STEFFES CORPORATION
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Public Review of Energy Interoperation v1.0 using working draft 26 dated 8 July 2011

Steffes Corporation of Dickinson, North Dakota ("Steffes") is pleased to submit these Comments in response to the Energy Interoperation v1.0 working draft. Steffes manufactures electric thermal storage ("ETS") space heating units and works with ISO's, RTO's and Utilities from across the United States and Canada. Steffes also manufactures sophisticated grid-interactive control systems for its ETS space heating units, and also for water heaters, that allow space and water heaters to participate in frequency regulation markets and other programs maintained by grid operators. Through participation in these programs, Steffes ETS space and water heating units

- Dynamically couple consumer electricity usage with the real-time needs of the electric grid,
- Deliver grid reliability, stabilization, and optimization,
- Integrate more renewable energy generation into the grid,
- Store Terawatt-hours of energy cost-effectively,
- Shape load in real-time
- Provide precise and verifiable up and down regulation services, and
- Offer utilities a capital investment for which rate recovery is justified.

In order to provide optimum value and control and to meet the requirements of the ISO/utility, our units are required to send the following power data to the ISO/utility:

1) Regulation Set Point Feedback – a repeat of the control value sent from the ISO/utility,
2) Up Regulation Capacity Available – the up regulation capacity available to the ISO/utility,
3) Down Regulation Capacity Available – the down regulation capacity available to the ISO/utility,
4) Current Regulation Set Point – the regulation service that is currently being provided to the ISO/utility,
5) Baseline Power – the system load that would exist were the system not providing regulation services,
6) Instantaneous Power Flow, and
7) 15-Minute Rolling Average of Power Flow

One embodiment of the use of these parameters is outlined in Appendix I (attached). Additionally, new control strategies would allow the ability to provide several energy parameters important to energy storage applications, including:

8) Stored Energy – amount of energy currently stored
9) Target Energy Storage – desired energy storage level
10) Available Energy Storage – capacity available for further energy storage

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The Energy Interoperation v1.0 specification currently supports two data classes: PowerFeedbackType and EnergyFeedbackType (from Figure 8-8, line 1110 of working draft). Steffes requests that consideration be given to supplement these two data classes with the above-listed 10 parameters as optional data classes within the standard. These data types are necessary to facilitate frequency regulation and other Smart Grid Control for ISO/Utilities.

Respectfully submitted,

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Attachment I: Example of the use of multiple power parameters for providing regulation services.

Setup

A fleet of water heaters representing 5.0 MW of load is controlled by an aggregator that is communicating with the ISO/utility demand response infrastructure (DRi) every 4 seconds. For the purposes of this example, it is assumed that the water heaters have sufficient energy storage capacity for the regulation activity. It is further assumed that all of the market-based bidding, etc. has been performed and we are coming into an hour where 2.0 MW each of up and down regulation capacity are to be provided. Finally, negative power values indicate load, positive regulation set points reduce the magnitude of loads, and negative regulation set points increase the magnitude of loads.

Example

At the start of the regulating hour, the aggregator communicates that it has 2.0 MW of up regulation capacity, 2.0 MW of down regulation capacity, and a baseline power of -3.0 MW to the DRi. The DRi communicates a regulation set point of +1.0 MW to the aggregator, which sends back a regulation set point feedback of +1.0 MW and assigns loads to the fleet of water heaters to meet this set point. The current regulation set point is now +1.0 MW, the instantaneous power flow is at or near -2.0 MW (baseline power of -3.0 MW plus +1.0 MW regulation set point) and the 15-minute average of power flow is trending toward -2.0 MW.

After 4 seconds, the aggregator again communicates 2.0 MW of up and down regulation capacity and -3.0 MW of baseline power to the DRi. The DRi communicates a regulation set point of -0.5 MW to the aggregator. The aggregator responds with a regulation set point feedback of -0.5 MW and assigns loads to the fleet of water heaters to meet the new set point. The current regulation set point is now -0.5, the instantaneous power flow is at or near -3.5 MW (baseline power of -3.0 MW plus -0.5 MW regulation set point) and the 15-minute average of power flow is trending toward -3.5 MW.