Accounting for Behavioral Persistence – A Protocol and a Call for Discussion

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ABSTRACT

Energy efficiency program administrators increasingly include behavior programs as an often substantial portion of their portfolios. A growing number of targeted evaluations show that savings motivated from residential behavior-based programs, such as home energy reports (HERs), persist at significant levels beyond the year the influence was delivered. While this savings persistence has implications for program cost-effectiveness and ongoing program savings, and therefore program design, in future years, there is not yet authoritative guidance on how to incorporate these effects into calculations of reported savings and cost-effectiveness. We describe here a standard protocol for accounting for behavior persistence that explicitly tracks the persistence effects of program intervention for these calculations. The approach is designed to be applicable to any type of behavior program that has a calculated or evaluated savings input and enough evidence to determine a persistence factor to use. The protocol incorporates a number of variables expected to affect the impact of persistence on savings and cost-effectiveness, such as: program retention rates; savings persistence rate; duration of persistence and rate of drop-off; and the effect of cross-year weather differences. Applying the protocol requires making decisions about assumed values for each of these. Stakeholders in Illinois have chosen specific deemed values for persistence and other assumptions to apply in the protocol for their HERs-type residential programs, and are currently developing plans using this protocol. We invite the broader community to review this approach and the assumptions made in this protocol and provide additional data, results, and insights to strengthen its value and applicability.

Introduction

Energy efficiency program administrators are increasingly including behavior programs as part of their portfolios. These programs are characterized by various kinds of outreach, education, and customer engagement designed to motivate increases in conservation and energy management behaviors, and most commonly include participant-specific energy usage information. Savings impacts are evaluated by *ex-post* billing analysis comparing consumption before and after, or with and without, program intervention, and require M&V methods that include customer-specific energy usage regression analysis and randomized controlled trial (RCT) experimental designs, among others (see SEE Action 2012; UMP 2015 for more information). As such, initial calculation of savings is treated as a custom protocol, and not generally included in a Technical Reference Manual (TRM), which serves as a repository of deemed values and deemed savings calculations.

An important issue for many stakeholders is whether energy savings from behavior programs continue over time (i.e., whether they persist beyond the initial program year). Behavior programs have now been delivered for a number of years in many jurisdictions. The weight of evaluation evidence indicates that the energy-saving behaviors influenced through these programs can persist beyond the initial period of program intervention, even without continued program participation (see Khawaja and Stewart 2014; Skumatz 2016; Ashby et al. 2017 for reviews). This post-treatment savings persistence has implications for calculations of first-year savings, measure life, and cost-effectiveness testing. Because annual goals are based on first-year savings, programs should only count savings truly attributable to first-year spending. That said, the effect of persistence of savings beyond the first year should be included in lifetime savings calculations and cost-effectiveness testing. Thus, accounting appropriately for persistence will yield savings and cost-effectiveness estimates that more accurately reflect the true benefits of these programs. This increase in accuracy has significant implications for program planning and valuation, and provides better information relevant to on-going program design and delivery improvements. In short, without explicitly accounting for persistence, programs are short-changing cost-effectiveness (or lifetime savings) results; over-stating first-year savings in subsequent years for on-going programs; and missing important information that might be useful for program design improvements.

While there is this growing body of work documenting persistence levels for a variety of behavior program types and time frames, there is not yet authoritative guidance, at least in the public domain, on how to incorporate these effects into ongoing savings and cost-effectiveness calculations. In 2015, members of the IL TRM Technical Advisory Committee (TAC)[1], a subcommittee of the Illinois Energy Efficiency Stakeholder Advisory Group, requested that their TRM Administrator, the Vermont Energy Investment Corporation, work with the group to develop a standard protocol for the application of savings persistence for behavior programs to annual savings and cost-effectiveness calculations, and to recommend deemed values for savings persistence. (An update with minor adjustments was undertaken in 2016.) The protocol described in this paper is the result of the work of that group (IL TRM 2017).

Effects of Savings Persistence

Within the past decade, a number of studies have been undertaken to investigate the retention of energy-saving behaviors by assessing the persistence of savings from HER-type program interventions[2] (see Khawaja and Stewart 2014; Skumatz 2016; Ashby et al. 2017 for reviews). While not yet as common as evaluations to measure annual savings in these programs, studies designed to test persistence consistently show that savings from interventions extend beyond the year of treatment. Studies to date show that some level of savings persists for at least 1 and up to 3 years, though at declining levels over time. On average, electric programs may show 15-30% annualized decay in savings, with the few studies done on gas programs showing faster rates of saving decay (as much as 45-60% per year).

These findings mean that at least some of the savings measured in future years are actually attributable to the current year's intervention, and that programs should get credit for all the savings driven by costs incurred in the intervention year – for cost-effectiveness or for life-time savings calculations. As illustrated in Figure 1, if behaviors that result in saving continue after the first year, the system continues to benefit, and those benefits should be balanced against the initial year's cost of treatment when considering program cost effectiveness.

This persistence of savings has additional implications for programs that continue to send HERs reports after the first year of treatment. In jurisdictions with savings goals based on first-year or annual savings, programs should only count HERs savings attributable to spending in the reporting year. That means that the savings for a HERs program as directly measured by evaluators in subsequent years actually reflect savings from prior years' treatments as well as any incremental increases in savings for the specific reporting year, as illustrated in Figures 2 and 3.

[1] The IL TAC includes support from the state's program administrators (ComEd, Ameren Illinois, Nicor Gas, Peoples Gas, North Shore Gas, and, through 2017, the IL Department of Commerce and Economic Opportunity), the Illinois Commerce Commission, advocates, consultants, and other interested parties.

[2] Residential HERs-type programs: programs that regularly deliver home energy reports to residential customers through direct mail or email channels using a random control trial (RCT) experimental design.

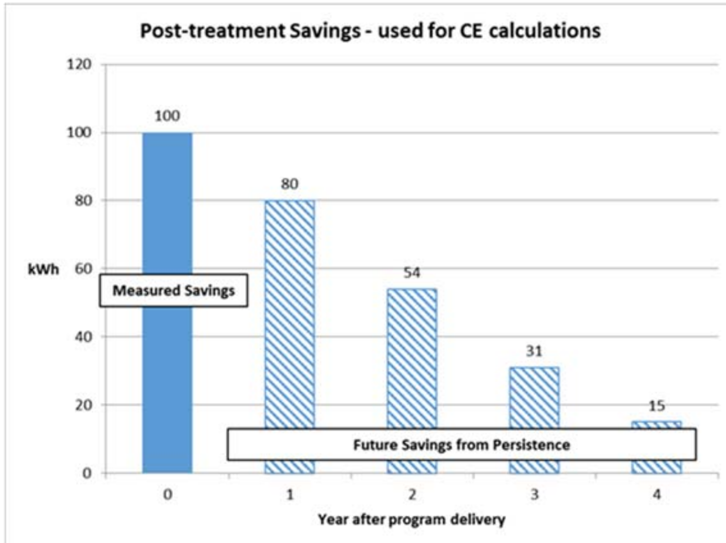

Figure 1. Illustration of the effect in future years of persistence of savings. Based on Khawaja and Stewart 2014 and IL TRM electric persistence rates.

Figure 2. Annual program savings (per home) as measured by program evaluation.

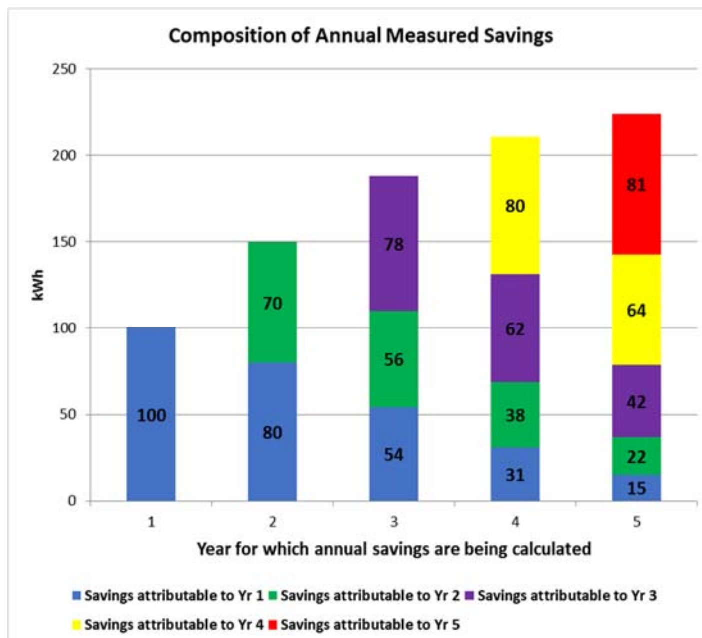

Figure 3. Annual program savings (per home), showing portion of measured savings attributable to previous years' activities. Based on graphics from Khawaja and Stewart 2014 and IL TRM electric persistence rates.

These results imply that the effects of these persistent savings should be specifically included in both in the calculations of program cost-effectiveness as well as annual savings across program years for these programs. Even given these important implications, program administrators have been reluctant to implement. Integrating persistence into program forecasting and reporting is complicated to implement.

There is additional administrative burden related to the additional measurement and calculation needed to apply this protocol, and also added costs to develop sufficiently robust vales for the assumptions needed. At the time of the IL TRM development, it appeared that only a few jurisdictions were accounting for persistence, even with a fairly simple approach by extended the HER measure life beyond one year; there was little publically available information on their specific methodologies.

The Illinois TRM Protocol

The IL TRM protocol is designed to translate the graphical representation of Khawaja and Stewart (2014), as shown in Figures 1 and 3, into a discrete, clear-cut algorithm that will account for the effects of persistence. It provides direction for calculating annual savings after adjusting for the effects of persistence, and guidance on incorporating persistence into cost-effectiveness calculations.[3]

Calculating Annual Savings as Adjusted for Persistence

The algorithm shown below was developed to calculate the annual persistence-adjusted savings to be reported in year T. The adjustment removes the proportion of the measured savings for that program year that actually reflects persistent savings from prior years' program activities (years T-1, T-2, …,T-*n*).

$$S_{T\ Adjusted} = S_{T\ Measured} - \sum_{i=1}^{n} (S_{T-i\ Adjusted} * RR_{T-i,T} * PF_i)$$

where:

$S_{x\ Adjusted}$ = total program annual savings for year *x*, after adjustments to account for persistence

$S_{x\ Measured}$ = measured savings; total program savings as determined from custom calculation/ billing analysis[4] of participants in program during year *x*

$RR_{y,x}$ = program retention rate in year *x* from year *y* participation
= % of program participants from year *y* that are still in program in year *x* (calculated as # participants still in program in year *x* / # participants in year *y*)

PF_z = persistence factor
= % savings that persist *z* years after savings were initially measured
= (Illinois TRM assumptions: use Table 1 below to select the appropriate value for PF)

n = number of years after year T program delivery for which savings persist
= (Illinois TRM assumption = 4)

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[3] This general protocol could be used for any type of behavior program once supportable assumptions for persistence exist as measured by multi-year, rigorous evaluation studies; persistence factors for those behavioral programs may differ from the specific factors provided in this discussion of assumptions for HERs-type programs.

[4] All appropriate adjustments to remove effects of participation in other utility programs, move-outs, opt-outs, to normalize for effects related to weather, and other adjustments as determined by the program experimental design, are assumed to have been made to result in this value for "measured savings". This value has been adjusted for standard year weather terms.

Table 1. Illinois TRM persistence factors for residential HERs-type programs

	PF_Z = Percent of adjusted savings from Year T activities that persist *z* years after year T			
	PF_1	PF_2	PF_3	PF_4
Electric savings persistence	80%	54%	31%	15%
Gas savings persistence	45%	20%	9%	4%

For Program Year T: record 100% of adjusted savings ($S_{TAdjusted}$ above). Source: IL TRM 2017; see REFERENCE TABLES for primary sources and calculation of average values and rate of decay.

Figure 4 illustrates the effect of this adjustment on the total measured savings.

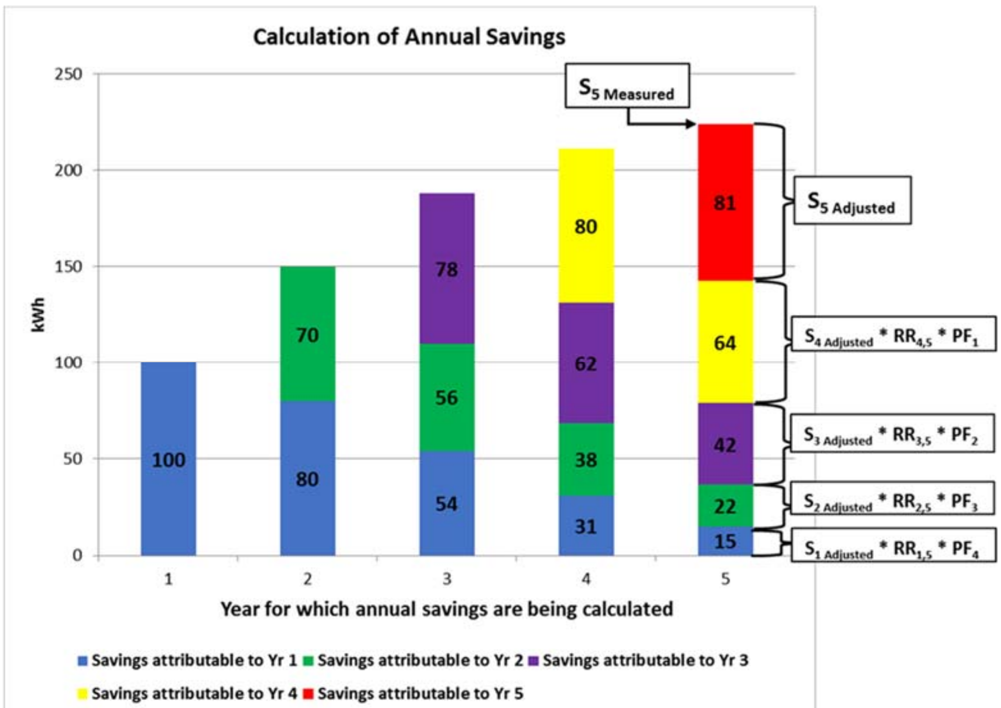

Figure 4. Illustration of calculation of annual adjusted savings (per home), after removing savings attributable to previous years.

Application of Persistence for Cost-effectiveness

For determination of cost effectiveness (or lifetime savings) of programs in year T, savings related to the current year activities can be calculated directly for each future year as:

Benefit of Year T savings in Year T+*i* = $S_{T\ Adjusted} * PF_i$

where:

PF_z = persistence factor
= % savings that persist *z* years after savings were initially measured
= (Illinois TRM assumptions: use Table 1 above to select the appropriate value for PF)

This approach assumes that individual values for future benefits can be recorded by year in cost-effectiveness calculators, allowing for the use of non-linear decay functions and more precise application of program-specific persistence factors.

The Significance of Accounting for Savings Persistence

Understanding and being able to account for this savings persistence clearly affects a program's cost-effectiveness and ability to claim savings in measurable ways. While the focus has been on the positive implications for cost-effectiveness, these effects need to be balanced with the effects on annual savings after the first year. Table 2 illustrates the impact of taking persistence into account for calculating cost-effectiveness and savings.

Table 2. Illustration of the potential effect of accounting for persistence on savings and cost-effectiveness. Assumes: Annual deployment cost = $600,000; Avoided cost ($/kWh) = 0.05; Discount rate = 7%; Participant retention rate = 95%; IL TRM electric persistence rates.

a. Without Accounting for Persistence

Year	Measured MWh savings	Annual Reported MWh	Lifetime MWh	Avoided cost (NPV)	Cost Effectiveness
2018	18,000	18,000	18,000	$900,000	1.5
2019	21,000	21,000	21,000	$1,050,000	1.8
2020	22,000	22,000	22,000	$1,100,000	1.8
2021	23,000	23,000	23,000	$1,150,000	1.9
2022	23,000	23,000	23,000	$1,150,000	1.9
Total	107,000		107,000	$5,350,000	

b. Including Accounting for Persistence

Year	Measured MWh savings	Annual Reported MWh	Lifetime MWh	Avoided cost (NPV)	Cost Effectiveness
2018	18,000	18,000	47,436	$1,922,882	3.2
2019	21,000	7,320	19,290	$781,972	1.3
2020	22,000	7,665	20,198	$818,774	1.4
2021	23,000	8,823	23,252	$942,578	1.6
2022	23,000	8,414	22,174	$898,860	1.5
Total	107,000		132,351	$5,365,064	

In addition, correctly attributing impacts to the costs to achieve them has implications for more-effective program design and modification, which, when done well, can lead to increases in long-term effectiveness, credibility, and the ability to reach more customers. For example, program delivery schedules might be designed to leverage persistence, and program messaging might be designed to offset some of the decay through interventions that motivate a larger response in second and third years, or that message for longer-lived responses. One intriguing suggestion (Allcott and Rogers 2014; Skumatz 2016) is that overall multi-year cost-effectiveness might be increased by cycling customers on and off of program intervention, reducing cost of delivery in off years but continuing to capture persistent savings across years. A hypothetical example provided by Skumatz (2016) suggests that a program design with two or even three years off could achieve a high percentage of savings at a fairly substantial savings (on the order of 70% of the savings at 2% of the cost of continual treatment). Best approaches to such program design modifications will depend on specific goal metrics: maximize savings, maximize cost-effective savings, or other objectives.

Assumptions and Compromises

Using this protocol requires incorporating a number of assumptions that affect the impact of persistence on savings and cost-effectiveness, such as: program retention rates; the average persistence rate; the length of time that savings persist; the shape of the persistence function; and the effect of cross-year weather differences. At this time, there is not a definitive, correct, and Illinois-specific answer for all of these inputs, and, much like many assumptions included in TRM characterizations, the protocol uses averaged or assumed values based on input from across a number of studies as well as stakeholder expectations and compromise recommendations. We encourage the broader community to review the approach and assumptions made in this protocol and provide additional data, results, and insights to strengthen its value and applicability.

In the following sections, we review the assumptions required by the protocol, the choices made by the Illinois stakeholders, and the thinking behind these decisions.

Measured Inputs

Defined in these calculations as “measured savings”, input values for this protocol are established through the comparison-based EM&V methods that determine program savings based on the differences in consumption before and after or with and without program intervention. The approach outlined here assumes that adjustments to remove the effects of savings from: program lift (participation in other utility programs), including legacy uplift; to account for move-outs and opt-outs; to normalize for effects of weather; and any other appropriate adjustments have been made as part of the custom calculation of savings. Therefore, this protocol does not need to account for those effects on savings.

Cross-year Effects from Weather

It is believed that at least some if not all of the persistence of savings from these programs is the result of persistent behaviors – for example, a new habit to reduce thermostat settings when away from home. However, because absolute savings from year to year may be affected by weather, economic down-turns, etc. – conditions that affect both treatment and control groups equally – calculating persistence as a percentage of a previous year’s savings may not capture the appropriate impact. In particular, weather is likely to play an important role in driving behavioral effects, affecting savings magnitude (e.g., a constant percentage change in consumption will result in more cooling savings during a hotter-than-average summer) as well as savings rate (e.g., the percentage change in consumption is likely to be higher during hotter-than-average summers).[5] As such, the IL TAC decided that the savings inputs used for these calculations should reflect weather-normalized values. Evaluators will adjust for effects related to weather as part of the custom “measured savings” inputs to this protocol, with evaluators choosing the most-appropriate method for weather normalization.[6] Adjusting savings to a standard weather year is

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[5] An analysis to confirm that cross-year effects of weather are material, and therefore should be included as outlined here, is planned.

[6] For example, one method would be to provide savings using a model specification that incorporates standard weather year inputs (e.g., HDD and CDD), to be used as the initial input into the calculation of annual savings, as well as inputs for cost effectiveness, as outlined here. This input will approximate average savings for a standard weather year based upon historical data. In the future, this approach could be empirically tested by comparing actual savings calculated in future program years against standard weather year results, producing a ‘realization rate’ between

consistent with how other weather-sensitive TRM measures are specified, and will remove this weather-related risk from performance goals and cost-effectiveness testing.

Effects of Program Retention Rates

Move-out rates and other attrition factors continue to occur and fluctuate year over year, and customers moving outside of the program service territory will not continue to produce attributable savings. The calculations for adjusted annual savings specifically include an adjustment to remove the effects attributable to previous year's participants who are no longer in the program. Because the savings measured by program evaluations every year come only from current participants, these savings should be reduced only for that component relating to persistence of savings from previous years for these current participants. Calculating the exact rate of retention of current participants relative to any previous year is possible, because of the level of individual participant data available in the typical HERs-type program.

On the other hand, the contribution of savings persistence to cost-effectiveness requires a prospective estimation of a savings amount that will continue in the future. To be accurate, the value of persistence used for lifetime cost and cost-effectiveness calculations should therefore adjust for future savings attrition from move-outs and other causes through the application of an additional deemed retention rate adjustment. At this time, we do not have sufficient data for such an adjustment and recommend further evaluation to develop appropriate *ex ante* estimates to use for cost-effectiveness calculations. The cost-effectiveness input calculations given in the IL TRM assume a retention rate of 100% after the first program year.

Use of Deemed Persistence Assumptions

Part of the value of including this protocol in the IL TRM is the documentation of a consensus decision about standardized assumptions for the levels and pattern of savings persistence. Given the limited scope of available persistence studies, we acknowledge that using averages of the rates found, and best current expectation of duration and decay function, may be the best approximations of the character of this persistence. However, moving forward, the IL TAC plans to consider additional study values, of their own and from other evaluations, and develop the most appropriate persistence factors, taking into account participant characteristics such as the duration of exposure, the frequency of reports, baseline energy usage, and the amount of time that has passed since receiving their final report, as well as the shape of the persistence curve.

Deemed persistence rates. Persistence studies done to date for HERs-type programs capture effects only through a limited timeframe and only for the specific program characteristics of the programs studied. They may not accurately represent the specific conditions in Illinois or any other particular set of program characteristics elsewhere. The Illinois TAC determined that an average annual persistence rate across the studies done to date is the best currently available data to approximate persistence for the general class of residential HERs-type programs. The current available HERs program persistence studies find varying rates of savings persistence, but cluster around a 20% annualized average for electric efficiency programs[7]. It is clear from discussion with investigators in this field that further targeted studies will be unlikely to find that a single set of persistence factors is appropriate for all program and participant characteristics

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planned and actual savings results. Standard weather years could potentially be enhanced to better reflect these differences.

[7] This 20% persistence rate is the level recommended by Khawaja and Stewart (2012) and is also the average across the studies reviewed for the IL TRM, and is the rate assumed for the first year persistence in the TRM.

(James Stewart, Principal Economist, Cadmus, pers. comm., March 28, 2017; Matt O'Keefe, Director, Market Development & Regulatory Affairs, Oracle, pers. comm., April 3, 2017). Rather, persistence factors are expected to depend on the length of treatment, with rate of decay higher and savings persistence lower in the early stages of program participation (see NMR 2016 for a study of short-term participants). At this point, neither Illinois nor the rest of the country has enough data to develop persistence factors that are a function of the length of treatment. If persistence does increase with time in program, use of over-inflated persistence values could mean a risk of over-estimating lifetime savings or cost-effectiveness of HERs programs if the persistence factors are applied to populations treated for a short period of time. Program administrators could decide to require that behavior programs run for a minimum length of time before persistence savings are counted.

Savings for these programs are also affected by other potential contributing factors, such as report frequency, baseline energy usage, and penetration of energy efficiency technologies and education in the program markets. It seems unlikely that such factors will not also affect savings persistence, and further studies would be helpful to determine these effects.

Shape of the decay function. While a linear decay rate has been used in simple illustrations of persistence (Khawaja and Stewart 2012), specific information about the shape of the decay function is limited. Most studies done to date that assess decay after more than one year do not specifically evaluate after each individual year and instead just calculate an average annual decay across the years studied.

Olig and Young (2016) recently completed an evaluation of the ComEd electric HERs program specifically designed to determine the first and second year persistence rates separately for each individual year, with the objective of helping to define the shape of the resulting decay function. The study shows an increased rate of decay in year two, indicating that a linear decay rate assumption may not be accurate, at least for the first two years. The results show an average decrease in the year-over-year persistence factor from year 1 to year 2 of 15%. This level of non-linear decrease in the persistence factor is assumed to hold for the five years of electric savings persistence for HERs-type programs and is used to calculate persistence factors used in the IL TRM protocol.[8]

It is recommended that the persistence values and the shape of the decay function used in this protocol continue to be updated. The assessment of the validity of a non-liner decay rate should be reviewed, and the rate as it extends beyond the first two years should be revisited when there have been additional studies designed to explicitly assess the shape of the decay curve across several years.

Length of duration of persistence. There is acknowledgment that studies have shown behaviors persist for multiple years. However, no studies have yet followed former program participants until savings become undetectable. The IL TAC members expressed a preference for an approach that would provide stable guidance for a span of years. The original proposal for the IL TRM was to use a linear decay for a five-year period. This resulted in stable decay but, at a 20% decay rate, a spike in savings in the first year after the end of this persistence period. There was concern that resulting patterns might drive program decisions in ways that seem counter-intuitive, based solely on the mechanics of the application of the persistence function. The non-linear function now incorporated into the IL TRM avoids this pattern, as persistence drops to very low levels by the fourth year after treatment (see Table 1).

Peak Savings and Persistence

While there are no readily available studies that directly evaluate the persistence of peak electric

[8] This Navigant study focused on electric HERs programs. Having no additional evaluations of this sort for the Illinois gas programs, the IL TRM protocol assumes a linear on-going rate of decay for five years based on the average annual persistence found in available gas program persistence studies (see Table 1).

savings, without more-specific information on the actual behaviors undertaken by program participants and their corresponding peak savings, it could be assumed that peak savings will persist in a pattern similar to energy savings. If program evaluations report kW as well as kWh savings, the algorithms here can be used to calculate the effects of persistence of peak savings as well. Further evaluation should be undertaken to clarify this point and determine appropriate peak-specific persistence values.

Application to Different Program "Waves"

Many program administrators introduce new iterations of their HERs-type behavior programs over time, with new sets of participants and perhaps different program designs. In order to appropriately track persistence effects, a separate instance of this protocol would be used for each new "wave", that is, each new launch of a program with new participants and controls. Data are tracked and savings measured separately for each wave, and the annual savings algorithm proposed here is appropriate if applied separately to each wave of programs. An assumption must also be made about the treatment of any new wave if the new program is launched other than at the beginning of a reporting year. Because persistence is applied in this protocol as a discrete, annual percentage of first-year savings values, precise application in both annual savings and cost-effectiveness calculations would require partial year measurements and calculations. For simplicity, the IL TRM assumes that any new wave starts at the beginning of a program year (Year 1).

While it might seem more appropriate to track, calculate, and report separately for multiple different treatment types, such as energy usage groups, report frequency, etc., at this time there is little explicit evidence on differing levels of persistence correlated with these program characteristics, and thus no benefit to undertaking the additional administrative cost of tracking and calculating these program tracks separately. If future persistence research uncovers more fine-tuned persistence data, it may make sense to apply this protocol to each distinct program design track.

Transition to Using This Approach

As programs begin to explicitly account for persistence in their savings and cost-effectiveness calculations, they will be faced with the question of how to transition to this approach, given that there may be programs that have been underway, and participants that will have been receiving treatments, for several years. In addition, there may be constraints on changes to allocations of savings across years inherent in legislation or regulatory rules, or hesitation to implement changes in the middle of plan cycles. We acknowledge that there is no graceful way to undertake a completely accurate "re-set". Stakeholders in Illinois decided that this method of accounting for persistence would begin as if 2018 is the first year of program delivery for anyone in their HERs-type programs at that time, and the assumptions and protocols outlined here will not be applied retrospectively to any utility programs. It is understood that this approach does not accurately take into account that programs have been in place prior to this date, and the fact that customers at that time will have been receiving reports for variable amounts of time, with varied associated actual savings persistence from these earlier program efforts. The difficulties of trying to "phase in" persistence adjustments to reflect this history have been recognized, and the approach outlined here has been approved by the Illinois TAC members as a reasonable, though imperfect, compromise.

Conclusion and Call for Discussion

This protocol is designed to explicitly account for the effects of savings persistence on the determination of annual savings as well as in the calculations of cost effectiveness. While the approach takes the year-by-year implications of persistence into account, it does require inputs specific to each program wave and year, involves multifaceted calculations, and may be complicated to implement.

Accurately assessing not only annual savings but also cost-effectiveness of spending on behavior programs in a given year is critical for program planning and valuation. Removing the effects of persistence attributable to this year from future years' savings also provides motivation for continued focus on opportunities to grow future incremental savings through on-going program design and delivery improvements to continue to influence savings. The implications revealed by accurately accounting for savings directly related to costs can, and perhaps should, influence program design decisions. For example, because of the high levels of short-term savings persistence, it has been suggested that increased savings might be achieved by "cycling" customers on and off the program, saving the program costs in the "off" years (Skumatz 2016). While such an approach seems initially counter-intuitive, clearer understanding of the real patterns of influence and saving will undoubtedly lead to more effective program designs. For this reason, attempting to incorporate persistence effects into behavior program accounting as accurately as possible seems important.

The protocol presented here incorporates a number of factors that are expected to affect the impact of persistence on savings and cost-effectiveness, such as: program retention rates; the average persistence rate; the length of time that savings persist; the shape of the persistence function; and the effect of cross-year weather differences. At this time, there is not a definitive correct answer for all of these inputs; stakeholders in Illinois have made their own decisions about the use of averaged or assumed values based on input from across a number of studies as well as stakeholder expectations. Further evaluations, designed with these specific questions in mind, could provide better inputs for these analyses, and could include:

- Persistence evaluation studies specifically designed to assess:
  - Persistence rates for different program design characteristics, such as frequency of reporting
  - Persistence rates for different customer characteristics, such as length of time receiving reports, or baseline energy usage
  - The shape of the decay curves
  - The full length of persistence effect
- Impact of weather on cross-year effects – is it material enough to include in the accounting?

We invite the broader community to review the approach and assumptions made in this protocol and provide additional data, results, and insights to strengthen its value and applicability.

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