2020 Illinois Statewide Technical Reference Manual for Energy Efficiency

Version 8.0

Attachment C: Framework for Counting Market Transformation Savings in Illinois:

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1 Market Transformation Context

This Attachment describes a high level framework for estimating savings from Market Transformation (MT) initiatives. MT protocols will need to be developed for individual MT initiatives as they are launched. The development and future inclusion of MT initiative-specific protocols in the IL-TRM will (1) help to ensure consistent evaluation approaches are used for similar MT initiatives that are offered throughout the state and (2) provide utilities with greater certainty as to how specific MT initiatives will be evaluated.

This Attachment is divided into two sections. The first gives the context of Market Transformation (MT) and describes some of its unique features that influence the estimation of savings. The second part describes high-level methodologies for determining savings from MT initiatives.

1.1 Market Transformation Definition

This protocol uses the following definition for Market Transformation (MT) which is also used by the Midwest Market Transformation Collaborative and is very similar to definitions used by other organizations:

> *Market Transformation is the strategic process of intervening in a market to create lasting change that results in the accelerated adoption of energy efficient products, services and practices.*

1.2 Market Transformation and Resource Acquisition

An MT initiative can include intervention activities similar to those implemented in standard Resource Acquisition[1] (RA) programs, such as incentives that reduce first costs, training for trade allies, and marketing and case study materials[2]. However, MT initiatives additionally include activities that specifically seek to affect the long-term structure of a market in ways that are not easily undone. For example, working directly with manufacturers on product specifications and features or engaging with ENERGY STAR and DOE on test procedures and rulemakings.

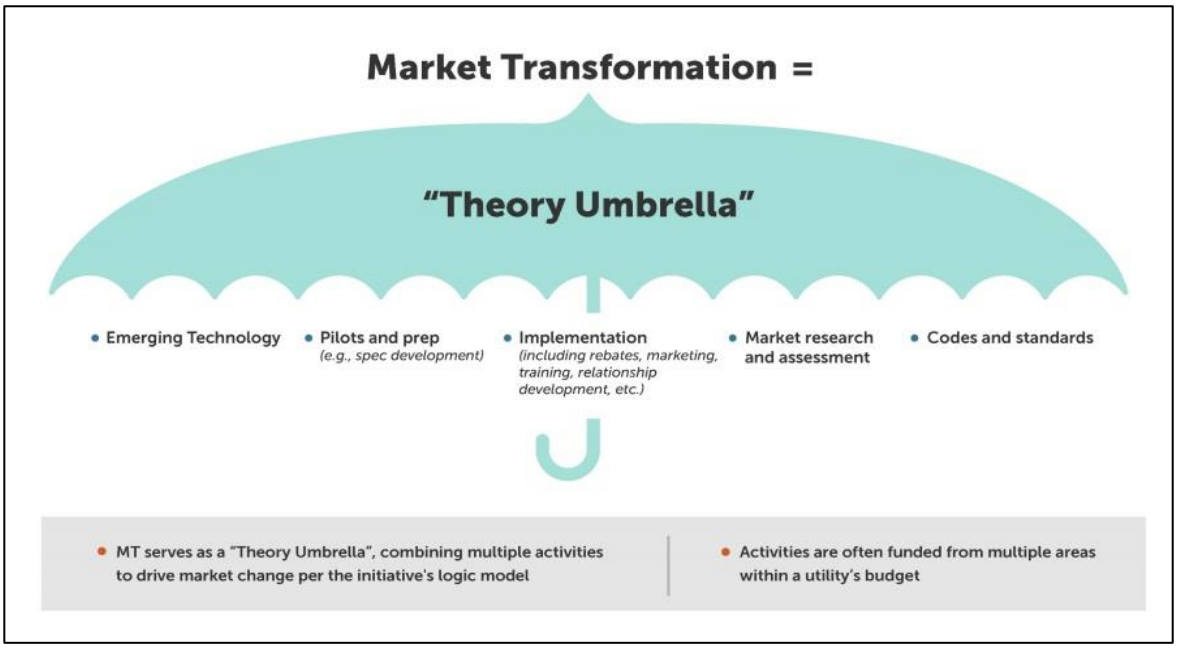
Figure 1 depicts the types of activities that might be included in an MT initiative. There are a number of other process actions required to develop an initiative, such as discussions with stakeholders or setting up an evaluation plan, but this is not the subject of the figure. An example of an MT initiative with multiple interventions is the Heat Pump Water Heater (HPWH) Initiative[3] in the Northwest. Interventions include: Technical support for development of ENERGY STAR specifications; Laboratory testing of new HPWH to prove performance claims; Upstream manufacturer engagement including incentives to encourage aggressive market pricing; Customer facing retail rebates; Providing technical information to the US DOE standards process in support of HPWHs being cost-effective for large tank sizes; and Working with local jurisdictions to develop code provisions that provide "extra-credit" for HPWH in new construction.

Figure 1: Examples of Potential MT Activities Under a "Theory Umbrella"

[1] Resource acquisition (RA) is defined in the glossary but is used loosely in this Attachment to refer to more traditional utility driven energy efficiency programs that typically work at the individual consumer level, rather than the market level.

[2] For a review of best practices for designing and implementing market transformation initiatives, see Keating (2014).

[3] A description of this initiative can be found in recent reports from NEEA: https://neea.org/resources/northwest-heat-pump-water-heater-initiative-market-progress-evaluation-report-3 or https://neea.org/resources/northwest-heat-pump-water-heater-initiative-market-progress-evaluation-report-4



Each MT initiative must establish its own unique overarching MT theory with an "umbrella hypothesis" under which a variety of strategic activities, including those that may be occurring through other parts of the utility or even other organizations, can be combined to affect the desired market change. The goal of this set of activities is to reduce market barriers and leverage opportunities to create lasting market change. The entire set of activities are incorporated in the overall MT initiative hypothesis and logic model, even if some of those activities might be funded or implemented from different budgets or organizations.

RA activities can also result in market changes[4] and RA savings approaches may also include documenting market effects for those programs independently from an MT initiative. However, RA savings are normally measured through participation in a program rather than whole market effects. There are further differences between RA and MT that influence the methods for calculating savings and key difference are shown in table 1 below. While this protocol addresses savings from initiatives identified as MT, RA savings approaches may also include documenting market effects for those programs independently from an MT initiative. Accounting for overlap in MT and RA program savings is discussed in a later section of this paper.

Although an MT initiative might include activities similar to an RA program under the MT Theory Umbrella, the significant differences between MT and RA program types provide important context for planning, implementation and evaluation. As summarized in Table 1 below, these differences include: the scale of the intervention, the target market, the ultimate goal, the fundamental program approach, the time frame over which cost effectiveness must be evaluated, the amount of program administrator (PA) control, and the set of activities that are tracked, measured and evaluated.

[4] For example, NMR Group, Inc. (2014) reviews methods for the evaluation of market effects primarily (though not exclusively) for RA programs.

Table 1: Comparing Resource Acquisition Programs and Market Transformation Initiatives[5]

	Resource Acquisition	Market Transformation
Scale	Program Administrator's service territory	Entire defined market
Target	Whoever can be induced to participate	All consumers of a particular product or service
Goal	Near-term savings	Structural changes in the market leading to long term savings
Approach	Save energy through customer participation	Save energy through mobilizing the market
Scope of Effort	Results from a single program	May result from effects of multiple programs or interventions
Level of Program Administrator Control	PAs can control the pace, scale, geographic location, and can usually identify participants	Markets are very dynamic, and the PAs are only one set of actors. If, how, where, and when the impacts occur are usually beyond the direct control of the program administrators
Evaluation and Measurement	Energy use and savings, participants, free-ridership, and sometimes spillover	Interim and long-term indicators of market progress and structural changes, attribution to the program, and cumulative energy impacts
Timeframe for planning, savings measurement and cost-effectiveness	Typically based on annual or multi-year planning and reporting cycle savings	Typically planned and implemented over a 10-20 year timeframe

Historically, the differences between the two approaches have created challenges for MT initiatives to thrive in states where policy frameworks are strongly focused on resource acquisition[6]. The much longer time frame for MT initiatives and the lesser degree of program administrator control can be difficult to reconcile with policy rules that are focused largely on the precise quantification of annual savings.[7] Evaluation of net savings can be fraught in jurisdictions where financial incentives or penalties are determined based on evaluated results, and can be particularly challenging for MT initiatives, which require market analyses that introduce additional uncertainty. Operating MT initiatives in this scenario requires upfront negotiation on evaluation processes to set clear expectations on measurement approaches.

1.3 Market Transformation and Attribution

The concept of attribution - or the attempt to assess the extent to which observed outcomes are caused by the program(s) of interest as opposed to events that would have happened regardless of any intervention - is

[5] Source: adapted from Prahl and Keating, 2014; derived in turn from Keating, et al. and Sebold et al., 2001.
[6] Note, for example that a regulatory framework supporting the MT initiative is cited as one of three "must-have components" for MT to thrive in a recent Illinois Summit on MT. ComEd Energy Efficiency Program "Energy Efficiency Market Transformation Summit Report", Navigant Consulting, February 2019.
[7] For a comprehensive discussion of the challenges of reconciling MT and RA within an RA-dominant policy framework, see Prahl and Keating (2014).

fundamental to the evaluation of energy efficiency programs[8]. Without attribution, it is difficult to understand the success or failure of a program – and to improve (or to justify continued public funding for) a program whose success or failure is not understood.

While attribution is relevant to both market transformation initiatives and resource acquisition programs, there are important differences to approaching attribution between the two types of programs. For resource acquisition programs, it has long been the norm in much of the US to treat attribution as a continuous variable that can be quantitatively scored (often in the form of a net-to-gross ratio that adjusts for free ridership and spillover) and applied to savings claims at frequent intervals with relative granularity. RA programs can ask questions directly of actual participants to ascertain attribution. However, MT initiatives typically do not lend themselves to this type of quantitative approach. More often than not, there is too much elapsed time over the lifecycle of a market transformation initiative and too many other market forces at work for a quantitative attribution score to be meaningful. So instead, market transformation paints a qualitative case as to whether the initiative was generally successful in causing the intended market changes.[9]

Successful incorporation of MT initiatives into a program portfolio that is dominated by resource acquisition programs generally requires that stakeholders accept these methodological differences between the two program approaches, and the fact that with MT initiatives, attribution can typically only be established qualitatively.

It is important to note this does not imply that quantitative estimates of net savings should not be made for MT initiatives. Fundamentally, all Illinois efficiency programs will need to quantitatively estimate savings so long as counting the savings toward goals and estimating cost-effectiveness is adopted policy. It simply means that net savings for MT initiatives will be significantly less certain by nature than those for pure RA programs. Defensible methods for dealing with the limits to quantifying attribution for MT initiatives are discussed at length in the second half of this paper.

1.4 What Makes an MT Initiative Recognizable?

Because of the difference in evaluation approaches between an MT initiative and an RA program, it is important to first confirm whether an initiative falls into the MT category or the RA category before developing savings estimates.

To qualify as an MT initiative, there needs to be a clearly delineated target market[10], as well as a documented theory of change in this market (or MT hypothesis) that is embedded in a defensible logic model,[11]. This logic model provides the linkages between program activities and the anticipated lasting market change that accelerates the adoption of energy efficiency. The logic model is documented in the MT Business Plan[12] or similar document and is developed in advance of executing activities. MT initiatives are not created by looking backwards and claiming credit for market changes from previous programs. Nor are all "upstream" programs MT by default. For example, the upstream program may not result in any lasting change to the market and once the incentive is removed the market reverts to its prior condition.

1.5 Evaluation and Measurement of Savings in MT Initiatives

Energy savings from MT initiatives are the end result of increased and accelerated market adoption over and above the hypothesized future that would have happened without the MT initiative. Attributing savings to MT initiatives

[8] See additional discussion on attribution in the Illinois Technical Reference Manual, Volume 4: Cross-Cutting Measures and Attachments, Section 2.

[9] In this regard, the evaluation of market transformation initiatives closely resembles most other fields of social program evaluation, and it is actually the evaluation of resource acquisition programs that is unusual. For example, evaluations of early intervention education programs such as Head Start routinely concern themselves with the issue of attribution, but they generally do not seek to construct a quantitative attribution score for a specific program, region, and year.

[10] As shown in the glossary, this paper uses the following common definition of a market: an actual or nominal place where forces of demand and supply operate, and where buyers and sellers interact (directly or through intermediaries) to trade goods, services, or contracts or instruments, for money or barter.

[11] In some regions of the country, this is called a "program theory."

[12] The content of an MT Business Plan is listed in Appendix A.

requires the assumption that some portion of the observed changes in market adoption are the direct result of a targeted, strategic market intervention that was designed and implemented to achieve that result. The MT framework requires both validation of the MT initiative logic and an evaluation of program implementation and progress towards specific market progress indicators before savings can be estimated.

The following section discusses several core concepts specific to the evaluation of MT initiatives.[13]

1.5.1 Evaluation Approach – Theory-based Evaluation

Methodologically, MT evaluation tends to rely heavily on Theory-Based Evaluation (TBE).[14] TBE starts with a theory of change that explains how an intervention is expected to produce results. This theory of change is embodied in the logic model that is the core of an MT initiative. Theory-based evaluation 1) attempts to understand if observed changes in the market are consistent with those that would be expected if the initiative were successful, and 2) seeks to understand an intervention's contribution to those market changes. Because the unit of analysis is an entire market not a single transaction, MT evaluations tend to require numerous pieces of evidence that 1) change is occurring; and 2) the program is influential in that change.[15] A preponderance of evidence approach, rather than proof is most often required. It is important to note that "preponderance of evidence" does not require that all indicators show overwhelming evidence of programmatic influence, but rather that multiple indicators show consistent direction. This information can be qualitative (based on in-depth interviews or observational data collection) or quantitative (based on market share or production data).

Under a TBE approach, it is important to assess the consistency of the changes observed in the market with those predicted by the program theory. It can also be important to have a mix of leading indicators (such as early shifts in market share), which provide timely feedback on the near-term progress of the program and the market, as well as lagging indicators, (such as new entrants in the supply chain for the energy efficient product) which can be used to help assess longer-term outcomes.

1.5.2 Evaluation Products

To evaluate a market transformation initiative effectively, it is essential to conduct regular research to understand market changes and implications for program adaptation. The Northwest Energy Efficiency Alliance (NEEA) refers to these regular evaluations as Market Progress Evaluation Reports (MPERs) and typically executes one per initiative yearly.[16] MPERs include components of impact and process evaluation, market research, and planning and market assessments and are designed to document progress and market change over the initiative's life cycle. It usually takes multiple MPERs over time to tell the complete story of an initiative.

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[13] For a comprehensive review of best practices for the evaluation of market transformation initiatives, see NMR Group, Inc. (2013). For a more condensed discussion, see Prahl and Keating (2014). Metrics, Tracking, and Performance Assessment Working Group (2018) provides a regional perspective by discussing New York state's approach to the evaluation of its market transformation efforts. Also see Navigant (2018) for a discussion of bet practices in MT design. Finally, it is important to keep in mind that both market transformation initiatives and resource acquisition programs can cause market effects; NMR Group, Inc. (2014) reviews methods for the evaluation of market effects primarily (though not exclusively) for RA programs.

[14] See Chen (1990) or Weiss (1998). TBE is also often useful for resource acquisition programs but tends to be particularly central for the evaluation of market transformation initiatives. For a discussion of the application of TBE to energy efficiency programs in general, see Section 6.9 in Attachment A of the cross-cutting protocols.

[15] Examples might include: changes in efficient market share or product positioning; changes in leading indicators such as distributor stocking practices, consumer awareness, or new vendors entering into the market; self-reports of program effects from market actors; evidence of change in the prevalence of training/credentials, sales or installation data,—basically, evidence that the efficient option is being "normalized".

[16] In other regions, such recurring efforts may go by other names. However, the general concept of regular, recurring efforts to understand the progress of a market transformation initiative is widely accepted in the energy efficiency industry. This paper uses the term MPER for envisioned MT evaluations in Illinois. For examples of completed MPERs, see https://neea.org/resources-reports

The MPER scope is centered around 1) an assessment of the strength of remaining barriers and 2) measurement of Market Progress Indicators (MPIs).[17] MPIs are market-based milestones associated with progress hypothesized in the logic model and confirmed as appropriate real-world indicators of progress. Examples of MPIs include market share for the efficient option, changes in product availability, or evidence of promotional activity by affiliated or unaffiliated market actors. Regular assessment of MPI progress plays a central role in building a qualitative case for attribution over time via theory-based evaluation.

1.6 Uncertainty and Risk in MT Savings Estimates

It is also important to understand that MT interventions operate with a different level of certainty than many resource acquisition programs. Experimental design and tight error bounds on realized energy savings are not realistic expectations for initiatives that seek to animate, but not control, market shifts. One key reason for this greater uncertainty, as discussed above, is the greater difficulty of establishing attribution. In addition, needed market data (particularly sales data) can be hard to obtain. Finally, uncertainty also stems from items such as a rapidly changing product category or a reliance on the indirect influence of retail sales people.

To help stakeholders and utilities assess the risks associated with this uncertainty, program designers should engage early with planning and evaluation professionals with experience in market transformation. Establishing energy savings methods associated with the proposed intervention and gaining acceptance for the proposed baseline often requires multiple rounds of review and refinement as data and assumptions are vetted. At the time of writing, it is anticipated that the Illinois Stakeholder Advisory Group Working Group on Market Transformation Savings will serve as a forum to effectively plan MT initiatives and navigate unexpected market events.

2 Estimating Savings for MT Initiatives

2.1 Overall Approach

There are three key factors to consider when estimating MT savings. The first is the Total Market Savings that result from the entire market adoption of energy efficiency products or services. The second is the Natural Market Baseline, which is an estimate of the market as if there were no utility funded energy efficiency activity. Figure 2 illustrates these two factors[18]. The third is the removal of savings specifically tied to RA programs operating in the same market to prevent double counting. After all three factors are considered, then MT savings are typically allocated to individual service territories.

The first step to estimate savings is to determine MT Units and Unit Energy Savings (UES). MT Units is the result of subtracting Natural Market Baseline Units from Total Market Units. MT UES is the result of subtracting the Unit Energy Consumption (UEC) of the efficient product/service from the UEC of the baseline product/service. These are described more fully in the text below.

MT Energy Savings = Unit Energy Savings (UES) x Number of MT Units (Units)

Where:

- *Unit Energy Savings = Unit Energy Consumption (UEC) of baseline product/service – UEC of EE product*
- *Number of MT Units = Total Market Units minus Natural Market Baseline Units;*

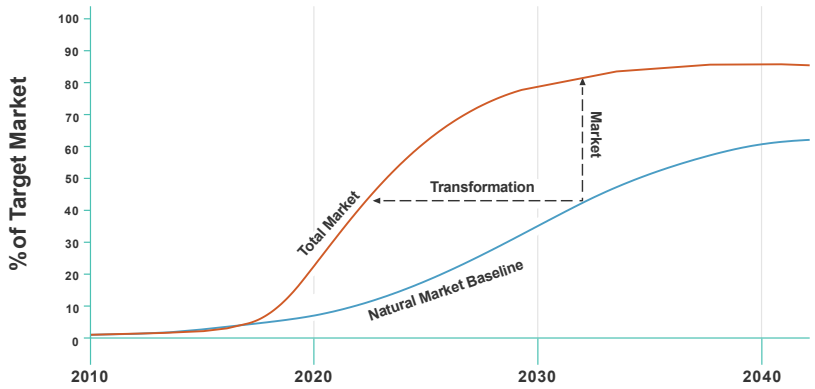
Note: Units are adjusted in a subsequent step to account for any overlap between RA and MT.

Figure 2 illustrates the overall approach where Natural Market Baseline is subtracted from the Total Market to estimate MT savings.

[17] Market Progress Indicator is the term used in the Northwest. A closely related term that is often used in other regions of the country is “market indicator,” although there are shades of differences in the meanings of the terms.

[18] Not illustrated in the figure are further adjustments for savings from RA programs operating in the same market or allocations of the market savings to individual utility service territories. These are discussed in subsequent sections.

Figure 2: Framework for MT Savings



2.1.1 Unit Energy Savings

2.1.1.1 Theory

Estimating total market savings requires unit energy savings for each unit. The definition of "units" will depend on the energy-efficient product or service that is the focal point for the MT initiative. Units are defined upfront and typically are measured as: a device; square footage; number of housing units; number of operators; pound of product, etc. The appropriate unit definition will have been identified in the MT Business Plan. Savings are measured in kwh/unit, therms/unit and kW/unit. Note that the average savings per unit for that market likely will be the weighted average savings per unit for different categories of product (such as top-load or front-load clothes washer categories). In this paper unit energy savings reflect the weighted average of all the categories included in the target market.

2.1.1.2 Practice

Savings per unit are derived from the delta between the unit energy consumption in the baseline product or service and that of the efficient one. This savings delta can be a deemed value already included in the TRM, it can be calculated as part of the planning and baseline work that informs typical MT programs, or it can be directly tracked or researched.

For MT programs that rely on shifts in practice or sales mix, an appropriate approach to calculating savings can be using the energy consumption embodied in the "standard practice" or "average sales mix" as opposed to a single widget-based calculation. When data is not available for the consumption of standard practice or average sales, modelling of an applicable energy code or standard can also be used.

Analysts can review existing sources of information for savings per unit (or base- and efficient- consumption) and use those estimates if they are applicable. These sources could include the Business Plan for the initiative; prior evaluations; TRMs; load forecasts; existing energy efficiency programs within the utility; emerging technology/R&D results; negotiated settlements on particular savings values, etc.

If existing sources aren't available or don't seem sufficiently reliable, the analyst should develop and implement a plan for securing more information on savings per unit. This may include product testing, piloting, or developing an agreed upon proxy for use in the near term with a plan for developing more robust savings estimates over the longer term.

2.1.2 Estimating Total Market Units

2.1.2.1 Theory

Each market will have unique characteristics and data sources for tracking units in that market. In many markets, extrapolations or approximations based on best available information will need to suffice. Ideally, the initiative should try to track both the total number of units in the market and the portion of units that meet the efficiency specification in the MT initiative (efficient units). Over time, Market Progress Evaluation Reports will work to track shifts in the relationship between efficient units and total units – which represents the market share of efficient units.

In the case of gas-heated new home construction, for example, Market Progress Evaluation Reports would collect public information on new gas-heated housing starts as well as track the number of new homes meeting a particular efficiency specification. In mass markets, like appliances and commercial food service equipment, the best market data often resides with key market actors, like large distributors or manufacturers. In these cases, the design of the initiative should include a plan to secure sales data for the whole product category and the efficient units as an inherent part of the initiative's implementation. If not secured at the beginning of an initiative, this data can be difficult or impossible to secure later. As a result, it is optimal to design this data collection into the initiative when starting strategic partnerships with the market actors.

In many cases an initiative is unlikely to have participation from distributors, manufacturers and/or retailers that cover sales in 100% of the market. In this case factors need to be developed to extrapolate the data that is available for a portion of the market to the rest of the market.

2.1.2.2 Practice

In practice, planning a market transformation initiative requires developing a plan for obtaining sufficient market data to enable the establishment of a reasonable baseline, as well as for on-going estimation of savings from the MT initiative. Below are a few of the approaches to meet this requirement:

1. **Full category sales[19] or market practice data**[20]. Market analyses are most comprehensive when they include full category data from key actors in the market chain, such as retailers or distributors. They can reveal unexpected trends in product categories that inform both trendlines and program interventions. These data make it possible to understand the market share of the efficient product relative to its competitive set.
2. **Primary data collection and extrapolation.** Because full category data is rarely available, primary research within the target market is frequently used to develop an understanding of the current level of market activity, including the portion consistent with the efficiency threshold sought by the program. Surveys with robust samples of trade allies, design professionals, and distributors can provide data on the square footage, sales in dollar value, project volume or denominator of interest. In cases where downstream rebate programs are operating in tandem with MT engagement, rebate processing data can provide a detailed look at a slice of the total market. Similarly, some upstream programs will be able to collect actual primary sales data on market share for some or all of the market.
3. **Secondary market data**. Regardless of the data available to the program, it is also best practice to include a scan for other sources of market data that might be available outside of the energy efficiency community. Investment briefs, product trend analyses, JD Power or Consumer Reports data, and industry data often gathered by trade associations or similar organizations such as the Association of Home Appliance Manufacturers, NPD Group, Heating Air-conditioning Refrigeration Distributors International, etc.

[19] MT initiatives can also operate on buildings (like multi-family ordinances), engage corporations (like Strategic Energy Management), or even drive behavior change (like Building Operator Certification) – assuming they are structured as MT. The goal is still to gather total units as well as efficient units.

[20] Full category sales data includes all sales within a product category such as clothes washers -- both efficient and inefficient units.

2.2 Estimating Natural Market Baseline

2.2.1 The Role of Natural Market Baseline and Attribution

The Natural Market Baseline is a forecast of the future in which no utility-funded energy efficiency programmatic intervention exists. Natural Market Baseline is removed from the Total Market Savings to ensure that the savings counted from ratepayer activities do not include savings that would have occurred without the utility funded programs. This is the MT version of "attribution" and no further adjustment for free riders is needed.

As discussed earlier in the paper, attribution can typically only be established qualitatively for MT initiatives, yet under the policy framework in place in Illinois, a net savings figure must be determined. Subtracting the Natural Market Baseline from Total Market Units is the mechanism by which this is accomplished. Once an initial forecast has been made, the focus of evaluation efforts turns to building a case over time as to whether sufficient evidence exists to establish a link between program activities and market effects that are consistent with that forecast. As discussed below, depending on the body of evidence that emerges over time, the initial forecast for both Total Market Units and the Natural Market Baseline may be revised periodically. In addition, quantitative adjustments may be made to allocate total net savings between sponsors or between MT and RA programs as discussed later.

In principle, subtracting the Natural Market Baseline from total market units yields by definition an estimate of total net savings[21]. However, depending on the specifics of the regional policy framework and the individual initiative, further adjustments could be called for. One example would be a situation in which policymakers or stakeholders simply wish to build some conservatism into MT savings claims to reflect the greater uncertainty surrounding attribution compared to RA programs. Another example would be a situation in which it appears that some other public intervention not directly connected to the MT initiative or reflected in the Natural Market Baseline, is likely to have contributed to the progress of the market.[22] Such further adjustments for attribution could be either deemed up front, negotiated after the fact, or determined by an oversight agency such as a regulatory commission.

2.2.2 Natural Market Baseline Units[23]

2.2.2.1 Theory

The Natural Market Baseline should be modeled during the development of the MT initiative with the best available information, and then adjusted over time if significant new data becomes available during the implementation of the initiative, or because of unexpected market disruptions, such as those associated with substitute products.

Typically, the Natural Market Baseline will reflect at least some naturally occurring adoption of the targeted measure or practice because as Prahl and Keating (2014) note:

> With market transformation, the gross market changes observed over the time horizon of a market transformation initiative are not all linked to the utility or other public policy intervention. Some of it is naturally occurring – even a slow growing product, if it is moving into the market will have an increasing penetration, even without a strategic market transformation intervention. This equates to the non-net portion of resource acquisition. (pp. 45-46)

Forecasting Natural Market Baseline units often assumes that, over time, adoption of energy efficient technology will follow a normal distribution consistent with Diffusion of Innovation theory. In this theory, market share is small due to a few innovators and early adopters participating in the market in early years, increasing to a majority of adopters during the peak years of market growth and then over time decreasing again to a small number of laggards adopting the product/service. Sometimes MT initiatives are primarily attempting to shift the adoption curve forward in time. Other times, they may be attempting to increase the slope and/or maximum values of the adoption curve

[21] This "net" savings includes savings from both MT and RA programs, so the "net" is further adjusted for RA savings, which is discussed in a section below.

[22] This is not to be confused with a situation in which the MT initiative has multiple administrators and some allocation of savings among them is needed – an issue that is discussed below.

[23] The term "Naturally Occurring Market Adoption" or NOMAD is synonymous with "Natural Market Baseline Units".

The Natural Market Baseline is probably the most challenging piece of estimating savings from MT because it is a prediction of the future that will never actually exist and therefore can't be measured. As a result, it is important to involve evaluators and stakeholders in advance to ensure transparency, alignment and understanding of the data and judgement that will ultimately be used to estimate savings.

2.2.2.2 Practice

The basic task is to develop a baseline of how the energy efficient product, service or behavior would have grown in the market independent from utility activity. There are several elements for effectively developing the Natural Market Baseline:

1. **Identify existing data sources** that could inform the Natural Market Baseline and include these in the MT Business Plan. Market or sales data are the best sources, particularly if they are "full category" (or include the full efficiency mix, not just the qualified, efficient units). Other data sources can also be used, including industry forecasts, market intelligence and trend information, primary data collected as part of market research or market characterization to support the initiative development, hedonic price modeling, or other information about how efficiency is positioned relative to other market drivers. In addition, trade associations, advisors to the target market/industry, investment grade forecasts or organizations related to regulatory oversight (like Lawrence Berkeley National Laboratory) can be good sources of data. Manufacturers or distributors themselves are excellent sources, but they may be unwilling to share proprietary information.
2. **Use available data, quantitative modeling, best judgement, proxy data or other techniques** to develop a Natural Market Baseline. Some projects lend themselves to modeling or model averaging using statistical approaches to estimating baseline sales behavior. These can incorporate different assumptions about how a program affects product sales. In many cases, multiple approaches can be used. For example, a recent evaluation completed for Consolidated Edison included a sales model, market share model, probit model[24] and a model averaging model, which were used in a single project to test different ways of estimating baseline sales.[25] In some cases, a comparison group (such as different but similar region that is not intervening in this market) may be used as a proxy.
3. **Develop the initial baseline curve** and have the shape of baseline curve and underlying assumptions reviewed by stakeholders. Several key product characteristics should be considered when determining the shape of the Natural Market Baseline curve. These characteristics include the maximum potential market share, the pace of innovation within a given market, the lifecycle or time between purchase decisions, the presence of non-energy benefits, and the incremental cost associated with the efficient product without the MT intervention. It is also important to consider the strength of identified barriers to adoption for a given product. These barriers often emerge from market research or market characterization studies and can point to installation or supply barriers that might otherwise be missed.

   In some cases, the Natural Market Baseline can be zero for a number of years. This might be the case when an MT initiative catalyzes the entrance into the market of a technology that otherwise wouldn't have emerged for many more years.
4. **Incorporate anticipated changes to codes and standards** to the extent they are known in the baseline**.** The special case of savings from energy codes and standards is discussed further in the Energy Codes and Standards section of this protocol.
5. **Identify any known data gaps** that emerged in the planning process needed to improve the forecast over time and monitor these gaps as the initiative progresses.

[24] In statistics, a probit model is a type of regression where the dependent variable can take only two values, for example married or not married.

[25] EMI Consulting. Con Edison 2017 Retail Products Platform (RPP) Evaluation. June 15, 2018.

2.2.2.3 Reviewing Natural Market Baseline Over Time

It is important to track the baseline forecast periodically as part of MPERs or other recurring efforts to assess the progress of the program and the target market. Changes should be made to the Natural Market Baseline if they significantly impact the results.

Criteria for Updating the Natural Baseline Market Forecast

The fundamental reason for periodically reviewing the initial baseline forecast is because better information is likely to become available over time that may allow improvements in the accuracy of the initial forecast. The Natural Market Baseline forecast is a major determinant of the estimated savings attributable to the program. Given the challenges inherent in forecasting a counterfactual scenario, Natural Market Baseline often constitutes the biggest individual source of uncertainty surrounding estimated savings. As such, incorporating enhanced information regarding the Natural Market Baseline forecast helps both in building an improved qualitative case for attribution for observed market changes, and in supporting adaptive management of the program.

At the same time, it can be counterproductive and costly to update the baseline forecast too easily or too often. What is typically most readily available to the evaluator is the actual trajectory of total number of efficient units appearing in the market, which may well reflect effects from the MT program itself. This raises the risk that evaluators may decide that an observed acceleration in efficient market share is due to an acceleration in the Natural Market Baseline when it is actually due to the effects of the MT program, thereby leading to underestimation of the program's accomplishments – or, the reverse can happen. Deciding how often to update the baseline forecast requires the evaluator to balance the desirability of incorporating valuable new information with the importance of ensuring reasonable treatment.[26]

This tension can best be resolved by establishing guidelines for when new information is significant enough to update the initial forecast. The following are examples of some key circumstances where it may be appropriate to update the initial Natural Market Baseline forecast.

1. **Key assumptions underlying the initial forecast have proven to be incorrect.** For example, the initial forecast may have reflected an assumption that in the absence of intervention, manufacturers would have little naturally occurring incentive to incorporate a key energy-saving feature into their products, and it might become clear with the passage of time that this assumption was incorrect.
2. **The timing of key anticipated events has changed.** Examples might include a product launch being substantially delayed, a key partner ceasing operations, or an energy code or standard opportunity being delayed. All of these factors could affect the baseline forecast if it was built assuming certain events would impact the naturally occurring adoption.
3. **Changes in exogenous conditions affecting the target market have altered the initial trajectory of the Natural Market Baseline.** Examples might include a substantial change in public policy brought about by an electoral outcome, or economic conditions that create unexpected shifts in the level of economic activity (e.g. recession, housing booms, tariffs, unforeseen jump in the price of raw materials, etc).
4. **Significant improvements in the availability of sales data demonstrate that the initial forecast can be improved without introducing a significant risk of over- or under-estimating program impacts.** For example, the initial forecast may have been based on limited information from key market informants, but over time full category sales data may become available and show that the initial estimate of efficient market share was off base.

[26] It is important to note that trying to strike this balance can and does lead to differences in baseline assumptions between MT initiatives and related RA programs. The mission of RA programs is generally to achieve measurable, reliable, near-term savings. From that perspective, it is important that the baseline assumptions reflect the realities at work in the marketplace at any one time. However, the mission of an MT initiative is to gradually achieve large-scale improvements in the way markets work, so it is important that the baseline forecast reflect the conditions facing the initiative at its onset. Resolving these potential differences in the handling of baseline assumptions between MT initiatives and related RA programs is an example of the broader issue of accounting, which is discussed elsewhere in this paper.

5. **The criteria for what constitute an "efficient" product have changed in a manner that tends to superannuate the initial baseline forecast.** Examples might include changes in test procedures or qualifying standards.
6. **Substitute products or innovations have been introduced that change the energy consumption profile of an entire product category.** Examples might include LEDs displacing CFLs, laptop computers overtaking desktops, and the addition of 4k or 8k features to televisions.

2.3 Accounting for RA Savings

Ideally, customer-facing RA programs would be an integrated part of MT activities. This would allow for counting all savings in the target market regardless of assignment to either MT or RA. However, in the near-term, RA programs are likely to continue to be implemented and evaluated separately from MT programs. As a result, if RA and MT programs are operating simultaneously in the same market, there is a need to parse the savings between the MT and RA efforts.

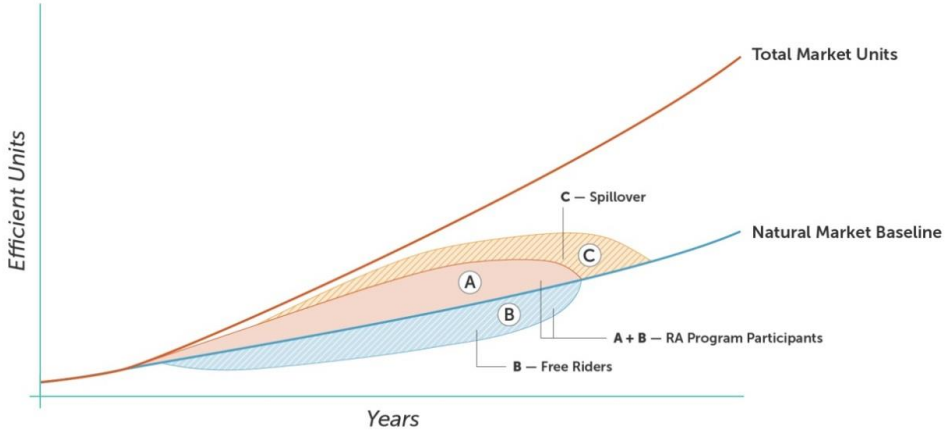
While the goal of not double counting is clear, the actual practice is complicated by the fact that RA and MT use different methodologies to get to a "net" savings. For example, both methodologies adjust for a counterfactual baseline; designated as free-ridership for RA programs and Natural Market Baseline for MT initiatives. Both methodologies also attempt to estimate market effects that occur beyond the direct program participants; designated as spillover in RA and savings above baseline for MT. To successfully avoid double counting of savings, the MT framework must include consideration for all components of the RA framework.

Figure 3 is a depiction of the typical components of RA savings overlaid on the MT savings framework. Area A represents participants who wouldn't have taken the action without the program, area B is free riders and area C is spillover. As described above, MT savings are Total Market minus Natural Market Baseline.

To avoid double counting with RA programs, the default approach is to subtract all non-Market Transformation verified savings within the same market being targeted by the MT initiative from the MT savings calculated in previous sections[27]. If accuracy could be improved or greater cost-efficiency created in the evaluation process from using another method, that can be proposed by the evaluator. An example might be separating the units between the MT and RA activities but using the MT savings per unit (if it differs from the RA savings per unit) as the factor to multiply by the MT units.

[27] Note that the traditional use of the terms "net" and "gross" savings can be confusing in the MT framework. The MT savings calculation described in the first equation in Section II results in savings that are attributed to utility programs (both MT and RA) – typically called "net" in RA evalution. This section then further nets out RA savings so MT savings can be separately analyzed.

Figure 3: Accounting for RA and MT Program Savings



A key benefit of netting out all RA claimed savings is that it allows for a straightforward assertion that "all savings counted through the RA program have been removed from the MT initiative savings". This simple statement may satisfy the needs of regulators and stakeholders without requiring further detail on the differences between the RA and MT frameworks.

On the other hand, this technique creates a bias against MT initiatives in favor of counting the savings in RA. This is because it has the unfortunate consequence of removing legitimate market effects (like spillover) from the MT initiative. This could discourage coordination and collaboration between MT initiatives and RA programs.

2.4 Allocating Energy Savings to Individual Utility Sponsors

Market boundaries rarely, if ever, align nicely with the geographic boundaries of utility service territories. While it is possible for an individual utility to operate a market transformation program that is limited in scope to the boundaries of their own service territory, it is more likely that utilities will be implementing MT initiatives in collaboration with other entities at a state, regional, or even nationwide level. In multi-sponsored MT initiatives, an allocation scheme should be used to distribute savings to each sponsoring utility/efficiency organization. Historically, there have been several different approaches to utility allocation, although most of them attempt to base the proportion to each utility on estimated savings that land in that utility's service territory. The method used should be selected in advance.

1. **Allocation by Sponsor Funding Shares** In this approach, energy savings are allocated to each funder according to their share of the total MT initiative funding across all participating sponsors. In the Northwest, this approach is applied at a portfolio level to the total savings, partially because funding shares are based on the relative energy loads of the utilities.
2. **Allocation by Service Territory Delivery** This approach allocates energy savings based on an attempt to track market adoption of the energy efficient units (and therefore savings) to the geographic boundaries of the sponsoring utility. Unfortunately, most MT initiatives track efficient units at a scale different than utility service territory (such as to the point of distribution or retail sale), and methods must be used to scale these units to the service territory of the utilities operating the initiative. In these cases, a factor is developed in advance to share retail sales from the point of sale or distribution into an allocation to each of the utility service territories served by that channel. It is best to develop this factor ahead of time and use it consistently throughout the program, unless compelling data becomes available that would justify a change in the methodology. The adjustment can sometimes be made by working with the channel to get estimates of the zip codes of their clientele and then correlate that to the service territory zip codes. In the Northwest,

for example, Bonneville Power Administration developed a retail sales allocation tool where retail locations are divided up by how they serve customers from different utilities.

3. **Allocation by Tracking Participants** There may be initiatives where it is possible to track all participants – for example, Building Operator Certification where every tracked operator comes through the initiative itself. This can then be a direct measurement.
4. **Allocation by Survey of Market** This approach samples the entire market and asks survey questions about in which service territory the efficiency is occurring.
5. **Allocation by Customer Proportions or Energy Consumption** This approach allocates energy savings based on the share of total customers or energy consumption within the sponsoring utilities service territories, or if known, shares within a particular market. Customers or consumption in this approach are a proxy for relative market share for the MT initiative. Examples include total residential single-family homes with a certain type of appliance, number of industrial customers of a certain size, or total energy consumption of commercial end use loads for the market end use in question.

2.5 Estimating Savings Post Active-Market Engagement in Markets without Codes or Standards as an Endpoint

Not all MT initiatives have the possibility of a code or standard to lock-in sustained market change or will be successful in the achieving the desired code or standard. For example, programs seeking to change standard practice in operations and maintenance, influence recommendations for building upgrades in existing buildings (not typically affected by new construction codes), or create change via training often cannot rely on a code or standard to ensure sustained adoption. Even without a code or standard, it is still possible for estimated MT savings to become significant as the market adoption rate can grow exponentially. Therefore, it is important to design market evaluation components that support ongoing measurement and estimation of total market adoption and efficient units, even after MT investments have subsided. There may also be exogenous market factors that could trigger a reforecast of the Natural Market Baseline during this post period. A periodic independent evaluation of these elements is recommended to support continued and accurate calculation of successful, long-term MT savings.

Key considerations for post-active market engagement energy savings estimation include:

- **Total Market Units** Data collection for total market units may be more challenging if the market actors who previously provided full market data are not willing to continue doing so without an active value transaction. In some situations, access to sales data could continue via contractual agreements with key market actors. In many scenarios, however, analysts will need to infer market changes through surveys, adjustments to purchased third-party data, or on-going market studies.
- **Unit energy savings** Given the wider market adoption at this point, it may be necessary to adjust the unit energy savings estimate. For example, with wider adoption there may be better data about the actual energy savings performance of the efficient measure. Key assumptions that affect UES during this period may also change as a wider group of users engage with the product or service.
- **Natural Market Baseline** As adoption grows, often other market forces become more apparent and may warrant review and possible adjustment of the Natural Market Baseline. Also, exogenous variables can come into play in the market that simply could not have been foreseen during the initial forecast of the Natural Market Baseline.

2.5.1 Duration of Savings Post Active Market Engagement in Markets without Codes or Standards as an Endpoint

It is important to establish the length of time that savings will be credited to the utility post-active-market engagement. This time period is separate from the lifetime of the measures embodied in savings measures. Instead it reflects the amount of time that a utility will receive credit for having changed the market even when it has no or minimal engagement. In some circumstances, the Natural Market Baseline will be expected to increase over time until some point where it essentially overtakes the Total Market. This provides a natural ending point for claiming savings from the MT initiative.

In some markets, the Natural Market Baseline will never approach the Total Market, or it will do so in an unreasonably long time-fame. In these cases, there is no quantitative analysis to determine duration directly; instead, it requires a policy call that balances an appropriate level of credit to make it worth the effort to support MT initiatives without counting savings into perpetuity. Factors to consider in crafting this determination include the likelihood of the baseline changing over time and the lifecycle of the product (which influences when things would have changed anyway). Given that this is a policy call, it is usually best to make this decision early in the MT initiative design process to provide certainty to program designers and implementers.

2.6 Energy Codes and Appliance Standards

Best practice in MT initiative design will identify applicable codes or standards early on and design interventions over the life of the initiative to accelerate early adoption of more efficient energy codes and standards when possible. If an MT initiative can successfully influence the code or standard to incorporate higher levels of efficiency, the initiative can effectively "lock-in" sustained efficiency changes for virtually the entire market. Logic models for MT initiatives will often include activities that are deliberately targeting and driving towards adoption of enhanced energy codes or standards (C&S). Energy savings that occur following successful adoption of efficient C&S[28] are often a significant portion of the energy savings claimed. In California[29] and the Northwest, savings from C&S currently represent significant portions of the energy savings in their energy efficiency program portfolios.

Illinois does not yet count savings from energy codes or increased compliance, but as of this writing is discussing possible activities to influence energy code compliance and potential adoption of higher efficiency levels in energy codes and standards. This Attachment describes savings estimates from energy codes adoption[30] because these are often part of MT efforts[31] and energy code compliance enhancement activities because they increase the effectiveness of the codes.

Figure 4[32] depicts the course of an MT initiative with an emphasis on the portion that effects energy codes[33]. This figure depicts a market where the natural market baseline does not have a regular code adoption cycle, but if that is the practice for the market being analyzed, anticipated energy code adoptions and their efficiency level would be included in the baseline. Area A represents the savings that accrue to activities in an MT initiative that prepare the market before C&S adoption and can include the wide variety of activities that are shown in Figure 1. Area B represents the savings following adoption of a new C&S. There are many activities that could be sponsored by utilities at the point of adopting a code or standard (just before the "code effective" vertical line). Some examples include developing model C&S language, providing technical and economic analysis and support, or submittal of C&S proposals.

[28] Energy code compliance is a key factor in the actual savings resulting from a code, and this is discussed in a later section.

[29] See TRC (2019) Codes & Standards Program Advocacy & Attribution study for a review of California's methods for codes and standards savings.

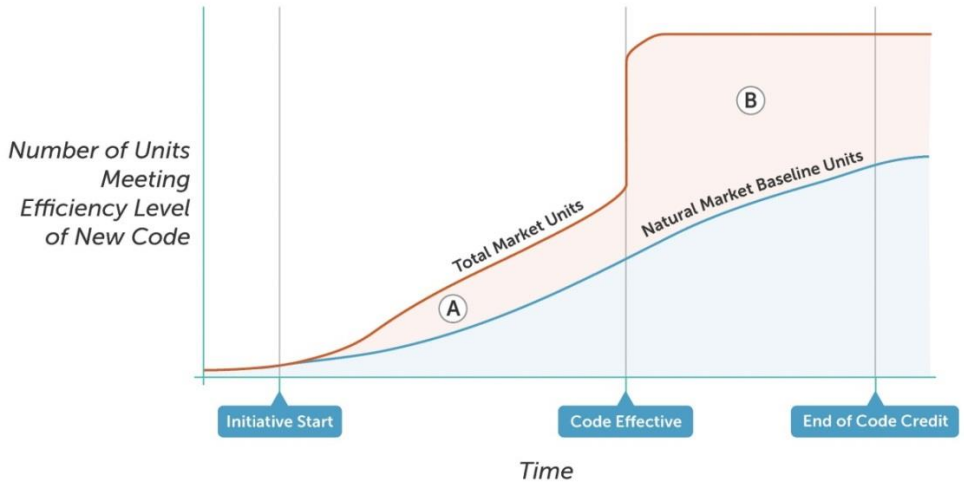
[30] Savings for "stretch" codes are covered by this discussion of codes and standards. If allowed by the state, a stretch code means local jurisdictions can adopt a code that is beyond the state code and is mandatory only for builders within that local jurisdiction. Savings would be calculated per this section, but only applied to buildings in the adopting jurisdiction.

[31] It should be noted that California has similar calculation methods for savings from codes and standards, although they weren't developed specifically under an MT framework. Massachusetts has developed a method for savings for code compliance that is similar to RA program analysis other than how attribution is estimated.

[32] Note that compliance with the energy code is usually less than -- and can sometimes be greater than 100%. Compliance greater than 100% can occur, for example, if the typical measure most readily available is more efficient than the code requirement; builders will simply use the available measure.

[33] In calculating savings, the effective date of the energy code or standard adoption drives the uptick in the number of efficient units meeting the efficiency level. In this paper, the term "adoption" is short-hand for the energy code or standard adoption, which would have an effective date by which most units will comply.

Figure 4: The Effect of Energy Code Adoption



If an MT initiative includes C&S activities as part of its logic model, energy savings from the pre-adoption period A in Figure 4 are counted using the methods described earlier. In addition, it can be credited with energy savings post-adoption B, which are also derived using the methods described earlier, but with some additional considerations, described below.

2.6.1 Additional Considerations for Savings from Codes and Standards [34]

This section describes the additional items needed to calculate savings from Codes and Standards (C&S). Per unit savings and total market units are calculated as described above. Additional factors that need consideration for C&S include:

- **Compliance when a new energy code is adopted:** Total Market Savings should be adjusted for measured or estimated compliance rates. Measured compliance pre- and post-adoption of the new energy code is strongly preferred, but not always available. In this case, a baseline compliance rate pre-adoption either measured or estimated is usually assumed to be the same post-adoption for purposes of energy savings estimation.
- **Post-adoption Natural Market Baseline:** Special attention should be given to the segment of the Natural Market Baseline (from energy code adoption to the end of energy code credit). The best representation of the counterfactual might be a fixed post-adoption baseline that changes to full adoption rates during the next scheduled change in the C&S processes (e.g. 3 years for the International Energy Conservation Code). Another option is some form of declining savings credit, such as a baseline that increases over time.
    - Determining the timing of this counter-factual movement in some alternate future has been difficult in those regions already counting savings from energy code adoption. One approach involves expert subject matter panels (Delphi panels) to establish this alternative future. However, finding enough independent experts and achieving convergence of opinion can be challenging. Trending market data or comparison with other similar code provision adoptions may also be used as alternatives. Ultimately, as with all counterfactual baseline estimation, there will need to be an aspect of professional judgement to determine the appropriate treatment of post-adoption baseline.

[34] A paper by Cadmus *et. al.* in 2013 describes the estimation of energy code adoption and energy code compliance savings in depth starting on page 52.

- **Accounting:** Accounting of savings between RA and MT programs is not generally used for C&S. This is because utility RA programs typically have ended operations before or at the point that the energy code adoption process takes place.
- **Allocation:** In principle, allocation of energy savings that occur from an MT initiative supported by multiple sponsoring utilities and targeting statewide code changes should be no different than during the voluntary portion of the MT initiative (see above section on allocation). In addition, there may need to be a split between utilities and other parties working on code adoption. This is often a negotiated number, sometimes informed by a Delphi panel, evaluators, stakeholders, or other entities.
- **Duration of Energy Savings Claims[35]:** It is important to establish the length of time that savings will be credited to the utility for the new code or standard. This is shown in Figure 4 as the time between "Code Effective" and "End of Code Credit". This time period is separate from the lifetime of the measures embodied in the energy code. Instead it reflects the amount of time that a utility will receive credit for having changed the energy code.
    - There is no quantitative analysis that can determine the duration of an energy code credit to the utilities; instead, it requires a policy that provides an appropriate level of credit to implementers that makes it worth the effort to support MT initiatives that target code changes, while not being so large as to be unfair to ratepayers. The policy call can be informed by when the code or standard would have been updated anyway to the level targeted in the MT initiative. Given that this is a policy call, it is usually best to make this decision early in the MT initiative design process to provide certainty to the program designers and implementers. For example, the Northwest negotiated a standard policy that allows for claiming code savings for ten years post the code effective date. For the residential code, NEEA does not report savings units six months after the code becomes effective, and then counts savings for a full ten years. This was a negotiated number among the parties involved at the time. If a new, more efficient code comes into play during that period, the incremental savings for that change are also counted for ten years.

2.7 Energy Savings from Enhanced Energy Code Compliance Activities

From work in other regions, a number of activities such as training and education, increased support for enforcement, and third-party plan-review, have been shown to result in increased compliance of energy codes, which in turn results in energy savings[36]. Efforts are underway in Illinois to analyze and discuss activities for improving compliance with existing energy codes.

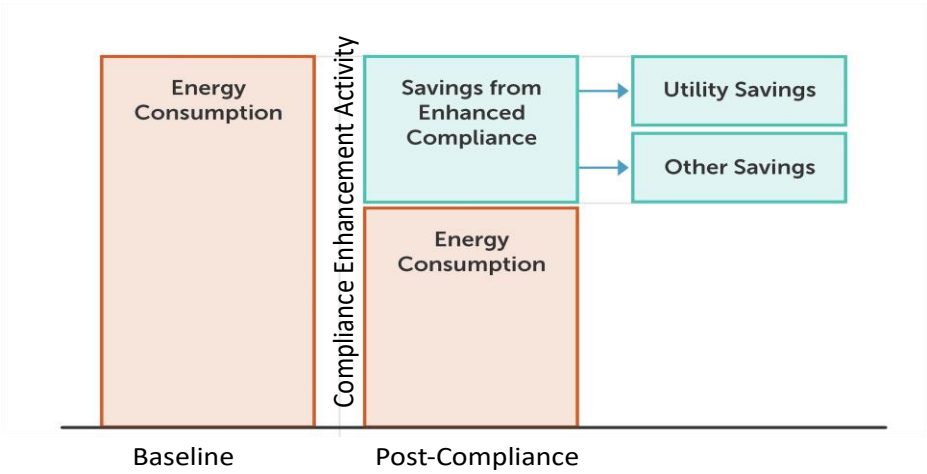
Savings from enhancing code compliance activities are derived by documenting compliance rates before the initiative starts[37], and compliance after the initiative has operated for a period of time. See Figure 5.

[35] Duration of savings claims can interact with the considerations in the Natural Market Baseline since this baseline can sometimes equate to Total Market Units over time, and therefore savings effectively become zero.

[36] For examples of recent evaluation reports analyzing the effects of compliance support programs on compliance rates in the residential and non-residential sectors, respectively, see NMR Group, Inc. (2018) and NMR Group, Inc. and Cadmus (2018):
NMR Group, Inc. 2018. Residential New Construction and CCSI Attribution Assessment (TXC48). http://ma-eeac.org/wordpress/wp-content/uploads/TXC_48_RNCAttribution_24AUG2018_Final.pdf
NMR Group, Inc. and Cadmus. 2018. Massachusetts TXC47 Non-Residential Code Compliance Support Initiative Attribution and Net Savings Assessment. http://ma-eeac.org/wordpress/wp-content/uploads/TXC_47_Nonres_CCSI_Attribution_Assessment_26July2018_Final-1.pdf.

[37] The Midwest Energy Efficiency Alliance is currently developing field data to determine compliance with current energy codes, and analyze which measures create the largest gap in savings.

Figure 5: Savings from Enhancing Energy Code Compliance



Unit energy savings[38] is the difference between the average unit energy consumption in the pre-enhanced-compliance case compared to the post-case[39] multiplied by the number of new units each year in the market that are affected. This is typically developed using building energy-use modeling of the baseline and post-compliance cases, and then subtracting the two. The building energy modeling should follow the practices for new construction modeling in the TRM for residential or commercial buildings as appropriate.

The per unit energy consumption for the baseline case is computed based on total building energy consumption with either measured or assumed compliance for all energy-impacting measures in the building. The per unit energy consumption for the post-compliance-enhancement activities is similarly calculated but using the energy-impacting measures of the post-compliance-enhancement building. For example, per building energy savings for wall insulation would be calculated by subtracting the building energy use assuming post-compliance-activity insulation amounts in the walls from an equivalent building energy use with the baseline wall insulation amounts. These building level savings are then divided by the square feet of the building to derive an average UES/square foot. This in turn is multiplied by the number of square feet in the market that are affected to derive the total compliance-enhancement related savings.

Total savings are then reviewed for the savings directly resulting from the efforts of the utility, versus other causes. Examples of other causes that can create enhanced code compliance include suppliers who might stock only "above code" materials or "spillover" from other larger jurisdictions that make it uneconomical for builders to change practices across jurisdictions. Most often, the split between utilities and other causes is a negotiated number among utilities and stakeholders which is sometimes informed by a Delphi panel that gives input to a third-party evaluator on their opinion of the utility's contribution if there are enough independent experts to form a Delphi panel.

2.7.1 Duration of Enhanced Energy Code Compliance Savings

Similar to the duration of savings credit for other MT initiatives, the actual value is a policy call. However, in the case of enhanced code compliance activities, duration of the activities is usually deemed to be the period of time that the particular code is in place. Once the code changes, (for example, every three years for the International Energy Conservation Code (IECC)), then credit for compliance-enhancement savings from the prior code would be stopped. This is because compliance savings are tied to a specific set of measures, and those measures may change when the code changes.

[38] In some cases, enhancing the compliance or effectiveness of measures in the code can have an impact on savings already incorporated in a TRM. If Illinois moves forward with enhanced code compliance, this could be an adjustment in the future to other sections of the TRM.

[39] If both compliance and increased efficiency happen at the same time, the savings can be calculated separately for each and summed.

3 Appendices

3.1 Appendix A: MT Initiative Business Plan Outline

The MT Initiative Business Plan is intended to document the strategy, data and assumptions about the initiative at the time of launch. It is a document that can evolve as knowledge of the market and the initiative evolves but is essential to prepare and guide launch of the initiative into the market.

Key components of the Business Plan include:

1. Identification/description of the specific market to be targeted
2. Description of the "leverage" point(s) that catalyze transformation
3. Logic Model or hypothesis of how the planned intervention will result in the desired market change
    a. Barriers that prevent market adoption
    b. Activities/interventions that will catalyze the change
    c. Outputs that result from the activities
    d. Market Outcomes (short-, medium- and/or long-term) that are measurable responses to the activities
    e. Ultimate desired impact – which is the final state of the market after it is transformed.
4. Market Progress Indicators
    a. Data collection/management plan
    b. Document any input from evaluators
5. Multi-year budget
6. Multi-year savings, including description of baseline over time
7. Estimate of cost-effectiveness
8. Names of utilities most likely to be involved with operating this initiative
9. Description of interaction with other programs (if any) by utility
10. Description of Jobs or Disadvantaged Community Impacts
11. Discussion of risks specific to this initiative
12. Date of adoption and Date of amendment(s), if any

3.2 Appendix B: Glossary of Terms

Above Natural Market Baseline Savings Net of RA Savings – The residual estimated energy savings computed by subtraction of energy savings claimed by an RA program.

Accounting – For purposes of this document, accounting refers to the practice of adjusting MT above market baseline savings to net out energy savings being claimed through any RA programs operation in the same market.

Adoption Date (of Code or Standard) – The date when the change in a building code or appliance/equipment standard was adopted by the rule-making authority.

Allocation – The process of allocating energy savings from MT programs to multiple sponsors of an MT initiative that operates across multiple sponsoring utilities; e.g. at a state or multiple state regional level.

Attribution, general - The concept of attributing causality for claimed energy savings to specific or general actions by the utility(s) as opposed to other agents acting in the same market. Attribution provides credible evidence that there is a causal link between the program activities and the outcomes achieved by the program.

Attribution, MT Programs –Attribution of all energy savings not counted in the Natural Market Baseline to utility funded interventions, including RA, MT, and supporting infrastructure. Note that this is not actually a statement of causality but rather a measurement by subtraction of Natural Market Baseline.

Attribution, RA Programs –In traditional RA program attribution is generally approached through application of an adjustment factor that adjusts "gross energy savings" measured through the program participants to account for "free-ridership"; i.e., those participants that would have acted without the RA program. For RA programs, this adjustment is usually represented in a "net-to-gross" (NTG) factor that is multiplied by gross energy savings to get "net" energy savings that can be "attributable" to the RA program.

Counterfactual – A constructed alternative future that might have happened without the intervention of either the MT or RA programs.

Estimated Market Transformation Savings – The residual estimated energy savings computed by subtraction of the natural market baseline savings from total market savings. These estimated savings are assumed to be associated with all utility funded market interventions including MT and RA programs, supporting infrastructure, and codes and standards activities. Analogous to the space above the Natural Market Baseline in Figure 2.

Estimated Market Transformation Savings Net of RA – The residual estimated energy savings after subtracting energy savings claimed by a resource-acquisition (RA) program from Estimated Market Transformation energy savings operating in the same geographic service territory.

Free Riders – A program participant who would have implemented the program's measures or practices in the absence of the program. Free riders can be: (1) total, in which the participant's activity would have completely replicated the program measure; (2) partial, in which the participant's activity would have partially replicated the program measure; or (3) deferred, in which the participant's activity would have partially or completely replicated the program measure, but at a future time beyond the program's time frame.

Full Category Data – Sales data (individual SKU, price and numbers sold) for all units of a specific product including both efficient and inefficient versions typically sold through a retail or distributor channel. May also refer to data available from manufacturers or trade associations that includes all units manufactured or sold.

Hedonic Price Modelling – a statistical approach that controls for a variety of variables and attempts to isolate the incremental cost associated with the feature of interest.

Logic Model – a graphic depiction of the shared relationships among the activities, outputs, and outcomes of a program. The theory of change should be visible in the logic model.

Market – an actual or nominal place where forces of demand and supply operate, and where buyers and sellers interact (directly or through intermediaries) to trade goods, services or contracts or instruments, for money or barter.

Market Progress Evaluation Report (MPER) – A report on MT program progress, usually conducted in parallel with program implementation over a relatively short (e.g. 12 months) timeline. Best practices would have these evaluation activities conducted by a third party. [Note that there are regionally distinct terms for similar evaluation products, including Market Evaluation. The specific term is less important for the purpose of this framework than the need to acknowledge that market transformation requires a somewhat different evaluation scope and product than might be required of other programs.]

Market Progress Indicator (MPI) – A measurement of market progress for a specific indicator of an element of MT theory described in the program logic that defines the associate barrier/opportunity/intervention strategy and anticipated outcomes from successful implementation. [Note that regional differences exist in how these indicators are labeled, including the term Market Indicator. The specific term is less important than the fact that the indicator refers to activities occurring within the market, rather than within the program, and that they will likely include long-term indicators that can take years to emerge.]

Market Transformation (MT) - The strategic process of intervening in a market to create lasting change that results in the accelerated adoption of energy efficient products, services and practices.

MT Business Plan - A document embodying the strategy, data and assumptions about the MT initiative at the time of launch. It includes a description of the efficiency opportunity, targeted markets, assessment of barriers and opportunities, intervention strategies, near, mid and long-term market outcomes, market progress indicators and key energy savings estimation assumptions.

Natural Market Baseline Savings – The estimated energy savings computed based on a market adoption rate forecast of what would have happened without any utility funded interventions that may include both MT and RA programs as well as enabling infrastructure support. The forecast of Natural Market Baseline is generally established before the start of the MT initiative but may be revised periodically.

Resource Acquisition (RA) – An approach to capture energy efficiency grounded in a regulatory framework which views EE as a resource that can be "acquired" through direct utility action analogous to any other "resource" considered by a utility to meet its existing and future energy requirements. These can be thought of as traditional utility-driven energy efficiency programs that typically work at the individual consumer level, rather than the market level.

Spillover – Reductions in energy consumption and/or demand caused by the presence of an energy efficiency program. There can be participant and/or nonparticipant spillover:

- **Participant spillover** is the additional energy savings that occur as a result of the program's influence when a program participant independently installs incremental energy efficiency measures or applies energy-saving practices after having participated in the energy efficiency program.
- **Nonparticipant spillover** is energy savings that occur when a program nonparticipant installs energy efficiency measures or applies energy savings practices as a result of a program's influence.

Summative Report – An evaluation report that attempts to quantify and assess the outcome effects for a given program period. Distinguished from "process evaluation" and consistent with "impact evaluation" in energy efficiency.

Total Market Savings – The estimated energy savings computed based on all market adoption above and beyond the adoption rate at the start of the MT initiative.

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