NOTICE DATE: August 16, 2016

NOTICE TYPE: M-A081616-01 Legal

SHORT DESCRIPTION: Protocol Interpretation on Definition of Wholesale Storage Load

INTENDED AUDIENCE: All ERCOT Market Participants

LONG DESCRIPTION: On August 2, 2016, ERCOT received a Protocol Interpretation Request (PIR) concerning the definition of "Wholesale Storage Load" in Section 2.1 of the ERCOT Protocols. ERCOT reads this request to seek a determination that metered Load attributable to sustaining the rotation of hydroelectric generators in synchronous condenser mode and metered Load attributable to the operation of the motors used to pump water to a higher elevation should both be considered Wholesale Storage Load (WSL) under the Protocols. ERCOT agrees that the pump motor Load should be considered WSL, but disagrees that the Load associated with sustaining the rotation of generator turbines should receive this treatment.

Section 2.1 of the ERCOT Protocols defines Wholesale Storage Load as follows:

> Energy that is separately metered from all other Facilities to charge a technology that is capable of storing energy and releasing that energy at a later time to generate electric energy. WSL includes losses for the energy conversion process that are captured by the WSL EPS Meter. WSL is limited to the following technologies: batteries, flywheels, compressed air energy storage, pumped hydro-electric power, electro chemical capacitors, and thermal energy storage associated with turbine inlet chilling.

Thus, to qualify as WSL, the energy metered as ERCOT Load must be used "to charge a technology that is capable of storing energy and releasing that energy at a later time to generate electric energy."

Under this definition, motor Load attributable to pumping water to a higher elevation qualifies as WSL because the electrical energy of the Load is converted to potential energy, which can later be converted to kinetic energy and ultimately electrical energy if the water is released from the reservoir and used to turn the turbine generators. In fact, ERCOT would conclude that this motor Load is the essence of "pumped hydro-electric power," which is explicitly referenced as one of the storage technologies qualifying as WSL.

However, under this same reasoning, the Load attributable to sustaining the rotational momentum of the hydroelectric generator turbines should not be

considered WSL because that energy is not “stored” with the expectation that it will be provided back to ERCOT at some later time. ERCOT understands that this Load is simply used to sustain the rotation of the turbines so that they can be available to provide Responsive Reserve Service (RRS) within the response time required by the Protocols. The provision of RRS would be achieved by releasing water from the reservoir and by changing the operational status of the turbines from synchronous condenser mode to generator mode. Under these circumstances, the Load required to sustain the operation of the hydroelectric generators operating in synchronous condenser mode would result in generation only in the limited circumstance in which the turbines happen to be deployed for RRS, and then, only as an incident to the generation created by the flow of water.

The requestor suggests that each of its hydroelectric generators, when in synchronous condenser mode, “acts as a flywheel” by “stor[ing] energy for use by the system during frequency and voltage events.” ERCOT agrees that hydroelectric generator turbines – like every other online synchronous machine in the ERCOT System (motor or generator) – are similar to flywheels in that they are rotating masses that contribute to the inertia of the system. However, in ERCOT’s judgment, the principal reason these turbines draw energy from the ERCOT System is not to “charge” the turbines for the purpose of releasing that same energy back to ERCOT at some later time (whether in real or reactive form); rather, it is to ensure that the turbines are available to provide RRS when called upon, and that RRS would be provided by energy from hydroelectric generation, and not the energy drawn from the ERCOT System.

Furthermore, if Load that contributes to a turbine’s rotational momentum were considered storage Load, every online synchronous machine in the ERCOT System – including every synchronous generator and synchronous motor – would be eligible for WSL treatment. Such a broad application of this exemption would appear to be inconsistent with the limited purpose for which the Commission amended Substantive Rule 25.501 to allow for wholesale treatment of storage Load.

For these reasons, ERCOT concludes that:

- energy used to pump water to a higher elevation for subsequent generation of electric energy should be considered WSL, and
- energy used to sustain the motion of a turbine generator in synchronous condenser mode should not be considered WSL.

In accordance with Public Utility Commission (PUC) Substantive Rule 25.503(i), ERCOT provided a copy of the PIR to PUC Staff upon receipt and consulted with PUC Staff before issuing this interpretation.

Irrespective of this PIR, and consistent with past practice, ERCOT will continue to evaluate all requests for Wholesale Storage Load treatment to ensure they comply with the requirements of the ERCOT Protocols.

CONTACT: If you have any questions, please contact your ERCOT Account Manager. You may also call the general ERCOT Client Services phone number at (512) 248-3900 or contact ERCOT Client Services via email at ClientServices@ercot.com.