You Can't Make Bricks Without Straw

Building a Residential Energy Code Support Program from a Utility Perspective

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ABSTRACT

Improvements in building energy codes cannot be fully realized unless targeted stakeholder education, training and outreach is provided to support increased understanding of and compliance with the minimum requirements. With Michigan's adoption of the 2012 International Energy Conservation Code (IECC), an analysis determined statewide annual energy savings of approximately 480,000 MMBtu and $4 million in annual utility bill savings for homeowners from bringing below code residential new construction up to minimum requirements. It can be cost prohibitive to improve building envelopes in existing buildings, which is why it is critical to address these measures through new construction building codes. Therefore, the two utilities serving the greater Michigan area (DTE Energy and Consumers Energy) conducted in-depth code official interviews, followed by site visits of single-family homes under construction to assess energy code implementation. This paper presents an approach developed to assess the energy savings and benefit-costs associated with implementing an energy code education, training and outreach program in Michigan.

The method focuses on the unique needs and perspectives of the utility stakeholders, while still aligning with the methodology outlined for the U.S. Department of Energy (DOE) Residential Energy Code Field Study conducted in nine other states. The sample design approach focuses the survey efforts on construction characteristics with the greatest variability and/or impact on energy use, reducing the number of site visits and study costs. State level results are presented, and highlight an attribution model developed for allocating utility territory level savings. We also discuss the applicability of this approach to the residential and commercial new construction and major renovation markets.

1. Introduction & Background

Energy code field studies are becoming more and more common across the United States. Numerous utilities have begun to investigate how savings can be claimed from educating the code official and construction communities on compliance current and future code provisions. This interest is being driven by three primary factors:

1. As efficiency markets mature, achieving state-mandated energy efficiency targets is becoming increasingly expensive. Many utilities are now looking beyond standard efficiency measures and programs to meet saving goals in a cost-effective manner.
2. Some energy savings opportunities exist only at the time of initial construction, or are prohibitively expensive to address after a structure is inhabited.

3. Studies indicate there are opportunities to help improve home performance through increased stakeholder education, training and outreach.[1]

In the fall of 2014, DTE Energy and Consumers Energy, along with efforts in nine other states, began participating in the DOE Residential Energy Code Field Study to assess residential energy code performance.[2] The study goal was to determine whether or not sufficient electric and gas savings exist as a result of raising energy code performance rates to justify a utility sponsored codes support program. It is important to note the intent was not to determine final savings values and costs associated with a codes support program, but rather to assess whether or not there was sufficient energy and cost savings to take the next step towards program design. The Michigan team included Navigant, Michigan State University (MSU), Britt/Makela Group (now part of Cadmus Group), and the Midwest Energy Efficiency Alliance (MEEA). Our team, along with the other state teams, agreed to follow the data collection and analysis methodology developed by the US DOE and Pacific Northwest National Laboratory (PNNL), in an effort to create a consistent analysis methodology. This paper details the efforts of DTE Energy and Consumers Energy to understand the potential savings from codes support while providing a framework for how utilities might structure similar studies.

From its outset, the Michigan study differed from the other studies participating in the DOE's Residential Energy Code Field Study in three critical ways. First, the Michigan study was the only project funded exclusively by investor-owned utilities (IOUs), as opposed to the US DOE. Second, the Michigan study was structured without a second field measurement, whereas the other participant studies planned to re-measure compliance rates after a codes support program. The reason for this is simple; the study's objective was to determine whether or not there was potential for savings before completing a second field study. In the Michigan study's two phases, Phase 1 would encompass all activity surrounding the field study and analysis of potential program savings, whereas Phase 2 would focus on designing and implementing an energy codes support program to procure the available savings identified in Phase 1. Lastly, the Michigan study took significant steps to reduce the total number of visits by developing an alternate sampling methodology.

Since the Michigan study would not be completing a second measurement of code performance, Phase 1 was designed to include not just analysis of projected statewide savings, but also an estimate of the savings each utility could reasonably expect the state regulator to allow. To make this determination, the team set out to identify:

- **Gross (Potential Statewide) Savings**: the total energy (electric and gas) and dollar savings available from improving new homes that do not meet energy code requirements
- **Allocation & Attribution**: the total energy and dollar savings from codes support activities occurring in each utility's **service territory,** and resulting from utility-specific efforts
- **Net (Allocated and Attributed Statewide) Savings**: total amount of savings available to each utility based on calculated statewide savings, allocation, and attribution estimates

[1] Lee, A., D. Groshans, P. Scaffer, and A. Rekkas. 2013. Attributing Building Energy Code Savings to Energy Efficiency Programs. Portland, OR: Northwest Energy Efficiency Partnerships (NEEP)
[2] Additional information on the U.S. Department of Energy's Residential Energy Code Field Study can be found at https://www.energycodes.gov/compliance/residential-energy-code-field-study

- **Relative Cost of Savings**: the per-energy-unit cost of codes-based savings

To support this effort, the project utilized a diverse array of data collection techniques. These included interviews with code enforcement officials, analysis of statewide building and energy use trends, field data collection for residential new construction sites, and modeling of collected building data. Additionally, the project made significant efforts to engage with the construction and code official communities to build awareness and buy-in for the study, including attending regional industry events and conducting direct outreach to 10 local Home Builders Association (HBA) chapters, and conducting face-to-face or phone interviews with 20 building departments across the state to establish a rapport and understanding of current enforcement practices, impediments, and possible support opportunities.

Table 1. Selected key code characteristics and targets

Code Criteria	**Estimated MI Household Energy Use**	**Expected Variability**	**Target Sample** (# of homes)
ACH50	29%	Wide	63
Duct Leakage	12%	Normal	40
Window Solar Heat Gain Coefficient/U-Factor	10%	Normal	40
Wall R Value	24%	Normal	40
Ceiling R Value	5%	Wide	63
Lighting	6%	Normal	40
Foundation *(Floor/Basement/Slab)*	14%	Wide	63

***Source**: Navigant Consulting, Inc.*

It is also important to note just as the field data collection had finished, the state of Michigan announced it was planning on transitioning to an updated version of its residential building code. This meant that while results could be interpreted relative to the 2009 Michigan Unified Energy Code (MUEC), extrapolating these results to the future construction environment would require additional consideration.

2. Field Study

In order to determine the potential savings available by improving code performance, the team first assessed baseline residential construction practices. The primary goal of field data collection was collecting information on seven energy code characteristics determined to have the greatest impact on energy performance and use. Unlike the other participating studies, the target number of sample observations for each criterion were allocated to focus data collection efforts on those

Table 2. Construction vs. sampling activity

Enforcement Authority	**Construction**		**Sample**	
	Homes	%	Sites	%
State	115	>1%	0	0%
County	2,440	20%	29	23%
Local	9,905	79%	95	77%
Total	**12,460**	**100%**	**124**	**100%**

***Sources:** US Census Bureau (2013), Navigant Consulting, Inc.*

characteristics with the greatest expected observation variability and/or a significant impact on new home energy use. Table 1 presents the sample targets along with supporting assumptions.

The field study sample was designed to collect information on specific home performance characteristics, rather than overall code compliance, for two reasons. First, the team assumed that observing all of the seven key criteria in each home visited would be difficult, if not impossible, due to the timing associated with new home construction. For example, determining compliance with the state's high efficacy lighting requirement would not likely be possible at the same time a wall insulation value was observed. Second, the project team wanted to ensure the state's major utilities were not seen as taking on a code enforcement role. As such, the team wanted to ensure the home building community that overall compliance at a single site would not be measured, and all observations would be anonymously aggregated to determine an overall performance rate for each code item.

Finally, the team would need to be confident the data collected represented new construction activity across the state with a high degree of certainty. As such, the field data sample was designed to achieve in excess of 90% confidence and 10% precision in the final energy model. The sample for each individual key characteristic is designed to achieve at least 90% confidence and 20% precision. To achieve this, the team selected each county included in the sample at random, while simultaneously ensuring the distribution of observations would be representative of construction activity occurring throughout the state. Four main sampling criteria were identified:

Table 3. Observed performance for key code items

Item	**Observations** (# of homes)	**Performance Rate**[3]
ACH50	63	97%
Ceiling R-value	79	89%
Foundation R-value *(Floor/Basement/Slab)*	63	68%
Duct Tightness	45	62%
Window SHGC & U	75	99%
Wall R-value	55	42%
Lighting	84	35%

Source*: Navigant Consulting, Inc.*

- **Climate Zone:** the sample was designed to visit sites in each of Michigan's three climate zones (5A, 6A, and 7) proportional to new construction activity within the state
- **Enforcement Authority**: the sample was designed to collect information from sites constructed under different enforcement environments to account for any differences in code implementation across different authority types (see Table 2)
- **Utility Service Territory**: the sample focused on collecting information from sites being constructed in in DTE Energy or Consumers Energy service territory
- **Jurisdiction Type**: the project sample aimed to collect data from homes constructed in cities, townships, villages, counties, unincorporated areas, or state jurisdictions to account for any differences in construction practices across various municipal environments.

[3] Performance rate is defined as the percentage of observations meeting or exceeding prescriptive code requirements

3. Analysis

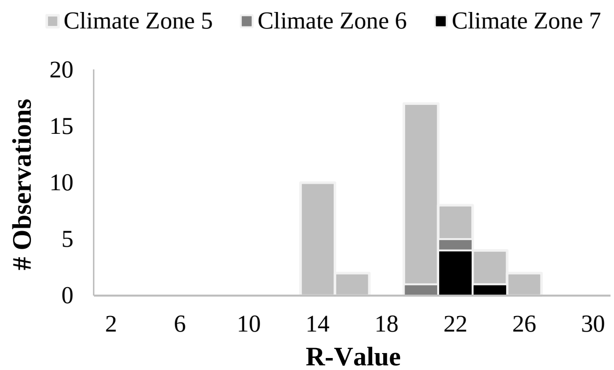
Results from the field study revealed while minimum performance rates with the 2009 Michigan Uniform Energy Code were found to vary, in most cases homebuilders in Michigan are meeting or exceeding prescribed code requirements (Table 3). The most significant identified areas for improvement in code performance were found to be frame wall insulation and high efficacy lighting, both of which had performance rates below 50%. The field study also revealed additional savings opportunities may become available after Michigan transitioned to an updated building code in February 2016, largely related to air sealing.

From 55 observations of frame wall insulation, 42% met or exceeded code requirements (Figure 3), with the highest rate of non-performance in Climate Zones 5A and 6A, with a total of 32 observations below the R-20 code (minimum. Of the under-performing frame wall insulation measurements taken, a significant number (just under 30%) were nearly compliant, with observed values of R-18 or R-19. About 23% of all observations were R-13 walls.

In addition, high efficacy lighting was observed in 84 homes, with 35% meeting or exceeding the required 50% socket saturation for permanently installed fixtures (Figure 3). Many homes were found to have construction quality bulbs installed and it was unclear whether or not these lamps would have been ultimately replaced before (or after) the time of sale by the future home occupant.

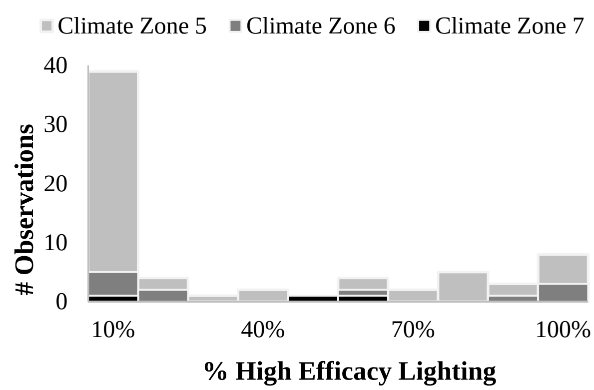
Michigan transitioned to an updated residential construction code in February 2016. One of the largest changes was the decrease in air changes per hour allowed, reduced from 7 to 4 ACH50. Of the 63 air sealing observations, 2 were above the maximum 2009 requirement, resulting in a

Figure 1. Frame wall observations



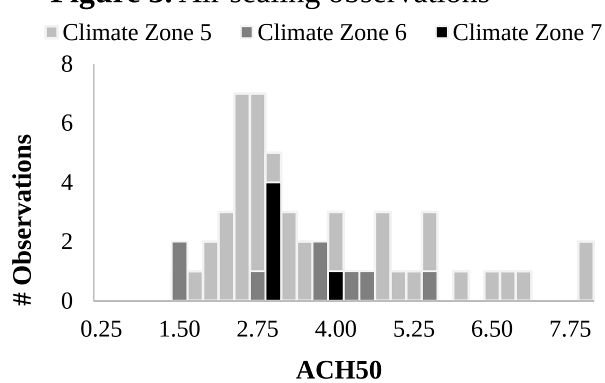
Source: *Navigant Consulting, Inc.*

Figure 2. Lighting observations



Source: *Navigant Consulting, Inc.*

Figure 3. Air sealing observations



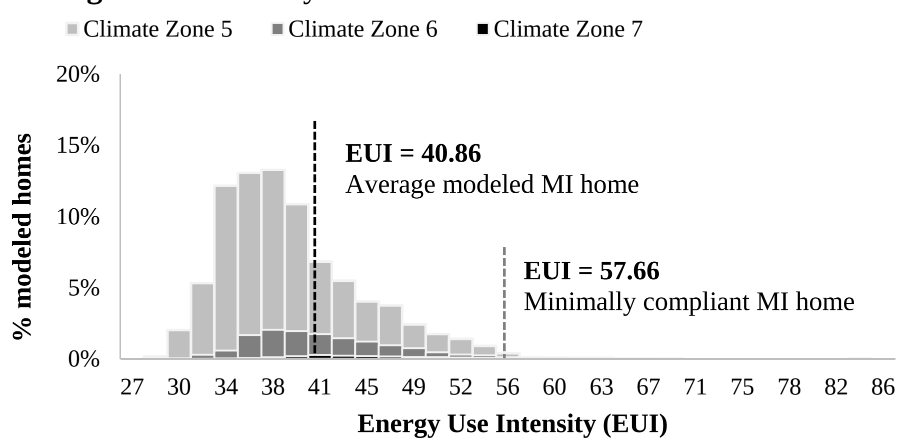
Source: *Navigant Consulting, Inc.*

performance rate of 97%. However about 30% were above 4 ACH50, indicating additional savings opportunities may be available (Figure 3).

Next, the team determined the total potential savings based on these data. To determine how best to conduct the analysis, observed key code criteria were broken down into two categories: mandatory and tradeable. Mandatory items must be addressed in all new homes, whereas the efficiency of tradeable items can be adjusted up or down as long as the 2009 MUEC minimum overall energy performance metric is met. To account for the differences in how these measures can be used to adhere to existing energy code, Navigant, along with PNNL and MEEA, pursued two separate analyses to identify potential savings resulting from each measure category.

The first analysis method was designed by PNNL and measured savings in an environment where all code items are tradeable.[4] This was done by creating 1,500 "pseudo home" models for each Michigan climate zone by drawing randomly from the observations collected for each key code criteria (Monte Carlo simulation). The results of these model runs were compared to the energy use index (EUI) of a home meeting the minimum energy code requirements to determine whether or not the "average" new construction home in Michigan would use more, less, or the same amount of energy as a home meeting the minimum requirements. In Figure 4, the grey line represents the EUI for a code minimum home in Michigan, and the black represents the average EUI for modeled homes in Michigan. This analysis revealed statewide financial savings resulting from all homes meeting the code level EUI equivalent to less than $36,000.

Figure 4. EUI analysis



Source: *Pacific Northwest National Laboratory*

The next analysis performed looked at measure-level performance across the state to determine savings in a purely prescriptive environment. The analysis looked at the energy loss specific to each under-performing measure, and analyzed potential savings by raising the observed value to the minimum compliance level. Savings values were determined on a per-home basis, and extrapolated out to the population of new home starts. This approach assumes no trades are being made between individual code elements to meet an overall performance target, and does not account for interactive effects between code items. This analysis revealed savings to be significantly higher than those determined using the EUI methodology, over $1 million worth of savings statewide.

[4] EUI analysis was based on the methodology developed by PNNL, which is described in greater detail at https://www.energycodes.gov/sites/default/files/documents/Field_Study_120715_Final.pdf

To determine how to bring these two savings estimates into alignment, and to understand the overall portion of savings resulting from each measure category (tradeable or mandatory), observed homes were broken down into three categories: prescriptive, performance, and REScheck™,[5] which uses a UA trade-off approach. Sites seeking compliance through the prescriptive path were assumed to not make measure trade-offs, and thus needed to meet all prescriptive code requirements. Homes indicating performance without REScheck™ were assumed to be trading efficiency between measures to meet a target (and thus not required to meet prescribed requirements for individual measures). In total, 35% of homes used the prescriptive compliance path, 13% the performance path without REScheck™, with 52% using REScheck™.

Homes using REScheck™ were analyzed across tradeable measures (excluding high efficacy lighting, ACH50, and duct leakage) to determine whether or not trade-offs were occurring. The results of this analysis revealed trade-offs were not occurring for the measures observed. High efficacy lighting, ACH50, and duct leakage were excluded from this analysis, since these are not used as REScheck™ inputs. This analysis compared different combinations of observed tradeable measures to determine whether or not high performance in a given measure category showed lower performance in another. If so, this would indicate trade-offs between measures occurred. Instead, this analysis showed across all tradeable REScheck™ items, homes that performed high in one area tended to perform high in other areas as well, and vice-versa.

To determine the range of realistic statewide savings possibilities resulting from improved code performance, the team first determined the measure-level savings resulting from mandatory measures. The lower bound assumed all homes were trading performance for non-mandatory measures, and thus combined the measure-level savings from mandatory measures and EUI savings to arrive at annual statewide savings of 4.3 GWh, 1.25 MMCF, and $600,000.The upper savings estimate assumed no homes make trade-offs between measure performance, and all homes met the prescribed requirements for each code element. Savings associated with mandatory measures were combined with measure-level savings for non-mandatory measures, arriving at an annual statewide savings of 5.2 GWh, 34.3 MMCF, and over $1 million. With around 87% of homes (sites pursuing the prescriptive or REScheck™ compliance paths) appeared to not be trading-off measure performance, it is likely the actual savings potential in Michigan is closer to the high end of this range, around 5.1 GWh, 29.1 MMCF, and $1 million in annual statewide savings, when weighted based on the number of homes pursuing each compliance pathway.

4. Allocation and Attribution

Once gross statewide savings were determined, DTE Energy and Consumers Energy needed to understand both the amount of savings occurring in its service territory, and the amount of savings it could expect to claim as a result of undertaking a codes support program to achieve the estimated savings. These two concepts are referred to here as Allocation and Attribution. Allocation refers to the amount of savings available to each utility based on its service territory. To develop realistic allocation estimates, the team used two specific

[5] REScheck is a group of products that allow home design and construction professionals to determine if trade-offs in a new home, addition, or renovation meet existing UA code requirements. Additional information is available at https://www.energycodes.gov/rescheck

methodologies that leveraged either energy sales or residential permit data. The purpose of using two estimation methods was to compare both estimates with the goal of arriving at a realistic range of savings both utilities could potentially claim.

Table 4. Potential Michigan utility energy savings available through codes support

Utility	**% of Electric Savings**			**% of Gas Savings**		
	% Residential Sales Estimate	% Permit Estimate	Average Estimate	% Residential Sales Estimate	% Permit Estimate	Average Estimate
Other Utilities	17.3%	21.4%	**20.0%**	13.1%	21.3%	**17.5%**
Consumers Energy	37.6%	36.9%	**37.5%**	50.5%	45.4%	**47.5%**
DTE Energy	45.2%	41.7%	**42.5%**	36.4%	33.3%	**35.0%**

Sources: *US Energy Information Administration (EIA), State of Michigan, Navigant Consulting, Inc.*

The first method used to determine utility-specific savings potential leveraged available residential energy sales data from the US Energy Information Administration (US EIA). These data, segmented by fuel type (electricity or natural gas), utility, state, and calendar year, were treated as a proxy for the amount of construction activity occurring in each utility's service territory annually. The second method used census data on new construction permits from 2013 to determine utility-specific savings potential. These data were compared to the relative proportion of utility "footprint" in each county. This weighting was done by determining the average of the number of utilities serving various townships in each county. Take, for example, a 15-jurisdiction county where all 15 jurisdictions are served by DTE Energy with 5 simultaneously served by Consumers Energy. In this example, the new construction activity in the county would be weighted 75% to DTE and 25% to Consumers Energy. This average was then rolled up to the state level to determine energy savings potential.

When comparing the results from the residential sales and permit estimates (Table 4), the team found minimal differences in the absolute proportion of utility-specific savings, on the order of 5% or less. Both estimates are presented here as a range of fuel-specific savings both partnering utilities could expect to claim from energy codes support program activity. Given the similarity between the results of these two estimation methodologies, the team was confident these methods could be used as a way of estimating allocated savings. The results showed DTE Energy and Consumers Energy could reasonably claim a combined 80% - 85% of available electric and gas savings. Of these savings, DTE Energy would be able to claim 40% - 45% of statewide electric savings and 35% - 40% of statewide gas savings. Consumers Energy would be able to claim 35% - 40% of statewide electric savings and 45% - 50% of statewide gas savings. For the purposes of determining the estimated savings available, the team used a rounded average of these estimates.

Attribution refers to the amount of potential savings a utility can claim credit for, as determined by the regulating body, as a result of a codes support program. Of the total savings available through energy code adoption and compliance, only a portion results from utility involvement in code support activities. Other savings will result from existing compliance rates, naturally occurring market adoption (NOMAD), with some savings not realized through continued non-compliance.

With that statewide savings potential in Michigan already measured through the field study, the framework already in place across the country was used to estimate likely attribution rates in Michigan. With code support programs still relatively new across the country, few program administrators have experimented with claiming savings from this type of support activity. Utility experience with claiming savings through energy codes support programs is still limited, with most programs claiming savings based on advocacy for code updates or enhancements rather than performance support. Table 5 presents an overview of attribution activity in five states. Based on these results, the team determined a program could conservatively expect between 30% and 50% of allocated savings to be attributed to code support efforts by the Michigan Public Service Commission (MPSC).

Table 5. State-by-State Comparison of Energy Codes Support Programs

State	Program Structure	Attribution Methodology	Attribution Rate
California	Research into code advancement and support and training for building community	Savings determined by Delphi panel based on code support activity	50% - 100% *(must be **verified** savings from code adoption and compliance)*
Arizona	IOUs need to demonstrate code adoption and compliance support to claim savings	To claim savings, Arizona Corporation Commission (ACC) requires IOUs to “quantify” savings through measurement and verification (M&V) study	33% - 50% *(Investor Owned Utilities can claim 33%; Salt River Project plans on claiming 50%)*
Massachusetts Rhode Island	List of activities including training, providing technical resources, and other tools	Attribution pre-determined to be between 20%, 40%, or 70% depending on program activity	0% - 70% *(depending on annual programmatic activity)*
Illinois	Provide resources to inspectors, builders, and third-party inspector reviews	Assumes activity leads to increase in compliance from 70% to 80%, and the savings associated with this are available to utilities	10% *(increase in compliance **rate**, not necessarily savings)*

Sources*: Attributing Building Energy Code Savings (2013), Claiming Savings from Building Code Activities (2012), Midwest Energy Efficiency Alliance (2015)*

5. Net Savings and Cost of Savings

After allocation and attribution estimates were determined, the team was able to establish Net Savings, or the allocated and attributed savings available to DTE Energy and Consumers Energy resulting from code support activity. Analysis revealed that should DTE Energy or Consumers Energy choose to claim savings based on code support activity, DTE Energy could reasonably expect to claim 10% – 15% of total statewide electric and gas savings, whereas Consumers Energy could expect to claim 15% - 20%. Tables 6 through 9 show the different potential energy savings estimates, for both electricity and gas, across the identified allocation and attribution ranges. These estimates use the previously-discussed weighted statewide savings values of 5 GWh and 29 MMCF. Numbers on top represent savings relative to the 2009 energy code, whereas numbers on bottom represent savings relative to Michigan's newly-adopted code. How results from the field study should be interpreted in the context of an updated energy code remains to be determined.

Table 6. Potential Electric Savings
DTE Energy, Annual MWh

		Attribution		
	%	**30%**	**40%**	**50%**
Allocation	**40%**	610 1,100	820 1,470	1,020 1,840
	45%	690 1,240	920 1,660	1,150 2,070

Table 7. Potential Electric Savings
Consumers Energy, Annual MWh

		Attribution		
	%	**30%**	**40%**	**50%**
Allocation	**40%**	460 830	610 1,100	770 1,380
	45%	540 960	720 1,290	900 1,640

Table 8. Potential Gas Savings
DTE Energy, Annual MCF

		Attribution		
	%	**30%**	**40%**	**50%**
Allocation	**40%**	3,060 8,790	4,090 11,720	5,110 14,650
	45%	3,500 10,040	4,670 13,390	5,840 16,740

Table 9. Potential Electric Savings
Consumers Energy, Annual MCF

		Attribution		
	%	**30%**	**40%**	**50%**
Allocation	**40%**	3,940 11,300	5,260 15,070	6,570 18,840
	45%	4,380 12,560	5,840 16,740	7,300 20,930

The next step in understanding whether or not to move forward with a codes support effort was to determine the cost-effectiveness of a potential program. To do this, the team compared the estimated cost of a codes support program to the net fuel-specific savings resulting from that program. The cost of implementing a support pilot program was assumed to be $120,000, based on existing codes-related activity by DTE Energy. This cost was assumed to cover leading 15 educational events with code officials and home building organizations across the state (targeting 750+ attendees), along with the development, distribution, and support of educational materials to various stakeholder communities.

To determine the cost of savings, the team used the average allocation estimates (42.5% and 35% of statewide electric and gas savings, respectively) and an attribution rate of 40%. Assumed program costs were then allocated between fuels based on the relative portion of energy savings (38% electric, 62% gas). This approach resulted in about $46,000 spent to procure electricity savings, with $74,000 for gas related activities. Comparing this to net savings revealed the cost of electric savings was $51.91 per MWh,

Table 10. Cost of savings

Utility	**Electric** ($/MWh)	**Gas** ($/MCF)
DTE Energy	$170.28	$20.03
Consumers Energy	$201.48	$27.67
Code Support	$51.91	$18.66

***Sources**: Navigant analysis, MPSC Case No. U-17351, MPSC Case No. U-17762* and $18.66 per MCF. Comparing these per-unit savings costs to those forecasted by DTE Energy (and $170/MWh) and Consumers Energy (and $201/MWh) revealed that, while modest in size, the savings are relatively affordable.[6]

6. Next Steps and Concluding Thoughts

Field data collection revealed that overall, homebuilders in Michigan are meeting or exceeding existing prescriptive code requirements for all but two of the observed code elements, indicating a large portion of the energy savings potential from the residential energy code is being achieved in the field. The implications of this fact are twofold:

- Given the high compliance rates for most key code characteristics as determined from the field study, newly constructed homes in Michigan are doing a good job meeting most of the minimum energy code requirements.
- There is modest opportunity for Michigan utilities to claim savings for activity aimed at raising overall home performance to meet minimum energy code requirements.

While small, the study did reveal opportunities for enhancing new home performance in leading to measureable energy savings. The majority of savings would be generated by improving wall insulation and high efficacy lighting in newly–constructed homes. Additionally, a codes support program would provide new ways to support the construction and code official communities across the state. Additionally, the relative cost of projected savings is fairly low compared to other energy efficiency programs. Further, additional savings opportunities exist in enhancing the air sealing performance of new homes relative to Michigan's newly-enacted residential energy code.

A compliance support effort also presents a unique opportunity for continued collaboration between Michigan's two largest utilities. Since many homebuilders operate across the state, and savings are claimed based on service territory, the resources provided by each utility do not detract from the savings each can claim. Instead, the more resources made available through collaboration to assist code officials and homebuilders, the more effective the program. The savings DTE Energy can claim from a codes support program will at the very least stay the same if another utility offers funding, and may actually increase as more trainings are offered and more resources are made available to the industry.

There is also the question of how the results of the field study can be interpreted in the context of Michigan's newly-adopted energy code. Since the study determined performance of the 2009 energy code just as an updated code was on the verge of implementation, and assuming compliance increases over time, it would stand to reason code performance was measured at its highest level. Any program implemented would instead be creating savings in a new code environment, at the beginning of the code's lifecycle, when performance rates are likely to be lower. The level with which compliance rates would be lower will remain unknown until a second field study is conducted. The question then becomes how performance on specific code criteria can be extrapolated from one code environment to the next. While expecting

[6] Numbers represent an average of forward-looking per-unit cost of energy savings, as determined by Navigant Consulting after reviewing regulatory plans filed by each utility with the Michigan public Service Commission (MPSC)

homebuilders to meet a future code when assessing performance is not fully appropriate, neither is assuming similar adherence to the new code starting immediately at the time of implementation. As DTE Energy and Consumers Energy continue to weigh these considerations and determine whether or not to pursue claiming savings from a codes support program, DTE Energy has launched a pilot codes support program focused on capitalizing on the field study's momentum by educating the code official and construction communities. The goal of the project is to provide training opportunities to stakeholder groups on changes to Michigan's energy code, along with opportunities to enhance compliance rates. Training curricula are designed to incorporate findings from the field study, with additional time allotted to address strategies to comply with the wall insulation, high efficacy lighting, and air sealing requirements. The project is targeting 15 trainings across the state, and is on pace to educate more than 750 stakeholders.

Based on the performance of this pilot, coupled with the results from follow-up discussions on the relative benefits of a codes support program, DTE Energy and Consumers Energy will determine whether to continue the project beyond the pilot phase. Should either company decide to claim savings from this activity, several steps will likely need to take place:

- **Convene Working Group**: First, DTE Energy and Consumers Energy will need to establish a working group to create a framework for claiming savings from energy codes support activities. The group would include state officials, code enforcement officers, utilities, the construction community, and other stakeholders. Michigan's existing Energy Efficiency Collaborative would serve as the ideal starting place to launch such a group.
- **Solidify Allocation & Attribution**: If DTE Energy and Consumers Energy move forward, they plan on refining the estimates presented above, beginning with allocation claims. This effort would likely include a GIS analysis of new construction starts across the state to determine the exact proportion of activity occurring in each utility's jurisdiction. At the same time, DTE Energy and Consumers Energy would help establish a Michigan-specific attribution framework. This effort would involve convening a Delphi Panel with experts representing various roles within the industry to determine an agreed-upon level of attribution for energy codes support activity.
- **Cost-Effectiveness**: Once allocation and attribution levels are fully understood and potential net savings are agreed upon, DTE Energy and Consumers Energy will reassess cost-effectiveness to determine whether or not the finalized numbers represent sufficient opportunity to further develop a codes support program.
- **Design Program**: If the resulting analysis indicates claiming savings is feasible and cost-effective, DTE Energy and Consumers Energy will need to design, implement, and ultimately evaluate a codes support program.

As efficiency markets continue to mature, determining how savings through building code adoption and support can be claimed is increasingly becoming more common. It is DTE Energy's and Consumers Energy's intent that the framework presented here, along with the lessons learned from the field study, can streamline this process for any organizations interested in pursuing a codes support program.

8. References

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