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RE: Docket: 15-RETI-02 â€“ Smart Wires, Inc. Comments on the January 22, RETI 2.0 Transmission Technical Input Group Workshop

Additional submitted attachment is included below.

February 5, 2016

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Docket: 15-RETI-02 – Smart Wires, Inc. Comments on the January 22, RETI 2.0 Transmission Technical Input 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) Transmission Technical Input Group (TTIG) and to identify additional information it can use to improve renewable integration in California and across the West.

While the TTIG has compiled an impressive list of information, we submit for your consideration a request for transmission planning methodologies to include advanced power flow control as a transmission alternative. The current transmission planning methodologies may not be properly considering all of the advanced transmission technologies that could be used to cost-effectively facilitate development and integration of renewable energy. For example, in CAISO's "50% Renewable Energy Special Study,"[1] several zones showed reliability issues, congestion, and renewables curtailment. As explained below, newer tools such as advanced power flow control can, among other things, reduce network congestion, ease the integration of renewable energy resources into the transmission system, and reduce curtailment of renewable energy. These technologies should be used by the TTIG as an integral component in meeting California's statewide greenhouse gas (GHG) and 50% renewable energy goals while building a smarter transmission system.

About Smart Wires

The future of the electric grid is increasingly uncertain given the large number of potentially viable load and generation scenarios, making it increasingly difficult to create sound, long-term investments in static infrastructure. In the face of this uncertainty, California needs flexible investments that can better utilize the existing infrastructure. Smart Wires' technology can improve the integration of renewable energy by addressing transmission challenges, such as network congestion, and increasing the

[1] CAISO Draft 2015-2016 Transmission Plan. Section 3.4 – 50 Percent Renewable Energy Special Study. February 2016. http://www.caiso.com/Documents/Draft2015-2016TransmissionPlan.pdf

capabilities of the current grid. 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.

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. Therefore, the planning results may not fully account for advanced power flow control's ability to help meet California's future transmission needs.

Simply stated, advanced power flow control technologies push or pull electric power flow around transmission constraints. By not including this tool in transmission planning, the state is leaving benefits on the table, such as:

- **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 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**. Traditional transmission investments can have large negative environmental effects. 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.

Comment: Include Advanced Power Flow Control in Models and As Part of the RETI 2.0 Process

In its request for Comments, the TTIG requests additional information to fully understand the implications of renewable energy on the transmission system, and how to improve renewable integration in California and across the West. In order for the TTIG to fully investigate the benefits of newer transmission tools, the CAISO and other stakeholders should include advanced power flow control technologies in transmission planning analyses and better understand the impacts and capabilities of modular power flow control. There are a number of initial steps that the TTIG should consider, such as:

- **Verify that the CAISO's planning models appropriately represent advanced power flow control.**[2] Advanced power flow control technologies are more easily dispatched, have greater granularity and accuracy in dispatch, and allow for more intelligent control than traditional power flow control technologies. We would ask that the Commission and CAISO verify that these differences can be appropriately represented, or approximated, in CAISO's planning models and software. We are available to help with any information CAISO may need to ensure the models can accurately represent the benefits of advanced power flow control.

- **Ensure that advanced power flow control is included in the potential set of transmission alternatives and included in special study analyses.** In CAISO's "50% Renewable Energy Special Study," several zones showed reliability issues, congestion, and renewables curtailment. In the study's recommendations, CAISO specifically noted the need to investigate the "possibility of considerably greater reliance on congestion management in ISO market and challenges and

[2] Planning models are representations of the electric power systems that allow the transmission planner to forecast the future needs of the transmission system. These models require inputs such as load forecasts; forecasts of which generators will be online and available; the current transmission topology; and a set of feasible elements that can be added to the transmission network to meet future needs. It is important that these planning models can appropriately represent advanced power flow control, otherwise the planning process precludes the selection advanced power flow control as solution to meet California's future transmission needs.

implications of doing so." Given the ability for advanced power flow control to reduce network congestion using existing infrastructure, it is important that the RETI 2.0 process considers advanced power flow control as a feasible option to ensure California builds a smart transmission system to meet future needs.

- **Ensure that transmission investment decisions consider benefits in addition to capital cost**. This can be done by including considerations such as speed of deployment, redeployability, long-term rather than just up-front costs, impacts and benefits to rate-payers and the environment, and valuing the many additional benefits of advanced power flow control including the optionality that is created by the incremental, modular, and redeployable nature of devices.

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 that advanced power flow control is appropriately included in models and as a part of the RETI 2.0 process.

Sincerely,

Gregg Rotenberg

President
Smart Wires, Inc.