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Sequentric Receives Patent for Breakthrough Variable-Capacity Grid-Interactive Water Heater Designed Specifically for Electric Utilities

Real-Time Pre-Heating Control Enables Energy Storage, Renewable Integration, Off-Peak Water Heating, and Ancillary Services including AGC-Following Frequency Regulation

ATLANTA, GA – October 29, 2013 -- [Sequentric Energy Systems, LLC](#) ("Sequentric"), innovators of advanced Smart Grid technologies for electric utilities, today announced the U.S. Patent and Trademark Office has issued a patent for its breakthrough variable-capacity grid-interactive water heating technology. The first water heater designed specifically for electric utility energy storage and grid management programs, Sequentric's variable-capacity technology uniquely allows grid operators to manage 100% of the second-by-second timing of all of the electricity required for water heating. In addition, it guarantees a constant supply of safe hot water for the utility's customers at all times. The technology can be incorporated into any brand of storage tank electric water heater, regardless of material construction. Licensing discussions with water heater manufacturers have begun.

About the Technology

Sequentric's variable-capacity water heaters are linked in real-time with utility operated servers for telemetry acquisition and direct dispatching. This allows them to be used in all legacy demand



response programs as well as generation-following load management initiatives including: energy storage, neutralizing variability to assist in ever increasing renewable energy contributions, and a wide range of ancillary services, including Automatic Generation Control (AGC) signal following for frequency regulation services. When, for whatever reason, the communication link to the utility server becomes unavailable, the variable-capacity water heater simply reverts back to function as a conventional, fixed capacity water heater that runs autonomously.

Evolution of the Technology

According to Daniel Flohr, CEO of Sequentric, “In response to rapidly growing renewable energy on the grid, in 2008 we began working on technologies that would give utilities the ability to control the precise timing of all of the energy that goes into the [estimated 50 million electric water heaters in North America](#) . Our variable-capacity water heater came out of the [Canadian PowerShift Atlantic projects that Sequentric was awarded](#) where we developed the technology to specifically respond to the challenge of controlling fleets of water heaters to manage wind variability and store excess supply in real-time.”

Mr. Flohr continued, “[With over 14 Terawatt-Hours of wind power curtailed over the past four years](#) and state storage mandates now appearing, the need for energy storage is growing. Water heaters employing our variable capacity technology are an order of magnitude less expensive than virtually all other storage technologies and can be deployed today at grid scale. The 8% annual turnover rate of the water heater population creates the opportunity to add many Gigawatts of storage and carbon-free regulation capacity to the power grid over the next few years.”

Industry Reaction

According to Eric Rehberg, Research Scientist at the [Battelle Memorial Institute](#), “Battelle is focused on solving the big problems facing humanity; including the growing energy challenges from renewables and storage technologies. Large fleets of networked water heaters create opportunities to address significant shortcomings in the existing power grid. Sequentric's variable capacity water



heating technology provides the ability to pre-heat the incoming cold water in a way that is essentially decoupled from the customer's hour-by-hour hot water usage. This makes a number of very sophisticated energy products possible, including frequency regulation, wind support, traditional demand response, and other ancillary services.”

Independent Testing Underway

Independent testing of Sequentric’s variable-capacity water heaters is currently underway. Utilities and energy service providers interested in demonstration systems, including integrated servers and dispatching software, should contact Sequentric directly.

Upcoming Speaking Engagements

The 14th [PLMA Fall Conference](#) on Thursday, October 31, 2013 at the Hyatt Regency Downtown, Atlanta, will feature, “*Come on in, the Water’s Fine: The Emerging Market for Grid-Interactive Electric Water Heating*”. At 9:45 a.m., Daniel Flohr, Sequentric’s CEO, will talk about the use of grid-interactive water heaters in electric utility programs.

The [ACEEE Hot Water Forum](#) at the Hyatt Regency Atlanta Hotel in Atlanta, Georgia, is the premiere technical conference focused on water heating. Daniel Flohr will speak about grid-interactive water heating on Monday, November 4 at 1:30 p.m. Variable-capacity water heaters will be on display.

About Sequentric

Providers of advanced generation following load management and demand response technologies to electric utilities, Sequentric has been redefining the smart grid since 2007. Selling turn-key systems directly to utilities and through its OEM and distribution partners, Sequentric continues to prove the value of its leading edge solutions as its technologies are deployed by North American utilities. Privately held, the company is assembling an extensive patent portfolio based on pioneering smart grid technologies. Please visit us at www.sequentric.com or email info@sequentric.com for more information.

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