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Analysis of Residential DER Potential for Grid Service Provision

Abstract: How well can residential devices provide flexible load and generation needed for a next generation transactive grid? NIST performed research to study in depth the technical potential of residential devices and systems to supply energy reserves, voltage and frequency support. An evaluation was performed for eleven common household devices/systems based on six indicators of capability: flexibility, availability, fast response, reserves, reactive power, and power level. Three scores were developed for: frequency response, reserves and reactive power services. These scores are used to estimate the number of any given device required in aggregation to provide some meaningful level of each ancillary service. Some observations are made about the pathways and challenges for delivering these services.