To: State of Michigan
From: Rebecca Stanfield, Senior Energy Policy Advocate, NRDC Midwest Program
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Q10. Given current technology, how much energy efficiency is technically feasible in Michigan? What is the remaining cost-effective energy efficiency potential in MI, taking into account: 1) what has been tapped to date; and 2) what will be tapped by the end of 2015 through utility energy optimization programs?

All available evidence suggests that Michigan utilities should be able to ramp up to a level of annual electric savings equal to 2% of sales, roughly double what they are currently planning to achieve in 2013.

Introduction

The question of how much energy efficiency potential could be captured in the future in Michigan – or any other state for that matter – is a difficult to answer precisely. States commonly conduct efficiency potential studies to assess such questions. However, such a study does not currently exist for Michigan; the Public Service Commission has just commissioned one, but it will not be available until the Fall of 2013. Moreover, efficiency potential studies have important limitations that tend to lead to systematic under-estimates of achievable potential. Perhaps most notably – and by definition – they cannot fully account for the emergence of new technology, new services, or new efficiency program designs that will increase the savings that will actually be able to be achieved in the future.

Thus, while efficiency potential studies can provide some valuable insights, it is likely more instructive to examine what leading jurisdictions are actually achieving and/or planning to achieve in the near future. To be sure, there are differences between jurisdictions that could have some impact on the level of efficiency savings that can be achieved. However, more than two decades of experience with the implementation and evaluation of efficiency programs across dozens of states suggests that such differences are highly unlikely to dramatically affect the transferability of results, at least between states with roughly similar climates.

What Evidence from Leading States Suggest Should Be Possible

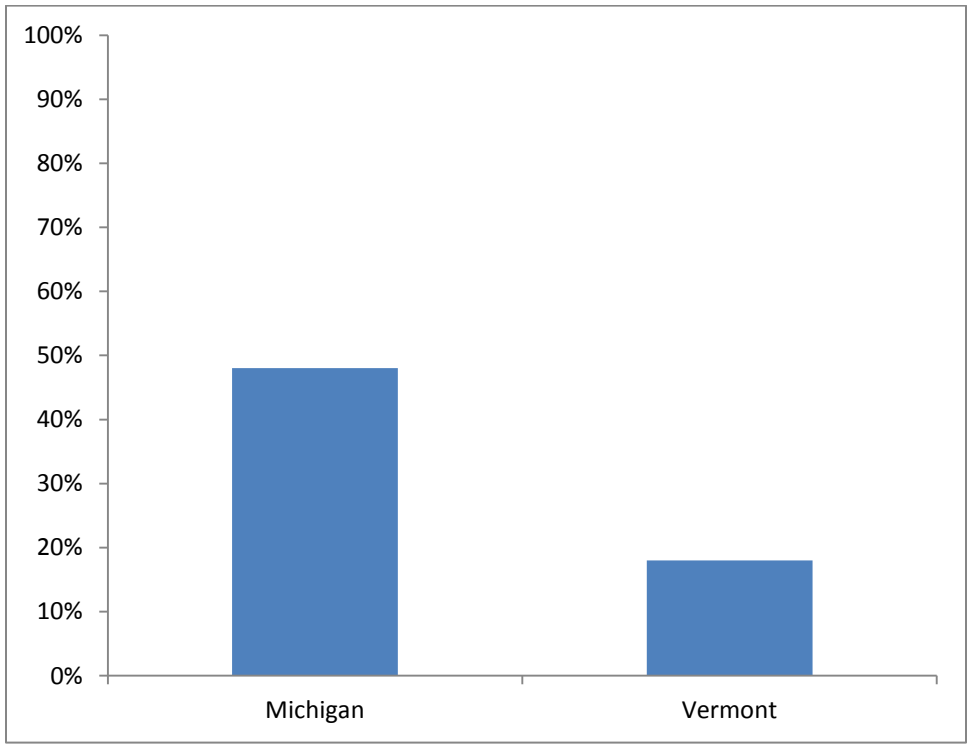
There are about half a dozen jurisdictions across the United States that are either planning or already achieving energy efficiency savings at the level of approximately 2% of annual sales or greater: Massachusetts, Vermont, Connecticut, Arizona, Rhode Island and New York. Several other states—including Ohio, Illinois and Indiana - have legislative requirements to ramp up to 2% savings as a percentage of sales over time.

While there are certainly differences between Michigan and these other states, we would not expect the differences to show that Michigan has less potential than the states listed above. Michigan would more likely have more cost-effective potential than these other states, most of which have been

engaging in aggressive energy efficiency programs for some time and have already captured more of the "low-hanging fruit."

Consider, for example, the availability of savings from efficient business lighting measures. A 2011 assessment of baseline efficiency levels in Michigan's businesses concluded that more than 40% of all lighting fixtures and nearly half of the linear fluorescent commercial lighting fixtures in use in the state are highly inefficient T-12s.[1] As the Figure 1 illustrates, that is three times the percentage than in Vermont,[2] one of the states that is both currently achieving 2% annual electric savings and planning to continue to do so well into the future.

Figure Q10-1: % of Linear Fluorescent Lighting Fixtures that are T-12s (inefficient)



A comparative assessment of residential lighting efficiency in Michigan yields a similar result. A 2011 study of baseline efficiency levels in Michigan's homes concluded that only 16% of bulbs in use were CFLs.[3] In contrast, as Figure 2 shows, CFL socket saturations in leading states like Vermont and Massachusetts are nearly roughly double those levels.[4]

Figure Q10-2: % of Residential Light Sockets with CFLs (efficient)

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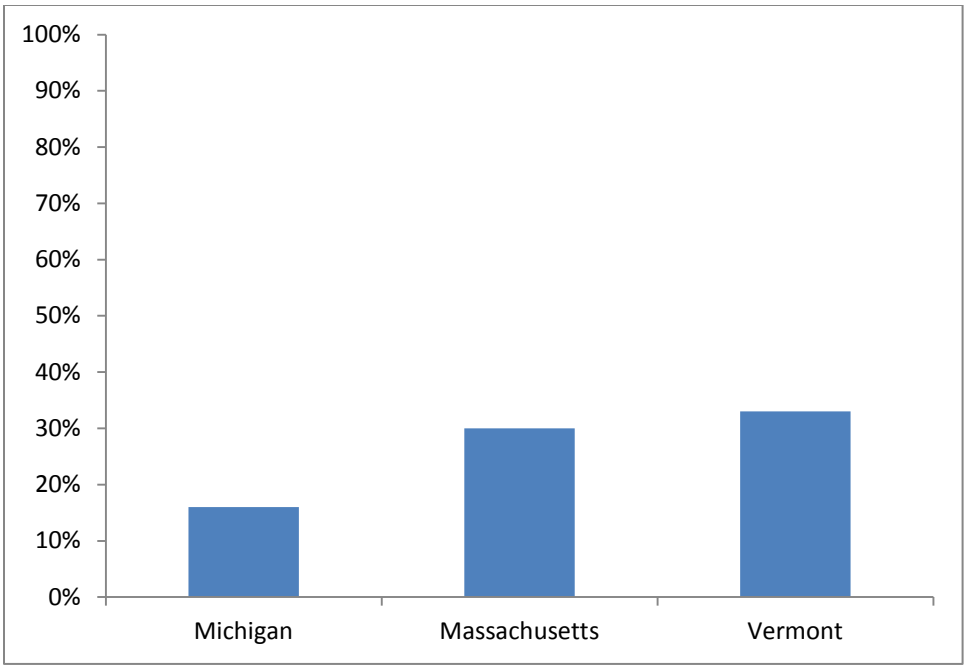
[1] The Cadmus Group, Michigan Baseline study 2011: Commercial Baseline Report, June 2011.
[2] Navigant, *2011 Vermont Market Characterization and Assessment Study: Business Sector (Commercial and Industrial) Existing Buildings*, Final, Prepared for Vermont Public Service Department, October 6, 2012.
[3] The Cadmus Group, *Michigan Baseline Study 2011: Residential Baseline Report*, July 2011.
[4] NMR Group, *Vermont Single-Family Existing Homes Onsite Report*, Final, 2/15/2013, and NMR Group, Results *of the Massachusetts Onsite Compact Fluorescent Lamp Surveys*, Final, 10/23/2012.



These differences in existing lighting efficiency levels are very important when considering remaining efficiency potential in Michigan. Lighting measures have historically dominated efficiency savings acquired by electric utility programs across the U.S., including in Michigan. For example, both Detroit Edison and Consumers Energy are planning to get nearly two-thirds of their total 2013 savings from either residential or commercial lighting efficiency measures. The fact that their customers' lighting existing lighting efficiency is so low suggests that a lot more remains to be done.

More importantly, from a comparative perspective, the fact that leading jurisdictions like Vermont and Massachusetts are already capturing 2% savings per year and planning to continue to do so well into the future despite much higher levels of baseline lighting efficiency[5] suggests that Michigan too could ramp up to 2% savings per year – probably at lower cost per unit of savings.

What Are Leading States Doing Differently?

These examples raise a broader question about what else the leading states are doing to achieve their more aggressive energy efficiency goals that Michigan is not. A preliminary assessment of the differences between the Michigan utilities' current plans for 2013 – 2015 and either recent experience or current plans of a couple of the most aggressive programs in the country—Efficiency Vermont and NSTAR in MA—suggests several important factors:

- Greater emphasis on the commercial and industrial (C&I) sector

[5] We have quantitatively compared only lighting efficiency in this document. However, there is every reason to believe that the patterns seen there would apply to other types of efficiency opportunities as well given the much longer history and much more aggressive savings targets in leading states.

- Greater emphasis on non-lighting savings, especially in the C&I sector
- Greater emphasis on cutting-edge technology
- Greater spending to achieve greater savings

1. Greater Emphasis on the Commercial & Industrial (C&I) Sector

It appears that leading states are planning to achieve a greater percentage of their savings from the C&I sector as a percentage of sales, particularly compared to Detroit Edison, as seen in the table below. This trend is likely to continue in the future as savings potential from residential CFLs diminishes.

Table Q10-1: 2013 Planned C&I Savings as a Percent of Sales

	Michigan		Leading States	
	Detroit Edison	Consumers	NSTAR (MA)	Efficiency Vermont
Savings/Sales (Overall)	1.1%	1.2%	2.5%	2.2%
Res Savings/Res Sales	1.4%	1.2%	2.0%	2.1%
C&I Savings/C&I Sales	0.8%	1.2%	2.7%	2.2%

2. Greater Emphasis on Non-Lighting Measures, Especially in the C&I Sector

Leading states are planning, and in some cases already achieving, greater levels of savings from non-lighting technologies, especially in the commercial and industrial (C&I) sector. For example, in 2013 Detroit Edison plans to get only 19% of its C&I savings from non-lighting technologies, while Consumers plans to get only 29% from non-lighting measures. By contrast, NSTAR in Massachusetts plans to get more than half (53%) of its C&I savings from non-lighting technologies, while Efficiency Vermont plans to achieve 41% from non-lighting measures.

Table Q10-2: 2013 Planned C&I Prescriptive Savings from Lighting and Non-Lighting Technologies

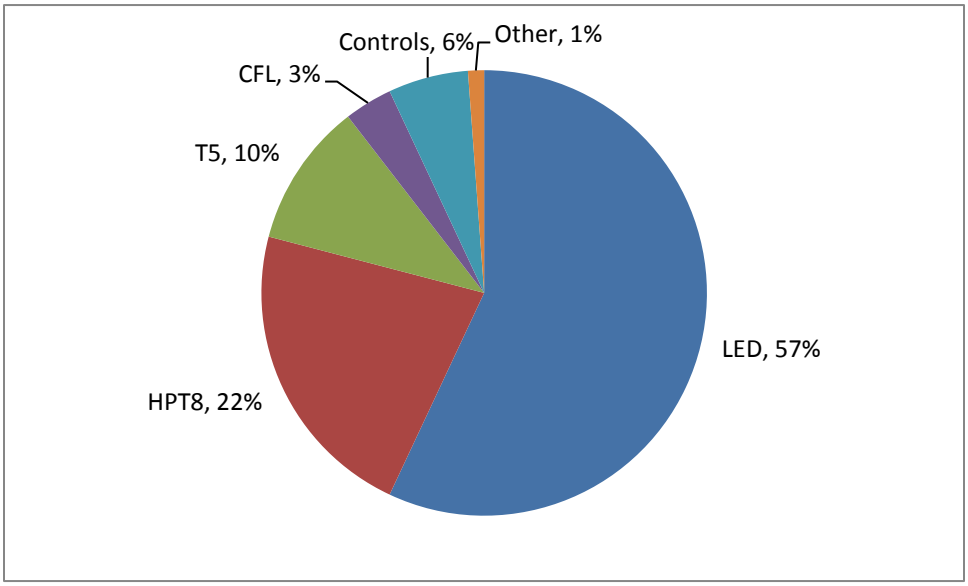
	Michigan		Leading States	
	Detroit Edison	Consumers	NSTAR (MA)	Efficiency Vermont
C&I Lighting Savings (MWh)	193,541	184,047	180,516	42,027
C&I Non-Lighting Savings (MWh)	45,717	74,146	200,403	28,766
C&I Lighting Savings (%)	81%	71%	47%	59%
C&I Non-Lighting Savings (%)	19%	29%	53%	41%

This is not to say that lighting savings are becoming less important or are being de-emphasized. Indeed both NSTAR and Efficiency Vermont are getting 50-100% more C&I lighting savings, as a percent of annual sales, than either of the Michigan utilities. However, they are also getting two to three times as much non-lighting savings as Consumers and four to seven times as much non-lighting savings as Detroit Edison.

3. Greater Emphasis on Cutting-Edge Technology

Leading states also appear to place a greater emphasis on cutting-edge technologies. For example, as Figure 3 shows, Vermont is achieving more than half of its 2012 C&I existing building lighting savings from LEDs.[6]

Figure Q10-3: Efficiency Vermont C&I Lighting Savings in 2010 (Existing Buildings only)



It appears that the Michigan utilities are planning to achieve significantly lower levels of C&I savings from LEDs. For example, Consumers Energy plans to achieve only about 6% of its prescriptive lighting savings from LEDs in 2013.

Although LEDs are perhaps the best example of emerging technology that can be tapped much more heavily – probably even more in the future than today as the products evolve to become viable options for more different kinds of lighting, as efficiency improves and as costs come down – there are a variety of other emerging technologies that offer potentially significant opportunities as well. Examples include advanced HVAC and lighting controls, advanced business customer energy usage assessments that can be used to identify and help address operational efficiency opportunities, heat pump clothes dryers, heat pump water heaters, cold climate ductless heat pumps and many others.

4. Greater Spending to Achieve Greater Savings

As Table 3 shows, while Massachusetts and Vermont are achieving much greater savings than Michigan's utilities, they are also spending more per kWh saved to do so. Put simply, going after more difficult savings often requires higher levels of financial incentives, more technical assistance and/or more marketing.

[6] Personal communication with Dan Mellinger, Efficiency Vermont's C&I lighting manager

TableQ10-3: 2013 Planned Cost per First Year MWh Saved[7]

	Michigan		Leading States	
	Detroit Edison (2013)	Consumers (2013)	NSTAR (MA) (2013)	Efficiency Vermont (2012)
Electric Spending (millions $)	$76.4	$69.2	$205.6	$32.0
MWh (first year) Saved	519,120	407,718	492,276	113,385
Cost per MWh (first year) saved	$147	$170	$418	$284

It should be emphasized that not all of the cost differences can be attributable to higher electric savings targets. For example, both the Vermont and Massachusetts efficiency budgets include funding of significant efforts – particularly in Massachusetts – to improve the efficiency of the use of unregulated fuels such as oil and propane (used by a large portion of homes and businesses in New England to provide space heating). Also, both Vermont and Massachusetts are required to spend considerably more on low income customers than the Michigan utilities are currently spending. The higher levels of baseline efficiency also undoubtedly contribute to higher costs per unit of savings.

That said, even at the cost per unit of savings in Vermont, there would be substantial net benefits associated with increasing Michigan's electric savings target to 2% per year. [8]

A Final Word

The answer to the question of how much more efficiency potential exists in Michigan and can be cost-effectively acquired in the future ideally would be informed by both (1) a rigorous analysis of current energy usage in the state, efficiency baselines for key end uses, likely changes in the future absent utility efficiency programs, and what that all suggests about remaining efficiency potential; and (2) an examination of what has been done and is being planned in other states. Though some of this work has been done, some key elements have not.

In particular, as noted above, though the Michigan Public Service Commission is about to embark on a process to conduct an energy efficiency potential study for the state, the study will not be completed until the fall of 2013. That said, other regional studies likely provide hints regarding what the potential in Michigan is. For example, an Ohio potential study conducted by the American Council for an Energy-Efficiency Economy (ACEEE) notes that electric savings equivalent to 22% of consumption is achievable

[7] This is the entire cost divided by just the first year of savings that the installed measures produce. Thus, it is not comparable to the cost of generating electricity. Such comparisons would require calculations of the levelized cost of electricity saved over the life of the savings. The Michigan utilities' forecast average levelized cost per kWh saved through 2015 is more like 2 cents.

[8] It should also be noted that NSTAR's budget is designed to achieve savings equal to 2.5% of sales –the highest (along with its other Massachusetts utility partners) in the country. The extra 0.5% above the 2% level is likely significantly more expensive than the increments below that level.

by 2025,[9] while another ACEEE potential study in Pennsylvania found that 30% of energy demand and 33% of electricity demand could be met through efficiency by 2025.[10]

Also, though we have attempted to do some comparative analysis of the differences between the Michigan utilities' current efficiency program plans (targeting 1% annual savings) and those of leading jurisdictions that are achieving and planning to continue to achieve 2% savings per year or more, there may be value to a more extensive and exhaustive comparison.

Michigan should ideally be pursuing all cost-effective efficiency opportunities. To not do so would mean saddling consumers – and the Michigan economy – with unnecessarily high energy costs, lower levels of economic development and fewer jobs. In a way, that imperative begs not only the conduct of an efficiency potential study, but a comprehensive, statewide, long-term energy resource plan in which all costs and benefits of all demand and supply-side options are weighed against each other in an integrated way.

[9] American Council for an Energy-Efficient Economy, Summit Blue Consulting, ICF International, and Synapse Energy Economics, *Shaping Ohio's Energy Future: Energy Efficiency Works*, March 2009.

[10] American Council for an Energy-Efficient Economy, Summit Blue Consulting, Vermont Energy Investment Corporation, ICF International, and Synapse Energy Economics, *Potential for Energy Efficiency, Demand Response, and Onsite Solar Energy in Pennsylvania*, April 2009.