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From: Jake Millette and Jayden Wilson, Opinion Dynamics

Date: ~~August 24~~September 18~~7~~, 2018

Re: Net-to-Gross Research Results from the EPY9/GPY6 Non-Residential New Construction Program

INTRODUCTION

This report presents the results of the real-time net-to-gross (NTG) analyses conducted during the EPY9/GPY6 evaluation activities of the Coordinated Utility Non-Residential New Construction Program (New Construction Program) implemented for ComEd, Nicor Gas, Peoples Gas, and North Shore Gas Companies.

The memo presents the NTG ratio estimation algorithm, NTG ratio analysis results, related process findings, and verbatim excerpts from the interviews. EPY9/GPY6 covers June 1, 2016 through December 31, 2017.¹

METHODOLOGY

Free ridership. During the course of the EPY9/GPY6 evaluation, the evaluation team again employed a “real-time” approach for researching free-ridership and spillover which was used in EPY8/GPY5, with a few modifications. This overall methodology involved a review of project documentation followed by a post-reservation phase interview with key decision makers of participating project teams. The participant survey instrument asked about awareness of the measures identified and their inclination to pursue incorporation of those measures into design plans absent the program.

- 1) ~~Project Documentation~~ **Documentation Review. This included:**
 - a. ~~Measure Incentive Reservation. The evaluation team began by reviewing the measure incentive reservation for each sampled project. This document allowed the evaluation team to ask about the decision-making processes for specific components of each project. The measure incentive reservation documents contained:~~
 - i. ~~Project description~~
 - ii. ~~Estimated savings by energy efficiency measures (baseline compared to proposed equipment)~~
 - iii. ~~Estimated incentive, by energy efficiency measures~~
 - b. ~~Project Narrative. The evaluation team began by also reviewing a project narrative file for the documentation on each sampled project provided developed by the implementation contractor. These narratives allowed the team to determine potential points of influence of the program to identify potential points of influence. This component file included:~~

Commented [JM1]: The first bullet in the original version (referring to Documentation Review) was outdated and mistakenly pulled in from earlier evaluation reports. Over the years, the implementation and evaluation teams have found that the “project narrative” approach was much more efficient for both parties with no appreciable loss in the needed information provided.

¹ The program has historically run from June 1 to May 31 but was extended to include a bridge period in EPY9/GPY6 as the utilities shifted from a fiscal to a calendar year cycle.

- i. Project contacts
 - ii. Reviewing email correspondence for indications of program influence
 - ii. Reviewing building plans from throughout the project's participation to identify changes in efficiency throughout the construction processProject history. The implementation contractor listed key dates for the project, including formal project milestones (e.g., date of application reception), informal milestones (e.g., documenting receipt of updated drawings), and communication between the participant and implementation contractor. For each entry, the implementation contractor listed the date and a summary description of the event/milestone.
 - iii. Project narrative. The implementation contract provided a summary of the project
 - b. Discussing the project with the implementation contractor to confirm areas where they believe the program was influential, if needed
- 2) **Post-Reservation Interview.** Once a sampled project reaches the reservation stage, the implementation contractor provided the evaluation team with contact information for project contacts key decision makers and the team conducted a post-reservation interview as soon as possible. The evaluation team sought to speak with key decision makers for the project. In most cases, the primary project contact was the key decision maker, but we verified this as part of the interview and asked to be referred to the appropriate contact if necessary. We also incorporated customized questions for each project linked to the points of influence identified in the documentation review. The in-depth-interview guide used in these interviews is provided as an attachment.

Spillover. In prior years, the evaluation team also conducted post-verification interviews with participants once a project was complete, to collect additional free-ridership information as well as participant spillover data. Because in previous evaluations the second interview consistently provided little new information, we suspended the post-verification interview. Over the course of the program's life, the annual evaluations have found very little evidence of participant spillover. Therefore, the team has omitted the post-completion project interview since the EPY8/GPY5 evaluation.

Instead, the evaluation team shifted from annual spillover research to conducting a periodic standalone spillover survey to quantify any spillover that has occurred because of program's activities since participation.² We utilized an online survey and in-depth interviews with participants and training recipients from previous program years.³ As new construction projects typically take several years to complete, we surveyed participants from past program years to identify any energy efficient equipment or efficient designs incorporated in other buildings without receiving incentives from the New Construction Program or other ComEd, Nicor Gas, Peoples Gas or North Shore Gas programs.

Data collection included an online survey with a census attempt of participants from EPY6/GPY3 through EPY8/GPY5 and training recipients from past as well as current program years (EPY7/GPY4 through EPY9/GPY6) to identify potential cases of participant and trade ally spillover. For those cases, a member of our engineering team administered a follow-up interview to quantify the potential spillover savings. We surveyed a total of 2,033 unique participants, consisting of 147 past program participants and 1,886 training participants.⁴ Of these, 120 responded to the survey, resulting in an 8% response rate after accounting for email bounce backs and screened out respondents.

NET-TO-GROSS ALGORITHM

The NTG analysis estimates the energy savings which each project would be expected to achieve in a counterfactual scenario in which the New Construction Program does not exist - that is, it identifies how much of the gross savings are attributable to program activities. Our analysis relied on data gathered

² The evaluation team plans to conduct the periodic spillover survey every three years and last conducted it in EPY6/GPY3.

³ Training recipients included a variety of professionals, such as architects, engineers, building owners, consultants, and energy service providers in Illinois and other states.

⁴ Note that some part program participants also took part in trainings offered by the program.

Commented [AJL2]: Please clarify – was actual email correspondence reviewed or the detailed email correspondence narrative provided by the implementer?

Commented [AJL3]: Please clarify if this occurred and, if so, with what frequency.

Commented [AJL4]: It is my understanding that the implementation contractor provides the contact information for the person most engaged with them during the course of the project. That may or may not translate to the "key decision maker" for a given project as summarized in Navigant comment on page 3 "The decision-making process in new construction projects is complex, involving multiple market actors with varying degrees of influence coordinating over a period that could stretch into years." It therefore seems it could be a misnomer to call the contacts here "key decision makers."

Commented [SD5]: Participating customer spillover, correct? (and same with next paragraph). I don't recall if the research has examined TAs, would they be included in those that went through training? (and I recall in our meeting a few years ago that program staff said they felt TAs were taking what they learned from the programs and using it in other buildings). Would be helpful to clarify here if TAs were or were not included.

Commented [CC6]: Since NC program does not typically work directly with trade allies it does not appear there were many on our program participant list. However, any trade allies participating in NC trainings would have been part of the training participant list.

Commented [AJL7]: We should have a discussion about this since I assumed "TA" in this instance was referring to the design firms who in many cases are the program "participants" on behalf of the project owners. Although we don't use that term for them, some act as TA's in the sense that they bring us the projects and they consider it an added benefit to their clients to do so.

Commented [JM8]: We surveyed both firms that completed projects through the programs (i.e., participants) as well as firms/individuals that received training from the implementor. This included A&E firms and other trade allies. We added a footnote clarifying the types of training recipients.

through interviews with program participants in the reservation phase of the program or later. We asked interviewees a battery of questions about how the program influenced the project's design and the expected efficiency of the project had the program not been available. Responses to our NTG questions were used to calculate three different scores, which, in turn, were used to triangulate project-specific NTG ratios. We employed the C&I New Construction NTG approach of the Illinois TRM v6.0 protocol to combine these estimates into a project-specific NTG ratio. This approach is very similar to other commercial programs but acknowledges that new construction energy efficiency programs are not expected to alter a project's timeline. Each of these free-rider scores, the corresponding interview questions used to calculate them, and the overall equation for determining our NTG ratio is provided below in [Table 1](#).

Table 1. Net-to-Gross Analysis Plan (Free Rider Question Score Map)

NTG ratio = 1 - FR, where FR = (PI + PC + NP) / 3

| Free Rider score | Questions | Algorithm Notes |
|-------------------------------|-----------|--|
| Program Influence (PI score) | FR6a-b | These questions ask respondents to rate the relative importance of the program versus non-program influences by allocating a total of 100 points between the program (FR6a) and other factors (FR6b). Then, the PI score is calculated as one minus the program point divided by 100. |
| Program Components (PC score) | FR5a-mm | These questions ask respondents to rank the influence of multiple program and non-program factors on a scale of zero to ten, where zero corresponds to "no influence at all" and ten corresponds to "extremely influential". Then, the PC score is calculated as one minus the maximum program factor score divided by 10. |
| No-Program (NP score) | FR8 | This question asks respondents to rank the likelihood the project would have included the same level of energy efficiency had the program not been available, on a scale from zero to ten, where zero corresponds to "not at all likely" and ten corresponds to "extremely likely". Then, the NP score is calculated by dividing this score by 10. |

Commented [AJL9]: Had?

FINDINGS SUMMARY

Free-Ridership

To obtain the program-level NTG ratio, the project-level NTG ratio values were weighted by ex ante gross kWh savings and gross therm savings (for joint projects, using savings without interactive effects). The results of our analysis are included in [Table 2](#) below. For ease of comparison to the overall NTGR, each component free-rider score is presented as a difference from one. The NTG ratios presented below are based upon the 24 interviews conducted in EPY9/GPY6.⁵

Table 2: Researched Net-to-Gross Findings

| Savings Type | PI Score (1-FR) | PC Score (1-FR) | NP Score (1-FR) | NTG ratio |
|--------------|-----------------|-----------------|-----------------|-----------|
| kWh/kW | 0.34 | 0.83 | 0.44 | 0.54 |
| Therms | 0.34 | 0.81 | 0.29 | 0.48 |

Source: Navigant team analysis, Data Collection Instrument

Commented [CC10]: Has the evaluation team seen trends in declining participation or is this response rate similar to past years?

Commented [JM11]: The response rate has been very consistent over time. We have found past participants to be very responsive.

Commented [SD12]: Can you tell us how many of these had gas vs. electric savings? (and which utility). Also, please include the final interview guide as an appendix.

Commented [JM13]: Added a footnote and included guide as an appendix.

Commented [CC14]: The difference between the PC score and PI/NP scores is worth discussion. Arguably the PC score questions are more concrete & specific and may yield more meaningful results than asking a participant to imagine a "no program" scenario that doesn't exist. Does it make sense to continue to weight them all equally?

Commented [JM15]: This approach follows the approach for commercial NC programs outlined in the IL TRM. While refinements to the algorithm are always being discussed by the NTG working group, this approach reflects the consensus best practice at this time.

⁵ All 24 of the interviewed projects had electric savings while 18 also had gas savings.

The variation across free-ridership scores is likely a result of the inherent difficulty in estimating attribution in new construction programs and highlights the benefits of including multiple variations of attribution questions in participant surveys. The decision-making process in new construction projects is complex, involving multiple market actors with varying degrees of influence coordinating over a period that could stretch into years.

The evaluation team also attempted to isolate NTG estimates by measure or end uses, when deemed appropriate by the respondent. Only a few respondents elected to provide different responses to the free-ridership battery questions by end use, and in most cases the mechanics of the algorithm produced the same final NTG.⁶ Yet those who did provide different responses by measures tended to provide higher influence scores for the program incentive and the program's technical assistance for lighting controls and window properties and lower scores for those program factors for indoor and outdoor lighting power densities.

Spillover

In an attempt to identify and quantify potential cases of spillover resulting from the program, our team conducted an online survey of program participants and training participants. A total of 120 past program participants and training participants completed the survey. Based on the survey results, we identified four cases of potential spillover.⁷ Our engineering team followed up with these respondents and three responded to our request for interviews. In all three instances, our team determined that there was no related spillover. The findings for each of these interviews are shown in Table 3. As a result, our EPY9/GPY6 evaluation found no quantifiable cases of spillover.

Table 3. Spillover Findings by Respondent

| Participant | Results |
|-------------|--|
| 1 | Pursuing custom incentive |
| 2 | Not in ComEd's service territory |
| 3 | Unreachable |
| 4 | Training recipient who is active in the ComEd Standard and Custom Commercial programs. Of the potential spillover measures identified, one received a ComEd Standard incentive and the others did not qualify for the Standard incentive. These were considered more appropriately represented in the Standard program's spillover estimate. |

Additional Findings

In addition to answering quantitative questions in the free-ridership battery of questions, respondents also gave qualitative responses about the program's influence on current or past projects and provided suggestions on how the program may be able to influence future projects. In the post-reservation interviews, respondents often highlighted or indicated there were opportunities for the New Construction Program to expand to better serve high-efficiency participants. Nearly half of the participants we interviewed (10 of 24 respondents) indicated either that the program had minimal influence on their project's design or indicated that they would like to see the program offer [incentives on a broader range of](#)

⁶ For example, if a specific program factor was rated 8 for some measures and 7 for others, but the Program's technical assistance was rated 10 for all measures, because the NTG algorithm only incorporates the highest rated program factor these measures would have the same PC Score.

⁷ The evaluation team identified cases of potential spillover through a series of survey questions. To be considered spillover savings, the improvement had to be completed in ComEd's service territory (and the applicable gas company's territory if a gas measure), not be required by building code, not receive an incentive from their utility, and rate the New Construction Program or training as influential (>5 on a 0-10 scale) in incorporating the measure into the project.

Commented [SD16]: Helpful that this was included and we should include for all evaluations. The discrepancy between the scores is concerning. The PC and NP scores are in the direction that we would expect (i.e., "aspects of the program, like the incentives/advice, were really important, but then the respondent states there is a high chance they would have done it anyway").

Did you follow up on those that gave inconsistent responses (e.g., via an open ended question), and if so how many of the 24 had that and how were they handled? (TRM outlines the responses that would trigger the consistency check).

Nicor Gas has stated that the 100 point allocation approach is biased and probably not capturing all aspects of the program, and the discrepancy between the PI and PC scores, in our opinion, reflects that (i.e., they might not be assigning the 100 points to a factor that we consider a program factor).

Commented [JM17]: As shown in the guide, we included the consistency checks recommended in the TRM. Additionally, these interviews were conducted by senior consultants very familiar with the program and its offerings and we were therefore also able to catch and correct for other inconsistencies when they occurred. The most common example of this would be if a respondent obviously did not understand a question, the interviewer could catch it in real time and repeat/explain the question.

Commented [JM18R17]: The consistency checks were triggered in 8 cases. If a check was triggered, we pointed out the discrepancy (as written in the consistency check questions) and ask them to explain. In some cases, the respondent did not understand the original question, so we asked the relevant questions again. In other cases, they understood the questions and wanted to provide the answers they did and then provided an explanation as to why.

Commented [BH19]: This is not a large sample size. Are we sure the survey was asking questions that people understood? Or asking the right people? The conclusion here is not consistent with my experience.

Commented [JM20]: The sample size is 120 respondents, of which 4 passed through the appropriate screens for us to flag them as cases of potential spillover.

As stated earlier, this is consistent with the participant spillover research we have seen throughout the program's history.

~~rebates on more advanced measures~~ or offer more tailored support to project teams. ~~Based on these responses, it appears that these participants were not aware of the full set of offerings the program provides.~~ Almost one-third of interviewed participants (7 out of 24) indicated the rebated measures their project included are beginning to become standard practice in the industry or that one or more of the rebated measures would have been included in their specific project regardless of their participation in the New Construction Program. Several respondents (3 out of 24) indicated a lack of awareness of the higher-level support offered by the program or stated they would be open to a more in-depth participation process. One of these participants commented that the detailed nature of program recommendations, regarding specific equipment efficiency ratings or lighting power densities may limit the program to influencing decisions around the margin as opposed to higher order impacts.

Similarly, many participants discussed non-program factors which they identify as influential in their decision to install the energy efficiency measures rebated by the program which reveal that the new construction market in ComEd's service territory ~~may be experiencing an increase in naturally-occurring or market-driven energy efficiency.~~ ~~For instance, 6 of 24 respondents indicated that current building codes were an important factor in the installation of program-rebated measures.~~

Therefore, there may be opportunities for the program to better serve participants who already plan to install many energy efficiency measures in their project. ~~The underlying sentiment was that design teams who already plan to build an energy efficient building both are in need of and would respond well to technical assistance that the program already provides but of which participants may not take full advantage, advanced levels of program support.~~ This could be useful to projects teams who have to meet strict city building codes or who are planning to apply for LEED certification. Overall, this is promising news for the programs new Accelerated Performance program, which is likely to be well received and subscribed by program participants. In addition, it highlights the importance of the program's new focus on small businesses and public-sector buildings which may not yet exhibit high levels of energy efficiency in their initial design.

Verbatim Responses

Below we provide quotes from the in-depth interviews to provide additional context around the quantitative NTG results

Commented [SD21]: Did they state what type of advanced measures they wanted, or more details about "tailored support"? (I thought the program does offer customized support.) Maybe participants didn't take advantage of it?

Commented [JM22R21]: This was not described in the interview. I revised the text to help clarify. And yes, it seems like the feedback is really stating that the participants were not taking advantage of current program offerings.

Commented [BH23]: This example does not make sense in the context of "naturally-occurring or market-driven energy efficiency". Codes are neither naturally-occurring nor market-driven. Then since the program uses code as baseline, the fact that codes influence behavior is irrelevant in determining program influence.

Commented [AJL24]: This is a very confusing statement in light of the fact that the program baseline is code compliance (as Ben mentions above). In essence it appears either 6 out of 24 respondents did not fully understand the nature of the program or potentially that the interviewers were not individuals who are a subject matter expert. This is of concern.

Commented [JM25]: We deleted this sentence to avoid confusion. But to provide context around the original point:

These respondents state that they can often meet code in different ways and have a toolbox of measures they use on other buildings to meet energy code. Participation in the program means (i.e., to get above code) that they just pick different combinations of these measures or all at once. (Note that this does not mean that they would have installed all of them without the incentives.)

Commented [AJL26]: Again a puzzling statement in view of the fact that this is exactly the technical assistance this program provides and incentivizes (above code energy efficiency)

Commented [JM27]: Rephrased. Essentially, we are finding that the participants are asking for what the program already offers, but they may not be fully aware and therefore not take advantage.

Table 4. Select Verbatim Responses from In-Depth Interviews

| Topic | Quote |
|--|---|
| Expanded Technical support and Recommendations | "The parameters by which the program seems to be based are on pretty hard numbers like EER for equipment that we're not anywhere near selecting... so I guess I would be a little unclear as to what they could do for us earlier, but if they can educate us on what that help would be then we'd be more inclined to take the time to engage them. Sometimes adding one more [consultant to the process] is more than we'd like but if they can show that they'd be useful beyond what our energy model might already be doing then we'd be happy to engage them sooner." |
| Expanded Technical support and Recommendations | "I think maybe if there was more of a sit-down or a longer conference call ...something where maybe they educate a little bit more. I feel like maybe that's something that's a little lacking. Usually for us it's been, "We've already done all this stuff. Here's what we've done. Take a look at it. What can we achieve?" |
| Expanded Technical support and Recommendations | "I don't know if we've necessarily been engaged as much about all the other capabilities that they have or services they are willing to provide...I don't know if there a bigger picture that we're missing." |
| Limited Recommended Measures | "It's just there are a lot of [measures] that I typically do anyway... I was planning on [installing that measure] regardless of any incentives from you, but it's nice to see that there was a program that's encouraging this type of construction so you do have better efficiency buildings out there." |
| Limited Recommended Measures | "The measures that were agreed upon are like I said very consistent with what we are doing as a standard practice and again thrilled that [the program] is recognizing that." |
| Limited Recommended Measures | "I will say that the measures presented were somewhat prescriptive or somewhat typical I'd say and not perhaps as creative. I'm not sure to what extent the program is given access to really make what I would call a more creative decision or creative recommendation about the way the building is operated or designed." |
| Limited Recommended Measures | "[The recommended measures] start to look familiar across multiple projects...and frankly for the most part it is kind of a baseline spec for us now anyways" |
| Limited Recommended Measures | "The project would include [the rebated measures] regardless of whether the program existed or not" |
| Limited Recommended Measures | "What I recall is that the program reviewed our design and really identified measures that were in the design that we would qualify for [incentives]. So I don't think we made any changes to the design." |
| Limited Recommended Measures | "I was planning on doing that regardless of any incentive from you, but it's nice to see that there was a program that's encouraging this type of construction." |
| Building Codes | "The [rebated measure] is again, it's a requirement here in this city as well so ...we were bound to do that regardless" |
| Building Codes | "So these [rebated measures] are probably some of the most consistent approaches that our team uses to meet current energy codes" |
| Program Satisfaction | "To try and maintain our standard of high performance buildings and pushing the envelope when it comes to energy efficiency, we've had to work hard to do that and the support we get from programs like this is really critical to help us maintain that." |
| Energy Model | "[The energy model] was very useful to the [client] because it gave them a good idea as far as the energy cost of the project before it was ever constructed." |
| Energy Model | "[An energy model] is very time-consuming and cumbersome work. So to... get [a] very detailed energy model free of charge as part of the program if you qualified I was pretty impressed." |
| Energy Model | "The building owner was encouraged to make certain decisions that were better for a lifecycle cost kind of decision making based on the program's guidance." |

Commented [BH28]: Was any attempt made to identify personal or institutional bias in these responses. Many of the firms involved in new construction use "sustainability" or "green" as a marketing differentiator and may be unconsciously discounting awareness of incentives as a motivating factor.

Commented [JM29]: We try to correct for this in three ways:
 1) As described earlier in this memo, before conducting the interview, we research the project and the interactions the implementation team had with the project. It is natural for people to overestimate their own piece of the story over time and underestimate the influence of others. Having the project narrative at our fingertips while conducting the interview allows us to remind the respondent (if needed) of the influence of the program.
 2) We try to identify and weed out respondents that are "greenwashing" the interview and talk to those who had key decision-making roles in the project. For example, sometimes we are referred to and speak with the Director of Sustainability but try to speak to the contacts who actually worked on the project.
 3) We listen to the responses and probe with follow up questions if the answers are inconsistent or are lacking. All interviews are conducted by experienced consultants who are very familiar with the program and commercial decision-making.

Commented [BH30]: See quote #7: This sounds like a repeat participant who has become comfortable with efficiency measures over multiple projects and incorporated them into company standard designs. This could easily be interpreted as program influence in the sense that the program has changed their design practices, but instead is resulting in a FR penalty.

Commented [JM31]: Agreed. The program appears to have changed the market for both participants and non-participants so that to compete buildings need to be energy efficient.

APPENDIX 1.: COMED NON-RESIDENTIAL NEW CONSTRUCTION PROGRAM NTG HISTORY

| | Business New Construction Service |
|------|--|
| EPY1 | NTG was not evaluated for EPY1 because program began in EPY2. |
| EPY2 | NTG 0.59 Free-Ridership 41% Spillover 0% Method: Customer self-report. 14 projects were assessed from a population of 16. Enhanced method. NTG scores were adjusted for standard design national retail stores. |
| EPY3 | NTG 0.65 (0.69 for Systems Track and 0.54 for Comprehensive Track) Free-Ridership 35% Spillover 0% Method: Customer self-report. 13 interviews with individuals representing 15 projects out of population of 37 projects. Enhanced method. NTG scores were adjusted for standard design national retail stores. |
| EPY4 | Compressive Track – Retroactive application of NTG of 0.54 Systems Track used PY2 value of 0.59 NTG 0.57 (based on weighted avg. of 0.59 for Systems Track and 0.54 for Comprehensive Track) EPY4 Research Comprehensive Track 0.54 EPY4 Research Systems Track 0.59 Free-Ridership 43% Spillover 0% Method: EPY3 deemed value for Systems Track projects. Customer self-report for Comprehensive Track projects. Interviews with individuals representing 5 of 6 Comprehensive Track projects. Enhanced method. NTG scores were adjusted for standard design national retail stores and LEED projects. |
| EPY5 | SAG Consensus: <ul style="list-style-type: none"> • 0.65 |
| EPY6 | SAG Consensus: <ul style="list-style-type: none"> • 0.52 |
| EPY7 | Full Program NTG: 0.59 Comprehensive NTG: 0.59 Systems Projects NTG: 0.64 Free-Ridership 0.43 Spillover (all types) 0.05 Source. The NTG from estimate is from the EM&V EPY4 participant survey. Spillover is an EM&V estimate based on our literature review. In 50 participant interviews from EPY2-4 we found 2 spillover projects. Some of those interviews were early in the program's life when spillover is less likely. We also looked at existing literature on past studies and a wide range of spillover values. For example, in September of 2012, National Grid Rhode Island published a study: "2011 Commercial and Industrial Programs Free-Ridership and Spillover Study." For commercial new construction, they found 78% participant |

| | Business New Construction Service |
|-------|--|
| | <p>spillover and 0% non-participant spillover. Southern California Gas recently did a study to estimate spillover for its 2013 and 2014 Savings By Design program by looking at past studies. They only found a couple of older California studies relevant to commercial new construction. The 2003 BEA reported 11% participant spillover and 1% non-participant spillover. A 2002 study by the same evaluator showed 13% participant spillover and 5% non-participant spillover. Finally, they also looked at the NYSERDA New Construction Program Impact Evaluation Report from 2007-2008, which found participant spillover of 20% and non-participant spillover of 61%. This study has been questioned and we understand that NYSERDA is reevaluating its validity.</p> <p>Our conclusion is that, given the ComEd program design and implementation approach, it is reasonable to expect that a meaningful amount of spillover is being created and should be credited to the program. Given the range of spillover amounts we found in our literature review, we believe a spillover amount of 5% is probably a realistic and probably conservative estimate. That spillover is probably occurring through the action of architects, engineers, and builders who have had exposure to the program and, to a lesser degree, building owners who had a building go through the program. Given that mix, we have not tried to differentiate between participant and nonparticipant spillover.</p> |
| EPY8 | <p>Recommendation (based upon PY6 research): Full Program NTG: 0.80 – Preliminary, updated number to be provided later</p> <p>Free-Ridership: 0.20 Spillover: 0.00</p> <p>The researched NTGRs are being developed using a “real-time” approach where the evaluation team conducts interviews with program participants both after each project passes the reservation phase, and again after it passes the verification phase.</p> |
| EPY9 | <p>Full Program NTG: 0.77 Free-Ridership: 0.23 Spillover: 0.00</p> <p>NTG Research Source: Free-Ridership: Participant and service provider self-report through real time EMV Spillover: NTG real time research methods in EPY6 combine participant and service provider survey results.</p> |
| EPY10 | <p>Full Program NTG: 0.60 Free-Ridership: 0.40 Spillover: 0.00</p> <p>NTG Research Source: Free-Ridership: PY8 Participant and service provider self-report through real time EMV Spillover: NTG real time research methods in EPY6 combine participant and service provider survey results.</p> |

Source: http://lisaqfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.pdf

APPENDIX 2.: PEOPLE GAS (PGL) AND NORTH SHORE GAS (NSG) NON-RESIDENTIAL NEW CONSTRUCTION PROGRAM NTG HISTORY

| | Business New Construction |
|------|--|
| GPY4 | NTG 0.52 Method and Source: PGL and NSG have joined the Business New Construction (BNC) Program offered by Nicor Gas and ComEd. The BNC Program NTG value was the recommended value for Nicor Gas for GPY4. |
| GPY5 | NTG 0.92; Free ridership 0.08, Spillover 0.00 Method and Source: Value drawn from gas-weighted free-ridership and spillover results from participant interviews conducted for the Nicor Gas and ComEd GPY3/EPY6 Business New Construction Program. |
| GPY6 | NTG 0.67 Method and Source: FR, PSO, and NPSO research conducted for Nicor Gas and ComEd for GPY4/EPY7 resulted in a NTG of 0.57 for gas. SAG consensus for GPY6 is a three-year average of 0.52, 0.92, and 0.57. Also applies to small business new construction. |
| GPY7 | NTG: 0.77 Method: Research conducted for ComEd and gas utility program partners for GPY5/EPY8 resulted in a NTG ratio of 0.83 for natural gas measures. SAG consensus for GPY6 and GPY7 was to use a three-year average of the most recent NTG research values. For GPY7, the three most recent research values are: 0.92, 0.57, and 0.83, producing an average of 0.77. The NTG value also applies to small business new construction. The research applied TRM v5.0 NTG algorithms. |

Source:
http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/PGL_and_NSg_NTG_Summary_GPY1-7_2017-03-01_Final.pdf

**APPENDIX 3.: NICOR GAS NON-RESIDENTIAL NEW CONSTRUCTION PROGRAM
 NTG HISTORY**

| | Business New Construction Service |
|------|--|
| GPY1 | NTG 0.33 Free ridership 67% Spillover 0% Method: Customer self-report for all projects. Interviews with individuals representing 4 of 7 projects with gas incentives. NTG scores were adjusted for standard design national retail stores and LEED projects. |
| GPY2 | NTG 0.52 Free ridership N/A Spillover N/A Method: SAG deemed NTG ratio based on electric program evaluation results from EPY4. |
| GPY3 | NTG 0.52 Free ridership N/A Spillover N/A Method: SAG deemed NTG ratio based on electric program evaluation results from EPY4. |
| GPY4 | NTG 0.52 Free ridership N/A Spillover N/A Method: NTG values for GPY4 were deemed using values from GPY3, and reported in Table 14 of the Nicor Gas filed Energy Efficiency Plan for GPY4-GPY6. |
| GPY5 | NTG 0.92 Free ridership 8% Spillover 0% Method: Gas-weighted free-ridership and spillover results from participant interviews conducted for the Nicor Gas and ComEd GPY3/EPY6 Business New Construction Program evaluation. |
| GPY6 | NTG 0.67 Method: FR, PSO, and NPSO research conducted for Nicor Gas and ComEd for GPY4/EPY7 resulted in a NTG of 0.57 for gas. SAG consensus for GPY6 is a three-year average of 0.52, 0.92, and 0.57. Also applies to small business new construction. |
| GPY7 | NTG: 0.77 Method: Research conducted for ComEd and gas utility program partners for GPY5/EPY8 resulted in a NTG ratio of 0.83 for natural gas measures. SAG consensus for GPY6 and GPY7 was to use a three-year average of the most recent research values. For GPY7, the three most recent research values are: 0.92, 0.57, and 0.83, producing an average of 0.77. The NTG value also applies to small business new construction. |

Source: http://ilsafiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/Nicor_Gas_NTG_Summary_GPY1-7_2017-03-01_Final.pdf

APPENDIX 4.: NTG IN-DEPTH INTERVIEW GUIDE

**COMEd NEW CONSTRUCTION SERVICE IN-DEPTH INTERVIEW GUIDE –
 EPY9/GPY6**

**Post-Reservation Phase Comprehensive Track Interview
 May 2017**

Purpose

This in-depth interview guide will be used shortly after a Comprehensive Track project reaches the Reservation Phase. This interview asks questions about the participant’s experience with the program so far, including the start of the project, the program’s technical assistance, and its influence on the project’s design and planned measures.

This interview will be used to attribute the effects of the New Construction Service on the projects under the purview of the respondent. It will also support the process analysis for this program. They will be performed by Navigant and Opinion Dynamics analytical staff via the telephone. We will call the primary contact person as provided by Seventhwave, but it may be necessary to expand our calls to include other individuals within the project if it appears that others were highly involved in the decision-making process. The numbered questions in this depth interview guide will definitely be asked, while non-numbered questions are prompts for the analyst to help ensure a complete response that adequately addresses the purpose of the numbered question. As such, not all questions in this guide will be asked as written.

| | |
|--------------------------------------|---|
| Respondent name: | |
| Respondent phone number: | |
| Respondent title: | |
| Respondent type: (circle one) | Developer/owner, A&E Design Professional, Other |
| Company name: | |
| Project: (in sample) | |
| Utility: (circle one) | ComEd only ComEd/Gas Utility |
| Incentive Amount | |
| Program Track: | Comprehensive Track |
| EE Equipment incented: | |
| Interviewer: | |
| Date: | |

| | |
|--------------------|--|
| Time Start: | |
|--------------------|--|

Introduction

Thank you for taking the time to talk with me today. The Opinion Dynamics [If joint participant, “and “Navigant”] evaluation team is currently conducting a study for ComEd [If joint participant, “and your gas utility”]. There are two aims of this interview: first, we’d like to get your perspective on the New Construction Service and find ways to improve it as much as possible; and second we’d like to understand the decision-making around the energy efficient design and equipment that went into the [PROJECT NAME] project. We’d like to get your insight by asking you some questions that should take about 30 minutes.

Role on Program Projects

Throughout this interview when I ask about the “program” or “New Construction Service” please consider your experience with Seventhwave, ComEd, [If joint participant, “your gas utility”], or any combination of these as they relate to the [PROJECT NAME] project.

1. Please tell me about your involvement in the ComEd Energy Efficiency New Construction Service. Specifically:
 - How long have you been working with the program in relation to the [PROJECT NAME] project?
 - What is your role on the project and what are you responsible for?
 - Could you give me a brief overview of the [PROJECT NAME] project?
2. Are you involved now or were you involved in other projects that have participated in the New Construction Service?
 - Please give me a brief overview of those project(s).
3. We know there are several people/firms involved in the project, but who is the main decision-maker for choices regarding the energy efficiency of the building design and equipment? [Note: We are interested in both the decision-making individual and firm.]
 - [IF NOT THE INTERVIEWEE, TAKE NAME AND CONTACT INFORMATION OF MAIN DECISION-MAKER.]
 - [IF NOT THE INTERVIEWEE, CONFIRM INTERVIEWEE HAS GOOD PERSPECTIVE ON THE DECISION-MAKING.] Although you are not the main decision maker, do you think you can still provide a lot of the rationale for choices regarding the energy efficiency of the building design and equipment?
 - [IF THE INTERVIEWEE LACKS GOOD PERSPECTIVE ON THE DECISION-MAKING, EXPLORE PROCESS QUESTIONS TO THE EXTENT POSSIBLE.]

Project Background

4. Program records show that the program is planning to offer [INCENTIVE AMOUNT] in incentives for the [PROJECT NAME] project. Does this sound about right?
5. Did the program’s energy analysis benefit your project?
6. Did the program assist you in developing your own energy model?

If yes, did the program provide energy modeling or calculations for the project before one existed for the project or did the program help refine an existing model or calculations?

- [If necessary] This would have been a computerized whole-building energy model Seventhwave used to analyze the energy savings, cost savings and incentives for each energy efficiency measure that was incorporated in the building design.

7. Is this project intended to be a LEED project?
 - [If no] Was it ever intended to be at an earlier point in the design?
8. Were items cut from the project to control up-front project costs? (i.e., value engineering)?

Process Section

Now I would like to ask you about your experience with the New Construction Service.

Awareness and Participation

9. When did you first hear about the New Construction Service? How did you learn about the program?
10. Why did you or your team decide to participate in the program?
 - [If necessary] Who on your team first decided to participate in the program?
11. Are you aware of the different program tracks offered through the New Construction Service?
12. Do you understand why your project qualified for the Comprehensive Track?

Satisfaction

13. Overall, how satisfied are you with the program so far? Please use a scale where 0 is 'not satisfied at all' and 10 is 'extremely satisfied'.
 - [If <7, ask] Why are you not more satisfied with the program?

Program Processes

14. Have the program requirements been clearly explained to you?
15. Are there any ways you think the program can explain requirements or participation more clearly to participants in the future?
16. Do you think there are any requirements the program should adjust or change?
 - If so, which ones and how?
17. Did you fill out the program application for the project? If so, what do you think of it?
 - Do you have any suggestions for how to improve it?
18. How would you describe your experience with the technical assistance component of the program? [If necessary, "Technical assistance refers to the range of analysis, advice and support Seventhwave provided and may have included energy modeling; design assistance; technology and system recommendations; and an analysis of preliminary savings estimates and incentive levels."
 - Do you have any suggestions for how to improve it?

[ASK IF ENERGY MODEL WAS DEVELOPED]

19. Could you describe the role the program's energy analysis played in your project?

20. Throughout your involvement with the program, has your communication with program staff been what you wanted? [[Probe for timeliness and effectiveness of communication](#)]

Alignment of Program Design with Participant New Construction Practices

21. At what point in your standard new construction design process do you consider participating in energy efficiency programs?
22. When did you submit the application for this project to the New Construction Service? Was it:
1. Before 50% design completion (i.e., two of four main systems)?
 2. At least six weeks before design completion?
 8. Don't know
23. If you were to participate in the program again, do you think you or your project team would contact the program earlier in the design process? Why or why not?
24. Considering future projects, how could the program engage you or your peers in the new construction industry earlier during the project's pre-design phase?
25. Will you use the New Construction Service for future projects? If not, why not?

NET-TO-GROSS (Attribution) SECTION

APPENDIX A. Free Ridership Factor (FR)

Now I'd like to ask a few questions about the decisions to incorporate the energy efficient design strategies or measures (e.g., HVAC, envelope, and lighting) that will be incented by the program into the project. We need to understand how you [[IF APPLICABLE: "and your client"](#)] thought about energy efficiency and what influenced you [[IF APPLICABLE: "and your client"](#)] to incorporate energy efficient design strategies or measures into this project.

- FR1. So first could you give me an overview of how the energy efficient design strategies or measures incented by the program were initiated? What were the main reasons they became or have stayed a part of this project?
- FR1a. What were the roles of natural gas and electricity prices in the decision-making around energy efficient design or equipment if any?
- FR1b. The program records show that the following types of measures are planned into the project and the program provided energy savings analysis for these measures. [[READ MEASURES/ASSISTANCE](#)] Is this correct? Were any other measures included or assistance provided?
- FR2. Now could you give me an overview of the influence, if any, of the program on the energy efficiency components of the building design?
- What are the main ways the program has helped you improve the energy efficiency of the project, if any?
 - [[If nothing specific described, then ask](#)] Can you provide me with specific examples of the ways the program helped improve the energy efficiency of the project?
 - How would the energy efficiency of the project be different if it had participated in the program?

FR3. Would you say you have worked with the program staff more around changes to design or changes to specific equipment? We know that design changes often mean equipment changes, but simple equipment changes do not tend to have extensive changes in design (if any).

[NOTE: Ask subsequent attribution questions in line with the answer to this question, i.e., a design change or equipment changes (by Measure #1, Measure #2).]

[ASK FR4 IF LEED PROJECT]

FR4. Since the project is intended to meet LEED standards, we are interested in knowing how the program may have helped support or enhance the LEED goal. Please answer yes or no to the following questions.

- i. Did the program support your LEED modeling in any way?
- ii. Did program staff provide technical assistance that highlighted ways to achieve LEED design plans?
- iii. Did program incentives or technical assistance help the project to receive more energy and atmosphere credits than was originally planned?

FR5. Next, I'm going to ask you to rate the influence of the program as well as other factors that might have influenced the decision to include the [per FR3: use this design/install Measure #1] that will be incented by the program. Please think of a scale from 0 to 10, where 0 means 'no influence at all' and 10 means 'extremely influential'. If something did not pertain to your project please let me know. [FOR FR5a-m, RECORD 0 to 10; 96=Not Applicable; 98=Don't Know; 99=Refused]

(If needed: "How influential was/were _____ in the DECISION to include the energy efficient design/Measure #1 in the project(s)?)

| Q | Question | Program Factor | Response |
|------|--|----------------|----------|
| FR5a | [ASK IF PARTICIPANT ATTENDED TRAINING] Training sponsored by the program | Yes | |
| FR5b | The availability of financial incentives | Yes | |
| FR5c | Previous experience with this type of design/Measure #1 | No | |
| FR5d | [ASK IF PRIOR/CONCURRENT PARTICIPANT] Previous experience with the program | Yes | |
| FR5e | The program's technical assistance and building performance modeling | Yes | |
| FR5f | Recommendations from a program representative | Yes | |
| FR5g | Program information from program forms/website | Yes | |
| FR5h | Program outreach including Lunch & Learns, press releases, email or phone calls from Seventhwave | Yes | |
| FR5i | A recommendation from a design or consulting engineer | No | |
| FR5j | [ASK IF OWNER OR DEVELOPER] Corporate policy or guidelines | No | |
| FR5k | Standard practice in your business or industry | No | |
| FR5l | The program's assistance in limiting value engineering | Yes | |

FR5m. Were there any other factors we haven't discussed that were influential in the decision to [\[per FR3: use this design/install Measure #1\]](#)? If so, what were they?

[\[ASK IF FR5m = YES\]](#)

FR5mm. Using the same zero to 10 scale, how would you rate the influence of this factor on the decision to [\[per FR3: use this design/install Measure #1\]](#)? [\[RECORD 0 to 10; 98=Don't Know\]](#)

FR6a If you were given a TOTAL of 100 points that reflect the importance in your decision to [\[per FR3: use this design/install Measure #1\]](#), and you had to divide those 100 points between: 1) the program and 2) any other factors, how many points would you give to the importance of the PROGRAM? Points given to program:

FR6b And how many points would you give to other factors? [\[RECORD 0 to 100; 998=Don't Know; 999=Refused\]](#)

[Interviewer Note: The allocated points for program factors and non-program factors should sum to 100.](#)
CONSISTENCY CHECK ON PROGRAM IMPORTANCE SCORE

[\[ASK IF Program Factor Points > 70 AND ALL OF Program Factors in FR5 < 3, ELSE SKIP TO FR18\]](#)

FR7a You just gave <FR6a RESPONSE> points to the importance of the program. I would interpret that to mean that the program was quite important to your decision to [\[per FR3: use this design/install Measure #1\]](#). Earlier, when I asked about the importance of the individual elements of the program, I recorded some answers that would imply they were not that important to you. Just to make sure I understand, would you explain why the program was not very important in your decision to [\[per FR3: use this design/install Measure #1\]](#)?

[\[ASK IF Program Factor Points <30 AND ANY OF Program Factors in FR5 >7, ELSE SKIP TO FR8\]](#)

FR7b You just gave <FR6a RESPONSE> points to the importance of the program. I would interpret that to mean that the program was not very important to your decision to [\[per FR3: energy efficient design/Measure #1\]](#). Earlier, when I asked about the importance of individual elements of the program, I recorded some answers that would imply that they were very important to you. Just to make sure I understand, would you explain why the program was not very important in your decision to [\[per FR3: use this design/install Measure #1\]](#)?

Now I want to ask you a few questions about how this project may have been different if the program had not existed.

FR8. Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the program had not existed, what is the likelihood that the project would have included the same energy efficient [\[per FR3: use this design/install Measure #1\]](#)? [\[RECORD 0 to 10; 98=Don't know\]](#)

[\[ASK IF SEVENTHWAVE DEVELOPED THE FIRST ENERGY MODEL FOR THE PROJECT\]](#)

FR9A. Using the same scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the program had not existed, what is the likelihood that an energy model would have been used as a design tool? [\[RECORD 0 to 10; 98=Don't know\]](#)

[\[ASK IF SEVENTHWAVE HELPED REFINE AN EXISTING ENERGY MODEL\]](#)

FR9B. Using the same scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the program had not existed, what is the likelihood that the final energy model would have included the same level of energy efficiency as it did? [\[RECORD 0 to 10; 98=Don't know\]](#)

FR10. And using the same scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", what is the likelihood that independent, third party data supporting the design vision would have been available if the program had not been involved in this project? [\[RECORD 0 to 10; 98=Don't know; NOTE: This could include financial and energy data\]](#)

[For projects with multiple measures ask:]

FR11. Now I'd like to ask you about <Measure #2>. In terms of how the program or other factors influenced its incorporation into the design, would you say that this measure reflected the same or nearly the same decision-making as <Measure #1>?

1. Yes [Continue to FR12]
2. No [Ask FR5 to FR10 for Measure #2]

[If measure 1 and 2 are different fuels]

FR12. Did the fuel type (electricity or natural gas) of <Measure #2> affect the decision-making at all?

1. Yes
 - [If so] How?
2. No

CONSISTENCY CHECK #2: INCENTIVE VS. NO PROGRAM SCORE

[FR8 > 7 AND ANY Program Factors in FR5 > 7, ELSE SKIP TO FR14a]

FR13a When you answered the question(s) about the influence of the program factors with high ratings, I would interpret that to mean that the program was quite important to your decision to complete the project. Then, when you provided a high rating for how likely you would have been to include the same level of energy efficient design in the final project without the program, it sounds like the program was not very important in your decision.

I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain the role the program played in your decision to include the achieved level of energy efficient design?

FR13b Would you like for me to change your rating on the importance of the program factors to which you gave a high rating or change your rating on the likelihood you would include the same level of energy efficient design? We can also change both if you wish.

[Change ratings as necessary]

[FR8 < 3, AND ALL OF Program Factors in FR5 < 3, ELSE SKIP TO FR15]

FR14a When you answered the questions about the influence of the program factors with low ratings, I would interpret that to mean that the program was not important to your decision. Then, when you provided a low rating for how likely you would have been to include the same level of energy efficient design in the final project without the program, it sounds like the program was very important in your decision.

I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain the role the program played in your decision to include the same level of energy efficient design?

FR14b Would you like for me to change your rating on the importance of the program factors to which you gave a high rating or change your rating on the likelihood you would include the same level of energy efficient design? We can also change both if you wish.

[Change ratings as necessary]

CORPORATE POLICY BATTERY [ASK IF FR5J>5, ELSE SKIP TO FR20]

FR15 Does your organization have a corporate environmental policy to reduce environmental emissions or energy use? Some examples would be to "buy green" or use sustainable approaches to business investments.

FR15b Has the program supported your corporate environmental policy goals?

[ASK IF FR15=YES, ELSE SKIP TO FR20]

FR16 What specific corporate policy influenced your decision to include [per FR3: design/ Measure #1] in the project?

FR17 Had that policy caused you to adopt [per FR3: design/ Measure #1] in other projects before participating in the program?

[ASK IF FR17=1, ELSE SKIP TO FR20]

FR18 Did you receive an incentive for a previously including [per FR3: design/ Measure #1]?

- 1 Yes
- 2 No
- 8 (Don't know)
- 9 (Refused)

[ASK IF FR18=1]

FR19 To the best of your ability, please describe....

- 1 the amount of financial incentive received (IF NEEDED: for a previous installation of equipment)
- 2 the approximate timing
- 3 the name of the program that provided the incentive

STANDARD PRACTICE BATTERY [ASK IF FR5K>5 AND FIRM IS PRIMARY DECISION MAKER (FROM QUESTION 3), ELSE SKIP TO NEXT SECTION]

FR20 Approximately, how long has use of energy efficient equipment been standard practice in your industry ?

[ASK IF APPLICABLE]

FR21 Does your company ever deviate from the standard practice?

- If so, please describe the conditions under which your company deviates from this standard practice.

FR22 How did this standard practice influence your decision to adopt the [per FR3: design/ Measure #1] through the program?

FR23 Could you please rate the importance of the program versus this standard industry practice in influencing your decision to adopt [per FR3: design/ Measure #1]? Would you say the program was...

- 1 Much more important
- 2 Somewhat more important
- 3 Equally important
- 4 Somewhat less important
- 5 Much less important

FR24 To what industry group or trade organization do you look to establish standard practice for your industry?

FR25 How do you and other firms in your industry receive information on updates in standard practice?

1.1.1.2 CLOSING SECTION

- 26. Is there anything else that you would like to let us know based on the topics we covered today, including any ways to improve the program if possible or how the program has affected your use of energy efficient measures or design in projects?

- 27. As part of this study, the evaluation team may seek to inspect the facilities and equipment for which the program incentives were received. Is there a site-level staff person you can refer me to who might be able to work with the evaluation site lead? This might be a facilities manager or a site engineer? When do you anticipate construction will be complete for this building?

Name _____
Role _____
Contact Information _____

On behalf of ComEd (If joint project, "and your gas utility"), we thank you for your time today. If in reviewing my notes, I discover a point I need to clarify, is it all right if I follow-up with you by phone or email?

Time End _____