

# **A method for evaluating frequency regulation in an electrical grid - Part II: applications to non-synchronous devices**

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## **Abstract-**

The second part of this two-part paper discusses how to determine whether a device connected to the grid is providing inertial response and/or frequency control. The proposed technique is based on the index proposed in Part I of this paper. This part first discusses the dynamic behavior in terms of the rate of change of controlled power of a variety of non-synchronous devices that do and do not regulate the frequency. These include passive loads, energy storage systems and thermostatically controlled loads. Then a case study based on a real-world dynamic model of the all-island Irish transmission system discusses an application, based on a statistical analysis, of the proposed technique to wind power plants with and without frequency control. The properties and the robustness with respect to noise and other measurement issues of the proposed technique are also thoroughly discussed.

**Index Terms-** Primary frequency control, inertial response, converter-interfaced generation, phasor measurement unit (PMU), wind turbines, energy storage.

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