New Mexico
GAS COMPANY®
AN EMERA COMPANY

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June 24. 2022

Ms. Melanie Sandoval
New Mexico Public Regulation Commission
P. O. Box 1269
Santa Fe, New Mexico 87504-1269

RE: New Mexico Gas Company Inc.'s 2021 Energy Efficiency Program Annual Report

Dear Ms. Sandoval:

In compliance with 17.7.2.8 NMAC, New Mexico Gas Company, Inc ("NMGC") hereby submits its 2021 Energy Efficiency Program Annual Report, which includes the Annual Reconciliation, Rate 1-15 calculations, and the Measurement and Verification Report ("M&V Report") submitted by the independent program evaluation firm Evergreen Economics, Inc., as designated by the Commission.

A copy of NMGC's 2021 Energy Efficiency Program Annual and M&V Reports will be posted to NMGC's website at www.nmgco.com.

If you have any questions or require any additional information, please do not hesitate to contact me at (505) 697-3832. Thank you for your assistance in this matter.

Sincerely,

/s/Rebecca Carter

Rebecca Carter
Interim Director, Regulatory Affairs

Enclosures

cc: Tim Martinez – NMPRC
Bradford Borman – NMPRC
John Reynolds – NMPRC
Elisha Leyba-Tercero – NMPRC

2021

Energy Efficiency Program

Annual Report

June 24, 2022

NEW MEXICO GAS COMPANY, INC.

2021 Energy Efficiency Program Annual Report

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NEW MEXICO GAS COMPANY, INC.

2021 Energy Efficiency Program Annual Report

Introduction

New Mexico Gas Company, Inc. ("NMGC" or the "Company") hereby submits its 2021 Energy Efficiency Programs' Annual Report ("2021 Report") for the period of April 1, 2021 through March 31, 2022 ("2021 Program Year"). Additionally, included as Appendix C to the 2021 Report is the independent evaluator's, Evergreen Economics, Inc. ("Evergreen") final report, entitled "Evaluation of the 2021 New Mexico Gas Company Energy Efficiency Programs," ("M&V Report"), which was completed on June 7, 2022.

On August 30, 2019, NMGC filed its 2020, 2021 and 2022 Program Plan ("Program Plan") with the New Mexico Public Regulation Commission ("NMPRC" or "Commission") docketed as Case No. 19-00248-UT. The Program Plan was approved by the NMPRC on May 20, 2020, and became available to customers on April 1, 2021. The 2021 Report covers all costs incurred in the implementation of the programs and customer participation during the 2021 Program Year.

The following programs and offerings are included in the 2021 Report:

(1) Water Heating - tankless water heaters, condensing tank water heaters, showerheads, faucet aerators and pipe wrap measures.

(2) Space Heating - furnaces, boilers, insulation and smart thermostat measures.

(3) New Homes – provides incentives to home builders to build high performance homes through several methodologies including high efficiency furnaces, boilers and water heaters, tightening of envelope and ductwork, location of equipment, and increased insulation values.

(4) Income Qualified - multiple natural gas saving measures for individual low-income residences including Native American communities.

(5) Multi-Family - multiple natural gas saving measures for both low-income and market-rate multi-family facilities.

(6) Efficient Buildings - multiple natural gas saving measures for commercial and school facilities including direct install, prescriptive and custom.

The 2021 Report includes an Executive Summary that presents a high-level assessment of the program performance for the 2021 Program Year, followed by a summary of the findings of the M&V Report and the impacts on the future of the programs. The 2021 Report also includes specific program information as required by 17.7.2 NMAC ("EE Rule") as well as additional program information.

Executive Summary

This is NMGC's thirteenth annual report on the Company's Energy Efficiency Program ("Program"), that includes detailed results of the Company's six programs for the 2021 Program Year as approved in NMPRC Case No. 19-00248-UT.

The following table reflects the total number of customer participants, savings, and program costs for the 2021 Program Year. The savings for each program are net savings as derived from the final conclusions in the M&V Report reached by Evergreen's evaluation of NMGC's 2021 Program Year.

Program Savings and UCT Results per M&V

Program	Total Number of Rebates Processsed (April 1, 2021 to March 31, 2022)**	Total Annual NET Savings (Therms)*	Lifetime NET Savings (Therms)*	Total Program Costs	UCT	Cost per Therm Saved
Water Heating	2700	76,612	1,103,858	$625,565	0.85	$0.57
Space Heating	1185	99,577	2,012,831	$498,021	1.78	$0.25
New Homes	988	309,937	7,128,561	$1,383,495	2.17	$0.19
Income Qualified	459	158,467	2,785,296	$1,020,435	1.50	$0.37
Multi-Family*	1243	211,502	3,366,498	$1,014,308	1.80	$0.30
Efficient Buildings**	129	762,641	8,654,128	$2,054,016	2.15	$0.24
Portfolio Costs	N/A	N/A	N/A	$153,529	N/A	N/A
Total		1,618,736	25,051,172	$6,749,369	1.81	$0.27

**Net savings adjusted for free-ridership and derived from M&V Report*

***Multi-Family are the number of units and Efficient Buildings participation are projects associated with those programs*

Except where otherwise noted, the following table indicates the Program's costs for its energy efficiency portfolio during the 2021 Program Year.

Program Year 2021	Total Actual Costs
Administration (Internal and External)	$2,902,396
Promotion/Marketing	$86,055
Measurement and Verification	$102,193
Rebates	$3,505,195
Portfolio Costs	$153,529
Total	$6,749,369

*Program Year 2021 - NMPRC Case No. 19-00248-UT

Administration

The figures in this category include both internal and external administration of the Program. Internal administration is the labor and administrative costs for the NMGC Energy Efficiency Department Staff ("EE Staff") expended on energy efficiency programs in research, development and oversight of the program plan, as well as NMPRC compliance reporting and ongoing interface with the Company's program administrators and M&V activity. External administration are the costs associated with third party program administration of NMGC's programs. Administering the Water Heating, Space Heating and New Homes programs is ICF International ("ICF"). Administering the Income Qualified program is New Mexico Mortgage Finance Authority ("MFA") for the Weatherization Assistance Program and EnergyWorks for the Native American Energy Efficiency Program. Administering the Multi-Family program is ICAST and administering the Efficient Buildings program is CLEAResult. All five of the third parties program administrators are under contract with NMGC. Third party administration costs include labor and other direct expenses related to program implementation planning, program marketing and website materials development and management, outreach and marketing of the programs to eligible participants, energy efficiency opportunity identification and assessment, energy engineering and energy savings validation, some direct installation of high efficiency faucet aerators and low flow pre-rinse spray valves, rebate processing and quality control inspections. Review of rebate applications and qualifying of customers by ICF, MFA, EnergyWorks, ICAST and CLEAResult for their respective programs is also included. To the extent that these contracts require the third parties to conduct promotional activities acceptable to NMGC, those promotional costs are considered third party administrative costs.

Promotion/Marketing

This cost category contains all promotional costs expended on the Program including brochures, direct mail costs, newspaper, radio, television, media design and production expended by NMGC and all other promotional or marketing costs not included in third party contracts.

Measurement and Verification

The measurement and verification ("M&V") costs include final invoices received from Evergreen since April 1, 2021, for performing final M&V activities for the 2020 Program Year and their annual independent program evaluation report for the 2020 Program Year, completed June 2021. Also included in the costs are invoices received and paid through March 31, 2022, from Evergreen for their continued evaluation of NMGC's 2021 Program Year.

Rebates

The rebate cost category includes all rebates paid directly to participating customers or for measures and services provided under the Income Qualified, Multi-Family and Efficient Buildings programs. Labor and materials necessary for some direct-install measures are included in this category.

Portfolio Costs

This cost category includes all costs related to the energy efficiency portfolio but not directly associated to an individual program such as legal expenses, training, research and development, and general education activities.

The EE Rule requires that an independent evaluator conduct measurement and verification assessments of all energy efficiency programs.

For the 2021 Program Year, the NMPRC selected Evergreen to provide an M&V Report on all six of the energy efficiency programs offered by NMGC and approved by the Commission in NMPRC Case No. 19-00248-UT.

The M&V Report contains important findings and recommendations. A more complete summary of these findings and recommendations along with NMGC's comments is provided in the following section. These findings include the following:

- The overall Utility Cost Test ("UCT") for all six programs was 1.81.
- All but one of the individual programs passed the UCT. The Water Heating program received a UCT of 0.85.
- Program recommendations that have either already been implemented or will be implemented in the next filing.

Tariff Collections

As of April 1, 2021, when the 2021 Program Year began, NMGC was charging eligible sales and transportation customers the approved Company Rate No. 1-15 - Rate Rider No. 15 Energy Efficiency Rider Surcharge Factor ("Rider 15") of $0.0178/therm (Advice Notice No. 80), for recovery of program costs. The Rider 15 remained in effect from April 1, 2021, through July 31, 2021. On June 29, 2021, NMGC filed with the NMPRC its Advice Notice No. 84, revising its Rider 15 in alignment with the annual reconciliation. Advice Notice No. 84, included supporting testimony, exhibits and the annual Rider 15 reconciliation report pursuant to 17.7.2.13C NMAC, that requires reconciliation of collections from the prior year, along with proposals to make up under or over-collections. The Surcharge of $0.0117/therm for Rider 15 was approved with an effective start date beginning with the first billing cycle for August 2021. The total cost recoveries through Rider 15 from April 1, 2021 to March 31, 2022, were $6,541,353.22. As of this filing, Rider 15 continues to be charged at the current Surcharge Factor of $0.0117/therm.

Tariff Reconciliation

The beginning balance in the Energy Efficiency account as of April 1, 2021 was an over-collection of $2,229,257.73. Expenses for the for the 2021 Program Year totaled $7,566,993.44. Actual carrying charges of $48,831.36 charged to NMGC for the same period decreases the net expense to $7,518,162.08. Total collections for the period totaled $6,541,353.22. Collections included $473,314.07 for Incentives. Collections not including Incentives were $6,068,039.15, resulting in a net under-collection of $1,450,122.93. Including the beginning balance of an over-collection of $2,229,257.73 as of April 1, 2021, the total net over-collection as of March 31, 2022 was $779,134.80. Expenses associated with the 2021 Program Year were $6,749,369.08 of the $7,566,993.44 reported during the period. The difference of $817,624.36 is mostly attributed to invoices received after March 31, 2021, but allocated to the 2020 Program Year.

Pursuant to the provisions of Company Rule No. 37 and 17.7.2.13 NMAC that requires reconciliation of collections from the prior year, along with proposals to make up under or over-collections, attached as Appendix B is the Program Reconciliation and Cost Recovery Calculation and the Program Cost Rider Calculation reports.

Based on the above and pursuant to NMPRC Case No. 19-00248-UT, approving NMGC's 2022 Program Year budget of $7,819,720, NMGC's calculated Surcharge Factor of $0.0185/therm for the 2022 Program Year, upon approval will be implemented and charged through the 2022 Program Year for the recovery of the Program costs.

Regulatory Proceedings

On May 20, 2020, the Commission unanimously approved NMGC's 2020, 2021 and 2022 Program Plan (NMPRC Case No. 19-00248-UT) and the 2021 Program became available to NMGC's customers on April 1, 2021.

On June 6, 2022, the Commission's Utility Division Staff petitioned the Commission to open a docket for the purpose of consideration of a rulemaking proceeding and issuance of a notice of proposed rulemaking regarding proposed amendments to 17.7.2 NMAC, Energy Efficiency. A

Petition to Open a Rulemaking Docket and for Issuance of a Notice or Proposed Rulemaking was assigned Case No. 22-000141-UT.

NMGC received the final M&V Report for its 2021 Program Year from Evergreen on June 7, 2022. On June 24, 2022, NMGC filed with the Commission its M&V and its 2021 Program Year Annual Reports.

Summary of M&V Report Findings

Background and Purpose of Independent Evaluation

The NMPRC approved Evergreen to perform an independent evaluation, measurement, and verification of NMGC's Energy Efficiency Programs for Program Years 2017 through 2022. NMGC and its program administrators worked with Evergreen to provide the data necessary to complete the 2021 M&V Report. This included providing rebate processing files, budget data by program, net and gross savings assumptions, and avoided cost information.

The primary purpose of the independent evaluation is to assess the cost effectiveness of the programs using the UCT Test. A second purpose of the evaluation is to perform a basic process evaluation of the program to determine customer satisfaction with how the programs operated.

2021 M&V Report

The 2021 Program Year evaluation consists of an analysis of all six of the offered programs. Attached as Appendix C is the complete M&V Report.

Summary of Findings and NMGC Comments

Evergreen concluded that the overall portfolio UCT for the six programs was 1.81 and all but one (Water Heating Program) of each individual program also passed the UCT. NMGC believes that Evergreen has conducted a professional assessment of the six programs offered under the 2021 Program Year and agree with most of their findings and recommendations. Below is a summary of their findings and recommendations along with NMGC's comments.

Efficient Buildings Program

- The evaluation team evaluated and adjusted six projects in the sample that installed commercial kitchen gas fryers. The evaluation team used the savings methodology documented in the "FINAL" CLEAResult Work Papers for this measure, which differed from the savings reported by NMGC. The supplied energy savings calculations utilized the average value of gas savings (therms) for all the 'Casual Dining' facility types for both the Standard and Large Vat fryers in the savings algorithm, which decreased the savings for five projects and increased savings for one.

- **Recommendation:** Use the deemed savings values listed in the NMGC Commercial Work Papers for the applicable facility type.
- **NMGC Response:** NMGC's implementer will utilize the Work Papers when applicable when the TRM does not adequately apply.

Space and Water Heating Programs

- The Space Heating and Water Heating programs received a limited evaluation this year to update the free ridership and net-to-gross (NTG) values. A new participant survey was completed for both programs that focused solely on free ridership and included additional questions relating to the contractor influence on the efficiency level of the equipment chosen. Using these new questions, an updated free ridership algorithm was developed to ensure that the contractor influence was being incorporated appropriately into the calculation. For the smart thermostat measure in the Space Heating program, a deemed NTG value was assigned based on a recent impact evaluation from California. Based on these new results, the updated NTG ratio for the Space Heating program (excluding smart thermostats) is 0.7313 and is 0.7700 for smart thermostats. For Water Heating, the new NTG ratio is 0.5854. All of these reflect increases over the current values and will be used to calculate net impacts beginning in PY2022.
    - **NMGC Response:** NMGC appreciates Evergreen reassessing the NTGR for the programs. However, NMGC believes the new NTGR's should have been applied to the 2021 programs rather than waiting until 2022. Applying the revised NTGR's to 2021 would have raised the UCT of the Water Heating Program above 1.0.

Income Qualified Program

- The supplied National Energy Audit Tool (NEAT) reports for the 18 projects sampled were generated using the NEAT – Weatherization Assistant application. Installed measures included Faucet Aerator, DHW Tank Insulation, DHW Pipe Insulation, Door Replacement, Duct Sealing, Infiltration, Duct Insulation, Attic Insulation, Floor Insulation, Low-Flow Showerhead, Faucet Aerator, Window Replacement, and Furnace Replacement. The evaluation team verified that software version v8.9.0.5 follows the correct baseline efficiencies.
    - **Recommendation:** Provide sufficient documentation to verify the installation of equipment if the measure is not included in the NEAT report.
    - **NMGC Response:** NMGC's implementer will provide the necessary documentation.
- The NEAT reports for 10 projects did not match the savings reported by NMGC. There were discrepancies between the NEAT report and savings reported by NMGC for the following measures: Window Replacement, Attic Insulation, Floor Insulation, Door Replacement, Infiltration, and DHW Pipe Insulation.

- **Recommendation:** Ensure the savings generated by the Weather Assistant application are reported for each measure or provide sufficient documentation to verify updates to each measure not included in the NEAT report.
- **NMGC Response:** NMGC's implementer will provide the necessary documentation.

In summary, this is NMGC's thirteenth evaluation of its programs and the thirteenth time that M&V has concluded that the Company's program portfolio is cost-effective. The program portfolio cost/benefit analysis was determined to have a UCT of 1.81. NMGC believes this corroborates the adjustments proposed and taken each year to enhance its portfolio and make the programs more cost-effective. NMGC is pleased with Evergreen's report that overall NMGC's customers are satisfied with NMGC's programs and find them of value and had an influence on their decisions. All the programs in NMGC's portfolio were successful and received high customer satisfaction remarks. It is important to note that under the 2021 Program Year, a portion of the savings under the Efficient Buildings program were through direct-install measures. These direct-install measures are energy efficient showerheads, pre-rinse valves and faucet aerators that reduce water usage. Combined with the Water Heating, Income Qualified and Multi-Family programs these measures accounted for more than 24,698,009 gallons of water saved annually. Based on the City of Albuquerque's previously calculated savings of 3.548 kWh per 1000 gallons pumped, these measures provide an additional 85,406 kWh savings in pumping costs. Although NMGC maintains that the reduction in water usage from energy efficient showerheads, faucet aerators, and pre-rinse spray valves does directly affect energy usage by reducing the quantity of water pumped by the water utility or municipality, NMGC does not include these savings in calculating the UCT for its programs. Electric savings for NMGC's programs are not allowed under the UCT but the water savings will continue to be documented as non-energy benefits for future programs.

Energy Efficiency Rule Reporting Requirements

This section of the 2021 Report follows the reporting requirements and section headings as specified in 17.7.2.14.D NMAC of the EE Rule.

D(1) Independent Measurement and Verification Report

NMGC contracted with Evergreen to conduct the independent evaluation of its energy efficiency programs. Their report entitled "Evaluation of the 2021 New Mexico Gas Company Energy Efficiency Programs" is submitted with this report (Appendix C) and includes an analysis of the energy savings realized by all six programs.

D(2) Program Expenditures Not Included in the M&V Report

The M&V Report for the 2021 Program Year contains an analysis of all six programs. Therefore, all expenditures were included in the M&V Report. The expenditures for all programs for the 2021 Program Year were $6,749,369. These expenditures include all expenses incurred by NMGC to develop and implement the programs.

D(3) Material Variances in Program Costs

The table below provides comparisons on estimated savings and monetary costs to actual savings and costs for each program for the 2021 Program Year. The information for each program was derived from the final conclusions reached by Evergreen's evaluation of NMGC's 2021 Program Year and documented in the attached 2021 M&V report (see Appendix C). Avoided costs used to calculate savings can be found in Appendix A of this document.

NEW MEXICO GAS COMPANY, INC.

2021 Energy Efficiency Program Annual Report

Estimated Program Budget and UCT Results

Program	2021 Year Estimated Participation	Estimated Annual Therms Saved*	Estimated Lifetime Therms Saved *	Total Program Budget	UCT	Cost per Therm Saved
Water Heating	4970	156,712	2,616,810	$725,715	1.67	$0.28
Space Heating	1325	74,529	1,424,872	$530,692	1.11	$0.37
New Homes	850	221,631	5,540,775	$1,199,084	1.85	$0.22
Income Qualified	679	209,000	3,390,413	$1,644,374	1.11	$0.49
Multi-Family**	2134	198,478	2,977,170	$1,364,479	1.09	$0.46
Efficient Buildings**	357	649,090	9,077,864	$2,093,932	2.07	$0.23
Portfolio Costs	N/A	N/A	N/A	$181,445	N/A	
Total		**1,509,440**	**25,027,904**	**$7,739,720**	**1.51**	$0.31

** Adjusted for free ridership as derived from the M&V report and/or the NMTRM*

***Efficient Buildings participation are projects associated with that program and Multi-Family are units associated with that program*

Actual Program Budget and UCT Results

Program	2021 Year Actual Participation	Actual Annual Therms Saved*	Actual Lifetime Therms Saved *	Total Program Costs	UCT	Cost per Therm Saved
Water Heating	2700	76,612	1,103,858	$625,565	0.85	$0.57
Space Heating	1185	99,577	2,012,831	$498,021	1.78	$0.25
ThermSmart New Homes	988	309,937	7,128,561	$1,383,495	2.17	$0.19
Income Qualified	459	158,467	2,785,296	$1,020,435	1.50	$0.37
Multi-Family**	1243	211,502	3,366,498	$1,014,308	1.80	$0.30
Efficient Buildings**	129	762,641	8,654,128	$2,054,016	2.15	$0.24
Portfolio Costs	N/A	N/A	N/A	$153,529	N/A	N/A
Total		**1,618,736**	**25,051,172**	**$6,749,369**	**1.81**	$0.27

**Net savings adjusted for free-ridership and derived from M&V Report*

***Efficient Buildings participation are projects associated with that program and Multi-Family are units associated with that program*

D(4) Number of Program Participants

Total number of participants for each program for 2021 Program Year is reflected in the table below.

Program Year 2021	Total Number of Participants for Program Year 2021
Water Heating	2700
Space Heating	1185
New Homes	988
Income Qualified	459
Multi-Family*	1243
Efficient Buildings*	129
* Efficient Buildings participation are projects associated with that program and Multi-Family are units associated with that program	

D(5) Economic Benefits

The table below reflects the economic benefits from the 2021 Program Year and are derived from the M&V Report.

Program	Cost per Therm Saved	2021 Economic Benefits*	NPV of Total Economic Benefits*
Water Heating	$0.57	$37,042	$ 533,724
Space Heating	$0.25	$43,749	$ 884,324
New Homes	$0.19	$130,447	$ 3,000,276
Income Qualified	$0.37	$87,170	$ 1,532,148
Multi-Family**	$0.30	$114,452	$ 1,821,746
Efficient Buildings**	$0.24	$389,952	$ 4,425,016
All Programs	$0.27	$802,812	$ 12,197,234
** Economic Benefits and NPV of Total Economic Benefits are derived from the M&V Report.*			

D(6) Self-Direct Programs

There were no customer applications for the self-direct program in the 2021 Program Year.

D(7) Other Information of Interest to the Commission

Cost Allocation and Expenses by Program

All energy efficiency expenses are tracked through a unique set of account numbers. The following table shows the allocation of costs to the various programs for the 201 Program Year.

Program Year 2021	Rebates	Internal Administration	External Administration	Promotion	M&V Expenses	Total Program Costs
Water Heating	$239,634	$58,087	$296,470	$14,343	$17,032	**$625,565**
Space Heating	$234,250	$58,087	$174,310	$14,343	$17,032	**$498,021**
New Homes	$884,798	$58,087	$409,236	$14,343	$17,032	**$1,383,495**
Income Qualified	$799,551	$58,087	$131,423	$14,343	$17,032	**$1,020,435**
Multi-Family*	$735,529	$58,087	$189,318	$14,343	$17,032	**$1,014,308**
Efficient Buildings**	$611,434	$58,087	$1,353,120	$14,343	$17,032	**$2,054,016**
Portfolio Costs	N/A	$153,529	N/A	N/A	N/A	**$153,529**
Total	**$3,505,195**	**$502,050**	**$2,553,876**	**$86,055**	**$102,193**	**$6,749,369**

Internal administration is the labor and administrative costs expended on energy efficiency programs by the Company's Energy Efficiency Department. As of March 31, 2022, NMGC's Energy Efficiency Department consisted of three full-time staff members ("EE Staff"). EE Staff labor, during the 2021 Program Year, was spent on oversight of the existing energy efficiency programs, vetting programs and measures for potential future filings, preparing and submitting NMPRC compliance reporting, ongoing interface with NMGC's program administrators and M&V activity.

External administration are the costs associated with third party program administration of NMGC's programs. Administering the Water Heating, Space Heating and New Homes programs is ICF. Administering the Income Qualified program is MFA for the Energy$mart program and EnergyWorks for the Native American program. Administering the Multi-Family program is ICAST and administering the Efficient Buildings program is CLEAResult. All five third party program administrators are under contract with NMGC. Third party administration costs include labor and other direct expenses related to program implementation planning, program marketing and website materials development and management, outreach and marketing of the programs to eligible participants, energy efficiency opportunity identification and assessment, energy engineering and energy savings validation, some direct installation of high efficiency showerheads, faucet aerators and pre-rinse spray valves, rebate processing and quality control inspections. Review of rebate applications and qualifying of customers by ICF, MFA, EnergyWorks, ICAST and CLEAResult for their respective programs is also included. To the extent that these contracts require the third parties to conduct promotional activities acceptable to NMGC, those promotional costs are considered third party administrative costs.

Promotional expenses for the 2021 Program Year were used primarily for raising awareness on all programs through brochures and advertising campaigns and were allocated equally among the energy efficiency programs except those costs specific to individual programs.

M&V expenses for the 2021 Program Year include final invoices received from Evergreen since April 1, 2021 for performing final M&V activities for the 2020 Program Year and their annual independent program evaluation report for the 2020 Program Year , completed June 2021. Also included in the costs are invoices received and paid through March 31, 2022, from Evergreen for their continued evaluation of NMGC's 2021Program Year.

Portfolio costs includes all costs related to the energy efficiency portfolio but not directly associated to an individual program such as legal, training, research and development, and general education activities.

Non-Energy Benefits

The following table shows the CO_2 emission reductions associated with the portfolio of programs. The annual and lifetime avoided emissions are determined by multiplying the emissions rates times the annual and lifetime therms saved by the portfolio of programs.[1] In addition, three of NMGC's energy efficiency measures contribute directly to water savings. The Efficient Buildings program direct-install measures of low flow pre-rinse valves and faucet aerators combined with the Water Heating and Multi-Family measures account for more than 24,698,009 gallons of water saved annually. The expected lifetime for those measures is 10 years as determined by New Mexico's Technical Resource Manual.

2021 Program Year			
Emission Impact	Annual Avoided Gas Emissions Rate (lbs/therm)*	Annual Avoided Gas Emissions Rate (Metric tons)	Lifetime Avoided Emissions (Metric tons)
CO_2	117	94,696	1,465,494
Water Impact		Annual Water Saved (gallons)	Lifetime Water Saved (gallons)
Water Savings		24,698,009	246,980,090

Promotional Activities

Most promotional and marketing activities for NMGC's programs are the responsibility of the third party administrators to work with builders, contractors, distributers, manufacturers,

* The avoided CO_2 emissions rate for gas combustion was taken from U.S. Department of Energy - Energy Information Administration's Annual Energy Outlook 2022.

architects and other trade allies to educate and make them aware of NMGC's programs. Outreach directly to NMGC's customers is a joint effort with shared budgets. For NMGC's 2021 Program, activities included the following:

Mass Media Communications

NMGC began its promotional effort after receiving the Final Order in NMPRC Case No. 19-00248-UT approving the 2021 Program Year. Promotional efforts and program information for the 2021 Program Year began in April 2021 updating rebate applications, promoting the continuation of existing programs and marketing the new programs. A brochure that outlines all of the approved programs continued to be distributed throughout the State at NMGC offices. Typically, they would also be offered early in the year at various events throughout the year including, but not limited to, the Albuquerque Home & Garden Show, the Albuquerque Home & Lifestyle Show, the New Mexico Municipal League Annual Conference and the Albuquerque Home & Remodeling Show, however due to COVID those events were delayed until early 2022. Radio ads informing and promoting NMGC's energy efficiency programs to the public ran throughout the year along with internet banner ads and social media.

Targeted Communications

In conjunction with ICF and CLEAResult, NMGC held meetings throughout the State with contractors, vendors, and suppliers to inform them of the programs and began signing them up as participating contractors in April 2021. Additional contractors were added throughout the 2021 Program Year and all participating contractors were kept in communications regarding the 2021 Program Year and to solicit continued participation. To participate, contractors are required to have a license and insurance and understand the program criteria. They are then listed on NMGC's website including the areas they serve. NMGC also ran social media campaigns and bill messages promoting its programs and the Home Energy Analyzer that helps homeowners determine the most effective measures to make their home more energy efficient.

NMGC understands the value of promotion and education of its energy efficiency programs and the importance of expanding the outreach. The Energy Efficiency staff has continued to communicate with NMGC offices throughout the state to better educate NMGC employees about its energy efficiency programs. The intent is to have more employees understand the background of the energy efficiency programs and be able to transfer that knowledge to customers in their region of the State.

New Mexico Gas Company, Inc.

Energy Efficiency Avoided Costs
2021 Program Year

Natural Gas Avoided Costs

The following table provides the avoided energy costs (in real terms) used in the UCT model for the 2021 Program Year.

Year	Projected Avoided Cost (per MMBtu)	Per Therm
2017	$5.50	$0.55
2018	$5.39	$0.54
2019	$5.46	$0.55
2020	$5.56	$0.56
2021	$5.48	$0.55
2022	$5.49	$0.55
2023	$5.62	$0.56
2024	$5.81	$0.58
2025	$6.06	$0.61
2026	$6.15	$0.62
2027	$6.17	$0.62
2028	$6.25	$0.63
2029	$6.26	$0.63
2030	$6.30	$0.63
2031	$6.29	$0.63
2032	$6.43	$0.64
2033	$6.50	$0.65
2034	$6.55	$0.66
2035	$6.60	$0.66
2036	$6.69	$0.67
2037	$6.72	$0.67
2038	$6.74	$0.67
2039	$6.76	$0.68
2040	$6.83	$0.68
2041	$6.81	$0.68
2042	$6.85	$0.69
2043	$6.93	$0.69
2044	$7.03	$0.70
2045	$7.12	$0.71
2046	$7.20	$0.72
2047	$7.31	$0.73
2048	$7.47	$0.75
2049	$7.60	$0.76
2050	$7.70	$0.77

NEW MEXICO GAS COMPANY, INC.

Program Reconciliation and Cost Recovery Calculation
2021-2022

Line No.		Over/(Under) Recovered Amounts
1	Reconciliation Amounts at 3/31/2022	$ 779,135
2	2021 Plan expenses incurred after 3/31/2022	$ (876,160)
3	Net Under Collection for Program Year 2021	$ (97,025)
4	Actual Cost recovery 4/1/2022 - 5/31/2022	$ 798,341
5	Cost recovery estimate 6/1/2022 - 7/31/2022 (see calcs below)	$ 409,601
6	Program Cost - 2022	$ (8,314,773)
7	Cost recovery estimate 8/1/2022 - 3/31/2023(see calculation below)	$ (7,203,856)

Rate 10 - Residential

	June 2022 through July 2022 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Current Recovery Rate	Rider No. 15 Recovery
8	6/1/2022- 7/31/2022	17,155,179	16,662,096	17,161,300	1,012,029	499,594	0.0117	$ 200,787
9	Total	17,155,179	16,662,096	17,161,300	1,012,029	499,594		$ 200,787

Rate 54 - Small Volume Service

	June 2022 through July 2022 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Current Recovery Rate	Rider No. 15 Recovery
10	6/1/2022- 7/31/2022	10,837,715	10,583,011	10,900,344	129,346	40,967	$ 0.0117	$ 127,534
11	Total	10,837,715	10,583,011	10,900,344	129,346	40,967		$ 127,534

Rate 56 - Medium Volume Service

	June 2022 through July 2022 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Current Recovery Rate	Rider No. 15 Recovery
12	6/1/2022- 7/31/2022	6,002,977	6,588,318	6,946,954	372	105	$ 0.0117	$ 81,279
13	Total	6,002,977	6,588,318	6,946,954	372	105		$ 81,279
14	Total Rates 10, 54 & 56	33,995,871	33,833,425	35,008,599	1,141,747	540,666		$ 409,601

-

Rate 10 - Residential

	August 2022 through March 2023 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Proposed Recovery Rate	Rider No. 15 Recovery
15	8/1/2022 - 3/31/2023	243,901,090	236,278,524	243,976,561	4,041,091	499,594	$ 0.0185	$ 4,509,866
16	Total	243,901,090	236,278,524	243,976,561	4,041,091	499,594		$ 4,509,866

Rate 54 - Small Volume Service

	August 2022 through March 2023 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Proposed Recovery Rate	Rider No. 15 Recovery
17	8/1/2022 - 3/31/2023	112,782,070	109,487,664	113,096,158	445,940	40,967	$ 0.0185	$ 2,090,564
18	Total	112,782,070	109,487,664	113,096,158	445,940	40,967		$ 2,090,564

Rate 56 - Medium Volume Service

	August 2022 through March 2023 (Based on Test Year 2019 Rate Case)	Therms Distribution	Therms Transmission	Therms Commodity	Bills	Number of Customers	Proposed Recovery Rate	Rider No. 15 Recovery
19	8/1/2022 - 3/31/2023	27,762,693	30,767,946	32,644,395	1,493	105	$ 0.0185	$ 603,426
20	Total	27,762,693	30,767,946	32,644,395	1,493	105		$ 603,426
21	Total Rates 10, 54 & 56	384,445,853	376,534,134	389,717,113	4,488,524	540,666		$ 7,203,856

April 2022 through May 2022 actuals at 0.0117
June 2022 through July 2022 estimates at 0.0117
August 2022 through March 2023 estimates at 0.0183

NEW MEXICO GAS COMPANY, INC.

Program Cost Rider Calculation

Line No.		8/1/21 - 3/31/22			
	Program Budget Costs				
1	Internal Administration	$ 341,654			
2	External Administration	$ 2,497,101			
3	Rebates	$ 4,561,520			
4	Promotional Costs	$ 108,000			
5	Measurement & Verification Costs	$ 130,000			
6	Portfolio Costs	$ 181,445			
7	**TOTAL for EE Plan Budget**	**$ 7,819,720**			
8	Incentive Rate	$ 544,253			
9	Incentive Reconciliation - Under Recovered 2021 Program Year	$ 48,927			
10	Actual Incentive recovery 4/1/2022 - 5/31/2022	$ (66,618.66)			
11	Incentive recovery estimate 6/1/2022 - 7/31/2022 (see calcs below)	$ (31,507.74)			
12	**Total Cost to be Recovered**	**$ 8,314,773**			
13	Cost recovery 8/1/2021 - 3/31/2022 (See SLC-3, page 1, Line 7)	$ (7,203,856)			
	Revenues by Rate Class - Projected for 8/1/2022 through 3/31/2023				
	Based on Rate Case Rates & Determinants	**Revenues**	**Bills**	**Therms**	
14	Residential (Rates 10 and 70)	$ 243,963,522	4,041,091	243,976,561	
15	Small Volume (Rates 54 and 70)	$ 92,589,689	445,940	113,096,158	
16	Medium Volume (Rates 56 and 70)	$ 22,316,117	1,493	32,644,395	
17	**Totals**	**$ 358,869,328**	**4,488,524**	**389,717,113**	
	Program Cost Rider				
18	Program Costs to be Recovered	$ (7,203,856)			
19	Revenues 8/1/22 - 3/31/23	$ 358,869,328			
20	Percentage of Revenues	-2.007%			
21	Rider 15 as a Charge per Therm	(0.0185)			
	Proof of Revenue				
22	Charge per Therm	$ (0.0185)			
23	Therms	389,717,113			
24	Rider 15 Revenue Generated	$ (7,203,856)			
	Cost per therm saved				
25	Therms Saved Over the Life of the Measures		25,527,904		
26	Cost of the Programs		$ 7,819,720		
27	Cost per therm Saved		$ 0.3063		
28	Cost of Gas Purchases Avoided (2020 before FF & GRT)		$ 0.5030		
29	Savings per therm		$ 0.1967		
30	Total Avoided Cost of Gas Purchases		$ 12,840,536		
31	Net Savings to Customers from Energy Efficiency Programs		$ 5,020,816		

Evaluation of the 2021 New Mexico Gas Company Energy Efficiency Programs

Final Report

Submitted by Evergreen Economics

June 7, 2022

EVERGREEN ECONOMICS
ECOMETRIC
RESEARCH & POLLING INC

Table of Contents

Executive Summary

This report presents the independent evaluation results for the New Mexico Gas Company (NMGC) energy efficiency programs for program year 2021 (PY2021).

The NMGC programs and evaluation requirements were first established in 2005 by the New Mexico legislature's passage of the 2005 Efficient Use of Energy Act (EUEA).[1] The EUEA requires public utilities in New Mexico, in collaboration with other parties, to develop cost-effective programs that reduce energy consumption. Utilities are required to submit their proposed portfolio of programs to the New Mexico Public Regulation Commission (NMPRC) for approval. As a part of its approval process, the NMPRC must find that the program portfolio is cost effective based on the Utility Cost Test (UCT).

An additional requirement of the EUEA is that each program must be evaluated at least once every three years. As part of the evaluation requirement, NMGC must submit to the NMPRC a comprehensive evaluation report prepared by an independent program evaluator. As part of the reporting process, the evaluator must measure and verify energy savings, determine program cost effectiveness, assess how well the programs are being implemented, and provide recommendations for program improvements as needed. The Evergreen evaluation team consisted of the following firms:

- **Evergreen Economics** was the prime contractor and managed all evaluation tasks and deliverables;
- **EcoMetric** provided engineering capabilities and conducted the desk reviews; and
- **Research & Polling** fielded all the phone surveys.

For PY2021, the following NMGC programs were evaluated:

- Efficient Buildings
- Income Qualified
- ENERGY STAR Water Heating
- ENERGY STAR Space Heating

[1] NMSA §§ 62-17-1 *et seq* (SB 644). Per the New Mexico Public Regulation Commission Rule 1 SEP Pursuant to the requirements of the EUEA, the NMPRC issued its most recent *Energy Efficiency Rule* (*17.7.2 NMAC*) effective September 26, 2017, which sets forth the NMPRC's policy and requirements for energy efficiency and load management programs. This Rule can be found online at https://www.srca.nm.gov/parts/title17/17.007.0002.html

For the Efficient Buildings and Income Qualified programs, the evaluation team estimated realized gross and net therm impacts and calculated program cost effectiveness using the UCT. A brief process evaluation was also conducted for the Efficient Buildings program. Due to the ENERGY STAR Water Heating and Space Heating programs receiving a full evaluation in PY2020, evaluation activities for PY2021 were limited to a new free ridership survey.

The analysis methods used for the evaluated PY2021 programs are summarized as follows:

Efficient Buildings. A large number of projects in the Efficient Buildings program are prescriptive in nature and as such, a significant portion of the evaluation of this program was centered on a deemed savings review, phone survey verification, and project desk reviews. The custom projects with more complicated savings calculations were evaluated using a desk review and participant phone survey. The deemed savings review for prescriptive and direct install measures focused on verifying that the appropriate savings values were applied based on the equipment installed and per the referenced source of savings, whether that was the New Mexico Technical Reference Manual (TRM) or another source. The phone survey was used to verify that program-rebated measures are still installed and functional as well as gather information to calculate a free ridership rate. Finally, desk reviews conducted by engineers examined the savings assumptions and calculations specific to each project that was selected for review.

Income Qualified. The Income Qualified program provides weatherization and other efficiency improvements at no cost to low-income customers. These are a combination of prescriptive and custom measures, and as such, the focus of the evaluation for this program was a deemed and custom savings review. This included a review of the source of deemed savings, as well as verification that the deemed savings were applied correctly in the tracking data. For custom projects, we selected a sample for desk reviews of project details. As a low-income program, the net-to-gross (NTG) ratio is deemed to be 1.0. New to PY2021, the Income Qualified program includes a sub-program that offers the same efficiency improvements at no cost, but with a focus on Native American Housing Authorities across New Mexico. The evaluation team is in the process of conducting interviews with the Housing Authority participants during the Summer of 2022, with results to be provided to NMGC in a memo later this year.

ENERGY STAR Water Heating. This program offers rebates to residential customers for tankless water heaters, faucet aerators, low flow showerheads, and pipe wrap. Evaluation activities for PY2021 were limited to the new free ridership survey.

ENERGY STAR Space Heating. This program is similar in design to the ENERGY STAR Water Heating program, except with a focus on space heating equipment. This program offers rebates to residential customers for boiler upgrades, furnace upgrades, smart thermostats, and insulation. Evaluation activities for PY2021 were also limited to the new free ridership survey.

Table 1 summarizes the PY2021 evaluation methods used for these programs.

Table 1: Summary of PY2021 Evaluation Methods by Program

Program	Deemed Savings Review	Phone Survey	Engineering Desk Reviews
Efficient Buildings	◆	◆	◆
Income Qualified	◆		◆
ENERGY STAR Water Heating		◆	
ENERGY STAR Space Heating		◆	

The results of the PY2021 impact evaluation are shown in Table 2, with the programs evaluated highlighted in blue.

Table 2: PY2021 Savings Summary – Therms

Program	# of Projects	Expected Gross Therm Savings	Engineering Adjustment Factor	Realized Gross Therm Savings	NTG Ratio	Realized Net Therm Savings
Efficient Buildings	129	849,526	0.9986	848,321	0.8990	762,641
Income Qualified*	459	151,566	1.0455	158,467	1.0000	158,467
Multi-Family Low Income	447	152,900	1.0000	152,900	1.0000	152,900
Multi-Family Market Rate	796	68,943	1.0000	68,943	0.8500	58,602
ThermSmart New Homes	988	422,661	1.0000	422,661	0.7333	309,937
ENERGY STAR Water Heating	2,700	158,616	1.0000	158,616	0.4830	76,612
ENERGY STAR Space Heating	1,185	188,095	1.0000	188,095	0.5294	99,577
Total	**6,704**	**1,992,308**		**1,998,003**		**1,618,736**

*The Native American Housing Authority sub-program accounts for 47,004 expected gross therm savings in the Income Qualified program.

Lifetime therm savings are shown in Table 3 by program and for the portfolio overall. This includes expected gross, realized gross, and realized net lifetime savings.

Table 3: PY2021 Lifetime Savings Summary – Therms

Program	Expected Gross Lifetime Savings (therms)	Realized Gross Lifetime Savings (therms)	Realized Net Lifetime Savings (therms)
Efficient Buildings	9,640,068	9,626,394	8,654,128
Income Qualified*	2,663,994	2,785,296	2,785,296
Multi-Family Low Income	2,550,047	2,550,047	2,550,047
Multi-Family Market Rate	960,531	960,531	816,451
ThermSmart New Homes	9,721,199	9,721,199	7,128,561
ENERGY STAR Water Heating	2,285,416	2,285,416	1,103,858
ENERGY STAR Space Heating	3,802,095	3,802,095	2,012,831
Total	**31,623,349**	**31,730,978**	**25,051,174**

*The Native American Housing Authority sub-program accounts for 793,702 expected gross lifetime therm savings in the Income Qualified program.

Beginning in 2021 for the impact evaluation, we shifted to applying new NTG ratios prospectively for future years, rather than retrospectively as had been done in prior years. Consequently, the same NTG ratios applied in PY2020 are also being used for PY2021. For the PY2021 evaluation, the only updates to the NTG ratios occurred with the Efficient Buildings, ENERGY STAR Water Heating, and ENERGY STAR Space Heating programs; these new ratios will be applied beginning in PY2022. For the Efficient Buildings program, the ratio will change from 0.8990 to 0.9191, for ENERGY STAR Water Heating, the ratio will change from 0.4830 to 0.5854, and for ENERGY STAR Space Heating, the NTG ratio will change from 0.5294 to 0.7313.

Table 4 summarizes the updates to the NTG ratios for PY2022, with the updated values shaded in green.

Table 4: Net-to-Gross Ratio Updates for PY2022

Program	PY2021 NTG Ratio	PY2022 NTG Ratio
Efficient Buildings	0.8990	0.9191
Income Qualified	1.0000	1.0000

Program	PY2021 NTG Ratio	PY2022 NTG Ratio
Multi-Family Low Income	1.0000	
Multi-Family Market Rate	0.8500	
ThermSmart New Homes	0.7333	
ENERGY STAR Water Heating	0.4830	0.5854
ENERGY STAR Space Heating - Furnace	0.5294	0.7313
ENERGY STAR Space Heating – Insulation	0.5294	0.7313
ENERGY STAR Space Heating – Smart Thermostat	0.5294	0.7700

Using net realized savings from this evaluation and cost information provided by NMGC, the evaluation team calculated the ratio of benefits to costs for each of NMGC's programs and for the portfolio overall. The evaluation team calculated cost effectiveness using the UCT, which compares the benefits and costs to the utility or program administrator implementing the program.[2] The evaluation team conducted this test in a manner consistent with the California Energy Efficiency Policy Manual.[3] The results of the UCT are shown in Table 5. The UCT for the Water Heating program decreased in PY2021 to 0.85; however, all other programs had a UCT equal to or greater than 1.00, and the portfolio overall was found to have a UCT ratio of 1.81.

[2] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.
[3] California Public Utilities Commission. 2020. *California Energy Efficiency Policy Manual – Version 6*. https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

Table 5: PY2021 Cost Effectiveness

Program	Utility Cost Test (UCT)
Efficient Buildings	2.15
Income Qualified	1.50
Multi-Family	1.80
ThermSmart New Homes	2.17
ENERGY STAR Water Heating	0.85
ENERGY STAR Space Heating	1.78
Overall Portfolio	**1.81**

Based on the data collection and analysis conducted for this evaluation, the evaluation team found that overall, NMGC is operating high quality programs that are achieving significant energy savings and producing satisfied participants.

The impact evaluation included engineering desk reviews for a sample of Efficient Buildings and Income Qualified projects. Adjustments to savings based on the desk reviews were due to the implementation team averaging deemed savings values for Commercial Kitchen measures in the Efficient Buildings program and discrepancies between the reported *ex ante* savings and the savings values in the project files for the Income Qualified program. The evaluation team made several recommendations to improve savings values that include calculating savings specific to the installed equipment and other minor consistency improvements.

1 Evaluation Methods

The general analysis methods used for the evaluated PY2021 programs are described below.

1.1 Phone Surveys

Participant phone surveys were fielded in April 2022 for participants in the Efficient Buildings and ENERGY STAR Space Heating and Water Heating programs. The surveys averaged about 20 minutes in length and covered the following topics:

- Verification of measures included in NMGC's program tracking database;
- Satisfaction with the program experience;
- Survey responses for use in the free ridership calculations;
- Participation drivers and barriers; and
- Customer characteristics.

The original goal was to complete 50 phone surveys for the Efficient Buildings program and a total of 150 phone surveys across the Space Heating and Water Heating programs. Given the relatively small number of participants in the Efficient Buildings program, we attempted to contact a census of participants for the survey to try and get as close to our goal of 50 completed surveys. Ultimately, 31 phone surveys were completed for this program, with 25 direct install and six non-direct install customers. We were able to complete a total of 120 surveys across both the Space Heating and Water Heating programs. Table 6 shows the distribution of completed surveys.

Table 6: NMGC Phone Survey Summary

Program	Customers with Valid Contact Info	Target # of Survey Completes	Completed Surveys
Efficient Buildings	75	50	31
ENERGY STAR Space Heating	254	75	60
ENERGY STAR Water Heating	297	75	60
Total	**626**	**200**	**151**

The final survey instrument for the Efficient Buildings program is included as Appendix A, and the final survey instrument for the Space Heating and Water Heating programs is included as Appendix B.

1.2 Engineering Desk Reviews

To verify gross savings estimates, the evaluation team conducted engineering desk reviews for a sample of projects in the Efficient Buildings and Income Qualified programs. The goal of the desk reviews was to verify equipment installation, operational parameters, and estimated savings.

Both prescriptive and custom projects received desk reviews that included the following:

- Review of project description, documentation, specifications, and tracking system data;
- Confirmation of installation using invoices and supporting project documentation; and
- Review of project documentation, when available, detailing differences between installed equipment and subsequent adjustments.

For projects in the Efficient Buildings programs that used deemed savings values for prescriptive measures, the engineering desk reviews included the following:

- Review of measures available in the New Mexico TRM and utility Work Papers to determine the most appropriate algorithms that apply to the installed measure;
- Recreation of savings calculations using TRM or Work Paper algorithms and inputs as documented by submitted specifications, invoices, and other project documentation; and
- Review of New Mexico TRM algorithms to identify candidates for future updates and improvements.

For the custom projects included in the Efficient Buildings program, the engineering desk reviews included the following:

- Review of engineering analyses for technical soundness, proper baselines, and appropriate approaches for the specific applications;
- Review of input data for appropriate baseline specifications and variables such as weather data, bin hours, and total annual hours to determine if they are consistent with facility operation; and
- Consideration and review for interactive effects between affected systems.

For projects in the Income Qualified programs, the engineering desk reviews included the following:

- Review of the report generated by the National Energy Audit Tool (NEAT) – Weatherization Assistant application for consistency;
- Ensured software version to have appropriate baseline efficiencies;
- Cross checked data provided with values in the program tracking data; and
- Verification that the claimed equipment match the project documentation.

Normally, the evaluation team would collect additional information if needed through on-site visits, but due to COVID-19 restrictions, there were no on-sites completed for the PY2021 evaluation.

1.3 Net Impact Analysis

1.3.1 Self-Report Approach

The evaluation team estimated net impacts for the Efficient Buildings program using the self-report approach. This method uses responses to a series of carefully constructed survey questions to learn what participants would have done in the absence of the utility's program. The goal is to ask enough questions to paint an adequate picture of the influence of the program activities (rebates and other program assistance) within the confines of what can reasonably be asked during a phone survey.

With the self-report approach, specific questions that are explored include the following:

- What were the circumstances under which the customer decided to implement the project (i.e., new construction, retrofit/early replacement, replace-on-burnout)?
- To what extent did the program accelerate installation of high efficiency measures?
- What were the primary influences on the customer's decision to purchase and install the high efficiency equipment?
- How important was the program rebate on the decision to choose high efficiency equipment?
- How would the project have changed if the rebate had not been available (e.g., would less efficient equipment have been installed, would the project have been delayed)?
- Were there other program or utility interactions that affected the decision to choose high efficiency equipment (e.g., was there an energy audit done, has the customer participated before, is there an established relationship with a utility account representative, was the installation contractor trained by the program)?

The method used for estimating free ridership (and ultimately the NTG ratio) using the self-report approach is based on the 2017 Illinois Statewide Technical Reference Manual (TRM).[4] For the NMGC programs, questions regarding free ridership were divided into several primary components:

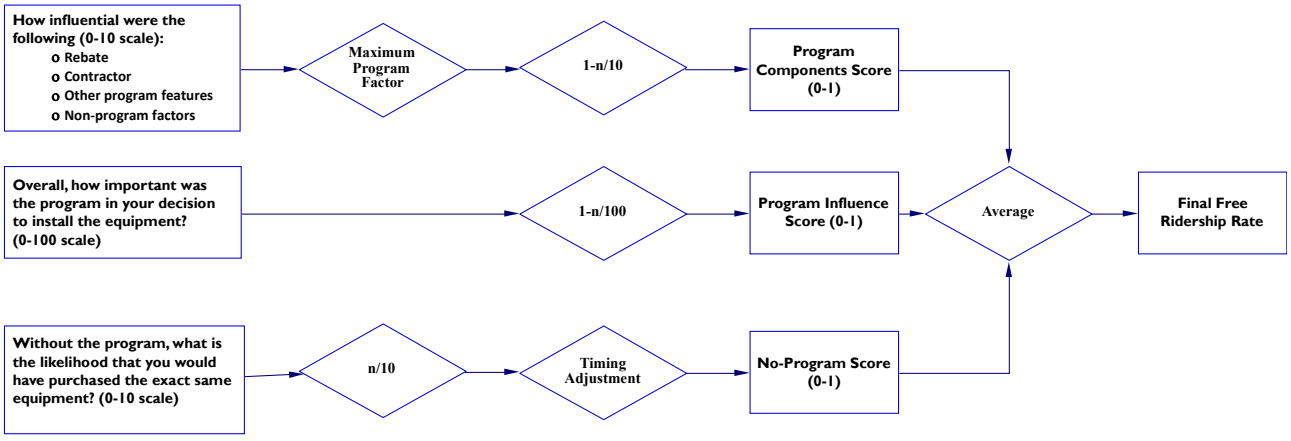
[4] The full Illinois TRM can be found at Illinois Energy Efficiency Stakeholder Advisory Group. 2017. "IL Statewide TRM Version 6.0." https://www.ilsag.info/il_trm_version_6.html

- A ***Program Component*** series of questions that asked about the influence of specific program activities (rebate, customer account rep, contractor recommendations, other assistance offered) on the decision to install energy efficient equipment;
- A ***Program Influence*** question, where the respondent was asked directly to provide a rating of how influential the overall program was on their decision to install high efficiency equipment; and
- A ***No-Program Component*** series of questions, based on the participant's intention to carry out the energy-efficient project without program funds or due to influences outside of the program.

Each component was assessed using survey responses that rated the influence of various factors on the respondent's equipment choice. Since opposing biases potentially affect the main components, the *No-Program* component typically indicates higher free ridership than the *Program Component/Influence* questions. Therefore, combining these opposing influences helps mitigate the potential biases. This framework also relies on multiple questions that are crosschecked with other questions for consistency. This prevents any single survey question from having an excessive influence on the overall free ridership score. It also allows the evaluation team to review all of the responses together and check for consistency in responses, and to make adjustments to the final free ridership estimate if needed.

Figure 1 provides a simplified version of the scoring algorithm. In some cases, multiple questions were asked to assess the levels of efficiency and purchase timing in absence of the program. For each of the scoring components, the question responses were scored so that they were consistent and resulted in values between 0 and 1. Once this was accomplished, the three question components were averaged to obtain the final free ridership score.

Figure 1: Self-Report Free Ridership Scoring Algorithm



Source: Adapted by Evergreen Economics from the 2017 Illinois TRM.

More detail on each of the three question tracks is provided below.

Program Component Questions

The ***Program Component*** battery of questions was designed to capture the influence of the program on the equipment choice. These questions were also designed to be as comprehensive as possible so that all possible channels through which the program is attempting to reach the customer were included.

The type of questions included in the Program Component question battery included the following:

- How influential were the following on your decision to purchase your energy efficient equipment?
    - Rebate amount
    - Contractor recommendation
    - Utility advertising/promotions
    - Technical assistance from the utility (e.g., energy audit)
    - Recommendation from utility customer representative (or program implementer)
    - Previous participation in a utility efficiency program

As shown at the top of Figure 1, the question with the highest value response (i.e., the program factor that had the greatest influence on the decision to install a high efficiency measure) was the one that was used in the scoring algorithm as the Program Component score.

Program Influence Question

A separate ***Program Influence*** question asked the respondent directly to rate the combined influence of the various program activities on their decision to install energy efficient equipment. This question allowed the respondent to consider the program as a whole and incorporated other forms of assistance (if applicable) in addition to the rebate. Respondents were also asked about potential non-program factors (condition of existing equipment, corporate policies, maintenance schedule, etc.) to put the program in context with other potential influences.

The Program Influence question also provided a consistency check so that the stated importance of various program factors could be compared across questions. If there appeared to be inconsistent answers across questions (rebate was listed as very important in response to one question but not important in response to a different question, for example), then the interviewer asked follow-up questions to confirm responses. The verbatim responses were recorded and were reviewed by the evaluation team as an additional check on the free ridership results.

No-Program Questions

A separate battery of ***No-Program*** component questions was designed to understand what the customer might have done if the NMGC rebate program had not been available. With these questions, the evaluation team attempted to measure how much of the decision to purchase the energy efficient equipment was due to factors that were unrelated to the rebate program or other forms of assistance offered by NMGC.

The types of questions asked for the No-Program component included the following:

- If the program had not existed, would you have
  - Purchased the exact same equipment?
  - Chosen the same energy efficiency level?
  - Delayed your equipment purchase?
- Did you become aware of the utility rebate program before or after you chose your energy efficient equipment?

The question regarding the timing of awareness of the rebate was used in conjunction with the importance rating the respondent provided in response to the earlier questions. If the respondent had already selected the high efficiency equipment prior to learning about the rebate **and** said that the rebate was the most important factor, then a downward adjustment was made on the influence of the rebate in calculating the Program Component score.

The responses from the No-Program questions were analyzed and combined with a timing adjustment to calculate the No-Program score, as shown in Figure 1. The timing adjustment was made based on whether or not the respondent would have delayed their equipment purchase if the rebate had not been available. If the purchase would have been delayed by one year or more, then the No-Program score was set to zero, thereby minimizing the level of free ridership for this algorithm component only. As an additional check on free ridership, verbatim responses were reviewed by the evaluation team, and scores have been adjusted to better reflect program influence.

Free Ridership and NTG Calculation

The values from the Program Component score, the Program Influence score, and the No-Program score were averaged in the final free ridership calculation; the averaging helped reduce potential biases from any particular set of responses. The fact that each component relied on multiple questions (instead of a single question) also reduced the risk of response bias. As discussed above, additional survey questions were asked about the relative importance of the program and non-program factors. These responses were used as a consistency check, which further minimized potential bias. In some cases, adjustments to the free ridership rate may be made during the

evaluation if responses regarding program influence are inconsistent across the survey components.

Once the self-report algorithm was used to calculate free ridership, the total NTG ratio was calculated using the following formula:

$$Net\text{-}to\text{-}Gross\ Ratio = (1 - Free\ Ridership\ Rate)$$

As mentioned in the Executive Summary, beginning in 2021, any updates to program NTG ratios will be applied prospectively. As a result, the new NTG ratios for the Efficient Buildings, ENERGY STAR Water Heating, and ENERGY STAR Space Heating programs developed in the PY2021 evaluation will be used beginning in PY2022. The realized net impacts discussed below were calculated using the existing NTG ratios from PY2020.

1.4 Gross and Net Realized Savings Calculations

The final step in the impact evaluation process is to calculate the realized gross and net savings, based on the program-level analysis described above. The **Gross Realized Savings** are calculated by taking the original *ex ante* savings values from the participant tracking databases and adjusting them using an **Installation Adjustment** factor (based on the count of installed measures verified through the phone surveys) and an **Engineering Adjustment** factor (based on the engineering analysis, desk reviews, etc.):

Gross Realized Savings =

(*Ex Ante* Savings)*(Installation Adjustment)*(Engineering Adjustment Factor)

Net Realized Savings are then determined by multiplying the Gross Realized Savings by the net-to-gross ratio:

Net Realized Savings = (Net-to-Gross Ratio)*(Gross Realized Savings)

1.5 Cost Effectiveness

The cost effectiveness of NMGC's programs was tested using the Utility Cost Test (UCT). In the UCT, the benefits of a program are the present value of the net energy saved, and the costs are the present value of the program's administrative costs plus incentives paid to customers. To perform the cost effectiveness analysis, the evaluation team requested the following from NMGC:

- Program costs (all expenditures associated with program delivery);
- Avoided cost of energy (costs per therm over a 20-year time horizon);
- Discount rate (percentage used to calculate the net-present value of future savings);

- Distribution loss factor (percentage used to adjust avoided cost for distribution losses);
- Proportions of programs that are targeted at low-income customers; and
- Any additional (i.e., non-low-income) assumed non-energy benefits, expressed in monetary terms or as a percentage of savings for each measure or program.

In response to the request for these data, NMGC provided its annual average avoided costs, discount rate, and program administrative costs. The avoided costs provided were in 2017 dollars, and so an inflation rate and a discount rate provided by NMGC were applied to analyze avoided costs in terms of 2021 dollars. This approach is consistent with previous years. NMGC does not quantify the distribution loss factor separate from the avoided cost of energy.

The evaluation team obtained the program savings and effective useful life values from the final PY2021 tracking data submitted by NMGC. The final net energy savings values estimated from the PY2021 impact evaluation were used in the final cost effectiveness calculations.

Additionally, Section 17.7.2.9.B(4) of the New Mexico Energy Efficiency Rule allows utilities to claim utility system economic benefits for low-income programs equal to 20 percent of the calculated energy benefits. The evaluation team applied this 20 percent adder to the benefits calculated for the Income Qualified program.

The evaluation team input the savings and cost data into a cost effectiveness model that calculated the benefits, costs, and benefit-cost ratio for each measure, project, or program entered, and rolled up the data into program-level UCT values.

2 Impact Evaluation Results

The results of the PY2021 impact evaluation are shown in Table 7. As noted previously, each program is required to be evaluated a minimum of once every three years. For 2021, the evaluated programs covered 68 percent of the *ex ante* therm savings.

Table 7: PY2021 Savings Summary – Therms

Program	# of Projects	Expected Gross Therm Savings	Engineering Adjustment Factor	Realized Gross Therm Savings	NTG Ratio	Realized Net Therm Savings
Efficient Buildings	129	849,526	0.9986	848,321	0.8990	762,641
Income Qualified*	459	151,566	1.0455	158,467	1.0000	158,467
Multi-Family Low Income	447	152,900	1.0000	152,900	1.0000	152,900
Multi-Family Market Rate	796	68,943	1.0000	68,943	0.8500	58,602
ThermSmart New Homes	988	422,661	1.0000	422,661	0.7333	309,937
ENERGY STAR Water Heating	2,700	158,616	1.0000	158,616	0.4830	76,612
ENERGY STAR Space Heating	1,185	188,095	1.0000	188,095	0.5294	99,577
Total	**6,704**	**1,992,308**		**1,998,003**		**1,618,736**

*The Native American Housing Authority sub-program accounts for 47,004 expected gross therm savings in the Income Qualified program.

Lifetime therm savings are shown in Table 8 by program and for the portfolio overall. This includes expected gross, realized gross, and realized net lifetime savings.

Table 8: PY2021 Lifetime Savings Summary – Therms

Program	Expected Gross Lifetime Savings (therms)	Realized Gross Lifetime Savings (therms)	Realized Net Lifetime Savings (therms)
Efficient Buildings	9,640,068	9,626,394	8,654,128
Income Qualified*	2,663,994	2,785,296	2,785,296
Multi-Family Low Income	2,550,047	2,550,047	2,550,047
Multi-Family Market Rate	960,531	960,531	816,451
ThermSmart New Homes	9,721,199	9,721,199	7,128,561
ENERGY STAR Water Heating	2,285,416	2,285,416	1,103,858
ENERGY STAR Space Heating	3,802,095	3,802,095	2,012,831
Total	**31,623,349**	**31,730,978**	**25,051,174**

*The Native American Housing Authority sub-program accounts for 793,702 expected gross lifetime therm savings in the Income Qualified program.

Details on the individual program impacts are summarized below, with additional details on the analysis methods and results for some programs included as appendices where noted.

2.1 Efficient Buildings Program

2.1.1 Efficient Buildings Gross Impacts

The *ex ante* PY2021 impacts are summarized in Table 9 for the Efficient Buildings program. In total, the Efficient Buildings program accounted for 43 percent of energy impacts in NMGC's overall portfolio for PY2021.

Table 9: Efficient Buildings Program Savings Summary

Measure Category	# of Projects	Expected Gross Therm Savings
Custom	31	596,227
Prescriptive	23	12,462
Direct Install	75	240,838
Total	**129**	**849,526**

The majority of the gross impact evaluation activities were devoted to engineering desk reviews of a sample of projects. For the desk reviews, the sample frame included projects across the

prescriptive, custom, and direct install categories. The sample was stratified to cover a range of different measure types so that no single measure would dominate the desk reviews. The sample was also stratified based on total energy savings within each measure group. Overall, the sampling strategy ensured that a mix of projects in terms of both project size and measure type would be included in the desk reviews.

The final sample design is shown in Table 10. The resulting sample achieved a relative precision of 90/1 for the program overall.

Table 10: Efficient Buildings Program Desk Review Sample

Measure Group	Stratum	Count	Average Therms	Total Therms	% of Savings	Final Sample
Custom	-	4	67,390	234,716	36%	4
	1	5	24,724	123,620	19%	2
	2	12	7,934	95,212	14%	2
Prescriptive Kitchen Appliance	-	2	712	1,424	0%	2
	1	7	356	2,492	0%	2
	2	8	309	2,474	0%	2
Water Conservation	-	4	981	3,923	1%	4
	1	3	641	1,923	0%	2
	2	12	141	1,691	0%	2
Weather Stripping	1	3	19,598	58,794	9%	2
	2	4	10,700	42,798	6%	2
	3	7	6,400	44,803	7%	2
	4	10	3,067	30,668	5%	2
	5	29	490	14,220	2%	2
Total		**110**	**10,246**	**658,758**	**100%**	**32**

As discussed in the Evaluation Methods section, the evaluation team determined gross realized impacts by performing engineering desk reviews on the sample of projects.

For prescriptive projects in the Efficient Buildings program, some of the measure savings were calculated using algorithms and assumptions contained in the New Mexico TRM. For projects where these types of measures were installed, the evaluation team reviewed project-specific

inputs and project documentation to confirm that the proper TRM algorithms and associated input values were used.

Savings for prescriptive weather stripping and commercial cooking equipment measures in the Efficient Buildings program were calculated using algorithms and assumptions documented in the utility Work Papers prepared by the program implementer, CLEAResult, for NMGC. The evaluation team reviewed the general assumptions and methodologies contained in the Work Papers for accuracy and appropriateness. For projects where these measures were installed, the evaluation team reviewed project-specific inputs and project documentation to confirm that the proper input values were used.

Custom projects in the Efficient Buildings program calculated savings using a variety of spreadsheet-based methods. The analyses submitted were reviewed by the evaluation team to ensure accuracy of the calculation methodology used, including verification that proper inputs were used based on submitted supporting documentation. When applicable, approaches and assumptions used in custom analyses were compared to those contained in the New Mexico TRM.

Table 11 shows the result of the desk reviews and how the resulting engineering adjustment factor was used to calculate realized savings. For the Efficient Buildings program overall, these adjustments resulted in an engineering adjustment factor of 0.9986.

Table 11: PY2021 Efficient Buildings Program Gross Impact Summary

Program	# of Projects	Expected Gross Therm Savings	Engineering Adjustment Factor	Realized Gross Therm Savings
Efficient Buildings	129	849,526	0.9986	848,321

Engineering adjustment factors that varied from 1.0 for individual projects were due to the following reasons:

- The evaluation team completed desk reviews for six gas fryer projects in the evaluation sample for the Commercial Kitchen measures. The evaluation team was able to replicate the reported *ex ante* savings estimate and found that the savings value was the average of the Casual Dining facility types (Casual Dining 3pm – 11pm, Casual Dining 11am – 11pm, and Casual Dining 24hr) and not the deemed value for a particular Casual Dining facility type listed in the NMGC Work Papers. The implementation team confirmed this approach was used to calculate the reported *ex ante* savings. The Commercial Kitchen measures comprise a small portion of the total program saving, so the implementation team's approach would not significantly impact the savings for the program. Conversely, the evaluation team used the deemed savings value for the appropriate facility type when

calculating the verified *ex post* savings. This resulted in verified *ex post* savings that differed (both higher and lower) from the *reported ex ante* savings.

- **Recommendation:** Use the deemed savings values listed in the NMGC Commercial Kitchen Work Papers for the applicable facility type.

2.1.2 Efficient Buildings Net Impacts

Net impacts for the Efficient Buildings program were calculated using an NTG ratio that was developed using the self-report method described in the Evaluation Methods section using participant phone survey data. For all direct install projects and steam trap projects (which involved a steam trap test provided by the program), an NTG ratio of 1.00 was applied.[5] The resulting NTG ratio for the Efficient Buildings program overall is 0.8990. This is a weighted average of the NTG ratio for custom and prescriptive projects from the participant survey and the assumed NTG ratio of 1.00 for direct install projects. In PY2022, the NTG ratio will change from 0.8990 to 0.9191.

Table 12 summarizes the PY2021 net impacts for the Efficient Buildings program using the NTG ratio described above. Net realized savings for the program overall are 762,641 therms.

Table 12: PY2021 Efficient Buildings Program Net Impact Summary

Program	# of Projects	Realized Gross Therm Savings	NTG Ratio	Realized Net Therm Savings
Efficient Buildings	129	848,321	0.8990	762,641

2.2 Income Qualified Program

The Income Qualified program provides energy efficiency upgrades at no cost or low cost to low-income customers. Measures include insulation, duct sealing, water heating, and space heating. The majority of savings in this program come from measures with custom savings calculations based on an energy audit of the participant's home. To evaluate the impacts of the Income Qualified program, the evaluation team conducted engineering desk reviews on a statistically representative sample of custom measures and a deemed savings review of the prescriptive measures offered through the program. The resulting sample achieved a relative precision of 90/2 for the program overall.

[5] NMGC currently has an *ex ante* NTG ratio of 1.00 for direct install projects, and the evaluation team agrees this is appropriate, as the targeted customers are very unlikely to complete these projects on their own. This is analogous to assigning an NTG ratio of 1.00 to low-income programs, which is typically done for the same reason.

Table 13: Income Qualified Desk Review Sample

Program	Stratum	Count	Average Therms	Total Therms	% of Savings	Final Sample
Income Qualified	1	16	1,080	17,273	20%	4
	2	27	655	17,686	20%	4
	3	38	460	17,487	20%	4
	4	55	321	17,659	20%	3
	5	159	110	17,549	20%	3
Total		**295**	**525**	**87,654**	**100%**	**18**

Savings for Income Qualified projects that received an energy audit were quantified using the Weatherization Assistance energy analysis software, developed by Oak Ridge National Laboratory for the U.S. Department of Energy. For these projects, the evaluation team compared software inputs to the available supporting project documentation, which included invoices, pre-retrofit photographs, and post-retrofit photographs.

Based on the engineering desk reviews, the evaluation team made adjustments to savings for the following projects:

- For 10 projects in the evaluation sample, the evaluation team found that the savings for window replacement, attic insulation, floor insulation, door replacement, infiltration, and domestic hot water (DHW) pipe insulation differed between the tracking data and the projects' analysis reports. The evaluation team based the verified savings on the analysis reports, resulting in an increase in savings for those projects.
- For one project in the sample that claimed savings for floor insulation, the evaluation team found the floor insulation savings differed between the tracking data and the projects' analysis reports. The evaluation team based the verified savings on the analysis reports, resulting in a 17 percent increase in savings.
- For one project in the sample, the evaluation team found that the savings for infiltration and DHW pipe insulation differed between the tracking data and the projects' analysis reports. The evaluation team based the verified savings on the analysis reports, resulting in a 16 percent increase in savings for both projects.
- For one project in the sample, the evaluation team found that the savings for infiltration and door replacement differed between the tracking data and the projects' analysis reports. The evaluation team based the verified savings on the analysis reports, resulting in an 8 percent increase in savings for both projects.

The resulting engineering adjustment factor for the Income Qualified program overall is 1.0455. A summary of the individual desk review findings for each of the 18 projects is included in Appendix E.

For net impacts, the NTG ratio for the Income Qualified program is stipulated at 1.00 because the program serves only low-income customers. As a result, the net realized savings are equal to the gross verified savings. The final realized gross and net savings in therms are shown in Table 14.

Table 14: Income Qualified Program PY2021 Impact Summary

Program	# of Projects	Expected Gross Therm Savings	Engineering Adjustment Factor	Realized Gross Therm Savings	NTG Ratio	Realized Net Therm Savings
Income Qualified	459	151,566	1.0455	158,467	1.0000	158,467

2.3 ENERGY STAR Space Heating and Water Heating Programs

A separate task for the PY2021 evaluation was to revisit the methods used in PY2020 to calculate free ridership for the ENERGY STAR Space Heating and Water Heating programs and explore whether there are additional factors that should be taken into account. Specifically, a new survey and scoring method was designed in an attempt to accurately capture the influence of contractors on the final equipment choice and efficiency levels. Additionally, when water heaters or furnaces fail and need to be replaced, the level of urgency is greater and respondents may not be as concerned about energy efficiency, or may not remember clearly how much efficiency levels were considered. The new free ridership scoring method, with a greater emphasis on the contractor role, is an attempt to address these issues.

As discussed earlier in the Evaluation Method section of this report, free ridership for all the NMGC programs has typically been estimated using responses from a series of phone survey questions designed to capture the influence of the program. The responses to these self-report survey questions are then scored to create several different components:

- ***Program Component*** questions ask about specific program activities (rebate, customer account rep, contractor recommendations, other assistance offered);
- ***Program Influence*** question asks directly to provide a rating of how influential the overall program was on their decision to install high efficiency equipment; and
- ***No-Program Component*** question asks participant's intention to carry out the energy-efficient project without program funds or due to influences outside of the program.

These components are then reviewed for consistency and then used to calculate a single free ridership rate. For both Space Heating and Water Heating measures, free ridership has been

calculated using the program component and program influence scores, with the No-Program questions and verbatim responses used as consistency checks.

The new free ridership method for the Space Heating and Water Heating programs includes just the **Program Component** questions, but adds a score that captures **Contractor Influence**. This provides a wider opportunity for the program activities (either directly or through the contractor) to influence the free ridership score. The Program Influence and No-Program questions are still asked, but they do not factor directly into the free ridership score but instead are used as a consistency check. This is being done to address concerns that the respondents might be interpreting the Program Influence and No-Program questions as asking about the entire decision to purchase a new space heater or water heater, rather than focusing just on the efficiency levels of their new equipment. The verbatim responses on how the program influenced the efficiency decisions were also reviewed and used to adjust the scores in situations where the program is clearly having a positive influence that is not being reflected in the current scoring (i.e., no change from how the verbatim responses are currently used).

For the contractor score, questions are asked about the following:

- Did the contractor help select the model, did they present multiple options?
- Did contractor discuss energy efficient options?
- Did the customer choose a more efficient model after talking with the contractor?
- How influential was the contractor on the final decision to choose an efficient model?

If the respondent indicates that the contractor influenced them to purchase a more energy efficient model, then the program would get higher credit from the Contractor Influence scoring component.

The final free ridership score was calculated based on the following question components scoring:

- 50% Program Component score (0 – 0.50 range)
- 50% Contractor Influence score (0 – 0.50 range)

The resulting free ridership scores will then be used for all Water Heater program measures, as well as for the furnace and insulation measures in the Space Heating program.

Based on the survey, a significant portion of Water Heater respondents (37%) did not use a separate contractor for their installation, but instead purchased their water heater through a retailer. For these customers, the contractor questions were not applicable, and the free ridership rate was therefore calculated using the existing self-report method as described in the Evaluation Methods section. The final free ridership value for the Water Heating program is the simple average of the values for customers that used a contractors and those that purchased through a retailer.

As a separate task, a literature review was conducted to determine a deemed free ridership rate for smart thermostats rebated through the Space Heating program. It was decided that a literature review would be a better method for thermostats, as it is a less expensive measure and respondents may have more difficulty accurately recalling the influence of the program on their purchase decision. This also allowed the survey to focus on the higher-cost measures (e.g., furnaces, water heaters), for which contractors are more likely to have some influence on the final equipment choice.

Based on the literature review, the most relevant source appears to be a recent (2021) California Public Utilities Commission impact evaluation report, *Impact Evaluation of Smart Thermostats – Residential Sector Program Year 2019*.[6] Although this report covered all four of the California IOUs, the most relevant value is for the gas utility Southern California Gas (SoCalGas). For SoCalGas, the NTG ratio for smart thermostats was 0.7700. A PY2019 evaluation of smart thermostats for Ameren Missouri had a similar finding, where an NTG value of 0.7070 was estimated. The Ameren Missouri value is the one currently assigned to the SPS Smart Thermostat program. Since the California value is a) from a recent evaluation published in 2021, and b) based on a gas utility program that is likely to be more similar to the NMGC program than the other utilities covered in that study, we recommend that the California free ridership rate be used for smart thermostats in the NMGC Space Heating program.

The results of the updated free ridership analysis are shown in Table 15, with the existing free ridership values used for the PY2021 evaluation shown for comparison. The new NTG ratios will be used beginning in PY2022, with a separate value for smart thermostats.

Table 15: Updated Free Ridership Rates and NTG Ratios

Program / Measure	Current (PY2021) NTG Ratio	Updated Free Ridership	Updated NTG Ratio (1-FR)
Water Heating	0.4830	0.4146	0.5854
Space Heating – Furnace	0.5294	0.2687	0.7313
Space Heating – Insulation	0.5294	0.2687	0.7313
Space Heating – Smart Thermostat	0.5294	0.2300	0.7700

[6] http://www.calmac.org/publications/CPUC_Group_A_Residential_PY2019_SCT_Final_Report_CALMAC.pdf

Additional survey results relating to free ridership and program influence for both the Space Heating and Water Heating programs are presented in the Process Evaluation section of this report.

3 Cost Effectiveness Results

The evaluation team calculated cost effectiveness using the Utility Cost Test (UCT) for each individual NMGC energy efficiency program, as well as the cost effectiveness of the entire portfolio of programs.[7] The evaluation team conducted these tests in a manner consistent with the California Energy Efficiency Policy Manual.[8]

Cost effectiveness tests compare relative benefits and costs from different perspectives. The specific cost effectiveness test used in this evaluation, the UCT, compares the benefits and costs to the utility or program administrator implementing the program. The UCT explicitly accounts for the benefits and costs shown in Table 16.

Table 16: Utility Cost Test Benefits and Costs

Benefits	Costs
• Utility avoided energy-related costs • Utility avoided capacity-related costs, including generation, transmission, and distribution	• Program overhead/ administrative costs • Utility incentive costs • Utility installation costs

Using net realized savings from this evaluation and cost information provided by NMGC, the evaluation team calculated the ratio of benefits to costs for each of NMGC's programs and for the portfolio overall. The results of the UCT are shown in Table 17. The UCT for the Water Heating program decreased in PY2021 to 0.85; however, all other programs had a UCT equal to or greater than 1.00, and the portfolio overall was found to have a UCT ratio of 1.81.

[7] The Utility Cost Test is sometimes referred to as the Program Administrator Cost Test, or PACT.
[8] California Public Utilities Commission. 2020. *California Energy Efficiency Policy Manual – Version 6*. https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

Table 17: PY2021 Cost Effectiveness

Program	Utility Cost Test (UCT)
Efficient Buildings	2.15
Income Qualified	1.50
Multi-Family	1.80
ThermSmart New Homes	2.17
Water Heating	0.85
Space Heating	1.78
Overall Portfolio	**1.81**

4 Process Evaluation Results

This section summarizes key methods and findings from the PY2021 process evaluation of the NMGC Efficient Buildings and ENERGY STAR Space Heating and Water Heating programs. These findings, along with findings from the impact evaluation, inform the conclusions and recommendations presented in the following section.

Throughout the analysis described here, the evaluation team presents the survey results as weighted percentages based on the proportion of savings represented by survey respondents relative to the total savings of all program participants.

4.1 Efficient Buildings Program Participant Surveys

The evaluation team conducted phone surveys with representatives from 31 participating companies (25 direct install and 6 non-direct install) that received rebates through the NMGC Efficient Buildings program. These surveys were completed in May 2022 and ranged from 15 to 20 minutes in length.

The participant survey was designed to cover the following topics:

- Verification of the measure installations included in the program tracking database;
- Collection of information on participants' satisfaction with the program experience;
- Survey responses for use in the free ridership calculations;
- Baseline data on energy use and/or equipment holdings;
- Participant drivers and barriers; and
- Additional process evaluation topics.

NMGC provided program data on the Efficient Buildings participant projects, which allowed us to select a sample for surveys. The evaluation team randomly selected and recruited program participants from the population of Efficient Buildings program participants that had valid contact information.

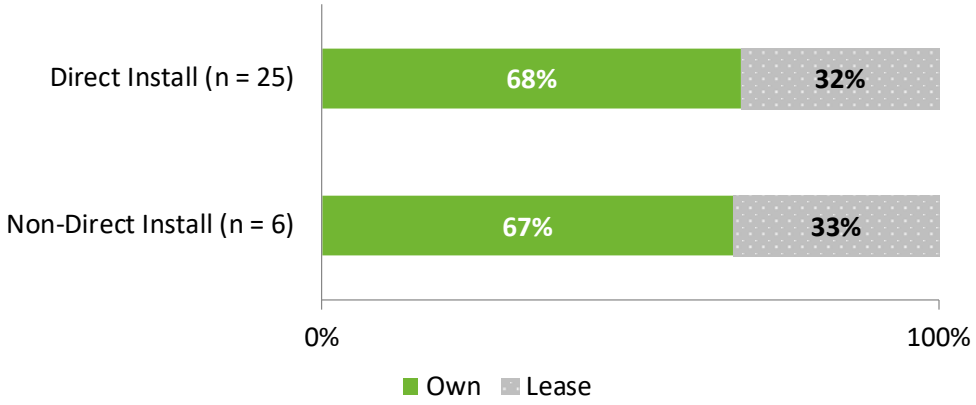
The following subsections report results on company demographics, sources of program awareness, motivations for participation, and program satisfaction.

4.1.1 Company Demographics

The evaluation team asked survey respondents whether their company owns or leases the building where the project was completed. Sixty-eight percent of participants with direct install projects

and 67 percent of participants with non-direct install projects reported that they own their building (Figure 2).

Figure 2: Participant Buildings Ownership



The following two figures summarize the survey respondents' building size and number of employees by whether they had direct install or non-direct install projects. Figure 3 and

Figure 4 both show that the majority of smaller businesses are being serviced through both the non-direct install and direct install channels of the program, with 53 percent of direct install participants and 60 percent of non-direct install participants occupying buildings of less than 5,000 square feet. A small portion (6%) of direct install participants occupied larger buildings (over 50,000 square feet), compared to 20 percent of non-direct install participants. Additionally, 67 percent of non-direct install participants reported having fewer than 10 full-time employees. Similarly, direct install projects were more commonly completed by small-sized customers, with 65 percent of direct install participants having fewer than 10 full-time employees.

Figure 3: Participant Building Square Footage

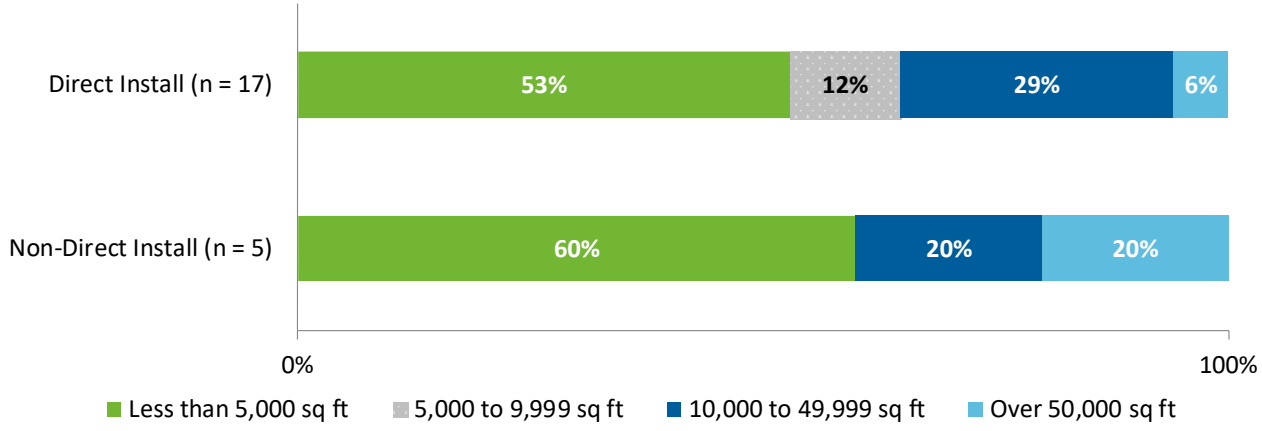
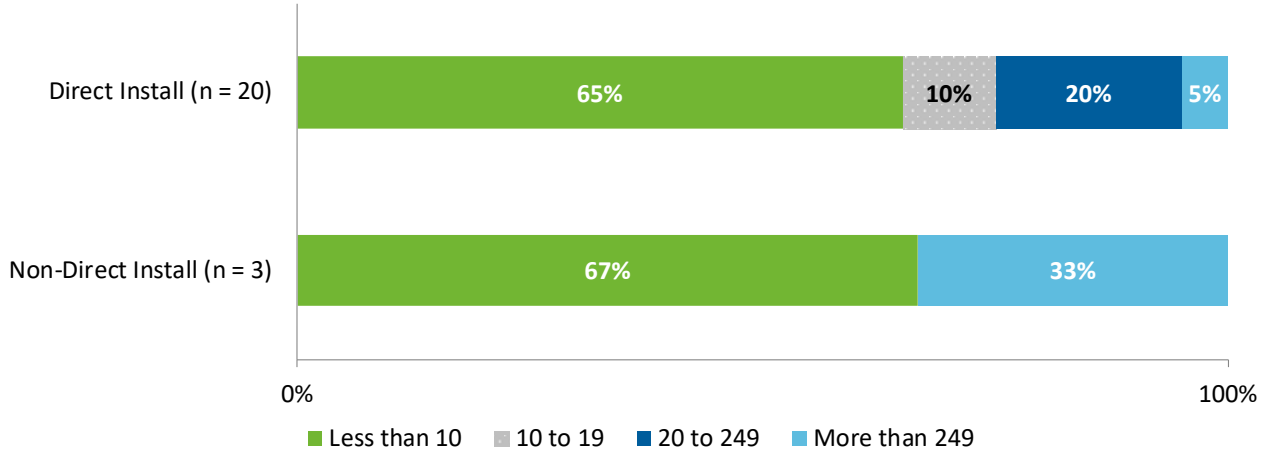
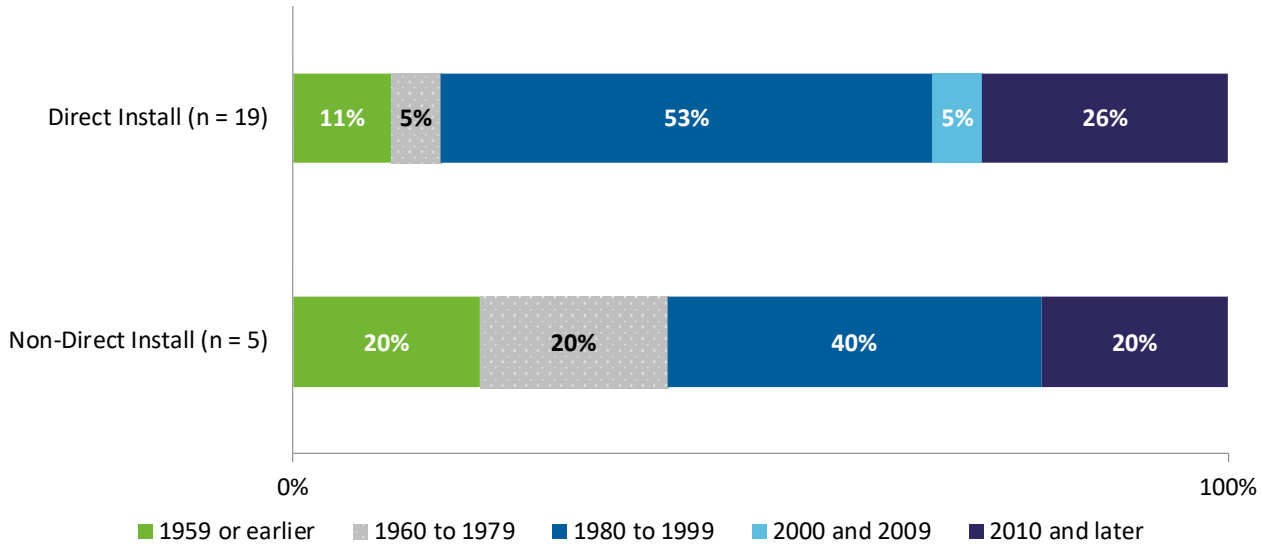


Figure 4: Participant Number of Full-Time Employees



When asked to report the year when their buildings were built, 53 percent of direct install participants estimated that their building was built between 1980 and 1999. Non-direct install participants were more likely to report older buildings, with 40 percent built before 1980 (Figure 5).

Figure 5: Participant Building Age

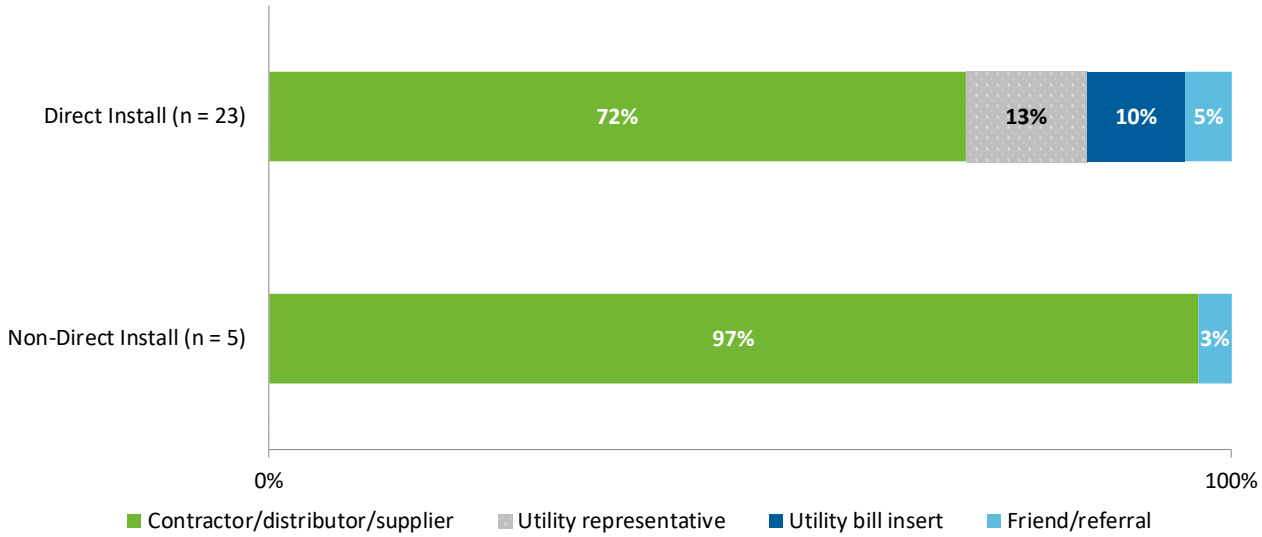


4.1.2 Sources of Awareness

Efficient Buildings program participants became aware of the program rebates and assistance through a variety of sources, including contractors, distributors, suppliers, utility representatives or utility marketing, and friends/referrals.

The large majority (97%) of non-direct install participants reported first hearing about the program through a contractor, distributor, or supplier (Figure 6). Direct install participants first heard about the program through a variety of means, including through a contractor, distributor, or supplier (72%), utility representative (13%), utility bill insert (10%), or a friend/referral (5%).

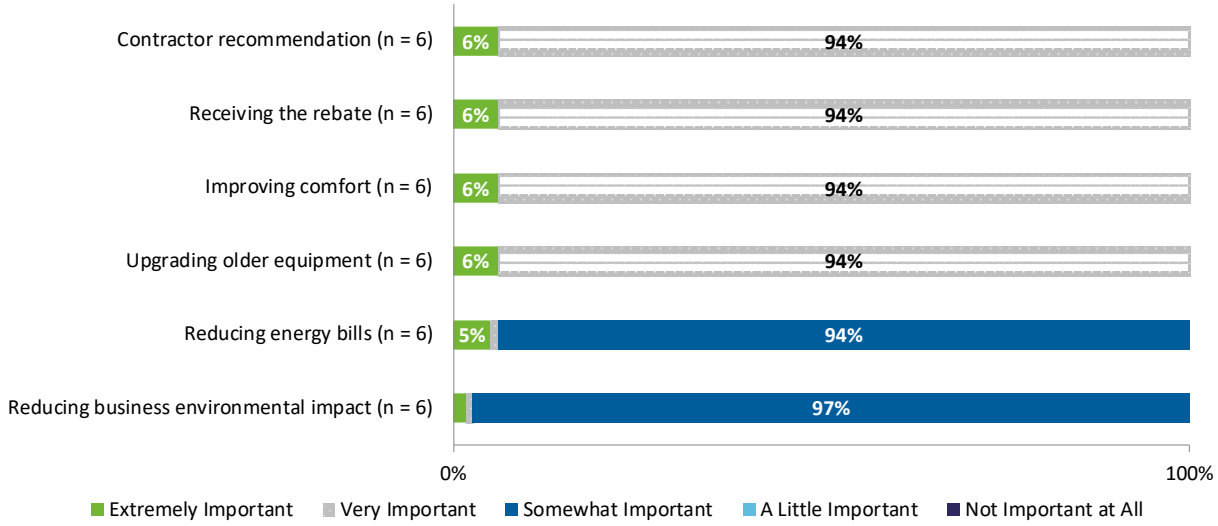
Figure 6: Initial Source of Awareness



4.1.3 Motivations for Participation

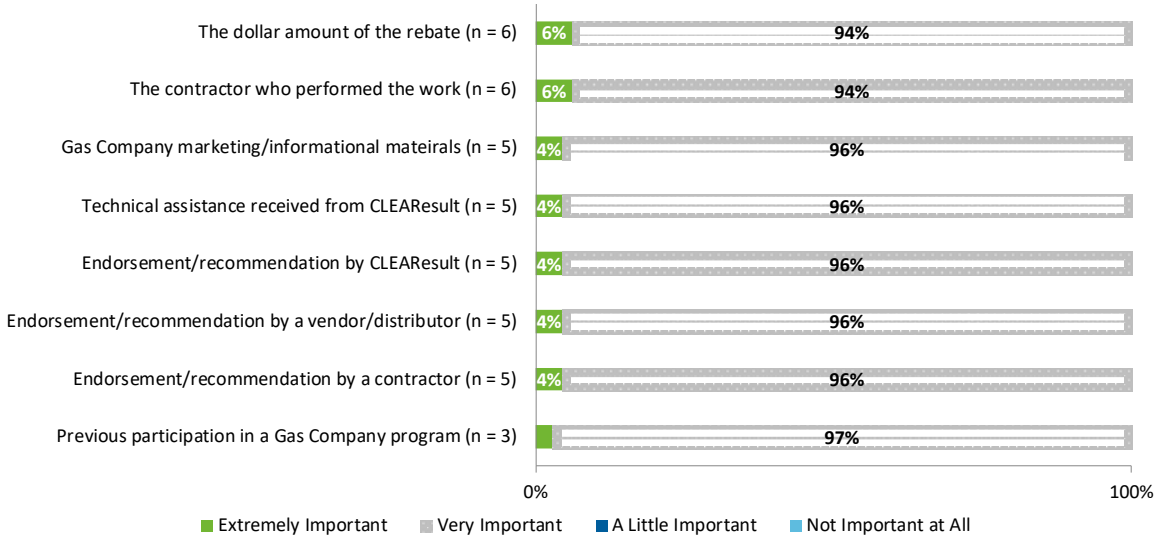
Figure 7 shows the level of importance placed on a variety of factors that might be influencing non-direct install customers to participate in the program. Participants were most likely to cite the contractor recommendation, receiving the rebate, improving comfort, and upgrading old equipment, with 100 percent of respondents rating each as extremely or very important. Reducing the environmental impact of the business was the least important factor (but still important) in their decision, with 97 percent rating it as somewhat important.

Figure 7: Motivations for Participation



In addition to motivations for participating, non-direct install respondents were given a list of potential program and non-program factors that may have influenced their decision about how energy efficient their equipment would be and were then asked to rate their importance on a 0 to 10 point scale.[9] Figure 8 shows that 100 percent of participants rated all program factors as very or extremely important (a score of 6 to 10) in their decision to determine how energy efficient their project would be.

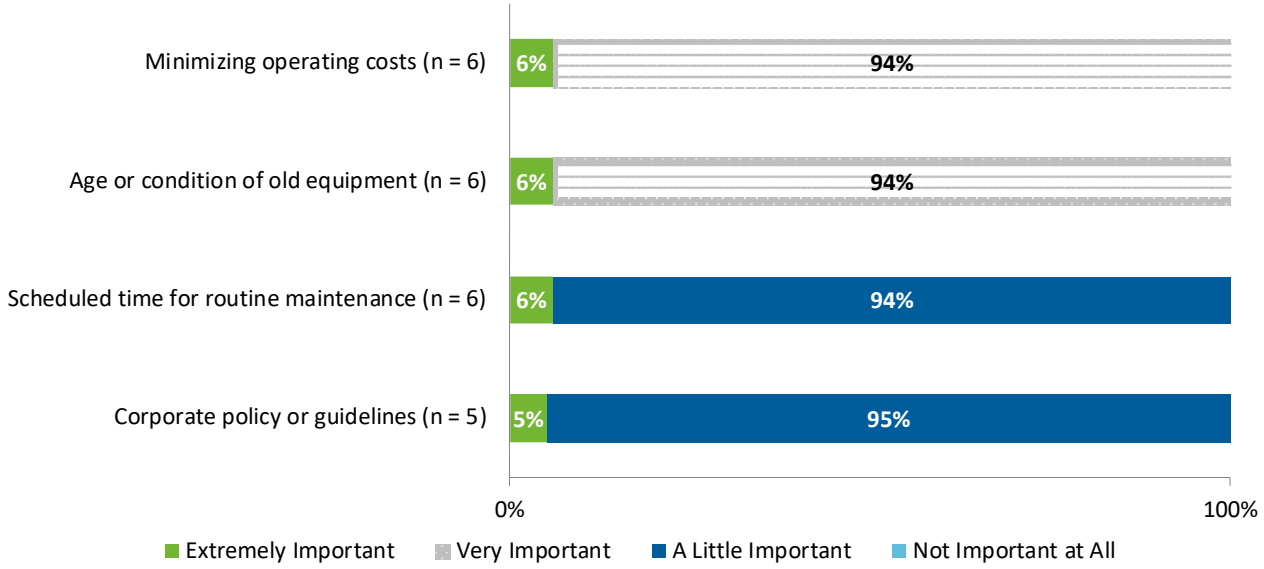
Figure 8: Importance of Program Factors



[9] On the 0 to 10 point scale, 0 indicated "not at all important" and 10 indicated "extremely important."

Similarly, participants ranked non-program factors that may have played a role in their decision to determine how energy efficient their project would be (Figure 9). Minimizing operating costs and the age or condition of the old equipment were the most influential non-program factors in their decision regarding the efficiency level of the equipment, with 100 percent rating both as extremely or very important. Corporate policy or guidelines had the highest percentage of participants ranking it as a little important (95%) in their decision to determine the efficiency level of their equipment, followed closely by scheduled time for routine maintenance (94%).

Figure 9: Importance of Non-Program Factors



To get a sense of the condition of their existing equipment, participants were asked about the functionality of their replaced equipment and approximately how much longer their equipment would have lasted if it had not been replaced. Ninety-seven percent of participants reported that replaced equipment needed minor repairs, and 62 percent of participants estimated the replaced equipment would have lasted one to two more years. This finding tells us that the program is doing a good job of targeting customers with functioning equipment, rather than those whose equipment is not working and would need to be replaced anyway (i.e., potential free riders).

4.1.4 Participant Satisfaction

The participants evaluated their satisfaction with various components of the Efficient Buildings program on the following scale: very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied. The individual components that participants were asked to rank their satisfaction with included:

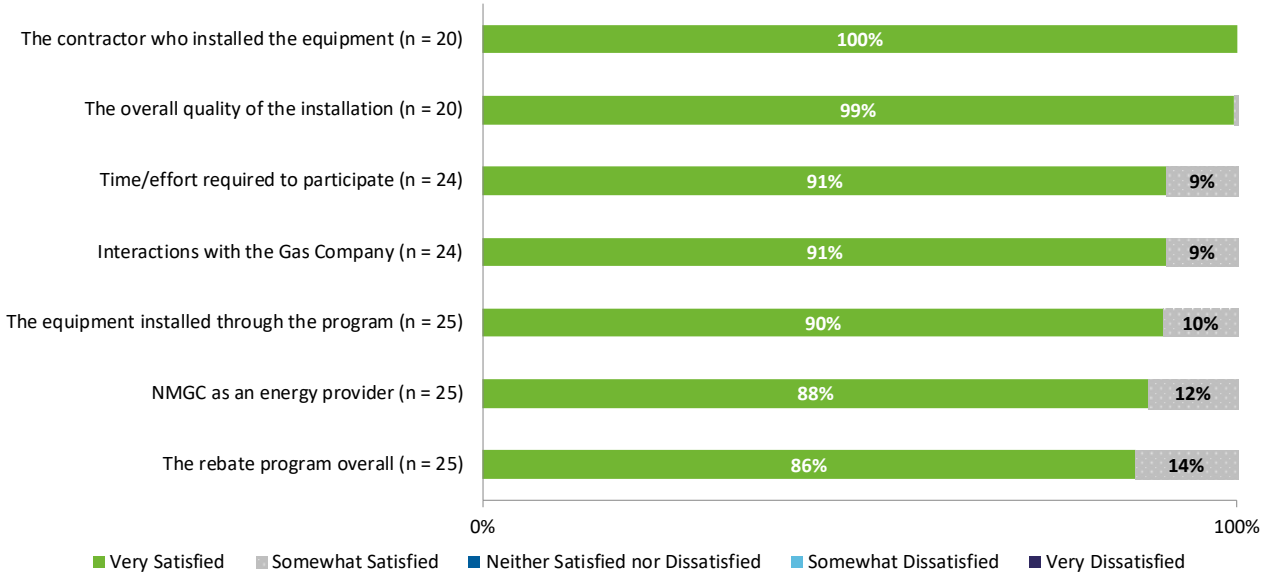
- NMGC as an energy provider
- The rebate program overall

- The equipment installed through the program
- The contractor who installed the equipment
- Overall quality of the equipment installation
- The time it took to receive the rebate
- The dollar amount of the rebate
- Interactions with NMGC
- The overall value of the equipment for the price they paid
- The time and effort required to participate
- The project application process

Figure 10 and Figure 11 summarize the satisfaction levels for direct install and non-direct install rebate participants.

Overall, surveyed participants expressed high levels of satisfaction with the direct install and non-direct install program components. Direct install participants expressed high levels of satisfaction across each individual program component, with the large majority of respondents reporting being very satisfied (Figure 10).

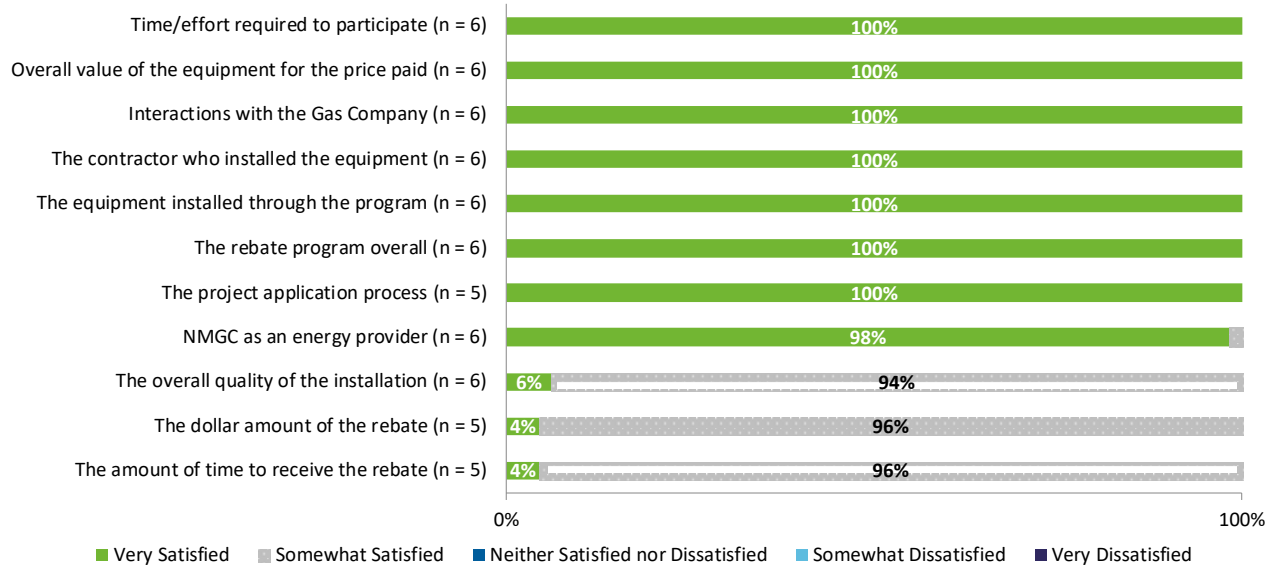
Figure 10: Direct Install Participant Program Satisfaction



As shown in Figure 11, non-direct install participants also expressed high levels of satisfaction, with 100 percent of participants reporting being very satisfied with eight of the eleven program components. Respondents reported being somewhat satisfied with the overall quality of

installation (94%), the dollar amount of the rebate (96%), and the amount of time to receive the rebate (96%).

Figure 11: Non-Direct Install Participant Satisfaction



4.2 Efficient Buildings Program Contractor Interviews

The evaluation team conducted telephone interviews with contractors who participated in the Efficient Buildings program in PY2021. The interviews ranged from 15 to 30 minutes and covered the following topics:

- Contractor background and program involvement;
- Role and influence of program in the market; and
- Program satisfaction.

4.2.1 Contractor Background and Program Involvement

The interviewed contractors varied in regard to the scope of their work and geographic reach of their businesses. Respondents work in both the commercial and industrial sectors and completed projects in schools, hotels, hospitals, and data centers. Interviewed contractors specialized in boilers, steam operated systems, and retro-commissioning work. The roles of each interviewed contractor varied and included project manager, mechanical engineer, and owner.

All four contractors already had an understanding and awareness of the Efficient Buildings program prior to the 2021 program year and have participated in the program for at least three years. Respondents reported that they received information on rebates directly from NMGC or the program implementer (CLEAResult). One respondent reported that they often look at a website

(DSIRE) run by North Carolina State University that lists rebates that are available for energy efficiency upgrades all over the country.

4.2.2 Program Influence

To gauge the level of influence the Efficient Buildings program has on the market for energy efficient equipment, the evaluation team explored when contractors communicate about the NMGC rebates with customers and what role they play in the contractors' and customers' ultimate choices.

When asked to discuss the ways in which the program is helpful to contractors in their business, all respondents were consistent in their responses. Each contractor reported the program as being very helpful to the customer in making the energy efficient upgrades, but it also helps the contractors in some cases to add on work due to customers having additional funds to spend since they saved on the initial upgrade cost. All four contractors also reported that being able to offer the incentives helps them up-sell to higher efficiency equipment.

Three of the four contractors reported that customers already are aware of the rebate offerings before the topic comes up, but customers do not always know whether they qualify for the rebate before talking with the contractors. One of the contractors reported that their customers typically do not know about the program, or "they've heard about the program but don't believe they will actually receive a rebate." The contractor went on to state that "people are scared of free money —they think they will be paying for it somehow. That's why we as contractors need to relay that this is the real deal."

4.2.3 Program Satisfaction

Contractors were asked to quantify their level of satisfaction with the program overall using a 1 to 5-point scale, with 1 being very dissatisfied and 5 being very satisfied. Contractors were then asked to estimate their customers' satisfaction with the program using the same 1 to 5-point scale. All four contractors rated their satisfaction and their customers' satisfaction with the program overall as a 5 (very satisfied).

When asked if there was any room for improvements within the program, three of the four contractors said there were not any they could think of, and they believe the program is being run well. One contractor who also thought the program is being run well did offer one recommendation of "some sort of follow up that the right person is getting the checks. I've had issues with checks getting lost in the mail." However, they did acknowledge that this is more of a mailing issue rather than a program process issue.

4.3 ENERGY STAR Space and Water Heating Programs Participant Surveys

A separate phone survey was fielded in the spring of 2022 that utilized a sample of participants from the PY2021 Water Heating and Space Heating programs. The primary purpose of this survey was to support a new free ridership calculation for both programs. The responses to this survey are presented below and organized by topic area. Table 18 shows the number of participants available and the completed surveys by measure type.

Table 18: Phone Survey Sample

Program	Available Sample	Completed Surveys
Space Heating	254	60
Water Heating	297	60

Program Awareness and Existing Conditions

Respondents were first asked about how they became aware of the program; results are shown in Figure 12 for the Water Heating program and Figure 13 for the Space Heating program. For both programs, the contractor or other equipment supplier was the most common source mentioned by respondents.

Figure 12: Sources of Awareness: Water Heating Program

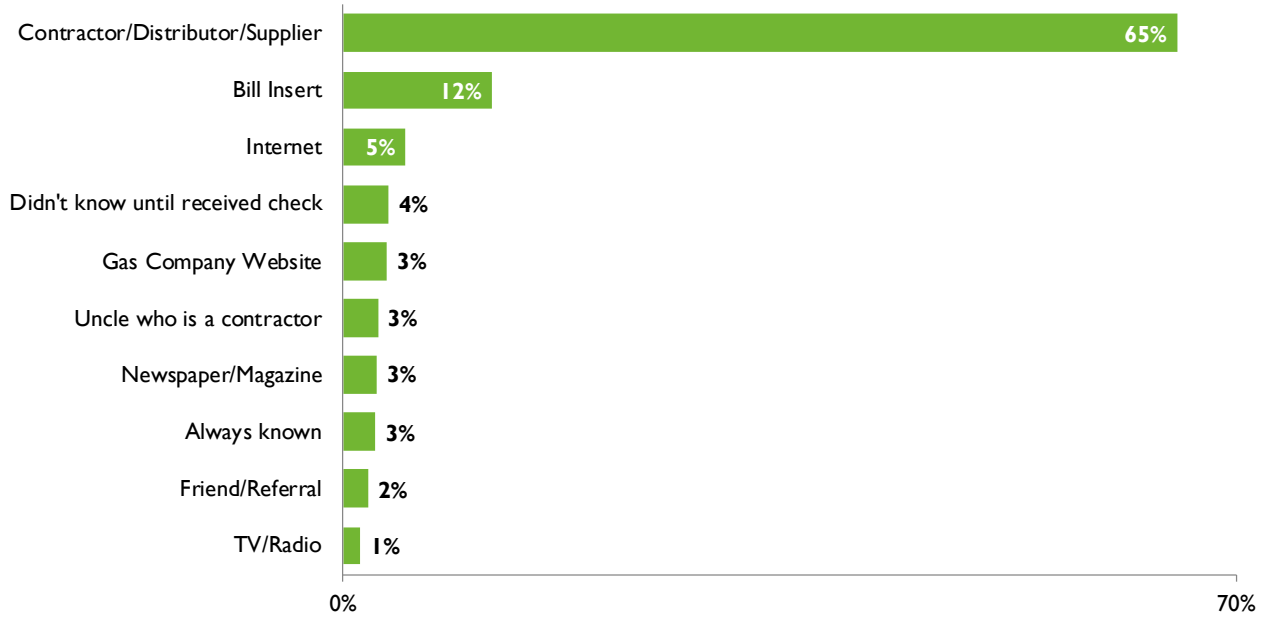
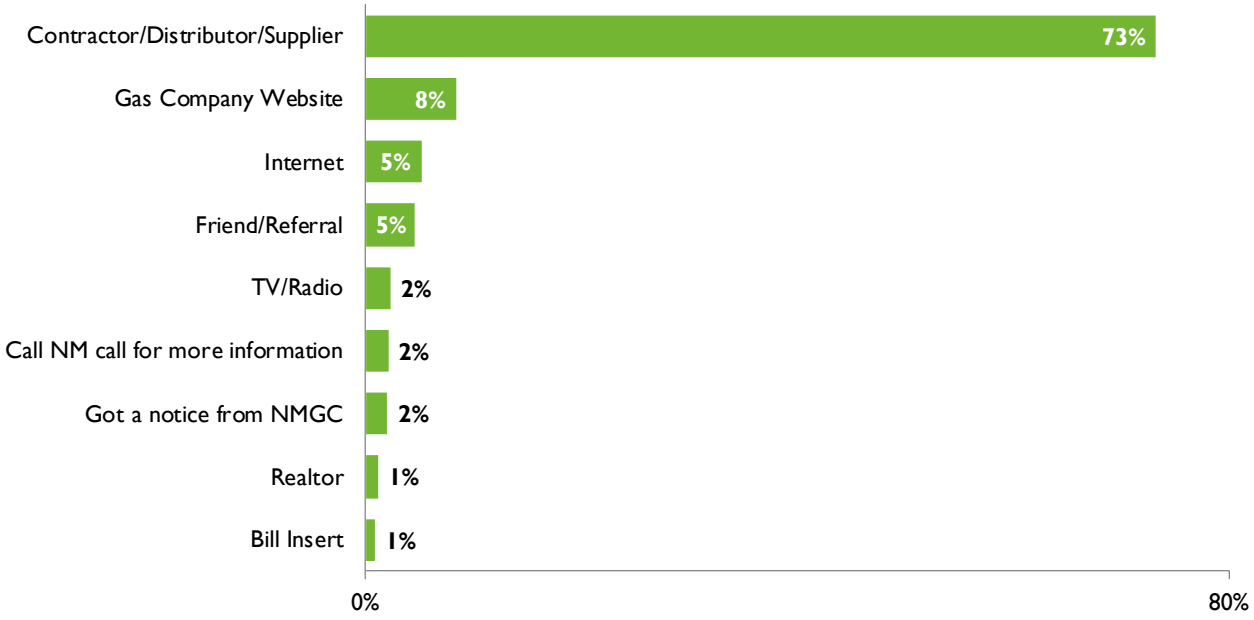


Figure 13: Sources of Awareness: Space Heating Program



Respondents were also asked if they learned about the program before or after they had decided on the energy efficiency level of their new equipment. It appears that for the majority of respondents, the efficiency level was already decided prior to learning about the program (Figure 14). As shown in subsequent charts, this is consistent with the finding that the program is only having a modest effect on the equipment being chosen and the efficiency levels.

Figure 14: Learned About Program Before or After Efficiency Level of Equipment Chosen

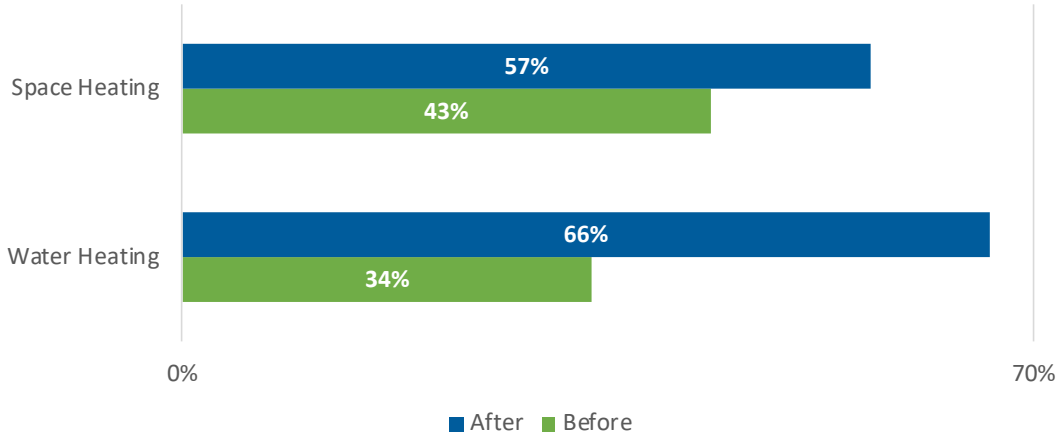


Figure 15 and Figure 16 show the responses relating to the existing equipment prior to replacement. These questions were included to determine how urgent the equipment replacement was, and (conversely) how much time participants may have had to consider various efficient equipment options.

For Water Heating program participants (Figure 15), about one third of the respondents indicated that their water heater had failed completely, while most of the remainder (58%) reported that their water heater was still functioning but was beyond its useful life. Very similar results were reported by Space Heating program participants (Figure 16).

Figure 15: Condition of Existing Equipment: Water Heating

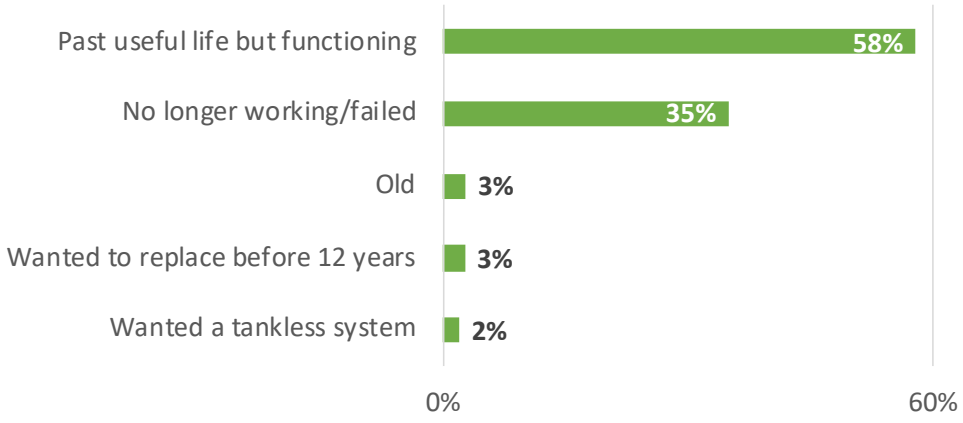


Figure 16: Condition of Existing Equipment: Space Heating

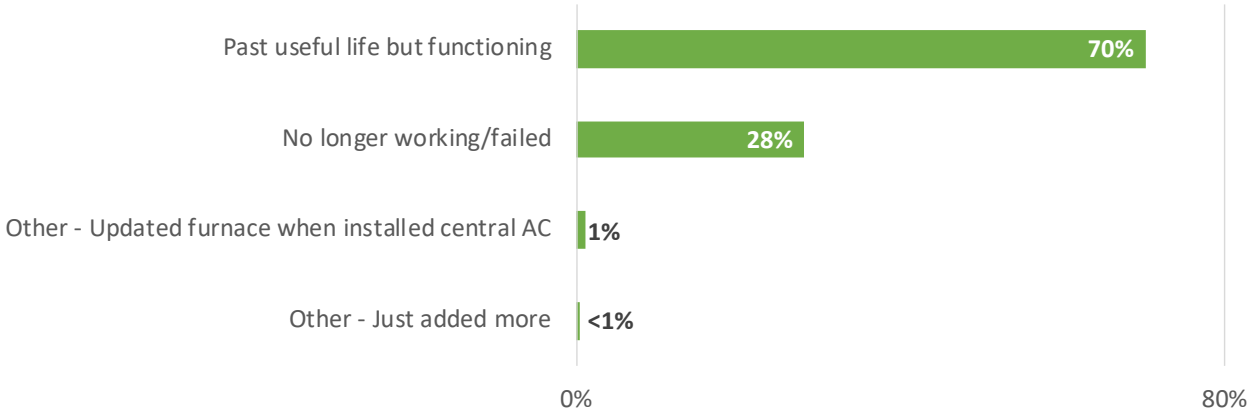
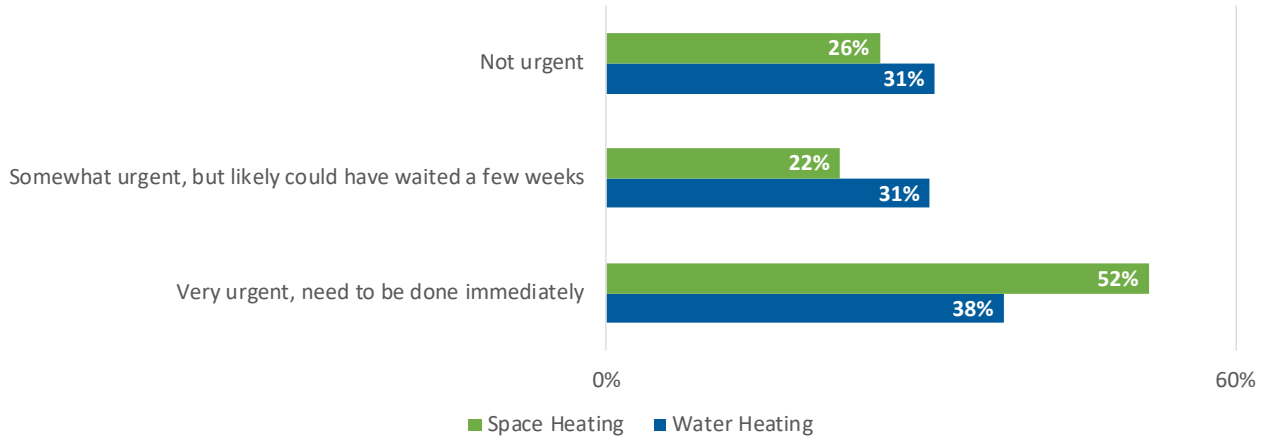


Figure 17 shows how urgent the participants perceived the equipment replacements to be, with respondents reporting medium to high levels of urgency for both programs. For Water Heating, 38 percent indicated that the replacement was very urgent, and an additional 31 percent indicated it was somewhat urgent but possibly could have been delayed by a few weeks. Space Heating participants reported a higher level of urgency, with 52 percent indicating that the replacement

needed to be done immediately and 22 percent indicating it could have waited a few weeks. The urgency reported for both programs indicates that participants may have been less willing to spend much time considering a range of energy efficient equipment options.

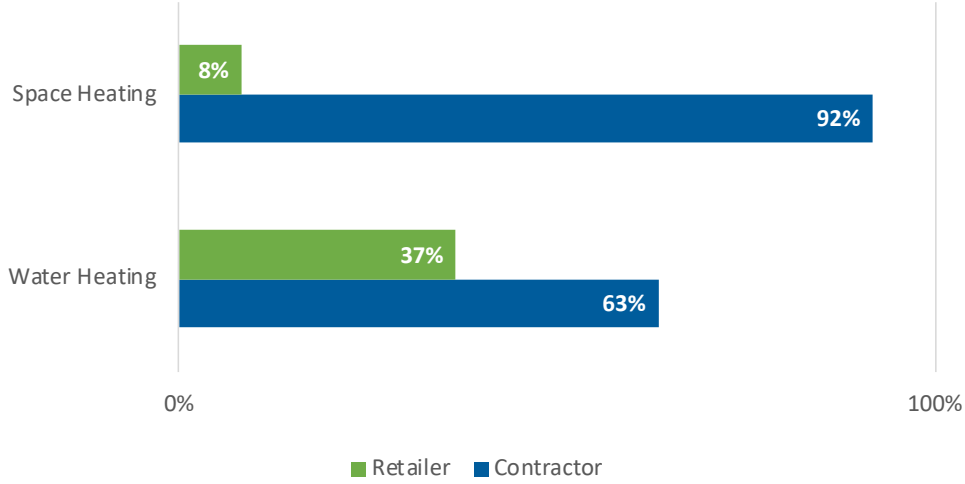
Figure 17: Urgency of Equipment Replacement



Contractor Influence

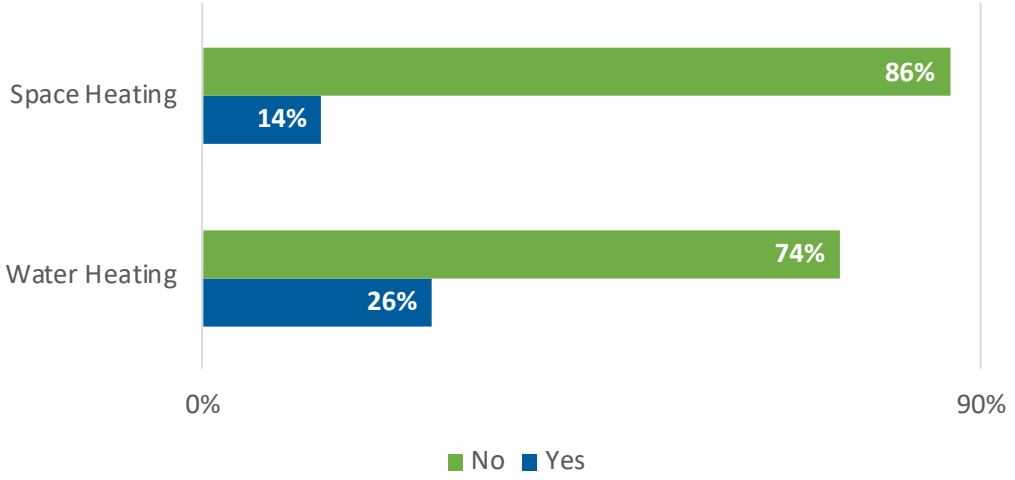
A series of new questions were asked to explore the influence that the contractors were having on the equipment choice and efficiency levels. As mentioned previously (and shown in Figure 18), the Space Heating program was much more reliant on contractors for installations, while for the Water Heating program, there was a significant number of participants who relied on a retailer (37%).

Figure 18: Purchased Through Contractor or Retailer



Most participants reported that they had not yet selected their equipment prior to talking with the contractor (Figure 19). For Space Heating participants, 86 percent had not chosen their equipment prior to talking with their contractor. This result was lower for Water Heating participants, with 74 percent not choosing their equipment before interacting with their contractor.

Figure 19: Equipment Selected Before Talking with Contractor



Once interaction with the contractor began, most contractors presented their customers with multiple equipment options (Figure 20). More importantly for the programs, the vast majority of respondents reported that their contractor did discuss different efficiency options (73% of Water Heating participants and 93% of Space Heating participants, Figure 21).

Figure 20: Did Contractor Present Multiple Equipment Options?

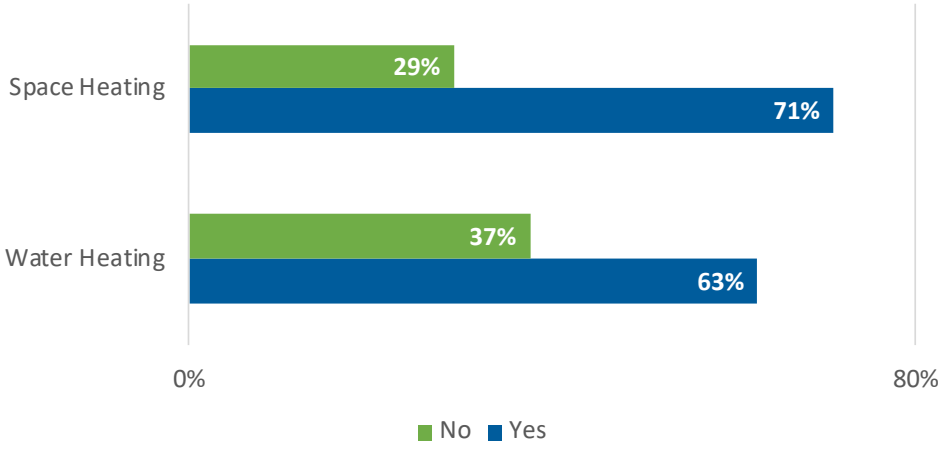
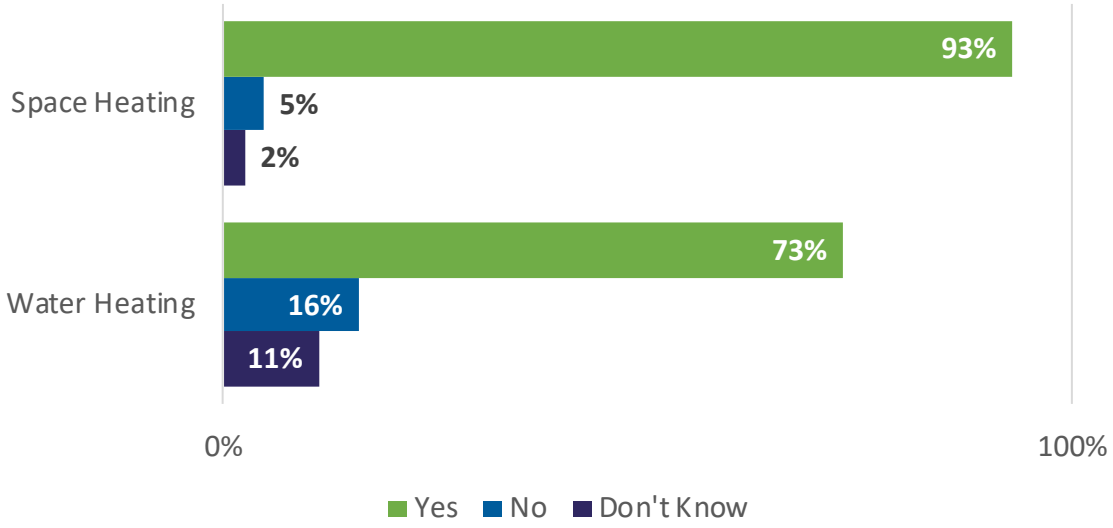
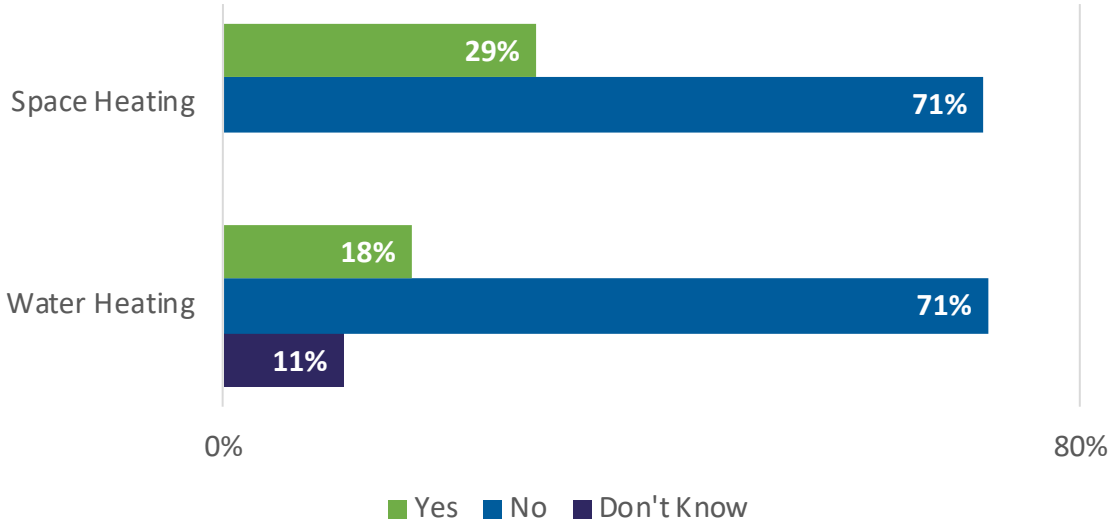


Figure 21: Did Contractor Discuss Different Efficiency Options?



Despite the contractors presenting different choices and discussing efficiency levels, there was little switching of equipment choices by customers after talking with their contractor (Figure 22).

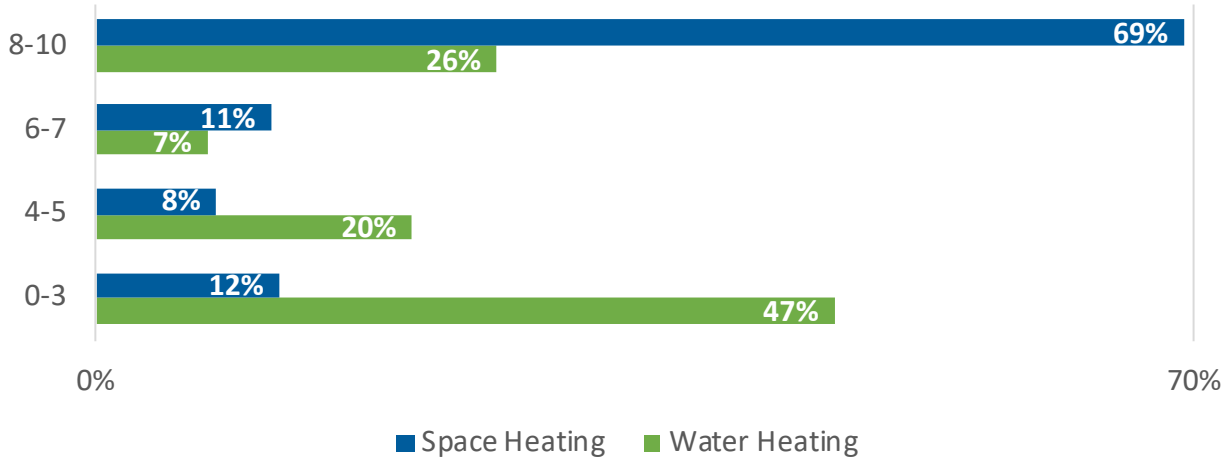
Figure 22: Was Efficiency Level Changed After Speaking with the Contractor?



The last question asked about contractors' overall influence on the efficiency level of the equipment chosen (Figure 23). In the case of Space Heating respondents, contractors were viewed as much more of a factor, with 69 percent indicating that the contractor was extremely influential (i.e., rated as an 8 or higher on a scale of 0 to 10). This is in contrast to Water Heating participants,

for which only 26 percent gave a rating of 8 or higher and almost half (47%) indicated that the contractor had little or no influence on the efficiency level (0 to 3 rating).

Figure 23: Overall Influence of Contractor on Equipment Efficiency Level (0 to 10 scale)

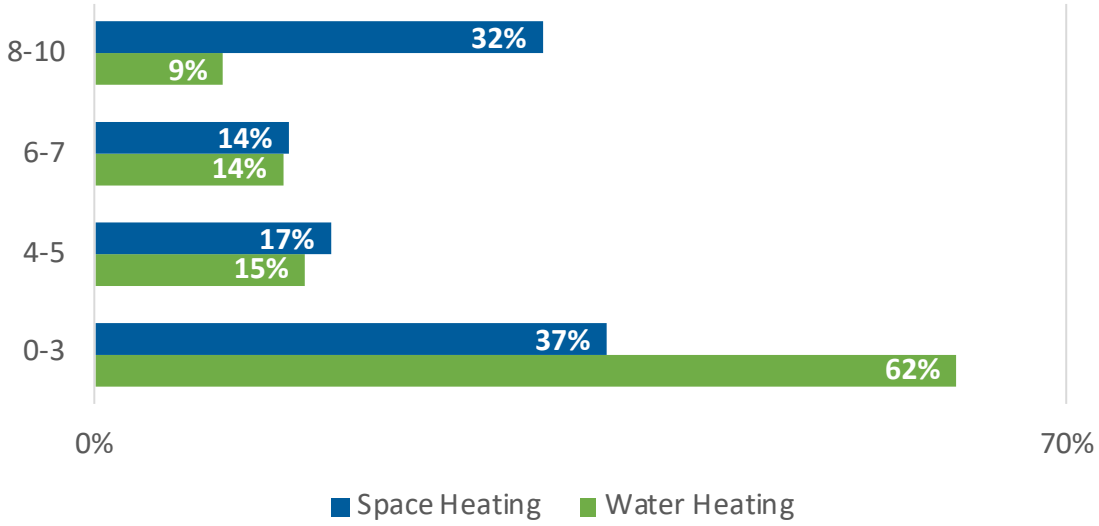


Program Influence

A series of questions were asked to measure the influence of different program activities; responses to these questions were ultimately used to create the Program Component score for the free ridership calculation.

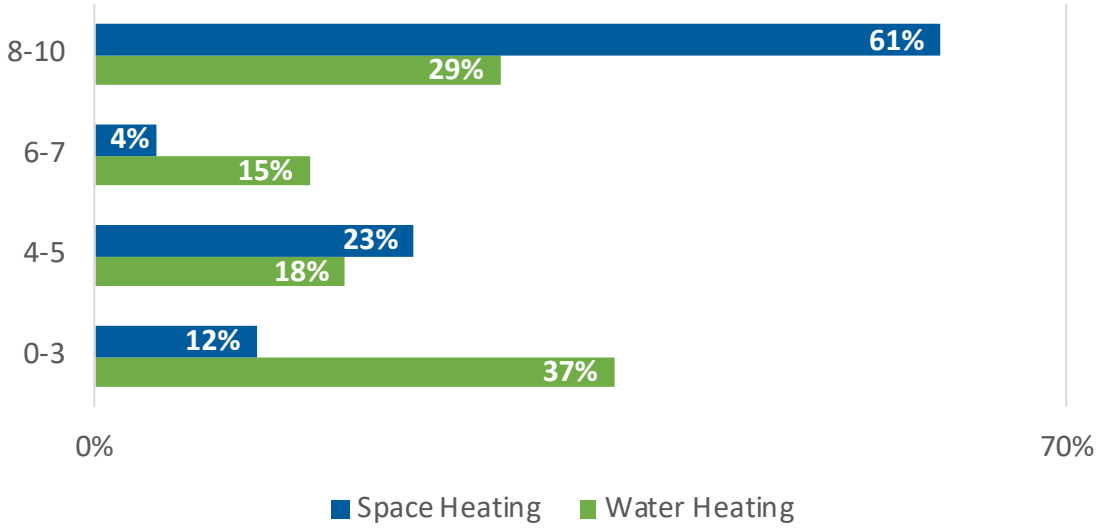
Figure 24 shows the level of influence of the program rebate amount, with respondents rating the level of influence from not at all influential to extremely influential on a 0 to 10-point scale. The influence of the rebate was significantly more important for Space Heating participants, with 32 percent indicating that it was very influential in their decision (rating of 8 or higher). However, a similar proportion (37%) indicated that the rebate had very little influence (rating of 0 to 3). For Water Heating respondents, the dollar amount of the rebate was less influential, with a majority (62%) indicating that it had very little influence on their final equipment choice.

Figure 24: Influence of Rebate Amount on Choosing Energy Efficiency Equipment (0 to 10 scale)



A separate question asked about the influence of their contractor on the equipment choice (Figure 25). Contractors were clearly having an effect on Space Heating participants, with 62 percent saying that their contractor's advice was very influential on their decision. The influence was much lower for Water Heating participants, with only 29 percent indicating that the contractor was very influential and 37 percent indicating that the contractor had very little influence. The Water Heating results are not surprising given that a significant portion of the customers reported that they did not use a contractor for their water heater purchase.

Figure 25: Influence of Contractor Recommendation on Choosing Energy Efficiency Equipment (0 to 10 scale)



Two additional questions were asked about the possible influence of NMGC information and promotional materials (Figure 26) and previous participation in an NMGC efficiency program (Figure 27). The responses indicate that these particular NMGC interactions were having little influence on the equipment choices for either program.

Figure 26: Influence of NMGC Promotional/Marketing Materials on Choosing Energy Efficiency Equipment (0 to 10 scale)

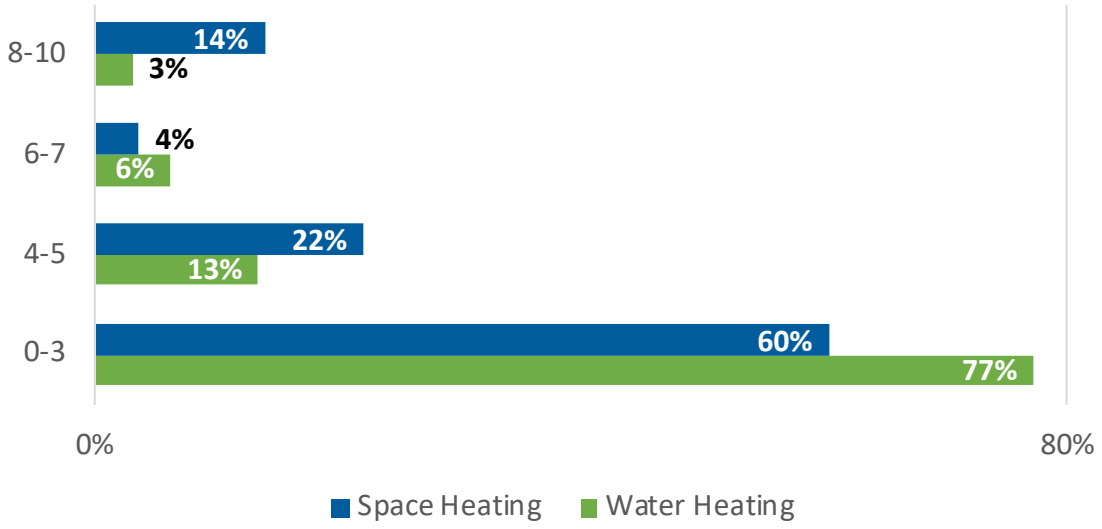
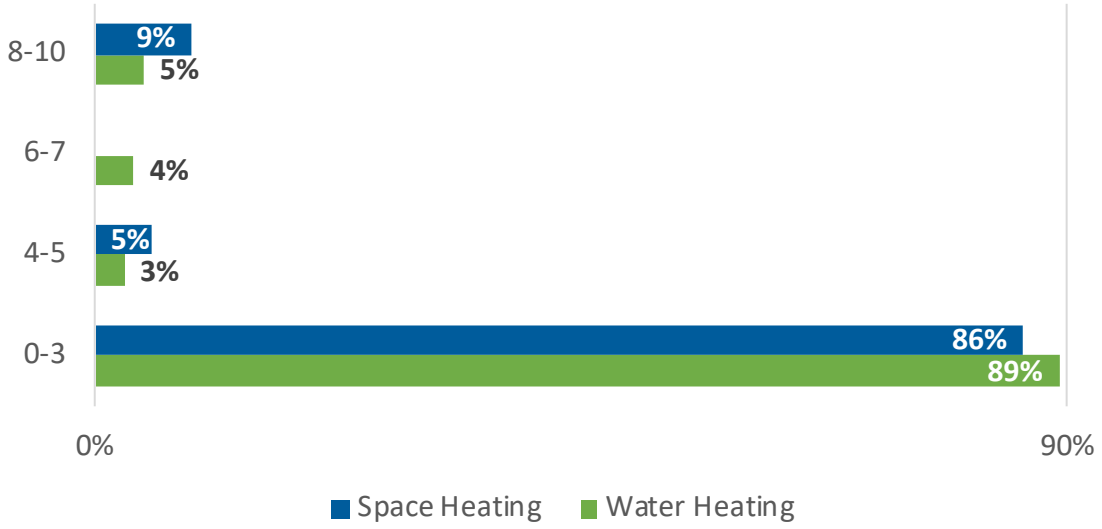


Figure 27: Influence of Prior NMGC Program Participation on Choosing Energy Efficiency Equipment (0 to 10 scale)



No-Program and Timing Questions

The final questions addressed what participants would have done if the rebate program had not been available (the No-Program scenario), and if the timing of the purchase would have been delayed significantly without the program. These questions were part of the original self-report free ridership battery used in the prior evaluations of both programs. In the current analysis, they were used primarily as a consistency check for the new free ridership calculations. The exception was for those water heater participants that did not use a contractor; for those instances, the No-Program responses were used in original self-report calculations to estimate free ridership.

Even after being reminded of the various ways the program could be influencing their equipment choices, the majority of respondents indicated that they would likely have purchased the same equipment in absence of the program. As shown in Figure 28, most Space Heating participants (89%) indicated that they would be very likely to purchase the same energy efficiency equipment again even if they program was not available. For Water Heater participants, 79 percent indicated a very high likelihood of choosing the same equipment in absence of the program.

Figure 29 also shows a limited program influence on the timing of the equipment purchases, with most participants (78% to 87%) indicating that they likely would have still made the same equipment choice within 12 months even if the program were unavailable.

Figure 28: Likelihood of Choosing Same Energy Efficiency Level Without the NMGC Rebate (0 to 10 scale)

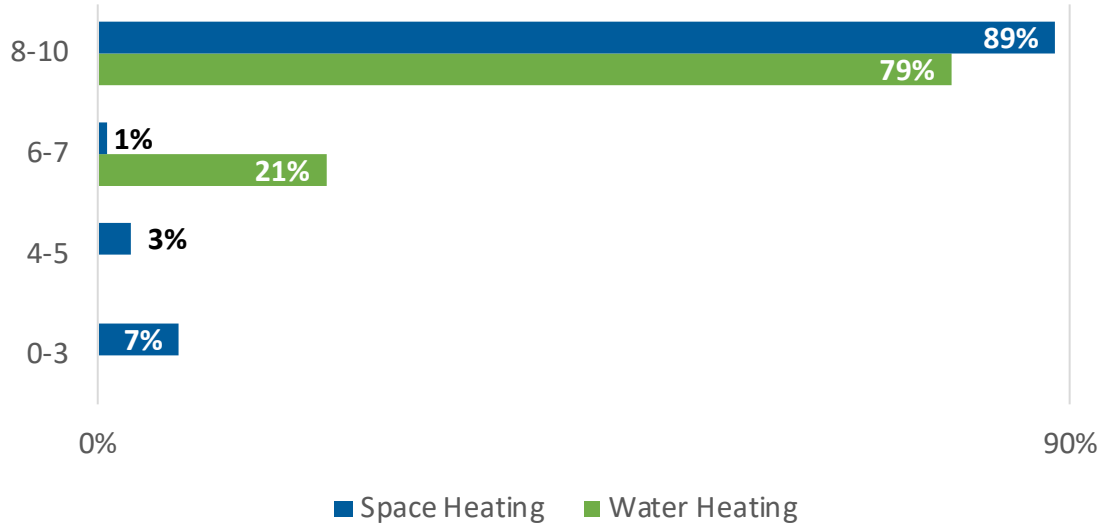
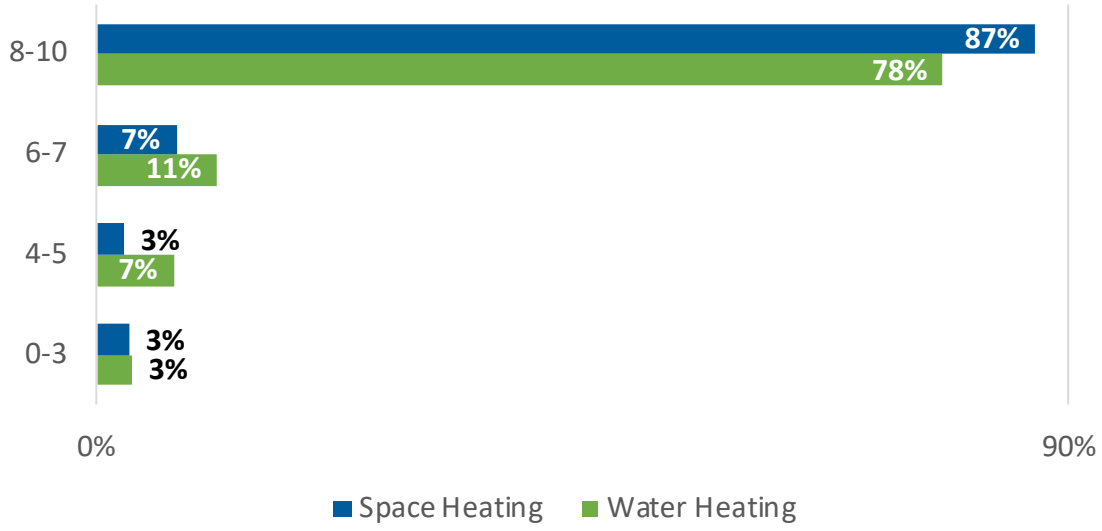


Figure 29: Likelihood of Purchasing Same Energy Efficient Equipment within 12 Months Without NMGC Rebate (0 to 10 scale)



Finally, for both programs, an open-ended question was asked for respondents to describe in their own words the influence the NMGC program had on the energy efficiency level of the equipment they chose. These responses were reviewed as a consistency check and (if needed) used to adjust the free ridership scores if the verbatim responses indicated a greater role of the program on the equipment choice. The verbatim answers confirmed that the program was having only a modest influence on final equipment choice and efficiency levels. As a result, no changes to the free ridership scores were made based on these responses.

5 Conclusions and Recommendations

Based on the results from the data collection and analysis methods described in the previous sections, the evaluation team has developed a number of conclusions and associated recommendations to improve NMGC's programs. These are organized below by program.

5.1 Efficient Buildings Program

- The evaluation team evaluated and adjusted six projects in the sample that installed commercial kitchen gas fryers. The evaluation team used the savings methodology documented in the "FINAL" CLEAResult Work Papers for this measure, which differed from the savings reported by NMGC. The supplied energy savings calculations utilized the average value of gas savings (therms) for all the 'Casual Dining' facility types for both the Standard and Large Vat fryers in the savings algorithm, which decreased the savings for five projects and increased savings for one.
    - **Recommendation:** Use the deemed savings values listed in the NMGC Commercial Kitchen Work Papers for the applicable facility type.

5.2 Income Qualified Program

- The supplied National Energy Audit Tool (NEAT) reports for the 18 projects sampled were generated using the NEAT – Weatherization Assistant application. Installed measures included Faucet Aerator, DHW Tank Insulation, DHW Pipe Insulation, Door Replacement, Duct Sealing, Infiltration, Duct Insulation, Attic Insulation, Floor Insulation, Low-Flow Showerhead, Faucet Aerator, Window Replacement, and Furnace Replacement. The evaluation team verified that software version v8.9.0.5 follows the correct baseline efficiencies.
    - **Recommendation:** Provide sufficient documentation to verify the installation of equipment if the measure is not included in the NEAT report.
- The NEAT reports for 10 projects did not match the savings reported by NMGC. There were discrepancies between the NEAT report and savings reported by NMGC for the following measures: Window Replacement, Attic Insulation, Floor Insulation, Door Replacement, Infiltration, and DHW Pipe Insulation.
    - **Recommendation:** Ensure the savings generated by the Weather Assistant application are reported for each measure or provide sufficient documentation to verify updates to each measure not included in the NEAT report.
- The NEAT report calculated savings for Lighting Retrofit and Refrigerator Replacement measures that were not reported in the *ex ante* savings estimate.

- **Recommendation:** Consider reporting all measures installed that have potential gas savings (therms).

5.3 ENERGY STAR Space Heating and Water Heating Programs

The Space Heating and Water Heating programs received a limited evaluation this year to update the free ridership and net-to-gross (NTG) values. A new participant survey was completed for both programs that focused solely on free ridership and included additional questions relating to the contractor influence on the efficiency level of the equipment chosen. Using these new questions, an updated free ridership algorithm was developed to ensure that the contractor influence was being incorporated appropriately into the calculation. For the smart thermostat measure in the Space Heating program, a deemed NTG value was assigned based on a recent impact evaluation from California. Based on these new results, the updated NTG ratio for the Space Heating program (excluding smart thermostats) is 0.7313, and is 0.7700 for smart thermostats. For Water Heating, the new NTG ratio is 0.5854. All of these reflect increases over the current values and will be used to calculate net impacts beginning in PY2022.