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Smart Wires, Inc. Comments on the May 2, RETI 2.0 Transmission Joint Agency Group Workshop

Additional submitted attachment is included below.

May 16, 2016

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Docket: 15-RETI-02 – Smart Wires, Inc. Comments on the May 2, RETI 2.0 Transmission Joint Agency Group Workshop

Dear Members of the California Energy Commission:

Smart Wires Inc. ("Smart Wires") is a California-based grid solutions company that designs, manufactures, and delivers modular power flow control solutions for transmission systems. Smart Wires is pleased to offer these Comments to support the effort undertaken by the Renewable Energy Transmission Initiative's (RETI 2.0) Plenary Group and Transmission Technical Input Group (TTIG) as they move into evaluating transmission implications of renewable resources.

Smart Wires commends the RETI 2.0 team for compiling an impressive set of information that will help California meet its statewide greenhouse gas and 50% renewable energy goals, while building a smarter transmission system and minimizing impact to the environment. As the TTIG analyzes the Transmission Assessment Focus Areas and whether renewables require new transmission or upgrades, Smart Wires respectfully requests that the TTIG ensure it considers impacts to not just high voltage lines, but to the entire Bulk Electric System[1] and network under CAISO operational control[2]. In addition, if transmission upgrades are required to meet resource needs, in line with the Garamendi Principles[3] the TTIG should encourage the use of cost-saving technologies that improve the utilization of existing infrastructure over costly upgrades and new lines when technically feasible. As explained below, newer tools such as advanced power flow control can, among other things, help optimize infrastructure utilization, reduce network congestion, ease the integration of renewable energy resources into the transmission system, and reduce curtailment of renewable energy. These types of technologies should be used by the TTIG as an integral component in meeting renewable energy goals in a cost-effective manner.

[1] Bulk Electric System includes transmission lines at or above 100kV. North American Electric Reliability Corporation. "Bulk Electric System Definition Reference Document." January 2014. http://www.nerc.com/pa/Stand/Project%20201017%20Proposed%20Definition%20of%20Bulk%20Electri/bes_phase2_reference_document_20140124_llh.pdf

[2] CAISO Planning Standard. April 1, 2015, Page 4, Section 2.1, http://www.caiso.com/Documents/FinalISOPlanningStandards-April12015_v2.pdf

[3] SB 2431 (Garamendi, Chapter 1457, Statutes of 1988)

About Smart Wires

Smart Wires' technology is used to mitigate transmission challenges, such as network congestion, at a time when increasing the capabilities of the current grid is essential. Smart Wires enables each power line to dynamically control and transfer more or less power based on the real-time needs of the grid. By turning the lines themselves into dispatchable assets that can be dialed up or down like a power plant, grid operators can transfer much more power using the existing infrastructure they already have. In addition, power flow control allows grid operators to spread the variability across a wide area. By adding Smart Wires strategically to their grids, grid owners and operators can dramatically lower the investment required to accommodate a much higher penetration of renewable energy.

Comment 1: Consider Transmission Implications to entire Bulk Electric System in California and the CAISO-controlled network (down to 60kV)

In the TTIG analysis of Transmission Assessment Focus Areas and whether renewables require new transmission or upgrades, Smart Wires respectfully requests that the TTIG ensure it considers impacts to all transmission facilities at or above 60kV. While high voltage lines (220 kV – 500 kV) are important arteries of the transmission system for delivering renewable energy, lower voltage lines (60kV-220kV) are critical components of the grid. Discussion and analysis of transmission needs often focuses on transmission assets of 220 kV or higher voltages, though this narrow scope would ignore a significant portion of our grid which consists of lower voltages. The TTIG should consider lower voltage lines given that:

1. The North American Electric Reliability Corporation (NERC) covers reliability of the entire Bulk Electric System (*i.e.,* generally transmission lines at or above 100kV) and CAISO has operational control of transmission lines and associated facilities, most of which is at or above 60kV.

2. This portion of our network is where a good portion renewable energy resources will be interconnecting. For example, in the current CAISO Generator Interconnection Queue[4], about 15% of the solar and wind capacity will be connecting at points lower than 220kV.

3. Many lower voltage lines that can constrain the flows on the parallel higher voltage lines. Smart Wires research shows that by not including voltages as low as 60 kV, the results will ignore a significant portion of the congestion, curtailment, and transmission costs.

Therefore, we recommend that the TTIG include lower voltage lines (60kV – 220kV) in its impact analysis of renewable energy integration.

[4] California ISO. Generator Interconnection Queue as of May 6, 2016. https://www.caiso.com/planning/Pages/GeneratorInterconnection/Default.aspx

Comment 2: Encourage the Use of Cost-Saving Technologies That Optimize Existing Transmission Infrastructure, Consistent with the Garamendi Principles

In addition, if transmission upgrades are required to meet resource needs, in line with the Garamendi Principles, the TTIG should encourage the use of cost-saving technologies that improve the utilization of existing infrastructure over costly upgrades and new lines when technically feasible. As explained below, newer tools such as advanced power flow control can, among other things, help optimize transmission infrastructure, reduce network congestion, ease the integration of renewable energy resources into the transmission system, and reduce curtailment of renewable energy. These types of technologies should be used by the TTIG as an integral component in meeting renewable energy goals in a cost-effective manner.

Technologies to Improve Utilization of Existing Infrastructure - Advanced Power Flow Control

Power flow control technologies include traditional devices such as phase-shifting transformers and series reactors, as well as newer advanced technologies such as flexible AC transmission systems (FACTS) and modular FACTS devices, such as Smart Wires PowerLine Guardian® and Tower Router. While traditional power flow control devices are included in planning models, there are aspects of advanced power flow control technologies, such as the modular and easily dispatchable nature of the products, that are not always represented in current transmission planning processes or in the operations models.

Simply stated, advanced power flow control technologies can instantaneously change the reactance of the lines so they can push or pull electric power flow around transmission constraints. By not including this tool in transmission planning or operations, ratepayers fail to experience the benefits these technologies provide, including:

- **Reducing network congestion and increasing system reliability**. Transmission constraints create economic inefficiency and cause reliability risks. Advanced power flow control can in real-time route power around these constraints, creating value and reducing risk.

- **Smarter investments through incremental investment, quick deployment, and redeployment**. Advanced power flow control technologies can increase the utilization of the existing infrastructure, and are flexible in three ways that traditional investments such as reconductoring and new line builds are not:

  i. they can be modular, allowing for an incremental investment strategy;
  ii. they can be deployed quickly, shortening the planning and installation cycle from years to months; and
  iii. they can be easily removed and redeployed; given the rapidly changing utility system this flexibility can ensure the devices are always optimally placed in the system.

  Modular power flow solutions create a flexible power system and smarter investments, which ensures that California rate-payers are getting the most reliable and cost-effective transmission system while delivering low GHG electricity.

- **Helping integrate renewable energy and reduce curtailment cost-effectively**. All of the aforementioned benefits of power flow control mean that the transmission upgrades needed to integrate renewable energy can be done in the most cost-effective manner and with the least cost to consumers. It may also reduce curtailment of renewable energy, allowing grid operators to more effectively use low GHG sources of energy.

- **Reducing the environmental impact of transmission investments**. Advanced power flow control can reduce the need for new line construction, upgrading facilities to higher operating voltages, and reconductoring. Advanced power flow control can be installed with little to no environmental impact. For example, Smart Wires recently completed a helicopter installation of its PowerLine Guardian, allowing for installation without disturbing an environmentally sensitive area.

Advanced power flow control technologies, such as Smart Wires, can be a key element of the transmission planning process and lead to solutions that optimize capital expenditure, improve the integration of renewable energy, address uncertainty in planning transmission, and reduce network congestion. Smart Wires works closely with utilities and transmission-owners to design and develop a dynamic grid that is reliable, affordable, safe, and clean.

Conclusion

We appreciate the opportunity to participate in and submit comments to the RETI 2.0 process. RETI 2.0 comes with the implicit responsibility to find the best possible investments on behalf of the California rate-payers. As detailed herein, advanced power flow control, and Smart Wires specifically, can help meet California's energy goals in a cost-effective manner. We therefore respectfully suggest that the TTIG ensure lower voltage lines are included in the transmission implication analysis and that transmission infrastructure optimization is encouraged when technically feasible.

Sincerely,

Todd Ryan

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