

Energy Efficiency Question 5: Can energy efficiency efforts impact reliability, and if so, how have Michigan and other jurisdictions addressed that in their efficiency standards and implementation?

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## Executive Summary

1. Energy efficiency can impact reliability by lowering the overall energy consumption on a given Transmission and Distribution (T&D) system, thus minimizing reliability issues related to capacity constraints. Some states have set goals for reducing peak demand, but there is limited evidence of providing an incentive to meet that goal. Establishing goals that reflect the costs and benefits of reducing peak demand is complex and there are many issues to be considered when setting appropriate goals.
2. Michigan's current energy-efficiency standards do not explicitly address reliability. A few jurisdictions have utilized geo-targeted energy efficiency measures to alleviate short-term local reliability issues.

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**1. Energy efficiency can impact reliability by lowering the overall energy consumption of a given Transmission and Distribution (T&D) system, thus minimizing reliability issues related to capacity constraints. Some states have set goals for reducing peak demand, but there is limited evidence of providing an incentive to meet that goal. Establishing goals that reflect the costs and benefits of reducing peak demand is complex and there are many issues to be considered when setting appropriate goals.**

Reliability is measured primarily as the frequency and duration of customer interruptions.<sup>1</sup> The programs utilities use to manage system reliability can be classified into two methods: proactive and reactive. Traditionally, the main impact on a utility's short-term reliability is how well it reacts to interruptions and how quickly it can restore outages. Energy efficiency does not in itself assist a utility in restoring interruptions, and thus does not directly impact the reactive reliability methods. However, energy efficiency can be considered part of the proactive efforts to prevent reliability problems. In general, Michigan utilities generally allocate resources for several proactive reliability programs. These programs include vegetation management, system reliability, and system improvement, which all operate independently from the energy efficiency programs. While not directly tied to those core programs, energy efficiency can also be considered a proactive reliability method as it results in reduced overall energy consumption, and, more importantly for reliability, reduced peak demand.

A 2012 Department of Energy report<sup>2</sup> states that electric reliability can be improved by focusing on the supply-side and demand-side, and that energy efficiency is prime method for the demand-side. A key conclusion of the report is: "*An important, cost-*

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<sup>1</sup> Institute of Electrical and Electronics Engineers (IEEE) Standard 1366

<sup>2</sup> Reliability of the U.S. Electricity System: Recent Trends and Current Issues, Julie Osborn and Cornelia Kawann, <http://emp.lbl.gov/sites/all/files/REPORT%20Ibnl%20-%2047043.pdf>

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*effective, and environmentally conscious option for mitigating potential electricity system resource deficiencies is to reduce or flatten system load. Load can be reduced by increasing customer access to energy-efficiency programs.”*

A 2006 National Action Plan for Energy Efficiency (NAPEE) report<sup>3</sup> makes a related point that: “...energy efficiency can be used to reduce the overall system peak demand or the peak demand in targeted load areas with limited generating or transport capability. Reducing peak demand improves system reliability and reduces the potential for unplanned brown-outs or black-outs...”

**2. Michigan’s current energy-efficiency standards do not explicitly address reliability. A few jurisdictions have utilized geo-targeted energy-efficiency measures to alleviate short-term reliability issues.**

Utilities outside of Michigan have used energy efficiency as a direct contributor to system reliability programs. Utilities in Vermont and New York City have implemented “geo-targeted” efficiency strategies.<sup>4</sup> These programs identify the most constrained areas in the territory and offer special programs or increased incentives to encourage energy-efficiency projects in these targeted areas. The goal is to use energy efficiency to defer or delay T&D upgrades, reduce grid stress, and, in theory, improve overall system reliability. Efficiency appears to be helpful in reducing system congestion, but the need for long-term T&D upgrades are likely to be highly dependent on a large number of factors, a few of which include weather, the economy, changing load profiles in the area among others.

Certain technologies applied to a utility distribution system can be utilized to help address localized reliability issues or concerns, however. New grid management technologies can improve reliability, achieve Energy Efficiency and Demand Response, and provide the operating processes and systems that will be required to integrate future generation and storage device efficiencies into the electric grid. A specific example of a new grid management technology is Conservation Voltage Reduction (CVR). The application of CVR to a distribution circuit, or circuits, can reduce demand and energy. On those circuits deemed optimal for CVR, demand and energy requirements have been measured to reduce energy and demand in a range of 2% to 3%. Heavily loaded distribution circuits are the best candidates for CVR, and as a result, the technology cannot be assumed to cost-effectively achieve similar reductions on all circuits.

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<sup>3</sup> National Action Plan for Energy Efficiency, [http://www.epa.gov/cleanenergy/documents/suca/napee\\_report.pdf](http://www.epa.gov/cleanenergy/documents/suca/napee_report.pdf)

<sup>4</sup>Process and Impact Evaluation of Efficiency Vermont’s 2007-2009 Geotargeting Program.

Prepared for Vermont Department of Public Service. Navigant Consulting, 2010.

[http://publicservice.vermont.gov/sites/psd/files/Topics/Energy\\_Efficiency/EVT\\_Performance\\_Eval/](http://publicservice.vermont.gov/sites/psd/files/Topics/Energy_Efficiency/EVT_Performance_Eval/)

[Navigant\\_Vermont%20GeoTargeting%202010%20Process%20%20Impact%20Evaluation%20FINAL%20.pdf](http://publicservice.vermont.gov/sites/psd/files/Topics/Energy_Efficiency/EVT_Performance_Eval/Navigant_Vermont%20GeoTargeting%202010%20Process%20%20Impact%20Evaluation%20FINAL%20.pdf)