Block Heater Timer Program Evaluation Report

FINAL REPORT

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SUBMITTED TO:
Independent Electricity System Operator

SUBMITTED BY:
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NMR Group, Inc.

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Acknowledgements

The NMR team would like to thank the participants that supported the NMR team's surveys. Their cooperation with the NMR team's efforts has produced high quality data that will serve Ontario conservation efforts for years to come.

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Acronyms

Acronym	Definition
CDM	Conservation and Demand Management
CE Tool	Cost Effectiveness Tool
CI	Confidence Interval
EM&V	Evaluated Measurement and Verification
IDI	In-depth Interview
IESO	Independent Electricity System Operator
IF	Interim Framework
LDC	Local Distribution Company
LED	Light-emitting Diode
MW	Megawatt
MWh	Megawatt-hour
NTG	Net-to-Gross
PAC	Program Administrator Cost Test
RR	Realization Rate
TRM	Technical Reference Manual

Executive Summary

NMR Group, Inc. (NMR), in partnership with subcontractor, Resource Innovations, Inc. (formerly Nexant Inc.), (collectively, "the NMR team") and under contract to the Independent Electricity System Operator (the IESO), performed an evaluation of the Block Heater Timer Program under the Interim Framework.

Program Description

The Block Heater Timer Program was a locally delivered direct install program offered by local distribution company (LDC), Synergy North Corporation (referred to as "Synergy North"). It provided eligible residential customers with block heater timers that could save up to $30 annually. The program was administered and promoted by Synergy North and delivered by one program delivery vendor who performed direct installations of the equipment at participating customer sites. The program was available to customers between January of 2020 and December of 2020, though the program was paused due to the COVID-19 pandemic between March 16, 2020 to October 12, 2020.

Evaluation Objectives

The Block Heater Timer Program evaluation sought to address several evaluation objectives, as follows:

- Verify energy and demand savings;
- Estimate realization rates (RRs) and net-to-gross (NTG) ratio;
- Conduct cost-effectiveness analyses;
- Estimate the avoided greenhouse gas (GHG) emissions; and
- Perform a limited process evaluation.

SUMMARY OF RESULTS

The impact evaluation results for the Block Heater Timer Program are displayed in Table 1. The program did not produce any summer peak demand savings, therefore no realization rate or net-to-gross (NTG) ratio was calculated for demand. The program's energy realization rate was 100% and net-to-gross ratio was 106.7%.

Table 1: Block Heater Timer Program Results

Metric	Units	Evaluated
Participation	Timers	606
Reported Energy Savings	MWh	145
Reported Demand Savings	MW	-
Gross Energy RR		100%
Gross Demand RR		-
Gross Verified Energy Savings	MWh	145
Gross Verified Demand Savings	MW	-
Net-to-Gross (NTG) Ratio (Energy)		106.7%
Net-to-Gross (NTG) Ratio (Demand)		-
Net Verified Annual Energy Savings (First Year)	MWh	155
Net Verified Annual Demand Savings (First Year)	MW	-
Net Verified Persisting Energy Savings to PY2022	MWh	155
Net Verified Persisting Demand Savings to PY2022	MW	-
Total Resource Cost (TRC) Test Ratio	-	0.50
Program Administrator Cost (PAC) Test Ratio	-	0.45
Levelized Delivery Cost (Energy)	$/kWh	0.08
Levelized Delivery Cost (Demand)	$/kW	-

KEY FINDINGS AND RECOMMENDATIONS

This section summarizes the Block Heater Timer Program evaluation's key findings and recommendations. Section 7 presents these key findings and recommendations in greater detail.

Finding 1: Program tracking data included incorrect participant addresses. The program tracking data did not differentiate between mailing address and installation address. Specifically, addresses listed in the program tracking data were sometimes P.O. boxes and did not include the participant's home. In another instance, the address in the tracking data was the participant's name.

> **Recommendation 1.** Conduct QA/QC procedures to ensure program tracking data is accurate and matches the physical participation and consent forms.

Finding 2: Participation fell well below expectations, leading to program low cost-effectiveness. Expected program participation was 3,375, but actual participation was 606.

> **Recommendation 2.** With the understanding that the COVID-19 pandemic presented unique challenges to recruitment, the program may wish to consider different ways of expanding participation, such as marketing through additional channels like bill inserts.

Finding 3: ***Program free-ridership (FR) was moderately high at 13.8%.*** The program helped three-fourths (75%) of participants with upgrades they otherwise would not have purchased (43%) or would have postponed (32%). The remaining participants would have bought the "exact same block heater timer anyway" (18%) or were unsure of what they would have done (7%). This suggests that there is still room for FR improvements.

Recommendation 3a. Maintain focus on minimizing FR if the program continues in future years. Key areas to focus on include:

- Identifying and targeting customers who would be unlikely to purchase a block heater timer without program support (e.g., customers who would not have known about the block heater timers, or would not have had the funding available to purchase them), and,
- Encouraging all participants to complete the evaluation surveys to ensure that the FR results are as representative of the true population of program participants as possible. For example, LDCs could include a clause within participation agreements informing customers that they may be requested to complete an evaluation survey following their participation. Additionally, program delivery vendors or program partners could inform customers about the evaluation survey and encourage them to complete it.

Recommendation 3b. Continue to encourage participants to install additional energy-efficient equipment or services beyond what is covered through the program if it is feasible for them to do so. While onsite, the delivery vendor provided customers with a handout with tips to further reduce their energy use. Continuing to do so may lead to increases in the program's spillover (SO), which may in turn help offset FR and lead to improved NTG.

Recommendation 3c. Provide more than one block heater timer to eligible customers who have more than one vehicle that meets participation criteria. Doing so may lead to increases in the program's energy savings.

Finding 4: On-site block heater timer installations are straightforward to install, but the process is resource intensive. If the program were to be delivered again in the future, LDC program staff recommend that the program forego a site visit. Staff explained that a site visit is not necessary for this type of installation, and that it was likely a barrier to participation that also increased delivery costs.

Recommendation 4. Consider mailing pre-programmed block heater timers to eligible customers in place of conducting on-site installations. Additional website resources and/or follow-up calls could assist with determining eligibility, confirming installations, and conducting additional quality assurance and control post-installation. Mailing timers could minimize the cost of installation, avoid scheduling conflicts, reduce the cost of unit storage, and add flexibility to program design.

Section 1 Introduction

The Independent Electricity System Operator (the IESO) retained NMR Group, Inc. (NMR), in partnership with subcontractor, Resource Innovations, Inc., (collectively, "the NMR team") to conduct an evaluation of its Low Income, First Nations, and Residential Local programs and pilots offered under the Interim Framework (IF). This report includes results, findings, and recommendations specific to the Block Heater Timer Program.

1.1 Program Description

1.1.1 Design and Delivery

The Block Heater Timer Program was offered by local distribution company (LDC), Synergy North Corporation (referred to as "Synergy North") and delivered by one program delivery vendor who performed direct installations of the equipment at participating customer sites. The program covered the full cost of the timer and the installation. Block heater timers reduce energy consumption by allowing the engine heater to operate for a pre-programmed amount of time, as opposed to all night. This is particularly useful in winter months. In March 2020, the program paused for seven months due to the COVID-19 pandemic. The program resumed in October 2020 with new safety protocols. During the site visits, the delivery vendor installed the block heater timers, collected program documentation, and provided training to the customer on how to install and use the timer. They also highlighted other energy savings tips for the customer's consideration.

1.1.2 Eligibility

Participant eligibility requirements included:

1. Must live in designated service territories;
2. Must possess at least one car that is not stored in a heated shelter and for which the owner does not already own a block heater timer;
3. Must use vehicle regularly; and
4. Must not have participated in the Block Heater Timer pilot program.

Facility eligibility requirements included:

1. Home must be a single, semi-detached or townhouse; if the participant lives in a multi-residential building, the outdoor electrical outlet must be connected directly to the smart meter and the tenant must pay their own electricity bill;
2. Address must not have participated in HAP in the past;
3. Home must have an operating GFCI outdoor outlet; and
4. Vehicle must have a working block heater.

1.1.3 Measures

The Block Heater Timer Program provided block heater timers to eligible customers. Block heater timers save energy by reducing the time that block heaters operate. Normally, block heaters operate throughout the night, approximately 12 hours, to keep the engine warm. The use of a timer allows the block heater to come on at a pre-programmed time. This saves a significant amount of energy as engines typically do not require more than four hours of heating prior to start-up. The proper use of block heater timers could save participants as much as $30 per year.

1.2 Evaluation Objectives

The Block Heater Timer Program evaluation sought to address several research objectives, including the following:

- Verify energy and demand savings with a 90% level of confidence at 10% precision for the program;
- Estimate realization rates (RRs) and net-to-gross (NTG) ratio;
- Conduct cost-effectiveness analyses;
- Estimate the avoided greenhouse gas (GHG) emissions from electricity savings using the *IESO Cost Effectiveness (CE) Tool*; and
- Conduct a limited process evaluation by addressing key research questions of interest to the program.

Section 2 Methodology

This section presents a summary of the impact, cost-effectiveness, and process evaluation methodologies in this section. Detailed descriptions of these methodologies are provided in Appendix A.

2.1 Impact Evaluation Methodology

To calculate the gross verified savings, the impact evaluation reviewed the program's tracking database, benchmarked savings against secondary sources, and conducted desk reviews. Each activity is discussed in more detail below.

2.1.1 Program Tracking Database Review

The NMR team began by reviewing the program's tracking database, involving several steps. First, the reported savings data is examined for completeness and agreement with the reported savings' reference source – the *IESO Prescriptive Measures and Assumptions List*. Second, the project quantity and relative timing of the projects in the database are compared against implementer invoices provided to IESO by the LDC. Lastly, the database review ends by drawing a random sample of projects for the ensuing engineering desk reviews. The NMR team originally targeted 90% confidence and 10% precision for the desk review reviews; however, LDC staff were only able to provide supporting documentation on enough participants for a sample drawn to target 85% confidence and 15% precision, assuming a coefficient of variation of 0.5.

2.1.2 Savings Review and Benchmarking

The reported savings were based on the *IESO Prescriptive Measures and Assumptions List*, which, in turn, was based on a PY2017 evaluation of a block heater timer program implemented by five LDCs in the Thunder Bay region.[1] The NMR team reviewed the PY2017 evaluation report to verify the reasonability and the applicability of its results on the Synergy North Hydro block heater timer program. The NMR team also compared the reported savings to savings estimated in several TRMs containing an engine block heater measure.

2.1.3 Engineering Desk Reviews

The engineering desk reviews consisted of a randomly selected sample of 29 projects for the program tracking database review. For each selected project, the LDC provided the NMR team with participant consent and application forms. These forms contained information like home type, home address, and date of installation. The desk reviews compared information in the forms with the data in the program tracking database, checking for inconsistencies. The desk review further compared the information provided by the LDC to secondary aerial and street views of the homes, verifying the reported home type and examining installing a block heater timer was reasonable

[1] *PY2017 Block Heater Timer Pilot Impact and Process Evaluation*, Prepared for the IESO by Cadmus and Econoler, November 15, 2018.

(i.e., the home had a place to park, the parking was outside, and a power outlet was reasonably close to the parking area).

2.1.4 Realization Rate

The impact evaluation activities resulted in an adjustment factor, or realization rate, calculated using Equation 1. The realization rate is the ratio of verified savings to reported savings. There were no reported or verified peak demand savings for this program; therefore, realization rate was only calculated for energy savings.

Equation 1: Realization Rate

$$RR = \frac{\sum Sample\ Verified\ Savings}{\sum Sample\ Reported\ Savings}$$

2.1.5 Net Savings Estimate Methodology

To calculate the net verified savings, the NMR team calculated the portion of gross verified savings attributable to the Block Heater Timer Program. The NMR team determined the net verified savings by multiplying the gross verified savings by the NTG ratio, as shown in Equation 2.

Equation 2: Net Verified Savings

$$Savings_{net} = Savings_{verified} \times NTG$$

Where:

$Savings_{net}$ = Net savings impact (kW or kWh)

$Savings_{verified}$ = Verified savings (kW or kWh)

NTG = Net-to-gross ratio

To estimate the direct influence of the program in generating net verified energy savings, the NMR team implemented attribution surveys to collect inputs used to calculate free-ridership (FR) and spillover (SO) rates. Both FR and SO are represented as percentages of the program's total reported savings and are estimated for each survey respondent. The NMR team then aggregated the results to develop total FR and SO estimates and weighted them by the percentage of savings associated with each respondent's completed energy-efficiency project. Note that for this program, most participants had the same savings values associated with their project given that most only installed one timer through the program, which in turn meant that there were no customer projects that had more influence on the NTG than other customer projects.

FR refers to the program savings attributable to free riders, who are program participants who would have implemented a program measure or practice in the program's absence. SO refers to additional reductions in energy consumption and demand due to program influences beyond those directly associated with program participation. SO represents installations of energy-efficient equipment influenced by the participant's experience with the program and that were completed without any program rebates or other financial support.

The NTG ratio is defined by Equation 3, where FR is the participant FR percentage and SO is the participant SO percentage.

Equation 3: Net-to-gross Ratio

$$NTG = 100\% - FR + SO$$

The NMR team calculated the FR and SO for a single project for each sampled participant. The NMR team then combined these results to develop overall FR, SO, and NTG values.

Additional details regarding the NTG evaluation methodology can be found in Appendix A.2.

2.2 COST-EFFECTIVENESS EVALUATION

The NMR team completed the cost-effectiveness analysis in accordance with the IESO requirements as set forth in the *IESO Cost Effectiveness Guide for Energy Efficiency*[2] and using *IESO's Cost-Effectiveness Tool* (CE Tool). The energy savings results from the impact evaluation were inputs into the IESO CE Tool. Other inputs included the administrative cost and rebate information supplied from IESO. A more detailed description of the cost-effectiveness methodology is provided in Appendix A.1

2.3 PROCESS METHODOLOGY

The process evaluation focused on program design and delivery. The NMR team evaluated program processes through an in-depth interview (IDI) with LDC staff from Synergy North and a survey with program participants, which focused primarily on FR and SO feedback. For each respondent type, the NMR team developed a customized interview guide or survey instrument to ensure responses produced comparable data and to allow the NMR team to draw meaningful conclusions.

Table 2 shows the survey methodology, the total population that the NMR team invited to participate in the survey or interviews, the total number of completed surveys or interviews, and the sampling error at the 90% confidence interval (CI). A detailed description of the process evaluation methodology is provided in Appendix A.3.

Table 2: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Completed	Population	90% CI Error Margin
LDC Program Staff	Phone In-Depth Interview (IDI)	1	1	0%
Participants[3]	Phone Survey	84	568	8.3%

[2] *Cost Effectiveness Guide for Energy Efficiency Version 4*, Independent Electricity System Operator, January 20, 2021, https://www.ieso.ca/-/media/Files/IESO/Document-Library/EMV/CDM_CE-TestGuide.ashx

[3] Please note that the participant phone survey was primary used to collect NTG-related participant feedback.

Section 3 Impact Evaluation

This section presents the impact evaluation results. Details regarding the impact methodology can be found in Section 2. Details regarding the impact methodology can be found in Section 2.1.

3.1 High-Level Results

3.1.1 Net Verified Energy and Demand Savings Key Results

High-level results from the net verified first year energy and demand savings include the following:

- Peak demand savings were neither reported nor verified
- The program's energy realization rate was 100%
- The program's energy net-to-gross ratio was 106.7%
- The program's first year net energy savings were 154,583 kWh.
- The program's first year energy savings are expected to fully persist through 2022, meaning the program is expected to continue to provide 154,583 kWh of savings in 2022.

3.2 Gross Impact Savings Review

The NMR team's database review found the data to generally reflect the information collected in the participation and consent forms. However, the addresses listed in the program tracking database for six of the 29 sampled projects did not match the participation forms. In these cases, the participation form was used for verification purposes, as the participation form documented a site visit time and date at the address specified. The review also found some minor administrative errors in the data, including an incorrect project completion date (year of "2448") and an incorrect address (participant's name).

The NMR team reviewed the evaluation report supporting the IESO's deemed savings as listed in the *Measures and Assumptions List*. The NMR team found the previous evaluation's methodology, data collection, and results to be sound and reasonable. It was noted in that report that realization rate was low (37%), primarily due to the assumed block heater wattage. To fill this gap in data, the NMR team originally proposed to spot measure the wattage of participating block heaters. Ultimately, this portion of the evaluation was removed due to budget constraints.

The NMR team also compared reported savings to savings provided by other TRMs, including those serving Wisconsin, Pennsylvania, New York, Minnesota, Michigan, and Illinois. In all TRMs, the engine block heater measure was found to be targeted at commercial applications, and specifically agriculture. Therefore, while the engine block heater wattage estimated in the PY2017 pilot program's evaluation of 0.511 kW was much lower than the range listed in the TRMs (0.8 to 1.5 kW), the NMR team determined that the 0.511 kW wattage was the most applicable for the vehicles in this program, and consequently assumed a 0.511 kW engine block heater wattage for this evaluation.

Lastly, the NMR team conducted desk reviews on a sample of 29 participants. In each case, the home address listed in the participation form appeared to be a reasonable location for the use of an engine block heater timer when viewed through online aerial and street views.

3.2.1 Program Level Savings

Table 3 presents reported and net verified first year energy and demand savings for the program. Program-level results are representative of 606 installations, 535 of which were completed in 2020 and 71 in 2021.

Table 3: Program Level Reported and Net Verified First Year Savings

Metric	Energy (MWh)	Demand (MW)
PY2020 Reported Savings	128	-
PY2021 Reported Savings	17	-
Total Reported Savings	**145**	**-**
PY2020 Gross Verified Savings	128	-
PY2021 Gross Verified Savings	17	-
Total Gross Verified Savings	**145**	**-**
PY2020 Net Verified Savings	136	-
PY2021 Net Verified Savings	18	-
Total Net Verified Savings	**155***	**-**

*Individual years do not sum to total due to rounding.

3.3 NET-TO-GROSS

The NTG evaluation results are presented in the following subsections. Appendix B presents additional details.

3.3.1 Net-to-Gross Results

Table 4 presents the results of the Block Heater Timer Program NTG evaluation covering PY2020 and PY2021 participants. The NMR team targeted 90% confidence and 10% precision levels in the savings results; however, due to low project volume and survey participation, these confidence and precision levels were not achieved. Instead, 85% confidence and 15% precision levels were considered when calculating NTG for this region, and 85% confidence and 8.8% precision levels were achieved. The following subsections summarize the completed analyses for the interpretation of these values.

Table 4: NTG Results

Unique Participants	NTG Responses	Savings Weighted FR	SO, Energy	SO, Summer Demand	NTG, Energy	NTG, Summer Demand	Energy Precision (85/15)
568	84	13.8%	20.5%	N./A	106.7%	N/A	8.8%

3.3.2 Key Findings

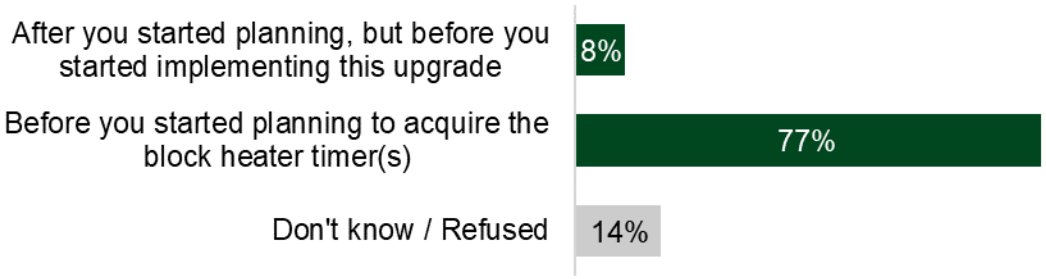
- Participant feedback indicates moderate levels of FR at 13.8%.
  - The program helped three-fourths (75%) of participants with an upgrade they otherwise would not have purchased (43%) or would have postponed (32%).
  - Less than one-fifth (18%) of participants would have bought the "exact same block heater timer anyway" or were unsure what they would have done (7%). This suggests that some level of FR for these respondents.
  - The availability of the block heater timer(s) and the program materials and information provided by the LDC had the greatest influence on the respondents' decision to participate in the program (86% and 51%, respectively).
  - Participation in the program resulted in a high SO at 20.5%, which helped to offset the FR. Over one-tenth (11%) of respondents installed equipment with attributable SO savings.

3.3.3 Free-ridership

The NMR team assessed the extent of FR within the program by surveying Block Heater Timer Program participants to understand their experiences and plans before learning about the program, what they would have done in the program's absence, and how influential the program was on their decision to implement the energy-efficient upgrades.

Over three-fourths (77%) of respondents stated that they first learned they could receive a free block heater timer through the Block Heater Timer Program before they started planning to acquire the block heater timer (Figure 1). Only about one-tenth (8%) of respondents learned they could receive a free block heater timer after they started planning but before they acquired it. This suggests that the program was influential in most respondents' decisions to acquire a block heater timer. While responses to this question did not directly impact the FR score, they provided additional context for understanding the point during the process when participants became aware of the program.

Figure 1: When Participants First Learned About the Program (n=84)*

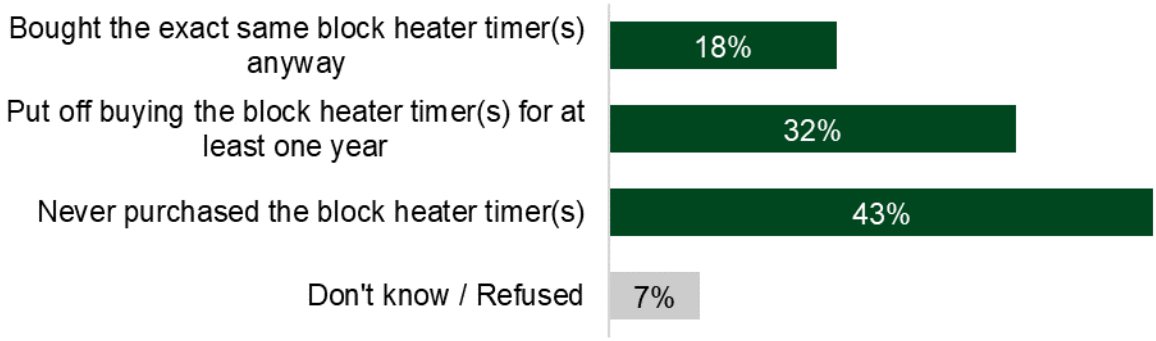


*Does not sum to 100% due to rounding.

Respondents provided feedback about what they would have done in the program's absence (Figure 2). Overall, their responses suggest low FR as fewer than one-fifth (18%) would have bought the "exact same block heater timer anyway," would have put off buying the block heater

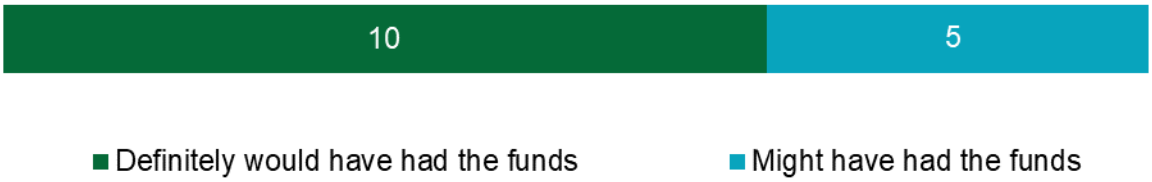
timer for at least one year (32%), or were unsure of what they would have done (7%). These replies indicate partial or full FR. Over two-fifths (43%) of respondents would never have purchased the block heater timer without the program's support. Responses from this question were factored into the FR analysis.

Figure 2: Actions in Absence of Program (n=84)



The 15 respondents who stated they would have bought the "exact same block heater timer anyway" in the program's absence were asked to confirm whether they could have afforded it without the program's support. Most (ten respondents) confirmed that they definitely would, while the remainder (five respondents) said they would not (Figure 3). This feedback indicates some degree of FR but also suggests that the program has likely helped a portion of these customers to complete upgrades they might not have been able to otherwise. Additionally, the program provides a service of convenience for many participants who would not have been likely to seek them out without the program's influence. This NMR team factored the participant intent question into the FR analysis.

Figure 3: Availability of Funds in Absence of Program (n=15)*



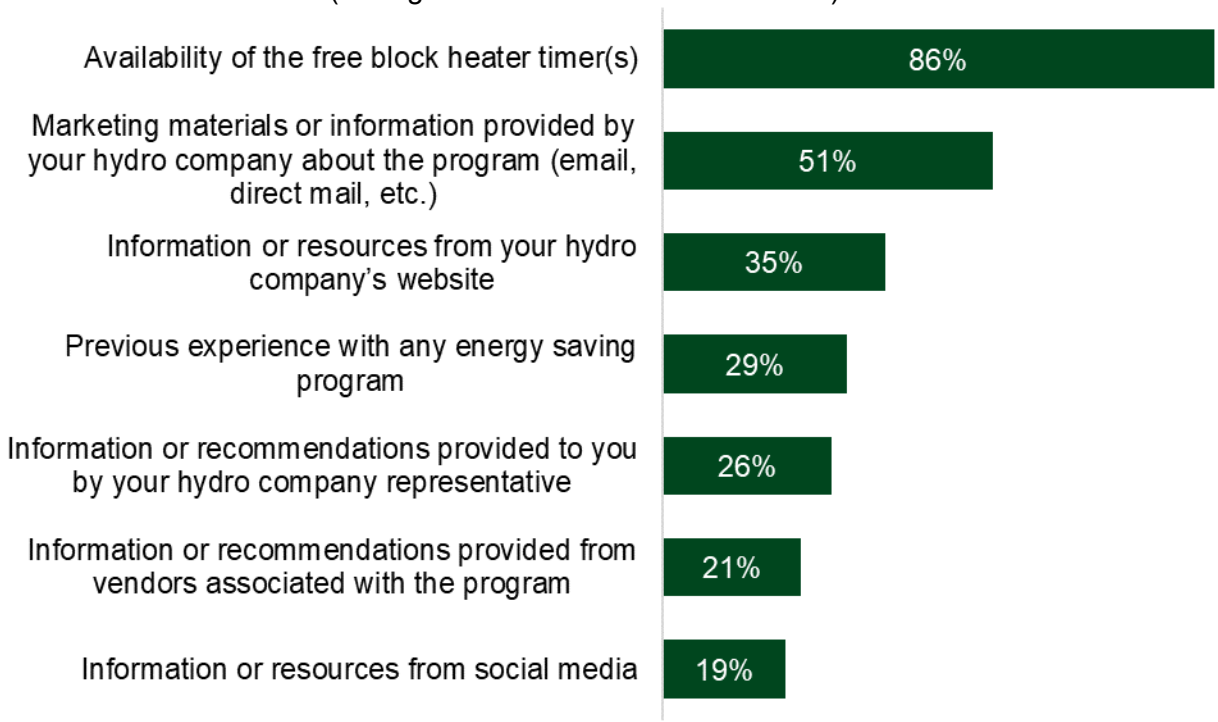
*Responses displayed as counts due to small n.

Respondents rated how influential various program features were on their decision to participate in the Block Heater Timer Program (Figure 4). They rated each feature's influence on a scale from 1 to 5, where 1 meant it had "no role at all" and 5 meant it had a "great role." The highest-rated responses were the availability of the free block heater timer and program marketing materials and information provided by Synergy North (86% and 51% with a 4 or 5 rating, respectively). Information or recommendations provided by program vendors and information or resources from social media were rated as least influential (21% and 19% with a 4 or 5 rating, respectively). The findings from this question emphasize the importance of the program's marketing materials and website and highlight potential future opportunities to utilize vendors and social media further to

promote the program. The NMR team used this question, which focuses on the program's influence, along with the prior questions about customer intentions, to estimate the FR score.

Figure 4: Influence of Program Features on Participation (n=84)

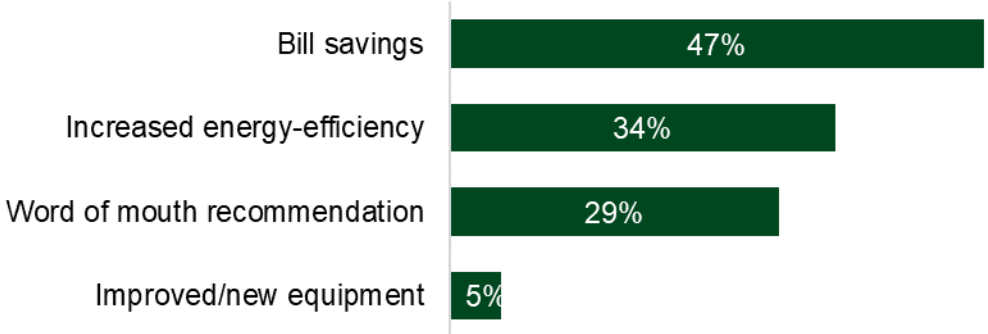
(Rating of 4 or 5 on a scale from 1 to 5)*



*Does not sum to 100% due to multiple response.

Over two-fifths (45%) of respondents reported other factors played "a great role" in influencing their household to obtain the block heater time. Respondents' answers varied (Figure 5). The most common responses included bill savings (47%), the possibility of increased energy-efficiency (34%), and word of mouth recommendation (29%).

Figure 5: Other Influential Factors on Upgrade Decision (n=38; Multiple Response)*



*Does not sum to 100% due to multiple response.

In summary, FR results among the Block Heater Timer Program participants indicate moderately high FR levels at 13.8%. Three-fourths (75%) of respondents would have put off (32%) or cancelled the upgrade (43%) without the program's support, which indicates low FR among these respondents. However, one-fourth (25%) of participants would have bought the "exact same block heater timer" anyway (18%) or were unsure of what they would have done (7%). These results suggest there is still some room for FR improvements if the program were to be offered again in the future.

3.3.4 Spillover

To estimate SO, participants provided feedback about whether they had installed any energy-efficient equipment for which they did not receive an incentive following their participation in the Block Heater Timer Program. Nearly one-fourth (25%) reported installing new equipment and one-tenth (11%) reported installing equipment with attributable SO savings.

Table 5 displays the types of non-incentivized equipment installed by participants after their Block Heater Timer Program project was complete. Some survey respondents installed multiple types of equipment.

Respondents rated the level of influence their participation in the Block Heater Timer Program had on their decision to install additional energy-efficient equipment. Participants rated the program's influence on a scale from one 1 to 5, where 1 meant the program had "no influence at all" and 5 meant the program had "great influence." As indicated in Table 5, the average influence score for most equipment types was below a 3-rating, which suggests the program was not influential on most respondents' additional equipment installations. However, some respondents indicated that the program had an influence (a rating of 3 or higher) on their decisions to install some of the following equipment types: ENERGY STAR appliances, ENERGY STAR Light-emitting Diodes (LEDs), lighting controls, heating equipment, cooling equipment, water heating equipment, and windows.

Table 5: Program Influence on Efficient Equipment Installed Outside the Program (n=21; Multiple Response)*

Type of Equipment Installed	Count of Respondents	Average Influence Score
ENERGY STAR appliance	9	2.2
ENERGY STAR LED	7	3.1
Lighting controls (lighting timers, occupancy sensors)	3	2.3
Windows	2	10
High-efficiency heating, cooling, or water heating equipment	2	2.0
Window film	1	10
Doors	1	1.0
Programmable or smart thermostat	1	1.0

*Does not add to 21 due to multiple response.

The survey then asked participants who indicated they installed the program-influenced non-incentivized equipment a series of follow-up questions (i.e., capacity, quantity, efficiency, and

annual hours of operation). These details are displayed in Appendix B and are used within the NTG algorithm to attribute SO savings to each equipment installation. SO savings were driven mainly by the installation of 109 new ENERGY STAR LEDs completed by five respondents.

Section 4 Cost-effectiveness Evaluation

This section presents the cost-effectiveness evaluation results. Details regarding the cost-effectiveness methodology can be found in Section 2.2 and Appendix A.1.

The cost-effectiveness results are presented in Table 6. The program did not pass the Total Resource Cost (TRC) test nor did it pass the Program Administrator Cost (PAC) test because benefits were less than their respective costs in both tests (i.e., their net benefit ratios were each less than 1.0). The PAC test is meant to understand the relationship between the costs carried and benefits received by the program administrator. The TRC test uses a broader definition of costs and benefits than the PAC test, incorporating those costs carried and benefits received by both the program administrator and customers.

Table 6: Program Level Cost-Effectiveness Key Metrics

Cost-effectiveness Test	Value
TRC	
TRC Costs ($)	136,584
TRC Benefits ($)	68,852
TRC Net Benefits ($)	67,731
TRC Net Benefit (Ratio)	0.50
PAC	
PAC Costs ($)	132,848
PAC Benefits ($)	59,872
PAC Net Benefits ($)	-72,977
PAC Net Benefit (Ratio)	0.45
Levelized Unit Energy Cost	
$/kWh	0.08
$/kW	-

The sensitivity analysis in the program's business case presented multiple "what-if" scenarios, showing where the program may not reach cost effectiveness due to underperformance. The element with the largest influence was, by far, program participation volume. The business case's estimated participation quantity was 3,375 participants, while actual program performance was 606 participants. The timing of the program during COVID-19 restrictions certainly did not help recruitment. However, holding all other actual performance CE parameters constant, the program would have needed about 4,400 participants to yield a TRC ratio of 1.0 and about 9,000 participants to yield a PAC ratio of 1.0. To understand the source for differing CE results between the business case and the achieved CE results, Table 7 compares the values for a few key input parameters which changed the most between the business case and achieved (verified) case.

Table 7: Key CE Input Parameters With the Largest Change Between Business Case and Verified

CE Input Parameter	Business Case	Verified
Net-to-Gross Ratio	1.75	1.07
Participation	3,375	606
Administrative Cost	$61,000	$77,096

Section 5 Process Evaluation

This section presents the process evaluation results. Details regarding the process methodology can be found in Section 2.3 and Appendix A.3.

5.1 LDC Program Staff Perspectives

The following subsections highlight the feedback received from the LDC program staff about the design and delivery of the Block Heater Timer Program.

5.1.1 High-Level Results

High-level results from the LDC program staff IDI include the following:

- While the program did not meet its participation targets, LDC program staff reported that it met their expectations given the challenges associated with the COVID-19 pandemic.
- LDC program staff reported that the program was effectively delivered, and customers showed continued interest in the program over time.
- The cost savings and ease of participation made the program appealing to customers.
- While COVID-19 was the primary barrier to program delivery, LDC program staff reported other barriers, including a delayed program start, supply chain delays in acquiring timers, the requirement to complete site visits to install the timers, and limits on the number of timers allowed per household.
- LDC program staff provided recommendations for program improvement, including ensuring adequate and efficient supply chain access to procure stock, providing alternative delivery methods such as customer self-installations, allowing more than one timer for households with multiple vehicles, and bundling the timers as part of larger residential packages.

5.1.2 Program Design and Delivery

The program was administered and promoted by Synergy North and delivered by one program delivery vendor who performed direct installations of the equipment at participating customer sites. The program was offered between January of 2020 and December of 2020, with a pause due to the COVID-19 pandemic between March 16 and October 12, 2020. When the program resumed in October, the delivery vendor initially focused on completing installations that were pending due to the pause in delivery. Two-thirds (66%) of program measures were installed in the last quarter of 2020.

To generate awareness about the program, the LDC conducted a marketing campaign that included interviews with various news outlets in Thunder Bay and Kenora, social media outreach, and radio, online, and local print advertisements. Program staff indicated that the interviews and social media outreach were the most efficient and effective outreach methods used to reach their target audience. Customers could apply online or reach out to the LDC via phone or e-mail. LDC

program staff indicated that they had also intended to perform face-to-face community outreach to promote the program, but this was not possible due to the pandemic.

LDC program staff screened each customer to ensure eligibility before passing the application on to the delivery vendor. Within five days of receiving the application, the delivery vendor would contact the applicant to schedule a site visit. The delivery vendor was required to conduct the site visit within ten business days of the first scheduling call. The timer itself and site visit were free of charge to eligible customers. During the site visit, the delivery vendor collected program documentation (e.g., signed participant agreement, customer consent form), installed the block heater timer, provided training to the customer on how to use the timer, and highlighted other energy-saving tips for the customer's consideration.[4] Following the site visit, the program delivery vendor submitted all relevant program documentation to the LDC.

Overall, LDC program staff thought the program met their expectations considering the challenges associated with the pandemic. They stated that the program delivery vendor did an excellent job managing program delivery, especially during such challenging circumstances.

5.1.3 Quality Assurance/Quality Control

LDC program staff performed quality assurance and control checks on 15% of completed projects to ensure all the required information was collected. Additionally, to better understand the customer experience, LDC program staff performed follow-up calls with approximately 5% of customers per month to request feedback about the installation process and to ensure that the program was running well from the customers' perspective. According to LDC program staff, customers provided positive feedback about the delivery vendor and the site visit.

5.1.4 Customer Engagement

LDC program staff indicated that customers typically chose to participate in the program to receive the cost savings. Typically, participants could expect to save $25 to $30 per year, depending on their usage of the timer. Staff indicated that the program was designed with ease of customer participation in mind. The timer is very simple to install and easy to use. LDC program staff noted that the program was very popular with customers. Customers were still reaching out to the LDC in 2021 asking about the program's availability, indicating continued interest in the program.

5.1.5 Barriers and Opportunities

LDC program staff indicated that the COVID-19 pandemic presented the greatest challenge to the program. As indicated in Section 5.1.2, the program paused between March and October due to pandemic-related restrictions. This pause in enrollment impacted momentum and the program was only able to reach 18% of its original participation target.

In addition, the program experienced a delayed start and did not receive applications until 2020, as opposed to 2019 as originally expected. LDC program staff indicated this was due to program

[4] The delivery vendor provided the customer with a handout identifying energy-saving tips that were pre-determined by the LDC and delivery vendor prior to all site visits. The tips focused on turning down thermostats, paying attention to energy rates, sealing air leaks, choosing efficient lighting, considering ENERGY STAR products, and minimizing phantom loads through the use of power bars with timers.

planning delays as well as unexpected delays in the procurement of the block heater timer inventory. To procure the timers, LDC program staff reached out to suppliers they had worked with previously as well as suppliers they knew had previously worked with the IESO's Home Assistance Program. However, due to limited availability, the initial procurement of block heater timers took longer than expected, occurring over a period of 12 weeks. LDC program staff noted that if the Block Heater Timer Program were to be made available again in the future, they would be interested in talking with IESO staff about any opportunities there may be to leverage existing supply chain relationships that the IESO has to help procure stock for the program in a timely manner.

LDC program staff reported ordering a total of 750 timers prior to the start of the program. Ultimately, the program installed about 600 of these timers. Staff believe that at least 750 could have been installed if not for the supply chain delays and the pandemic-related seven-month pause.

The pandemic and its related restrictions also made it even more challenging than normal for the program delivery vendor to serve customers located in remote areas, especially in the LDC's Northwest Ontario service territory where residences are more dispersed. If the program were to be delivered again in the future, LDC program staff recommend that the program forego a site visit. Staff explain that a site visit is not necessary for such a simple installation, and it was likely a barrier to participation that also increased delivery costs.

LDC program staff proposed pre-programming the timers, mailing them directly to participants for self-installation, and launching a website for customers to use to confirm the installation. Following confirmation, the LDC could follow up with additional QA/QC measures to verify the installation. LDC program staff said that shipping timers could minimize the cost of paying for the units' storage, improve flexibility in delivery, increase participation, and avoid scheduling conflicts and challenges with installation visits.

LDC program staff mentioned that any future program designs should consider the possibility of offering multiple timers to households with multiple cars or offering block heater timers as part of a larger package of equipment that could be offered to residential customers.

Section 6 Other Energy-Efficiency Benefits

This section presents results related to the program's other energy efficiency benefits including avoided greenhouse gas emissions.

6.1 Avoided Greenhouse Gas Emissions

The NMR team used the IESO CE Tool to calculate avoided GHG emissions. The NMR team calculated Avoided GHG emissions for the first year and for the lifetime of the measures. Table 7 presents the results of these calculations.

Table 8: Avoided GHG Emissions

First Year GHG Avoided (Tonnes CO_2 equivalent)	Lifetime GHG Avoided (Tonnes CO_2 equivalent)
20.28	356.85

Section 7 Key Findings and Recommendations

This section presents detailed key findings and recommendations for the evaluation.

Finding 1: Program tracking data included incorrect participant addresses. The program tracking data did not differentiate between mailing address and installation address. Specifically, addresses listed in the program tracking data were sometimes P.O. boxes and did not include the participant's home. In another instance, the address in the tracking data was the participant's name.

> **Recommendation 1.** Conduct QA/QC procedures to ensure program tracking data is accurate and matches the physical participation and consent forms.

Finding 2: Participation fell well below expectations, leading to program low cost-effectiveness. Expected program participation was 3,375, but actual participation was 606.

> **Recommendation 2.** With the understanding that the COVID-19 pandemic presented unique challenges to recruitment, the program may wish to consider different ways of expanding participation, such as marketing through additional channels like bill inserts.

Finding 3: *Program FR was moderately high at 13.8%.* The program helped three-fourths (75%) of participants with upgrades they otherwise would not have purchased (43%) or would have postponed (32%). The remaining participants would have bought the "exact same block heater timer anyway" (18%) or were unsure of what they would have done (7%). This suggests that there is still room for FR improvements.

> **Recommendation 3a.** Maintain focus on minimizing FR if the program continues in future years. Key areas to focus on include:
>
> - Identifying and targeting customers who would be unlikely to purchase a block heater timer without program support (e.g., customers who would not have known about the block heater timers, or would not have had the funding available to purchase them), and
> - Encouraging all participants to complete the evaluation surveys to ensure that the FR results are as representative of the true population of program participants as possible. For example, LDCs could include a clause within participation agreements informing customers that they may be requested to complete an evaluation survey following their participation. Additionally, program delivery vendors or program partners could inform customers about the evaluation survey and encourage them to complete it.
>
> **Recommendation 3b.** Continue to encourage participants to install additional energy-efficient equipment or services beyond what is covered through the program if it is feasible for them to do so. While onsite, the delivery vendor provided customers with a handout with tips further reduce their energy use. Continuing to do so may lead to increases in the program's SO, which may in turn help offset FR and lead to improved NTG.

Recommendation 3c. Provide more than one block heater timer to eligible customers who have more than one vehicle that meets participation criteria. Doing so may lead to increases in the program's energy savings.

Finding 4: On-site block heater timer installations are straightforward to install, but the process is resource intensive. If the program were to be delivered again in the future, LDC program staff recommend that the program forego a site visit. Staff explained that a site visit is not necessary for this type of installation, and that it was likely a barrier to participation that also increased delivery costs.

Recommendation 4. Consider mailing pre-programmed block heater timers to eligible customers in place of conducting on-site installations. Additional website resources and/or follow-up calls could assist with determining eligibility, confirming installations, and conducting additional quality assurance and control post-installation. Mailing timers could minimize the cost of installation, avoid scheduling conflicts, reduce the cost of unit storage, and add flexibility to program design.

Appendix A Detailed Methodology

This appendix presents additional details about the cost-effectiveness methodology, NTG methodology, and process evaluation methodology.

A.1 COST-EFFECTIVENESS METHODOLOGY

This appendix presents additional details about the cost-effectiveness methodology. A summary of the methodology was provided in Section 2.2.

The cost-effectiveness analysis was completed using the IESO CE Tool and in accordance with the IESO *Cost Effectiveness Guide for Energy Efficiency.*[5] The IESO CE Tool was populated with the following key information from the evaluation:

- First year energy savings in kWh
- Effective Useful Life (EUL)
- End use load profile
- Incremental equipment and installation cost
- Net to gross ratio for energy savings

Additionally, IESO provided the following information for use in the cost-effectiveness calculation:

- Program administrative costs
- Incentives

The IESO CE Tool provides many outputs and varying levels of granularity. While the NMR team leveraged various outputs to develop findings and recommendations, the key outputs we selected to be directly presented in this report are as follows:

- PAC test costs, benefits, and ratio
- Levelized unit energy cost by kWh

[5] *Cost Effectiveness Guide for Energy Efficiency Version 4*, Independent Electricity System Operator, January 20, 2021, https://www.ieso.ca/-/media/Files/IESO/Document-Library/EMV/CDM_CE-TestGuide.ashx

A.2 NET-TO-GROSS EVALUATION METHODOLOGY

This appendix presents details on the sampling plans for collecting NTG data, the instruments used to assess FR and SO, the implementation of the data collection, and the analysis methods. This section provides additional details about the NTG evaluation methodology. A summary of the methodology was provided in Section 2.1.4.

The NMR team developed an effective questionnaire to assess FR and SO. The approach has been used successfully in many previous evaluations. The NTG ratio is defined as follows (Equation 4).

Equation 4: NTG

$$NTG = 100\% - FR + SO$$

A.2.1 Free-Ridership Methodology

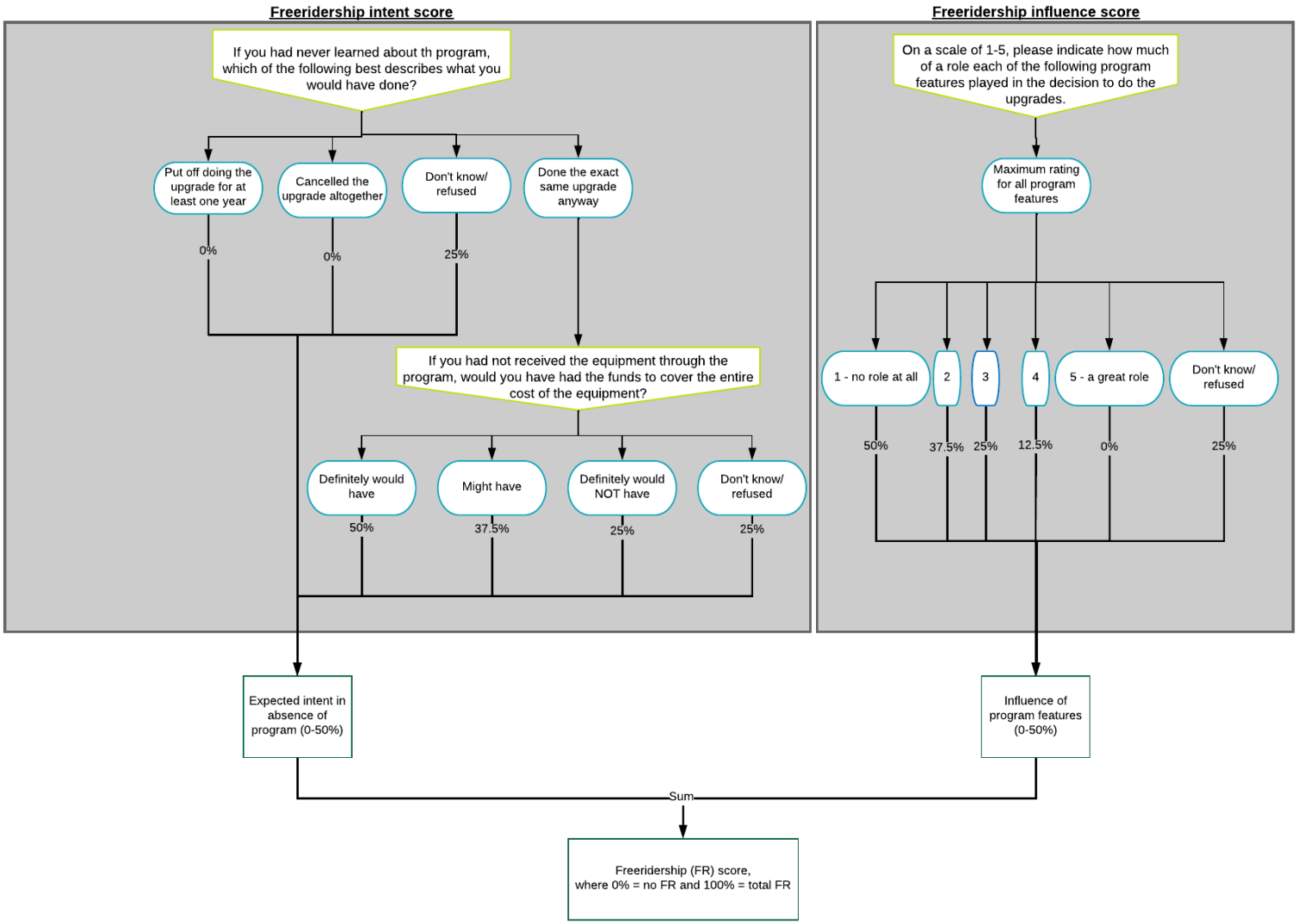
The survey addressed the attribution of savings for each sampled project or type of equipment through two main components:

- Intention of the expected behavior in the absence of the program; and
- Influence of various program features, such as the rebate, program marketing and outreach, and any technical assistance received.

Each component produces scores ranging from 0 to 50. The two components are summed to produce a total FR score ranging from 0 (not a free rider) to 100 (complete free rider). The total score is interpreted as a percentage (0% to 100%) to calculate the mean FR level for a given program.

Figure 37 illustrates the FR methodology.

Figure 6: FR Methodology



Intention Component

The FR score's intention component asks participants how the evaluated project would have been different in the program's absence. The two key questions that determine the intention score are as follows:

> Question 1: If you had never learned about the Block Heater Timer Program, which of the following best describes what you would have done? You would have...
> 1. Put off buying the block heater timer(s) for at least one year
> 2. Never purchased the block heater timer(s)
> 3. Bought the exact same block heater timer(s) anyway
> 98. Don't know
> 99. I'd rather not answer
>
> [ASK ONLY IF RESPONSE TO QUESTION 1=3: Purchased the exact same block heater timer(s) anyway] Question 2: If you had not received the block heater timer(s) through the program, would you have had the funds to cover the cost of the block heater timer?
> 1. Definitely would have
> 2. Might have
> 3. Definitely would NOT have
> 98. Don't know
> 99. I'd rather not answer

Table 8 indicates the possible intention scores a respondent could have received depending on their responses to these two questions.

If a respondent provided an answer of 1or 2 (would postpone or never make the purchase), the respondent would receive an FR intention score of 0% (on a scale from 0% to 50%, where 0% is associated with no FR and 50% is associated with high FR). If the respondent answered 3 (would have purchased the exact same block heater timer anyway), they are asked the second question before an FR intention score can be assigned. If a respondent said they did not know or refused the question, the respondent would receive an FR intention score of 25% (associated with moderate FR).

The second question asks the participants who had said they would have done the exact same project if they definitely would have, might have, or definitely would not have had the funds to cover the cost of the block heater timer if they did not receive one through the program. If the respondent answered 1 (definitely would have had the funds), the respondent would receive a score of 50% (associated with high FR). If the respondent answered 2 (might have had the funds), they would receive a slightly lower FR score of 37.5%. If the respondent answered 3 (definitely would not have had the funds) or did not know or refused the question, the respondent would receive an FR intention score of 25% (associated with moderate FR).

Table 9: Key to FR Intention Score

Question 1 Response	Question 2 Response	Intention Score (%)
1 or 2	Not asked	0 (no FR for intention score)
98 (Don't Know), or 99 (Refused)	Not asked	25

Question 1 Response	Question 2 Response	Intention Score (%)
3	3, 98 (Don't Know), or 99 (Refused)	25
3	2	37.5
3	1	50 (high FR for intention score)

The bullet points below display the same FR intention scoring approach in a list form. As mentioned above, for each respondent, the NMR team calculated an intention score, ranging from 0% to 50%, based on the respondent's report of how the project would have changed had there been no program:

- Project postponement or cancellation = 0%
- Respondent does not know what they would have done in the absence of the program = 25%
- No change and respondent states they would not have made funds available = 25%
- No change but respondent is not sure whether they would have made funds available = 37.5%
- No change and respondent confirms they would have made funds available = 50%

Influence Component

The influence component of the FR score asks each respondent to rate how much of a role various potential program-related influence factors had on their decision to do the upgrade(s) in question. Influence is reported using a scale from 1 to 5, where one meant it had "no role at all" and five meant it had "a great role." The potential influence includes the following:

- Availability of the block heater timer(s)
- Information or recommendations provided to you by your hydro company representative
- Information or recommendations provided from vendors associated with the program
- Marketing materials or information provided by your hydro company about the program (e-mail, direct mail, etc.)
- Information or resources from your hydro company's website
- Information or resources from social media
- Previous experience with any energy saving program
- Others (identified by the respondent)

Table 9 indicates the possible influence scores a respondent could receive depending on how they rated the influence factors above. For each respondent, the program influence is set equal to the maximum influence rating that a respondent reports across the various influence factors. For example, suppose the respondent provided a score of 5 (great role) to at least one of the influence factors. In that case, the program is considered to have had a great role in their decision to do the upgrade, and the influence component of FR is set to 0% (not a free rider).

Table 10: Key to FR Influence Score

Maximum Influence Rating	Influence Score (%)
5 - program factor(s) highly influential	0
4	12.5
3	25
2	37.5
1 - program factor(s) not influential	50
98 – Don't know	25
99 - Refused	25

The bullet points below display the same FR Influence scoring approach in a list form. As mentioned above, for each project, the NMR team calculated a program influence score, also ranging from 0% to 50%, based on the highest influence rating given, among the potential influence factors:

- Maximum rating of 1 (no influence factor had a role in the decision to do the project) = 50%
- Maximum rating of 2 = 37.5%
- Maximum rating of 3 = 25%
- Maximum rating of 4 = 12.5%
- Maximum rating of 5 (at least one influence factor had a great role) = 0%
- Respondent does not know how much influence any factor had = 25%

The NMR team summed the intention and program influence scores for each project to generate an FR score ranging from 0 to 100. The scores are interpreted as % FR: a score of 0 means 0% FR (i.e., the participant was not at all a free rider), a score of 100 means 100% FR (the participant was a complete free rider), and a score between 0 and 100 means the participant was a partial free rider.

A.2.2 Spillover Methodology

To assess the SO, respondents provided feedback about installing energy-efficient equipment or services that were done without a program rebate following their participation in the program. The equipment-specific details assessed are as follows:

- ENERGY STAR® appliance
- ENERGY STAR® LED
- Lighting controls (lighting timers, occupancy sensors)
- High efficiency heating, cooling, or water heating equipment (central air conditioning, furnace, boiler, water heater)
- Weatherstripping around doors and windows
- Window film
- Programmable or smart thermostat
- Smart power bar
- Low-flow showerhead
- Faucet aerator
- Others (identified by the respondent): description of upgrade, size, quantity, hours of operation

For each equipment type that the respondent reports installing without a program rebate, the survey instrument asks about the extent of influence that earlier involvement in the program had on the decision to carry out the upgrades. Influence is reported using a scale from 1 to 5, where 1 meant it had “no role at all” and five meant it had “a great role.” In the case that the influence score is between 3 and 5 for a particular equipment type, the survey instrument solicits details about the upgrades to estimate the quantity of energy savings that the upgrade produced.

For each upgrade, the NMR team converted the program influence rating to an influence score ranging from 0% to 100%, as follows:

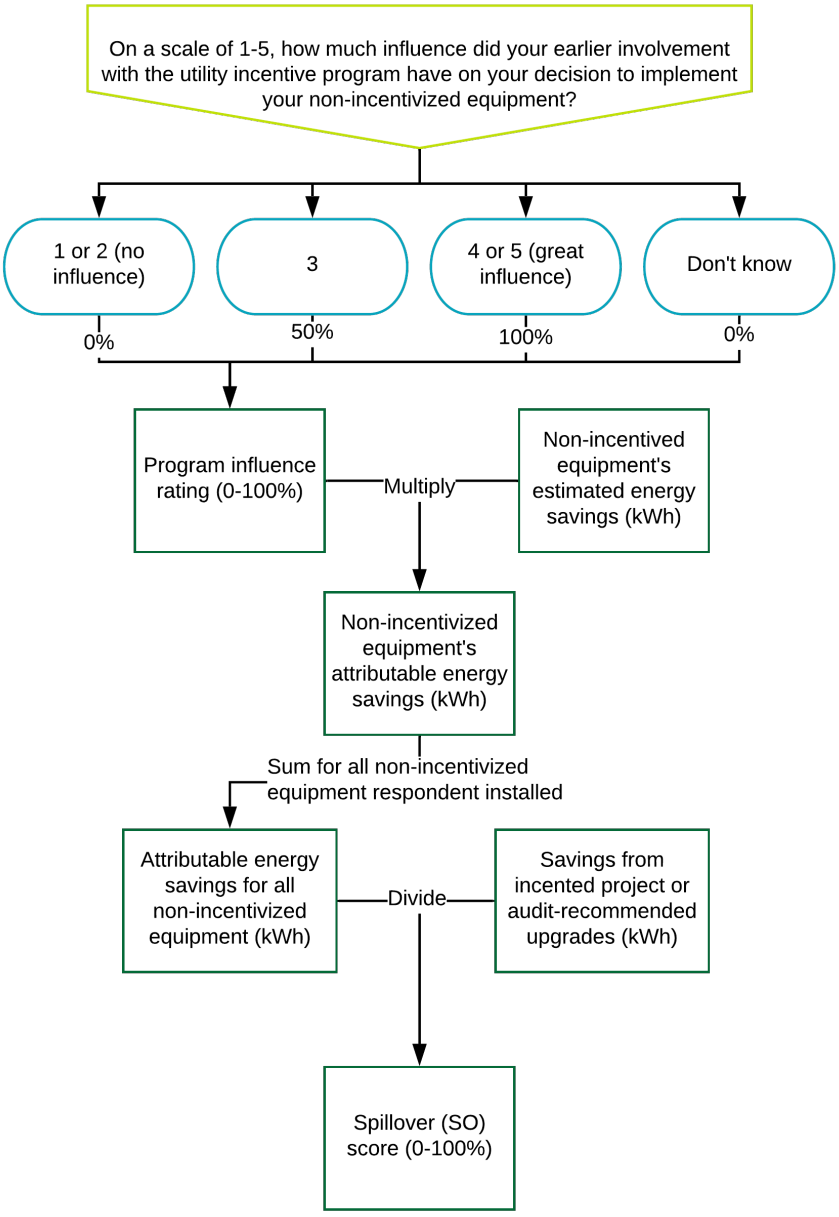
- Maximum rating of 1 or 2 (no influence) = 0%
- Maximum rating of 3 = 50%
- Maximum rating of 4 or 5 (great influence) = 100%
- Respondent does not know how much influence any factor had = 0%

The NMR team used the following procedure to calculate an SO percentage for each respondent:

- Multiplying the estimated energy savings for each upgrade by the influence percentage to calculate the upgrade’s program-attributable energy savings.
- Summing program-attributable energy savings from all identified upgrades for each respondent to calculate the respondent’s total SO savings.
- Dividing each respondent’s total SO savings by the savings from the incented project.

Figure 7 illustrates the SO methodology.

Figure 7: SO Methodology



A.2.3 Other Survey Questions

In addition to the questions addressing FR and SO, the survey included the following topics to provide additional context:

- Whether the respondent is the person primarily involved in decisions about upgrading equipment. If the respondent is not the appropriate contact, they are asked to forward the survey weblink on to the appropriate contact.
- Whether the respondent was the homeowner or tenant.
- When the respondent first learned about the program, relative to the upgrade in question (before planning; after planning, but before implementation; after implementation began, but before project completion; or after project completion).
- How the respondent learned about the program.

The responses to these questions are not included the algorithms for calculating FR or SO, but do provide additional context. The first question ensures that the appropriate person responded to the survey. The other questions provide feedback about responsibility for the relationship of the respondent to the property where the upgrade was performed, and how and when program influence occurs.

A.2.4 Net-to-gross Survey Implementation

The NMR team implemented the NTG survey over the web as part of a larger survey that collected NTG, impact, and process-related feedback from participants. The NMR team assumed that all contacts who responded were the appropriate contacts to answer the questions. The introductory text in the survey asked the respondent to forward the survey weblink to the appropriate contact to fill it out if they were not the appropriate contact to do so.

A.3 PROCESS EVALUATION METHODOLOGY

This appendix presents additional details about the process evaluation methodology. A summary of the methodology was provided in Section 2.3.

During the process evaluation, the NMR team collected primary data from key program actors, including the LDC program staff, and participants (Table 10). The NMR team collected the data using different methods, depending on what was most suitable for a particular respondent group (e.g., web surveys or telephone-based-IDIs). This data, when collected and synthesized, provides a comprehensive understanding of the delivery of the program.

The NMR team directly carried out or managed all process evaluation data collection activities and developed all survey instruments, interview guides, and sample files for use in the interviews and surveys. The survey instruments and interview guides were approved by the IESO Evaluated Measurement and Verification (EM&V) staff, and the data used to develop the sample files came from program records supplied either by the IESO EM&V staff or the LDC staff.

The NMR team conducted the interview with the LDC program staff using in-house staff (rather than through a survey lab). The NMR team fielded the participant surveys as phone-based survey in partnership with the Resource Innovations survey lab based in Toronto. The NMR team

designed the survey instruments and developed the sample lists. The Resource Innovations survey lab then programmed the surveys using Qualtrics survey software and distributed the survey by phone. The NMR team worked closely with the Resource Innovations survey lab to test the programming of the survey and to perform quality checks on all data collected.

Table 11: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Fielding Firm	Completed	Population	90% CI Error Margin
LDC Program Staff	Phone IDI	NMR Staff	1	1	0%
Participants	Web Survey	Resource Innovations Survey Lab	84	586	8.3%

The following subsections provide additional details about the process evaluation methodology.

A.3.1 LDC Staff Interviews

The NMR team completed one interview with two LDC program staff members to obtain a detailed understanding of the Block Heater Timer Program (Table 11). The purpose of the interviews was to better understand program design, delivery, and barriers, and solicit suggestions for improvement.

The interview topics included program roles and responsibilities, program design and delivery, marketing and outreach, market actor engagement, program strengths and weaknesses, and suggestions for improvement.

The NMR team identified the appropriate staff to interview in consultation with the IESO EM&V staff. The interview took approximately 45 minutes to complete. The NMR team conducted the IDI via phone on October 13 of 2021.

Table 12: LDC Staff Interview Disposition

Disposition Report	Total
Completes	1
E-mails bounced	--
Bad Contact Info (No Replacement Found)	--
Unsubscribed	--
Partial Complete	--
Screened Out	--
No Response	--
Total Invited to Participate	1

A.3.2 Participant Survey

The NMR team surveyed 84 participants from a sample of 568 unique contacts (Table 12). The purpose of the survey was to collect to support the NTG analysis. The survey topics included free ridership, spillover, and demographics.

The NMR team developed the sample from program records provided by the IESO EM&V staff. NMR team employed a census-based approach to reach the largest number of respondents possible given the small number of unique contacts.

The NMR team delivered the survey over the phone in partnership with the Resource Innovations survey lab using Qualtrics survey software. The NMR team conducted survey implementation between October 19 and November 5 of 2021. The survey took an average of 8 minutes to complete after removing outliers.[6]

Table 13: Participant Survey Disposition

Disposition Report	Total
Completes	84
Bad Contact Info (No Replacement Found)	--
Partial Complete	3
Screened Out	-
Busy	49
Callback	25
Hard Refusal	35
No answer	48
No Eligible Respondent	--
Non-working #	42
Voicemail	146
Wrong Number	6
Language Barriers	--
Answering Machine	119
No Response	95
Total Invited to Participate	568

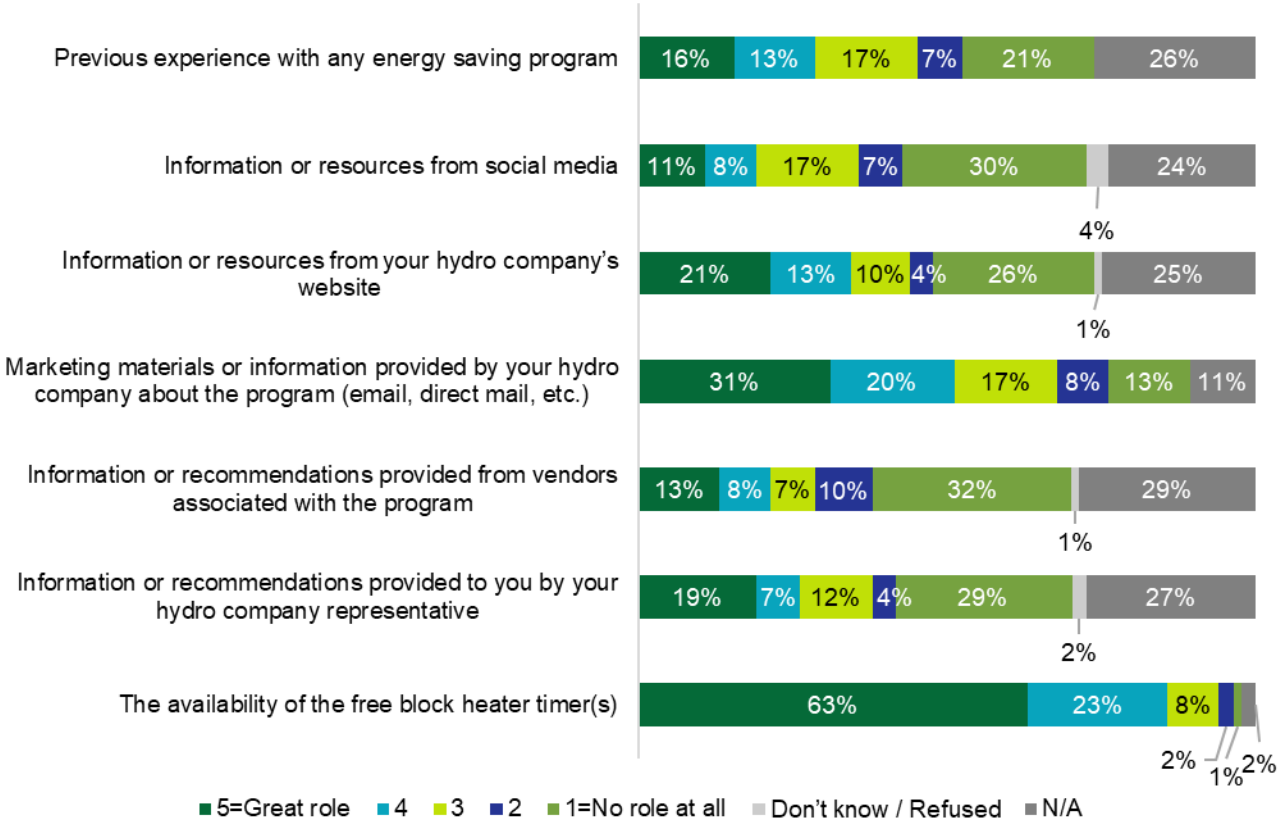
[6] Note that the NMR team designed the survey to allow the respondent to come back to the survey at a later time to complete it if they preferred. The average survey time was calculated with this in mind and assumed that any survey that took 40 minutes or more to complete was likely completed by a respondent who took a break before completing the survey.

Appendix B Additional Net-to-gross Evaluation Results

This appendix presents additional detail regarding the participant NTG results for the Block Heater Timer Program. More detailed results were provided in Section 3.3.

Figure 8 and Table 13 present additional detail regarding the participant FR and SO results collected as part of the participant survey.

Figure 8: Influence of Program Features on Participation (n=84)*



*May not sum to 100% due to rounding.

Table 14: Detailed SO Results (n=9)

Type of Equipment Installed	Count of Respondents with Spillover Projects	Number Installed	Size or Type
ENERGY STAR appliance	3	4	Clothes washer (two respondents); dishwasher (one respondent); clothes dryer (one respondent)

Type of Equipment Installed	Count of Respondents with Spillover Projects	Number Installed	Size or Type
ENERGY STAR LED	5	109	< 10 watts (two respondents); 11-20 watts (one respondent); 31+ watts (two respondents)
Lighting controls (lighting timers, occupancy sensors)	2	n/a	Timer (one respondent); Occupancy sensor (one respondent)

*Does not sum to 9 due to multiple response.