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Smart Wires Comments on July 29 TTIG meeting

Additional submitted attachment is included below.

August 8, 2016

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Docket: 15-RETI-02 – Smart Wires, Inc. Comments on the July 29, RETI 2.0 Transmission Technical Input Group Meeting

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) as they evaluate potential constraints and mitigation solutions for renewable development scenarios.

Smart Wires commends the TTIG for its impressive work on evaluating transmission implications of new capacity in the Transmission Assessment Focus Areas (TAFAs). This evaluation is important to reach increased renewable energy capacity levels and meet California's 50% renewable energy goal.

This comment is in response to the stakeholder discussion Question 1 "*Do you agree with the TAFA evaluations? Including…likely solutions.*"

The TTIG should recognize that the current evaluations of the TAFAs only consider traditional transmission investments as mitigations. Advanced transmission technologies can *increase the full capacity/energy only capacity in TAFA evaluations* by offering more flexibility in transmission grid infrastructure and operation. This additional flexibility provides consumer savings and helps California meet its renewable energy targets.

<u>The Need for Flexible, Advanced Transmission Technologies</u>

The high dropout rate of potential generators and the large and lumpy nature of traditional transmission investments leads to high uncertainty in the TAFA estimates. New generation facilities face multiple hurdles in the early project stages such as investment needs and permitting, which contributes to a high dropout rate of generators in the CAISO interconnection queue. Case in point, 71 percent of projects in the CAISO queue have been withdrawn since 2006.[1] This high uncertainty of generator interconnection creates additional risk in planning for and implementing transmission mitigation solutions. The upgrades may not be needed by the time they become operational, or other upgrades may be needed at different

[1] CAISO Resource Interconnection Management System (RIMS), Generation Project Report as of August 2, 2016.

locations. This can lead to over- or under-building of transmission upgrades. Neither is desirable – over-building can result in adverse ratepayers and/or environmental impacts, and under-building can result in adverse reliability impacts.

The Benefits of Flexible, Advanced Transmission Technologies

Flexible grid technologies, such as modular power flow control, dynamic line rating, and energy storage, can enable further utilization of existing infrastructure and allow transmission owners to defer large upgrades until interconnection becomes more certain. In addition, devices that can be installed incrementally and redeployed can provide optionality in transmission investments. This optionality allows transmission owners and renewable energy developers to make a modest upgrade to the system to increase capabilities in the near-term, which allows time to know with more certainty whether and where large, longer-term upgrades are necessary and enable their implementation where needed in an orderly fashion.

The Application of Flexible, Advanced Transmission Technologies in TAFA Evaluations

In CAISO's Queue Cluster 8 Phase 1 Interconnection Study Report, for example, there are several TAFAs that could benefit from modular advanced power flow control and other flexible advanced transmission grid technologies, including:

- **San Joaquin Valley TAFA** – The TTIG identified multiple constraints on the transmission system in the study range. The Deliverability Assessment Results for the Fresno Interconnection Area[2] noted several overloads with a reconductor mitigation, such as the 230 kV lines between Gates and Midway, that may also be mitigated with power flow control.

- **Victorville TAFA**[3] - The TTIG identified constraints in the North of Lugo area with conceptual mitigations on 500kV and an upgrade of Coolwater-Lugo. Power flow control may be able to relieve overloads through incremental upgrades that may enable deferral of some portions of the major upgrades.

- **Imperial TAFA -** The TTIG identified several constraints in the study range with conceptual mitigations of major upgrades on 500kV lines. Additionally, several overloads are identified in the SDG&E Study Area Report [4] with proposed mitigations using SPSs. However, coordinating those multiple SPSs may be a challenge and power flow control may be able to quickly relieve some of these overloads and increase energy deliverability.

By adding flexible grid technologies, it is possible for the TTIG to more quickly integrate renewable energy, increase optionality in transmission investments, and mitigate constraints in a lower cost way using the existing transmission infrastructure.

[2] CAISO. "Cluster C8 Phase I PG&E Fresno Interconnection Area, Appendix I, Deliverability Assessment Results." January 2016.
[3] CAISO. "Queue Cluster 8 Phase l Interconnection Study Report, SCE North of Lugo Bulk Area Report, Final Report." January 2016.
[4] CAISO. "Queue Cluster 8 Phase l Interconnection Study Report, SDG&E Study Area Report." January 2016.

When evaluating transmission implications in TAFAs, Smart Wires respectfully requests the TTIG to encourage CAISO and transmission owners to consider mitigation solutions that improve the utilization of existing infrastructure. The Garamendi Principles[5] also support considering solutions to use existing infrastructure before major upgrades or new lines. By using flexible grid technologies to mitigate constraints, CAISO and transmission owners can provide consumer savings, improve network optimization, and provide optionality over costly upgrades and new facilities when technically feasible.

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, flexible grid technologies, and Smart Wires specifically, can help meet California's energy goals in a cost-effective manner. We therefore respectfully suggest that the TTIG ensure flexible grid technologies that improve utilization of existing infrastructure are included in the transmission implication analysis and encouraged when technically feasible.

Sincerely,

Todd Ryan

Todd Ryan, Ph.D. | Director of Regulatory Affairs
todd.ryan@smartwires.com
Smart Wires Inc.

About Smart Wires

Based in the San Francisco Bay Area, with offices in the United States, United Kingdom, Ireland and Australia, Smart Wires is the leader in grid optimization solutions that leverage its patented modular power flow control technology. Driven by a world-class leadership team with extensive experience delivering innovative solutions, Smart Wires partners with utilities globally to address the unique challenges of the rapidly evolving electric system. Smart Wires technology was developed by utilities for utilities, led by a consortium of large US utilities at the National Electric Energy Testing Research and Applications Center (NEETRAC). This core group of utilities, which included Southern Company, the Tennessee Valley Authority (TVA), Baltimore Gas and Electric Co. (BG&E) and the National Rural Electric Cooperative Association (NRECA), defined the vision for the original modular power flow control

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

solution. Today, the technology is rapidly becoming part of the utility tool kit as more and more electric utilities explore new ways to alleviate congestion, improve network utilization, manage changing generation profiles and maintain reliable electric service.

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 is a modular advanced power flow control solution that enables control of the power through each power line, directing flows away from lines that are heavily loaded and onto lines with spare capacity. 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.