown in Table 2-3. For TAFE's, the only metric-like quantifier noted would be the mitigation cost estimates for the Transmission Considerations. We think the cost per MW metric is good and should perhaps be applied to some of the TAFE assessments. However, the transmission service type (i.e. FCDS and EO)

would need to be standardized. Otherwise, metrics to be considered include cost per MWh or curtailment percent, which both require dispatch modeling. That approach may be considered in a section on recommended next steps.

11. Another interpretation of the steps needed to move projects forward would include process remedies to solve the chicken-and-the-egg problem among utilities, transmission developers, and RE project developers. The contractual issues necessary for project finance should be addressed in the context of transmission planning. In other words, if regional planning moves forward with utility participation, leverage it to help the buy-in from the entities bearing risk in transmission or renewable energy project development.
12. We think the section of the Plenary entitled Conclusions and Recommendations should be split out to two relevant sections to highlight "Next Steps" so decision makers could more quickly access ideas and proposals for how to keep the momentum of this exercise going.
13. We think highly of the Western Outreach Project report and are appreciative of the opportunity for external stakeholders to participate in California's RETI 2.0 process. However, we think the recommendations listed beginning on Page 73 of the Outreach report could be highlighted/summarized better in the Plenary report. We think doing so could help complete the suggestions in the Plenary as to recommendations. For specific comments on the details in the Recommendations section of the Outreach report, please see the Appendix. In summary, we appreciate the recommendations by the working group, but suggest even further studies and scenarios to account for the many West-wide 'moving parts'.

Best Regards,



Barbara O'Neill  
Grid Integration Manager  
National Renewable Energy Laboratory

## Appendix: Specific Comments on the Recommendations section of the Western Outreach Project report

### 1. Convene Further Regional Collaboration

#### a. Facilitate Western Resource Planning Coordination

**Comment.** Planning coordination should be encouraged on a regional basis with emphasis both in and outside of CA in all facets of scenario planning including coordination across larger areas to better include the effects of geographic and regional resource diversity

#### b. Design, Promote, and Review New Market Product(s) for Overgeneration

##### Conditions

**Comment.** Conduct future capacity expansion and better regionally integrated CPUC with emphasis on regional planning and future scenario analysis. Scenarios should include security constrained economic dispatch modeling looking at different regional resource mixes and grid integration aspects such as advanced solar and wind plants, northwest hydro integration, as well as flexible markets products for enabling technologies such as energy storage.

Evaluate regional coordination looking at potential future market structures including scenarios that reflect market products that might be provided by regional Western Independent System Operators (ISOs) or Regional Transmission Operators (RTOs) type entities even though the products might be associated with an Energy Imbalance Market (EIM) or other regional agreements.

### 2. Update Resource and Transmission Data Used in Decision Making

#### b. Request Information from Out-of-State Resource and Transmission

##### Combinations –

**Comment.** Recommend a more aggressive and inclusive approach to integrating out of state resource, generation, and transmission plans and data. Make better use of the numerous and detailed study data and existing information that has been publically available and provided by qualified entities. Be more proactive in engaging these entities.

#### c. Review and Update Out-of-State Resource Costs for Planning Tools –

**Comment.** Take this farther and look at advanced wind plant features including providing grid services such as regulation and ramp products from coupling wind with short term energy storage products. Some advanced features from integrated advanced solar plants should also be evaluated synergistically with advanced wind plants and energy storage including benefits to overall reliability.

#### d. Evaluate Available Transfer Capability between New Transmission Projects and the California Transmission System

**Comment.** A more systematic and regional analysis of transmission in the RETI 2.0 import/export TAFAs is required to evaluate the full benefits and costs and to inform cost/benefit analysis

### 3. Address Barriers to Entry for Out-of-State Resources

#### a. Review Aggregation and Eligibility Requirements

**Comment.** RPS procurement processes with impractical eligibility requirements for out of state renewables make financing for the transmission needed for the generation challenging: reviewing these barriers is critical for regional planning.

**b. Incorporate Opportunity Cost or Scenario Analysis of Out-of-State Options when Evaluating Procurement and Transmission Plans –**

**Comment.** Stop drawing the bubble or box around CA for scenario analysis and evaluate costs/benefits that include regional integration mechanisms that include regional geographic diversity.