

A New Frontier: Capturing Savings From Code Advancement

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ABSTRACT

As building codes become more stringent and increasing baseline efficiency reduces new construction program cost-effectiveness, program administrators face increasing difficulty generating savings in the new construction market. This problem is compounded by the diminishing role of lighting as a source for low-cost savings. Fortunately, a Code Advancement program model can provide some relief in this sector. During the 2018 building energy code adoption process in Massachusetts, the program administrators developed and submitted three commercial amendments and two residential amendments to the 2018 IECC that were ultimately adopted into the state's building energy code. Our team developed a framework to estimate the gross technical potential savings for each of the five amendments and attribution factors for program administrators' efforts. We estimated the five amendments would result in 138,153 MMBtu of combined gas and electric savings through the year 2026 with minimal financial expenditure when compared to incentive based new construction programs. We estimated an attribution factor of 90%, indicating that it was unlikely that similar amendments would have been adopted without the program administrators' efforts. This paper details the efforts taken by the program administrators to get their five amendments promulgated. It summarizes the key actions taken by the program administrators that resulted in a relatively high attribution factor while also explaining what evidence would have been needed to claim an attribution factor of 100%. In addition, this paper discusses the currently-developing policy framework to integrate future Code Advancement efforts into statewide evaluations and the complications resulting from mixing code advocacy efforts with typical new construction programs.

Introduction and Background

In 2018, the Massachusetts Board of Building Regulations and Standards (BBRS) began considering the adoption of a new state-level building energy code based on the 2018 International Energy Conservation Code (IECC). The code adoption process in Massachusetts allowed any stakeholder to submit amendments to the IECC to be adopted by the BBRS into state's building energy code. The Massachusetts Program Administrators (PAs) decided to develop and submit energy efficient code amendments to the BBRS for adoption and thus piloted their first state-level building energy code advocacy program.

The PAs were motivated by the potential to generate low-cost energy savings and by examples set by other utilities in California that had claimed savings for code advocacy efforts. With the opportunity for lighting savings decreasing, and increasingly stringent building energy codes making it particularly difficult for new construction programs to claim savings, code advocacy offered a chance to get "ahead of the game" and lock in savings for years to come. While typical programs only reach the program participants, making changes to the building code affects all buildings built under the applicable code.

Specifically, the PAs developed, proposed, and advocated for seven energy-efficiency amendments to the state-level building code. Ultimately, the BBRS adopted three commercial and two residential amendments proposed by the PAs. The amendments concerned interior lighting power density

allowances, daylighting controls, exterior lighting, residential efficiency packages, and residential insulation installation quality. An evaluation was conducted to estimate the gross technical potential (GTP) savings resulting from the five amendments and to determine an attribution factor for the PAs' efforts (NMR 2020). Since the publication of the evaluation in 2020, evaluators and key stakeholders have gained additional insights into code advocacy efforts' interactions with other energy-efficiency programs and PA planning. The Massachusetts PAs' journey through code advocacy implementation, evaluation, and claiming of savings can inform similar efforts in other jurisdictions.

Implementation

Understanding the Regulatory Environment

Any PA seeking to engage in a code or standard advocacy program must first start with an understanding of the target code or standard environment. PAs need to know the details of the development and adoption process, including opportunities for input, key decision makers, and the enforcement regime. Below, we discuss the environment relevant to the Massachusetts PAs' 2018 code advocacy efforts.

The code adoption process was overseen by the BBRS, which had a statutory obligation to adopt the 2018 IECC with approved amendments within one year of the 2018 IECC's publication. The BBRS held monthly public meetings starting in May of 2018 to consider the IECC. Any stakeholder could submit amendment proposals and advocate for them at the BBRS meetings. Before voting on energy-related amendments, the BBRS requested feedback from its Energy Advisory Council (EAC). The EAC includes industry professionals and energy-efficiency experts and was chaired by a representative from the Department of Energy Resources (DOER). During an interview with our team, a member of the BBRS said they tend to defer to the conclusions of the EAC when voting on energy-related amendments. Therefore, the EAC and DOER were significant decisionmakers in the process. The BBRS sent the 2018 IECC version with their approved amendments to the Governor's office in late 2019. The Governor's office conducted health and safety and legal reviews but did not shape the code itself. After the Governor's office promulgated the code, the code became law in February 2020. Typically, there is a six-month grace period following the Governor's promulgation before the code goes into effect, but due to COVID-19, this grace period was extended to nine months, resulting in the code becoming effective in November 2020. In this paper, we refer to this code as the base code.

Crucially, the base code is developed at the state level and then applied statewide. This informed the PAs' code advocacy efforts because it meant the PAs should focus their efforts on state government proceedings. In other states that have stronger *home-rule* provisions than Massachusetts, municipalities may have authority over their own building codes. Advocacy efforts in those states should differ from the effort discussed in this paper.

Massachusetts also has a *stretch code*, which is intended to be more stringent than the base code. The stretch code is also developed at the state-level but only applies to buildings in municipalities that have adopted the stretch code. The PAs' 2018 efforts only applied to the base code because the stretch code is updated on a different cycle. It is possible that energy-efficient amendments in the base code could increase the stringency of the following stretch code; however, there is no current framework for PAs to claim savings from such an impact.

Figure 1 shows the timeline of the 2018 IECC code adoption process in Massachusetts. Note that while Massachusetts state law required the BBRS to adopt the updated base code by September 2018, this deadline was not met. Code adoption processes are prone to delays, which affects when savings are realized.



Figure 1. Timeline of 2018 IECC Code Adoption Process in Massachusetts. *Source:* NMR 2020.

The PAs' 2018 Efforts

Between June and August of 2018, the PAs brainstormed and selected code advancement proposals to pursue. To generate ideas, the PAs looked across a range of sources for potential code provisions that could be easily incorporated into the Massachusetts state building energy code given the nuances of the Massachusetts construction market and the local climate. The sources included, but were not limited to, codes in other states, the New Buildings Institute (NBI) Stretch Code Provisions, and ASHRAE 189.1 Standard for the Design of High-Performance, Green Buildings. One PA representative said they were looking for “things that wouldn't require tremendous investment on [their] end to create something new.”

After collecting ideas for possible code advancement proposals, the PAs conducted a high-level analysis to select proposals that had (1) the highest potential magnitude of savings and (2) the lowest additional costs to builders. The PAs engaged their implementation contractors for both the Residential New Construction program and the Codes and Standards Compliance and Support Initiative. The PAs also engaged an engineering firm to help vet and select the potential proposals by providing technical and industry expertise.

The PAs only selected proposals that were different from every other proposal that had already been submitted to the BBRS. The PAs benefited from engaging in the code amendment and adoption process months after the BBRS had started their consideration of the 2018 IECC. By the time the PAs got involved, many stakeholders had already submitted their own amendment proposals. The DOER, the most active proponent of amendments, had already made its final presentation to the BBRS regarding the DOER's own proposals. Therefore, the PAs could confidently select proposals that differed from all other

submitted proposals and would represent additional energy savings beyond what would have otherwise been in the code.

Note that while the late-entry approach worked for the PAs in this instance, it may prove detrimental in other code advocacy efforts. The PAs overcame challenges resulting from their late entry into the 2018 code development process by selecting simple proposals, working expediently, withdrawing two complicated proposals, and benefiting from a process that was delayed by forces beyond the PAs' control. In a less favorable scenario, late-entry could result in not having enough time to build momentum for proposals, missing filing deadlines, and not having enough time to provide sufficient evidence to justify the proposals.

After selecting the proposals, the PAs conducted their own research and coordinated with industry experts to calculate high-level savings estimates before submitting the proposals to the BBRS in October of 2018. The PAs then reached out to various stakeholders, including municipal code officials, Home Energy Rating System (HERS) raters, the International Association of Lighting Designers (IALD), the Design Lights Consortium (DLC), and the Massachusetts Area Planning Council (MAPC) for feedback on their proposals and to gain written comments of support. From November 2018 to February 2019, the PAs revised their proposals based on feedback from the BBRS, EAC, DOER, and IALD.

Finally, in March of 2019, the BBRS approved five of the PAs' proposals, as shown in Table 1, with the remaining two withdrawn by the PAs based on feedback from the EAC. In May of 2019, after the BBRS had approved the PAs' proposals but before the codes had been finalized by the state, the National Association of Industrial and Office Properties (NAIOP Inc.) submitted a proposal to undo the C1 proposal relating to interior LPD. The PAs attended the BBRS meeting in May 2019 to advocate against the NAIOP proposal, which was ultimately rejected by the BBRS—thus approving the C1 amendment.

Table 1. PA Proposals Adopted into the Massachusetts State Building Code

Proposal Name	Description
C1: More Stringent Interior LPD	Reduces maximum allowable interior LPD in Section C405.3.2)
C2: Lower Exterior LPD	Requires projects selecting the second optional requirement in C406.1 to reduce exterior lighting power 10% from the maximum level allowed by code.
C3: Expansion of Daylight-Responsive Controls	Lowers watt threshold above which daylight-responsive controls are required for a space
R1: Additional Residential Efficiency Packages	Adds a new section to residential code prescriptive path requiring homes incorporate at least one high-efficiency package from a list of seven packages (e.g., efficient HVAC equipment, efficient water heaters, or heat/energy recovery systems)
R2: Grade I Insulation Installation	Clarifies that Grade I (i.e., "proper") insulation installations are required.

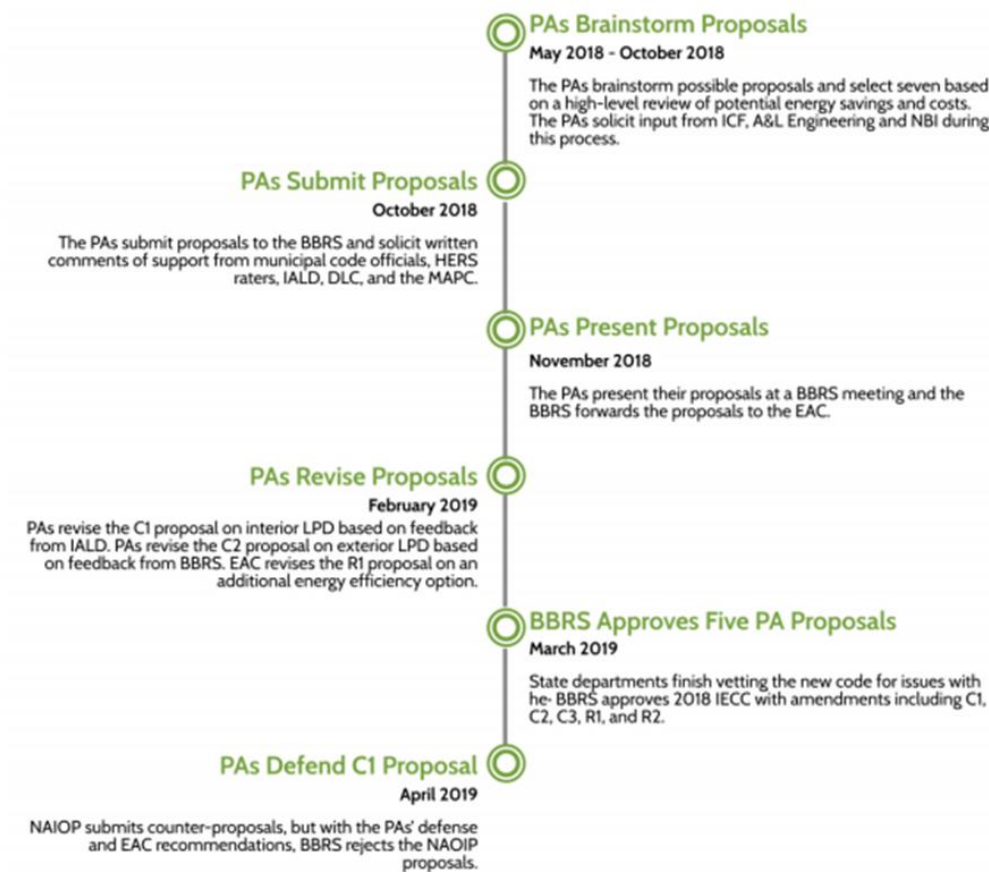


Figure 2. Timeline of PA amendment Process in Massachusetts 2018 IECC. *Source:* NMR 2020.

Evaluation

Code advocacy programs require evaluations to (1) estimate savings and (2) determine what share of the savings are attributable to the PAs. This section summarizes the methods used to evaluate the Massachusetts PAs' 2018 Code Advocacy efforts. For detailed methodologies, data sources, and findings, see NMR 2020.

Estimating Savings

To develop savings estimates, the evaluation team developed separate GTP methodologies for each amendment. Note that savings from code advocacy do not accrue until buildings are completed years after the advocacy work is over. This is because the code must go into effect before buildings can be built under that code. When developing and selecting proposals, evaluators can estimate GTP savings using forecasts for variables such as construction activity. Such analysis also includes assumptions about future standard practices and naturally occurring market adoption of efficient practices. When claiming savings in later years, PAs can increase confidence by using actual data and ISP evaluations to recalculate savings.

When calculating savings, the team followed an approach similar to those conducted for code advocacy efforts in California (Lee et al. 2012). The approach involves estimating the GTP savings individually for each amendment and then adjusting for industry standard practice (ISP) and code

compliance. The ISP adjustment reduces GTP for the portion of the market that naturally performs better than the 2018 IECC requirement for that measure up until the efficiency of the amended requirement. If the entire market would comply with the amended requirement naturally, then the ISP adjustment is 100% and there are no savings generated by the amendment. If the entire market would perform better than the unamended 2018 IECC requirement, but not as good as the amended requirement, then the ISP adjustment is between 0% and 100%. The team based the ISP adjustments for this study on literature reviews from recent Massachusetts evaluations, including the 2018 “Massachusetts Commercial Energy Code Compliance and Baseline for IECC 2012.” For a full discussion on ISP adjustments for each amendment, see NMR 2020.

The code compliance adjustment reduces GTP due to buildings that would not comply with the new amendments. During the advocacy period, this can only be estimated since future compliance is unknown; however, when claiming savings in later years, PAs can conduct code compliance studies to calculate an accurate value. As an initial estimate, the study forecasts that the five amendments would result in 138,153 MMBtU of combined gas and electric GTP savings through the year 2026. For a full methodology for each of the five amendments see NMR, 2020.

Determining Attribution

To develop attribution factors, the team conducted a process evaluation involving a detailed document review of all PA records relevant to the 2018 IECC code amendment adoption process. This included internal meeting minutes, internal correspondences, records and minutes from meetings with stakeholders, emails and other correspondence with stakeholders, amendment proposal drafts, amendment proposal research, estimates of the GTP savings associated with each of the proposed amendments, and other documentation. Additionally, the evaluators reviewed all publicly available documentation for the state-level code adoption process. Most importantly, the evaluators then conducted in-depth interviews (IDIs) with representatives from all key stakeholders in the code adoption process, including the PAs, BBRS, EAC, DOER, and other active stakeholders and advocacy groups.

Evaluators sought to determine how likely it would have been for similar amendments to those submitted by the PAs to have been adopted into the code without the PAs efforts. Evaluators had to answer the following questions:

- **Would another party have submitted similar proposals?** Reviewing hearing minutes and submissions can reveal if similar proposals were discussed or submitted by other parties. However, it is also important to determine if any party chose not to submit a similar proposal after seeing proposals submitted by the PAs. To ascertain this possibility, the team interviewed participants in the code development process. This included people who submitted comments or just followed proceedings. The team asked interviewees if they knew anyone that was tracking or participating in the proceedings or had considered submitting similar proposals. In one interesting example, a few interviewees mentioned that one specific entity may have been considering submitting a similar proposal to that of PA amendment. When interviewed, the representative from that entity detailed the proposals they had considered that differed from the PAs’ amendments’ scope and confirmed that they were never going to submit a similar proposal.
- **How important was advocacy from another party in getting the proposals adopted?** Once a proposal is submitted and becomes public, other parties might advocate on behalf or against its adoption. Evaluators must seek to ascertain the relative influence of all proponents. The team reviewed meeting minutes and documents to see who had advocated for the proposals. The team also asked participants in the process to reflect on who were the most influential advocates. Once

proponents were identified, the team sought to determine how and why each proponent got involved. Many proponents got involved because they were contacted by the PAs to submit comments in favor of their proposals and noted that they were unlikely to submit comments without the PAs' invitation—this was important to note in terms of attribution. The team also identified an industry group that opposed the PAs proposals. The team explored the responses to the opposition and the role played by the PAs in countering the opposition.

The team convened two conference calls in June and July of 2020 to discuss how to interpret the evaluation results and establish an attribution factor for the PAs' 2018 code advocacy efforts. The first call included representatives from the DOER, PA implementation staff, PA evaluation staff, the Energy Efficiency Advisory Council (EEAC), and the evaluation team. The second call only included representatives from the EEAC, the PA evaluation staff, and the evaluation team. The team provided the group with an interim report showing all the gathered evidence and facilitated a consensus conversation. The group quickly determined that the eventual attribution factors should be relatively high (i.e., close to 100%) for the following reasons:

- The PAs' submitted their proposal late in the code adoption process; therefore, they were able to choose proposals that were not being advanced by other parties.
- Key stakeholders affirmed that it would have been unlikely for similar proposals to have been approved without the PAs' involvement.
- Nearly every individual or organization that supported the adoption of the PAs' proposal was solicited by the PAs.

The group then discussed whether the attribution factor should be 100% or a slightly lower value. During the second call, the group unanimously agreed that 90% was an appropriate attribution factor for the PAs' efforts to promulgate the five amendments for the following reasons:

- **Evidence not meeting a high enough standard to justify 100% attribution factor:** Using a 100% attribution factor implies that there was no chance that another individual or organization would have submitted or advocated for similar proposals without the PAs' efforts. While the document review and IDI findings indicated that it was unlikely that another individuals or organizations would have submitted or advocated for similar proposals, working group participants felt the evidence did not indicate that the submittal of similar proposals was impossible without the PAs. For example, two of the non-PA respondents indicated that it was possible that another organization might have submitted similar proposals in the absence of the PAs' efforts, although they did not name any other organizations specifically. One said, "I did not know of any other organization that was planning to propose similar amendments, but maybe they saw that [the PAs] had it covered so they did not have to." Such equivocal responses from IDI respondents did not meet the high evidentiary standards required to justify a 100% attribution factor.
- **False precision resulting from the small sample size of IDI participants:** While the sample of IDI participants seemed to represent all the key participants in the 2018 IECC adoption process, it was a small sample. For the sake of discussion, the team calculated an average attribution factor based on the values provided by interviewees. This resulted in an overall attribution of 88% across the five amendments—a value that aligned with the group's consensus that the attribution factor should be high but not 100%. Still, the group felt using the 88% value implied a quantitative certainty that did not exist given the small sample size (n=5).

The group also discussed the following three issues:

- **“Necessary” vs. “Sufficient”:** The group discussed that the PAs were “necessary” in the promulgation of the five amendments but not “sufficient,” since the amendments would not have been promulgated without the support of EAC and the voting of the BBRs. The group considered determining attribution factors based on the extent to which the PAs were “necessary” or the extent to which the PAs were “sufficient.” Following what the group felt was an industry standard, the group elected to determine attribution based on the extent to which the PAs were “necessary” while requiring a high evidentiary standard to achieve 100%.
- **“Precedent”:** The group discussed the fact that setting attribution at 100% might set a precedent for similar activities moving forward. The group asked, “if we assign a 100% attribution factor in this case, are there future scenarios in which the PAs’ efforts would result in partial attribution factors, or would attribution become a binary choice between 0% and 100%?” A number of scenarios were discussed in which the PAs’ efforts could result in partial attribution factors, including instances where the PAs advocate for a proposal developed by another organization or instances where another organization provides substantial and crucial advocacy for a proposal developed by the PAs. Additionally, the group noted that the unique attribution scheme developed in this study may become obsolete in the near future given changing policy frameworks in Massachusetts.
- **Future Attribution Assessments:** The group briefly discussed how future attribution assessments will likely need to be structured differently to account for the complexity associated with most future code advocacy efforts. The late intervention of the PAs in the 2018 IECC code adoption cycle simplified the attribution process, although it also highlighted how even *simple* questions can be quite complex. The group felt, moving forward, the PAs, EEAC, and evaluation consultants should consider developing guidelines for future attribution assessments in this research area. California has historically used a more formalized process including independent expert judgement to determine attribution. This is an approach that can be reviewed as a starting point for developing recommendations regarding future attribution methods in this area. To date, this procedure has not been solidified in Massachusetts.

The consensus group recommended an attribution factor of 90% for the PAs’ efforts to promulgate the five amendments to the 2018 IECC in Massachusetts. The 90% value was the consensus value from the conversations between the EEAC, the PA evaluation staff, and the evaluation team, which considered all the documentation and interviews reviewed during this study. The value reflects that the PAs’ efforts were necessary for the promulgation of the five amendments, but that there was a small amount of uncertainty regarding whether similar amendments would have been submitted without the PAs’ involvement.

Note that for this study, attribution was determined after the PAs’ intervention; however, a regulatory regime could allow attribution factors to be deemed beforehand. An EM&V approach can allow for more certainty and capture originally unexpected impacts of the PAs or other actors. Yet, an EM&V approach still relies on a level of subjective interpretation. While the 90% attribution factor for the Massachusetts PAs’ 2018 code advocacy effort was reached unanimously by a consensus group, the discussions started with various stakeholders looking at the same evaluation results and recommending different attribution factors. The group was able to reach a consensus, but such a resolution could prove more illusive if the code adoption and advocacy process is more complicated than it was in this instance. A deemed attribution factor can acknowledge the inherent speculative nature of claiming savings from code advocacy efforts and reduce evaluation costs at the expense of the defensibility of claimed savings.

Cost of Savings

The utility representatives reported that the 2018 code advocacy efforts were done on a *shoestring* budget. Two staff members from the PAs conducted all the code advocacy efforts as a part-time project over a few months at the end of 2018. The proposals were designed on existing standards from other codes or template codes and thus the PAs could leverage research from those standards. The staff took a simple approach to estimating savings, figuring that a more rigorous analysis could be done for proposals that were actually adopted. The staff leveraged relationships and good-will with industry experts to solicit expert feedback on the proposals for no extra cost. There was a minor outreach effort through the program implementer to solicit comments of support, but this was a light touch and not broad industry stakeholder engagement. The largest cost was EM&V, which is typical of code advocacy efforts since there are no typical program implementation or incentive costs.

While actual costs for the code advocacy efforts are hard to determine, we estimate that \$500,000 represents a high estimate of related costs. This includes the utility staff labor and consulting costs during advocacy and the evaluation efforts to determine attribution factors for the years 2022 through 2026 and to update gross technical potential (GTP) estimates annually when claiming savings. The study estimated that 124,338 MMBtu (90% of 138,153 MMBtu) of first year combined electric and gas savings will be attributable to the PAs' efforts through the year 2026. Therefore, a high estimate of the costs per savings is \$4.02 per MMBtu. Note that this number is based on the estimates of GTP savings from the study and should be verified annually in the years 2022 through 2026. For comparison, in 2020, the cost for annual savings was \$364.72/MMBtu for Residential New Construction and \$45.48 MMBtu for C&I New Buildings and Major Renovations (Mass Save, 2021).

Claiming Savings

Claiming savings from code advocacy programs presents challenges that are distinctive from typical incentive-based programs. Savings are realized years after the advocacy work takes place. These activities can increase baseline values and thus cannibalize savings from other programs. Finally, policy uncertainties must be resolved to avoid hampering savings.

Lag of Savings Realization

Savings resulting from code advocacy start accruing once buildings permitted under the code are completed. The team estimated that residential buildings take approximately one year to complete after permitting. Commercial buildings were estimated to take one to three years to complete after being permitted. If codes go into effect six months after the advocacy efforts, it can take between 1.5 and 3.5 years after the PAs' efforts to realize savings. Furthermore, code adoption processes are frequently delayed and can occur more than a year after the statutorily required effective date.

In the case of the 2018 IECC code adoption cycle in Massachusetts, the PAs started their advocacy work in May 2018 and the code did not go into effect until November 2020—at which point buildings had to be permitted and completed before savings would begin to accrue. Therefore, some savings from the PAs' 2018 advocacy work started accruing three and half years after the advocacy efforts began.

This lag in savings from the time of the active PA involvement presents logistical challenges in claiming savings. The lag is long enough to require savings to be claimed in a different planning period from which the advocacy took place. Details of the code advocacy work, savings estimation, and attribution must be passed along from staff conducting the advocacy and evaluation, to staff drafting the plan for the next phase, to staff claiming savings in the next phase. Staff turnover can complicate this

issue. For example, this study was published in 2019 and determined an attribution factor of 90% that should be applied to savings accrued in 2022 through 2026 from the PA's 2018 code advocacy efforts. To claim savings in 2022 through 2026, the study recommended the PAs annually recalculate GTP savings each year from 2022 through 2026. In the year 2021, PA staff making plans for the years 2022 through 2024 needed to be aware of the recommendation to claim savings as their own line item in reporting documentation. PA staff in the years 2022 through 2024 must be aware of the need to recalculate savings each year with more recent data on construction activity, compliance, and naturally occurring market adoption.

Additionally, the lag in savings realization adds uncertainty to any savings estimates that are made during the PAs' active involvement, such as the 138,153 MMBtu estimate. Any estimates would rely on assumptions about construction activity, code compliance, and industry standard practice. The longer the lag, the greater the need to study those assumptions in later years.

Cannibalizing Savings from other Programs

Many states use codes to define their baseline for new construction programs against which program participants are compared to determine savings. Massachusetts does not use code as the baseline for many new construction measures. Instead, Massachusetts conducts evaluations to determine the baseline of non-participant new buildings about every three years. This captures measure-level efficiencies where ISP differs from code. Still, increasing code stringency can push the baseline to be more efficient since homes that comply with the code will be more efficient than they would have been if the PAs had not advocated for code advances. Therefore, code advocacy efforts can increase the baseline and reduce savings available to conventional new construction programs by making it harder to achieve savings beyond a higher baseline.

One solution to this problem is to include code advocacy savings as a separate line item in plans and filings using an agreed upon attribution factor. This was the method recommended by the NMR 2020 study. Still, questions remain on how code advocacy efforts impact new construction programs and how code advocacy efforts complicate calculations of net-savings for new construction portfolios.

Code advocacy efforts can make it harder to participate in new construction programs. For example, the Massachusetts RNC program requires homes to perform at least 5% better than the baseline. If the baseline increases due to code advocacy efforts, the incremental cost of achieving 5% savings may increase if more expensive measures need to be selected. This could reduce program penetration. It can also reduce the pool of GTP savings since there is a limit to home efficiency.

However, while code advancement reduces gross savings available to new construction programs, the impact on net savings is unclear. A shift in the baseline does not necessarily mean there is a change in net savings. For example, if an increasingly efficient baseline causes minimally performing participants to drop out from the RNC program, those dropouts could have represented real savings or free riders. Perhaps they represented builders that really built more efficiently, though minimally, because of the program. Conversely, the dropouts could be free riders who participated in the program considering the incentives as free money for what they were already doing. If all the dropouts were free riders, this would increase the net savings. If none of the dropouts were free riders, this would decrease net savings. Without more research, there is no telling what proportion of dropouts are free riders. If all the free riders are high-performance participants, an increase in the baseline is not likely to reduce the number of free riders in the program and thus net savings would go down as the gross savings decreases.

The evaluators, state representatives, and PAs in Massachusetts have not determined how to reconcile the impacts of these code advocacy efforts with net savings calculations for new construction programs. Recent net-to-gross evaluations for the PAs' residential and commercial new construction efforts decided to make no adjustments for code advocacy in the net-to-gross estimates (NMR 2021a;

NMR 2021b). The team considered accounting for code advocacy in the NTG calculations by reducing the gross savings in the NTG calculation by the gross savings estimated from the code advocacy efforts. However, this would increase the NTG ratio and perhaps lead to double counting since the code promulgation savings were meant to be claimed as a separate line item using the 90% attribution factor. The study stakeholders decided not to make this adjustment to avoid double counting.

The conversation was complicated at the time by a regulatory framework that required NTG ratios to be locked in for three years. This three-year lock was removed for the 2022-2024 plan in mid-2021. While the stakeholders have still not finalized a code advocacy and new construction program net savings framework, the removal of the lock provides more flexibility. NTG ratios can be calculated the same year that GTP assumptions are updated based on actual data as opposed to forecasts conducted during the code advocacy process. These future NTG evaluations can also ask questions regarding the impact of the 2018 code advocacy efforts after the efforts have had time to make a material impact.

Lifetime Savings

Additional determinations are needed in Massachusetts regarding the range for lifetime savings resulting from code advocacy efforts. One option is to use the lifetime of the buildings built under the affected code. Other options include using a deemed value or the time span for which the code is effective. The latter is a flawed approach because buildings built under a code lock in most of their features for a period far longer than the code is effective. Another question is if an increase in code stringency leads to an increase in the stringency of the next code that would not have existed without the PA's efforts. This is a difficult question to answer and therefore our study looked only at buildings permitted within the examined code cycle.

Conclusions

- Codes and standards advocacy efforts offer an opportunity for low-cost energy savings.
- Codes and standards advocacy efforts must begin with an understanding of the target code or standard development process and enforcement regime.
- The Massachusetts PAs' earned an attribution factor of 90% for their 2018 code advocacy efforts because they proposed amendments that were unlikely to be advanced without their participation, as shown by a detailed document review and interviews with participants in the code development process.
- PAs need to carefully document all their communications and efforts relating to code advocacy.
- There can be a multi-year lag in PA efforts and the realization of savings. This requires communication between staff members and recalculation of savings in years to solidify values that could only be assumed during the time of the advocacy efforts.
- In jurisdictions with a net-savings reporting requirement, the interaction of code advocacy efforts and baselines for other programs need to be carefully considered.

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