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**Subject:** Background Information on NTG Policy

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This memo serves as background information on potential changes to the Illinois net-to-gross (NTG) policy. In summary, this memo shows the following:

- › In the past three years, Nicor Gas portfolio-level NTG values have been very stable, between 78%-80%. More variation occurs at the sector and program level.
- › Approximately 8% of evaluation resources have been spent toward the evaluation of NTG values. Going forward, this translates into \$80K to \$100K per year in evaluation spending for Nicor Gas. If a similar 8% were spent on NTG evaluations statewide, this would translate to approximately \$1,200,000 per year of NTG research.
- › Other states have policies that vary from those implemented in Illinois, including:
  - Measuring savings performance using gross savings.
  - Deeming NTG ratios for entire portfolios at 1.0.
  - Deeming NTG ratios for entire portfolios at values below 1.0.
  - Providing a multi-year lock on prospective NTG values within plan cycles.
- › NTG research has substantial methodological issues and can pose additional survey burden on participants.
- › A Value of Information approach might be useful in Illinois as it attempts to determine the appropriate level of resources to dedicate to NTG research.

### *Historical NTG Trends*

The Apex team reviewed PY1-PY6 NTG ratios for the portfolio overall, for sectors, and for individual programs.

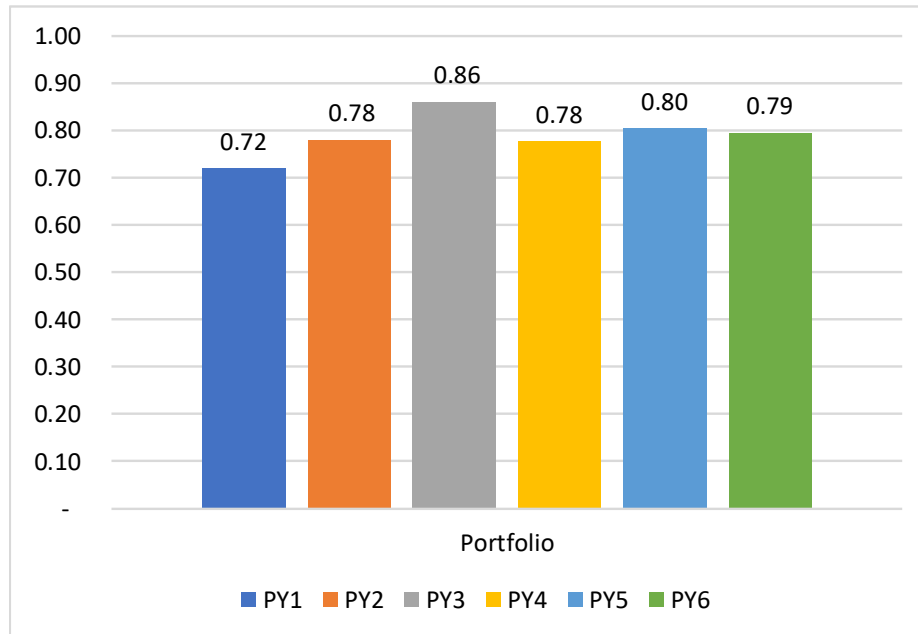
Across the portfolio, there has not been substantial variation in NTG ratios in the past six years.<sup>1</sup> The highest variation was seen during the start-up phase of energy efficiency programs (PY1-PY3), with a low in PY1 (0.72) and high in PY3 (0.86). This variation may be

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<sup>1</sup> Weighted average by program level savings. Note that most program NTG ratios have only been updated once per cycle, so are not updated annually. The exception is the Business New Construction Program, which is updated annually, but is based on a rolling NTG from the most recent three years.

due to the high spending in PY3, with NTG ratios rising with the focus of resources bringing in more customers.<sup>2</sup> NTG ratios have stabilized during the second plan cycle, with values ranging from 0.78 (PY4) to 0.80 (PY5).

**Figure 1. Portfolio NTG ratios by Year**



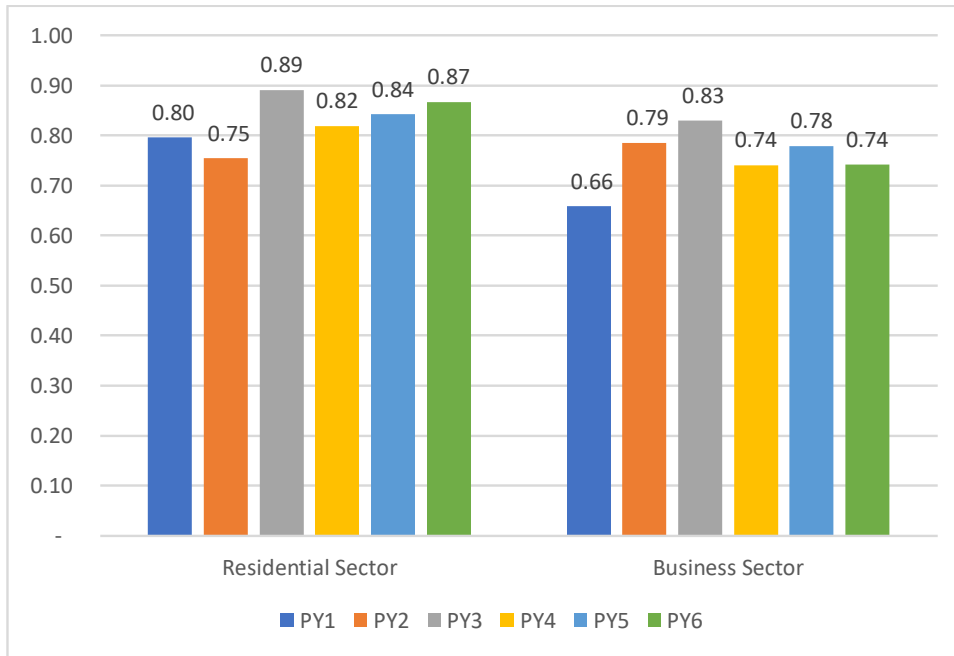
Within the residential and business sectors the NTG ratios have shown more variation. Again, the largest variation in NTG ratios is shown in the first plan cycle and more stability is experienced in the second plan cycle.

For the residential sector, the lowest NTG was in PY2 (0.75) and the highest in PY3 (0.89). In the second plan cycle, the NTG ratios were more stable, with a low in PY4 (0.82) and high in PY6 (0.87). The business sector experienced a similar story: the lowest NTG was in PY1 (0.66) and the highest in PY3 (0.83), with less variation in the second plan period (0.78 in PY5 and 0.74 in PY4 and PY6).

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<sup>2</sup> More aggressive programs, with higher incentives, attract a higher percentage of non-free riders and thus have higher NTG ratios. Conversely, less aggressive programs with lower incentives are less likely to motivate trade allies and customers to take action that they wouldn't have done absent the programs, and thus are more likely to have higher free ridership and lower NTG ratios.

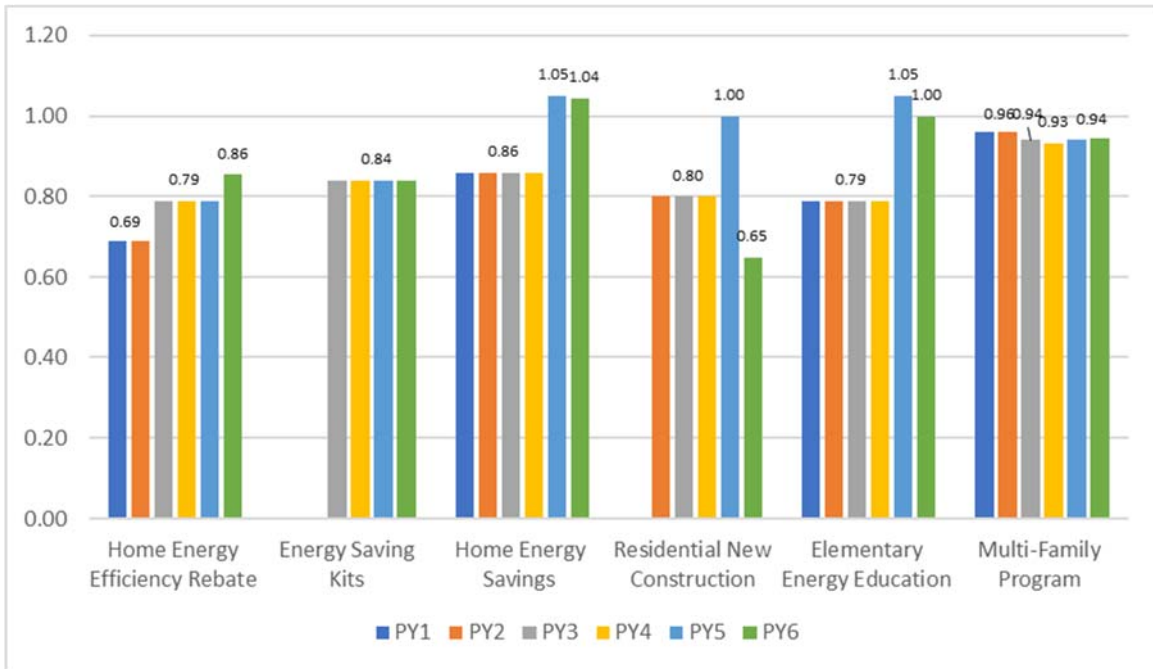
Figure 2. Residential and Business Sector NTG Ratios by Year



Underlying the sector and portfolio changes in NTG are the program-specific NTG ratios. As noted above, program NTG ratios are not researched every year, but when they are updated they do show more variation than the portfolio and sector level results above.<sup>3</sup> For example, Figure 3 shows the applied NTG ratios over time for the residential sector. Generally, these values are stable until research occurs and then they often change. For example, the HEER Program went from a NTG of 0.69 in PY1 to a NTG of 0.86 in PY6 (Figure 3), and Elementary Education fluctuated from a low of 0.79 (PY1 through PY4) to 1.05 (PY5).

<sup>3</sup> Note the research may have been conducted in the prior program year based on participants in an even earlier program year. In some cases the values represent negotiated values based on primary research, secondary data, projected changes to the program, or a combination of some/all of these.

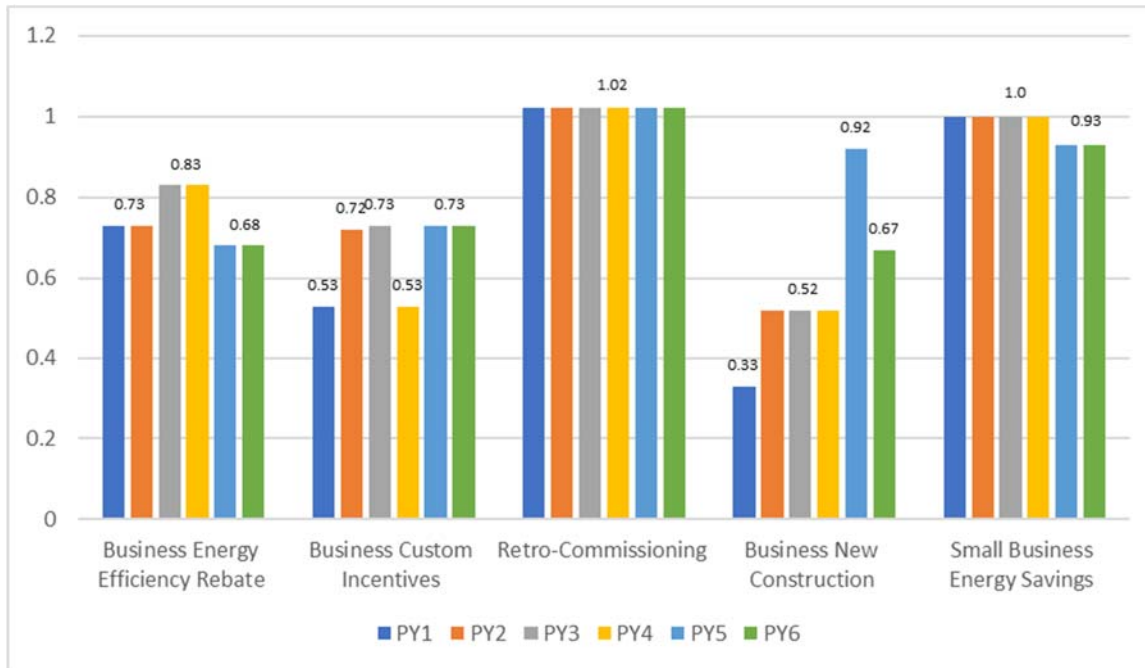
Figure 3. Program-Specific NTG ratios, Residential Sector\*



*\*Note program level NTG values are not updated every year, and values applied across multiple years are only shown once (e.g., HEER applied the 0.69 NTG for both PY1 and PY2).*

The next graph shows the NTG ratios over time for the business sector. Similarly, these values show more variation than the portfolio and sector level results. are stable until research occurs and then they often change. For example, the NTG for Business New Construction ranged from 0.33 (PY1) to 0.92 (PY5).

Figure 4. Program-specific NTG ratios, Business Sector\*



\*Note program level NTG values are not updated every year, and values applied across multiple years are only shown once (e.g., BEER applied the 0.73 NTG for both PY1 and PY2).

### Evaluation Spending on NTG Research

Although Navigant does not track spending for NTG, we estimated NTG spending based on the timing of NTG research and approximate share of increased cost due to NTG research<sup>4</sup>.

From PY4-PY6, approximately \$256,000 or 8% of evaluation spending has been conducted on NTG research. This has averaged approximately \$85,000 per year. With higher budgets starting in 2018 as Nicor Gas takes over programs previously managed by DCEO, 8% of evaluation spending would translate into \$100,000 per year in NTG research. Then again, due to the change to four-year plan cycles, and since NTG for most programs will only be examined once every four years (instead of every three years), NTG research costs may not reach \$100,000 per year.

<sup>4</sup> Increased cost was estimated as the difference in spending between the research year and an associated baseline year. For research conducted in PY6, we assumed PY5 was the baseline year. For research in PY4, we assumed PY5 was the baseline year. For research in PY5, we assumed PY6 was the baseline year except for Business Custom which was assumed to be PY4. We assumed that 50% of the increased cost was due to NTG research when NTG and Process work were conducted simultaneously. We assumed 33% of the increased cost was due NTG research when the research included NTG, process and custom research simultaneously.

**Table 1. Estimated NTG Evaluation Spending**

	PY4	PY5	PY6*	Total	<i>Average Annual</i>
NTG Cost	\$155,799	\$76,326	\$24,600	\$256,725	\$85,575
Total Eval Cost	\$1,317,013	\$848,040	\$1,142,033	\$3,307,087	\$1,102,362
NTG as % Total	12%	9%	2%	8%	8%
*PY6 is only through December 2017 and may not reflect spending in the first half of 2018.					

Although we do not have statewide data on NTG spending, if a similar 8% were spent on NTG evaluations statewide, this would translate to approximately \$1,200,000 per year.<sup>5</sup>

Additionally, it is worth noting that these estimates do not reflect the full cost associated with NTG efforts. In particular, it does not include:

- › Utility research staff time to design and manage research and internally coordinate on the results
- › Program staff time to review results and implement associated program changes
- › Utility reporting staff time to track and update NTG values and apply to program savings
- › Stakeholder Advisory Group (SAG) time to review research and decide on prospective NTG values

These evaluation resources have been spent across programs – even programs with a small contribution to portfolio savings and limited uncertainty (e.g., the Elementary Education Program) – and thus have come at the expense of other research that could be performed to improve gross savings estimates (e.g., billing analysis, metering studies, etc.), provide benchmark studies, provide more in-depth process evaluations (e.g., responses to alternative rebate strategies), or otherwise improve portfolio performance.

### ***Other States' NTG Policies***

Across the United States, NTG policies vary substantially across jurisdictions. Recently, the Apex team conducted a jurisdictional scan across all states to identify key themes<sup>6</sup> of other states' NTG policies. Some key themes include:

- › Approximately half (53%) of jurisdictions use gross savings in assessing achievement against savings goals. Although this includes some states with limited efficiency programs, it also includes jurisdictions that do not require NTG estimation

<sup>5</sup> Assumes \$15 million in annual evaluation spending, based on \$500 million in total energy efficiency spending (\$350 million for ComEd; \$80 million for Ameren; \$40 million for Nicor Gas; \$30 million for Peoples Gas/Northshore Gas), and 3% of total spending allocated to evaluation.

<sup>6</sup> [Net-to-Gross Policies: Cross-Cutting Jurisdictional Review by Navigant Consulting, Inc., and Apex Analytics, December 14, 2017.](#)

for reporting against goals. In those jurisdictions, NTG research is instead used as information regarding program influence.

- › Most states with net savings goals use a prospective or fixed NTG ratio. Similar to Illinois, most states with NTG (54%) have a prospective or fixed NTG ratio, while 38% of states with NTG use NTG ratios retrospectively.
- › Five states use a deemed NTG ratio:
  - Two states, Iowa and Arizona, use a NTG ratio of 1.0 (i.e., these are effectively the same as gross program states).
  - Three states use a value below 1.0: Hawaii (0.7), Michigan (0.9) and NY (0.9).
- › The frequency of NTG updates varies. In Massachusetts, NTG ratios are set for three-year program cycles and therefore the research to inform them is often only conducted once per cycle.<sup>7</sup>

### *Value and Risks of NTG Research*

The primary value of NTG research is to align the savings estimates with ratepayer value. That is, because ratepayers are funding efficiency programs, utilities want to ensure that those funds are being spent wisely on programs that are influencing customers to make changes to their energy usage that they would not have otherwise done. Therefore, NTG research provides utilities with information to inform their energy efficiency program planning and investment decisions. Additionally, NTG research, combined with process evaluation plays an important role in providing general information about the quality of the program, its performance and efficiency.

However, NTG research has inherent difficulties and risks to utilities, including:

- › **Difficulty to plan for changes.** First, if NTG values are used retrospectively, the NTG results can feel punitive and do not allow for utilities to make changes to address the results. Even if NTG values are used prospectively, as they are in Illinois, the timing of the research and updates to values may not provide sufficient time for utilities to make program changes that allows them to adjust for NTG changes.
- › **Lack of Alignment in Goals and Reporting.** While the goals for gas programs are now adjustable based on changes to gross savings in the TRM, the goals do not adjust based on changes to the NTG ratio. So, if a measure/program receives a lower NTG ratio than what was planned for, utilities need to make up this difference through either more measure installations, which requires additional costs than allocated in the plan. And while utilities can make up for lower-than-planned NTG ratios by

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<sup>7</sup> For the upcoming plan cycle, Massachusetts stakeholders are discussing whether to keep this multi-year lock on NTG ratios, with a strong push by some stakeholders (even including some of the utilities) to move to a one-year prospective approach for both net and gross savings, similar to Illinois. Although it has provided risk mitigation benefits to the utilities, it is seen by some as too long of a delay for some programs, especially those with fast-moving markets.

shifting resources to other measures in the portfolio, when NTG ratios decline for low-cost measures, resource shifts cannot be accomplished without increasing spending. Conversely, if evaluations increase a NTG ratio, utilities can experience an artificial “windfall” without making any changes to program design.

- › **Limitations of NTG research.** Although NTG research is conducted across the country, there are well-known methodological issues and limitations with the research. Substantial research<sup>8</sup> has been done that documents policies, methods and limitations of NTG research. In general, self-report methods are used to estimate NTG ratios. Research into Action (2017) reports on various issues with this methodology, including:

**Questionable Accuracy of Responses.**

There are multiple reasons why respondents to surveys are unable to provide accurate responses to NTG surveys, these include:

- Difficulty estimating and reporting attribution
- Difficulty reporting the counterfactual (i.e., hypothetical alternative)
- Tendency to rationalize past decisions
- Tendency to provide socially desirable responses
- Failure to recognize all direct and indirect pathways of program influence

**Research Design and Implementation issues:**

- Survey design and response bias
- Timing of surveys
- Potential arbitrariness in free-ridership scoring

- › **Customer Burden.** Additionally, NTG self-report research, which often requires lengthy and complicated survey batteries, poses an additional effort for Nicor customers, who are already very busy and may experience survey burden. For example, a NTG battery of survey questions could be up to 20 questions, and

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<sup>8</sup> Kushler, M., S. Nowak, and P. Witte. 2012. “A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs.” Prepared for ACEEE (American Council for an Energy-Efficient Economy). [http://ilsagfiles.org/SAG\\_files/Subcommittees/IPATRC\\_Subcommittee/6-16-2015\\_Meeting/NEBs\\_Sources/ACEEE\\_2012%20report.pdf](http://ilsagfiles.org/SAG_files/Subcommittees/IPATRC_Subcommittee/6-16-2015_Meeting/NEBs_Sources/ACEEE_2012%20report.pdf)

Kushler, M., S. Nowak, and P. Witte. 2014. “Examining the Net Savings Issue: A National Survey of State Policies and Practices in the Evaluation of Ratepayer-Funded Energy Efficiency Programs.” Prepared for ACEEE (American Council for an Energy-Efficient Economy). <http://aceee.org/sites/default/files/publications/researchreports/u1401.pdf>

Violette, D. and P. Rathbun. 2014. “Estimating Net Savings: Common Practices.” In The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, edited by T. Jayaweera, H. Haeri, pp. 23-1–23-74. Golden, CO: National Renewable Energy Laboratory (Subcontract Report NREL/SR-7A30-53827). Accessed at: [www.nrel.gov/docs/fy13osti/53827.pdf](http://www.nrel.gov/docs/fy13osti/53827.pdf).

Research Into Action. Review and Analysis of Net-to-Gross Assessment Issues for Natural Gas Demand Side Management Custom C&I Programs. Prepared for Enbridge Gas Distribution, Inc. August 25, 2017. <http://www.rds.oeb.ca/HPECMWebDrawer/Record/594277/File/document>



depending on the type of program, could require up to fifteen minutes of the participant's time.

### *Does the Value of NTG Research Justify the Cost?*

The issue of whether the effort associated with NTG research has been discussed in the literature several times in the past ten years<sup>9</sup>. In particular, there is recognition in the industry that although there is value in understanding the attribution of savings in order to spend ratepayer funds effectively, there is also a limit to how much research on attribution is valuable to ratepayers. For example, SEEACTION (2012, p5-7) states that "NTG ratios are stipulated in some jurisdictions when the net savings value is not considered critical, or if the expense of conducting NTG analyses and/or the uncertainty of the potential results are considered significant barriers." In addition, the report states that "One option for keeping costs down while using the more sophisticated approaches is to conduct an NTG ratio analysis every few years and stipulate NTG ratios for the intervening years as long as the market influences and participants' behavior are relatively consistent."

Additionally, recent research<sup>10</sup> recommends assessing the value of information (VOI) associated with NTG research. In particular, NEEP (2016) states that "incorporating both cost and information value criteria into the decision-making can provide insights leading to better decisions". Specific questions related to NTG research, include:

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*Value of information (VOI) is a decision-making process in which the potential value, or benefits, of the research results are considered in context of the costs of the research. To assess the VOI, the assumptions are documented regarding what the studies might produce and how the results can be used to produce value – NEEP, 2016*

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<sup>9</sup> Peters, J.S. and M. McRae. 2008. "Freeridership Measurement Is Out of Sync with Program Logic or, We've Got the Structure Built, but What's Its Foundation?" In Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. Monterey, CA: American Council for an Energy-Efficient Economy.

[http://aceee.org/files/proceedings/2008/data/papers/5\\_491.pdf](http://aceee.org/files/proceedings/2008/data/papers/5_491.pdf)

Messenger, M., R. Bhavirkar, B. Golemboski, C.A. Goldman, and S.R. Schiller. 2010. "Review of Evaluation, Measurement, and Verification Approaches Used to Estimate the Loan Impacts and Effectiveness of Energy Efficiency Programs." Lawrence Berkeley National Laboratory: Environmental Energy Technologies Division. LBNL-3277E. <https://emp.lbl.gov/sites/all/files/lbnl-3277e.pdf>

SEEACTION (State & Local Energy Efficiency Action Network). 2012. Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc., [https://www4.eere.energy.gov/seeaction/system/files/documents/emv\\_ee\\_program\\_impact\\_guide\\_0.pdf](https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf).

<sup>10</sup> Northeast Energy Efficiency Partnerships (NEEP) 2016. "Gross and Net Savings Principles and Guidance." Prepared for Northeast Energy Efficiency Partnerships by Navigant Consulting and Tetra Tech, April 2016. <http://www.neep.org/gross-and-net-savings-principles-and-guidance>.

- › Should research be conducted, or can past research or secondary research be used?
- › If net savings primary research is to be conducted, how much is needed, how often should it be done, and how can it be prioritized for maximum value?
- › What net savings research methods balance requirements for rigor, or expectations for confidence in the results within the available evaluation budget?

In 2015, Violette, et. al<sup>11</sup>, developed an analytical tool for estimating the net benefits (i.e., value of information) of conducting NTG research for programs in Iowa. In summary, they found:

*"conducting primary NTG research will generally be cost-effective and appropriate for most of the larger energy efficiency programs, but there are many smaller programs where maintaining deemed a NTG value of 1.0, or other values based on secondary research, would be appropriate. Additionally, the findings suggest a flexible, common-sense approach which considers the perspectives described above as complementary rather than mutually exclusive. This "blended" view is most likely to facilitate cooperation and compromise between the various parties in agreeing upon a common NTG approach for Iowa."*

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<sup>11</sup> Violette, D., K. Seiden, J. Erickson, M. Podolefsky, J. McMillan, S. Robinson, S. Dimetrosky, and N. Lieb. 2015. Final Report: Iowa Energy-Efficiency Net-to-Gross Report. Prepared for Iowa Utility Association and the Oversight Committee. September 2, 2015. <http://www.iowautility.org/wpcontent/uploads/2016/04/Appendix-B-Iowa-Net-to-Gross-Final-Report-11-25-2015.pdf>.