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**Readying Michigan to Make Good Energy Decisions:
Energy Efficiency**

DRAFT

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Presented by

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Reading Michigan to Make Good Energy Decisions – Energy Efficiency Executive Summary

The 30 energy efficiency questions posted on the Ensuring Michigan’s Energy Future website garnered 87 responses. The comment summary pie chart presents an overview of comments received at the website. Many additional comments regarding energy efficiency were provided at the public energy forums.

Where Michigan Is Today: Michigan’s current Energy Optimization (EO) standard required electric providers to ramp up energy savings to 1.0% of the previous year’s electricity sales in 2012, and natural gas utilities to ramp up energy savings to 0.75% of the previous year’s sales in 2012. The provisions in PA 295 provide for the continuation of the 1.0% energy savings for electric providers and 0.75% energy savings for natural gas providers through 2015. Beyond 2015, the efficiency savings targets would remain at 2015 levels under Michigan’s current law. Michigan’s electric and gas utilities are, in aggregate, surpassing the standards set forth in PA 295. Natural gas utilities achieved 134% of their targets in 2011, while electric utilities achieved 116% of their targets in 2011. Initial results for 2012 also indicate the targets were met, with natural gas utilities achieving 126% of their targets, and electric utilities achieving 125% of their targets. For each dollar spent on utility EO programs during 2012, it is estimated that customers benefit from approximately \$3.83 in avoided energy costs (on a net present value basis). The total estimated savings for the 2012 program year is expected to reach \$936 million on a net present value basis, and for the 2013 through 2015 program years, an additional savings of \$2.8 billion is expected. Through 2011, Michigan consumers paid approximately \$408 million in support of EO programs. Program spending for 2012 was \$245 million, and program spending for 2013, 2014 and 2015 is expected to be about the same level as for 2012.

EO Program History and Evaluation

- Michigan utilities are on track to continue to meet the current EO targets.
- Utility EO programs are designed to encourage customers to make their homes or businesses more energy efficient. Utilities collect money from customers in the form of a surcharge on the customers’ bills to fund the EO programs. The programs typically include rebates or incentives to reduce the upfront cost of energy efficiency upgrades such as lighting, furnaces and insulation.
- The objectives of the utility EO programs include delaying the need for new electricity generation, reducing emissions, encouraging local job creation, and lowering customers’ utility bills.

Commented [MK1]: This highlighted section is worded very strangely, and could lead to the erroneous impression that the annual energy savings requirement ends after 2015, and that utilities can just stay at the 2015 levels of savings that they’ve already achieved. The clear wording of the legislation requires that absent explicit action by the PSC or the legislature (as described in Section 97), the 1% annual savings requirement (0.75% for gas) continues for “each year thereafter”. Here is the specific language from the legislation:

“...Annual incremental energy savings in 2012, 2013, 2014, and 2015 and, subject to section 97, each year thereafter equivalent to 1.0% of total annual retail electricity sales in megawatt hours in the preceding year.” (Sec. 77)

The wording of the final report should be revised to make this clarification.

See also our later comment on this issue on page 6 of the report.

- Commenters state that Michigan’s EO programs to date have been cost effective.
- PA 295 provides that Michigan EO spending shall have a cap, not to exceed 2% of each utility’s annual revenues. The cap provides an incentive for utilities to pursue the most cost-effective EO programs to achieve the energy savings targets.
- EO charges collected from a particular customer class, such as residential, commercial, industrial or low-income, must be spent within that same rate class.
- PA 295 contains provisions allowing non-residential customers to self-direct their own EO programs. Self-directed EO programs are self-funded, and self-directed EO program customers do not pay EO surcharges to the utility. Self-directed EO programs have only been implemented by a handful of large customers.
- Commenters agree that energy efficiency should be considered a resource in long-term utility planning, however, caution was expressed that future savings are likely to be more expensive to achieve than in the past, because many cost-effective EO programs have already been implemented. Estimates of the increased cost of future programming are included in the GDS Potential Study and further evaluated by Optimal Energy.

Comparing Michigan EO Programs to Other States

- Many differences exist between state energy efficiency programs related to targets, timing, funding, and applicability making it difficult to directly compare programs between various states.
- Six states have standards that are 2.0% of electric sales or higher and nine (including Michigan) have standards between 1.0% and 1.9%.
- Five of nine states have natural gas standards above 1.0% and three of nine (including Michigan) have standards between 0.5% and 0.9%.
- State standards generally allow a broad range of end-use efficiency programs to count, but differ on whether to include combined heat and power, applications of waste heat, reduced transmission and distribution line losses, and electric generator efficiency upgrades.

Identifying and Quantifying Benefits and Costs of EO

- Benefit-cost tests are typically used to evaluate EO programs. Michigan law requires the utilities to use the utility system resource cost test (USRCT) sometimes referred to as the utility cost test (UCT), or the Program Administrator Cost (PAC) test. The USRCT includes all of the costs and benefits experienced by the utility.
- Some commenters contend that the USRCT does not take into account other benefits that were identified by commenters such as environmental improvement, macro-economic growth, or societal benefits.

Commented [MK2]: The energy efficiency “potential study” clearly demonstrates that bountiful remaining energy efficiency opportunities exist. Moreover, we have solid data from the MPSC showing a huge remaining need for basic energy efficiency improvements (I have reprinted at the end of these comments specific data on remaining need for energy efficiency improvements that I presented at the Kalamazoo forum, but unfortunately this report ignored all the forum testimony.)

Also, this “caution” was a point only made by the “joint utility response”, and their actual language said “...*somewhat* more expensive” (see p. 10 of the report). This summary bullet point reflects a stronger emphasis on this caution than in the actual record, and should be re-worded to make those two clarifications (it was just one party, and they said “somewhat” more expensive). The report should also acknowledge the considerable evidence that there is a huge amount of remaining need for energy efficiency improvements in Michigan homes and businesses.

- The USRCT also does not take into account costs experienced outside of the utility, such as the customer’s investment in new energy efficient equipment such as an upgraded furnace or insulation.
- Energy efficiency could also be used to prevent local reliability problems through geo-targeting.
- Utilizing the USRCT for calculating the benefits and costs synchs up well with revenue requirement (rate making) considerations.
- The report outlines additional methods for identifying and quantifying the benefits of EO programs.
- Michigan is one of the few states that relies on the USRCT (Utility System Resource Cost Test), also known as the Program Administrator Cost (PAC) test, as its primary test. Only one of the eight states surveyed for this report, and five states throughout the United States, use the PAC test as their primary test.

Improving Michigan’s EO Programs

- Nearly one quarter of the comments submitted included alternatives for improving Michigan’s EO programs.
- Suggested improvements include adding the following specific devices and emerging technologies in utility EO programs:
 - Flue-gas heat recovery systems
 - Combined heat and power systems
 - Geothermal heat pumps
 - Additional alternatives for improving Michigan’s EO programs included:
 - Providing customers with more detailed and timely data to better tailor their energy use to reflect utility system costs that vary in response to the timing of customer demands.
 - Upgrading building standards and codes.
 - Retaining flexibility and adaptability in EO programming.
 - Improving EO opportunities for all customer classes.
 - Improving low-income EO programming.
 - Integrating EO with utility business models.
 - Integrating EO with an RPS into a larger clean energy standard.
 - Greater consistency across utility programs such as commonality of forms and rebates providing for reduced confusion among contractors and customers.

Commented [MK3]: Why is there no mention at all of the “suggested improvement” of raising the annual savings standard? For example, in their responses to the posted questions, NRDC clearly made a case for raising the standard to 2%/yr. in their filed answers to the questions. Seems like that should be mentioned here.

- o Create incentives or remove the current disincentive for peak reductions and load management in order to reduce system peak loads.

Michigan's EO Potential

The Michigan Public Service Commission, DTE Energy and Consumers Energy worked together to complete a study in 2013 of energy efficiency potential in the state of Michigan. This draft study assesses electric and natural gas energy efficiency potential in Michigan over ten years, from 2014 through 2023. This energy efficiency potential study provides a roadmap for policy makers and identifies the energy efficiency measures having the greatest potential savings and the

measures that are the most cost effective. GDS Associates, the consulting firm retained to conduct this study, produced the following estimates of energy efficiency potential:

- Technical potential
- Economic potential
- Achievable potential

Summary of Key Findings in the Draft Potential Study

- This study examined 1440 electric energy efficiency measures and 811 natural gas measures in the residential, commercial and industrial sectors combined. The MPSC staff, utilities in Michigan, and stakeholder organizations all had input to the list of measures examined in this study.
- For the State of Michigan overall, the *economic* potential for electricity savings over the next ten years (2014 – 2023) ranges between 31% and 35% of forecast kWh sales for 2023. The *achievable* potential for electricity savings over the next ten years (2014 – 2023) is a range of 14.5% to 16.1% of forecast kWh sales for 2023.
- For the State overall, the *economic* potential for natural gas savings over the next ten years (2014-2023) ranges from 18.7% to 30.7% of forecast MMBtu sales for 2023. The *achievable* potential for natural gas savings over the next ten years (2014 – 2023) is a range of 10.5% to 14.7% of forecast MMBtu sales for 2023.
- The available energy efficiency potential may vary between individual utilities in Michigan.

Energy Efficiency Options and Analysis (Optimal Energy Phase 2 Study)

Building upon the Energy Efficiency Potential Study, Optimal Energy is currently conducting an analysis for Michigan to develop options for energy savings targets. The efficiency potential estimates from GDS Associates' draft potential study will be used to develop and present four concrete options for quantified annual energy and capacity targets and funding caps for years 2016-2020. In addition, the Optimal Energy Phase 2 Study will quantify options for demand targets and will explore expanded savings opportunities. The Optimal Energy Phase 2 Study is expected to be released later this fall.

Summary

- Michigan's utilities have met and are expected to meet near-term EO targets.
- The EO programs in Michigan to date, have been extremely cost-effective (~ 2 cents/kWh...less than a third of the cost of new supply resources).
- Michigan has the potential to continue to achieve incremental cost-effective savings from energy efficiency.in amounts much greater than the current 1% EO standard....

Commented [MK4]: Wow, is this under-stated. The EO results to date have been extremely positive, and the EE potential is very strong. This EE report "summary" really should reflect that reality.

[This current wording is about like describing the great Chicago fire as: "Some combustion occurred in a Midwest city". ☺]

I. Introduction

A. Summary review of the process

To inform future energy choices, the Governor requested that interested Michiganders communicate information relevant to the policy making process. As Governor Snyder directed, the Michigan Public Service Commission (MPSC) and Michigan Energy Office (MEO) engaged in an information gathering process which provided for both written and oral input from legislators and the public. This process was outlined in Appendix A to Governor Snyder's Special Message on Energy and the Environment (p. 20), entitled *Readying Michigan to Make Good Energy Decisions*.¹ The process includes identifying what information needs to be compiled or developed, and arranging for that information to be generated, as needed. As the process directs, these reports are "strictly informational and will not advocate for or recommend any particular outcome or policy." This draft report is being made available for public review and input, prior to finalization.

An Energy Efficiency page was established on the *Ensuring Michigan's Future* website.² The web page included 23 questions about energy efficiency policies and programs in Michigan, and invited readers to comment by April 25, 2013. By that date, 30 groups and individuals had submitted a total of 87 responses to the 23 questions. Table 1 presents a brief summary of the respondents. The process asked individuals to identify themselves, but in some cases only first names are provided and commenters did not identify their related professional affiliations, if any.

As Table 1 shows, 20 individuals or groups provided only one response each, one individual filed two responses, Michigan Electric and Gas Association (MEGA) filed three, another individual and the Nature Conservancy filed four each, and four different groups filed five each, including Consumers Energy, DTE Energy, 5 Lakes Energy, and the Michigan Energy Efficiency Contractors Council. Joint responses representing the points of view of multiple Michigan utility companies accounted for 15 responses, and the Natural Resources Defense Council submitted 16.

This report reviews the information provided through the public information-gathering process. Respondents answered questions regarding energy efficiency programs both in Michigan and in other jurisdictions. Specifically, the questions and this report examine Michigan energy providers' energy optimization (EO) programs. Where respondents may have disagreed in important ways, this report examines differences between the assumptions and data used to reach the differing conclusions. The intent is neither to endorse nor criticize any of the mentioned programs. Instead, it is to provide factual information to support public policy decision-making.

¹ <http://www.michigan.gov/energy/0,4580,7-230-63817-290530--,00.html>

² The *Ensuring Michigan's Future* website is <http://www.michigan.gov/energy>, and the link to the Energy Efficiency page is <http://www.michigan.gov/energy/0,4580,7-230-54284---,00.html>.

[skip to page 6]

II. Existing History with and Evaluation of Michigan Utility EO Programs

A. Introduction

Michigan's energy efficiency standards are articulated in Michigan's *Clean, Renewable, and Efficient Energy Act* (Public Act 295 of 2008, MCL460.1077).³ The law indicates that cost-effectively implementing the standard is intended to:

- (a) Diversify the resources used to reliability meet the energy needs of consumers in this state.
- (b) Provide greater energy security through the use of indigenous energy resources available within the state.
- (c) Encourage private investment in renewable energy and energy efficiency.
- (d) Provide improved air quality and other benefits to energy consumers and citizens of this state.⁴

Energy savings targets increase annually in the early years, with goals for efficiency savings identified separately for electric and natural gas utility EO programming.

Electric utilities are required to achieve savings equal to:

- 0.3% of 2007 sales in 2009;
- 0.5% of 2009 sales in 2010;
- 0.75% of 2010 sales in 2011; and,
- 1.0% of previous-year sales each year from 2012 to 2015, and, subject to section 97, each year thereafter (Sec. 77)

Natural gas utilities have targets of:

- 0.1% of 2007 sales in 2009;
- 0.25% of 2009 sales in 2010;
- 0.5% of 2010 sales in 2011; and,
- 0.75% of previous-year sales from 2012 to 2015, and, subject to section 97, each year thereafter (Sec. 77).

The law took effect in fall 2008. By mid 2009 the Michigan Public Service Commission had already issued the first orders intended to implement the energy efficiency provisions of the Act.⁵ Among other decisions, those early orders established a Michigan Energy Efficiency Collaborative, to provide opportunities for “electric and gas providers..., energy efficiency experts, equipment installers, and other interested stakeholders... to participate.” The initial goals of the Collaborative included:

- Making recommendations for improving energy optimization programs for all providers;

³ <http://legislature.mi.gov/doc.aspx?mcl-460-1077>

⁴ <http://legislature.mi.gov/doc.aspx?mcl-460-1001>

⁵ For additional details, see http://michigan.gov/mpsc/0,1607,7-159-52495_53750-217178--,00.html

Commented [MK5]: See my earlier comment on page ii. I'm concerned this may be creating an impression that the EO program annual savings requirements end after 2015. That is simply not the case.

Commented [MK6]: Ditto the above.

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- Improving EO opportunities for all customer classes, with special attention to low-income programming;
- Leveraging additional, private sources of funding for EO;
- Coordinating EO program offerings for both gas and electric utilities;
- Including non-traditional EO efforts to produce utility system benefits; and,
- Integrating EO with utility business models.

Each of these themes is reviewed in more detail in the following sections.

B. Retaining flexibility and adaptability in EO programming

Michigan utility company comments, in particular, cite flexibility and adaptability as important concerns for future EO programs. In responses to questions 3, 7, and 10, utilities express concerns that energy efficiency is an exhaustible or depleting resource, thus suggesting that flexibility in goals and spending could be required. The utilities' joint response to question 10 states, "Future savings... are likely to be somewhat more expensive to achieve than in the past." And, the joint response to question 7 reports, "DTE Energy estimates it will cost 2.9% of its electric revenue by 2015 and 4.3% by 2020 for each 1% of savings." The utilities point out challenges associated with continuing to meet Michigan's EO standard in a cost-effective manner and within the budget of the legislated 2% cap on utility revenues. For example, DTE Energy predicts higher costs and limited growth in savings for its electric EO program efforts in 2013 through 2015. DTE cites these challenges:

- gradually tightening evaluations of energy efficiency measure and program savings being used in Michigan, including adjustments to account for "free riders;"³⁵
- gradually tightening federal mandatory manufacturing standards for appliances and lighting;
- reduced forecasts for future avoided energy costs associated with lower power and capacity prices in Michigan's and the region's electricity markets;
- increasing difficulty in attracting program participants once early adopters have taken advantage of program offerings; and,
- the success of programming in the early years reducing the potential pool of future savings to be tapped.

Bill's response to question 2 also notes a proposed progression in the stringency of Michigan's energy efficiency construction code. He relates the need to verify the accuracy of predicted energy savings and evaluate the cost-effectiveness of incremental efficiency expenditures in buildings. The GDS study (2013a, p. 37) includes a discussion of similar factors, under the rubric of "naturally occurring conservation."

³⁵ The term "free rider" refers to "Participants in an energy efficiency program who would have adopted an energy efficiency technology or improvement in the absence of a program or financial incentive" (GDS, 2013a, p. 10).

Commented [MK7]: As documented on the following pages, there is abundant evidence that Michigan homes and businesses still have very large needs for energy efficiency improvements. Michigan is no-where near capturing all the "low hanging fruit". Also it is a well- documented fact that states which have been running EE programs much larger than ours for decades are still saving much larger percentages of usage than our 1% savings goal. (See the brand new 'State Energy Efficiency Scorecard' just released by ACEEE www.aceee.org)

EXCERPTS FROM MARTIN KUSHLER TESTIMONY
AT THE KALAMAZOO FORUM
March 18, 2013

KEY POINT #5:
MICHIGAN HAS ENORMOUS REMAINING POTENTIAL FOR ENERGY
EFFICIENCY

- Michigan's building stock is relatively old and inefficient (much constructed prior to advanced energy building codes)
- Recent data on existing buildings and equipment stock in Michigan shows huge need for efficiency improvements
- Other state studies on energy efficiency potential show large remaining potential.... even in states that have been doing utility energy efficiency programs for decades

MICHIGAN'S BUILDING AND EQUIPMENT STOCK IS
RELATIVELY OLD AND INEFFICIENT

Residential

- Two-thirds of residential dwellings in Michigan were built prior to 1980 -
- in the era before there were any energy codes in place in Michigan

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS11_5YR_B25034&prodType=table

Commercial

- 7 out of 10 commercial buildings in Michigan were built before 1990 - -
meaning nearly all were built before Michigan implemented the
relatively modest ASHRAE 1980 standard in 1986 (standard has been
upgraded several times since)

https://www.michigan.gov/documents/mpsc/Michigan_Commercial_Baseline_Study_367665_7.pdf

DATA ARE AVAILABLE ON THE RELATIVELY INEFFICIENT BUILDING AND
EQUIPMENT STOCK IN MICHIGAN

- *Michigan Baseline Study 2011: Residential Baseline Report* MPSC, 2011
www.michigan.gov/documents/mpsc/Michigan_Residential_Baseline_Study_367668_7.pdf
- *Michigan Baseline Study 2011: Commercial Baseline Report* MPSC, 2011
https://www.michigan.gov/documents/mpsc/Michigan_Commercial_Baseline_Study_367665_7.pdf

EXAMPLES OF RESIDENTIAL ENERGY EFFICIENCY NEEDS IN MICHIGAN,
FROM THE 2011 MPSC REPORT

- 40% of homes still don't have high-efficiency showerheads
- 82% don't have pipe insulation on hot water pipes
- 93% don't have water heater insulation wraps
- A fourth of all homes still have no CFL lightbulbs
- 3/4s of homes with crawl spaces or unfinished basements had no floor insulation or crawl space/basement wall insulation
- Nearly 30% of homes had no rim joist insulation
- Nearly 30% with finished basements had no basement wall insulation
- Over one-fourth of homes still have single-pane windows
- Nearly one-fifth of homes have heating systems over 20 years old, and 61% of homes "never" have their heating system tuned
- Over half of central air conditioners are over 10 years old (one-sixth are over 20 yrs old), and 56% of households "never" have a tune-up
- Less than half (44%) of homes had programmable thermostats
- Only 14% of washing machines were "Energy Star" qualified
- One-fourth of homes still have operating second refrigerators

EXAMPLES OF COMMERCIAL ENERGY EFFICIENCY NEEDS IN MICHIGAN,
FROM THE 2011 MPSC REPORT

- Nearly 30% of commercial buildings have no wall insulation
- Nearly half (49%) have roof insulation with R-value of R-12 or less
- 29% have single-glazed windows
- 90% have at least some inefficient T-12 lighting
- Less than 5% have the high-efficiency "Super T-8" or T-5 lighting

- 90% of do not have automated lighting controls
- Nearly a third still have incandescent exit sign lighting
- Only 18% of buildings with unitary HVAC systems have automated controls
- Less than one-fourth of buildings with air handlers have ‘variable air volume’ (high efficiency) units
- Less than a quarter (24%) of buildings with boilers have programmable thermostats or energy management systems
- Less than 10% of buildings with commercial refrigeration equipment have high efficiency measures such as heat recovery systems, high efficiency evaporator fans or floating head pressure controls