

## Transitioning Campus Distribution System into Networked Microgrids

Chee-Wooi Ten <ten@mtu.edu>, Michigan Technological University

Utilizing campus facilities and resources for research instrumentation is one way to implement and validate smart grid concepts. However, it can be cost-prohibitive if the infrastructure investment is not carefully planned to address the deficiencies of the existing communication infrastructure. This report is a summary on multi-phase milestones of a communication deployment plan for campus-wide distribution grid, which involves collaboration among research centers, facilities management, institutes, and industry participation for a feasibility study. These research entities are aligned with the institution's strategic energy initiatives. The cyberinfrastructure enhancement for the campus-wide grid is envisioned with three major milestones: (1) Identification of minimum electronic metering deployment for campus buildings, (2) improvement of energy control networks and architecture, and (3) cyberinfrastructure deployment with additional metering alternatives. The detailed case studies include feasibility evaluation of the existing communication infrastructure with monthly consumption average. Historical energy usage data are used to identify the pivotal nodes within the primary network that require closer monitoring. The historical trending of the initial phase implementation and operational drills are reported. Educational integration in existing courses is discussed and planned with curricula extensions. These milestones will enable future cyberinfrastructure enhancement that promote and support interdisciplinary research across engineering studies for networked microgrids in power and electronics, computational intelligence as well as social sciences such as occupant behavior and the impact of campus energy consumption.

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