

# **REPORT ON EFFORTS TO REDUCE ELECTRIC PEAK DEMAND**

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# Table of Contents

<b>Introduction</b> .....	1
<i>Report Criteria</i> .....	1
<b>Background</b> .....	1
<i>Peak Demand</i> .....	1
<i>Load Management and Demand Response</i> .....	2
<b>Order - MPSC Case No. U-16198 Requesting Public Comment</b> .....	3
<b>Summary of Comments</b> .....	4
<i>The Detroit Edison Company</i> .....	4
<i>Consumers Energy Company</i> .....	5
<i>Tilden Mining Company L.C. and Empire Iron Mining Partnership</i> .....	6
<i>Michigan Environmental Council</i> .....	7
<i>Michigan Electric Cooperative Association</i> .....	7
<i>Constellation NewEnergy, Inc.</i> .....	8
<i>The Association of Businesses Advocating Tariff Equity</i> .....	9
<i>Michigan Electric and Gas Association</i> .....	9
<i>Energy Michigan, Inc.</i> .....	9
<i>EnerNOC, Inc.</i> .....	10
<b>Current Commission Initiatives Related to Reducing Peak Demand</b> .....	10
<i>Order - MPSC Case No. U-16020</i> .....	10
<i>Order - MPSC Case No. U-16457 Prepaid Billing Option</i> .....	11
<i>Midwest ISO Demand Response Working Group</i> .....	12
<i>The Detroit Edison Company – MPSC Case No. U-16276 Dynamic Peak Pricing &amp; Electric Load Control</i> .....	12
<i>Consumers Energy Company – MPSC Case No. U-16446 Electric Vehicle Tariff</i> .....	13
<i>Detroit Edison – MPSC Case No. U-16406 Electric Vehicle Tariff</i> .....	13
<i>Indiana Michigan Power Company – MPSC Case No. U-16496 Electric Vehicle Tariff</i> ....	14
<i>Upper Peninsula Power Company – MPSC Case No. U-16298 Real Time Pricing</i> .....	14
<b>Recommendations</b> .....	15

## **Introduction**

### ***Report Criteria***

On October 6, 2008, Governor Jennifer M. Granholm signed into law 2008 PA 295 (Act 295), known as the “Clean, Renewable, and Efficient Energy Act.” Section 95(1) of Act 295, MCL 460.1095(1), provides:

Sec. 95. (1) The commission shall do all of the following:

- (a) Promote load management in appropriate circumstances.
- (b) Actively pursue increasing public awareness of load management techniques.
- (c) Engage in regional load management efforts to reduce the annual demand for energy whenever possible.
- (d) Work with residential, commercial, and industrial customers to reduce annual demand and conserve energy through load management techniques and other activities it considers appropriate. The commission shall file a report with the legislature by December 31, 2010 on the effort to reduce peak demand. The report shall also include any recommendations for legislative action concerning load management that the commission considers necessary.

## **Background**

### ***Peak Demand***

When referring to energy use, peak demand describes a period of strong consumer demand. Peak demand fluctuations can occur on daily, monthly, seasonal and yearly cycles. For an electric utility, the actual point of peak demand is measured by means of a single half hour or hourly period which represents the highest point of customer consumption of electricity. Units of measurement are megawatt (MW) or kilowatt (kW) and denotes the maximum power requirement of a system at a given time, or the amount of power required to supply customers at times when need is greatest. Peak demand can refer either to the load at a given moment or to average load over a given period of time. There are other terms that can be associated with peak

demand according to the Energy Information Administration (EIA). Instantaneous peak demand is the highest demand at the instant of maximum load. Metered peak demand refers to the presence of a device to measure the maximum rate of electricity consumption per unit of time is considered metered peak demand. This device allows electric utility companies to bill their customers for maximum rate of consumption, as well as for total consumption.

### ***Load Management and Demand Response***

Load management refers to the broad category of mechanisms available to an electric utility to control load on its distribution grid. Some of those mechanisms are entirely owned and dispatched by the utility such as stationary advanced battery storage and smart grid enabled automated substation and distribution system controls. However, the largest and most important load management option is customer demand response (DR).

With reference to the electricity grid, DR is a mechanism to manage customer consumption of electricity in response to both supply availability and price. Demand response resources (DRR) can be classified into four categories: (1) direct load control; (2) price responsive demand; (3) interruptible rates, and; (4) behind the meter generation (such as a small diesel generator operating under the control of the customer). The primary categories of DRR are price responsive demand and direct load control.

Price responsive demand includes various kinds of time-based rate schedules including time-of day rates (TOD), critical peak pricing (CPP), critical peak rebate (CPR), and real-time rates (RTR).

With respect to direct load control, utilities can ensure that their electrical load is less than what can be generated. Because the load reduction is under the control of the utility, such demand response resources are also viewed as capacity resources from the perspective of the

Midwest Independent Transmission System Operator (Midwest ISO or MISO). Certain applications can be identified as deferrable which means to run later in the day, after the peak. These applications may be different among locations, but common loads include residential electric hot-water heaters, central air conditioners, pool pumps, crop-irrigation pumps, etc. With direct load control, these devices are outfitted with communicating controllers that can run a program that limits the duty cycle of the equipment under control. The utility only exercises the option when necessary. During periods of particularly heavy use of electricity, the utility will send a radio signal to the building in its service territory with this controller and turn off the HVAC for a certain period. This type of control has historically involved residential consumers. As utilities implement advanced metering infrastructure (AMI) as part of their Smart Grid programs, the expectation is that utilities will be able to substantially increase the number of residential customers participating in direct load control programs and also expand participation of commercial and industrial customers. Note that direct load control does not include interruptible load, which remains under the control of the customer who can choose to ignore or override the utility's instructions (usually under financial penalty).

### **Order – MPSC Case No. U-16198 Requesting Public Comment**

On February 8, 2010, the Michigan Public Service Commission (MPSC or Commission) issued an order which allowed all interested parties to have an opportunity to provide comment to the Commission on efforts to promote load management and reduce peak demand, and offer recommendations for legislative action, if needed. Interested parties were encouraged to address both technical and policy issues related to developing and implementing cost effective demand response programs that take advantage of the latest technologies. All recommendations for the report were asked to be consistent with the provisions of Act 295.

## **Summary of Comments (Filed March 8, 2010)**

### ***The Detroit Edison Company***

The Detroit Edison Company (Detroit Edison) does not believe taking additional action to promote load management over and above what currently exists is necessary given the State of Michigan's economy and forecasted Michigan load growth. Detroit Edison supports pursuing public awareness programs for load management and the development of readily available technologies that enable customers to save money by managing their energy consumption and peak time energy usage. Detroit Edison notes that PA 295 requires the Commission to promote load management in appropriate circumstances, but does not provide more direction. The Commission notes that the statute does not include establishment of explicit standards, leaving such matter to the Commission. This area is addressed in the Recommendations section.

According to Detroit Edison, within the utility industry, load management addresses the highest 100 load hours of the year. In Michigan, this occurs in the summer when it is hot and people use their air conditioning. Detroit Edison says that they can serve this peak demand through its own generation, existing load management programs, and the purchase of summer capacity options. At this time, the summer capacity options cost less than developing and installing additional load management programs. Detroit Edison has a portfolio of load management programs including, internal load reduction programs, substation load relief program, distributed generation and a variety of load management tariffs. The load management tariffs include Interruptible Air Conditioning, Interruptible Water Heating, Interruptible Commercial General Service, Interruptible Supply, and Interruptible Supply Rider for primary voltage customers, and real-time pricing options for primary customers.

Detroit Edison also continues to move forward on an Advanced Metering Infrastructure (AMI) deployment which will facilitate new enabling technologies capable of promoting future customer-controlled load management utilizing smart thermostats, home area networks, smart appliances and price responsive demand (PRD) offerings communicated via the AMI network. Detroit Edison is currently developing pilot programs focused on PRD, including a Dynamic Pricing program and Pre-Pay Service in addition to a Time-of-Use Electric Vehicle tariff that encourages off-peak battery charging. Implementing AMI will lower the cost of future load management offerings through advanced communication with customers and the elimination of costly infrastructure development that has historically been the limiting factor in load management program development.

Detroit Edison supports a national communication and education program that can further be customized regionally to facilitate geographic load management requirements. They have suggested the Commission support and participate in Federal Energy Regulatory Commission (FERC) and regional education efforts that will incentivize consumers to take charge of their energy consumption and the economics that will lower their energy costs.

Detroit Edison recommended the Commission support the effective economic use of the existing portfolio of load management programs, actively pursue increasing public awareness of home electricity management by supporting the FERC National Action Plan on Demand Response recommendations for a national education and communication campaign and continue to monitor activity on FERC Order No. 719 and the MISO business practice manuals (BPMs) and defer the issuance of a final order in MPSC Case No. U-16020 until FERC's Final Order No. 719 and associated BPMs are approved.

***Consumers Energy Company***

Consumers Energy Company (Consumers) offers many programs to encourage energy efficiency, through its Energy Optimization (EO) Program as well as innovative rate design to encourage load management. Consumers believes that the Commission has appropriately addressed the reduction of annual demand and the conservation of energy through the support of the current Commission initiatives. They state that it has made efforts to reduce annual demand and conserve by means of its rate structure, net metering, and EO programs.

Consumers believes AMI will provide further opportunities for customers to reduce demand and manage load during peak times. Customer education and awareness can encourage energy consumption and load management. Consumers believes further legislation or additional regulatory requirements are not necessary.

***Tilden Mining Company L.C. and Empire Iron Mining Partnership***

Tilden Mining Company L.C. and Empire Iron Mining Partnership (The Mines) support efforts to promote load management and reduce peak demand that results in net benefits to ratepayers. The Mines recommend the Commission provide opportunities for ratepayers to participate in demand response programs. The Mines requested the Commission lift the temporary restriction on the ability of retail customers to participate in the new Regional Transmission Operator (RTO) demand response programs. They think the Commission should focus on ways to increase demand response participation and provide greater flexibility for Michigan's electric customers. The Mines recommend that the Commission closely examine capital intensive programs and avoid increasing costs to individual ratepayers.



### ***Michigan Environmental Council***

Michigan Environmental Council (MEC) discussed two broad categories of demand management techniques: service interruption and load shifting. They stated that the Commission could facilitate the use of demand side management programs in a number of ways including rate design and cost recovery to ensure utilities are using techniques that are designed to lower the overall costs to ratepayers.

MEC suggests that no further legislation is needed to implement those changes. As far as education is concerned, MEC recommended that the Commission design and implement a robust program intended to educate residential and commercial customers regarding the design of the program and the potential cost savings involved in implementing these techniques to save money.

### ***Michigan Electric Cooperative Association (MECA)***

MECA represents nine rural electric distribution companies, one generation and transmission cooperative, and one licensed alternative electric supplier. Comments were submitted on behalf of its electric distribution, and generation and transmission members. MECA's members' load management programs are as follows.

- Cloverland's use of its diesel plants to reduce monthly peak demand results in significant cost savings to its customers each year.
- Midwest has four active load management programs. According to the utility, the water heater load control program has been very successful in not only providing overall power cost saving but also in the retention of electric water heating market share. The irrigation load control program has a nearly 85 percent participation level. Two new interruptible

load management programs include a HVAC load control program, and whole-house load control program which are continuing to add customers.

- Thumb currently controls electric water heaters, dual fuel heating systems and central air conditioning units. They shift higher cost purchases to lower cost periods. Thumb also uses its own generation to minimize higher cost market power.
- Wolverine's distribution cooperative member-owners have had load management programs in place since 1992, when Wolverine installed a load management system as a means to reduce winter peak consumption. Wolverine was able to shed nearly 20 MW of winter load. Three of Wolverines four distribution cooperative members have installed or are in the process of installing complete AMI systems.

MECA recommended that the Commission's report on the status of utility load management programs should provide an overview of the various programs used by Michigan's electric utilities with no recommendation for new legislation. They stated that recent economic trends and the electric supply and demand situation in Michigan do not indicate a need for new load management initiatives.

***Constellation NewEnergy, Inc.***

Constellation New Energy, Inc. (Constellation) recommended that the Commission promote load management by allowing competition through unregulated aggregators of retail customers (ARCs) and deploying incentives to increase participation. They suggest the Commission should take steps to increase public awareness of demand response. Constellation would also like to see funding opportunities be explained with Commission support. In addition, Constellation recommends that the Commission implement MISO's ARC proposal by issuing an order to implement the necessary utility tariff changes.

***The Association of Businesses Advocating Tariff Equity***

The Association of Businesses Advocating Tariff Equity (ABATE) and its members support voluntary load management and oppose expansion of government-mandated programs to promote load management over and above what the utilities are implementing through their general rate cases and as a result of PA 295.

They believe that additional load management over and above what is currently available is not necessary at this time and will only further serve to raise rates. Given revenue decoupling mechanisms approved, further load management will simply increase the decoupling surcharges and customers' future bills.

***Michigan Electric and Gas Association***

Michigan Electric and Gas Association (MEGA) states that they believe that electric utility efforts to reduce peak demand through load management are ongoing and vary among utilities based on factors including the nature of the customer base, adequacy of electric supply, local economy, changing demand levels and costs versus benefits. MEGA's position is that there should be no recommendations for new legislation. Recent economic trends and the electric supply and demand situation in Michigan do not indicate a need for new load management initiatives.

***Energy Michigan, Inc.***

Energy Michigan recommends that the Commission use competition to promote increased load management activity on a regional basis by residential, commercial and industrial customers. They suggest the Commission should take action in pending MPSC Case No. U-16020 to determine that all Michigan retail customers can participate directly in MISO demand response programs. They feel the Commission should also support lifting the 10 percent

cap on retail electric choice in Michigan as a means of stimulating competition for electric customers including competitive demand response offerings. If retail competition is to increase, competitive electric providers will increase product offerings such as demand response programs which provide value to the customer and an opportunity for profit to the provider.

***EnerNOC, Inc. Comments***

EnerNOC recommends that wholesale markets be properly viewed as a facilitator of improving efficiency and commerce for the benefit of the retail customers, rather than a barrier. Demand response programs can increase the interest and participation in energy efficiency measures. Increasing demand response opportunities could positively affect interest and participation in energy efficiency. In EnerNOC's view, Michigan should ensure its retail customers have access to robust and competitive retail markets because it will benefit both participating and non-participating customers, bring needed money to Michigan's businesses, and encourage energy efficiency.

**Current Commission Initiatives Related to Reducing Peak Demand**

***Order, MPSC Case No. U-16020***

With respect to demand response resources, the Commission ordered that Michigan retail customers of regulated utilities, or aggregators of retail customers on behalf of such retail customers, not participate in any regional transmission organization wholesale power market until further order of the Commission. This temporary prohibition is intended to protect non-participating customers until such time as the Commission can approve appropriate rates and tariffs. Thus, the Commission ordered that within 30 days of the issuance of the final Federal Energy Regulatory Commission orders in RM07-19, Docket ER09-1049 in Midwest

Independent Transmission System Operator, Inc. market, and ER09-701 in the PJM Interconnection, LLC market, the Commission Staff convene a meeting with Michigan electric utilities with distribution exceeding four million megawatt-hours in the previous fiscal year to discuss issues relative to conforming to the final orders. Within 120 days of the issuance of such final FERC orders, each Michigan electric utility with distribution exceeding four million megawatt-hours in a fiscal year shall file a separate contested case proceeding limited in scope to the effects of participation of Michigan retail customers on that utility in wholesale power markets. Within each contested case proceeding, the affected utility was ordered to file proposed tariffs allowing the retail customers to participate in wholesale power demand response of markets along with an application for the approval of the respective retail tariff.

In its Order in MPSC Case No. U-16020, the Commission encouraged utilities to develop proposals, with accompanying tariff sheets, which allow ARCs to participate in wholesale power markets in a manner where the participating load is not inadvertently counted by both the utility and the ARC, and that the rate paid is fair to participants as well as non-participants. The Commission ordered that utility filings include testimony addressing topics such as advanced notification of load interruption by retail customers or ARCs on behalf of retail customers, whether there is a need for fees for metering or related services for measurement and verification, and other issues related to the proper administration of the program.

***Order, MPSC Case No. U-16457 Prepaid Billing Option***

Detroit Edison requested and the Commission approved the waiver of certain residential and commercial rules to facilitate an experimental project for implementation of its SmartCurrents program. As part of the program, Detroit Edison is offering a limited pre-pay billing option for up to 200 customers including: 1) 100 customers on the existing tariff; and 2)

100 customers on a Dynamic Peak Pricing tariff. Pre-pay billing allows customers to pre-pay for electric service when they want and in the amounts that they want, essentially providing a “pay as you go” option for customers. Customers must have AMI, enroll in online or electronic billing, have two applicable communication methods, and be on the Standard Residential Service (D1) or General Service (D3) rates. Customers with other monthly charges (such as appliance repair) will not qualify in the initial pilot. This pilot will provide Detroit Edison the opportunity to assess customer satisfaction with this billing and payment option and the program’s ability to assist the customers in optimizing energy utilization and reduction in on-peak energy consumption.

***Midwest ISO Demand Response Working Group***

Commission Staff is currently participating in the Midwest ISO Demand Response Working Group. In October 2008, FERC Order 719 was issued. This Order required Regional Transmission Operators (RTOs) to allow unregulated aggregators of retail customers (ARCs) to offer demand response directly into the market. It also reduced barriers to participation for Demand Response Resources and treats Demand Response Resource’s comparable to traditional resources.

***The Detroit Edison Company -- MPSC Case No. U-16276 Dynamic Peak Pricing & Electric Load Control***

The Commission approved the Detroit Edison application requesting *ex parte* approval of its proposed experimental dynamic peak pricing tariff. In its application, Detroit Edison stated that it is in the process of implementing a SmartCurrents Program to test various aspects of smart grid and advanced meter technology to increase service reliability and to enable customers to better control their energy costs. Detroit Edison has received an approximate \$80 million grant from the U.S. Department of Energy (DOE) to accelerate its SmartCurrents program that will

result in the installation of smart meters in portions of its service territory that will serve as the technological backbone for the SmartCurrents program. Detroit Edison proposed an optional time-of-use rate that includes a dynamic pricing period for a limited number of residential and small commercial customers taking all their electricity through a single SmartCurrents smart meter installed as part of the DOE Smart Grid Investment Grant. Customers taking service on this rate can manage their electric costs by either reducing load during high cost pricing periods or shifting load from high cost pricing periods to lower cost pricing periods.

***Consumers Energy Company -- MPSC Case No. U-16446 Electric Vehicle Tariff***

The Commission approved Consumers' application for a time-based electric vehicle charging rate. Consumers indicated that it is in the process of evaluating customer utilization of electric vehicles throughout its electric service territory and specifically, the operational effects of using electric vehicles, the customer and ratepayer benefits of utilizing off-peak charging of these vehicles, and the associated infrastructure requirements to facilitate charging these vehicles. Most customers enrolled for service under the tariff will receive a separate meter that is capable of recording the energy used to charge the electric vehicles and the time of day that the charging occurs. Up to 2,500 customers can receive up to \$2,500 toward a Level 2 (240 volt) charging station.

***Detroit Edison – MPSC Case No. U-16406 Electric Vehicle Tariff***

Detroit Edison indicated that it is in the process of evaluating customer utilization of electric vehicles throughout its electric service territory and specifically, the operational effects of using electric vehicles, the customer and ratepayer benefits of utilizing off-peak charging of these vehicles, and the associated infrastructure requirements to facilitate charging these vehicles. Most customers enrolled for service under the tariff will receive a separate meter that

is capable of recording the energy used to charge the electric vehicles and the time of day that the charging occurs. Up to 2,500 customers can receive up to \$2,500 toward a Level 2 (240 volt) charging station.

***Indiana Michigan Power Company – MPSC Case No. U-16496 Electric Vehicle Tariff***

Indiana Michigan Power Company's experimental revised residential off-peak energy storage/plug-in electric vehicle tariff was approved for bills rendered beginning December 30, 2010. Indiana Michigan Power Company is authorized to defer expenses incurred for the experimental electric vehicle supply equipment option for ratemaking purposes until the company's next general rate case.

***Upper Peninsula Power Company – MPSC Case No. U-16298 Real Time Pricing***

The new UPPCo Real Time Market Price (RTMP) tariff seeks to accommodate the unique characteristics of the existing WP-3 customer by reflecting an additional distribution service charge. It also addresses distribution losses because the existing WP-3 customer is not directly interconnected to the transmission facilities of American Transmission Company, LLC, (ATC) and therefore distribution facilities will be required. In addition, the RTMP reflects a renewable energy charge, as well as contract requirements and penalty provisions. WP-3 customers taking service under this tariff will be subject to actual locational marginal prices (LMP), so the tariff will not be subject to UPPCo's power supply cost recovery (PSCR) mechanism. Revenues collected from the transmission service charge and energy charges will be credited to reduce power supply costs to system customers as part of the PSCR process. The delivery of service charges (customer charge and demand charge) and the generation scheduling charge will be credited to reduce distribution and operation and maintenance costs to system



customers as part of the rate case process. The RTMP tariff will not increase existing rates or costs of service to existing tariff customers.

## **Recommendations**

Although the Midwest currently has an over supply of electric power as indicated by many of the comments submitted to the Commission's inquiry, these conditions will likely not continue indefinitely. It is the Commission's view that now is the time to explore, pilot, and demonstrate new load management concepts and technologies in advance of a turn-around in electric supply and demand, and a softening of the current economic recession. Thus, the Commission intends to begin the following exploratory initiatives pertaining to load control and peak reduction. Until the conclusion of these exploratory initiatives, the Commission is not in a position to make recommendations regarding legislative changes.

First, the Commission Staff will commence discussions with utilities regarding their pursuit of commercial and industrial (C&I) direct load control pilots. In the Commission's view, utility sponsored C&I direct load control programs are lacking or nonexistent. This situation contrasts markedly with that of third-party demand response aggregators who are particularly active on the east coast in the PJM footprint.

Secondly, PA 295 does not set targets for peak reduction nor does it provide incentive energy optimization credits (EOCs) for peak energy reductions. The Commission notes that in contrast, PA 295 does provide renewable energy credit (REC) incentives for solar photovoltaic energy to recognize that such energy is generally produced on peak, whereas, wind energy tends to be produced at night, that is, off-peak. The Commission Staff's EO Collaborative will analyze the potential enhancement to Michigan's demand response resources via EO targets for peak

load reductions and/or incentive EO credits, and provide a report and recommendation to the Commission.

The third initiative will be an investigation regarding the recognition of power factor as contributing to generation load. Increasing power factor is important because in an electric power system, a load with a low power factor draws more current than a load with a high power factor for the same amount of useful power transferred. The higher currents reduce the overall efficiency of the distribution system by increasing the energy losses in the lines, requiring larger (and more expensive) wires and other equipment. The Commission is of the opinion that EO incentives to increase power factor, would also reduce generation requirements and thus contribute to deferring construction of new electric generation facilities in Michigan. An example of a customer-owned technology that can improve power factor is a C&I capacitor bank. The reduction of generation requirements is and has been a primary goal of EO programs. Recommendations produced by this third investigation will be developed by the Commission Staff's EO Workgroups and submitted to the Commission for its assessment.

In closing, the Commission is actively involved in initiatives to promote load management programs, and is partnering closely with its regulated electric utilities in this endeavor.