

TESTIMONY FOR THE SENATE ENERGY AND TECHNOLOGY COMMITTEE, ON THE  
*READYING MICHIGAN TO MAKE GOOD ENERGY DECISIONS ENERGY EFFICIENCY REPORT*

[Re: the effectiveness of the Michigan 'Energy Optimization' programs]

By

Martin Kushler, Ph.D.  
Senior Fellow  
American Council for an Energy-Efficient Economy (ACEEE)  
March 11, 2014

Thank-you for the opportunity to testify on this important subject.

My name is Dr. Martin Kushler, and I am a Senior Fellow with the American Council for an Energy-Efficient Economy (ACEEE). I have over 30 years of experience directing research and program evaluation in the area of utility energy programs, including 10 years as the Supervisor of Evaluation at the Michigan Public Service Commission (MPSC). I am a lifelong resident of Michigan, and work out of my office in Williamston, Michigan.

The attached material (powerpoint slides) constitutes the body of my testimony.

I would be happy to answer any follow-up questions.

Respectfully submitted,

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American Council for an Energy-Efficient Economy

**HOW MICHIGAN'S ENERGY OPTIMIZATION PROGRAMS  
...DEVELOPED UNDER PA 295...  
HAVE PERFORMED AS A UTILITY SYSTEM RESOURCE**

*Testimony to the Michigan Senate Energy and Technology Committee  
March 11, 2014*

by

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**The American Council for an  
Energy-Efficient Economy (ACEEE)**

• Nonprofit 501(c)(3) focused on energy efficiency and the economy, conducting research, communications, and conferences.

• ~50 staff in Washington DC, + field offices in DE, MI, and WI.

• Focus on End-Use Efficiency in Industry, Buildings, Utilities, and Transportation; and State & National Policy

• Funding:

- Foundation Grants (52%)
- Contract Work & Gov't. Grants (20%)
- Conferences & Publications (20%)
- Contributions & Other (8%)

[@ACEEEdc](http://www.aceee.org)

Martin Kushler, Ph.D. (Senior Fellow, ACEEE)

• 30 years conducting research in the utility industry, including:

• 6 years as President of the International Energy Program Evaluation Conference

• 10 years as Director of the ACEEE Utilities Program

• 10 years as the Supervisor of the Evaluation section at the Michigan PSC

• Have assisted over a dozen states with utility EE policies



**The data already in evidence clearly documents  
that Michigan's Energy Optimization programs  
.... Created under PA 295....  
Have been extremely successful**



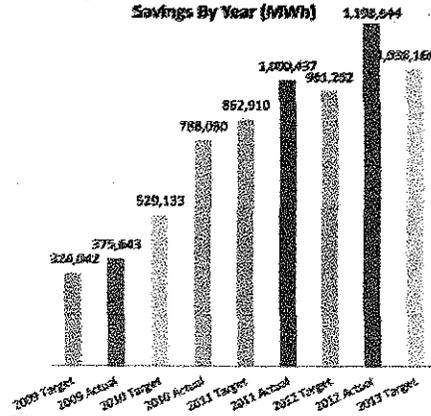
**MICHIGAN'S ENERGY OPTIMIZATION PROGRAMS  
HAVE EXCEEDED THE SAVINGS GOALS EVERY YEAR**

[Data shown are from presentation by Chairman Quackenbush, 3/4/14]

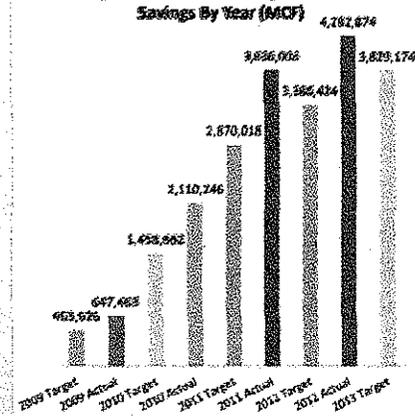
**ELECTRICITY SAVINGS VS. GOALS**

**NATURAL GAS SAVINGS VS. GOALS**

**Figure 1: State of Michigan Electric ED Savings By Year (MWh)**



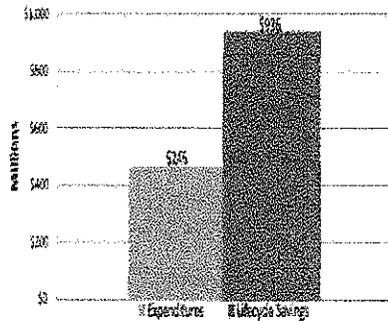
**Figure 3: State of Michigan Gas ED Savings By Year (MCF)**



## MICHIGAN'S ENERGY OPTIMIZATION PROGRAMS HAVE BEEN VERY COST-EFFECTIVE

[Data shown are from presentation by Chairman Quackenbush, 3/4/14]

Figure 5: State of Michigan Utility Cost of  
Service Savings



EO resources were obtained  
at a statewide levelized cost  
of \$20/MWh

(2 cents/kWh)

•For every dollar spent on EO  
programs in 2012, customers  
should expect to realize  
benefits of \$4.07.

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## COMPARISON OF PREDICTIONS TO ACTUAL RESULTS

In 2007, I testified before the House Energy and  
Technology Committee and stated the following:

“We have over two decades of experience showing  
energy efficiency programs can:

- Save natural gas at \$2.50/Mcf or less
- Save electricity at 3 cents/kWh or less”

I also noted that comparable costs for electricity supply  
resources were in the range of 6 cents to 10 cents/kWh

I added that ACEEE’s own studies had shown that energy  
efficiency programs produced utility system costs  
savings that exceeded the program costs by over 2 to 1

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## ACTUAL RESULTS

We now know that Michigan's Energy Optimization performance has been even better than those national averages. In their recent annual reports\* the MPSC reported:

- Energy Efficiency: **2.0 cents/kWh** (\$1.85/Mcf for gas EE)
- New gas combined cycle plant: **6.6 cents/kWh**
- New coal-fired power plant: **11.1 Cents/kWh**
- Current weighted average of power supply costs in Michigan, including purchased power: **6.4 Cents/kWh** (excluding transmission costs)
- Energy Optimization programs produce **\$4.07** in utility system cost savings for every \$1 in program costs

\* *2013 Report on the implementation of P.A. 295 Utility Energy Optimization Programs, November 26, 2013. Report on the implementation of the PA 295 Renewable Energy Standard and the Cost-Effectiveness of the Energy*

**ACEEE** Standards, MPSC 2013  
Advanced Center for Energy Efficient Economy

## CONGRATULATIONS TO MICHIGAN!

In ACEEE's **2011 State Energy Efficiency Scorecard**,

Michigan was recognized as the "most improved state" in the nation...rising from 27<sup>th</sup> to 17<sup>th</sup>.\* The report cites the importance of Michigan's 2008 legislation [PA 295]:

Michigan is "**reaping the rewards from Energy Efficiency Resource Standards (EERS) passed in 2008, which requires the state's utilities to provide portfolios of energy efficiency programs sufficient to meet a specific energy savings target that ramps up over time.**" (p. viii)

[Credit belongs to the Michigan legislature, which passed PA295 in 2008 with strong bi-partisan majorities in the Senate (26-10) and House (83-24)]

\* Michigan was again among the most improved in the 2012 Scorecard....rising to 12<sup>th</sup> in the nation. (Was 33<sup>rd</sup> in 2006)

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***Congratulations to the Michigan legislators who wisely developed the Energy Optimization policy!***

***These excellent results alone should be sufficient to support a continuation and expansion of strong Energy Optimization programs in Michigan***



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**THE BIGGER PICTURE:  
ENERGY OPTIMIZATION PROGRAMS  
IN THE CONTEXT OF PA 295**

***More broadly, policymakers and the public should celebrate the tremendous success of the fundamental energy policy shift that occurred in Michigan, with the extensive deliberations and ultimate passage of PA 295.***

**Key point:**

***The energy policy shift embodied in PA 295 has already saved Michigan ratepayers billions of dollars.***



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### SOME BRIEF HISTORY

In 2005, MPSC Staff conducted a Capacity Needs Forum (CNF) and concluded Michigan was alarmingly short of generating capacity, & needed to proceed aggressively to add capacity

In 2006, conventional wisdom was that Michigan needed 4 new large coal-fired generating plants. At least that many plants were being actively considered.

[Going against conventional wisdom, In Feb. 2006 I testified before the Senate Energy and Tech. Committee and said:

*"The CNF forecast of future demand growth is just one possible 'business as usual' scenario.... Through policies and programs, Michigan can cost-effectively reduce demand growth and the amount of generating capacity needed" ....*

I added: *If Michigan utilities spent \$100 million/yr. on energy efficiency programs, they could save \$2 to \$3 for every dollar spent on the programs [results have been very close to that]*



### MICHIGAN HISTORY LEADING TO PA 295 (cont.)

In 2007, the MPSC called "time out" on the rush to build more power plants, and conducted an extensive public process and data analysis, leading to the *Michigan 21<sup>st</sup> Century Electric Energy Plan*

One key objective of the analysis was to examine the potential for other types of resources....including energy efficiency and renewable energy....to reduce ratepayer costs compared to an 'all central generating station' supply plan

Results of that analysis showed that Michigan could save billions of dollars by adding energy efficiency and renewable energy to the electric resource portfolio to displace some new power plants



## MPSC 21<sup>st</sup> CENTURY ENERGY PLAN

*"... modeling for the Plan showed that, in the absence of any energy efficiency programming, Michigan would need no fewer than four new 500 MW baseload units by 2015 to meet forecasted demand. With energy efficiency programming, the model decreased the forecasted need to two new baseload units on a staggered basis, and with the addition of RPS, this projection has been decreased further to one new unit by 2015." (p.32)*

*"By displacing traditional fossil fuel energy, the energy efficiency program alone could save Michigan \$3 billion in electricity costs over the next 20 years." (p.33)*

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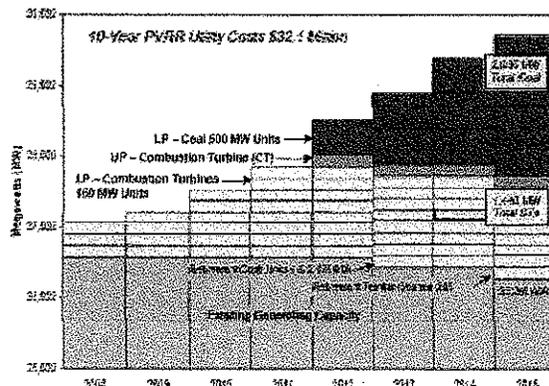
### From Michigan 21<sup>st</sup> Century Plan

(<http://www.dteq.state.mi.us/mpsc/electric/capacity/energyplan/index.htm>)

### Central Station Generation Scenario (Appendix I, p.6)

(represented "business as usual" in 2007)

Figure 4: Schedule of Cumulative Generation Additions for the Central Station Scenario



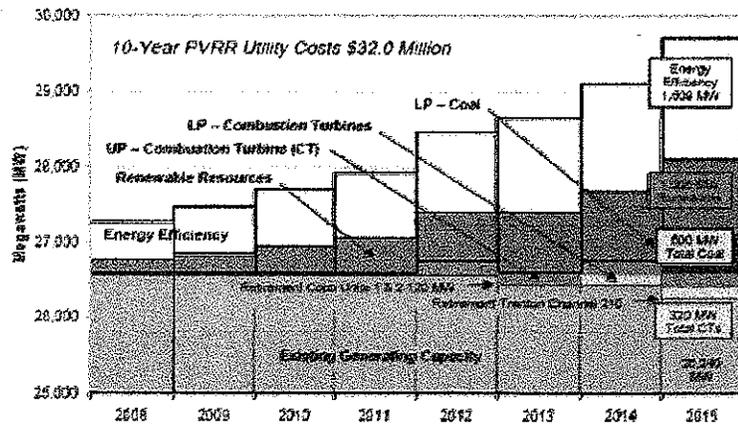
Note: LP - Lower Price Units; UP - Upper Price Units  
PVFR - Present Value of Future Requirements

Coal:  
10  
cents/  
kWh +  
carbon

nat gas  
8-9  
cents/  
kWh  
or  
8-9  
cents/  
for  
purch.  
power

## From Michigan 21<sup>st</sup> Century Plan: Energy Efficiency & Renewable Energy Scenario (Appendix I, p.7)

**Figure 5: Schedule of Cumulative Generation Additions for the Energy Efficiency with Renewable Energy Scenario**



Energy Efficiency  
3 cents/  
kWh (no  
carbon)  
Wind  
7-8  
cents/  
kWh (no  
carbon)  
A little  
gas or  
purch.  
power

Note: LP Lower Peninsula, UP Upper Peninsula  
PVRR - Present Value of Revenue Requirements

### THE 21<sup>ST</sup> CENTURY PLAN LED TO PA 295

The Michigan 21<sup>st</sup> Century Electric Energy Plan of 2007 helped lead directly to lengthy legislative hearings and ultimately the passage of PA 295 in 2008....

.....which created for the **first time** in Michigan:

1. A requirement for utility energy efficiency programs, including annual energy savings requirements; and
2. A renewable energy portfolio standard, requiring 10% renewable electricity by 2015

Essentially, Michigan has followed that "Energy Efficiency and Renewable Energy" scenario from the 21<sup>st</sup> Century Plan.

**Results:** Michigan ratepayers have avoided billions of dollars of costs for new electricity generating plants... just as the 21<sup>st</sup> Century Plan predicted.

**Congratulations to Michigan policymakers!**

(Including the members of this committee!)

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IN PA 295, ENERGY OPTIMIZATION IS BASED ON THIS CONCEPT OF ENERGY EFFICIENCY AS A 'RESOURCE'

From PA295, Section 71:

*"The overall goal of an energy optimization plan shall be to reduce the future costs of provider service to customers. In particular, an EO plan shall be designed to delay the need for constructing new electric generating facilities and thereby protect consumers from incurring the costs of such construction."*



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## ENERGY EFFICIENCY AS A 'RESOURCE'

From PA 295, Sec. 13 (d):

*"Utility system resource cost test" means a standard that is met for an investment in energy optimization if, on a life cycle basis, the total avoided supply-side costs to the provider, including representative values for electricity or natural gas supply, transmission, distribution, and other associated costs, are greater than the total costs to the provider of administering and delivering the energy optimization program...."*



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**MICHIGAN RATEPAYERS ARE ALREADY BENEFITTING FROM RATES THAT ARE HUNDREDS OF MILLIONS OF DOLLARS LOWER THAN THEY WOULD HAVE BEEN... BECAUSE OF THE PA 295 ENERGY OPTIMIZATION POLICY**

- The Attorney General technical staff estimated the annual cost to ratepayers of the coal plant proposed by Consumers Energy in 2007 was \$270 million/year
- Apply that to just the 2 coal plants avoided by the energy efficiency in the 21<sup>st</sup> Century Plan analysis= ~ \$540 million/yr. rate increase would have been in effect already
- Energy Optimization rate charges at the highest level (2012) have only been \$160 million/yr.  
\$540 million - \$160 million = \$380 million annual savings
- Ratepayers already seeing at least ~\$380 million/yr. in lower rates than if the Energy Optimization policy did not exist.

*More Broadly, had the major policy shift of 2007-2008.....culminating in PA 295...not occurred....*

*Construction would have begun on up to 4 new major coal plants.....at a cost of \$1-2 billion each....*

*Imagine the howls about "high rates" which you would be hearing had that occurred!*

*PA 295 has been an outstanding success, and should be celebrated and expanded*

**IF THE MPSC 21<sup>ST</sup> CENTURY PLAN ANALYSIS WAS REPEATED NOW:**

- **Coal plants wouldn't be selected at all**
  - Load growth is slow
  - Coal costs now are over 10 cents/kWh (vs. 6 cents in original study)
- **Energy Efficiency still by far the first priority**
- **Renewables & natural gas would fill the remaining need**

**Implications for policymakers**

- **The current Michigan policy framework is well-suited for addressing our 21<sup>st</sup> century needs**
- **The main areas for improvement would be to increase the energy efficiency and renewable energy standards**



**CONCLUSIONS**

- **Energy efficiency has been, and continues to be, Michigan's cheapest energy resource by far (one-third or less the cost of any other generation supply option); and has already helped Michigan ratepayers avoid billions of dollars in new electric generation costs.**
- **Michigan's building and equipment stock tends to be older and inefficient, and there is an enormous amount of remaining need for energy efficiency improvement (see Appendix A)**
- **The PA 295 Energy Optimization requirement should be continued, and consideration given to increasing the annual savings goals in the future. (The leading states are now saving over 2% per year.)**



**APPENDIX A:  
DOCUMENTING THE HUGE REMAINING POTENTIAL  
FOR ENERGY EFFICIENCY IN MICHIGAN**

**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 had *no* energy efficiency programs from 1996-2008

## 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=ACS\\_11\\_5YR\\_B25034&prodType=table](http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_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](https://www.michigan.gov/documents/mpsc/Michigan_Commercial_Baseline_Study_367665_7.pdf)



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## 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](http://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](https://www.michigan.gov/documents/mpsc/Michigan_Commercial_Baseline_Study_367665_7.pdf)



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

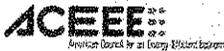
- 40% of homes still don't have high-efficiency showerheads
- 82% don't have pipe insulation on hot water pipes
- 93% don't have water heater insulation wraps
- A fourth of all homes still have no CFL lightbulbs
- 3/4s of homes with crawl spaces or unfinished basements had no floor insulation or crawl 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



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**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
- 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



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