ONTARIO GAS DSM EVALUATION CONTRACTOR

2021 Natural Gas Demand-Side Management Annual Verification Report

Ontario Energy Board

Date: 01 November 2022

Table of contents

AUDIT OPINION 1

1 EXECUTIVE SUMMARY 2
1.1 Enbridge Scorecard Results 4
1.2 Union Scorecard Results 6
1.3 Report Structure 8

2 GLOSSARY OF KEY TERMS AND CONCEPTS 9

3 INTRODUCTION 13

4 SCORECARD RESULTS: RESOURCE ACQUISITION 14
4.1 Scorecard achievements for Enbridge 14
4.2 Scorecard achievements for Union 15

5 SCORECARD RESULTS: LOW INCOME 17
5.1 Scorecard achievements for Enbridge 17
5.2 Scorecard achievements for Union 17

6 SCORECARD RESULTS: LARGE VOLUME 19
6.1 Scorecard achievements for Union 19

7 SCORECARD RESULTS: MARKET TRANSFORMATION 20
7.1 Scorecard achievements for Enbridge 20
7.2 Scorecard achievements for Union 21

8 SCORECARD RESULTS: PERFORMANCE BASED 22
8.1 Scorecard achievements for Union 22

9 UTILTY SUMMARY OF SHAREHOLDER INCENTIVES, PROGRAM SPENDING, COST EFFECTIVENESS, AND LOST REVENUE 23
9.1 Enbridge Results 23
9.2 Union Results 26

10 FINDINGS AND RECOMMENDATIONS 29

11 APPENDICES 38
11.1 Appendix A: Evaluation Background 38
11.2 Appendix B: Metric Verification Activities 41
11.3 Appendix C: Changes from 2020 Annual Verification 45
11.4 Appendix D: Summary of Verification Adjustments 46
11.5 Appendix E: Resource Acquisition Scorecards 48
11.6 Appendix F: Low Income Scorecards 88
11.7 Appendix G: Large Volume Scorecard 106
11.8 Appendix H: Market Transformation Scorecards 109
11.9 Appendix I: Performance Based (Union) and Market Transformation (Enbridge) Scorecards 125
11.10 Appendix J: Review of Metric Target Calculations 133
11.11 Appendix K: Review of Lost Revenue and DSM Shareholder Incentive Calculations 136

11.12 Appendix L: Lost Revenue and DSM Shareholder Incentive: Detailed Tables 141
11.13 Appendix M: Prescriptive Savings Verification 147
11.14 Appendix N: Program Spending Tables 172
11.15 Appendix O: Cost Effectiveness Methodology 174

List of figures

Figure 11-1. Overview of Gross Savings Verification for 2021 HEC Verification 55
Figure 11-2. Overview of gross savings verification for 2021 HRR verification 59
Figure 11-3. Overview of gross simulation savings verification for 2021 Winterproofing 91
Figure 11-4. Overview of gross savings verification for 2021 Home Weatherization program 94
Figure 11-5. Image of RIR Process Elements from Enbridge Plan 127
Figure 11-6. Lost revenue calculation 136
Figure 11-7. Savings verification process 148

List of tables

Table 1-1. Enbridge savings, spend, cost effectiveness, and incentive results*† 4
Table 1-2. Enbridge lost revenue results* 5
Table 1-3. Union achievement, spend, cost effectiveness, and incentive results*† 6
Table 1-4. Union lost revenue results* 7
Table 4-1. Enbridge 2021 Resource Acquisition verified achievements* 14
Table 4-2. Enbridge's 2021 Resource Acquisition targets, achievements, weights, and incentive*† 15
Table 4-3. Enbridge's verified 2021 Resource Acquisition savings* 15
Table 4-4. Union 2021 Resource Acquisition verified achievements* 16
Table 4-5. Union's 2021 Resource Acquisition targets, achievements, weights, and incentive*† 16
Table 5-1. Enbridge 2021 Low Income verified achievements 17
Table 5-2. Enbridge's 2021 Low Income scorecard targets, achievements, weights, and incentive*† 17
Table 5-3. Union 2021 Low Income verified achievements* 18
Table 5-4. Union's 2021 Low Income targets, achievements, weights, and incentive*† 18
Table 6-1. Union 2021 Large Volume verified achievements 19
Table 6-2. Union's 2021 Large Volume targets, achievements, weights, and incentive*† 19
Table 7-1. Enbridge Market Transformation program detailed evaluation, by appendix 20
Table 7-2. Enbridge 2021 Market Transformation verified achievements 20
Table 7-3. Enbridge's 2021 Market Transformation scorecard targets, achievements, weights, and incentive*† 21
Table 7-4. Union 2021 Market Transformation verified achievements 21
Table 7-5. Union's 2021 Market Transformation targets, achievements, weights, and incentive*† 21
Table 8-1. Union 2021 Performance Based verified achievements 22
Table 8-2. Union's 2021 Performance Based targets, achievements, weights, and incentive*† 22
Table 9-1. Summary of Enbridge's 2021 achievement weights and shareholder incentives 23
Table 9-2. Enbridge program cost summary* 24
Table 9-3. Enbridge summary of cost-effectiveness ratio results, TRC-Plus Test* 24
Table 9-4. Enbridge summary of cost effectiveness ratio results, PAC Test* 24
Table 9-5. Enbridge lost revenue results* 25
Table 9-6. Summary of Union's 2021 achievement weights and shareholder incentives* 26
Table 9-7. Union program cost summary* 27
Table 9-8. Union summary of cost-effectiveness ratio results, TRC-Plus Test* 27
Table 9-9. Union summary of cost effectiveness ratio results, PAC Test* 28
Table 9-10. Union lost revenue results* 28
Table 10-1. Overall annual verification - summary of recommendations 29
Table 10-2. Whole home simulation modelling - summary of recommendations 30
Table 10-3. Cost-effectiveness - summary of recommendations 31
Table 11-1. DSM programs offered – 2015 through 2021 38
Table 11-2. Energy efficiency metrics – 2016 through 2021 39
Table 11-3. 2021 Annual verification activities by program: Enbridge 42
Table 11-4. 2021 Annual verification activities by program: Union 43
Table 11-5. Desk Review Sample: Enbridge 44
Table 11-6. Desk Review Sample: Union 44

Table 11-7. Enbridge Metrics with Verified Value Greater than 1% Different from Tracked 46
Table 11-8. Union Metrics with Verified Value Greater than 1% Different from Tracked 47
Table 11-9. Enbridge 2021 Resource Acquisition scorecard* 49
Table 11-10. Union 2021 Resource Acquisition scorecard* 50
Table 11-11. Enbridge Resource Acquisition achievement: Home Energy Conservation metrics* 51
Table 11-12. Documentation used to verify the Home Energy Conservation program 51
Table 11-13. Enbridge Resource Acquisition achievement: HEC Program participants metric* 52
Table 11-14. Count of individual measure types among verified projects and types per home* 53
Table 11-15. Enbridge Resource Acquisition scorecard achievements: HEC Program CCM metric* 54
Table 11-16. Overview of gross savings verification 55
Table 11-17. Enbridge HEC Realization Rate* 55
Table 11-18. Union Resource Acquisition achievement: Home Reno Rebate metrics* 56
Table 11-19. Documentation used to verify the Home Reno Rebate program 56
Table 11-20. Union Resource Acquisition achievement: HRR Program participants metric* 57
Table 11-21. Count of individual measure types among verified projects and types per home* 58
Table 11-22. Union Resource Acquisition scorecard achievements: HRR Program savings metric* 58
Table 11-23. Overview of gross savings verification 59
Table 11-24. Union HRR realization rate* 60
Table 11-25. Enbridge Resource Acquisition achievement: Residential Adaptive Thermostats CCM metric* 61
Table 11-26. Documentation used to verify the Residential Adaptive Thermostats program 61
Table 11-27. Union Resource Acquisition achievement: Residential Adaptive Thermostats CCM metric* 63
Table 11-28. Documentation used to verify the Residential Adaptive Thermostats program 63
Table 11-29. Enbridge Resource Acquisition achievement: C&I Prescriptive CCM metric* 65
Table 11-30. Documentation used to verify the C&I Prescriptive program 65
Table 11-31. Enbridge Resource Acquisition achievement by measure group: small volume customers* 66
Table 11-32. Enbridge Resource Acquisition achievement by measure group: large volume customers* 66
Table 11-33. Union Resource Acquisition achievement: C&I Prescriptive CCM metric* 67
Table 11-34. Documentation used to verify the C&I Prescriptive program 67
Table 11-35. Union Resource Acquisition Achievement by measure group* 68
Table 11-36. Enbridge Resource Acquisition achievement: C&I Direct Install CCM metric* 69
Table 11-37. Documentation used to verify the C&I Direct Install program 69
Table 11-38. Enbridge C&I Direct Installation measure groups: large volume customers 70
Table 11-39. Enbridge C&I Direct Installation measure groups: small volume customers 70
Table 11-40. Union Resource Acquisition achievement: C&I Direct Install CCM metric* 71
Table 11-41. Documentation used to verify the C&I Direct Install program 71
Table 11-42. Union C&I Direct Installation measure groups 71
Table 11-43. Enbridge Resource Acquisition achievement: C&I Custom CCM metric* 73
Table 11-44. Adjustment factors applied to Enbridge C&I Custom Program cumulative gross savings* 73
Table 11-45. Documentation used to verify the C&I Custom program 74
Table 11-46. Verified gross savings rates for the Enbridge Custom C&I program 74
Table 11-47. Attribution ratios for the Enbridge Custom C&I program 74
Table 11-48. Spillover ratios for the Enbridge Custom C&I program 75
Table 11-49. Union Resource Acquisition achievement: C&I Custom CCM metric* 76
Table 11-50.Adjustment factors applied to Union C&I Custom Program cumulative gross savings* 76
Table 11-51. Documentation used to verify the C&I Custom program 77
Table 11-52. Verified gross savings rates for the Union Custom C&I program 77
Table 11-53. Attribution ratios for the Union Custom C&I program 77
Table 11-54. Spillover ratios for the Union Custom C&I program 78
Table 11-55. Enbridge Resource Acquisition achievement: Comprehensive Energy Management CCM metric* 79
Table 11-56. Adjustment factors applied to Enbridge CEM Program cumulative gross savings* 79
Table 11-57. Documentation used to verify the Comprehensive Energy Management program 80
Table 11-58. Verified gross savings rates for the Enbridge CEM program 80
Table 11-59. Attribution ratios for the Enbridge CEM program 80
Table 11-60. Spillover ratios for the Enbridge CEM program 81
Table 11-61. Enbridge Resource Acquisition achievement: Run it Right CCM metric* 82
Table 11-62. Adjustment Factors Applied to Enbridge Energy Leaders Program cumulative gross savings* 82
Table 11-63. Documentation used to verify the Energy Leaders program 83
Table 11-64. Enbridge Resource Acquisition achievement: Run it Right CCM metric* 85
Table 11-65. Adjustment Factors Applied to Run it Right Program cumulative gross savings* 85
Table 11-66. Documentation used to verify the Run it Right program 86

Table 11-67. Enbridge 2021 Low Income scorecard 88
Table 11-68. Union 2021 Low Income scorecard 88
Table 11-69. Enbridge Low Income achievements: Home Winterproofing CCM metrics* 90
Table 11-70. Documentation used to verify the Home Winterproofing program 90
Table 11-71. Overview of gross simulation savings verification 92
Table 11-72. Enbridge Home Winterproofing realization rate 92
Table 11-73. Enbridge scorecard achievements (cumulative savings) by measure group* 92
Table 11-74. Union Low Income achievements: Home Weatherization CCM metrics* 93
Table 11-75. Documentation used to verify the Home Weatherization program 93
Table 11-76. Overview of gross simulation savings verification 95
Table 11-77. Union Home Weatherization realization rate 95
Table 11-78. Union scorecard achievements by measure group* 95
Table 11-79. Enbridge Low Income achievement: New Construction participants metric* 97
Table 11-80. Documentation used to verify the Low Income New Construction program 97
Table 11-81. Eligibility requirements documentation 99
Table 11-82. Enbridge Low Income achievements: Low Income Multi-Residential CCM metrics* 100
Table 11-83. Documentation used to verify the Low Income Multi-Residential Program 100
Table 11-84. Enbridge - prescriptive measures - scorecard achievements by measure group* 101
Table 11-85. Enbridge - custom measures - scorecard achievements* 101
Table 11-86. Union Low Income achievements: Multifamily Program (SA) CCM metrics* 102
Table 11-87. Documentation used to verify the Multifamily (Social and Assisted) program 102
Table 11-88. Union - prescriptive measures - scorecard achievements by measure group* 103
Table 11-89. Union - custom measures - scorecard achievements* 103
Table 11-90. Union Low Income achievements: Multifamily (MR) Program CCM metrics* 104
Table 11-91. Documentation used to verify the Multifamily (Market Rate) program 104
Table 11-92. Union - prescriptive measures - scorecard achievements by measure group* 105
Table 11-93. Union - custom measures - scorecard achievements* 105
Table 11-94. Union 2021 Large Volume (Rate T2/Rate 100) program scorecard* 106
Table 11-95. Union Large Volume achievement: Large Volume CCM metrics* 106
Table 11-96. Adjustment factors applied to Large Volume Program cumulative gross savings* 107
Table 11-97. Documentation used to verify the Large Volume program 107
Table 11-98. Union - custom measures – verified cumulative gross savings by measure group* 107
Table 11-99. 2021 Large Volume measure groups adjustment values and cumulative net savings* 108
Table 11-100. Enbridge 2021 market transformation scorecard† 109
Table 11-101. Union 2021 market transformation scorecard 109
Table 11-102. Enbridge Market Transformation achievement: Commercial Savings by Design developments metric* 110
Table 11-103. Documentation used to verify the Commercial Savings by Design program 110
Table 11-104. Enbridge Commercial Savings by Design participation criteria, project satisfaction, and explanation 112
Table 11-105. Enbridge Commercial Savings by Design eligibility criteria, project satisfaction, and explanation 113
Table 11-106. Union Market Transformation achievement: Commercial New Construction developments metric* 114
Table 11-107. Documentation used to verify the Commercial New Construction program 114
Table 11-108. Union Commercial New Construction participation criteria, project satisfaction, and explanation 116
Table 11-109. Union Commercial New Construction eligibility criteria, project satisfaction, and explanation 116
Table 11-110. Enbridge Market Transformation achievement: Residential Savings by Design metrics* 117
Table 11-111. Documentation used to verify the Residential Savings by Design program 117
Table 11-112. Union Market Transformation achievement: Optimum Home percentage of homes built metric* 121
Table 11-113. Documentation used to verify the Optimum Home program 121
Table 11-114. Optimum Home claimed total and program homes built, by builder* 122
Table 11-115. Enbridge 2021 market transformation & energy management scorecard† 125
Table 11-116. Union 2021 performance-based scorecard 125
Table 11-117. Enbridge Market Transformation achievement: Run it Right participants metric* 126
Table 11-118. Documentation used to verify the Run it Right program 126
Table 11-119. Enbridge Market Transformation achievement: Comprehensive Energy Management participants metric* 129
Table 11-120. Documentation used to verify the Comprehensive Energy Management program 129
Table 11-121. Union Performance Based achievement: Strategic Energy Management percent savings metric* 131
Table 11-122. Documentation used to verify the Comprehensive Energy Management program 131
Table 11-123. Enbridge Metric Target Calculation Inputs – 2021 133
Table 11-124. Union Metric Target Calculation Inputs – 2021 134
Table 11-125. Union Large Volume Cost Effectiveness* Ratios 134
Table 11-126. Enbridge Metric Targets – 2021 134

Table 11-127. Union Metric Targets – 2021 135
Table 11-128. Rate classes for lost revenue calculation 136
Table 11-129. Lost revenue installation month savings ratio* 137
Table 11-130. Calculation to determine shareholder incentive 139
Table 11-131. Example lost revenue savings total for single rate class with monthly widget installation* 139
Table 11-132. Example total lost revenue* 140
Table 11-133. Example metric score* 140
Table 11-134. Example scorecard weighted score (WSA)* 140
Table 11-135. Enbridge's 2021 Resource Acquisition targets, achievements, and incentive* 141
Table 11-136. Enbridge's 2021 Low Income scorecard targets, achievements, and incentive* 141
Table 11-137. Enbridge's 2021 Market Transformation scorecard targets, achievements, and incentive* 142
Table 11-138. Union's 2021 Resource Acquisition targets, achievements, and incentive* 142
Table 11-139. Union's 2021 Low Income targets, achievements, and incentive* 143
Table 11-140. Union's 2021 Large Volume targets, achievements, and incentive* 143
Table 11-141. Union's 2021 Market Transformation targets, achievements, and incentive* 144
Table 11-142. Union's 2021 Performance Based targets, achievements, and incentive* 144
Table 11-143. Enbridge lost revenue volumes (10^3 m^3) by rate class, prorated by month* 145
Table 11-144. Enbridge lost revenue volumes (10^3 m^3) total volume, delivery rates, and revenue impact by rate class* 145
Table 11-145. Union lost revenue volumes (10^3 m^3) by rate class, prorated by month* 146
Table 11-146. Union lost revenue volumes (10^3 m^3) total volume, delivery rates, and revenue impact by rate class* 146
Table 11-147. Tracking variables used for prescriptive savings verification 149
Table 11-148. Explanation of calculation inputs for two types of prescriptive measures 149
Table 11-149. Enbridge measure savings calculation values* 151
Table 11-150. Union measures savings calculation values* 156
Table 11-151. Enbridge Measure Savings, Tracked and Verified, by Annual and Cumulative, Gross and Net* 163
Table 11-152. Union Measure Savings, Tracked and Verified, by Annual and Cumulative, Gross and Net* 167
Table 11-153. Enbridge measure verification discrepancies 171
Table 11-154. Union measure verification discrepancies 171
Table 11-155. Enbridge 2021 approved and spent budget* 172
Table 11-156. Union 2021 approved and spent budget* 173
Table 11-157: 2021 "Programs" as defined by the OEB, Enbridge, and Union 174
Table 11-158: Key inputs used in the TRC-Plus and PAC tests 175
Table 11-159. Enbridge summary of cost effectiveness ratio results* 177
Table 11-160. Union summary of cost effectiveness ratio results* 177
Table 11-161: Enbridge Gas Avoided Costs 178
Table 11-162: Enbridge Water and Electricity Avoided Costs 179
Table 11-163: Enbridge Carbon Avoided Costs 180
Table 11-164: Union Gas Avoided Costs 181
Table 11-165: Union Carbon Avoided Costs 182
Table 11-166: Union Water Avoided Costs 183
Table 11-167: Union Electricity Avoided Costs 184
Table 11-168: Enbridge overall PAC results*† 185
Table 11-169: Enbridge Residential PAC results*† 185
Table 11-170: Enbridge Commercial & Industrial PAC results*† 186
Table 11-171: Enbridge Low Income PAC results*† 186
Table 11-172: Enbridge overall TRC-Plus results*† 187
Table 11-173: Enbridge Residential TRC-Plus results*† 187
Table 11-174: Enbridge Commercial/Industrial TRC-Plus results*† 188
Table 11-175: Enbridge Low Income TRC-Plus results*† 188
Table 11-176: Union Resource Acquisition PAC results* 189
Table 11-177: Union Low Income PAC results* 189
Table 11-178: Union Large Volume PAC results* 189
Table 11-179: Union Performance Based PAC results* 190
Table 11-180: Union Resource Acquisition TRC-Plus results* 190
Table 11-181: Union Low Income TRC-Plus results* 190
Table 11-182: Union Large Volume TRC-Plus results* 191
Table 11-183: Union Performance Based TRC-Plus results* 191

AUDIT OPINION

Enbridge Gas Inc. (formerly Enbridge Gas Distribution Inc. and Union Gas Limited)[1] implemented energy conservation programs designed to reduce natural gas use at participating customer's homes and businesses throughout the 2021 calendar year. The programs were approved by the Ontario Energy Board (OEB) and were available to all types of natural gas customers, including residential, low income, commercial, and industrial.

The energy conservation programs, called demand-side management (DSM) programs, are regulated by the OEB. The OEB establishes policy guidance, holds public hearings to determine the merit of utility proposals, and approves the use of ratepayer funding for the utility to implement the programs. Depending on the level of success in meeting its annual OEB-approved targets, the utility may be eligible for a performance incentive, called the shareholder incentive. The maximum possible shareholder incentive for each legacy utility is $10,450,000, although this amount is only available if performance meets 150% of all OEB-approved targets. The utility may claim lost revenue as a result of the lower natural gas sales.

The Evaluation Contractor team[2] (DNV and Dunsky) provides the following opinion on the achieved natural gas savings, lost revenue, shareholder incentive, and cost effectiveness of the DSM programs offered by Enbridge and Union for the calendar year ending December 31, 2021.

Our opinion stems from our review of the program documentation, utility shareholder incentive calculations, and lost revenue calculations as set forth in the report that follows. It is also based on the information available at the time that this report was published.

In our opinion, the following figures are reasonable, subject to the qualifications given above.

Definition	Enbridge Results	Union Results
Shareholder Incentive	$4,961,553	$1,469,503
Lost Revenue	$57,207	$133,216
Verified Net Cumulative Energy Savings (m^3)	862,083,798	840,565,201[3]
Total Dollars Spent (not reviewed)	$69,619,780	$52,976,925
Benefit Cost Ratio (TRC-plus test)[4]	2.56	1.93

[1] Enbridge Gas Distribution Inc. (Enbridge) and Union Gas Limited (Union) amalgamated effective January 1, 2019 to become Enbridge Gas Inc. However, in 2021, Enbridge Gas Inc. continued to deliver the two legacy utility DSM plans in its different rate zones – EGD rate zone and Union rate zones (North and South). For ease of reference, throughout this report, the EC has referred to the legacy utility DSM plans as Enbridge and Union.

[2] DNV leads the Evaluation Contractor team and led the evaluation of the 2021 DSM programs, with contributions from Dunsky.

[3] The verified net cumulative energy savings value does not include the 3.55% savings from the Strategic Energy Management program, which is part of the Performance Based scorecard. This 3.55% savings are estimated to be 4,850,000 net cumulative CCM savings.

[4] The cost-effectiveness results use 2021 carbon tax rates that increase by $15 per year up to $170 per tCO2e in 2030. Beyond 2030, a 2% inflation rate is applied.

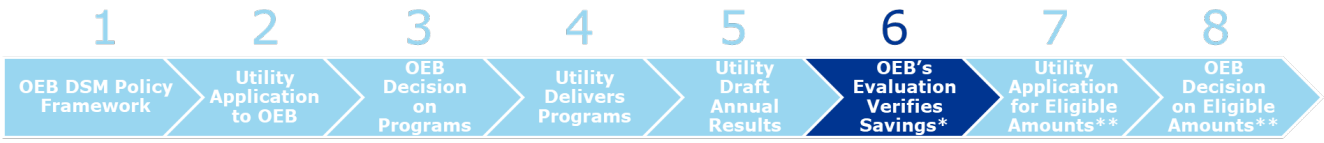
1 EXECUTIVE SUMMARY

Enbridge Gas Inc.[5] delivers demand-side management (DSM) programs under the Demand Side Management Framework for Natural Gas Distributors (2015-2020[6] and extended through 2022[7]) developed by the Ontario Energy Board (OEB). Through the framework development and approval of DSM plans, the OEB sets budgets, targets, and cost effectiveness thresholds, in addition to establishing a shareholder incentive for the successful delivery of the approved programs.

The OEB verifies, on an annual basis, natural gas savings and other aspects of energy conservation programs provided by Enbridge Gas Inc. and funded by ratepayers. The energy conservation programs are designed to reduce customer demand for gas through increases in energy efficient technologies and equipment using various methods such as financial incentives, building modifications, education, and outreach. These programs attempt to impact customers' energy usage (demand), rather than utility energy capacity (supply), which is why they are referred to as demand-side management programs.

This report provides results of the annual verification of natural gas DSM programs delivered in 2021 and offered by Enbridge Gas Inc. The verification was conducted on behalf of the OEB by its independent, third-party evaluation contractor (EC), the team of DNV and Dunsky.

The graphic below provides a general depiction of the broader process of creating DSM programs and their evaluation that led to this evaluation report.



*The OEB's EC conducts an expert, independent review to verify the program results, including natural gas savings and participants, and provides an opinion on the utility performance related to OEB-approved targets

**Eligible amounts include performance incentives the utility may be eligible to receive due to meeting or exceeding OEB-approved targets, lost revenues related to program-related natural gas savings, and changes to costs previously approved by the OEB

Independently verified program results, such as natural gas savings and the number of participants, provides important information to the OEB on the success and effectiveness of the programs and prudent use of ratepayer funding. Additionally, verified results are required for the utility to seek approval of any performance incentive related to OEB-approved targets. The financial incentive is to Enbridge Gas Inc.'s shareholders. The financial incentive is determined by reviewing the utility's accomplishments against their OEB-set targets, assembled in groupings called scorecards along with associated metrics that are used to determine program achievements. The degree of verified achievement (relative to the metric target) determines the shareholder incentive for each legacy utility DSM plan. The shareholder incentive is paid to the utility shareholders to encourage the utility to deliver DSM programs.

The annual verification uses the findings of any program-specific evaluation study applicable to the 2021 programs and applies them to the natural gas energy savings and achieved scorecard values reported by the utility to the OEB. For programs or metrics where no evaluation studies have been completed during the current evaluation, the EC team conducts a due diligence review of program documentation to verify the savings or metrics reported by the utilities.

[5] Enbridge Gas Distribution Inc. (Enbridge) and Union Gas Limited (Union) amalgamated effective January 1, 2019 to become Enbridge Gas Inc. However, the DSM framework and 2015-2020 DSM Plans were developed and approved by the OEB before amalgamation, and Enbridge Gas Inc. continues to deliver the two legacy utility DSM plans individually in its different rate zones – EGD rate zone and Union rate zones (North and South) through the remainder of the framework. As such, the EC still evaluates each DSM plan separately by legacy utility (Enbridge and Union). For ease of reference, throughout this report, the EC has referred to the legacy utility DSM plans as Enbridge and Union.

[6] EB-2014-0134

[7] EB-2019-0271, OEB Decision and Order on 2021 DSM Plans, July 16, 2020
EB-2021-0002, OEB Decision and Order on 2022 DSM Plans, August 26, 2021

The overall objectives are to provide an independent opinion on whether natural gas savings achieved through programs are reasonable, and that the corresponding DSM shareholder incentives and lost revenue amounts have been accurately calculated.

Table 1-1 and Table 1-3 show the verified, comprehensive scorecard results for the Enbridge and Union rate zones, respectively.

The OEB also requires the utility to deliver DSM programs that are cost-effective, which means the benefits produced by the programs outweigh the cost of their implementation (including the benefit of reduced use of natural gas, electricity, and water, the cost of those resources, and carbon emissions).[8] The methods that the EC used to calculate cost effectiveness in 2021 are the same ones used in the 2020 analysis. The cost effectiveness results (in terms of TRC-Plus benefit-cost ratio) for each program are found in Table 1-1 and Table 1-3 in the rightmost column. The bigger the number, the more cost effective the program is. These tables also show the amount of money spent by the utilities to implement the energy efficiency programs.

Table 1-2 and Table 1-4 show the verified revenues that Enbridge and Union lost, respectively, as a result of implementing DSM programs. The lost revenue is shown by rate class and is only the revenue lost during the 2021 calendar year.[9] A rate class is a group of customers that pay the same rate for their gas usage and service.

In summary:

- Enbridge programs offered in 2021 were verified to achieve:
  - Savings in 2021 of 45,753,945 m^3 (equal to heating 19,893 homes in Ontario for a year[10])
  - Cumulative savings of 862,083,798 m^3 (translating to emissions reductions of 1,686,811 tons of CO_2 equivalent[11])
- Union programs offered in 2021 were verified to achieve:[12]
  - Savings in 2021 of 48,136,107 m^3 (equal to heating 20,928 homes in Ontario for a year[13])
  - Cumulative savings of 840,565,201 m^3 (translating to emissions reductions of 1,644,706 tons of CO_2 equivalent[14])

In this report, we made several recommendations for the programs, focusing primarily on issues related to program data and documentation, energy modelling, and cost effectiveness.

At the time this report was published, the EC was continuing to study and compare the savings estimates from Enbridge Gas Inc.'s digital tool (eTools) with those estimated by modelling site-level energy usage from customer bills.[15] As this study was ongoing, we did not provide any conclusions from that investigation in this report.

[8] Cost effectiveness results for the 2021 programs do not reflect the significant gas price increases occurring in 2022.

[9] The lost revenue shown in these tables are not the entire lost revenue the utility realizes from its DSM programs. A forecast DSM amount, built into natural gas rates, accounts for a large majority of lost revenues.

[10] This calculation uses an average annual natural gas usage of 2,300 m^3 per year.

[11] This calculation uses cumulative savings, the federal carbon price, and the prescribed charge rate for marketable gas in Ontario.

[12] The first-year and cumulative energy savings values do not include the 3.55% savings from the Strategic Energy Management program, which is part of the Performance Based scorecard. This 3.55% savings are estimated to be 970,000 annual and 4,850,000 cumulative CCM savings.

[13] This calculation uses an average annual natural gas usage of 2,300 m^3 per year.

[14] This calculation uses cumulative savings, the federal carbon price, and the prescribed charge rate for marketable gas in Ontario.

[15] eTools is a digital Enbridge tool that leverages engineering calculations to estimate energy savings from boiler space and water heating projects.

1.1 Enbridge Scorecard Results

Table 1-1. Enbridge savings, spend, cost effectiveness, and incentive results*†

Program	Metric	Verified First-Year Savings (CCM)	Verified Cumulative Savings or Other Metric	Percent of Target Achieved	DSM Shareholder Incentive	OEB-Approved Program Budget	Utility Spending**	Budget/ Spending Variance	Benefit Cost Ratio (TRC Plus Test)***		Net Present Value (TRC Plus)***
									O&A Costs	No O&A Costs	
Resource Acquisition		**40,217,908**	**747,335,446**			**$42,908,517**	**$49,430,837**	**$6,522,320 (15%)**	**2.80**		**$156,479,000**
C&I Custom	CCM Savings	22,517,064	415,996,615	99.9%	$4,267,746	$7,658,968	$6,772,836	-$886,132	4.54	5.05	$95,405,000
C&I Direct Install	CCM Savings	2,501,800	31,979,551			$4,950,581	$2,909,245	-$2,041,337	3.41	3.64	$8,203,000
C&I Prescriptive	CCM Savings	3,278,116	38,277,606			$2,323,114	$2,438,956	$115,842	2.32	2.43	$7,563,000
Comprehensive Energy Management	CCM Savings	130,072	3,090,423			$98,838	$19,183	-$79,655	4.12	4.57	$646,000
Energy Leaders Initiative	CCM Savings	45,400	908,004			$0	$251,175	$251,175	0.85	0.87	-$46,000
Residential Adaptive Thermostats	CCM Savings	3,565,542	53,483,128			$2,262,870	$2,312,755	$49,885	3.17	3.32	$17,031,000
Run it Right	CCM Savings	44,885	224,426			$1,653,979	$225,192	-$1,428,787	0.21	0.21	-$259,000
Home Energy Conservation	CCM Savings	8,135,028	203,375,694			$18,727,200	$29,560,475	$10,833,275	1.66	1.71	$27,937,000
	Participants	N/A	15,321	152.4%					N/A	N/A	N/A
Resource Acquisition Overhead	N/A		N/A	N/A		$5,232,967	$4,941,020	-$291,947			
Low Income		**5,536,037**	**114,748,352**			**$13,849,850**	**$13,427,553**	**-$422,297 (-3%)**	**1.65**		**$14,707,000**
Home Winterproofing	CCM Savings	1,207,416	26,443,935	91.9%	$693,807	$6,736,859	$6,818,367	$81,508	1.55	1.65	$3,340,000
Multi-Residential	CCM Savings	4,328,621	88,304,418	95.1%		$3,967,353	$3,473,475	-$493,878	1.69	1.83	$11,368,000
New Construction	Applications	N/A	13	100.0%		$1,456,560	$1,540,866	$84,306	N/A	N/A	N/A
Low Income Overhead	N/A		N/A	N/A		$1,689,078	$1,594,845	-$94,233			
Market Transformation		**N/A**	**N/A**			**$7,181,118**	**$5,586,083**	**-$1,595,035 (-22%)**	**N/A**	**N/A**	**N/A**
School Energy Competition	Schools	N/A	0	0.0%	$0	$520,200	$0	-$520,200	N/A	N/A	N/A
Run it Right	Participants		36	31.0%		$329,209	$244,172	-$85,038			
Comprehensive Energy Management	Participants		2	3.6%		$941,562	$100,646	-$840,916			
Residential Savings by Design	Builders		24	62.5%		$3,392,296	$3,809,618	$417,322			
	Homes		2,514	81.0%							
Commercial Savings by Design	Developments		17	44.4%		$1,122,068	$604,724	-$517,344			
Market Transformation Overhead	N/A		N/A	N/A		$875,783	$826,923	-$48,860			
Enbridge Program Total		**45,753,945**	**862,083,798**		**$4,961,553**	**$63,939,485**	**$68,444,472**	**$4,504,987 (7%)**	**2.56**		**$171,187,000**
Portfolio Overhead and Administrative Costs						$3,817,891	$1,175,308	-$2,642,583 (-69%)			
Enbridge Portfolio Total						**$67,757,376**	**$69,619,780**	**-$1,862,404 (3%)**			

*Not all values may compute exactly due to rounding.
†CCM are cumulative cubic meters of natural gas.
**The OEB's DSM Framework allows for utility spending to differ from the approved budget. Sections 6.6 and 11.2 of the Filing Guidelines provide details for acceptable spending differences.
***Cost-effectiveness results use 2021 carbon tax rates that increase by $15 per year up to $170 per tCO2e in 2030. Beyond 2030, a 2% inflation rate is applied. Please see Appendix O for a more complete discussion of these costs as well as the application of O&A costs.

Table 1-2. Enbridge lost revenue results*

Rate Class	Verified Lost Revenue
Rate 110	$19,534
Rate 115	$2,495
Rate 135	$30,787
Rate 145	$3,786
Rate 170	$605
TOTAL	**$57,207**

*Not all values may compute exactly due to rounding.

1.2 Union Scorecard Results

Table 1-3. Union achievement, spend, cost effectiveness, and incentive results*†

Program	Metric	Verified First-Year Savings (CCM)	Verified Cumulative Savings or Other Metric	Percent of Target Achieved	DSM Shareholder Incentive	OEB-Approved Program Budget	Utility Spending**	Budget/ Spending Variance	Benefit Cost Ratio (TRC Plus Test)***		Net Present Value (TRC Plus)***
									O&A Costs	No O&A Costs	
Resource Acquisition		**35,457,931**	**635,084,369**			**$36,310,983**	**$31,447,736**	**-$4,863,247 (-13%)**	**1.82**		**$69,736,000**
C&I Custom	CCM Savings	26,753,925	470,976,925			$7,808,000	$9,244,820	$1,436,820	1.86	1.99	$44,711,000
C&I Direct Install	CCM Savings	1,362,569	18,403,367			$2,500,000	$1,897,957	-$602,043	2.74	2.90	$4,178,000
C&I Prescriptive	CCM Savings	2,102,246	30,179,867	82.6%		$7,149,000	$2,264,922	-$4,884,078	2.32	2.44	$5,884,000
Residential Adaptive Thermostats	CCM Savings	1,545,557	23,183,355		$806,921	$0	$1,177,701	$1,177,701	2.92	3.19	$7,015,000
Home Reno Rebate	CCM Savings	3,693,634	92,340,855			$12,226,000	$11,528,676	-$697,324	1.35	1.43	$7,948,000
	Participants	N/A	5,032	82.9%					N/A	N/A	N/A
Overhead and Administrative Costs	N/A		N/A	N/A		$6,627,983	$5,333,658	-$1,294,325			
Low Income		**2,965,806**	**63,747,123**			**$15,005,488**	**$11,966,434**	**-$3,039,054 (-20%)**	**1.66**		**$8,241,000**
Home Weatherization	CCM Savings	2,011,914	45,903,844			$8,374,000	$8,398,589	$24,589	1.83	1.99	$7,090,000
Furnace End-of-Life	CCM Savings	-	-	87.0%		$917,000	$0	-$917,000	-	-	-
Indigenous	CCM Savings	-	-		$0	$448,000	$71,444	-$376,556	0.00	0.00	-$70,000
Multi-Family - Social & Assisted	CCM Savings	507,004	9,535,480	54.7%		$3,573,000	$2,566,630	-$1,006,370	1.31	1.40	$1,222,000
Multi-Family - Market Rate	CCM Savings	446,888	8,307,799	69.5%							
Overhead and Administrative Costs	N/A	N/A	N/A	N/A		$1,693,488	$929,771	-$763,717	N/A	N/A	N/A
Large Volume		**9,712,370**	**141,733,709**			**$4,000,000**	**$2,729,314**	**-$1,270,686 (-32%)**	**5.23**		**$15,737,000**
Large Volume	CCM Savings	9,712,370	141,733,709	122.1%	$461,621	$3,150,000	$2,329,797	-$820,203	5.23	5.86	$15,737,000
Overhead and Administrative Costs	N/A	N/A	N/A	N/A		$850,000	$399,516	-$450,484	N/A	N/A	N/A
Market Transformation		**N/A**	**N/A**			**$2,338,070**	**$1,453,549**	**-$884,521 (-38%)**	**N/A**		**N/A**
Optimum Home	% of Homes Built	N/A	73.08%	120.0%	$200,960	$841,000	$63,077	-$777,923	N/A	N/A	N/A
Commercial New Construction	Developments		24	95.8%		$1,000,000	$816,326	-$183,674			
Overhead and Administrative Costs	N/A		N/A	N/A		$497,070	$574,146	$77,076			
Performance Based		**N/A**	**N/A**			**$1,053,000**	**$166,436**	**-$886,564 (-84%)**	**6.60**		**$848,000**
RunSmart	Participants	N/A	0	0.0%	$0	$163,000	$27,405	-$135,595	0.00	0.00	-$27,000
	% Savings		0.00%	0.0%							
Strategic Energy Management****	% Savings		3.55%	44.9%		$639,000	$86,438	-$552,563	8.06	13.99	$876,000
Overhead and Administrative Costs	N/A		N/A	N/A		$251,000	$52,593	-$198,407	N/A	N/A	N/A
Union Program Total		**48,136,107**	**840,565,201**		**$1,469,503**	**$58,707,541**	**$47,763,468**	**-$10,944,073 (-19%)**	**1.93**		**$94,562,000**
Portfolio Overhead and Administrative Costs						$5,642,000	$5,213,456	-$428,544 (-8%)			
Union Portfolio Total						**$64,349,541**	**$52,976,925**	**-$11,372,617 (-18%)**			

*Not all values may compute exactly due to rounding.
†CCM are cumulative cubic meters of natural gas.
**The OEB's DSM Framework allows for utility spending to differ from the approved budget. Sections 6.6 and 11.2 of the Filing Guidelines provide details for acceptable spending differences.
*** Cost-effectiveness results use 2021 carbon tax rates that increase by $15 per year up to $170 per tCO2e in 2030. Beyond 2030, a 2% inflation rate is applied. Please see Appendix O for a more complete discussion of these costs as well as the application of O&A costs.
**** The first-year and cumulative energy savings values do not include the 3.55% savings from the Strategic Energy Management program, which is part of the Performance Based scorecard. This 3.55% savings are estimated to be 970,000 annual and 4,850,000 cumulative CCM savings.

Table 1-4. Union lost revenue results*

Rate Class	Verified Lost Revenue
M4 Industrial	$89,768
M5 Industrial	$4,200
M7 Industrial	$31,007
T1 Industrial	$109
T2 Industrial	$1,042
20 Industrial	$1,142
100 Industrial	$5,948
TOTAL	**$133,216**

*Not all values may compute exactly due to rounding.

1.3 Report Structure

The table below provides an overview of the report structure and a link to each major section within the remainder of the report.

Section	Contents
2. Glossary of Key Terms and Concepts	This section contains a guide for readers to understand the terminology and concepts used throughout the report.
3. Introduction	This section provides the background of the annual verification report.
4. Scorecard: Resource Acquisition	• Scorecard achievements for Enbridge • Scorecard achievements for Union
5. Scorecard: Low Income	• Scorecard achievements for Enbridge • Scorecard achievements for Union
6. Scorecard: Large Volume	• Scorecard achievements for Union
7. Scorecard: Market Transformation	• Scorecard achievements for Enbridge • Scorecard achievements for Union
8. Scorecard: Performance Based	• Scorecard achievements for Union
9. Utility Summary of Shareholder Incentives, Program Spending, Cost Effectiveness, and Lost Revenue	• Enbridge Results • Union Results
10. Findings and Recommendations	Topics in this section include overall findings and recommendations, whole home simulation modelling, and cost effectiveness.
11. Appendices	• Evaluation Background • Metric Verification Activities • Changes from 2020 Evaluation • Summary of Verification Adjustments • Resource Acquisition Scorecards • Low Income Scorecards • Large Volume Scorecard • Market Transformation Scorecards • Performance Based (Union) and Market Transformation (Enbridge) Scorecards • Review of Metric Target Calculations • Review of Lost Revenue and DSM Shareholder Incentive Calculations • Lost Revenue and DSM Shareholder Incentive: Detailed Tables • Prescriptive Savings Verification • Program Spending Tables • Cost Effectiveness Methodology

2 GLOSSARY OF KEY TERMS AND CONCEPTS

Adjustment factor	An adjustment factor is a percentage or ratio that allows evaluation findings from a sample of projects to be applied to and "adjust" the population of projects. An example is an installation rate, which reflects the percentage of participants who installed a prescriptive measure and kept it installed.
Attribution	The energy savings or other benefits that are the result of a utility energy program's influence, including free ridership and spillover effects (see definitions in this Glossary).
Baseline, base case	The amount of gas used in the absence of a program offering. This could be the amount of gas the equipment in place is using, or the amount of gas that a standard efficiency piece of equipment would use.
Building envelope	Exterior surfaces of a building (for example walls, windows, roof, and floors) that separate the conditioned space from the outdoors.
C&I	Stands for commercial and industrial and can mean building types or customer types.
CCM	Cumulative cubic meters (cumulative m^3), and in this report, represents the volume of natural gas savings verified over the life of the measure.
Code	An action or standard required by local or federal laws for safety, environmental, or other reasons. For example, a building code that requires a minimum fuel efficiency for furnaces.
Cost effectiveness	Refers to the analysis that determines whether or not the benefits of a project/measure (see Glossary) are greater than the costs. It is based on the net present value of savings over the equipment life of the measure.
Cost effectiveness test - PAC	A test that compares the utility's avoided cost benefits with energy efficiency program expenditures (incentives plus administrative costs).
Cost effectiveness test – TRC-Plus	A test that compares benefits to society as a whole (avoided cost benefits plus non-energy benefits) with the participant's cost of installing the measure plus the cost of incentives and program administration.
Custom project savings verification (CPSV)	The process by which the cumulative gross savings estimates of the utilities' DSM projects are verified. A custom DSM project is based on customer-specific information and considerations, as opposed to standardized projects, which are called prescriptive.
Customer – Enbridge	Enbridge identifies unique customers based on the account number and the contact information. A customer may have multiple site addresses, decision makers, account numbers, and utilities. Customers can only be identified for records for which we received contact information.
Customer – Union	Union identifies unique customers based on the customer identification (ID) number and the contact information. A customer may have multiple site addresses, decision makers, customer IDs, and utilities. Customers can only be identified for records for which we received contact information.
Demand side management (DSM)	The act of modifying customer demand for gas through utility programs using various methods such as financial incentives (such as rebates), education, and outreach.
Domain	A grouping of like projects. For example, a domain may be defined as projects within a specific sector (such as residential homes), or it might be a category of measures (see definition in Glossary), end uses, or other categories.
Dual baseline	A phrase used to describe the baseline for a measure that replaces working equipment with high efficiency equipment, also known as early replacement. The first baseline is the energy used by the existing equipment and the second baseline is the energy used by a standard efficiency piece of equipment.

Early replacement (ER)	The act of replacing a piece of equipment that is not past its expected useful life (EUL) and is in good operating condition.
Early replacement period (ER Period)	Years that the existing equipment would have continued to be in use had it not been replaced early. This is the same as remaining useful life, or RUL.
Effective useful life (EUL)	The length of time that a measure (see definition in Glossary) is expected to provide its estimated annual gas savings. EUL depends on equipment lifetime and measure persistence (see Glossary definition).
Energy advisors	People who work for utilities or their programs to provide information to customers about energy saving opportunities and program participation. This term includes, but is not limited to, Enbridge's Energy Solutions Consultants and Union's Account Managers.
Ex ante	This means "from before" in Latin. Program evaluators use this term to describe claimed or reported inputs, assumptions, savings, etc. for a measure (see definition in Glossary) or program.
Ex post	This means "from behind" in Latin. Program evaluators use this term to describe inputs, assumptions, savings, etc. that are assessed and verified after savings are reported or claimed. The term does not include assessment and verification of the amount of program influence (see free ridership) on inputs, assumptions, savings, etc. This term is sometimes used to mean verified gross savings.
Free rider	A customer who would install or perform the same energy-saving measure (see definition in Glossary) without utility influence.
Free ridership	The portion of a program's verified energy savings that would naturally occur without the utility program.
Free ridership-based attribution	The portion of a program's verified energy savings that the utility influenced if one only considers free ridership and not spillover. Free ridership-based attribution is the complement of free ridership. (free ridership-based attribution = 100% - free ridership).
Gross savings	Changes in energy consumption and/or demand from programs or projects included in utility programs, regardless of reasons for participation.
In situ	This means "on site" or "in position" in Latin. For verification of energy savings, this means the existing measure (see Glossary definition) conditions and/or efficiency.
Incentive	An incentive is often a payment from the utility to participants of a DSM program. Incentives can be paid to customers, vendors, or other parties.
Incremental cost	The difference in purchase price (and any differences in related installation or implementation costs), at the time of purchase, between the energy-saving measure (see Glossary definition) and the base case measure. In some early retirements and retrofits, the full cost of the efficient technology is the incremental cost.
Industry standard practice (ISP)	A common practice used within an industry but not defined by code (see Glossary definition). For example, the agriculture sector is not covered by code, so the "typical" level of insulation used on hot water pipes is considered ISP.
Input assumptions	Operating characteristics and associated units of resource savings for DSM technologies and measures (see Glossary definition). These cover a range of typical DSM activities, measures, and technologies with residential, low-income, commercial and industrial applications.
Lifetime cumulative savings	These are total gas savings (in cumulative cubic meters, or CCM) over the life of a measure (see Glossary definition) and they are sometimes referred to as just "cumulative" or "lifetime" savings.

Maintenance (Maint.)	This is to repair, maintain, or restore to prior efficiency and/or optimum operation.
Measure	Equipment, technology, practice, or behavior that, once installed or working, results in a reduction in energy use.
Measure – Enbridge	For Enbridge, measures are identified in the tracking data as a unique combination of project ID and measure ID. Multiple measures may belong to the same project.
Measure – Union	For Union, measure refers to a project ID and line ID in the tracking data. Multiple measures may belong to the same project.
Measure persistence	How long a measure remains installed and performs as originally predicted in relation to its EUL. This considers events like business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued.
Measurement and Verification (M&V)	The verification of energy savings using methods not including attribution/free ridership assessment.
Metric	This is a term used by the OEB to measure a utility's program achievement. Under the DSM framework, programs are grouped into categories, called scorecards. Each program within a scorecard is assigned at least one metric that is used to measure utility performance. The metric for many programs is CCM savings, or a reduction in natural gas consumption, while other programs have non-savings metrics such as the number of program participants. Within each scorecard, various metrics are combined to produce an overall scorecard achievement.
MF	Means multifamily (multi-residential) and can be used to describe a building or program.
Net-to-gross	The ratio of net energy savings to gross savings. The NTG ratio is applied to gross program savings to convert them into net program savings.
New construction (NC)	New buildings or spaces.
Non-early replacement period (non-ER period)	The years after the ER period and up to the EUL.
Normal replacement (NR)	A measure that replaces a piece of equipment that has reached or is past its EUL and not in good operating condition.
Program	The OEB uses this term to categorize sub-units of Scorecards. For example, a program could be the C&I Custom Program within the Resource Acquisition Scorecard. DNV defines programs consistent with the OEB's Decision and Order approving the 2015-2020 DSM Plans.
Program evaluation	The activities related to the collection, analysis, and reporting of data for purposes of measuring program impacts (including gas savings and participation) from past, existing, or potential programs.
Program spending	The amount spent running energy-savings programs, not including the costs of running (called overhead costs) the larger portfolio of programs. This value can be divided into spending for program measures and incentives, as well as program-specific costs.
Project - Enbridge	For Enbridge, projects are identified in the tracking data based on the project ID. A project may have multiple measures as indicated by measure IDs in the current data tracking system.
Project – Union	For Union, projects are identified in the tracking data based on project ID. A project may have multiple measures as indicated by measure IDs in the current data tracking system.
Rate class	The OEB establishes distribution rate classes for Enbridge and Union. Distribution rate classes group customers with similar energy profiles.

Realization rate	This is the ratio of gross evaluated savings to gross claimed savings. This is used to provide a comparison of the savings that were achieved to the savings that were predicted.
Remaining useful life (RUL)	The number of years that the existing equipment would have remained in service and in good operating condition had it not been replaced. This is the same as the ER period.
Replace on burnout (ROB)	A measure that replaces a failed or failing piece of equipment.
Retrofit add-on (REA)	A measure that reduces energy use by modifying an existing piece of equipment.
Scorecard	A scorecard allows for multiple different kinds of metrics such as cumulative natural gas savings and/or participants enrolled to be used simultaneously to measure annual utility performance. Each utility has a scorecard identified for each program year, which can be found in the Ontario Energy Board Decision and Order EB-2015-0029/EB-2015-0049.
Scorecard Achievement	The verified value for program-specific metric targets (CCM, applications, etc.) of each scorecard identified by the Annual Scorecard. This is the value that is verified as the achieved value by the Annual Verification report and used for calculation of the shareholder incentive.
Shareholder Incentive	As part of the current DSM Framework, an annual performance incentive is available to the gas utilities in the event program performance is at or above 75% of the OEB-approved targets up to a maximum of 150%.
Site	Sites are places identified based on unique site addresses provided by Union and Enbridge through the contact information data request. A site may have multiple units of analysis, measures, and projects. Sites can be identified by the evaluation only for records for which we receive contact information – i.e. records associated with account number (Enbridge) or customer ID (Union) that have projects in the sample or backup sample.
Spillover effects	These are reductions in energy consumption and/or demand that occur as a result of the presence of a utility DSM program, but are beyond program-related savings and are not part of the utility's verified savings. These effects could result from many factors including additional efficiency actions that program participants take outside the program as a result of having participated, changes in store availability of energy-using equipment, and changes in energy use by program non-participants as a result of utility program advertising.
System optimization (OPT)	To improve system or system settings to exceed prior efficiency.
TRM	Technical Resource Manual, which is a document that identifies standard methodologies and inputs for calculating energy savings.
TSER	This means telephone-supported engineering review. This is a method to support the verification of energy savings via telephone.
Unit of analysis – Enbridge	The level at which data are analyzed, which in 2021 is a "measure" or sub-project level for Enbridge.
Unit of analysis - Union	The level at which data are analyzed, which in 2021 is a project for Union. A project is equivalent to a measure for Union as the database did not have a sub-project level.
Vendors	Program trade allies, business partners, contractors, and suppliers who work with program participants to implement energy saving measures.

3 INTRODUCTION

Enbridge Gas Inc.[16] delivers demand-side management (DSM) programs[17] under the Demand Side Management Framework for Natural Gas Distributors (2015-2020[18] and extended through 2022[19]) developed by the Ontario Energy Board (OEB). The 2021 Natural Gas DSM Annual Verification Report has been prepared for the OEB to report the results of the annual verification of the utility's natural gas DSM programs delivered in 2021. These verifications were conducted by the OEB's Evaluation Contractor (EC) team of DNV and Dunsky.

As part of the utility DSM plan, programs are grouped into categories, called scorecards. Each program within a scorecard is assigned at least one metric that is used to measure utility performance. The metric for many programs is cumulative cubic meters (CCM) savings, or a reduction in natural gas consumption, while other programs have non-savings metrics such as the number of program participants. Within each scorecard, various metrics are combined to produce an overall scorecard achievement.

Each scorecard metric is assigned a target.[20] The EC uses sampling, engineering reviews, documentation verification, and other techniques to verify the utilities' performance against the target for each program year. The percentage of target achieved for each metric is combined across the scorecard and used to determine the amount the utility is eligible for as a demand-side management shareholder incentive (DSMSI).[21]

In addition to the shareholder incentive, the OEB compensates the utilities for the reduced revenue taken as a result of delivering these DSM programs, called "lost revenue", which is also verified by the EC.

The OEB requires the utilities to deliver DSM programs that are cost-effective, which means the verified benefits produced by the programs outweigh the cost of their implementation.[22] Cost effectiveness results can be found in Sections 9.1.3, 9.2.3, and 11.15.

The OEB formed an evaluation advisory committee (EAC) to provide input and advice to the OEB and the EC on the evaluation and audit of DSM results. The EAC consists of representatives from OEB staff, the utilities, non-utility stakeholders, independent experts, staff from the Independent Electricity System Operator (IESO), and an observer from the Ministry of Energy, Northern Development and Mines. The EC received feedback and input from the EAC on the results of this annual verification. The content included in this report integrates our responses to their input. We thank them for their involvement.

[16] Enbridge Gas Distribution Inc. (Enbridge) and Union Gas Limited (Union) amalgamated effective January 1, 2019 to become Enbridge Gas Inc. In 2021, Enbridge Gas Inc. delivered the two legacy utility DSM plans in its different rate zones – EGD rate zone and Union rate zones (North and South). For ease of reference, throughout this report, the EC has referred to the legacy utility DSM plans as Enbridge and Union.

[17] Throughout this report, the word "program" is used consistent with the OEB's 2015-2020 DSM Framework and Decision on the utilities' 2015-2020 DSM Plans. See Section 2 for additional detail.

[18] EB-2014-0134

[19] EB-2019-0271, OEB Decision and Order on 2021 DSM Plans, July 16, 2020
EB-2021-0002, OEB Decision and Order on 2022 DSM Plans, August 26, 2021

[20] These targets, which were set in part based on 2020 performance, are described in detail in Section 11.10.

[21] A minimum weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive for a scorecard.

[22] The cost-effectiveness methodology is described in detail in Section 11.15.

4 SCORECARD RESULTS: RESOURCE ACQUISITION

Programs within the Resource Acquisition scorecard provide customers with financial incentives that reduce the cost of upgrading to more energy efficient technologies and equipment. This scorecard comprises the largest share of both utilities' budgets and shareholder incentive.

4.1 Scorecard achievements for Enbridge

The metrics for the Enbridge Resource Acquisition scorecard include:

- Total cumulative large volume customer natural gas savings
- Total cumulative small volume customer natural gas savings
- Number of Home Energy Conservation program participants

A detailed explanation of the verification activities for all Resource Acquisition programs can be found in Section 11.5. Verified program achievements are listed in Table 4-1 with DSM shareholder incentive results in Table 4-2.

Table 4-1. Enbridge 2021 Resource Acquisition verified achievements*

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Home Energy Conservation	Large Volume Customer - CCM	-	430,134,894
Residential Adaptive Thermostats		-	
C&I Custom		398,994,369	
C&I Direct Install		6,734,536	
C&I Prescriptive		20,068,154	
Comprehensive Energy Management		3,090,423	
Energy Leaders		908,004	
Run it Right		339,409	
Home Energy Conservation	Small Volume Customer - CCM	203,375,694	317,200,551
Residential Adaptive Thermostats		53,483,128	
C&I Custom		17,002,246	
C&I Direct Install		25,245,015	
C&I Prescriptive		18,209,452	
Comprehensive Energy Management		-	
Energy Leaders		-	
Run it Right		-114,983	
Home Energy Conservation	Participants	15,321	15,321

*Not all values may compute exactly due to rounding.

Table 4-2. Enbridge's 2021 Resource Acquisition targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
LV RA (CCM)	508,307,882	430,134,894	40.00%	84.62%	33.85%
SV RA (CCM)	239,149,677	317,200,551	40.00%	132.64%	53.05%
HEC Participants	10,054	15,321	20.00%	152.39%	30.48%
Verified Total Weighted Scorecard Achieved					117.38%
Maximum Scorecard Incentive					$7,012,787
Verified Scorecard Incentive Achieved					**$4,267,746**

*Not all values may compute exactly due to rounding.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

Table 4-3 shows the net cumulative natural gas savings (CCM) by program, as verified by the EC. Unlike Table 4-1, this table shows overall program totals, not broken out by Large or Small Volume metrics.

Table 4-3. Enbridge's verified 2021 Resource Acquisition savings*

Program	Net Cumulative Savings (m3)
Home Energy Conservation	203,375,694
Residential Adaptive Thermostats	53,483,128
Commercial & Industrial Custom	415,996,615
Commercial & Industrial Direct Install	31,979,551
Commercial & Industrial Prescriptive	38,277,606
Comprehensive Energy Management	3,090,423
Energy Leaders	908,004
Run it Right	224,426
Resource Acquisition Total	**747,335,446**

*Not all values may compute exactly due to rounding.

4.2 Scorecard achievements for Union

This section summarizes the results of the EC's review of the Union Resource Acquisition scorecard. The metrics for the Union Resource Acquisition scorecard include:

- Total cumulative natural gas savings
- Number of Home Reno Rebate program participants

A detailed explanation of the verification activities for all Resource Acquisition programs can be found in Section 11.5. Verified program achievements are listed in Table 4-4 with DSM shareholder incentive results in Table 4-5.

Table 4-4. Union 2021 Resource Acquisition verified achievements*

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Home Reno Rebate	CCM	92,340,855	635,084,369
Residential Adaptive Thermostats		23,183,355	
C&I Custom		470,976,925	
C&I Direct Install		18,403,367	
C&I Prescriptive		30,179,867	
Home Reno Rebate	Participants	5,032	5,032

*Not all values may compute exactly due to rounding.

Table 4-5. Union's 2021 Resource Acquisition targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
CCM	768,727,712	635,084,369	75.00%	82.61%	61.96%
HRR Participants	6,070	5,032	25.00%	82.89%	20.72%
Verified Total Weighted Scorecard Achieved					82.68%
Maximum Scorecard Incentive					$6,562,712
Verified Scorecard Incentive Achieved					**$806,921**

*Not all values may compute exactly due to rounding.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

5 SCORECARD RESULTS: LOW INCOME

Programs within the Low Income scorecard provide eligible customers with opportunities to improve the energy efficiency of their homes (for residential customers) and buildings (for building owners and multifamily customers) at no cost.

5.1 Scorecard achievements for Enbridge

This section summarizes the results of the EC's review of the Enbridge Low Income scorecard. The metrics for the Enbridge Low Income scorecard include:

- Total cumulative natural gas savings for single family homes
- Total cumulative natural gas savings for multi-residential homes
- Total applications for Low Income New Construction

A detailed explanation of the verification activities for all Low Income programs can be found in Section 11.6. Verified program achievements are listed in Table 5-1 with DSM shareholder incentive results in Table 5-2.

Table 5-1. Enbridge 2021 Low Income verified achievements

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Home Winterproofing	CCM	26,443,935	26,443,935
Low Income Multi-Residential	CCM	88,304,418	88,304,418
Low Income New Construction	Applications	13	13

Table 5-2. Enbridge's 2021 Low Income scorecard targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Home Winterproofing CCM	28,769,589	26,443,935	45.00%	91.92%	41.36%
Low Income Multi Residential CCM	92,855,103	88,304,418	45.00%	95.10%	42.79%
Low Income New Construction Applications	13	13	10.00%	100.00%	10.00%
Verified Total Weighted Scorecard Achieved					94.16%
Maximum Scorecard Incentive					$2,263,561
Verified Scorecard Incentive Achieved					**$693,807**

*Not all values may compute exactly due to rounding.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

5.2 Scorecard achievements for Union

This section summarizes the results of the EC's review of the Union Low Income scorecard. The metrics for the Union Low Income scorecard include:

- Total cumulative natural gas savings for single-family programs
- Total cumulative natural gas savings for "social & assisted" multifamily projects
- Total cumulative natural gas savings for "market rate" multifamily projects

A detailed explanation of the verification activities for all Low Income programs can be found in Section 11.6. Verified program achievements are listed in Table 5-3 with DSM shareholder incentive results in Table 5-4.

Table 5-3. Union 2021 Low Income verified achievements*

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Home Weatherization	CCM	45,903,844	45,903,844
Furnace End-of-Life		-	
Indigenous		-	
Multi-Family Social & Assisted	CCM	9,535,480	9,535,480
Multi-Family Market Rate	CCM	8,307,799	8,307,799

*Not all values may compute exactly due to rounding.

Table 5-4. Union's 2021 Low Income targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Single Family CCM	52,751,464	45,903,844	60.00%	87.02%	52.21%
Multi-Family - Social & Assisted CCM	17,447,511	9,535,480	35.00%	54.65%	19.13%
Multi-Family - Market Rate CCM	11,950,032	8,307,799	5.00%	69.52%	3.48%
Verified Total Weighted Scorecard Achieved					74.82%
Maximum Scorecard Incentive					$2,604,447
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

6 SCORECARD RESULTS: LARGE VOLUME

Union's Large Volume Program comprises the entire Large Volume scorecard. This program provides large volume customers[23] with training presentations, energy efficiency calculation tools, energy use analysis, and other technical assistance from Union's Technical Account Managers. It uses a self-directed funding model in which eligible customers can access and utilize funds included in their natural gas rates. Funds from customers electing not to participate are dispersed to fund energy efficiency projects for participating Large Volume customers.

Enbridge did not have DSM programs specifically for their large volume customers in 2021.

6.1 Scorecard achievements for Union

This section summarizes the results of the EC's review of the Union Large Volume scorecard. The metric for the Large Volume scorecard is total cumulative natural gas savings. A detailed explanation of the verification activities for the Large Volume program, broken out by prescriptive and custom savings, can be found in Section 11.7. Verified program achievements are listed in Table 6-1 with DSM shareholder incentive results in Table 6-2.

Table 6-1. Union 2021 Large Volume verified achievements

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Large Volume	CCM	141,733,709	141,733,709

Table 6-2. Union's 2021 Large Volume targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
CCM	116,103,299	141,733,709	100.00%	122.08%	122.08%
Verified Total Weighted Scorecard Achieved					122.08%
Maximum Scorecard Incentive					$694,265
Verified Scorecard Incentive Achieved					**$461,621**

*Not all values may compute exactly due to rounding.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

[23] Large volume customers are those with very high natural gas consumption, typically large industrial and commercial facilities.

7 SCORECARD RESULTS: MARKET TRANSFORMATION

Programs within the Market Transformation scorecard focus on changing customer behavior and attitudes related to energy efficiency, intending to cause permanent change in the marketplace over time. Although energy savings may result from these programs, savings are typically not the primary goal.

7.1 Scorecard achievements for Enbridge

This section summarizes the results of the EC's review of the Enbridge Market Transformation scorecard. The metrics for the Enbridge Market Transformation scorecard include the number of:

- Builders for Residential Savings by Design
- Homes built for Residential Savings by Design
- New developments for Commercial Savings by Design
- Participating schools for School Energy Competition
- Participants for Run it Right
- Participants for Comprehensive Energy Management

As some programs are similar to Union Market Transformation programs, and others similar to Union Performance Based programs, the programs are divided between Section 11.8 (Market Transformation Scorecards) and Section 11.9 (Performance Based (Union) and Market Transformation (Enbridge) Scorecards), as listed in Table 7-1.

Table 7-1. Enbridge Market Transformation program detailed evaluation, by appendix

Enbridge Program	Appendix
Commercial Savings by Design	H
Residential Savings by Design	
School Energy Competition	
Run it Right	I
Comprehensive Energy Management	

Verified program achievements are listed in Table 7-2 with DSM shareholder incentive results in Table 7-3.

Table 7-2. Enbridge 2021 Market Transformation verified achievements

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
School Energy Competition	Schools	-	-
Run it Right	Participants	36	36
Comprehensive Energy Management	Participants	2	2
Residential Savings by Design	Builders	24	24
	Homes Built	2,514	2,514
Commercial Savings by Design	New Developments	17	17

Table 7-3. Enbridge's 2021 Market Transformation scorecard targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
School Energy Competition Schools	58	-	10.00%	0.00%	0.00%
Run it Right Participants	116	36	20.00%	31.03%	6.21%
Comprehensive Energy Management Participants	29	2	20.00%	3.57%	0.71%
Residential Savings by Design Builders	39	24	10.00%	62.50%	6.25%
Residential Savings by Design Homes	3,105	2,514	15.00%	80.96%	12.14%
Commercial Savings by Design Developments	37	17	25.00%	44.44%	11.11%
Verified Total Weighted Scorecard Achieved					36.43%
Maximum Scorecard Incentive					$1,173,652
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

7.2 Scorecard achievements for Union

This section summarizes the results of the EC's review of the Union Market Transformation scorecard. The metrics for the Union Market Transformation scorecard include:

- Percentage of homes built by builders enrolled in the Optimum Home program
- Number of new developments enrolled by participating builders for Commercial New Construction

A detailed explanation of the verification activities for all Market Transformation programs can be found in Section 11.8. Verified program achievements are listed in Table 7-4 with DSM shareholder incentive results in Table 7-5.

Table 7-4. Union 2021 Market Transformation verified achievements

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
Optimum Home	Percentage of Homes Built	73.08%	73.08%
Commercial New Construction	New Developments	24	24

Table 7-5. Union's 2021 Market Transformation targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Optimum Home Percentage of Homes Built	60.88%	73.08%	50.00%	120.03%	60.02%
Commercial New Construction Developments	25	24	50.00%	95.83%	47.92%
Verified Total Weighted Scorecard Achieved					107.93%
Maximum Scorecard Incentive					$405,810
Verified Scorecard Incentive Achieved					**$200,960**

*Not all values may compute exactly due to rounding.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

8 SCORECARD RESULTS: PERFORMANCE BASED

Programs within the Performance Based scorecard focus on helping participating organizations make operational enhancements and improve their energy management practices. Although energy savings may result from these programs, savings are typically not the primary goal.

8.1 Scorecard achievements for Union

This section summarizes the results of the EC's review of the Union Performance Based scorecard. The metrics for the Union Performance Based scorecard include:

- Participants in the RunSmart program
- Percent savings achieved by participants in the RunSmart program
- Percent savings achieved by participants in the Strategic Energy Management program

A detailed explanation of the verification activities for all Performance programs can be found in Section 11.9. Verified program achievements are listed in Table 8-1 with DSM shareholder incentive results in Table 8-2.

Table 8-1. Union 2021 Performance Based verified achievements

Programs	Metrics	Verified Achievement	
		Program-level Achievements	Metric-level Achievements
RunSmart	Participants	-	-
	Savings %	0.00%	0.00%
Strategic Energy Management	Savings %	3.55%	3.55%

Table 8-2. Union's 2021 Performance Based targets, achievements, weights, and incentive*†

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
RunSmart Participants	69	-	10.00%	0.00%	0.00%
RunSmart Savings %	0.44%	0.00%	40.00%	0.00%	0.00%
Strategic Energy Management Savings %	7.87%	3.55%	50.00%	44.93%	22.46%
Verified Total Weighted Scorecard Achieved**					22.46%
Maximum Scorecard Incentive					$182,765
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.
†See Section 11.11 for a detailed description of the scorecard and incentive calculations.

9 UTILTY SUMMARY OF SHAREHOLDER INCENTIVES, PROGRAM SPENDING, COST EFFECTIVENESS, AND LOST REVENUE

This section provides the results of the financial performance of the 2021 DSM programs by utility.

9.1 Enbridge Results

9.1.1 Scorecard Weights and Shareholder Incentives

Table 9-1 shows Enbridge scorecard weights by metric and shareholder incentives by target for all programs. These were the metrics reviewed as part of the annual verification. The utility achieved a shareholder incentive of $4,961,553 or 47% of the maximum possible DSMSI incentive.

Table 9-1. Summary of Enbridge's 2021 achievement weights and shareholder incentives

Scorecard	Program	Metric	Weight	Utility Incentive
Resource Acquisition	Home Energy Conservation Residential Adaptive Thermostats C&I Custom C&I Direct Install C&I Prescriptive Comprehensive Energy Management Run it Right	Large Volume (CCM)	40.0%	$4,267,746
		Small Volume (CCM)	40.0%	
	Home Energy Conservation	Participants	20.0%	
Low Income	Home Winterproofing	CCM	45.0%	$693,807
	Low Income Multi-Residential	CCM	45.0%	
	Low Income New Construction	Applications	10.0%	
Market Transformation	School Energy Competition	Schools	10.0%	$0
	Run it Right	Participants	20.0%	
	Comprehensive Energy Management	Participants	20.0%	
	Residential Savings by Design	Builders	10.0%	
		Homes	15.0%	
	Commercial Savings by Design	Developments	25.0%	
Total Verified Utility Incentive				**$4,961,553**
Incentive if 100% of target achieved				$4,180,000
Maximum possible incentive (if 150% of target achieved)				$10,450,000

*Not all values may compute exactly due to rounding.

9.1.2 Program Spending Summary

The Enbridge tracking database included reported program spending information. The EC has reported on what was provided by Enbridge but has not verified spending figures or conducted a financial audit. Table 9-2 summarizes the spending across the portfolio. Additional spending detail is in Section 11.14.

Table 9-2. Enbridge program cost summary*

Spending Area	OEB-Approved Budget	Utility Spending	Difference ($)	Difference (%)
Program Sub-total (no overhead)	$56,141,657	$61,081,684	$4,940,027	9%
Program Overhead	$7,797,828	$7,362,788	-$435,040	-6%
Process and Program Evaluation	$1,774,228	$518,568	-$1,255,660	-71%
Other**	$2,043,663	$656,740	-$1,386,923	-68%
Total DSM Budget	**$67,757,376**	**$69,619,780**	**$1,862,404**	**3%**

*Not all values may compute exactly due to rounding.
**Other includes DSM IT Chargeback (no utility spending in 2021) and Collaboration and Innovation.

9.1.3 Cost Effectiveness Summary[24]

Table 9-3 and Table 9-4 show summary results for the TRC-Plus and PAC tests, respectively, including the benefit cost ratio and the net present value.[25,26] The EC cost effectiveness methodology applied in 2021 is consistent with what was done for the 2020 analysis. Additional detail, including the key inputs used in the TRC-Plus and PAC tests, is provided in Section 11.15.

Table 9-3. Enbridge summary of cost-effectiveness ratio results, TRC-Plus Test*

Scorecard	NPV Benefits	NPV Costs	NPV Net Benefits (Benefits – Cost)	TRC-Plus Benefit Cost Ratio
Resource Acquisition	$243,593,000	$87,114,000	$156,242,000	2.80
Low Income	$37,202,000	$22,495,000	$14,707,000	1.65
Total	**$280,795,000**	**$109,609,000**	**$171,187,000**	**2.56**

*Not all values may compute exactly due to rounding.

Table 9-4. Enbridge summary of cost effectiveness ratio results, PAC Test*

Scorecard	NPV Benefits	NPV Costs	NPV Net Benefits (Benefits – Cost)	PAC Benefit Cost Ratio
Resource Acquisition	$207,210,000	$49,776,000	$157,435,000	4.16
Low Income	$32,603,000	$11,887,000	$20,716,000	2.74
Total	**$239,813,000**	**$61,662,000**	**$178,151,000**	**3.89**

*Not all values may compute exactly due to rounding.

[24] Cost effectiveness results for the 2021 programs do not reflect the significant gas price increases occurring in 2022.

[25] Unlike Table 1-1 in the Executive Summary or the Enbridge-specific tables in Section 11.15, these tables do not include alternative benefit cost ratios that do not apportion the portfolio-level overhead and administration costs. The alternative ratios are only computed at the OEB-defined individual program level, and not the scorecard or overall portfolio level.

[26] The cost-effectiveness results are based on 2021 carbon tax rates.

9.1.4 Lost Revenue by Rate Class

The EC summed the verified net annual savings (prorated by installation month) by rate class and estimated lost revenues. Table 9-5 shows the results for each rate class.

Table 9-5. Enbridge lost revenue results*

Rate Class	Verified Lost Revenue
Rate 110	$19,534
Rate 115	$2,495
Rate 135	$30,787
Rate 145	$3,786
Rate 170	$605
TOTAL	**$57,207**

*Not all values may compute exactly due to rounding.

9.2 Union Results

9.2.1 Scorecard Weights and Shareholder Incentives

Table 9-6 shows the Union scorecard weights by metric and shareholder incentives by target for all programs. These were the metrics reviewed as part of the annual verification. The utility achieved a shareholder incentive of $1,469,503 or 14% of the maximum possible DSMSI incentive.

Table 9-6. Summary of Union's 2021 achievement weights and shareholder incentives*

Scorecard	Program	Metric	Weight	Utility Incentive
Resource Acquisition	C&I Custom C&I Direct Install C&I Prescriptive Home Reno Rebate Residential Adaptive Thermostats	CCM	75.0%	$806,921
	Home Reno Rebate	Participants	25.0%	
Low Income	Indigenous Furnace End-of-Life Home Weatherization	CCM	60.0%	$0
	Multi-Family (Social & Assisted)	CCM	35.0%	
	Multi-Family (Market Rate)	CCM	5.0%	
Large Volume	Large Volume	CCM	100.0%	$461,621
Market Transformation	Optimum Home	% of Homes Built	50.0%	$200,960
	Commercial New Construction	Developments	50.0%	
Performance-Based	RunSmart	Participants	10.0%	$0
		Savings %	40.0%	
	Strategic Energy Management	Savings %	50.0%	
Total Verified Utility Incentive				**$1,469,503**
Incentive if 100% of target achieved				$4,180,000
Maximum possible incentive (if 150% of target achieved)				$10,450,000

*Not all values may compute exactly due to rounding.

9.2.2 Program Spending Summary

Union's tracking database included program spending by scorecard. The EC has reported on what was provided by Union and has not verified spending figures or conducted a financial audit. Table 9-7 shows the Union budget for the portfolio overall. Additional spending detail is in Section 11.14.

Table 9-7. Union program cost summary*

Spending Area	OEB-Approved Budget	Utility Spending	Difference ($)	Difference (%)
Programs Sub-total (no overhead)	$48,788,000	$40,473,784	-$8,314,216	-17%
Program Overhead	$9,919,541	$7,289,684	-$2,629,857	-27%
Research	$1,000,000	$1,010,783	$10,783	1%
Evaluation	$1,300,000	$347,084	-$952,916	-73%
Administration	$2,842,000	$3,442,573	$600,573	21%
Other**	$500,000	$413,017	-$86,983	-17%
Total DSM Budget	**$64,349,541**	**$52,976,925**	**-$11,372,617**	**-18%**

*Not all values may compute exactly due to rounding.
**Other includes pilot programs and Open Bill Project.

9.2.3 Cost Effectiveness Summary[27]

Table 9-8 and Table 9-9 show summary results for the TRC-Plus and PAC tests, respectively, including the benefit cost ratio and net present value.[28,29] The EC cost effectiveness methodology applied in 2021 is consistent with what was done for the 2020 analysis. Additional detail, including the key inputs used in the TRC-Plus and PAC tests, is shown in Section 11.15.

Table 9-8. Union summary of cost-effectiveness ratio results, TRC-Plus Test*

Scorecard	NPV Benefits	NPV Costs	NPV Net Benefits (Benefits – Cost)	TRC-Plus Benefit Cost Ratio
Resource Acquisition	$154,842,000	$85,106,000	$69,736,000	1.82
Low Income	$20,776,000	$12,535,000	$8,241,000	1.66
Large Volume	$19,454,000	$3,717,000	$15,737,000	5.23
Performance Based	$1,000,000	$151,000	$848,000	6.60
Total	**$196,072,000**	**$101,509,000**	**$94,562,000**	**1.93**

*Not all values may compute exactly due to rounding.

[27] Cost effectiveness results for the 2021 programs do not reflect the significant gas price increases occurring in 2022.

[28] Unlike Table 1-3 in the Executive Summary or the Union-specific tables in Section 11.15, these tables do not include alternative benefit cost ratios that do not apportion the portfolio-level overhead and administration costs. The alternative ratios are only computed at the OEB-defined individual program level, and not the scorecard or overall portfolio level.

[29] The cost-effectiveness results are based on 2021 carbon tax rates.

Table 9-9. Union summary of cost effectiveness ratio results, PAC Test*

Scorecard	NPV Benefits	NPV Costs	NPV Net Benefits (Benefits – Cost)	PAC Benefit Cost Ratio
Resource Acquisition	$134,662,000	$31,448,000	$103,214,000	4.28
Low Income	$18,257,000	$11,966,000	$6,290,000	1.53
Large Volume	$16,386,000	$2,729,000	$13,657,000	6.00
Performance Based	$913,000	$166,000	$747,000	5.49
Total	**$170,218,000**	**$46,309,000**	**123,908,000**	**3.68**

*Not all values may compute exactly due to rounding.

9.2.4 Lost Revenue by Rate Class

The EC summed the verified net annual savings (prorated by installation month) by rate class and estimated lost revenues. Table 9-10 shows the results.

Table 9-10. Union lost revenue results*

Rate Class	Verified Lost Revenue
M4 Industrial	$89,768
M5 Industrial	$4,200
M7 Industrial	$31,007
T1 Industrial	$109
T2 Industrial	$1,042
20 Industrial	$1,142
100 Industrial	$5,948
TOTAL	**$133,216**

*Not all values may compute exactly due to rounding.

10 FINDINGS AND RECOMMENDATIONS

This section contains the findings and recommendations from all studies completed by the EC on the 2021 programs and recommendations from the previous annual verification report that are still relevant and remain outstanding, are in progress, or have been completed.

For 2021, recommendations relate only to the annual verification as no other studies were completed this year at the time or publishing. As noted in the EC's EM&V Plan, there is also an ongoing verification of eTools, a digital Enbridge tool that leverages engineering calculations to estimate energy savings from boiler space and water heating projects. The EC is currently conducting the study comparing the eTools savings estimates with those estimated by modelling site-level energy usage from customer bills, a methodology that leverages actual natural gas data. As this study was ongoing at the time this report was published, the EC did not provide any conclusions from that investigation in this report.

The 2021 annual verification identified several recommendations, most of which were previously identified in annual verification processes. The relative lack of new findings and recommendations is representative of a mature set of programs and a well-developed evaluation process. Compared to earlier evaluation years within this DSM Framework, the EC now encounters few issues, surprises, or gaps in data. This is a result of Enbridge responding effectively to previous recommendations and their willingness to proactively engage in the evaluation process.

Table 10-1, Table 10-2, and Table 10-3 show the findings and recommendations applying to the annual verification overall, whole home simulation modelling, and cost effectiveness, respectively. In the tables, primary outcomes of each finding and recommendation are classified into three categories: reduce costs (evaluation or program or both), improve savings accuracy, and decrease risk (multiple types of risk are in this category including risk of adjusted savings, risk to budgets or project schedules, and others). Further details follow the tables.

Table 10-1. Overall annual verification - summary of recommendations

#	Status	Finding	Recommendation	Previously Recommended	Applies to 2021		Primary Outcome		
					Utility	OEB	Reduce Costs	Improve Accuracy	Decrease Risk
O1	In Progress	Explicit third-party documentation was available for some, but not all, program qualification and participation requirements for all programs.	A: Third-party documentation for each required element for all non-savings metrics should be collected, requested, and delivered.	✓	✓		✓	✓	✓
O2	In Progress	Neither Union nor Enbridge tracking databases currently use prescriptive measure descriptions that map directly to the approved energy savings spreadsheet (TRM).	A: Develop, maintain, and use an electronic summary spreadsheet of the TRM.	✓		✓	✓	✓	✓
			B: Once the electronic TRM spreadsheet is developed, track prescriptive savings using unique measure	✓	✓		✓	✓	✓

			descriptions that map to electronic TRM.						
			C: Once the electronic TRM spreadsheet is developed, utilize the same electronic TRM for both utilities.	✓	✓		✓	✓	✓
			D: Develop means for consistent system.	✓		✓	✓	✓	✓
O3	In Progress	In recent years, evaluation results have stabilized and there have been only small changes to the annual verification activities or results.	A: In the next EM&V plan, consider shifting evaluation resources and attention towards areas that have historically received less rigorous focus but may have a higher risk of inaccurate verification.			✓		✓	✓

Table 10-2. Whole home simulation modelling - summary of recommendations

#	Status	Finding	Recommendation	Previously Recommended	Applies to 2021		Primary Outcome		
					Utility	OEB	Reduce Costs	Improve Accuracy	Decrease Risk
SM1	In Progress	The energy savings from the home retrofit programs rely exclusively on the simulations provided by the delivery agents.	A: Should the program continue to use current modelling software, consider funding a study to verify the models produced by the utility agents.	✓		✓		✓	
SM2	In Progress	Air sealing as a savings measure is present in a high percentage of single-family home retrofit projects.	A: For all whole home programs, provide the EC with air sealing percent improvement and energy savings attributable to air sealing.	✓	✓			✓	✓

Table 10-3. Cost-effectiveness - summary of recommendations

#	Status	Finding	Recommendation	Previously Recommended	Applies to 2021		Primary Outcome		
					Utility	OEB	Reduce Costs	Improve Accuracy	Decrease Risk
CE1	In Progress	All overhead is still applied at the sector level rather than the program level.	A: Allocate "sector"-level administrative cost and overhead to each individual program.	✓	✓	✓		✓	✓
CE2	In Progress	Methodology changes to the calculation of carbon benefits were made due to a federal regulatory update; however, this change was communicated late in the AV process.	A: Increase transparency when changes are made to accepted methodology.		✓			✓	✓
CE3	Completed	Methodologies for calculating incremental cost of dual baseline measures now align when comparing the EC's and Enbridge's calculations	A: Increase transparency in how incremental costs of dual baseline measures are calculated.	✓	✓			✓	

10.1.1 Overall Annual Verification Recommendations

O1. Finding: Explicit documentation (ideally, from a third-party) was not available for all program qualification and participation requirements for all programs. For example, the EC found the following:

- Union's Optimum Home program has a metric of percent of homes built, which is a function of the number of Optimum Homes built and the total number of natural gas housing starts for each builder in the calendar year. Enbridge provided the total number of natural gas housing starts in an Excel file created by Enbridge, but no independent proof to support the requirement.

Recommendation A: Third-party documentation for each required element for all non-savings metrics should be collected, requested, and delivered to the EC to prove program qualification and participation.

Previously Recommended: Yes – since the 2016 AV report.

Outcome: Reduced burden on utility staff and reduced evaluation costs.

Utility Response: As noted in the utility response to this recommendation in the 2020 verification report, the data on total number of natural gas housing starts does not come from a third party. It is output generated directly into Excel from an internal Enbridge database. No meaningful screenshot of the data within the database is possible. The EC should clarify what additional steps can be taken to address this recommendation.

EC Response: The EC considers this recommendation as in-progress, as it failed to follow up with Enbridge regarding additional supporting documentation for the Optimum Home program in the 2021 verification. The EC will pursue this recommendation further in the 2022 verification.

O2. Finding: Both Union and Enbridge tracking databases currently use prescriptive measure descriptions that map directly to *internally* consistent measure names. However, there is not a universally accessible (i.e., public) dataset that is fully transparent and comprehensive for all prescriptive and quasi-prescriptive measures. While the Technical Resource Manual (TRM) provides full documentation for new or updated measures; it does not provide a comprehensive resource for all currently accepted measures nor does it provide a concise location for all items that can impact gross or net savings such as detailed accounting of free ridership.

Recommendation A: Develop, maintain, and use an electronic summary of the TRM, such as an Excel file. Each measure (identified as a unique savings value) should have an assigned measure ID number, and new ID numbers should be assigned when a measure is updated with a new savings value. This allows for a historical record of the changes in the TRM and allows the evaluation to identify outdated values. For simplification and transparency, this system should be utilized for both utilities.

Recommendation B: Once the electronic TRM is developed, track prescriptive savings using unique measure descriptions that clearly map to the electronic TRM.

Recommendation C: Once the electronic TRM is developed, utilize the same electronic summary file for both utilities.

Recommendation D: As the entity with primary ownership of the TRM, the OEB should develop the references for parties to directly refer to specific measures in a consistent way which accounts for variations in energy savings due to capacity or other characteristics.

Previously Recommended: Yes – since the 2015 AV Report.

Outcome: Reduced burden on utility staff and reduced evaluation costs. Fewer errors in the tracking data.

Utility Response: As noted in Recommendation D, the OEB has primary ownership of the TRM including the development of a complete electronic TRM and unique measure IDs. Enbridge proposes that Board Staff address the EC's finding but that Enbridge needs to be involved to ensure the electronic TRM is developed in a manner that is functional within Enbridge tracking systems. Enbridge also notes its understanding that there were no errors in the 2021 natural gas savings tracking data for prescriptive measures in its portfolio.

OEB Response: As noted in its response to this recommendation in the 2020 AV Report, the OEB supports this recommendation and gave DNV direction to immediately develop the suggested electronic summary of the TRM for implementation as part of the 2021 program evaluation process. The OEB expects that the electronic TRM will be incorporated into future evaluation efforts following the 2021 evaluation process.

EC Response: The EC considers this recommendation as in-progress, as it has developed a beta version of this electronic TRM (eTRM) resource. Pending preliminary testing and confirmation of this beta version on the 2021 program data (which was ongoing at the time this report was published), the EC plans to fully implement the eTRM into its verification process in the next evaluation year.

O3. Finding: Over the course of the current DSM Framework and EM&V Plans, the evaluation results have stabilized and there have been only small changes to the annual verification activities or results in recent years. Assuming the new DSM Framework is based on the current programs and will not entail a wholesale change to program structure or make-up, this stability in evaluation is likely to continue. This presents an opportunity in the next EM&V planning process to construct a more rigorous evaluation of metrics that do not currently, but could, entail more third-party verification of participation and project details. This potential evaluation change would likely focus on non-savings metrics.

Recommendation A: In the next EM&V plan, consider shifting evaluation resources and attention away from well-developed areas with relatively low risk of systematic errors (like prescriptive savings verification) towards those that have historically received less rigorous focus but may have a higher risk of inaccurate verification (like participation-type metrics).

Previously Recommended: No.

Outcome: Greater certainty of metric achievements. Decreased risk of inaccurate verification of non-savings metrics.

Utility Response: As noted in Table 10-1, this recommendation is directed to the OEB.

OEB Response: The OEB supports this recommendation and will consider how to best incorporate into its next EM&V plan following the OEB's Decision and Order regarding Enbridge's proposed multi-year DSM plan application for 2023 and beyond.

EC Response: This is a new recommendation. The EC looks forward to working with the OEB to incorporate this potential change in the next evaluation year.

10.1.2 Whole Home Simulation Modelling Recommendations

SM1. Finding: The energy savings from the home retrofit programs rely exclusively on the simulations provided by the delivery agents. Those simulations likely rely on a number of assumptions or standard modelling practices which may or may not follow industry standards. Although these assumptions and practices may follow NRCan protocols, those protocols were not specifically designed for the delivery of a DSM program and may not be appropriate in this situation. A detailed review of the models was outside the scope of the annual audit.

Recommendation A: Consider funding a study to verify the models produced by the utility agents to ensure they conform to standard industry practice.

Previously Recommended: Yes – since the 2015 AV report.

Outcome: Greater certainty around savings estimates.

Utility Response: As noted in Table 10-2, this recommendation is directed to the OEB. For clarity, HOT2000 is the modelling software within Enbridge's OEB-approved DSM Plans for use in whole home modelling offerings.[30] The residential Home Efficiency Rebate offerings are delivered by registered Energy Advisors affiliated with NRCan-licensed Service Organizations, with the expectation that NRCan HOT2000 protocols/standards are being followed given that this is a licencing requirement. Failure to follow these protocols/standards could result in suspension or loss of licence by NRCan, which would in turn render Energy Advisors ineligible to participate in Enbridge's program.

OEB Response: The OEB supports this recommendation and has indicated its interest in completing this study pending direction related to the future of Enbridge's residential home retrofit program. Based on the OEB's Decision and Order regarding Enbridge's proposed multi-year DSM plan application for 2023 and beyond, OEB will determine the appropriate timing and scope of any study of the residential program once there is greater clarity and certainty of the program's future.

EC Response: The EC considers this recommendation as on-hold. Should the residential home retrofit program be approved to continue and use the same or similar modelling software, the EC's recommendation stands. It is important to verify that the Energy Advisors using the modelling software are doing so consistently with industry best practice for natural gas efficiency programs.

SM2. **Finding:** Air sealing as a savings measure is present in a high percentage of single-family home retrofits (over 95% of homes in some programs). With such a high percentage of projects relying on a single measure type, particularly one with such wide variance in savings per household, it is important to ensure the savings validity of that measure. Enbridge has provided air sealing percent improvement for each household for the Home Energy Conservation and Home Reno Rebate programs, but not the Low Income whole home programs (Home Winterproofing and Home Weatherization). Further, the energy savings attributable to air sealing for each household has not been provided.

Recommendation A: If possible, Enbridge should provide the EC with air sealing percent improvement and energy savings attributable to air sealing for each household participating in all whole home programs. This could potentially be accomplished by having the energy advisors implementing the programs run the simulations with and without the air sealing measure.

Previously Recommended: Yes – since the 2016 AV report.

Outcome: Greater certainty around savings estimates.

Utility Response: Enbridge notes the EC's observation of air sealing (also known as draft proofing) being a measure in a high percentage of single-family home retrofits refers to HER and not HWP.

Eligibility in Enbridge's whole home residential HER offerings requires installation of a certain number of "major" measures. For example, to count draft proofing as a major measure, air changes per hour ("ACH") data needed to calculate air sealing percent improvement must be collected for comparison against a measure eligibility threshold.

[30] See for example EB-2015-0029, 2015-2020 DSM Plan Union Gas Limited, Exhibit A Tab 2 Page 13 of 38

Since ACH values are collected for HER, Enbridge will continue to provide the EC with these values and air sealing percentage improvements for all HER participants as it has done in the 2021 verification cycle.

Enbridge's low-income HWP offerings involve the direct install of whole home upgrades that can reasonably be done in a home while keeping above a TRC ratio of 0.7 for the low-income program. There are no requirements that any specific upgrade, such as draft proofing, needs to hit a certain eligibility threshold. As such, ACH values are not extracted from the HOT2000 simulation files and air sealing percent improvement is not calculated or tracked for HWP participants. However, Enbridge does note that ACH values can be found in the sample of HWP simulation files it provides each year to the EC. Air sealing percent improvement can be calculated from those values.

Currently, HWP ACH data can only be extracted manually. There are thousands of homes claimed through the HWP offerings and this manual extraction would be resource intensive. Considering the resources required, Enbridge would like to better understand the need to manually collect ACH values for homes participating the HWP offerings since this data is not needed to assess HWP eligibility, calculate whole home energy savings or compare offering results to scorecard metrics.

As the EC noted in its response to this recommendation in the 2020 verification report, providing energy savings attributed to air sealing (draft proofing) for each household participating in HER and HWP whole home programs would require energy advisors to run HOT2000 simulations both with and without the air sealing measure. This would be complicated to conduct in field and be resource intensive. It would also require storing additional simulation files, extracting twice the data and maintaining this information in our tracking systems. Considering the resources required, Enbridge would like to better understand the need to conduct these additional steps since the data is not needed to assess eligibility, calculate whole home energy savings, or compare offering results to scorecard metrics.

EC Response: The EC considers this recommendation as in-progress. Enbridge is correct that collecting the above-referenced data is not currently required within the DSM framework. However, since air sealing is a crucial component of the whole home programs (as outlined above), it may be a candidate for further examination in the future. The EC will work with the OEB and Enbridge to identify what additional steps should be taken.

10.1.3 Cost Effectiveness Recommendations

CE1. Finding: For 2021, like previous years, administrative and overhead costs are allocated differently by each legacy utility. For example, legacy Union Gas identifies administration and evaluation costs at the scorecard level whereas Enbridge details spending as direct and indirect at the OEB-defined program level and then has an explicit 'overhead' spend at the scorecard level. Differences between each legacy utility's rate zones and how cost effectiveness is reported reflects the approved DSM plans developed in 2015 by separate organizations. In the absence of clear alignment of administrative and overhead costs, the EC apportioned Enbridge 'overhead' costs based on the distribution of savings. In 2019, Enbridge and OEB agreed that it is not appropriate to make fundamental changes in the middle of the DSM Framework, and full alignment should occur as part of the next DSM Framework and Plan.

Recommendation A: Under the next framework, Enbridge and the OEB should agree on a plan that calculates cost effectiveness at the appropriate level, allocates administrative costs and overhead to each component at the appropriate level, and ensures that cost-effectiveness results properly reflect true program costs and benefits.

Previously Recommended: Yes – since the 2015 AV Report.

Outcome: Ensure all costs are properly accounted for and allocated at the appropriate level so cost effectiveness results better reflect the true program costs.

EC Response: Enbridge Gas agrees with the EC that this issue is best dealt with via OEB Decision on Enbridge's multi-year DSM plan application for 2023 and beyond where full alignment between rate zones ought to occur.

OEB Response: As noted in its response to this recommendation in the 2020 AV Report, the OEB generally supports this recommendation. In particular, the OEB supports consistency in how costs are reported and ensuring accuracy of the cost effectiveness calculations. The ultimate decision on how this will be administered in the future will be determined by the panel of OEB Commissioners deciding on Enbridge's multi-year DSM plan application for 2023 and beyond.

EC Response: The EC considers this recommendation as in-progress as the 2022-2027 DSM Framework and Plan have not been formally approved.

CE2. **Finding**: Enbridge instituted two changes to the methodology to calculate the cost of carbon in 2021, one of which reflects the number of participants subject to the carbon charge and one of which reflects the magnitude of the charge. In the 2020 verification, all natural gas savings provided the same carbon benefits per CCM saved, whereas for 2021, Enbridge applied a weighting factor to reflect the proportion of customers within a rate class which are subject to the carbon charge. Also in the 2020 verification, the cost of carbon was defined by the Greenhouse Gas Pollution Pricing Act whereas for 2021, Enbridge adjusted the carbon charge per a December 2020 federal regulatory update, which established annual carbon pricing increases of $15/tonne from 2023 to 2030. Beyond 2030, a 2% inflation rate for remaining years (i.e., year 20 to 30) was applied. Typically, fundamental changes in the middle of the DSM Framework are not deemed appropriate (e.g., see CE1 above); however, the impact of applying the weightings to account for fully and partially exempt customers and volumes is material. The EC was directed to make these changes by the OEB during the cost effectiveness verification activities to accurately reflect the impact of carbon pricing in TRC calculations. Enbridge is encouraged to communicate to the EC when methodological changes such as this occur during the DSM Framework.

Recommendation A: Increase transparency and communication when changes are made to accepted methodology.

Previously Recommended: No.

Outcome: Ensure consistent methodology to assess cost effectiveness and increase efficiency of the evaluation.

Utility Response: At the launch of the annual verification cycle in April 2022, Enbridge provided the EC with the information needed to calculate avoided carbon costs using the updated methodology and a note highlighting the change. Moving forward, Enbridge will attempt to identify similar changes to accepted methodology more clearly.

EC Response: This is a new recommendation. The EC will continue to work with Enbridge to ensure effective communication when methodological changes are made.

CE3. **Finding**: In the past, it was not clear how Enbridge calculated incremental costs regarding dual baseline measures. Calculating the incremental cost for dual baseline measures is more involved than for replace on burnout measures, and the EC's and Enbridge's calculations often resulted in slightly different values. For the 2021 verification, the EC's and Enbridge's calculation of incremental costs resulted in the exact same cost effectiveness values, indicating alignment on methodology. As a result, this recommendation from the previous report has been completed.

Recommendation A: Increase transparency in how incremental costs of dual baseline measures are calculated.

Previously Recommended: Yes – since the 2020 AV Report.

Outcome: Ensure accurate cost effectiveness results.

Utility Response: Enbridge will continue with the aligned dual baseline methodology used in the 2021 verification.

EC Response: This recommendation from the previous report has been completed.

11 APPENDICES

11.1 Appendix A: Evaluation Background

Enbridge and Union deliver energy efficiency programs under the Demand Side Management Framework for Natural Gas Distributors (2015-2020 and extended through 2022) developed by the OEB. For the 2015 program year, both utilities "rolled-over" their 2014 plans into 2015 to allow them a smooth evolution into the new DSM framework. For the 2016 program year (and continuing through 2021), the new framework was implemented, resulting in changes to the programs offered, as shown in Table 11-1. Programs included in the plan and offered by the utilities are marked with a check, those in the plan and offered by the utilities but with no activity reported are marked with an X.

Table 11-1. DSM programs offered – 2015 through 2021

Scorecard	Program Name	2015	2016	2017	2018	2019	2020	2021
Enbridge								
Resource Acquisition	C&I Custom	✓	✓	✓	✓	✓	✓	✓
	C&I Direct Install		✓	✓	✓	✓	✓	✓
	C&I Prescriptive	✓	✓	✓	✓	✓	✓	✓
	Comprehensive Energy Management		✗	✗	✗	✗	✓	✓
	Energy Leaders Initiative		✓	✓	✓			✓
	Home Energy Conservation	✓	✓	✓	✓	✓	✓	✓
	Residential Adaptive Thermostats		✓	✓	✓	✓	✓	✓
	Run it Right (CCM)	✓	✓	✓	✓	✓	✓	✓
	Small Commercial New Construction		✗	✗	✗			
Low Income	Low Income Multi-Residential	✓	✓	✓	✓	✓	✓	✓
	Low Income New Construction	✓	✓	✓	✓	✓	✓	✓
	Home Winterproofing		✓	✓	✓	✓	✓	✓
Market Transformation	Commercial Savings by Design	✓	✓	✓	✓	✓	✓	✓
	Residential Savings by Design	✓	✓	✓	✓	✓	✓	✓
	School Energy Competition	✓	✓	✓	✓	✓	✓	✗
	Run it Right (Participants)		✓	✓	✓	✓	✓	✓
	Comprehensive Energy Management		✓	✓	✓	✓	✓	✓
Home Labelling	Home Labelling	✓						
Union								
Resource Acquisition	C&I Custom	✓	✓	✓	✓	✓	✓	✓
	C&I Direct Install			✓	✓	✓	✓	✓
	C&I Prescriptive	✓	✓	✓	✓	✓	✓	✓
	Energy Savings Kit	✓						
	Home Reno Rebate	✓	✓	✓	✓	✓	✓	✓
	Residential Adaptive Thermostats					✓	✓	✓
Low Income	Home Weatherization	✓	✓	✓	✓	✓	✓	✓
	Furnace End-of-Life		✓	✓	✗	✓	✗	✗
	Multifamily (Social and Assisted)		✓	✓	✓	✓	✓	✓
	Multifamily (Market Rate)		✓	✓	✓	✓	✓	✓
	Indigenous			✓	✓	✓	✗	✗
	Affordable Housing Conservation	✓						
Large Volume	Large Volume	✓	✓	✓	✓	✓	✓	✓
Market Transformation	Optimum Home	✓	✓	✓	✓	✓	✓	✓
	Commercial New Construction		✗	✓	✓	✓	✓	✓
Performance Based	RunSmart		✓	✓	✓	✓	✓	✗
	Strategic Energy Management		✓	✗	✓	✗	✓	✓

✓=Offered and reported ✗=Offered but no activity reported

Table 11-2 shows how the metrics under each scorecard have changed over time.

Table 11-2. Energy efficiency metrics – 2016 through 2021

Scorecard	Metric	2016	2017	2018	2019	2020	2021
Enbridge							
Resource Acquisition	Large Volume Customer Savings (CCM)	✓	✓	✓	✓	✓	✓
	Small Volume Customer Savings (CCM)	✓	✓	✓	✓	✓	✓
	Home Energy Conservation - Participants	✓	✓	✓	✓	✓	✓
Low Income	Home Winterproofing (CCM)	✓	✓	✓	✓	✓	✓
	Low Income Multi-Residential (CCM)	✓	✓	✓	✓	✓	✓
	Low Income New Construction – Project Applications	✓	✓	✓	✓	✓	✓
Market Transformation	Commercial Savings by Design – New Developments	✓	✓	✓	✓	✓	✓
	Comprehensive Energy Management – Participants	✓	✓	✓	✓	✓	✓
	Residential Savings by Design – Builders	✓	✓	✓	✓	✓	✓
	Residential Savings by Design – Homes Built			✓	✓	✓	✓
	Run it Right – Participants	✓	✓	✓	✓	✓	✓
	School Energy Competition - Schools	✓	✓	✓	✓	✓	✓
Union							
Resource Acquisition	CCM	✓	✓	✓	✓	✓	✓
	Home Reno Rebate - Participants	✓	✓	✓	✓	✓	✓
Large Volume	CCM	✓	✓	✓	✓	✓	✓
Low Income	Single Family CCM	✓	✓	✓	✓	✓	✓
	Multifamily Social & Assisted CCM	✓	✓	✓	✓	✓	✓
	Multifamily Market Rate CCM	✓	✓	✓	✓	✓	✓
Market Transformation	Commercial New Construction - New Enrolled Developments	✓	✓	✓	✓	✓	✓
	Optimum Home - % of Homes Built	✓		✓	✓	✓	✓
	Optimum Home - Participating Builders		✓	✓	✓		
	Optimum Home - Homes		✓	✓	✓		
Performance Based	RunSmart - Participants	✓	✓	✓	✓	✓	✓
	RunSmart - Savings %		✓	✓	✓	✓	✓
	Strategic Energy Management - Participants	✓	✓	✓			
	Strategic Energy - Savings %			✓	✓	✓	✓

The OEB hired the EC team to develop an overall evaluation, measurement, and verification (EM&V) plan and lead an annual verification of the reported utility DSM savings and scorecard achievements. This report is a result of that annual verification.

This report applies the results of several, previously completed studies:

- A study measuring the free ridership within the custom projects[31] implemented in the 2018 program year[32]
- A study verifying the custom project savings (CPSV) during the 2017 and 2018 program years[33,34]
- A study verifying the prescriptive project savings from prescriptive projects implemented in the 2017 program year[35]
- A study of custom measure lives, completed in May 2018.[36]
- A study of the spillover resulting from the implementation of custom projects during the 2013-2014 program years, completed in May 2018.[37]

[31] Low Income custom projects were not included in the NTG study.

[32] 2018 Natural Gas Demand Side Management Free-ridership Evaluation, DNV for the Ontario Energy Board, December 27, 2019

[33] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[34] Due to complications from the COVID-19 pandemic, the EC was unable to complete planned studies verifying the custom project savings (CPSV) from the 2019, 2020, and 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2019, 2020, and 2021.

[35] 2017 C&I Prescriptive Verification: Final Report – Measurement of NTG Factors and Gross Savings Verification, Itron for the Ontario Energy Board, June 7, 2019

[36] Final Report: Custom Measure Life Review, Michaels Energy for the Ontario Energy Board, May 10, 2018

[37] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018

11.2 Appendix B: Metric Verification Activities

To verify the metric achievements, the EC conducted the activities outlined in Table 11-3 and Table 11-4. The utilization of each activity depends on the "type" of measure being reviewed. DNV defined four different types of measures, listed below. A single program or scorecard metric may have more than one type of measure.

Prescriptive (P): Prescriptive gas savings measures are those where all savings inputs can be identified in the technical resource manual (TRM). This includes not only the prescribed savings but also additional prescribed inputs such as expected useful life (EUL) and free ridership rates.

Custom (C): Custom gas savings measures are those gas measures of equipment or actions (tune up, process) which are not prescribed by the TRM. Examples include measures verified as part of the CPSV process as well as non-prescribed programs like Run it Right.

Whole Home (W): Whole home savings are savings calculated using home modelling software (HOT2000).

Other (O): In addition to direct gas savings measures, the scorecards recognize additional metrics, such as the number of enrolled participants, new developments, or schools in a program or the percentage of homes built by a participating builder achieving certain efficiency levels.

Activities to verify the measures fall into three general categories. As previously stated, the utilization of each method is determined by the measure type.

- **Confirm Tracking:** Confirmation that the entries and calculations within the submitted tracking data accurately contribute to scorecard metrics.
  - *Prescriptive measures:* The EC confirmed that measure-level inputs were applied from the TRM where appropriate (such as savings per unit), then recalculated gross and net savings based on those inputs to verify the tracked net savings for a census of measures.
  - *Custom measures:* The EC used the results of the custom project savings verification, free ridership, and spillover studies conducted through separate processes.
  - *Whole Home and Other measures:* The EC confirmed that tracking records matched utility-reported achievement. Additional verification took place in other activities.
- **Apply Factors:** Application of relevant factors that are not otherwise applied in the TRM, such as gross savings adjustments, free ridership adjustments, and spillover ratios.
  - *Prescriptive measures*: The EC used the results of the C&I Prescriptive Verification and installation rate studies conducted through separate processes.
  - *Custom measures*: The EC used the results of the CPSV, free ridership, and spillover studies conducted through separate processes.
- **Desk Review:** File review of utility-provided documentation to verify whether the achievements in the tracking data were actually realized. Unless specifically mentioned otherwise, desk review methods were similar to those used in the prior verification.
  - *Whole Home:* Desk review included tasks such as review of energy software (HOT2000) modelling records for whole home programs.
  - *Other:* For scorecards with Other metrics, program achievements such as customer participation, eligibility for participation, and developer homes were evaluated using program records specific to each scorecard, program, and metric.

Table 11-3 and Table 11-4 identify the measure types within each scorecard and program as well as the method used to evaluate that program, corresponding with the measure type.

Table 11-3. 2021 Annual verification activities by program: Enbridge

Scorecard	Program	Measure Types	Confirm Tracking	Apply Factors	Desk Review
Resource Acquisition	C&I Custom	C		✓	
	C&I Direct Install	P	✓	✓	
	C&I Prescriptive	P	✓	✓	
	Comprehensive Energy Management	C		✓	
	Energy Leaders	C	✓	✓	✓
	Home Energy Conservation	W O	✓	✓	✓
	Residential Adaptive Thermostats	P	✓	✓	
	Run it Right	C	✓	✓	✓
Low Income	Home Winterproofing	P W	✓	✓	✓
	Multi-Residential	P C	✓	✓	
	New Construction	O	✓		✓
Market Transformation	Commercial Savings by Design	O	✓		✓
	Comprehensive Energy Management	O	✓		✓
	Residential Savings by Design	O	✓		✓
	Run it Right	O	✓		✓
	School Energy Competition	No 2021 activity reported			

Table 11-4. 2021 Annual verification activities by program: Union

Scorecard	Program	Measure Types	Confirm Tracking	Apply Factors	Desk Review
Resource Acquisition	C&I Custom	C		✓	
	C&I Direct Install	P	✓	✓	
	C&I Prescriptive	P	✓	✓	
	Home Reno Rebate	W O	✓	✓	✓
	Residential Adaptive Thermostats	P	✓	✓	
Large Volume	Large Volume	C	✓	✓	
Low Income	Indigenous	No 2021 activity reported			
	Furnace End-of-Life	No 2021 activity reported			
	Home Weatherization	P W	✓	✓	✓
	Multifamily Social & Assisted	P C	✓	✓	
	Multifamily Market Rate	P C	✓	✓	
Market Transformation	Commercial New Construction	O	✓		✓
	Optimum Home	O	✓		✓
Performance Based	RunSmart	No 2021 activity reported			
	Strategic Energy Management	O	✓		✓

Desk reviews of Whole Home and Other measures require additional information beyond what is provided in the tracking data. For example, the EC requested HOT2000 files and other documentation to confirm participation and eligibility for a sample of relevant participants in the Home Energy Conservation, Home Reno Rebate, Winterproofing, and Home Weatherization programs. Table 11-5 and Table 11-6 show the number of projects for which the EC requested additional documentation.

Table 11-5. Desk Review Sample: Enbridge

Scorecard	Program	Sample Requested
Resource Acquisition	Home Energy Conservation	30 Randomly Selected Homes
	Run it Right	10 Randomly Selected Projects
	Energy Leaders	Census
Low Income	Home Winterproofing	30 Randomly Selected Homes
	New Construction	Census
Market Transformation	Commercial Savings by Design	10 Randomly Selected Sites
	Comprehensive Energy Management	Census
	Residential Savings by Design	10 Randomly Selected Builders
		5 Randomly Selected Homes
	Run it Right	15 Randomly Selected Participants

Table 11-6. Desk Review Sample: Union

Scorecard	Program	Sample Requested
Resource Acquisition	Home Reno Rebate	30 Randomly Selected Homes
Low Income	Home Weatherization	30 Randomly Selected Homes
Market Transformation	Optimum Home	5 Randomly Selected Homes
	Commercial New Construction	10 Randomly Selected Projects
Performance-Based	Strategic Energy Management	Census

11.3 Appendix C: Changes from 2020 Annual Verification

There were no major changes between the 2020 and 2021 program year evaluations, but several small changes did occur. These included:

- **Programs not previously executed**: Enbridge's Energy Leaders was implemented/executed in 2021 but had not been since 2018.
- **Programs previously executed**: Enbridge's School Energy Competition and Union's RunSmart programs were implemented/executed in 2020 but had no activity in 2021. Union's Indigenous and Furnace End-of-Life programs, which were last executed and implemented in 2019, continued to report no activity in 2021.
- **Changed scorecard metrics:** There were no changes between 2020 and 2021 scorecard metrics.

11.4 Appendix D: Summary of Verification Adjustments

Table 11-7 and Table 11-8 provide a combined summary of metrics for Enbridge programs and Union programs, respectively. These tables show where the EC made adjustments of greater than 1% from the values identified in *tracking data*.

Table 11-7. Enbridge Metrics with Verified Value Greater than 1% Different from Tracked

Programs	Metrics	>1% Difference?
Resource Acquisition		
C&I Custom	Large Volume Customers CCM	
C&I Direct Install		
C&I Prescriptive		
Comprehensive Energy Management		
Energy Leaders		✓
Run it Right		
Home Energy Conservation (HEC)	Small Volume Customers CCM	
Residential Adaptive Thermostats		
C&I Custom		
C&I Direct Install		
C&I Prescriptive		
Energy Leaders		
Comprehensive Energy Management		
Home Energy Conservation (HEC)	HEC Participants	
Low Income		
Home Winterproofing	LISF (CCM)	
Low Income Multi-Residential	LIMR (CCM)	
Low Income New Construction	LINC Applications	
Market Transformation		
School Energy Competition	SEC Schools	
Run it Right	RiR Participants	
Comprehensive Energy Management	CEM Participants	
Residential Building by Design	RSBD Builders	
	RSBD Homes	
Commercial Building by Design	CSBD Developments	

Table 11-8. Union Metrics with Verified Value Greater than 1% Different from Tracked

Programs	Metrics	>1% Difference?
Resource Acquisition		
Home Reno Rebate	RA (CCM)	
Residential Adaptive Thermostats		
C&I Custom		
C&I Direct Install		
C&I Prescriptive		
Home Reno Rebate	HRR Participants	
Low Income		
Home Weatherization	LISF (CCM)	✓
Furnace End-of-Life		
Indigenous		
Multi-Family	LIMF-SA (CCM)	
	LIMF-MR (CCM)	
Large Volume		
Large Volume	LV (CCM)	
Market Transformation		
Optimum Home	Percentage of Homes Built	
Commercial New Construction	CNC Developments	
Performance Based		
RunSmart	RS Participants	
	RS Savings %	
Strategic Energy Management	SEM Savings %	

11.5 Appendix E: Resource Acquisition Scorecards

This appendix describes the detailed process used to verify the metrics for the Resource Acquisition Scorecard programs for Enbridge (Table 11-9) and Union (Table 11-10). The programs addressed in this appendix are:

- Residential Home Retrofit – Home Energy Conservation – Enbridge
- Residential Home Retrofit – Home Reno Rebate – Union
- Residential Adaptive Thermostats – Enbridge
- Residential Adaptive Thermostats – Union
- C&I – Prescriptive – Enbridge
- C&I – Prescriptive – Union
- C&I – Direct Install – Enbridge
- C&I – Direct Install – Union
- C&I – Custom – Enbridge
- C&I – Custom – Union
- Comprehensive Energy Management – Enbridge
- Energy Leaders – Enbridge
- Run it Right – Enbridge

Table 11-9. Enbridge 2021 Resource Acquisition scorecard*[38]

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Home Energy Conservation	Large Volume Customer - CCM	-	430,134,894	381,230,912	508,307,882	762,461,823	40.00%
Residential Adaptive Thermostats		-					
C&I Custom		398,994,369					
C&I Direct Install		6,734,536					
C&I Prescriptive		20,068,154					
Comprehensive Energy Management		3,090,423					
Energy Leaders		908,004					
Run it Right		339,409					
Home Energy Conservation	Small Volume Customer - CCM	203,375,694	317,200,551	179,362,258	239,149,677	358,724,516	40.00%
Residential Adaptive Thermostats		53,483,128					
C&I Custom		17,002,246					
C&I Direct Install		25,245,015					
C&I Prescriptive		18,209,452					
Comprehensive Energy Management		-					
Energy Leaders		-					
Run it Right		-114,983					
Home Energy Conservation	Participants	15,321	15,321	7,541	10,054	15,081	20.00%

*Not all values may compute exactly due to rounding.

[38] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Schedule C

Table 11-10. Union 2021 Resource Acquisition scorecard*[39]

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Home Reno Rebate	CCM	92,340,855	635,084,369	576,545,784	768,727,712	1,153,091,568	75.00%
Residential Adaptive Thermostats		23,183,355					
C&I Custom		470,976,925					
C&I Direct Install		18,403,367					
C&I Prescriptive		30,179,867					
Home Reno Rebate	Participants	5,032	5,032	4,553	6,070	9,105	25.00%

*Not all values may compute exactly due to rounding.

[39] Ibid.

11.5.1 Residential Home Retrofit - Home Energy Conservation – Enbridge

Overview

Table 11-11 shows the tracked and verified scorecard achievements for the 2021 Enbridge Home Energy Conservation (HEC) Program, with the metrics of CCM savings and participants (homes). As a result of this review, the EC verifies 203,375,694 CCM (100.00% of tracked) and 15,321 participants (100.00% of tracked). Each metric is discussed separately in this section, starting with the participants metric. Table 11-11 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-11. Enbridge Resource Acquisition achievement: Home Energy Conservation metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	-	-	-
Small Volume Customer - CCM	203,375,694	203,375,694	100.00%
Participants (Homes)	15,321	15,321	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-12 to verify the metrics for the Home Energy Conservation program.

Table 11-12. Documentation used to verify the Home Energy Conservation program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Enbridge provided the Tracking File listing 15,321 individual participants in the HEC program. To certify the scorecard metrics, the EC randomly selected 30 participants for review, requested additional documentation, confirmed receipt of the correct files, and reviewed documents to verify participation and eligibility.

Received Files

The folder had the following information:

- Photographs of pre- and post-installation conditions
- HOT2000 Model input or “Simulation” Files (.h2k)
- HOT2000 Model Output Files (.xls) aggregated in one spreadsheet

Participants Metric

Table 11-13 shows the tracked and verified scorecard achievements for the 2021 Enbridge HEC program with the metric of participant homes.

Table 11-13. Enbridge Resource Acquisition achievement: HEC Program participants metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Participants (Homes)	15,321	15,321	100.00%

*Not all values may compute exactly due to rounding.

Verify Participation and Eligibility

The Resource Acquisition Scorecard identifies one metric for the program as "Residential Deep Savings Participants (Homes)". To determine the definition of "participants," the EC looked first to the OEB Decision, which identified approval of the Enbridge Home Energy Conservation program.[40] The EC next looked to Enbridge's plan, which identified the following criteria:[41,42]

1. Be a residential homeowner in the EGD franchise area
2. Have a valid Enbridge Gas account in good standing
3. Use an approved Certified Energy Evaluator ("CEE")
4. Install at least two measures
5. Complete a pre- and post-energy audit
6. Achieve an average of at least 15% gas savings across all participants[43]

The EC evaluated the sampled participant files against the criteria above and determined:

- **Criterion 1:** Enbridge appropriately redacted Personally Identifiable Information (PII) in all of the project files, including customer name and address. However, each file contained an Enbridge account number, providing confirmation that the records were for Enbridge customers and thus within the service territory.
- **Criterion 2:** Each file contained an Enbridge account number, providing confirmation that the records were for Enbridge customers in good standing at the time of the project.
- **Criterion 3:** At the conclusion of the 2019 evaluation, Enbridge confirmed that their administrative process for contracting with Service Organizations includes a requirement to be NRCan-licensed and for the Service Organizations to ensure that all Energy Advisors remain certified, registered, and in good standing. While the EC does not have 100% certainty about certification status at the time of audit, we accept Enbridge's process as sufficient for this criterion.
- **Criterion 4:** The tracking data for all 15,321 records (including the 30 sampled) indicated that at least two measure types were installed at each location, with 24 homes (of the total population) receiving as many as seven.
- **Criterion 5:** Each project contained pre- and post- project photos. Photo documentation was not comprehensive for all measures, but did partially exist for each sampled project, confirming inspections did occur. In combination with submitted modelling files, the EC found that all projects satisfied this requirement.
- **Criterion 6:** As decided by the EAC in 2016, the EC uses the same criterion applied to the equivalent Union program, which is a 15% *average* savings across all homes. Tracking data, corroborated by HOT2000 model files, showed an average of 15.09% for the 30 sample projects reviewed, which was identical to the percentage predicted by the

[40] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 13

[41] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 2, Schedule 2, Page 19 of 55

[42] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 2, Schedule 1, Page 25 of 100

[43] Enbridge's plan is internally inconsistent on this point. In some areas, each house must achieve at least 15% savings. In others, the program must achieve 15% average across all homes. The EAC has chosen to use the second (average) criteria for evaluation.

Tracking File for those 30 homes. This gave the EC confidence in the average natural gas savings of 17.55% across all participants in the Tracking File. Therefore, the EC verified that the homes meeting this criterion.

In addition to these six criteria, the EAC identified one additional criterion for homes that installed air sealing. The EC also identified baseline adjustments occurring on some installed furnaces measures in addition to updating eligibility for participants who installed furnace measures.

- **Criterion 7:** For air sealing to qualify as a measure, the EAC determined that a reduction of at least 10% of the cubic feet per minute of air leakage (as measured by a documented blower-door test) must occur. Tracking data for all projects that claimed air sealing as an installed measure identified a reduction of 10% or more. Therefore, the air sealing measure qualified for all air sealing measures that were claimed.
- **Criterion 8:** As part of an effort to achieve deeper savings, starting January 1, 2021, Enbridge required participants who installed a furnace to install 2 additional measures. At the same time, governmental regulations came into force requiring all new furnaces to have at least 95% AFUE. Enbridge provided documentation and additional explanation to show adjusted furnace baselines based on pre- and post-audit dates. If a participant installed a furnace plus one measure and had a pre audit date before January 2021, they were determined to be eligible as a program participant.

Table 11-14 shows the measure types installed by the verified participants in the program, broken out by the number of total measure types installed per customer. The most common measure type was air sealing upgrade, with 15,018 total installations. Air sealing was most common in homes with only two measures; of the 7,299 homes with only two measures, 7,148 participants (98%) installed air sealing.

Table 11-14. Count of individual measure types among verified projects and types per home*

Measure Type	Number of Measure Types by Customer						Total	% of Total Homes
	Two	Three	Four	Five	Six	Seven		
Air Sealing Rebate	7,148	5,141	2,097	463	145	24	15,018	98%
Attic Rebate	6,644	4,124	1,922	415	136	24	13,265	87%
Furnace Rebate	-	3,465	1,688	352	134	24	5,663	37%
Water Heater Rebate	296	1,550	1,397	296	103	24	3,666	24%
Window/Door Rebate	142	808	691	352	141	24	2,158	14%
Basement Rebate	83	480	561	326	134	24	1,608	10%
Wall Rebate	26	104	132	121	83	24	490	3%
Boiler Rebate	259	84	36	15	6	-	400	3%
Total Measure Types	**14,598**	**15,756**	**8,524**	**2,340**	**882**	**168**	**42,268**	**N/A**
Total Homes	**7,299**	**5,252**	**2,131**	**468**	**147**	**24**	**15,321**	**N/A**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC verifies that 15,321 homes satisfy the requirements of participation (100.00% of tracked).

CCM Savings Metric

Table 11-15 shows the tracked and verified scorecard achievements for the 2021 Enbridge HEC program with the metric of CCM savings.

Table 11-15. Enbridge Resource Acquisition scorecard achievements: HEC Program CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	-	-	-
Small Volume Customer - CCM	203,375,694	203,375,694	100.00%
TOTAL	**203,375,694**	**203,375,694**	**100.00%**

*Not all values may compute exactly due to rounding.

Verify Tracked Savings

In calculating net CCM savings, the EC first utilized Enbridge tracking data to identify the savings for each of the tracked projects. The EC confirmed that the measure life and free ridership multipliers were correctly applied and reviewed the documentation for the sample of 30 program participants to identify whether the gross energy savings in the project files matched the gross energy savings in the tracking data. If any of the 30 projects did not match, an average savings-weighted realization rate was calculated and applied to the tracking savings to produce verified savings.

Calculate Realization Rate

The EC used a multi-step process to verify tracked energy savings for the 30 sampled homes, shown in Figure 11-1 for the 2021 HEC verification. The process was necessary because the simulation mode (EnerGuide or Expert[44]) used by program delivery agents is not available to non-certified professionals. While the EC can attempt to run the Expert simulations in General mode, the runs may produce error warnings or result in a savings differential between the Expert result and General result. Therefore, this multi-step process was developed to verify savings:

- EC requested simulation (H2K) and output (XLS) files from the program
- Where possible, the simulation file was re-run and the results used to verify the tracking savings. If different simulation versions or modes were used, the savings could be slightly different; therefore, simulation savings were considered "verified" if they were within 2% of the tracking savings; in this case, the tracked savings value was accepted as the verified savings.
- If a simulation file was not provided, the file inputs were incompatible with General mode and would not run, the file ran but produced an error due to version or mode differences, or the file produced a difference in savings greater than 2%, the output file was used to verify the tracking savings. As with the simulation file, the EC accepted tracking savings values within 2% of the output file value as the verified savings.
- If the EC was unable to verify the tracking savings against the output file, the EC requested additional documentation from the program (utility) to explain the discrepancy. This documentation explained the adjustments used to calculate approved furnace baselines for accurate reported savings values.
- If no additional documentation or explanation was available, the EC compared the output file values to the project documentation to determine whether they were consistent. If they were not consistent, the output file value was used as the verified value.

[44] "Expert" is the mode listed in the output files. This mode is also labelled as "EnerGuide" in simulation files. The EC uses both terms.

Figure 11-1. Overview of Gross Savings Verification for 2021 HEC Verification

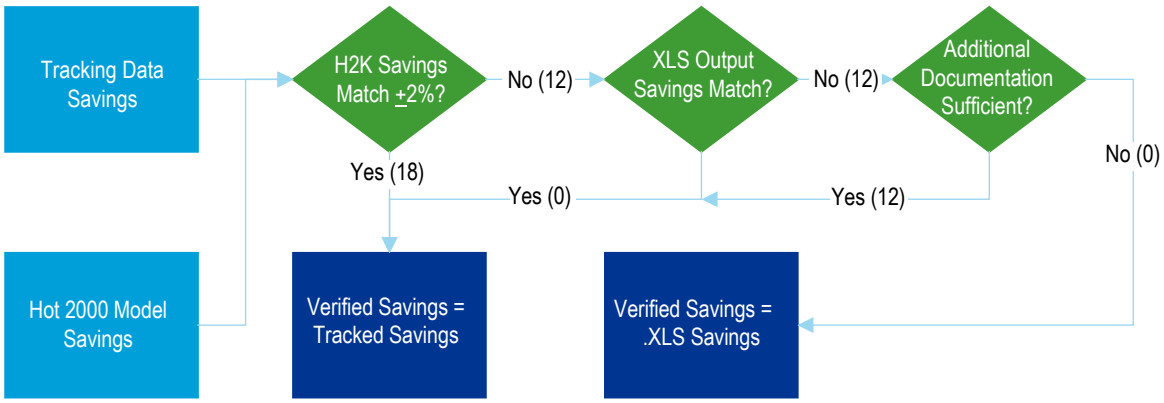


Table 11-16 shows how many customers were verified in each evaluation step.

Table 11-16. Overview of gross savings verification

Evaluation Step	# Verified
Simulation re-run (H2K) and compared to tracking, verified if ± 2%	18
Output files for (XLS) compared to tracking, verified if ± 2%	0
Additional Explanation request	12
Comparison to output file values	0
Total Verified	**30**

The gross savings realization rate (RR) is 100.00%, shown in Table 11-17.

Table 11-17. Enbridge HEC Realization Rate*

Numbers of Houses	Realization Rate	90% Confidence Interval			
		Absolute Precision	Lower Bound	Upper Bound	Relative Precision
30	100%	0.00%	100.00%	100.00%	0.00%

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms total savings of 203,375,694 CCM for Enbridge's Home Energy Conservation CCM savings metric (100.00% of tracked).

11.5.2 Residential Home Retrofit - Home Reno Rebate – Union

Overview

Table 11-18 shows the tracked and verified scorecard achievements for the 2021 Union Home Reno Rebate (HRR) program, with the metrics of CCM savings and homes built. As a result of this review, the EC verifies 92,340,855 CCM (100.00% of tracked) and 5,032 participants (100.00% of tracked). Each metric is discussed separately in this section, starting with the participants metric. Table 11-18 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-18. Union Resource Acquisition achievement: Home Reno Rebate metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	92,340,855	92,340,855	100.00%
Participants (Homes)	5,032	5,032	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-19 to verify the metrics for the Home Reno Rebate program.

Table 11-19. Documentation used to verify the Home Reno Rebate program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029

Participant Selection

Union provided the Tracking File listing 5,032 individual participants in the HRR program. To certify the scorecard metric, the EC randomly selected 30 participants for review, requested additional documentation, confirmed receipt of the correct files, and reviewed documents to verify participation and eligibility.

Received Files

The typical file folder had the following information:

- Photographs of pre- and post-installation conditions
- HOT2000 Model simulation or "Simulation" Files (.h2k)
- HOT2000 Model Output Files (.xls) aggregated in one spreadsheet

Participants Metric

Table 11-20 shows the tracked and verified scorecard achievements for the 2021 Union HRR program with the metric of participant homes.

Table 11-20. Union Resource Acquisition achievement: HRR Program participants metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Participants (Homes)	5,032	5,032	100.00%

*Not all values may compute exactly due to rounding.

Verify Participation and Eligibility

The Resource Acquisition Scorecard identifies one metric for the program as "Home Reno Rebate Participants (Homes)". To determine the definition of "participants," the EC looked first to the OEB Decision, which approved the Union HRR program[45]. The EC looked next to Union's plan, which identified the following criteria:[46]

> *Homes that count as a participant towards the Home Reno Rebate ("HRR") Participant (Homes) metric must meet the following two requirements:*
>
> > *1. A homeowner must complete at least two eligible renovations as outlined at Exhibit A, Tab 3, Appendix A, Section 1.0, Table 1.*
> >
> > *2. The aggregate of all of the homes counted towards the metric must achieve, on average, at least a 15% reduction in annual natural gas use as determined through comparing a pre and post energy assessment.*

The EC evaluated the sampled participant files against the criteria above and determined:

- **Criterion 1:** The EC confirmed that the project files documented at least two eligible measures for all homes, not only those sampled. Upon review, all participants met this requirement. Table 11-21 shows the measure types and number of measures in the homes that met this requirement.
- **Criterion 2:** Of the 30 homes randomly sampled, tracking files allowed the EC to calculate average savings of 22.62%. The EC further calculated from tracking data that the population of homes satisfied the 15% requirement, with an average of 25.24% savings across all homes.

Table 11-21 shows the measure types installed by the program, broken out by the number of total measure types installed per customer. The most common measure type was air sealing, with 4,827 total measures performed. The air sealing rebate was most common in homes with only two measures; of the 1,925 homes with only two measures, 1,838 (95%) performed air sealing.

[45] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 13
[46] Union's Proposed 2015-2020 DSM Plan, EB-2015-0029, Exhibit A, Tab 3, Page 24 of 73

Table 11-21. Count of individual measure types among verified projects and types per home*

Measure Type	Number of Measure Types by Customer						Total	% of Total Homes
	Two	Three	Four	Five	Six	Seven		
Air Sealing Rebate	1,838	1,623	872	367	108	19	4,827	96%
Attic Rebate	1,594	1,148	743	340	104	19	3,948	78%
Window/Door Rebate	124	671	573	324	104	19	1,815	36%
Basement Rebate	137	432	446	305	109	19	1,448	29%
Furnace Rebate	-	645	458	211	97	19	1,430	28%
Water Heater Rebate	74	383	309	137	63	19	985	20%
Wall Rebate	37	126	231	204	81	19	698	14%
Boiler Rebate	46	33	12	7	-	-	98	2%
Total Measure Types	**3,850**	**5,061**	**3,644**	**1,895**	**666**	**133**	**15,249**	**N/A**
Total Homes	**1,925**	**1,687**	**911**	**379**	**111**	**19**	**5,032**	**N/A**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC verifies that all 5,032 homes (100.00%) satisfy the requirements for participation.

CCM Savings Metric

Table 11-22 shows the tracked and verified scorecard achievements for the 2021 Union HRR program with the metric of CCM savings.

Table 11-22. Union Resource Acquisition scorecard achievements: HRR Program savings metric*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	92,340,855	92,340,855	100.00%

*Not all values may compute exactly due to rounding.

Verify Tracked Savings

In calculating Net Cumulative Cubic Meters (CCM) savings, the EC first utilized Union Tracking Data to identify the savings for each of the tracked projects, confirming that the measure life and free ridership multipliers were correctly applied. Union Tracking data includes all projects as individual records within the tracking data, allowing for a simple summing of tracked savings. The EC reviewed the documentation for the sample of 30 program participants to identify whether the gross energy savings in the project files matched the gross energy savings in the tracking data. If any of the 30 projects did not match, an average savings-weighted realization rate was calculated and applied to the tracking savings to produce verified savings.

Calculate Realization Rate

For the 2021 HRR verification, the EC used a multi-step process to verify tracked energy savings for the sampled homes, shown in Figure 11-2. The process was necessary because the simulation mode (EnerGuide or Expert[47]) used by program delivery agents is not available to non-certified professionals. While the EC can attempt to run the Expert simulations in

[47] "Expert" is the mode listed in the output files. This mode is also labelled as "EnerGuide" in simulation files. The EC uses both terms.

General mode, the runs may produce error warnings or result in a savings differential between the Expert result and General result. Therefore, this multi-step process was developed to verify savings:

- EC requested simulation (HSE) and output (TSV) files from the program
- Where possible, the simulation file was re-run and the results used to verify the tracking savings. If different simulation versions or modes were used, the savings could be slightly different; therefore, simulation savings were considered "verified" if they were within 2% of the tracking savings; in this case, the tracked savings value was accepted as the verified savings.
- If a simulation file was not provided, the file inputs were incompatible with General mode and would not run, the file ran but produced an error due to version or mode differences, or the file produced a difference in savings greater than 2%, the output file was used to verify the tracking savings. As with the simulation file, the EC accepted tracking savings values within 2% of the output file value as the verified savings.
- If the EC was unable to verify the tracking savings against the output file, the EC requested additional documentation from the program (utility) to explain the discrepancy. This documentation explained the adjustments used to calculate approved furnace baselines for accurate reported savings values.
- If no additional documentation or explanation was available, the EC compared the output file values to the project documentation to determine whether they were consistent.

Figure 11-2. Overview of gross savings verification for 2021 HRR verification

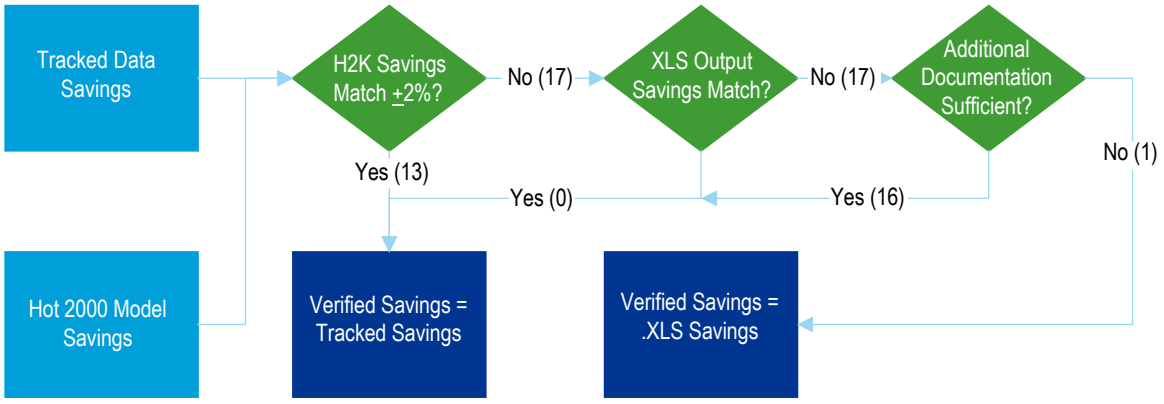


Table 11-23 shows how many customers were verified in each evaluation step.

Table 11-23. Overview of gross savings verification

Evaluation Step	# Verified
Simulation re-run (H2K) and compared to tracking, verified if ± 2%	13
Output files for (XLS) compared to tracking, verified if ± 2%	0
Additional Explanation request	16
Comparison to output file values	1
Total Verified	**30**

The EC produced verified savings for all 30 homes in the sample. The gross savings realization rate (RR) is 100.00%, shown in Table 11-24.

Table 11-24. Union HRR realization rate*

Numbers of Houses	Realization Rate	90% Confidence Interval			
		Absolute Precision	Lower Bound	Upper Bound	Relative Precision
30	100.00%	0.00%	100.00%	100.00%	0.00%

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the total savings of 92,340,855 CCM for Union's Home Reno Rebate CCM savings metric (100.00% of tracked).

11.5.3 Residential Adaptive Thermostats - Enbridge

Overview

Table 11-25 shows the tracked and verified scorecard achievements for the 2021 Enbridge Residential Adaptive Thermostat Program, with the metric of CCM savings. As a result of this review, the EC verifies 53,483,128 CCM (100.00% of tracked). Table 11-25 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-25. Enbridge Resource Acquisition achievement: Residential Adaptive Thermostats CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	-	-	-
Small Volume Customer - CCM	53,483,128	53,483,128	100.00%
TOTAL	**53,483,128**	**53,483,128**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used documentation shown in Table 11-26 to verify the metrics for the Residential Adaptive Thermostat program.

Table 11-26. Documentation used to verify the Residential Adaptive Thermostats program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
Adaptive Thermostat Ping Report	2021 Adaptive Thermostats Ping Reports LUG and LEG

Verify Cumulative Natural Gas Savings

The EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. In calculating gas savings, the EC used:

- Tracking File data, which reported 24,178 units
- TRM 5.0
- Adaptive Thermostat Ping Report, which reported 82.52% installation rate[48]

[48] The Residential Adaptive Thermostat Offering provides participants with a point-of-sale instant discount for purchasing adaptive thermostat. Ecobee supported Enbridge by "pinging" its devices claiming the offering's discount, allowing Ecobee to identify which purchased thermostats have been installed and connected to the internet. In early 2022, Ecobee pinged all Ecobee adaptive thermostats purchased online through the 2021 point-of-sale instant discount offer. If a device was determined to be online during at least one of three pings, it was considered an installed device, and an installation verification adjustment factor was determined using this information (installed devices / all devices pinged). The adjustment factor was applied to all adaptive thermostats purchased through the 2021 point-of-sale instant discount offer (including in-store Ecobee purchased devices and non-Ecobee devices). For legacy Enbridge, 3,120 devices were determined to be installed out of 3,781 total devices pinged (82.52% installation rate).

The EC certified the tracked savings, for a savings ratio of 100.00%.[49]

Verification Result

As a result of this review, the EC confirms the savings of 53,483,128 CCM (100.00% of tracked) for Enbridge's Residential Adaptive Thermostat small volume customer CCM metric.

[49] The savings ratio is 100% because the program used the same 82.52% installation rate as the EC, so the EC verifies 100% of the savings reported by the program.

11.5.4 Residential Adaptive Thermostats - Union

Overview

Table 11-27 shows the tracked and verified scorecard achievements for the 2021 Union Residential Adaptive Thermostat Program, with the metric of CCM savings. As a result of this review, the EC verifies 23,183,355 CCM (100.00% of tracked). Table 11-27 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-27. Union Resource Acquisition achievement: Residential Adaptive Thermostats CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	23,183,355	23,183,355	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used documentation shown in Table 11-28 to verify the metrics for the Residential Adaptive Thermostat program.

Table 11-28. Documentation used to verify the Residential Adaptive Thermostats program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016, OEB Mid-Term Review, EB-2017-0127/EB-2017-0128, and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
Adaptive Thermostat Ping Report	2021 Adaptive Thermostats Ping Reports LUG and LEG

Verify Cumulative Natural Gas Savings

The EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. In calculating gas savings, the EC used:

- Tracking File data, which reported 10,334 units
- TRM 5.0
- Adaptive Thermostat Ping Report, which reported 84.19% installation rate[50]

[50] The Residential Adaptive Thermostat Offering provides participants with a point-of-sale instant discount for purchasing adaptive thermostat. Ecobee supported Enbridge by "pinging" its devices claiming the offering's discount, allowing Ecobee to identify which purchased thermostats have been installed and connected to the internet. In early 2022, Ecobee pinged all Ecobee adaptive thermostats purchased online through the 2021 point-of-sale instant discount offer. If a device was determined to be online during at least one of three pings, it was considered an installed device, and an installation verification adjustment factor was determined using this information (installed devices / all devices pinged). The adjustment factor was applied to all adaptive thermostats purchased through the 2021 point-of-sale instant discount offer (including in-store Ecobee purchased devices and non-Ecobee devices). For legacy Union, 1,395 devices were determined to be installed out of 1,657 total devices pinged (84.19% installation rate).

The EC certified the tracked savings, for a savings ratio of 100.00%.[51]

Verification Result

As a result of this review, the EC confirms the savings of 23,183,355 CCM (100.00% of tracked) for Union's Residential Adaptive Thermostat CCM metric.

[51] The savings ratio is 100% because the program used the same 84.19% installation rate as the EC, so the EC verifies 100% of the savings reported by the program.

11.5.5 C&I - Prescriptive – Enbridge

Overview

Table 11-29 shows the tracked and verified scorecard achievements for the 2021 Enbridge C&I Prescriptive program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 38,277,606 CCM for large and small volume customers (100.00% of tracked). Table 11-29 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documents section.
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values.

Table 11-29. Enbridge Resource Acquisition achievement: C&I Prescriptive CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	20,068,154	20,068,154	100.00%
Small Volume Customer - CCM	18,209,451	18,209,452	100.00%
TOTAL	**38,277,605**	**38,277,606**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-30 to verify the metrics for the C&I Prescriptive program.

Table 11-30. Documentation used to verify the C&I Prescriptive program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016, and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
C&I Prescriptive Verification Study	2017 C&I Prescriptive Study – Measure of NTG Factors and Gross Savings Verification, Itron, June 2019
Commercial ENERGY STAR Combi Oven Sub Doc	White paper detailing prescriptive savings, costs, and assumptions for combination ovens

Verify Cumulative Natural Gas Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. Table 11-31 and Table 11-32 show the results of the analysis.

Table 11-31. Enbridge Resource Acquisition achievement by measure group: small volume customers*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Air Curtain	4	304,779	304,779	100.00%
Demand Control Kitchen Ventilation	28	1,849,011	1,849,011	100.00%
Demand Control Ventilation	42	40,700	40,700	100.00%
Destratification Fan	12	413,087	413,087	100.00%
Energy Recovery Ventilation	25	2,023,787	2,023,787	100.00%
Fryer	368	4,974,182	4,974,182	100.00%
Heat Recovery Ventilation	2	85,014	85,014	100.00%
Make-Up Air Unit	1	228,000	228,000	100.00%
Ozone Washer Extractor	1	704,145	704,145	100.00%
Oven	59	524,544	524,544	100.00%
Dock Door Seal	211	5,800,149	5,800,149	100.00%
Steam Cooker	2	170,669	170,669	100.00%
Water Heater	160	1,091,386	1,091,386	100.00%
Total	**915**	**18,209,451**	**18,209,452**	**100.00%**

*Not all values may compute exactly due to rounding.

Table 11-32. Enbridge Resource Acquisition achievement by measure group: large volume customers*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Broiler	1	24,106	24,106	100.00%
Demand Control Kitchen Ventilation	11	569,458	569,458	100.00%
Demand Control Ventilation	89	215,569	215,569	100.00%
Destratification Fan	35	1,380,645	1,380,645	100.00%
Energy Recovery Ventilation	7	98,221	98,221	100.00%
Fryer	147	1,986,970	1,986,970	100.00%
Heat Recovery Ventilation	3	1,627,388	1,627,388	100.00%
Ozone Washer Extractor	3	1,306,046	1,306,046	100.00%
Oven	25	231,994	231,994	100.00%
Dock Door Seal	505	11,778,642	11,778,642	100.00%
Steam Cooker	3	256,003	256,003	100.00%
Unit Heater	13	288,017	288,017	100.00%
Water Heater	42	305,098	305,098	100.00%
Total	**884**	**20,068,154**	**20,068,154**	**100.00%**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the savings of 18,209,452 CCM for small volume customers (100.00% of tracked) and 20,068,154 CCM for large volume customers (100.00% of tracked) for Enbridge's C&I Prescriptive Program.

11.5.6 C&I - Prescriptive – Union

Overview

Table 11-33 shows the shows the tracked and verified scorecard achievements for the 2021 Union C&I Prescriptive program, with the metric of CCM savings. As a result of this review, the EC verifies 30,179,867 CCM (100.00% of tracked). Table 11-33 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-33. Union Resource Acquisition achievement: C&I Prescriptive CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	30,179,865	30,179,867	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-34 to verify the metrics for the C&I Prescriptive program.

Table 11-34. Documentation used to verify the C&I Prescriptive program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
C&I Prescriptive Verification Study	2017 C&I Prescriptive Study – Measure of NTG Factors and Gross Savings Verification, Itron, June 2019
Commercial ENERGY STAR Combi Oven Sub Doc	White paper detailing prescriptive savings, costs, and assumptions for combination ovens

Verify Cumulative Natural Gas Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. Table 11-35 shows the results of the analysis.

Table 11-35. Union Resource Acquisition Achievement by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Air Curtain	13	367,170	367,170	100.00%
Steam Cooker	2	170,669	170,669	100.00%
Dock Door Seal	230	2,228,615	2,228,615	100.00%
Oven	50	469,181	469,181	100.00%
Demand Control Kitchen Ventilation	36	2,977,452	2,977,452	100.00%
Demand Control Ventilation	143	6,253,081	6,253,081	100.00%
Destratification Fan	27	770,904	770,904	100.00%
Energy Recovery Ventilation	970	4,877,407	4,877,407	100.00%
Fryer	284	3,838,771	3,838,771	100.00%
Heat Recovery Ventilation	23	1,133,253	1,133,253	100.00%
Make-Up Air Unit	11	4,541,825	4,541,825	100.00%
Ozone Washer Extractor	2	625,051	625,051	100.00%
Unit Heater	13	140,600	140,600	100.00%
Water Heater	237	1,785,886	1,785,888	100.00%
Total	**2,041**	**30,179,865**	**30,179,867**	**100.00%**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the savings of 30,179,867 CCM savings (100.00% of tracked) for Union's C&I Prescriptive Program.

11.5.7 C&I – Direct Install – Enbridge

Overview

Table 11-36 shows the tracked and verified scorecard achievements for the 2021 Enbridge C&I Direct Install Program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 31,979,551 CCM for large and small volume customers (100.00% of tracked). Table 11-36 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-36. Enbridge Resource Acquisition achievement: C&I Direct Install CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	6,734,536	6,734,536	100.00%
Small Volume Customer - CCM	25,245,015	25,245,015	100.00%
TOTAL	**31,979,551**	**31,979,551**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-37 to verify the metrics for the C&I Direct Install program.

Table 11-37. Documentation used to verify the C&I Direct Install program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0

Verify Cumulative Natural Gas Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. Three measures were installed, with 253 individual installations with large volume customers and 493 with small volume customers. The EC verified the tracked savings which resulted in a savings ratio of 100.00%.

Table 11-38. Enbridge C&I Direct Installation measure groups: large volume customers

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Air Curtain	16	1,354,605	1,354,605	100.00%
Dock Door Seal	236	5,130,143	5,130,143	100.00%
Demand Control Kitchen Ventilation	1	249,788	249,788	100.00%
TOTAL	**253**	**6,734,536**	**6,734,536**	**100.00%**

Table 11-39. Enbridge C&I Direct Installation measure groups: small volume customers

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Air Curtain	201	15,823,257	15,823,257	100.00%
Dock Door Seal	268	5,964,765	5,964,765	100.00%
Demand Control Kitchen Ventilation	24	3,456,993	3,456,993	100.00%
TOTAL	**493**	**25,245,015**	**25,245,015**	**100.00%**

Verification Result

As a result of this review, the EC confirms the savings of 6,734,536 CCM for large volume customers (100.00% of tracked) and 25,245,015 CCM for small volume customers (100.00% of tracked) for Enbridge's C&I Direct Install Program.

11.5.8 C&I – Direct Install – Union

Overview

Table 11-40 shows the tracked and verified scorecard achievements for the 2021 Union C&I Direct Install Program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 18,403,367 CCM (100.00% of tracked). Table 11-40 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-40. Union Resource Acquisition achievement: C&I Direct Install CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	18,403,367	18,403,367	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-41 to verify the metrics for the C&I Direct Install program.

Table 11-41. Documentation used to verify the C&I Direct Install program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0

Verify Cumulative Natural Gas Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. Three measures were installed, with 306 individual installations. The EC verified the tracked savings which resulted in a savings ratio of 100.00%.

Table 11-42. Union C&I Direct Installation measure groups

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Air Curtain	146	12,464,646	12,464,646	100.00%
Demand Control Kitchen Ventilation	11	1,868,389	1,868,389	100.00%
Dock Door Seal	149	4,070,332	4,070,332	100.00%
TOTAL	**306**	**18,403,367**	**18,403,367**	**100.00%**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the savings of 18,403,367 (100.00% of tracked) for Union's C&I Direct Install Program.

11.5.9 C&I - Custom – Enbridge

Overview

Table 11-43 shows the shows the tracked and verified scorecard achievements for the 2021 Enbridge C&I Custom program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 415,996,615 CCM (99.98%% of tracked). Table 11-43 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-43. Enbridge Resource Acquisition achievement: C&I Custom CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	399,069,686	398,994,369	99.98%
Small Volume Customer - CCM	17,002,246	17,002,246	100.00%
TOTAL	**416,071,931**	**415,996,615**	**99.98%**

*Not all values may compute exactly due to rounding.

Table 11-44 includes these variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Enbridge C&I Custom program. This is the amount of savings before any adjustments (including free ridership and spillover) are applied.
- RR: Gross realization rate from the 2017-2018 CSPV report.
- Att: Attribution ratio (the complement of free ridership) from the 2018 NTG report.
- Spillover: Spillover ratio from the 2013-2014 Spillover Study.
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 1: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 2: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-44. Adjustment factors applied to Enbridge C&I Custom Program cumulative gross savings*

Attribution Group	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj (%)	Verified Net Savings (CCM)
Commercial - Other	9,658,241	94.99%	25.65%	1.36%	25.66%	2,477,995
Commercial - Ventilation	14,918,504	94.99%	14.12%	1.36%	14.70%	2,193,684
Commercial - Boilers	98,113,708	94.99%	42.37%	1.36%	41.54%	40,755,578
Multi-Residential - Heating	121,098,351	121.09%	57.67%	8.24%	79.81%	96,649,101
Multi-Residential - Other	48,890,404	121.09%	69.73%	8.24%	94.41%	46,159,324
Industrial	394,812,679	110.79%	50.62%	1.45%	57.69%	227,760,932
TOTAL	**687,491,887**				**60.51%**	**415,996,615**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-45 to verify the metrics for the C&I Custom program.

Table 11-45. Documentation used to verify the C&I Custom program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[52,53]
2018 NTG Report	2018 Natural Gas Demand Side Management Free-ridership Evaluation[54]
2013-2014 Spillover Study	CPSV Participant Spillover Results[55]

Verify Savings

Adjustment Values – Realization Rate

The 2017-2018 CPSV Report conveyed gross realization rate by sector, as shown in Table 11-46. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-46. Verified gross savings rates for the Enbridge Custom C&I program

Sector	RR (%)
Commercial	94.99%
Low Income & Multi Residential	121.09%
Industrial	110.79%

Adjustment Values – Attribution Ratios

The 2018 NTG Report conveyed attribution ratios using a combination of sector and measure group, as shown in Table 11-47.

Table 11-47. Attribution ratios for the Enbridge Custom C&I program

Attribution Group	Att (%)
Commercial - Other	25.65%
Commercial - Ventilation	14.12%
Commercial - Boilers	42.37%
Multi-Residential - Heating	57.67%
Multi-Residential - Other	69.73%
Industrial	50.62%

[52] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[53] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

[54] 2018 Natural Gas Demand Side Management Free-ridership Evaluation, DNV for the Ontario Energy Board, December 27, 2019

[55] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018

Adjustment Values – Spillover Ratios

The 2013-2014 Spillover Study conveyed spillover ratios at the sector level, as shown in Table 11-48. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-48. Spillover ratios for the Enbridge Custom C&I program

Sector	Spillover (%)
Custom Commercial	1.36%
Multi-Residential	8.24%
Custom Industrial	1.45%

Verify Cumulative Natural Gas Savings

The program-level adjustment factors shown in Table 11-44 were built up from a measure-level application of the RR, Attribution, and Spillover ratios. Each measure was assigned a RR or Spillover ratio based on its sector, and an Attribution ratio based on the combination of sector and measure group. The EC calculated the measure-level net savings using Equation 1 and Equation 2, then summed the measure-level savings to produce program-level savings. The EC calculated the program-level adjustment ratio by dividing the program-level net savings by the program-level gross savings.

Verification Result

As a result of this review, the EC confirms the savings of 415,996,615 CCM (99.98% of tracked) for Enbridge's C&I Custom Program.

11.5.10 C&I - Custom – Union

Overview

Table 11-49 shows the shows the tracked and verified scorecard achievements for the 2021 Union C&I Custom program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 470,976,925 CCM (100% of tracked). Table 11-49 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-49. Union Resource Acquisition achievement: C&I Custom CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM	470,976,925	470,976,925	100.00%

*Not all values may compute exactly due to rounding.

Table 11-50 includes these variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Enbridge C&I Custom program. This is the amount of savings before any adjustments (including free ridership and spillover) are applied.
- RR: Gross realization rate from the 2017-2018 CSPV report
- Att: Attribution ratio (the complement of free ridership) from the 2018 NTG Report
- Spillover: Spillover ratio from 2013-2014 Spillover Study
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 3: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 4: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-50.Adjustment factors applied to Union C&I Custom Program cumulative gross savings*

Attribution Group	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj (%)	Verified Net Savings (CCM)
Agricultural	804,353,457	91.17%	50.16%	0.89%	46.54%	374,364,478
Commercial and Multi-Family	155,334,242	90.57%	28.62%	0.00%	25.92%	40,264,397
Industrial - Steam or Hot Water System	73,291,585	91.17%	4.11%	0.89%	4.56%	3,340,997
Industrial – HVAC	66,585,113	91.17%	39.88%	0.89%	37.17%	24,749,692
Industrial - Steam or Hot Water System	103,763,451	91.17%	28.98%	0.89%	27.23%	28,257,360
TOTAL	**1,203,327,848**				**39.14%**	**470,976,925**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-51 to verify the metrics for the C&I Custom program.

Table 11-51. Documentation used to verify the C&I Custom program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[56,57]
2018 NTG Report	2018 Natural Gas Demand Side Management Free-ridership Evaluation[58]
2013-2014 Spillover Study	CPSV Participant Spillover Results[59]

Verify Savings

Adjustment Values – Realization Rate

The 2017-2018 CPSV Report conveyed gross realization rate by sector, as shown in Table 11-52. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-52. Verified gross savings rates for the Union Custom C&I program

Sector	RR (%)
Agricultural & Industrial	91.17%
Commercial and Multi-Family	90.57%

Adjustment Values – Attribution Ratios

The 2018 NTG Report conveyed attribution ratios using a combination of sector and measure group, as shown in Table 11-53.

Table 11-53. Attribution ratios for the Union Custom C&I program

Attribution Group	Att (%)
Agricultural	50.16%
Commercial and Multi-Family	28.62%
Industrial - Steam or Hot Water System	4.11%
Industrial - HVAC	39.88%
Industrial - Steam or Hot Water System	28.98%

[56] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[57] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

[58] 2018 Natural Gas Demand Side Management Free-ridership Evaluation, DNV for the Ontario Energy Board, December 27, 2019

[59] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018

Adjustment Values – Spillover Ratios

The 2013-2014 Spillover Study conveyed spillover ratios at the sector level, as shown in Table 11-54. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-54. Spillover ratios for the Union Custom C&I program

Sector	Spillover (%)
Industrial	0.89%
Commercial and Multi-Family	0.00%

Verify Cumulative Natural Gas Savings

The program-level adjustment factors shown in Table 11-50 were built up from a measure-level application of the RR, Attribution, and Spillover ratios. Each measure was assigned a RR or Spillover ratio based on its sector, and an Attribution ratio based on the combination of sector and measure group. The EC calculated the measure-level net savings using Equation 3 and Equation 4, then summed the measure-level savings to produce program-level savings. The EC calculated the program-level adjustment ratio by dividing the program-level net savings by the program-level gross savings.

Verification Result

As a result of this review, the EC verifies total savings of 470,976,925 CCM (100% of tracked) for Union's C&I Custom Program.

11.5.11 Comprehensive Energy Management – Enbridge

Overview

Table 11-55 shows the shows the tracked and verified scorecard achievements for the 2021 Enbridge Comprehensive Energy Management (CEM) program, with the metric of CCM savings. The CEM Program has two metrics under separate scorecards, CCM Savings (Resource Acquisition) and Participants (Market Transformation). CCM Savings are discussed here, while the Participants metric is discussed in Section 11.9. As a result of this review, the EC verifies total savings of 3,090,423 CCM (100.00% of tracked) for large volume customers. Table 11-55 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-55. Enbridge Resource Acquisition achievement: Comprehensive Energy Management CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	3,090,423	3,090,423	100.00%
Small Volume Customer - CCM	-	-	-
TOTAL	**3,090,423**	**3,090,423**	**100.00%**

*Not all values may compute exactly due to rounding.

Table 11-56 includes these variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Enbridge CEM program. This is the amount of savings before any adjustments (including free ridership and spillover) are applied.
- RR: Gross realization rate from the 2017-2018 CSPV report.
- Att: Attribution ratio (the complement of free ridership) from the 2018 NTG report.
- Spillover: Spillover ratio from the 2013-2014 Spillover Study.
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 5: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 6: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-56. Adjustment factors applied to Enbridge CEM Program cumulative gross savings*

Attribution Group	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj (%)	Verified Net Savings (CCM)
Industrial	5,357,100	110.79%	50.62%	1.45%	57.69%	3,090,423
TOTAL	**5,357,100**				**57.69%**	**3,090,423**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-57 to verify the metrics for the Comprehensive Energy Management program.

Table 11-57. Documentation used to verify the Comprehensive Energy Management program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[60,61]
2018 NTG Report	2018 Natural Gas Demand Side Management Free-ridership Evaluation[62]
2013-2014 Spillover Study	CPSV Participant Spillover Results[63]

Verify Savings

The CPSV, NTG, and Spillover reports that were the source of the following adjustment values did not include projects installed as a part of the Comprehensive Energy Management program. However, DNV has assumed that the Industrial measures included in those studies are also representative of the Comprehensive Energy Management Program and therefore the adjustment values are applicable.

Adjustment Values – Realization Rate

The 2017-2018 CPSV Report conveyed gross realization rate by sector, as shown in Table 11-58. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-58. Verified gross savings rates for the Enbridge CEM program

Sector	RR (%)
Industrial	110.79%

Adjustment Values – Attribution Ratios

The 2018 NTG Report conveyed attribution ratios using a combination of sector and measure group, as shown in Table 11-59.

Table 11-59. Attribution ratios for the Enbridge CEM program

Attribution Group	Att (%)
Industrial	50.62%

[60] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[61] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

[62] 2018 Natural Gas Demand Side Management Free-ridership Evaluation, DNV for the Ontario Energy Board, December 27, 2019

[63] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018

Adjustment Values – Spillover Ratios

The 2013-2014 Spillover Study conveyed spillover ratios at the sector level, as shown in Table 11-60. The EC used the same sectors to apply the relevant rates at the measure level.

Table 11-60. Spillover ratios for the Enbridge CEM program

Sector	Spillover (%)
Custom Industrial	1.45%

Verify Cumulative Natural Gas Savings

The program-level adjustment factors shown in Table 11-56 were built up from a measure-level application of the RR, Attribution, and Spillover ratios. Each measure was assigned a RR or Spillover ratio based on its sector, and an Attribution ratio based on the combination of sector and measure group. The EC calculated the measure-level net savings using Equation 5 and Equation 6, then summed the measure-level savings to produce program-level savings. The EC calculated the program-level adjustment ratio by dividing the program-level net savings by the program-level gross savings.

Verification Result

As a result of this review, the EC confirms the savings of 3,090,423 CCM (100% of tracked) for Enbridge's Comprehensive Energy Management Program.

11.5.12 Energy Leaders – Enbridge

Overview

Table 11-61 shows the tracked and verified scorecard achievements for the 2021 Enbridge Energy Leaders program, with the metric of CCM savings. As a result of this review, the EC verifies total savings of 908,004 CCM (97.42% of tracked) for large volume customers. Table 11-61 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-61. Enbridge Resource Acquisition achievement: Run it Right CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	932,080	908,004	97.42%
Small Volume Customer - CCM	-	-	-
TOTAL	**932,080**	**908,004**	**97.42%**

*Not all values may compute exactly due to rounding.

Table 11-62 includes the following variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Enbridge Energy Leaders program.
- RR: Gross realization rate based on engineering reviews.
- Att: Attribution ratio (the complement of free ridership), deemed based on EAC consensus.
- Spillover: Spillover ratio, deemed based on EAC consensus.
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 7: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 8: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-62. Adjustment Factors Applied to Enbridge Energy Leaders Program cumulative gross savings*

Measure Type	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj* (%)	Verified Net Savings (CCM)
Large Volume Customers CCM	932,080	97.42%	100.00%	0.00%	97.42%	908,004

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-63 to verify the metrics for the Energy Leaders program.

Table 11-63. Documentation used to verify the Energy Leaders program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	PDF documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Enbridge first provided the Tracking File listing Energy Leaders participants with customer and site IDs, listing 3 individual projects. The EC requested full documentation for all projects.

Received Files

The EC received pdf files for each project listed in the Tracking File. PDF files generally included:

- Project summary
- Customer invoice for project incentive
- Custom Project Documentation Review Checklist
- Program Application Form
- Custom project documentation (ETools)
- Site evaluation/audit documentation
- Manufacturer invoice
- Installation invoice

Verify Gross Savings

In 2021, program participation consisted of a single commercial property manager replacing domestic hot water (DHW) boilers at three facilities with gas air-source heat pumps (GAHP).

GAHP Retrofit Projects

The EC reviewed the calculations to determine whether the savings estimates for the GAHP projects were reasonable. The program calculated savings using the following equation, which the EC deems appropriate.

$$Nat.Gas\ Savings\ = Q * 1/HHV * 1/\Delta E_t$$

In which:

Q = DHW heating load (BTU/hr)

$$Q = GPM * C * \rho * \Delta T * 60$$

In which,

GPM = flowrate of water (gallon per minute)

C = Specific heat of water (BTU/lb/°T)

ρ = density of water (lb/gallons)

ΔT = Temperature difference between input and output

HHV = High Heating Value of natural gas (BTU/m^3)

ΔE_t = Difference in thermal efficiencies of heating systems

The custom project documentation shows the inputs used in the equation.

The three projects utilized metered DHW water flowrate from a single facility, and contractor-reported maximum system flowrate (at system design conditions) as the basis of the GPM values used in the equations above. Upon investigation, the EC found that the meter data contained negative flow values. Additional data provided by Enbridge revealed that the flowmeters were not properly calibrated, which resulted in negative numbers where there should have been zero values. The EC adjusted the minimum metered flowrate to represent zero flowrate, which had no impact on the savings.

The EC also found that the maximum flowrate of the GAHPs, at design conditions, was insufficient to fully serve the DHW load at one facility, which meant that the existing DHW boiler would have to be used as a secondary unit to serve any excess load. As a result, the EC decreased the savings for that project by 3.4%, leading to an overall reduction in Energy Leaders savings of 2.58%.

Adjustment Values – Attribution and Spillover Ratios

In evaluating the 2016 programs, the EAC agreed to deem the Attribution and Spillover ratios at 100.00% and 0%, respectively. These deemed values continued into 2021. Therefore, the adjustment factor is equal to the realization rate.

Verification Result

As a result of this review, the EC confirms the savings of 908,004 CCM (97.42% of tracked) for large volume customers of the Energy Leaders program.

11.5.13 Run it Right – Enbridge

Overview

Table 11-64 shows the tracked and verified scorecard achievements for the 2021 Enbridge Run it Right (RIR) Program, with the metric of CCM savings. The RIR Program has two metrics under separate scorecards, CCM Savings (Resource Acquisition) and Participants (Market Transformation). CCM Savings are discussed here, while the Participants metric is discussed in Section 11.9. As a result of this review, the EC verifies total savings of 224,426 CCM (100.00% of tracked) for large and small volume customers. Table 11-64 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-64. Enbridge Resource Acquisition achievement: Run it Right CCM metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Large Volume Customer - CCM	339,409	339,409	100.00%
Small Volume Customer - CCM	-114,983	-114,983	100.00%
TOTAL	**224,426**	**224,426**	**100.00%**

*Not all values may compute exactly due to rounding.

Table 11-65 includes the following variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Enbridge 2021 Run it Right program.
- RR: Gross realization rate based on engineering reviews.
- Att: Attribution ratio (the complement of free ridership) from the 2015 CPSV report.
- Spillover: Spillover ratio from 2013-2014 Spillover Study.
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 9: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 10: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-65. Adjustment Factors Applied to Run it Right Program cumulative gross savings*

Measure Type	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj* (%)	Verified Net Savings (CCM)
Large Volume Customers CCM	678,005	100.00%	50.06%	0.00%	50.06%	339,409
Small Volume Customers CCM	-229,690	100.00%	50.06%	0.00%	50.06%	-114,983

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-66 to verify the metrics for the Run it Right program.

Table 11-66. Documentation used to verify the Run it Right program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	PDF document for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
2015 CPSV Report	2015 Natural Gas Demand Side Management Custom Savings Verification and Free-ridership Evaluation[64]
2013-2014 Spillover Study	CPSV Participant Spillover Results[65]

Participant Selection

Enbridge first provided the Tracking File listing RIR participants with customer and site IDs, listing 29 individual participants. The EC randomly selected 10 participants, requesting full documentation by Project ID.

Methodology Review

The program methodology did not change for the 2021 program year. For the certification, a senior engineer reviewed the calculation methods for each selected site. The following conclusion from the 2015 certification[66] remains valid:

> *The methodology used by the RIR program to estimate savings is appropriate for the application. No significant concerns were identified by the team; however, the RIR tool does not allow observation of all of the calculations performed.*

Verify Gross Savings

For 2021, evaluation engineers reviewed the supporting documentation provided in the Project Files (pdf) for the sample of sites to identify the answers to the following questions:

- Is the building type correctly identified?
- How many months were used in the baseline, improvement, and reference periods?
- What type of model was used?
- What independent variables were used?
- What R-squared values were used for the baseline and reference models?
- What is the estimated savings during the reference period?
- Were capital project savings deducted?
- What percentage of consumption do the savings represent?
- What is driving the positive or negative savings claimed?
- Should a new baseline model be created?

[64] 2016 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, June 31, 2018
[65] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018
[66] 2015 Natural Gas Demand Side Management Annual Verification, DNV for the Ontario Energy Board, December 20, 2018, Appendix F

The EC senior engineer used these questions (above) to review the calculations completed, the consumption pattern at the facility, and the baseline model. The EC senior engineer then asked three primary questions to assess the risk of savings accuracy as Low, Normal, or High. Three key questions were:

- Based on experience, is the baseline model specification reasonable?
- Based on experience, is the baseline time period definition reasonable?
- What is the assessed level of risk for achieving savings?

The baseline model specifications and time period definitions were reasonable for all projects examined. Overall, the savings claimed are reasonable, in part because both positive and negative savings are included in the program Tracking File and Project Files.

The EC assigned six sites as low-risk, two normal-risk, and two high-risk. Based on our experience, this distribution is similar to comparable programs. Across the participants, all savings claims were supported by actions taken at the facilities. Clear changes in consumption patterns occurred. The EC's review supports the savings claim for all sites.

Adjustment Values – Attribution and Spillover Ratios

The 2015 CPSV Report conveyed a single attribution ratio for the Run it Right program of 50.06%. The 2013-2014 Spillover study did not find any spillover savings for the program.[67] The two ratios (attribution and spillover) were combined with the RR to produce a program-level adjustment factor of 50.06%.

Verification Result

As a result of this review, the EC confirms the savings of 224,426 CCM (100.00% of tracked) for customers of the Run it Right program.

[67] Neither the attribution ratio nor the spillover value have been updated in more recent iterations of these reports.

11.6 Appendix F: Low Income Scorecards

This appendix describes the detailed process used to verify the metrics for the Low Income Scorecard programs for Enbridge (Table 11-67) and Union (Table 11-68). The programs addressed in this appendix are:

- Winter Retrofit - Furnace End-of-Life – Union
- Winter Retrofit - Home Winterproofing – Enbridge
- Winter Retrofit - Home Weatherization – Union
- Winter Retrofit - Indigenous Program – Union
- Low Income New Construction – Enbridge
- Low Income Multi-Residential – Affordable Housing Program – Enbridge
- Low Income Multi-Residential – Multifamily Program (Social Assisted) – Union
- Low Income Multi-Residential – Multifamily Program (Market Rate) – Union

Table 11-67. Enbridge 2021 Low Income scorecard[68]

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Home Winterproofing	CCM	26,443,935	26,443,935	21,577,192	28,769,589	43,154,383	45.00%
Low Income Multi-Residential	CCM	88,304,418	88,304,418	69,641,327	92,855,103	139,282,654	45.00%
Low Income New Construction	Applications	13	13	10	13	19	10.00%

Table 11-68. Union 2021 Low Income scorecard[69]

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Home Weatherization	CCM	45,903,844	45,903,844	39,563,598	52,751,464	79,127,196	60.00%
Furnace End-of-Life		-					
Indigenous		-					
Multi-Family Social & Assisted	CCM	9,535,480	9,535,480	13,085,633	17,447,511	26,171,267	35.00%
Multi-Family Market Rate	CCM	8,307,799	8,307,799	8,962,524	11,950,032	17,925,049	5.00%

[68] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, FINAL REVISED February 24, 2016, Schedule C

[69] Ibid

11.6.1 Winter Retrofit - Furnace End-of-Life Program – Union

No activity was reported for this program in 2021.

11.6.2 Winter Retrofit – Home Winterproofing – Enbridge

Overview

Table 11-69 shows the tracked and verified scorecard achievements for the 2021 Enbridge Home Winterproofing program, with the metric of CCM savings. As a result of this review, the EC verifies 26,443,935 CCM (100% of tracked). Table 11-69 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-69. Enbridge Low Income achievements: Home Winterproofing CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM – Prescriptive	5,455,712	5,455,712	100.00%
CCM - Whole Home	20,988,223	20,988,223	100.00%
TOTAL	**26,443,935**	**26,443,935**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-70 to verify the metrics for the Home Winterproofing program.

Table 11-70. Documentation used to verify the Home Winterproofing program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
TRM 4.0	Natural Gas Demand Side Management Technical Resource Manual, Version 4.0
TAPS Report	TAPS Verification Program 2012 Year End Research Report, Quadra Research. April 2013[70]

Simulation-based Savings

Participant Selection

Enbridge provided the tracking file listing 1,040 individual participant homes in the Winterproofing program. To certify the scorecard metric, the EC randomly selected 30 participants for review, requested additional documentation, confirmed receipt of the correct files, and reviewed documents to verify participation and eligibility.

[70] TAPS Verification Program 2012 Year End Research Report, Study CR-604, Quadra Research, April 3, 2013

Received Files

The typical file folder had the following information:

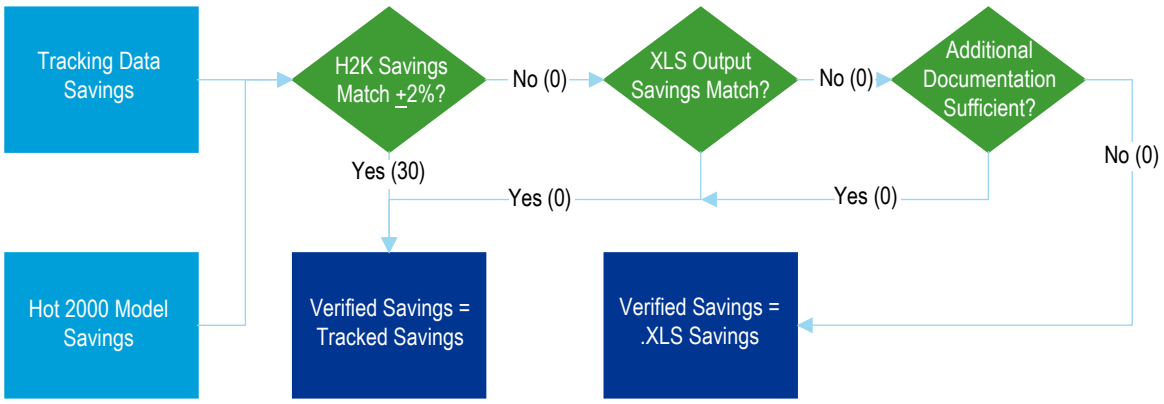
- Photographs of pre- and post-installation conditions
- HOT2000 Model simulation Files (.h2k)
- HOT2000 Model Output Files (.xls)

Calculate Realization Rate

The EC used a multi-step process to verify tracked energy savings for the 30 sampled homes, shown in Figure 11-3 for the 2021 Winterproofing verification. The process was necessary because the simulation mode (EnerGuide or Expert[71]) used by program delivery agents is not available to non-certified professionals. While the EC can attempt to run the Expert simulations in General mode, the runs may produce error warnings or result in a savings differential between the Expert result and General result. Therefore, this multi-step process was developed to verify savings:

- EC requested simulation (H2K) and output (XLS) files from the program
- Where possible, the simulation file was re-run and the results used to verify the tracking savings. If different simulation versions or modes were used, the savings could be slightly different; therefore, simulation savings were considered "verified" if they were within 2% of the tracking savings; in this case, the tracked savings value was accepted as the verified savings.
- If a simulation file was not provided, the file inputs were incompatible with General mode and would not run, the file ran but produced an error due to version or mode differences, or the file produced a difference in savings greater than 2%, the output file was used to verify the tracking savings. As with the simulation file, the EC accepted tracking savings values within 2% of the output file value as the verified savings.
- If the EC was unable to verify the tracking savings against the output file, the EC requested additional documentation from the program (utility) to explain the discrepancy.
- If no additional documentation or explanation was available, the EC compared the output file values to the project documentation summary to determine whether they were consistent. If they were not consistent, the output file value was used as the verified value.

Figure 11-3. Overview of gross simulation savings verification for 2021 Winterproofing



[71] "Expert" is the mode listed in the output files. This mode is also labelled as "EnerGuide" in simulation files. The EC uses both terms.

Table 11-71 shows how many customers were verified in each evaluation step.

Table 11-71. Overview of gross simulation savings verification

Evaluation Step	# Verified
Simulation re-run (H2K) and compared to tracking, verified if ± 2%	30
Output files for (XLS) compared to tracking, verified if ± 2%	0
Additional Explanation request	0
Comparison to output file values	0
Total Verified	**30**

The gross savings realization rate is 100.00%, shown in Table 11-72.

Table 11-72. Enbridge Home Winterproofing realization rate

Numbers of Houses	Realization Rate	90% Confidence Interval			
		Absolute Precision	Lower Bound	Upper Bound	Relative Precision
30	100.00%	0.00%	100.00%	100.00%	0.00%

Prescriptive Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. The EC certified the tracked savings which resulted in a savings ratio of 100.00%, as shown in Table 11-73.

Table 11-73. Enbridge scorecard achievements (cumulative savings) by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Faucet Aerator	781	19,079	19,079	100.00%
Showerhead	429	106,098	106,098	100.00%
Thermostat	1,913	5,330,535	5,330,535	100.00%
TOTAL	**3,123**	**5,455,712**	**5,455,712**	**100.00%**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the savings of 26,443,935 CCM (100.00% of tracked) for Enbridge's Home Winterproofing program.

11.6.3 Winter Retrofit – Home Weatherization – Union

Overview

Table 11-74 shows the tracked and verified scorecard achievements for the 2021 Union Home Weatherization Program, with the metric of CCM savings. As a result of this review, the EC verifies 45,903,844 CCM (103.88% of tracked). Table 11-74 includes the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-74. Union Low Income achievements: Home Weatherization CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM – Prescriptive	6,488,682	6,488,682	100.00%
CCM - Whole Home	37,700,583	39,415,162	104.55%
TOTAL	**44,189,264**	**45,903,844**	**103.88%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-75 to verify the metrics for the Home Weatherization program.

Table 11-75. Documentation used to verify the Home Weatherization program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
Low Income Kits Verification Study	Final Report Following an Audit of the Union Gas ESK - Helping Homes Conserve – HHC – Program, Beslin Communication Group, March 15, 2013

Simulation-based Savings

Participant Selection

Union provided the tracking file, listing 1,673 individual participant homes in the Home Winterproofing program. To certify the scorecard metric, the EC identified individual sites within Private and Social Housing and randomly selected 30 participants for review, requested additional documentation, confirmed receipt of the correct files, and reviewed documents to verify participation and eligibility.

Received Files

The typical file folder had the following information:

- Photographs of pre- and post-installation conditions
- HOT2000 Model simulation Files (.h2k)
- HOT2000 Model Output Files (.xls)

Calculate Realization Rate

The EC used a multi-step process to verify tracked energy savings for the 30 sampled homes, shown in Figure 11-4 for the Home Weatherization program. The process was necessary because the simulation mode (EnerGuide or Expert[72]) used by program delivery agents is not available to non-certified professionals. While the EC can attempt to run the Expert simulations in General mode, the runs may produce error warnings or result in a savings differential between the Expert result and General result. Therefore, this multi-step process was developed to verify savings:

- EC requested simulation (H2K) and output (XLS) files from the program
- Where possible, the simulation file was re-run and the results used to verify the tracking savings. If different simulation versions or modes were used, the savings could be slightly different; therefore, simulation savings were considered "verified" if they were within 2% of the tracking savings; in this case, the tracked savings value was accepted as the verified savings.
- If a simulation file was not provided, the file inputs were incompatible with General mode and would not run, the file ran but produced an error due to version or mode differences, or the file produced a difference in savings greater than 2%, the output file was used to verify the tracking savings. As with the simulation file, the EC accepted tracking savings values within 2% of the output file value as the verified savings.
- If the EC was unable to verify the tracking savings against the output file, the EC requested additional documentation from the program (utility) to explain the discrepancy.
- If no additional documentation or explanation was available, the EC compared output file values to project documentation to determine if the calculated model values were consistent with documentation. If they were not consistent, the output file value was used as the verified value.

Figure 11-4. Overview of gross savings verification for 2021 Home Weatherization program

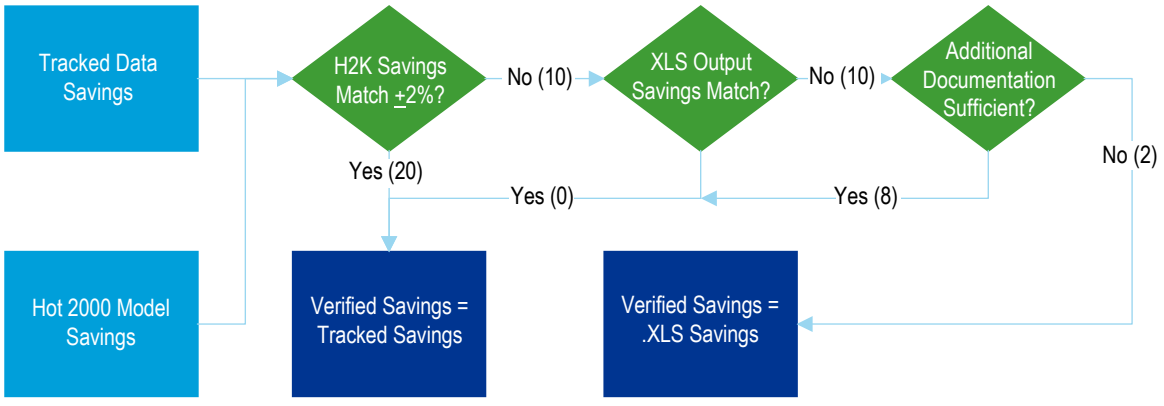


Table 11-76 shows how many customers were verified in each evaluation step. Savings for 30 homes were verified with comparison of tracking data against either simulation (H2K) or output (XLS) files.

[72] "Expert" is the mode listed in the output files. This mode is also labelled as "EnerGuide" in simulation files. The EC uses both terms.

Table 11-76. Overview of gross simulation savings verification

Evaluation Step	# Verified
Simulation re-run (H2K) and compared to tracking, verified if ± 2%	20
Output files for (XLS) compared to tracking, verified if ± 2%	0
Additional Explanation request	8
Comparison to output file values	2
Total Verified	**30**

The gross savings realization rate (RR) is 104.55%, shown in Table 11-77.

Table 11-77. Union Home Weatherization realization rate

Numbers of Houses	Realization Rate	90% Confidence Interval			
		Absolute Precision	Lower Bound	Upper Bound	Relative Precision
30	104.55%	4.72%	99.83%	109.27%	7.10%

Prescriptive Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. The EC certified the tracked savings which resulted in a savings ratio of 100.00%, as shown in Table 11-78.

Table 11-78. Union scorecard achievements by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Faucet Aerator	440	33,444	33,444	100.00%
Pipe Insulation	299	99,563	99,563	100.00%
Showerhead	217	48,405	48,405	100.00%
Thermostat	2376	6,307,270	6,307,270	100.00%
TOTAL	**3,332**	**6,488,682**	**6,488,682**	**100.00%**

*Not all values may compute exactly due to rounding.

Verification Result

As a result of this review, the EC confirms the savings of 45,903,844 CCM (103.88% of tracked) for Union's Home Weatherization program.

11.6.4 Winter Retrofit – Indigenous Program – Union

No activity was reported for this program in 2021.

11.6.5 Low Income New Construction – Enbridge

Overview

Table 11-79 shows the tracked and verified scorecard achievements for the 2021 Enbridge Low Income New Construction Program, with the metric of participants. As a result of this review, the EC verifies 13 participants (100.00% of tracked). Table 11-79 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-79. Enbridge Low Income achievement: New Construction participants metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Participants	13	13	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-80 to verify the metrics for the Low Income New Construction (LINC) program.

Table 11-80. Documentation used to verify the Low Income New Construction program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	PDF document for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
Enbridge's Draft 2021 Report	Enbridge Gas Inc. DRAFT 2021 Demand Side Management Annual Report

Participant Selection

Enbridge first provided the Tracking file listing Program Year, Project Code (unique ID), Participant Status, Application Date, Charrette Date, and IDP Report Receipt. The spreadsheet listed thirteen individual participants. The EC requested full documentation for all participants.

Received Files

Enbridge provided the EC with document folders identified by LINC Project number and containing project PDF documents. The EC first confirmed the folders received matched the IDs requested from the Tracking file. The EC confirmed that documents for all participants had been received.

Verify Participation

The metric for the program is participants. To determine the definition of participant, the EC looked first to the OEB Decision, which identified a participant as someone who submits a Project Application.[73]

The OEB Decision also includes the Enbridge proposed metric of "New Construction Program Participants."[74] This label differs slightly from "Number of Project Applications," and implies a second or additional definition for the metric. To identify if a record with a submitted a project application qualifies as a participant, the EC also reviewed the program description:[75]

> *"Enbridge's proposed low-income new construction program will provide home builders with workshops, energy efficiency modelling tools, design options, energy efficiency education and financial incentives related to new affordable housing new construction developments."*

From this, the EC determined that to demonstrate *participation*, Project Files should also provide documentation for *any* of the following:

- Workshop participation
- Energy efficiency modelling tools
- Design options
- Energy efficiency education
- Financial incentives

The EC evaluated the sampled participant files against the criteria above and determined that all thirteen projects qualify as participants.

Verify Eligibility

The OEB Decision does not provide a clear definition for participant eligibility, instead pointing to approval of Enbridge's Plan. From the Plan, the EC found the following eligibility requirements:

- Submitted project application
- New affordable housing qualified by a municipal, provincial and/or federal housing program.
- Application identifies the project is specifically directed to affordable building developments, either single family (Part 9) or multi-residential (Part 3)

These criteria were based on an examination of the 2016-2020 offer descriptions and Enbridge's Plan (Table 11-81).

[73] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, p. 64-65, 67, 78, and Schedule C
[74] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Schedule B
[75] Ibid, p. 30

Table 11-81. Eligibility requirements documentation

Document	Relevant Contents
2016-2020 OFFER DESCRIPTIONS[76]	*"The offer is specifically directed to residential and multi-residential affordable building developments and efforts will focus on working with and through municipal governments, private and non-profit local housing corporations."*
EVALUATION PLAN[77]	• *Developers and builders of new "affordable housing" as qualified by a municipal, provincial and/or federal housing program.* • *Developers and builders of both singe (sic) family Part 9 houses and multi-residential Part 3 buildings are eligible to participate.*
Draft 2021 Report[78]	*Eligibility criteria consists of the following:* • *New construction project must be located within the EGD rate zone; and,* • *The project proponent must have been recognized as a builder or provider of affordable housing by a municipal, provincial, and/or federal body, by virtue of receiving financial assistance, in the present or at any time in the past, from a government program aimed at affordable housing.*

To confirm eligibility, the EC looked for documentation that indicates the development or project is specifically directed to affordable building developments, either single family (Part 9) or multi-residential (Part 3). Project Files did contain identification of projects as Part 3 or Part 9 projects. Additionally, project files for all participants indicated that each development qualified as affordable housing.

Verification Result

As a result of this review, the EC confirms that all projects meet the definition and eligibility requirements, resulting in a scorecard achievement of 13 participants (100.00% of tracked) for Enbridge's Low Income New Construction program.

[76] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 2, Schedule 1, page 45 of 100
[77] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 2, Schedule 2, page 31 of 55
[78] Enbridge Gas Inc. Draft 2021 Demand Side Management Annual Report, April 1, 2021, page 98

11.6.6 Low Income Multi-Residential – Affordable Housing Program – Enbridge

Overview

Table 11-82 shows the tracked and verified scorecard achievements for the 2021 Enbridge Affordable Housing Program, with the metric of CCM savings. As a result of this review, the EC verifies 88,304,418 CCM for all program measures (100.00% of tracked). Table 11-82 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-82. Enbridge Low Income achievements: Low Income Multi-Residential CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
Prescriptive CCM	1,263,000	1,263,000	100.00%
Custom CCM	87,041,418	87,041,418	100.00%
TOTAL	**88,304,418**	**88,304,418**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-83 to verify the metrics for the Affordable Housing program.

Table 11-83. Documentation used to verify the Low Income Multi-Residential Program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[79,80]

Verify Prescriptive Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in Section 11.13. The EC made some minor changes to the tracked savings which resulted in a savings ratio of 100.00%, as shown in Table 11-84.

[79] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[80] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

Table 11-84. Enbridge - prescriptive measures - scorecard achievements by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Make-Up Air Unit	3	1,263,000	1,263,000	100.00%
TOTAL	**3**	**1,263,000**	**1,263,000**	**100.00%**

*Not all values may compute exactly due to rounding.

Verify Custom Savings

The EC identified the custom savings totals from Enbridge Tracking Files shown in Table 11-85. The EC applied a realization rate from the 2017-2018 CPSV report for Multi-Residential of 121.09%.

Table 11-85. Enbridge - custom measures - scorecard achievements*

Measure Group	Installed Measures	Tracked Gross Savings (CCM)**	Verified Achievement (CCM)	Savings Ratio
20 Year Space (Space Heating)	20	30,049,820	36,387,327	121.09%
Boiler - Hydronic Condensing - Space Heating	27	15,028,381	18,197,867	121.09%
Boiler - Hydronic Condensing - Water Heating	19	3,257,340	3,944,313	121.09%
Boiler - Hydronic High Efficiency - Space Heating	10	10,104,427	12,235,451	121.09%
Boiler - Hydronic High Efficiency - Water Heating	4	1,155,797	1,399,555	121.09%
Controls - Space Heating	14	4,400,070	5,328,045	121.09%
Controls - Ventilation	21	7,248,945	8,777,748	121.09%
Controls - Water Heating	8	325,005	393,549	121.09%
Insulation - Tank - Water Heating	1	10,800	13,078	121.09%
Solar Wall - Ventilation	1	245,100	296,792	121.09%
Tank Type Water Heater	3	55,905	67,695	121.09%
TOTAL	**128**	**71,881,590**	**87,041,418**	**121.09%**

*Not all values may compute exactly due to rounding.
**This value represents savings in the tracking data before any adjustments were made. This differs from tracked net savings, which do account for adjustments.

Verification Result

As a result of this review, the EC confirms the total savings of 88,304,418 CCM (100.00% of tracked) for Enbridge's Affordable Housing Program.

11.6.7 Low Income Multi-Residential – Multifamily Program (SA) – Union

Overview

Table 11-86 shows the tracked and verified scorecard achievements for the 2021 Union Multifamily (Social and Assisted) Program, with the metric of CCM savings. As a result of this review, the EC verifies 9,535,480 CCM (100.00% of tracked). Table 11-86 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-86. Union Low Income achievements: Multifamily Program (SA) CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM - Prescriptive	3,986,383	3,986,383	100.00%
CCM - Custom	5,549,097	5,549,097	100.00%
TOTAL	**9,535,480**	**9,535,480**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-87 to verify the metrics for the Multifamily (Social and Assisted) program.

Table 11-87. Documentation used to verify the Multifamily (Social and Assisted) program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[81,82]

Verify Prescriptive Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in 11.13. The EC certified the tracked savings which resulted in a savings ratio of 100.00%, as shown in Table 11-88.

[81] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[82] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

Table 11-88. Union - prescriptive measures - scorecard achievements by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Energy Recovery Ventilation	6	1,069,880	1,069,880	100.00%
Heat Recovery Ventilation	1	1,617,030	1,617,030	100.00%
Make-Up Air Unit	6	1,277,199	1,277,199	100.00%
Water Heater	2	22,274	22,274	100.00%
TOTAL	**15**	**3,986,383**	**3,986,383**	**100.00%**

*Not all values may compute exactly due to rounding.

Verify Custom Savings

The EC identified the custom savings totals from Union Tracking Files shown in Table 11-89. The EC applied an attribution factor of 95.00%, which is the deemed attribution for Low Income Multi-Residential programs, and a realization rate from the 2017-2018 CPSV report for Multi-Residential of 90.57%.

Table 11-89. Union - custom measures - scorecard achievements*

Measure Group	Installed Measures	Tracked Gross Savings (CCM)**	Verified Achievement (CCM)	Savings Ratio
Air Handling Unit	1	14,655	12,609	86.04%
Condensing Boiler - Combo	1	577,168	496,604	86.04%
Condensing Boiler - DHW - Less than 300 MBH	5	292,488	251,661	86.04%
Condensing Boiler - DHW	2	178,634	153,699	86.04%
Condensing Boiler - Heating	7	1,825,923	1,571,051	86.04%
High Efficiency Boiler - DHW	1	77,658	66,818	86.04%
Make-Up Air Unit	4	280,935	241,721	86.04%
New Construction	4	1,054,621	907,412	86.04%
Pipe/Valve/Fitting Insulation	1	391,496	336,849	86.04%
Solar Wall	6	1,755,750	1,510,673	86.04%
TOTAL	**32**	**6,449,326**	**5,549,097**	**86.04%**

*Not all values may compute exactly due to rounding.
**This value represents savings in the tracking data before any adjustments were made. This differs from tracked net savings, which do account for adjustments.

Verification Result

As a result of this review, the EC confirms total savings of 9,535,480 CCM (100.00% of tracked) for Union's Multifamily (Social and Assisted) Program.

11.6.8 Low Income Multi-Residential – Multifamily Program (MR) – Union

Overview

Table 11-90 shows the tracked and verified scorecard achievements for the 2021 Union Multifamily (Market Rate) Program, with the metric of CCM savings. As a result of this review, the EC verifies 8,307,799 CCM for all program measures (100.00% of tracked). Table 11-90 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-90. Union Low Income achievements: Multifamily (MR) Program CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM - Prescriptive	300,899	300,899	100.00%
CCM - Custom	8,006,899	8,006,899	100.00%
TOTAL	**8,307,799**	**8,307,799**	**100.00%**

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-91 to verify the metrics for the Multifamily (Market Rate) program.

Table 11-91. Documentation used to verify the Multifamily (Market Rate) program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
TRM 5.0	Natural Gas Demand Side Management Technical Resource Manual, Version 5.0
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[83,84]

Verify Prescriptive Savings

In calculating net CCM, the EC reviewed natural gas savings for prescriptive measures from the Tracking File, using the procedures identified in 11.13. The EC certified the tracked savings which resulted in a savings ratio of 100.00%, as shown in Table 11-92.

[83] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019

[84] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.

Table 11-92. Union - prescriptive measures - scorecard achievements by measure group*

Measure Group	Installed Measures	Tracked Achievement (CCM)	Verified Achievement (CCM)	Savings Ratio
Energy Recovery Ventilation	2	300,899	300,899	100.00%
TOTAL	**2**	**300,899**	**300,899**	**100.00%**

*Not all values may compute exactly due to rounding.

Verify Custom Savings

The EC identified the custom savings totals from Union Tracking Files shown in Table 11-93. The EC applied an attribution factor of 95.00%, which is the deemed attribution for Low Income Multi-Residential programs, and a realization rate from the 2017-2018 CPSV report for Multi-Residential of 90.57%.

Table 11-93. Union - custom measures - scorecard achievements*

Measure Group	Installed Measures	Tracked Gross Savings (CCM)**	Verified Achievement (CCM)	Savings Ratio
Air Handling Unit	1	25,215	21,695	86.04%
Condensing Boiler - Combination	3	2,565,140	2,207,085	86.04%
Condensing Boiler - DHW	2	223,935	192,677	86.04%
Condensing Boiler - Heating	3	432,283	371,942	86.04%
Boiler - Heating	2	96,840	83,323	86.04%
High Efficiency Boiler - DHW	1	405,800	349,156	86.04%
High Efficiency Boiler - Heating	2	1,872,375	1,611,020	86.04%
Building Automation	10	3,418,155	2,941,032	86.04%
Reflective Panel	2	266,115	228,969	86.04%
TOTAL	**26**	**9,305,858**	**8,006,899**	**86.04%**

*Not all values may compute exactly due to rounding.
**This value represents savings in the tracking data before any adjustments were made. This differs from tracked net savings, which do account for adjustments.

Verification Result

As a result of this review, the EC confirms total savings of 8,307,799 CCM (100.00% of tracked) for Union's Multifamily (Market Rate) Program.

11.7 Appendix G: Large Volume Scorecard

This appendix describes the detailed process used to verify the metrics for the Large Volume Scorecard programs for Union, shown in Table 11-94. The program addressed in this appendix is the Large Volume program.

Table 11-94. Union 2021 Large Volume (Rate T2/Rate 100) program scorecard*

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Large Volume	CCM	141,733,709	141,733,709	87,077,474	116,103,299	174,154,948	100.00%

Overview

Table 11-95 shows the tracked and verified scorecard achievements for the 2021 Union Large Volume program, with the metric of CCM savings. As a result of this review, the EC verifies 141,733,709 CCM for all program measures (100% of tracked). Table 11-95 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-95. Union Large Volume achievement: Large Volume CCM metrics*

Metric	Achievement		Ratio
	Tracked	Verified	
CCM - Prescriptive	-	-	-
CCM - Custom	141,733,709	141,733,709	100.00%
Total	**141,733,709**	**141,733,709**	**100.00%**

*Not all values may compute exactly due to rounding.

Table 11-96 includes these variables:

- Tracking Gross Savings: Gross cumulative tracking savings for all customers in the Union Large Volume program.
- RR: Gross realization rate from the 2017-2018 CSPV report.
- Att: Attribution ratio (the complement of free ridership) from the 2018 NTG report.
- Spillover: Spillover ratio from 2013-2014 Spillover Study.
- Adj: Adjustment Ratio, the product of the RR and the sum of the Att ratio and Spillover ratio

Equation 11: Adjustment Ratio

$$\boldsymbol{Adjustment\ Ratio = RR * (Att + Spillover)}$$

- Verified Net Savings: Cumulative gross savings multiplied by the Adjustment Ratio

Equation 12: Verified Net Savings

$$Verified\ Net\ Savings = Adjustment\ Ratio * (Cumulative\ Gross)$$

Table 11-96. Adjustment factors applied to Large Volume Program cumulative gross savings*

Measure Type	Tracking Gross Savings (CCM)**	RR (%)	Att (%)	Spillover (%)	Adj* (%)	Verified Net Savings (CCM)
Prescriptive	-	-	-	-	-	-
Custom	1,023,390,495	90.46%	14.49%	0.82%	13.85%	141,733,709
TOTAL	**1,023,390,495**					**141,733,709**

*Not all values may compute exactly due to rounding.
**This value represents savings in the tracking data before any adjustments were made. This differs from tracked net savings, which do account for adjustments.

Documentation

The EC used the documentation shown in Table 11-97 to verify the metrics for the Large Volume program.

Table 11-97. Documentation used to verify the Large Volume program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
Union's Draft 2021 Report	Union Gas 2021 Demand Side Management Draft Annual Report[85]
2017-2018 CPSV Report	2018 Natural Gas Demand Side Management Custom Savings Verification[86]
2018 NTG Report	2018 Natural Gas Demand Side Management Free-ridership Evaluation[87,88]
2013-2014 Spillover Study	CPSV Participant Spillover Results[89]

Custom Savings

The EC identified 43 tracked custom measures with tracked cumulative gross savings of 1,023,390,495 CCM. These projects are grouped by measure in Table 11-98.

Table 11-98. Union - custom measures – verified cumulative gross savings by measure group*

Measure Group	Installed Measures	Tracking Gross Savings (CCM)
Furnace or Dryer	14	377,062,881
HVAC	5	39,597,815
Productivity Improvement	1	62,935,080
Steam or Hot Water System	23	543,794,719
TOTAL	**43**	**1,023,390,495**

*Not all values may compute exactly due to rounding.

[85] While the EC recognizes that the draft report will be updated and finalized, the final was not available at the time of this evaluation, thus the draft is cited for reference.
[86] 2017-2018 Natural Gas Demand Side Management Custom Savings Verification, DNV for the Ontario Energy Board, December 26, 2019
[87] 2018 Natural Gas Demand Side Management Free-ridership Evaluation, DNV for the Ontario Energy Board, December 27, 2019
[88] The EC did not complete studies verifying the custom project savings (CPSV) during the 2019, 2020, or 2021 program years. Instead, the EC used the same adjustment factors resulting from custom projects implemented in the 2017 and 2018 program years, adjusted for the mix of projects installed in 2021.
[89] CPSV Participant Spillover Results, DNV for the Ontario Energy Board, May 23, 2018

Adjustment Values – RR

The 2017-2018 CPSV Report conveyed one gross realization rate for the program, 90.46%.

Adjustment Values – Att Ratios

The 2017-2018 CPSV Report conveyed one attribution ratio for the program, 14.49%.

Adjustment Values – Spillover Ratios

The 2013-2014 Spillover Study conveyed one spillover ratios for the program, 0.82%.

Verify Cumulative Natural Gas Savings

The EC calculated the measure-level net savings using Equation 11 and Equation 12, then summed the measure-level savings to produce program-level savings. The EC calculated the program-level adjustment ratio by dividing the program-level net savings by the program-level gross savings.

Table 11-99. 2021 Large Volume measure groups adjustment values and cumulative net savings*

Measure Type	Tracking Gross Savings (CCM)	RR (%)	Att (%)	Spillover (%)	Adj* (%)	Verified Net Savings (CCM)
Custom	1,023,390,495	90.46%	14.49%	0.82%	13.85%	141,733,709

*Not all values may compute exactly due to rounding.
†Adjustment value displayed is truncated (2 digit) average based on sum of all individual adjustments by measure. Individual adjustment factors (RR, ATT, Spillover) are utilized for calculations at the two-digit level, as displayed.

Verification Result

As a result of this review, the EC confirms total savings of 141,733,709 CCM (100% of net tracked) for Union's Large Volume (Rate T2/Rate 100) Program.

11.8 Appendix H: Market Transformation Scorecards

This appendix describes the detailed process used to verify the metrics for the Market Transformation Scorecard programs for Enbridge (Table 11-100) and Union (Table 11-101). The programs addressed in this appendix are:

- Commercial New Construction – Commercial Savings by Design – Enbridge
- Commercial New Construction – Union
- Residential New Construction – Residential Savings by Design – Enbridge
- Residential New Construction – Optimum Home Program – Union
- School Energy Competition – Enbridge

Table 11-100. Enbridge 2021 market transformation scorecard[90]†

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Run it Right	Participants	36	36	87	116	175	20.00%
Comprehensive Energy Management	Participants	2	2	22	29	44	20.00%
Residential Savings by Design	Builders	24	24	29	39	59	10.00%
Residential Savings by Design	Homes Built	2,514	2,514	2,329	3,105	4,658	15.00%
School Energy Competition	Schools	-	-	44	58	87	10.00%
Commercial Savings by Design	New Developments	17	17	28	37	56	25.00%

†Programs in grey text are not similar to Union programs under the Market Transformation Scorecard, and not discussed in this Appendix. For these programs, please refer to Section 11.9.

Table 11-101. Union 2021 market transformation scorecard[91]

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Optimum Home	Percentage of Homes Built	73.08%	73.08%	45.66%	60.88%	91.33%	50.00%
Commercial New Construction	New Developments	24	24	19	25	38	50.00%

[90] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Schedule C

[91] Ibid

11.8.1 Commercial New Construction – Commercial Savings by Design – Enbridge

Overview

Table 11-102 shows the tracked and verified scorecard achievements for the 2021 Enbridge Commercial Savings by Design (SBD) Program, with the metric of New Developments. As a result of this review, the EC verifies 17 New Developments (100.00% of tracked). Table 11-102 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-102. Enbridge Market Transformation achievement: Commercial Savings by Design developments metric*

Metric	Achievement		Ratio
	Tracked	Verified	
New Developments	17	17	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-103 to verify the metrics for the Commercial Savings by Design program.

Table 11-103. Documentation used to verify the Commercial Savings by Design program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	PDF documents
Confirmation Emails	PDF copies of email correspondence with builders verifying aspects of their housing developments
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Enbridge provided the Tracking File listing Project Number (unique ID), program year, commitment date, and IDP date. As tracking data indicated that all 17 listed participants were equally qualified, the EC randomly selected 10 records from the full list for document review. The EC requested all supporting documentation, including documentation that supports eligibility and participation criteria.

Received Files

The EC received two types of documents in response to this request:

- Commitment form, including terms and conditions
- IDP report

The EC first confirmed that the documentation received matched the IDs requested. The EC confirmed that the signature dates on the commitment form matched the commitment date in the tracking file, and that the date on the IDP report matched the date recorded in the IDP date field of the tracking file.

Verify Participation

To determine the definition of New Developments, the EC looked first to the OEB Decision, which approved the Enbridge ESC Plan:[92]

Decisions
The OEB approves Enbridge's Commercial Savings by Design program. This program is similar to Enbridge's Residential Savings by Design, with the difference being the target market is commercial and industrial buildings as opposed to residential new construction. For the same reasons as the Residential Savings by Design program, the OEB finds that this program is consistent with guiding principles of the DSM Framework and drives integrated conservation savings prior to building construction.

Relevant criteria for "new development" are described in Enbridge's Plan "Budgets, Metrics and Targets,"[93] paragraph 46:

- For the purpose of assessing the "new developments enrolled" metric for SBD Commercial:

  i. *Only builders and developers who have "enrolled" in the program and completed the IDP process are eligible to be counted towards the target.*

  ii. "Enrolment" is defined as a signed MOU with a builder or developer containing a commitment to participate in the Enbridge Commercial Savings by Design offer for a 5-year period which will include undertaking an IDP adhering to an Enbridge approved IDP process (such as IEA Task 23 or the iiSBE developed IDP Tool) which also includes the requisite energy model, demonstrating how to achieve at least 15% total energy savings relative to the yet to be completed 2017 Ontario Building Code. The builder must also commit to constructing buildings or a building to the IDP standard within 5 years.

  iii. The metric in the Commercial Savings by Design scorecard is based on the number of projects to which a developer commits, i.e., the same developer with different clients and different kinds of projects may be counted multiple times. A minimum 50,000 square feet requirement applies to each project. A project is defined as either a single building or multiples of the same building by the same company that add up to 50,000 square feet.

From these definitions, the EC observed the following criteria:

- Only projects from enrolled builders/developers count towards the metric. Enrollment is defined as:
  - A builder or developer committed to the CSBD offer for five years via an MOU
  - And undertaking the Enbridge approved IDP process for each development, which requires:
    - Energy model
    - Demonstration of how to achieve 15% energy savings over 2017 building code
    - A project which is a single building or multiples of the same building which sum to at least 50,000 ft^2

The EC noted that the IDPs submitted for the 10 developments cited an average savings of 32% improvement against the 2017 OBC code, with a range of 15.5% to 42.7% savings. The average square footage was 177,532 ft^2 with a range of 75,927 ft^2 to 273,916 ft^2.

[92] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 39
[93] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 1, Schedule 4, 37 of 41

Table 11-104. Enbridge Commercial Savings by Design participation criteria, project satisfaction, and explanation

Identified Criteria	Satisfied?	Explanation
Only projects from enrolled builders/developers count towards the metric	Yes	Following criteria meet definition for enrolment
Enrolment is defined as builder or developer committed to the CSBD offer for five years	Yes	Terms and Conditions establishes that project must be completed within 5 years
Undertaking Enbridge approved IDP process for each development	Yes	IDP Reports included in documentation
IDP includes energy model	Yes	IDP Reports identifies eQuest v3.65[94]
Sufficient energy savings achieved	Yes	See below
-IDP demonstrates how to achieve 15% energy savings over 2017 building code	N/A	All IDP reports states savings 15% over 2017 OBC
Project must be at least 50,000 ft^2	Yes	Applications and IDP Reports included in documentation
Project is a single building or multiples of same building which sum to at least 50,000 ft^2	Yes	Projects of one or multiple buildings all greater than 50,000 ft^2

As a result, the EC confirms that the submitted projects met the criteria for participation as a New Development for the Enbridge Commercial Savings by Design program.

Verify Eligibility

Enbridge's Plan, approved by the OEB, further identifies eligibility criteria. As stated in Enbridge's Plan:[95]

> *The SBD Commercial offer is direct-to-builder/developer delivered by an internal sales team. Eligibility criteria include the following:*
> - *Commercial, multi-residential or industrial buildings covered under the Ontario Building Code Part 3;*
> - *A minimum threshold of 50,000 square feet per project (including aggregate multi-location projects);*
> - *Building(s) must be within Enbridge's franchise area, or for aggregate projects 75% of the project square footage must be in the franchise area;*
> - *Building(s) must be in the design phase or earlier in the process;*
> - *Building construction must be completed within five years of signing the agreement, and commissioning must be completed no more than one year after that; and,*
> - *Builders will be eligible to participate in the offer multiple times for different projects*

These defined eligibility requirements overlap with the criteria Enbridge laid out for assessing enrolments. The EC used the Commitment Forms and IDP Reports to determine if the projects met these criteria.

[94] ASHRAE 90.1-2013 section 11 as modified by Supplementary Standard SB10-2017 Division 3, Chapter 2, were followed in generating reference and baseline models
[95] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 2, Schedule 1, 61 of 100

Table 11-105. Enbridge Commercial Savings by Design eligibility criteria, project satisfaction, and explanation

Identified Criteria	Satisfied?	Explanation
Commercial, multi-residential or industrial buildings	Yes	IDP Reports
50,000 ft^2 minimum project size	Yes	Commitment Form
Within Enbridge territory	Yes	Application terms and conditions
Design phase or earlier	Yes	IDPs performed to prior to construction.
Construction within 5 years	N/A	Eligibility for fuller program participation, not applicable for new enrolment.
Commissioning within 1 year of construction	N/A	

After reviewing the stated eligibility criteria and Project Files, the EC confirms the 10 sampled projects all meet the eligibility criteria.

Verification Result

As a result of this review:

- The EC confirms proper documentation for the requested projects
- Project files for the submitted projects meet all requirements for a participant
- Project files for the submitted projects meet further criteria for eligibility

As a result of this review, the EC confirms the scorecard metric of 17 new developments (100.00% of tracked) for the Enbridge Commercial Savings by Design program.

11.8.2 Commercial New Construction – Union

Overview

Table 11-106 shows the tracked and verified scorecard achievements for the 2021 Union Commercial New Construction Program (also referred to as the Commercial Savings by Design Program), with the metric of New Developments. As a result of this review, the EC verifies 24 New Developments enrolled by participating builders (100.00% of tracked). Table 11-106 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-106. Union Market Transformation achievement: Commercial New Construction developments metric*

Metric	Achievement		Ratio
	Tracked	Verified	
New Developments	24	24	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-107 to verify the metrics for the Commercial New Construction program.

Table 11-107. Documentation used to verify the Commercial New Construction program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Confirmation Emails	PDF copies of email correspondence with builders verifying aspects of their housing developments
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029

Participant Selection

Union provided the Tracking File listing Project Code (unique ID), program year, application date, Visioning Date, and IDP date. The spreadsheet identified 24 participants, all with 2021 dates. As tracking data indicated that all the 24 listed participants were equally qualified, the EC requested all supporting documentation for 10 developments, including documentation that supports eligibility and participation criteria.

Received Files

The EC received four types of documents in response to this request:

- Commitment form
- Terms and Conditions
- IDP report

- Supporting Letter

The EC first confirmed that the documents received matched the IDs requested. The EC confirmed that the signature dates on the commitment form matched the commitment date in the tracking file, and that the date on the IDP report matched the date recorded in the IDP date field of the tracking file.

Verify Participation

To determine the definition of New Developments, the EC looked first to the OEB Decision, which approved Union's Plan:[96]

Decisions
The OEB approves Enbridge's Commercial Savings by Design program. This program is similar to Enbridge's Residential Savings by Design, with the difference being the target market is commercial and industrial buildings as opposed to residential new construction. For the same reasons as the Residential Savings by Design program, the OEB finds that this program is consistent with guiding principles of the DSM Framework and drives integrated conservation savings prior to building construction.
The OEB directs Union to establish a similar program targeting commercial and industrial buildings in its service area. The OEB finds commercial and industrial customers would expect consistency in the market, especially for province-wide chains, franchises and companies.

Relevant criteria for "new development" are described in Union's Draft report:[97]

To be eligible for an incentive, the submitted projects must fulfill the following criteria:

- *Construction projects must have a minimum threshold of 50,000 square feet per project (including aggregate multi-location projects)*
- *Building(s) must be in the design phase or earlier*
- *Building construction must be completed within 5 years of completion of the IDP, and building must be commissioned within 1 year of construction completion*
- *Builders are eligible to participate in the offering multiple times for different projects*

From these definitions, the EC observed the following criteria:

- Only projects from enrolled builders/developers count towards the metric. Enrolment is defined as:
  - A builder or developer committed to the program offer for five years via an MOU
  - And undertaking the Union approved IDP process for each development, which requires:
    - Energy model
    - Demonstration of how to achieve 15% energy savings over 2017 building code
    - A project is a building or multiples of same building which sum to at least 50,000 ft^2

The EC noted that the IDPs submitted for 10 sampled participants cited an average savings of 38.11% improvement against the 2017 OBC code, with a range of 15% to 115.9%[98] in savings. Upon initial review, IDPs for 9 of the 10 developments showed at least 50,000 ft^2 with an average of 164,702 ft^2 and a range of 42,701 ft^2 to 400,963 ft^2. Therefore, one development initially did not qualify on the basis of being smaller than 50,000 ft^2. However, Union provided the EC with a supporting letter from the builder confirming the developments would in fact exceed 50,000 ft^2.

[96] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 39
[97] Union's DRAFT 2021 Demand Side Management Evaluation Report, Page 110
[98] The development with 115.9% savings achieved included a solar energy system, which resulted in the modelled building producing more energy than it would consume on an annual basis.

Table 11-108. Union Commercial New Construction participation criteria, project satisfaction, and explanation

Identified Criteria	Satisfied?	Explanation
Only projects from enrolled builders/developers count towards the metric	Yes	Following criteria meet definition for enrolment
Enrolment is defined as builder or developer committed to the CSBD offer for five years:	Yes	Terms and Conditions establishes that project must be completed within 5 years
Undertaking IDP process for each development	Yes	IDP Reports included in documentation
IDP includes energy model	Yes	IDP Reports identify eQuest v3.65[99]
Sufficient energy savings achieved	Yes	See below
- IDP demonstrates how to achieve 15% energy savings over 2017 code	N/A	All IDP reports state savings 15% over 2017 OBC
Project must be at least 50,000 ft^2	Yes	Commitment Forms and supporting letters
Project is a single building or multiples of same building which sum to at least 50,000 ft^2	Yes	Projects of one or multiple buildings all greater than 50,000 ft^2

As a result, the EC confirms that the submitted projects met the criteria for participation as a New Development for the Union Commercial New Construction program.

Verify Eligibility

Since Union's plan was submitted before the Decision and Order that instructed Union to create a similar program to Enbridge's, the earlier referenced draft report served as the primary reference for eligibility. The EC used the Commitment Forms and IDP Reports to determine if the projects met these criteria.

Table 11-109. Union Commercial New Construction eligibility criteria, project satisfaction, and explanation

Identified Criteria	Satisfied?	Explanation
Commercial, multi-residential or industrial buildings	Yes	IDP Reports
50,000 ft^2 minimum project size	Yes	Commitment Forms and supporting letters
Design phase or earlier	Yes	IDPs performed to prior to construction.
Construction within 5 years	N/A	Eligibility for fuller program participation, not applicable for new enrolment.
Commissioning within 1 year of construction	N/A	

After reviewing these stated eligibility criteria and Project Files, the EC confirms that all 10 projects meet the eligibility criteria.

Verification Result

As a result of this review:

- The EC confirms proper documentation for the requested projects
- Project files for 10 of the submitted projects meet all requirements for a participant
- Project files for 10 of those projects meet further criteria for eligibility

The EC verifies the achievement of 24 projects (100.00% of tracked) for the Union Commercial New Construction program.

[99] ASHRAE 90.1-2013 section 11 as modified by Supplementary Standard SB10-2017 Division 3, Chapter 2, were followed in generating reference and baseline models

11.8.3 Residential New Construction – Residential Savings by Design – Enbridge

Overview

Table 11-110 shows the tracked and verified scorecard achievements for the 2021 Enbridge Residential Savings by Design (SBD) Program, with the metrics of enrolled builders and number of homes built. As a result of this review, the EC verifies 24 builders (100.00% of tracked) and 2,514 homes built (100.00% of tracked). Each metric is discussed separately in this section, starting with the builders metric. Table 11-110 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-110. Enbridge Market Transformation achievement: Residential Savings by Design metrics*

Program	Metric	Achievement		Ratio
		Tracked	Verified	
Residential Savings by Design	Builders	24	24	100.00%
	Homes Built	2,514	2,514	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-111 to verify the metrics for the Residential Savings by Design program.

Table 11-111. Documentation used to verify the Residential Savings by Design program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	Files documenting participation and eligibility for selected builder/project
Confirmation Emails	PDF copies of email correspondence with builders verifying aspects of their housing developments
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Builders Metric

Participant Selection

Enbridge first provided the Tracking File listing Project Number (unique ID), Enrolment Year, Signed Commitment (date), and IDP date. The spreadsheet identified 24 builders, all with 2021 IDP dates. As tracking data indicated that all the 24 listed builders were equally qualified, the EC randomly selected 10 from the full list for document review. The EC requested all supporting documentation, including documentation that supports eligibility and participation criteria.

Received Files

Enbridge provided three types of files to support participation:

- “Project Application”
- “IDP Report”

- Letters from participants supporting participation criteria

Verify Participation

To determine the definition of Enrolled Builders, the EC looked first to the OEB Decision, which approved the Enbridge ESC Plan[100] stating: "*The OEB approves Enbridge's Residential Savings by Design program as proposed."* For further detail on criteria, the EC looked to Enbridge's Plan which identified:[101]

> *"For the purpose of assessing whether a builder is "enrolled" in SBD Residential:*
>
> *i. The builder must have signed a Memorandum of Understanding ("MOU") containing a commitment to participate in the Residential SBD program for a 3-year period*
>
> *ii. The builder must have completed a program-approved Integrated Design Process ("IDP"), such as IEA Task 23 or the iiSBE developed IDP tool, including requisite energy modelling for homes the builder plans to construct in a new development. Homes to be completed in 2016 must demonstrate at least 25% total energy savings relative to the 2012 Ontario Building Code. Homes to be completed in 2018 and beyond must demonstrate total energy savings of at least 15% relative to the yet to be developed 2018 Ontario Building Code.*
>
> *iii. Builders will be permitted to enroll in Enbridge's Residential SBD offer more than once to avoid lost opportunities. In order to increase the scale of energy efficiency amongst participating builders, repeat builders will be offered progressively smaller incentives per home, but shall be permitted to collect these reduced incentives for a larger number of units.*
>
> *iv. In order for a builder's development to qualify as significant enough in size to participate in Enbridge's SBD Residential offer, the development must include no less than 50 homes."*

The EC evaluated the sampled participant files against the criteria above and determined:

- Requirement i:
  - Section 2c. of the Enbridge-provided Terms & Conditions included in the application contains the following: "…Applicant must design and construct the residential homes…by no later than three (3) calendar years from the date of the IDP."
  - This identifies an agreement to complete a project within three years but does not indicate the commitment of a builder to participate in the Residential SBD program for three years.
- Requirement ii:
  - Section 2c. of the Enbridge-provided Terms & Conditions includes the following: "In order to apply for the Program and be eligible for financial incentives, the Applicant must design and construct the residential homes…in Enbridge franchise areas which meet or exceed the Target Energy Performance", which is established in Section 1.ii as exceeding "the 2017 Ontario Building Code's ("OBC") energy performance requirements by at least 15% or greater."
  - All ten submitted IDP Reports identified at least 15% energy savings above 2017 OBC using the HOT2000 simulation program.
- Requirement iii:
  - The EC does not find that this requirement is applicable to validating participation, only that it permits further participation.
- Requirement iv:

[100] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 34
[101] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 1, Schedule 4, Page 35-36 of 41

– The Project Applications of all ten randomly selected builders identified the total development size of 50 homes or more, satisfying the requirement for no less than 50.

Verification Result

As a result, the EC confirms:

- Builders do not have MOUs identifying agreement to participate "in the Residential SBD program for three years," only that projects would be completed before three years are over
- All selected builders meet the participation criteria for IDP submission with sufficient savings
- All submitted builders meet the participation criteria for project size

As a result of this review, the EC confirms the scorecard metric of 24 enrolled builders (100.00% of tracked) for the Enbridge Residential Savings by Design program.

Homes Built Metric

Participant Selection

Enbridge first provided the Tracking File listing Project Code (unique ID), Builder, and Savings Percent over OBC for program homes. The spreadsheet identified 1,425 program-rebated homes, separate from the 1,089 additional homes built to program requirements but not receiving program rebates. The EC randomly selected five homes from the 1,425 program-rebated homes for document review. The EC requested all supporting documentation, including documentation that supports eligibility and participation criteria.

Received Files

Enbridge provided the following files to support the sampled homes:

- "Application Form" – PDF document outlining initial plans
- "IDP Workshop Report" – PDF document outlining qualification documentation
- "H2K Results" – JPG showing the Total Annual Fuel Consumption in megajoules (MJ) of the sampled house

In addition to these documents to support program homes, Enbridge also confirmed that supporting letters were received for additional non-rebated homes, verifying that they were built to the same IDP standard as program homes.

Verify Participation

To determine the definition criteria for Homes Built, the EC looked first to the OEB Decision, which approved the Enbridge ESC Plan stating[102] "*The OEB approves Enbridge's Residential Savings by Design program as proposed."* For further detail on criteria, the EC looked to Enbridge's Plan which identified:[103]

> *For the purpose of assessing the "homes built" metric for SBD Residential:*
>
> *i. A home must be completed by a participating builder who has completed the IDP process for the development.*
>
> *ii. A home which, as constructed, has features consistent with the builder's IDP and that make it 25% more efficient than a new home built to the 2012 Ontario Building Code if constructed in 2016, and 15% more efficient than a new home built to the yet to be completed 2018 Ontario Building Code.*

[102] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, Page 34
[103] Enbridge's Proposed 2015-2020 DSM Plan, EB-2015-0049, Exhibit B, Tab 1, Schedule 4, Page 36-37 of 41

iii. Builders may apply the outcomes of the IDP to additional developments if the outcomes are applicable. The homes built in additional developments may be counted as homes built. However, the maximum number of homes for which a builder may receive incentives shall not increase.

iv. All homes constructed to the standard in a builder's development shall count towards the "homes built" metric even if rebates were not paid for all of them. Non-rebated units will be verified by a confirmation letter from the builder acknowledging that the homes were built to the IDP standard. Enbridge rebated units will be verified using the blower door test.

From this definition and submitted documentation, the EC determined participation for the randomly selected homes:

- Requirement i:
  - The EC did not evaluate whether the homes selected were completed by participating builders who had completed the IDP process for this development. Evaluation of the builders was done through verifying the Enrolled Builders metric (see above). The EC assumed that this portion of the requirements was met because the previous section confirmed builder participation.
- Requirement ii:
  - The Summary documentation as well as the Savings Summary worksheets, HOT2000 screenshots, and REM-Rate documents for all five randomly selected homes demonstrated modelled as-built energy consumption 15% or greater above 2017 OBC.
- Requirement iii:
  - The EC does not find that this requirement applies to validating participation, only that it permits further participation.
- Requirement iv:
  - Enbridge confirmed that supporting letters were received for all developments that included additional homes beyond those incentivized. The EC finds that this satisfies the requirement for non-rebated units.

The EC finds that all five randomly selected homes meet the eligibility and efficiency qualifications.

Verification Result

As a result of this review, the EC confirms 1,425 rebated program homes and 1,089 non-rebated homes, for an achievement of 2,514 Homes Built (100.00% of tracked) for the Enbridge Residential Savings by Design program.

11.8.4 Residential New Construction – Optimum Home Program – Union

Overview

Table 11-112 shows the tracked and verified scorecard achievements for the 2021 Union Optimum Home Program, with the metric of percentage of homes built (>15% above OBC 2017) by participating builders. As a result of this review, the EC verifies 73.08% of homes built (100.00% of tracked). Table 11-112 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-112. Union Market Transformation achievement: Optimum Home percentage of homes built metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Percentage of Homes Built	73.08%	73.08%	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-113 to verify the metrics for the Optimum Home program.

Table 11-113. Documentation used to verify the Optimum Home program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Union DSM programs
Optimum Home Top 10 and Homes Built List	Excel spreadsheet listing builders in each region by housing starts and all participating homes
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Union Plan	Union's 2015-2020 DSM Plan, EB-2015-0029
Union's Draft 2017 Report	Union Gas 2017 Demand Side Management Draft Annual Report

Participant Selection

Union first provided the Tracking File listing anonymized builders with the year each builder enrolled, the number of total new gas attachments in 2021, the number of program homes, and a percentage of homes built calculation. This file demonstrated the claimed metric achievement, identifying 1,352 of 1,850 total homes built by the 22 enrolled builders, as demonstrated in Table 11-114.

Table 11-114. Optimum Home claimed total and program homes built, by builder*

Builder	Total Homes Built	Optimum Homes Built	% of Homes Built
Builder 1	11	3	27.3%
Builder 2	133	132	99.2%
Builder 3	54	12	22.2%
Builder 4	806	806	100.0%
Builder 5	84	45	53.6%
Builder 6	97	40	41.2%
Builder 7	52	52	100.0%
Builder 8	0	0	0.0%
Builder 9	15	1	6.7%
Builder 10	2	0	0.0%
Builder 11	18	0	0.0%
Builder 12	0	0	0.0%
Builder 13	43	41	95.3%
Builder 14	0	0	0.0%
Builder 15	25	0	0.0%
Builder 16	13	0	0.0%
Builder 17	301	191	63.5%
Builder 18	0	0	0.0%
Builder 19	50	0	0.0%
Builder 20	2	0	0.0%
Builder 21	31	1	3.2%
Builder 22	113	28	24.8%
Total	**1,850**	**1,352**	**73.08%**

*Not all values may compute exactly due to rounding.

In addition, Union provided a list of Optimum Homes built in 2021 with individual listings for the 1,352 program homes, identifying builder, file number, and enrolment type (e.g., ES BOP Version 17). From these, the EC randomly selected five program homes for review and verification.

Union provided the following documentation to support verification of each of the selected program homes:

- Energy Star for New Homes Compliance Report – PDF
- Balance-of-Plant summary verifying building energy performance to ESNH v17

Verify Participation

This metric includes the percentage of homes built to Optimum Home energy performance standards "by participating builders." To fully verify the metric, the EC examined the builders of the randomly selected homes. The EC confirmed these builders enrolled in the program, satisfying the requirement.

Verify Eligibility

Union relaunched the Optimum Home program in 2017 in response to the introduction of the new Ontario Building Code (OBC) in 2017. To determine the definition of participating homes, the EC looked to the Union 2017 Draft Annual Report.

The report makes clear that qualifying homes constructed in 2017 and thereafter must “achieve ENERGY STAR® for New Homes v17 (“ESNH v17”).[104]

The EC requested documentation for verification of five sites, randomly selected from the 2021 Optimum Homes Built spreadsheet. Files provided by Union confirmed the eligibility of the homes. The ESNH v17 Compliance Report demonstrated both qualifying inspection dates (all 2021) and that the sites met the ESNH v17 energy performance threshold.

As a result, the EC confirms that the submitted projects meet the criteria for eligibility for the Union Optimum Homes program.

Verification Result

As a result of this review:

- The EC confirms proper documentation for the requested sites and builders
- Project files for the randomly selected sites meet energy savings compliance criteria

The EC verifies the scorecard metric of 1,352 out of 1,850 (73.08%) total participating builder homes (100.00% of tracked) for the Optimum Home program.

[104] Union’s Draft 2017 Demand Side Management Evaluation Report, Page 89

11.8.5 School Energy Competition – Enbridge

No activity was reported for this program in 2021.

11.9 Appendix I: Performance Based (Union) and Market Transformation (Enbridge) Scorecards

This appendix describes the detailed process used to verify the metrics for the Performance-Based Scorecard programs for Union (Table 11-116) and the similar programs for Enbridge that are contained under the Market Transformation Scorecard (Table 11-115). As noted in the OEB Decision and Order, the programs listed below are similar and thus included together. The programs addressed in this appendix are:

- C&I Operational Efficiency Improvement – Run it Right – Enbridge
- C&I Operational Efficiency Improvement – RunSmart – Union
- C&I Energy Management – Comprehensive Energy Management – Enbridge
- C&I Energy Management – Strategic Energy Management – Union

Table 11-115. Enbridge 2021 market transformation & energy management scorecard†

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
Run it Right	Participants	36	36	87	116	175	20.00%
Comprehensive Energy Management	Participants	2	2	22	29	44	20.00%
Residential Savings by Design	Builders	24	24	29	39	59	10.00%
Residential Savings by Design	Homes Built	2,514	2,514	2,329	3,105	4,658	15.00%
School Energy Competition	Schools	-	-	44	58	87	10.00%
Commercial Savings by Design	New Developments	17	17	28	37	56	25.00%

†Programs in grey text are not similar to Union programs under the Performance Based Scorecard, and not discussed in this Appendix. For these programs, please refer to Section 11.8.

Table 11-116. Union 2021 performance-based scorecard

Programs	Metrics	Verified Achievement		Metric Target			Weight
		Program-level Achievement	Metric-level Achievement	Lower Band	Target	Upper Band	
RunSmart	Participants	-	-	52	69	104	10.00%
	Savings %	0.00%	0.00%	0.33%	0.44%	0.67%	40.00%
Strategic Energy Management	Savings %	3.55%	3.55%	5.91%	7.87%	11.81%	50.00%

11.9.1 C&I Operational Efficiency Improvement – Run it Right – Enbridge

Overview

Table 11-117 shows the tracked and verified scorecard achievements for the 2021 Enbridge Run it Right (RIR) Program, with the metric of Participants. The RIR Program has two metrics under separate scorecards, CCM Savings (Resource Acquisition) and Participants (Market Transformation). Participants are discussed here, while the CCM Savings metric is discussed in Section 11.5. As a result of this review, the EC verifies 36 participants (100.00% of tracked). Table 11-117 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-117. Enbridge Market Transformation achievement: Run it Right participants metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Participants	36	36	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-118 to verify the metrics for the Run it Right program.

Table 11-118. Documentation used to verify the Run it Right program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	PDF scans of program participant documentation
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Enbridge first provided the Tracking File listing RIR Project Codes, Account Numbers, and Confirmation Date. The spreadsheet listed 36 individual accounts. The EC requested full documentation for a sample of 15 projects.

Received Files

The EC received a combined PDF document for each project, which included:

- One program application
- One investigation report
- Either one implementation time record or work orders for the recommended measures.

The EC also received an Excel file detailing the monitoring start date for each project. The EC first confirmed the document IDs received matched the IDs requested and that documents for all participants had been received.

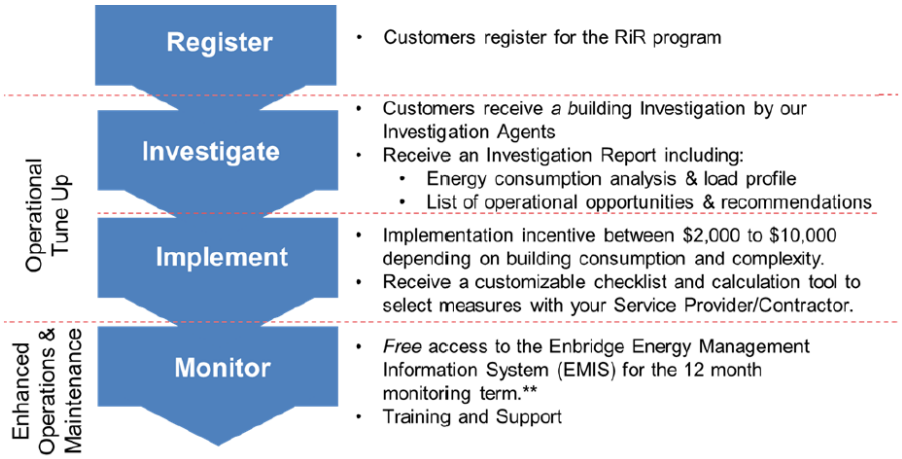
Verify Participation

Enbridge's Plan[105] states that:

> *Customers shall be deemed a "participant" in Enbridge's RiR offer for the purpose of the MTEM scorecard once they have entered the monitoring stage of the offer, which is the fourth of four steps inherent to this offer*.

Enbridge's plan further documents the four steps inherent to the offer to be: Register, Investigate, Implement, and Monitor (Figure 11-5). Combining the definition from Enbridge's plan with the figure, the EC interprets "participation" to require evidence of completing all four steps, including site energy use or savings monitoring produced by the fourth step.

Figure 11-5. Image of RIR Process Elements from Enbridge Plan[106]



Enbridge provided redacted program applications for 15 sites, satisfying intentional enrolment – the "register" step identified in Figure 11-5.

Enbridge provided investigation reports for the 15 sampled sites. Investigation reports provided estimated savings (analysis) for a site, as well as estimated savings by recommended measure. This document satisfies the second step identified in Figure 11-5.

For the 15 sampled sites, Enbridge provided either an implementation time record document or copies of work orders, either of which documented the execution of recommended work from the investigation reports. The EC considered either of these forms of documentation sufficient to satisfy the third step identified in Figure 11-5 for all projects submitted.

Enbridge provided an Excel file that listed the starting date for monitoring of the 15 sampled sites after project implementation, satisfying the fourth step identified in Figure 11-5.

Verification Result

As a result of this review, the EC verifies the scorecard metric of 36 participants (100.00% of tracked) for the Enbridge Run it Right program.

[105] Enbridge Gas Program Plan: DSM Plan Overview and Guiding Principles, EB-2015-0049, Tab 1, Schedule 4, Page 34 of 41
[106] Enbridge Gas Program Plan: DSM Plan Overview and Guiding Principles, EB-2015-0049, Tab 2, Schedule 1, Page 87 of 100

11.9.2 C&I Operational Efficiency Improvement – RunSmart – Union

No activity was reported for this program in 2021.

11.9.3 C&I Energy Management – Comprehensive Energy Management – Enbridge

Overview

Table 11-119 shows the tracked and verified scorecard achievements for the 2021 Enbridge Comprehensive Energy Management (CEM) program, with the metric of Participants. The RIR Program has two metrics under separate scorecards, CCM Savings (Resource Acquisition) and Participants (Market Transformation). Participants are discussed here, while the CCM Savings metric is discussed in Section 11.5. As a result of this review, the EC verifies two participants (100.00% of tracked). Table 11-119 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-119. Enbridge Market Transformation achievement: Comprehensive Energy Management participants metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Participants	2	2	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-120 to verify the metrics for the Comprehensive Energy Management program.

Table 11-120. Documentation used to verify the Comprehensive Energy Management program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Enbridge first provided the Tracking File listing CEM Project Codes, Account Numbers, Enrolment Date, and Energy Model Date. The spreadsheet listed two individual participants. The EC requested full documentation for both participants.

Received Files

The EC received two PDF application form documents, identified by CEM Project number. The EC first confirmed the documents received matched the IDs requested, and that documents for all participants had been received.

Verify Participation

Clear and specific criteria for participation in the CEM program were not readily available; rather, documentation indicates that the CEM program is intended to be a multi-year, 'holistic' process with ongoing engagement resulting in energy savings.

As a result, the EC understands that evidence of initial engagement and a specific agreement to participate are sufficient to verify participants for the purposes of the Market Transformation Scorecard metric of 'participants'.

The provided Project Files demonstrated that each participant applied for participation in the CEM program, signed by an applicant representative. In addition, the applications include declarations that the applicant:

- Acknowledges and confirms that they will commit resources to participate and identify energy efficiency opportunities
- Will create internal energy awareness
- Will share energy data with Enbridge
- Will allow continued communication with Enbridge

The EC confirmed documentation supports participation of both participants.

Verify Eligibility

The EC also used the Project File to confirm the eligibility of each participant,[107,108] namely to verify that customers had annual gas consumption between 340,000 m^3 and 5,000,000 m^3.

The Account Numbers listed in the Project Files matched Account Numbers listed in the Tracking File.

Project Files identified previous year gas consumption for the two customers:

- One customer with consumption between 340,000 m^3 and 5,000,000 m^3
- One customer with consumption greater than 5,000,000 m^3

Consumption of the larger participant was slightly greater than 5,000,000 m^3. Previous evaluations established that language in other parts of the plan make it clear that the target is large and complex commercial and industrial customers. Therefore, the EC feels that participants with consumption larger than the stated guideline are reasonably close to the expectations set by the plan, while participants with consumption significantly lower would not be. Since the participant is larger, the EC verifies the eligibility of this participant.

Verification Result

As a result of this review, the EC confirms that:

- Documentation confirmed all participants met the participation definition
- Documentation confirmed one of two participants met the eligibility definition
- Further review by the EC verified the remaining participant

The EC confirms the scorecard metric of 2 participants (100.00% of tracked) for the Enbridge Comprehensive Energy Management Program.

[107] Ontario Energy Board Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, page 47
[108] Enbridge Gas Program Plan: DSM Plan Overview and Guiding Principles, EB-2015-0049, Exhibit B, Tab 2, Schedule 1, Page 53 of 100

11.9.4 C&I Energy Management – Strategic Energy Management – Union

Overview

Table 11-121 shows the tracked and verified scorecard achievements for the 2021 Union Strategic Energy Management (SEM) program, with the metric of Percent Savings. As a result of this review, the EC verifies 3.55% savings (100.00% of tracked). Table 11-121 contains the following variables:

- Tracked: Metric value from original Tracking File sent by Enbridge upon first data request
- Verified: Metric value verified from review of Tracking File, Project Files, and other relevant documents identified in the Documentation section
- Ratio: Ratio of verified to tracked achievement. A value of 100.00% indicates that verified values match tracked values

Table 11-121. Union Performance Based achievement: Strategic Energy Management percent savings metric*

Metric	Achievement		Ratio
	Tracked	Verified	
Savings %	3.55%	3.55%	100.00%

*Not all values may compute exactly due to rounding.

Documentation

The EC used the documentation shown in Table 11-122 to verify the metrics for the Strategic Energy Management program.

Table 11-122. Documentation used to verify the Comprehensive Energy Management program

Report Language	Description or Citation
Enbridge-Provided Documentation	
Tracking File	Excel spreadsheet tracking metrics for all 2021 Enbridge DSM programs
Project Files	Various documents for each requested participant, supporting program metrics
Documents Used by EC	
OEB Decision	OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, OEB Revised Decision and Order, EB-2015-0029/EB-2015-0049, February 24, 2016 and OEB Decision and Order, EB-2019-0271, July 16, 2020
Enbridge Plan	Enbridge Gas Multi-Year DSM Plan (2015-2020), EB-2015-0049

Participant Selection

Union first provided the Tracking File listing Year, SEM Project Codes, Savings, Reference Consumption, and Percent Saved. The spreadsheet listed three individual participants, but only one participant had energy savings in 2021. The EC requested full documentation for this participant.

Received Files

The EC received one PDF document – a Savings Report that detailed the energy efficiency measures taken by the active participant and the resulting energy savings. The EC confirmed that the participant details in this documentation matched the details listed in the Tracking File.

Verify Savings Calculation

Union's plan defines savings percent[109] as "the aggregate percentage of savings achieved by the program participants within a program year." The savings report utilized on-site meter data and baseline consumption to model consumption and

[109] Description of Strategic Energy Management Savings Percent from Overview of Union's Proposed 2015-2020 DSM Plan, 2015EB-2015-0029, Exhibit A, Tab 3, Page 35 of 73

reductions in gas usage resulting from the implementation of the SEM Program. Union used the following equation for the participant's percentage savings:

$$Participant\ Savings\ \% = \frac{Pre\ Consumption\ Change}{Listed\ PY\ Consumption}$$

Union's tracked calculation then took the individual savings percent values for each participant and used the following equation to arrive at a program-level Savings Percent value:

$$\frac{\sum Participant\ Savings\ \%}{Count\ of\ Participants}$$

The EC agrees and confirms this methodology.

Verification Result

As a result of this review, the EC confirms a Savings Percent value of 3.55% (100.00% of tracked) for the Strategic Energy Management Savings Percent metric.

11.10 Appendix J: Review of Metric Target Calculations

Overview

For 2021 (and through the current framework), targets for metrics that existed in the previous year are defined based on the previous year's (PY) achievement[110] and spend,[111] the current year (CY) budget, and a multiplier.[112] In general, metric targets follow this generic formula:

$$Metric\ Target = \frac{PY\ Achievement}{PY\ Spend} \times CY\ Budget \times Multiplier$$

The exception to the generic formula above is the Union Large Volume Program, which uses the 3 Year cost effectiveness (CE),[113] the current year (CY) budget, and a multiplier of 2% (1.02):

$$Union\ Large\ Volume\ Target = 3\ Year\ CE \times CY\ Budget \times 1.02$$

Calculation Inputs

Table 11-123 and Table 11-124 provide the specific values used to calculate the 2021 metric targets.

Table 11-125 provides annual cost effectiveness (CE) ratios for the previous 3-years of the Union Large Volume Program and the average of those years, rounded to two digits past the decimal. The annual ratio is calculated via the final verified metric achievement divided by final actual program spend for that year. This rounded 3-year average value is what DNV used for target calculations.

Table 11-126 and Table 11-127 provide the targets for all 2021 metrics, calculation-based and prescribed.

Table 11-123. Enbridge Metric Target Calculation Inputs – 2021

Scorecard	Metric	2020 Achievement	2020 Spend	2021 Budget	Multiplier
Resource Acquisition	LV RA (CCM)	408,464,079	$8,133,265	$9,922,880	1.02
	SV RA (CCM)	268,310,350	$31,759,421	$27,752,670	
	HEC Participants*	14,013	$26,623,413	$18,727,200	
Low Income	LISF (CCM)	26,642,997	$6,363,661	$6,736,859	
	LIMR (CCM)	67,637,303	$2,947,688	$3,967,353	
	LINC Applications	15	$1,718,984	$1,456,560	
Market Transformation	CSBD Developments	36	$1,192,097	$1,122,068	1.10
	CEM Participants	7	$246,573	$941,562	
	RSBD Builders	35	$3,326,434	$3,392,296	
	RSBD Homes	2,768			
	RiR Participants	65	$202,106	$329,209	
	SEC Schools	7	$68,748	$520,200	

*HEC budget is a subset of, and not a separate line item from, the Resource Acquisition budget.

[110] Gas savings values used in calculating targets for 2021 are slightly different than the final savings values reported in the 2020 Annual Verification report because achievements for the target calculations use the more updated TRM 5.0 assumptions, compared to the final 2020 achievements which use the TRM 4.0 assumptions.

[111] Program spending used in calculating targets do not include overheads. They are also slightly different than spending values included in the 2020 Annual Verification report, as some of the program-specific spending in the 2020 report includes program-specific overheads. Budget values used in calculating targets also exclude overhead costs.

[112] 1.02 or 1.10 depending on the scorecard

[113] Three-year rolling average (2018-2020) Rate T2/T100 cost effectiveness where cost-effectiveness here is defined as "Final verified metric achievement used for MRAMVA purposes divided by final actual program spend for that year."

Table 11-124. Union Metric Target Calculation Inputs – 2021

Scorecard	Metric	2019 Achievement	2019 Spend	2021 Budget	Multiplier
Resource Acquisition	RA (CCM)	669,892,921	$27,717,300	$31,183,000	1.02
	HRR Participants*	7,619	$15,652,806	$12,226,000	
Large Volume	LV (CCM)†	36.14 (see Table 11-125)		$3,150,000	
Low Income	LISF (CCM)	38,411,013	$7,233,289	$9,739,000	
	LIMF-SA (CCM)	12,142,699	$1,654,002	$2,329,990	
	LIMF-MR (CCM)	8,316,698	$882,382	$1,243,010	
Market Transformation	CNC Developments	24	$1,041,572	$1,000,000	1.10
	OH % Built	39.19%	$595,522	$841,000	
Performance Based	RS Participants	-	$58,471	$163,000	
	RS Savings %	-1.52%	$58,471		
	SEM Savings %	2.61%	$232,526	$639,000	

*HRR budget is a subset of, and not a separate line item from, the Resource Acquisition budget.
†Union's Large Volume program metric target is based on different inputs; instead of the 2020 CCM achievement, the formula is based off the three-year rolling average (2018-2020) Rate T2/Rate 100 cost effectiveness. This average value (36.14) is what is listed for the 2021 achievement.

Table 11-125. Union Large Volume Cost Effectiveness* Ratios

Year	CE Ratio*
2018	38.10
2019	26.96
2020	43.35
3-Year Average	**36.14**

*Cost effectiveness here is defined as "Final verified metric achievement used for MRAMVA purposes divided by final actual program spend for that year." Annual CE Ratios and the 3-year average are rounded to 2 digits past the decimal.

Table 11-126. Enbridge Metric Targets – 2021

Scorecard	Metric	2021 Target
Resource Acquisition	LV RA (CCM)	508,307,882
	SV RA (CCM)	239,149,677
	HEC Participants	10,054
Low Income	LISF (CCM)	28,769,589
	LIMR (CCM)	92,855,103
	LINC Applications	13
Market Transformation	CSBD Developments	37
	CEM Participants	29
	RSBD Builders	39
	RSBD Homes	3,105
	RiR Participants	116
	SEC Schools	58

Table 11-127. Union Metric Targets – 2021

Scorecard	Metric	2021 Target
Resource Acquisition	RA (CCM)	768,727,712
	HRR Participants	6,070
Large Volume	LV (CCM)	116,103,299
Low Income	LISF (CCM)	52,751,464
	LIMF-SA (CCM)	17,447,511
	LIMF-MR (CCM)	11,950,032
Market Transformation	CNC Developments	25
	OH % Built	60.88%
Performance Based	RS Participants	69
	RS Savings %	0.44%
	SEM Savings %	7.87%

11.11 Appendix K: Review of Lost Revenue and DSM Shareholder Incentive Calculations

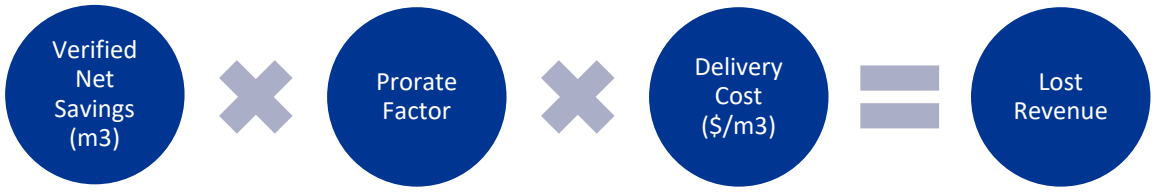
This appendix describes the EC team's review of the lost revenue and demand side management shareholder incentive calculations.

11.11.1 Lost Revenue Calculations

The basic approach to the lost revenue calculation is illustrated in Figure 11-6. The calculation is based on the following factors:

- The verified net natural gas savings (in annual cubic meters) by applicable rate class using the best available information at the time of the verification
- The delivery cost of the natural gas by rate class
- The month in which the measure was installed, represented in the equation below as a prorate factor

Figure 11-6. Lost revenue calculation



Lost revenues are summed across all measures in a rate class. Then the lost revenues for all applicable rate classes are summed to calculate total lost revenues per utility.

The applicable rate classes for Enbridge and Union are shown in Table 11-128. Values specific to these rates for the evaluated year are included in Section 11.12.

Table 11-128. Rate classes for lost revenue calculation

Enbridge	Union
Rate 110	M4 Industrial
Rate 115	M5 Industrial
Rate 135	M7 Industrial
Rate 145	T1 Industrial
Rate 170	T2 Industrial
	20 Industrial
	100 Industrial

The methods to compute each of the components shown in Figure 11-6. are described in the following sections.

Lost revenue: Verified Net Savings

The lost revenue calculation first utilizes verified net savings, calculated using best available inputs and assumptions at the time of the verification. For prescriptive program savings, this is currently the December 2021 update to the TRM. This differs from the savings used for the DSM shareholder incentive calculation, which uses the energy savings at the time of program planning.

Lost revenue: Prorate Factor Calculation

The prorate factor is simply the proportion of the annual net savings that will be included in the lost revenue calculation, based on the number of months the gas-saving measure was installed. Table 11-129 shows the prorate factors for each installation month. Prorated savings are calculated by multiplying the measure's annual savings by the ratio for the month it was installed.

Table 11-129. Lost revenue installation month savings ratio*

Month	Ratio (12-Month+1)/12
January	1.0000
February	0.9167
March	0.8333
April	0.7500
May	0.6667
June	0.5833
July	0.5000
August	0.4167
September	0.3333
October	0.2500
November	0.1667
December	0.0833

*Not all values may compute exactly due to rounding.

For example, the calculation assigns 12 months of savings to measures installed in January and one month of savings to measures installed in December.

Lost revenue: Delivery Cost Calculation

Delivery rates are expressed as cost per 1,000 cubic meters. Prorated energy savings are divided by 1,000 to convert savings in cubic meters to savings in thousands of cubic meters, which are then multiplied by the delivery rate for the respective rate class to determine lost revenue by rate class. The delivery rate is not verified as part of this evaluation.

Lost revenue: Summing lost revenue Savings

Lost revenue for each rate class is calculated by summing the lost revenue for all measures within the rate class. Total lost revenue for each utility is calculated by summing the lost revenue across all applicable rate classes:

$$Total\ Lost\ Revenue = \sum_{Rate\ Class}^{Utility} \sum_{Measure}^{Rate\ Class} Lost\ Revenue$$

11.11.2 DSM shareholder incentive calculations

The DSM shareholder incentive calculations are more complex than the lost revenue calculations. DSM shareholder incentive calculations are based on:

- The verified program achievements compared to the target metrics for that scorecard
- The weight placed on each metric within each scorecard
- The maximum incentive achievable for that scorecard

Because all three of these factors vary by utility and scorecard, a simple diagram is not possible.

DNV independently calculated DSM shareholder incentive values for both legacy utilities. The following sections lay out the calculation methodology, as well as inputs used for each utility.

The EC confirmed the lower band, upper band, target metric, weights, maximum incentives, rate classes, and rates for both utilities with the EAC.

DSM shareholder incentive: verification savings values

Where the verified net savings used in the lost revenue calculation represent the best available information at the time of the verification, the verified net savings used in the DSM shareholder incentive are calculated using the savings values leveraged during the program planning process.

DSM shareholder incentive: metric score

DSM shareholder incentive calculations are based on the verified metric achievement identified within each scorecard compared to the target value. For each metric, DNV first determines the percent of metric achieved.

$$\%\ Metric\ Achieved = \frac{achieved\ metric}{target\ metric}$$

If the achieved metric is less than or equal to the 2021 Target, the Metric Score is then calculated as:

$$Metric\ Score = 1 - \frac{0.25 * (target\ metric - achieved\ metric)}{(target\ metric - lower\ band)}$$

If the achieved metric is greater than the 2021 Target, the Metric Score is then calculated as:

$$Metric\ Score = 1 + \frac{0.5 * (achieved\ metric - target\ metric)}{(upper\ band - target\ metric)}$$

DSM shareholder incentive: weighted metric score

The weighted metric score is determined by multiplying the metric score by its corresponding weight. Each metric within the scorecard is weighted, with all weights within each scorecard summing to 100.00%. Per the OEB Decision and Order, the OEB approved maximum and minimum achievement limits per metric of 200% and 0%, respectively.[114] As a result, all Metric Scores are capped at 200%, thereby limiting the influence of any one metric within the weighted scorecard achievement calculation to twice its weight.

DSM shareholder incentive: weighted scorecard achievement

The weighted metrics within each scorecard are summed to calculate the weighted scorecard achievement:

$$weighted\ scorecard\ achievement = \sum_{Scorecard} (weight * Metric\ Score)$$

DSM shareholder incentive: incentive calculation

The weighted scorecard achievement (WSA) is then used to calculate the Shareholder Incentive for that Scorecard. The appropriate calculation is dependent on the WSA value, as demonstrated in Table 11-130.

[114] OEB Decision and Order, EB-2015-0029/EB-2015-0049, January 20, 2016, page 80

Table 11-130. Calculation to determine shareholder incentive

WSA Value	Incentive
<.75	0
.75≤WSA<1	$(40\%\ x\ Max\ Incentive)\frac{(WSA-0.75)}{.25}$
1≤WSA<1.5	$(40\%\ Max\ Incentive)+(60\%\ Max\ Incentive)*\frac{(WSA-1)}{0.5}$
1.5≤WSA	Max Incentive

The shareholder incentives for each scorecard are summed to calculate each utility's total incentive:

$$Total\ Incentive = \sum_{Utility} Scorecard\ Incentive$$

11.11.3 Example Calculations

Lost revenue

As an example, a widget carries an annual lost revenue verified savings value of 500 m^3 (annual, net savings). If that unit was installed in January, 500 m^3 (500 x 1.000) would be verified for lost revenue. If that same unit were installed in July, 250 m^3 (500 x 0.500) would be verified and if installed in November, 83.33 m^3 (500 x .1667). Table 11-131 shows the prorated total savings for all widgets with one installed per month, in 1000 m^3.

Table 11-131. Example lost revenue savings total for single rate class with monthly widget installation*

Month	Ratio (12-Month+1)/12	Units Installed	Lost Revenue Net Annual Gas Savings (m^3)	Prorated Energy Savings (m^3)	Lost Revenue Energy Savings (1000 m^3)
January	1.00	1	500	500.00	0.50
February	0.92	1	500	458.33	0.46
March	0.83	1	500	416.67	0.42
April	0.75	1	500	375.00	0.38
May	0.67	1	500	333.33	0.33
June	0.58	1	500	291.67	0.29
July	0.50	1	500	250.00	0.25
August	0.42	1	500	208.33	0.21
September	0.33	1	500	166.67	0.17
October	0.25	1	500	125.00	0.13
November	0.17	1	500	83.33	0.08
December	0.08	1	500	41.67	0.04
Total					**3.25**

*Not all values may compute exactly due to rounding.

In Table 11-132, the above example savings total is represented by Rate Class II – one widget per month was the sum of all measures performed within customers in that rate class. The verified lost revenue energy savings for the class are multiplied by the rate for that class to determine the lost revenue for that rate class; lost revenue for Rate Class II totalling $48.75 from energy savings of 3.25 at a rate of $15.00 per 1,000 m^3. All applicable rate class lost revenue are then summed for total lost revenue.

Table 11-132. Example total lost revenue*

Rate Class	Lost Revenue Energy Savings (1000 m^3)	Rate ($/1000 m^3)	Lost Revenue
I	25.00	$5.55	$138.75
II	**3.25**	**$15.00**	**$48.75**
III	150.00	$1.50	$225.00
IV	100.00	$4.00	$400.00
V	5.10	$25.50	$130.05
VI	1.26	$10.00	$12.60
Total Lost Revenue			$955.15

*Not all values may compute exactly due to rounding.

DSM shareholder incentive

The first step in calculating the DSM shareholder incentive is to calculate the percent of the target metric that was achieved, which is a simple ratio of the achieved metric divided by the target metric. The second step is to determine the correct formula based on whether the verified achievement for the scorecard metric was at, above, or below the annual target. In the example in Table 11-133, the verified achievement for Scorecard A CCM was below the 2021 Target, so the formula for achievement below target is used to determine the metric score. The Verified Achievement for participants was above the 2021 Target, so the alternative calculation is used. Both formulas are illustrated below.

Table 11-133. Example metric score*

Scorecard	Metric	Verified Achievement	Lower Band	2021 Target	Upper Band	Metric Score
Scorecard A	CCM	9,000,000	7,500,000	10,000,000	15,000,000	0.9
	Participants	250	150	200	300	1.25

*Not all values may compute exactly due to rounding.

$$CCM\ Metric\ Score = 1 - \frac{.25 * (10{,}000{,}000 - 9{,}000{,}000)}{(10{,}000{,}000 - 7{,}500{,}000)} = 1 - 0.1 = 0.9$$

$$Participant\ Metric\ Score = 1 + \frac{0.5 * (250 - 200)}{(300 - 200)} = 1 + .25 = 1.25$$

The metric score for each metric is then multiplied by the applicable weight. In this example, CCM savings is weighted at 75% and participants at 25%. The weighted metric scores are summed for the weighted scorecard achievement.

Table 11-134. Example scorecard weighted score (WSA)*

Scorecard	Metric	Metric Score	Weight	Weighted Metric Score	Weighted Scorecard Achievement
Scorecard A	CCM	0.9	75%	0.675	0.9875
	Participants	1.25	25%	0.3125	

*Not all values may compute exactly due to rounding.

For Scorecard A, if we assume a maximum incentive value of $100,000, a weighted scorecard achievement of 0.9875 would result in an incentive of $38,000, as demonstrated below.

$$(40\%\ x\ \$100{,}000)\frac{(0.9875 - .75)}{.25} = \$40{,}000\ x\ \frac{(0.2375)}{.25} = \$40{,}000\ x\ 0.95 = \$38{,}000$$

11.12 Appendix L: Lost Revenue and DSM Shareholder Incentive: Detailed Tables

11.12.1 Enbridge DSM shareholder incentive

Table 11-135. Enbridge's 2021 Resource Acquisition targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Large Volume Customer - CCM	508,307,882	430,134,894	40.00%	84.62%	33.85%
Small Volume Customer - CCM	239,149,677	317,200,551	40.00%	132.64%	53.05%
Home Energy Conservation Participants	10,054	15,321	20.00%	152.39%	30.48%
Verified Total Weighted Scorecard Achieved					117.38%
Maximum Scorecard Incentive					$7,012,787
Verified Scorecard Incentive Achieved					**$4,267,746**

*Not all values may compute exactly due to rounding.

Table 11-136. Enbridge's 2021 Low Income scorecard targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Home Winterproofing CCM	28,769,589	26,443,935	45.00%	91.92%	41.36%
Low Income Multi Residential CCM	92,855,103	88,304,418	45.00%	95.10%	42.79%
Low Income New Construction Applications	13	13	10.00%	100.00%	10.00%
Verified Total Weighted Scorecard Achieved					94.16%
Maximum Scorecard Incentive					$2,263,561
Verified Scorecard Incentive Achieved					**$693,807**

*Not all values may compute exactly due to rounding.

Table 11-137. Enbridge's 2021 Market Transformation scorecard targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
School Energy Competition Schools	58	-	10.00%	0.00%	0.00%
Run it Right Participants	116	36	20.00%	31.03%	6.21%
Comprehensive Energy Management Participants	29	2	20.00%	3.57%	0.71%
Residential Savings by Design Builders	39	24	10.00%	62.50%	6.25%
Residential Savings by Design Homes	3,105	2,514	15.00%	80.96%	12.14%
Commercial Savings by Design Developments	37	17	25.00%	44.44%	11.11%
Verified Total Weighted Scorecard Achieved**					36.43%
Maximum Scorecard Incentive					$1,173,652
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.

11.12.2 Union DSM shareholder incentive

Table 11-138. Union's 2021 Resource Acquisition targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
CCM	768,727,712	635,084,369	75.00%	82.61%	61.96%
Home Reno Rebate Participants	6,070	5,032	25.00%	82.89%	20.72%
Verified Total Weighted Scorecard Achieved					82.68%
Maximum Scorecard Incentive					$6,562,712
Verified Scorecard Incentive Achieved					**$806,921**

*Not all values may compute exactly due to rounding.

Table 11-139. Union's 2021 Low Income targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Single Family CCM	52,751,464	45,903,844	60.00%	87.02%	52.21%
Multi-Family - Social & Assisted CCM	17,447,511	9,535,480	35.00%	54.65%	19.13%
Multi-Family - Market Rate CCM	11,950,032	8,307,799	5.00%	69.52%	3.48%
Verified Total Weighted Scorecard Achieved**					74.82%
Maximum Scorecard Incentive					$2,604,447
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.

Table 11-140. Union's 2021 Large Volume targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
CCM	116,103,299	141,733,709	100.00%	122.08%	122.08%
Verified Total Weighted Scorecard Achieved					122.08%
Maximum Scorecard Incentive					$694,265
Verified Scorecard Incentive Achieved					**$461,621**

*Not all values may compute exactly due to rounding.

Table 11-141. Union's 2021 Market Transformation targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
Optimum Home Percentage of Homes Built	60.88%	73.08%	50.00%	120.03%	60.02%
Commercial New Construction Developments	25	24	50.00%	95.83%	47.92%
Verified Total Weighted Scorecard Achieved					107.93%
Maximum Scorecard Incentive					$405,810
Verified Scorecard Incentive Achieved					**$200,960**

*Not all values may compute exactly due to rounding.

Table 11-142. Union's 2021 Performance Based targets, achievements, and incentive*

Metric	Target	Verified Achievement	Weight	Metric Score	Weighted Metric Score
RunSmart Participants	69	-	10.00%	0.00%	0.00%
RunSmart Savings %	0.44%	0.00%	40.00%	0.00%	0.00%
Strategic Energy Management Savings %	7.87%	3.55%	50.00%	44.93%	22.46%
Verified Total Weighted Scorecard Achieved**					22.46%
Maximum Scorecard Incentive					$182,765
Verified Scorecard Incentive Achieved					**$0**

*Not all values may compute exactly due to rounding.
**A minimum total weighted scorecard achievement level of 75% is required to earn a portion of the available shareholder incentive.

11.12.3 Enbridge Lost Revenue

Table 11-143. Enbridge lost revenue volumes (10^3 m^3) by rate class, prorated by month*

Rate Class	Savings Volume by Month (1,000 m3)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Rate 110	1,765	272	107	421	178	45	149	33	115	141	11	45	3,283
Rate 115	-	-	706	-	99	-	-	360	16	37	-	-	1,219
Rate 135	-	-	-	378	1,275	63	22	-	-	-	-	-	1,738
Rate 145	-	-	108	-	-	-	-	-	-	-	-	-	108
Rate 170	13	47	-	-	-	-	-	-	115	14	25	-	214
TOTAL	**1,778**	**319**	**922**	**799**	**1,553**	**107**	**171**	**393**	**247**	**191**	**36**	**45**	**6,562**

*Not all values may compute exactly due to rounding.

Table 11-144. Enbridge lost revenue volumes (10^3 m^3) total volume, delivery rates, and revenue impact by rate class*

Rate Class	Savings Volume (1,000 m3)	Delivery Rate ($/1,000 m3)	Revenue Impact ($)
Rate 110	3,283	$5.95	$19,534
Rate 115	1,219	$2.05	$2,495
Rate 135	1,738	$17.71	$30,787
Rate 145	108	$34.93	$3,786
Rate 170	214	$2.83	$605
TOTAL	**6,562**		**$57,207**

*Not all values may compute exactly due to rounding.

11.12.4 Union Lost Revenue

Table 11-145. Union lost revenue volumes (10^3 m^3) by rate class, prorated by month*

Rate Class	Savings Volume by Month (1,000 m3)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
M4 Industrial	1,986	1,272	1,076	99	155	455	70	56	55	0	195	-	5,420
M5 Industrial	37	-	4	3	2	2	18	79	-	-	-	-	145
M7 Industrial	5,987	1,988	495	189	113	698	437	514	94	264	88	211	11,079
T1 Industrial	38	-	-	-	-	35	-	-	-	22	2	-	98
T2 Industrial	3,924	15	124	-	120	36	8	175	230	24	239	-	4,893
20 Industrial	89	6	22	-	13	-	3	-	15	3	6	1	157
100 Industrial	2,009	-	8	1	38	12	-	-	-	27	87	-	2,182
TOTAL	14,071	3,280	1,729	293	440	1,238	536	824	394	340	617	211	**23,974**

*Not all values may compute exactly due to rounding.

Table 11-146. Union lost revenue volumes (10^3 m^3) total volume, delivery rates, and revenue impact by rate class*

Rate Class	Savings Volume (1,000 m3)	Delivery Rate ($/1,000 m3)	Revenue Impact ($)
M4 Industrial	5,420	$16.56	$89,768
M5 Industrial	145	$28.88	$4,200
M7 Industrial	11,079	$2.80	$31,007
T1 Industrial	98	$1.11	$109
T2 Industrial	4,893	$0.21	$1,042
20 Industrial	157	$7.30	$1,142
100 Industrial	2,182	$2.73	$5,948
TOTAL	**23,974**		**$133,216**

*Not all values may compute exactly due to rounding.

11.13 Appendix M: Prescriptive Savings Verification

This appendix describes the detailed process used to verify the reported (tracked) prescriptive and quasi-prescriptive savings for Enbridge and Union programs.

11.13.1 Data Sources

Verification of prescriptive measures relies on several data sources provided by Enbridge and Union.

Tracking Files

The EC received one tracking file each from Enbridge and Union. Both tracking files are Excel files and include prescriptive measures and additional information for measures from non-prescriptive programs.

TRM - Joint Submissions

The EC utilized documents titled “New and Updated DSM Measures - Joint Submission from Union Gas Ltd. and Enbridge Gas Distribution,” referred to in this report as TRMs. The EC used the November 2020 TRM (TRM 5.0) as the primary source for identifying prescribed values, such as energy savings and measure life, for prescriptive measures. In addition to that primary TRM, the EC also used TRM 5.0[115].

Other Supporting Documentation

The Joint Submission documents did not contain all of the necessary detail to verify the savings for all measures. For example, savings for commercial ENERGY STAR combination ovens were not included in TRM 5.0. All prescriptive measures and corresponding verification sources are listed in the tables at the end of this appendix.

In addition to the TRMs, the EC also used the following for verification of savings for prescriptive measures, as cited in the tables at the end of this appendix.

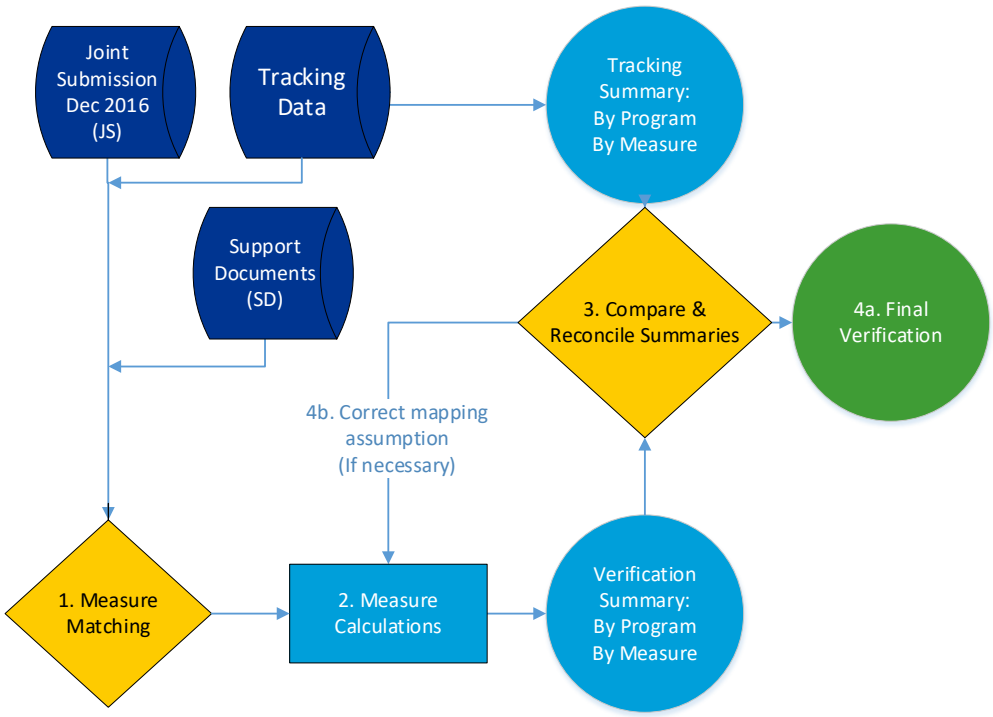
- C&I Prescriptive Showerheads, Enbridge, “Showerhead Verification Among Rental Buildings”, Ipsos Research, March 2012
- C&I Prescriptive Verification Study, “2017 C&I Prescriptive Study – Measure of NTG Factors and Gross Savings Verification”, Itron, June 7, 2019
- Commercial ENERGY STAR Combination Oven Sub Doc, “00_Commercial ENERGY STAR Combi Oven_EGI_July-16-2021-Sub Doc”, July 16, 2021
- “Low Income Kits Verification Study”: Final Report Following an Audit of the Union Gas ESK - Helping Homes Conserve – HHC – Program, Beslin Communication Group, March 15, 2013
- “TAPS Report”, TAPS Verification Program 2012 Year End Research Report, Study CR-604, Quadra Research, April 3, 2013
- “Adaptive Thermostat Ping Report”, 2021 Adaptive Thermostats Ping Reports LUG and LEG

[115] Natural Gas Demand Side Management Technical Resource Manual Version 5.0

11.13.2 Overall Methodology

The EC used a straightforward process to consistently verify savings for both utilities, summarized in Figure 11-7.

Figure 11-7. Savings verification process



The process includes the following high-level steps. Additional detail is presented below.

1. Manually match individual project measure savings against Joint Submission (JS) and Support Documents (SD) values, based first on measure name and then on other attributes, to calculate savings.
2. Calculate gross and net annual and lifetime savings for all measures.
3. Compare the summarized calculated savings and the tracked savings to identify discrepancies or disagreements.
4. When the EC determined that a discrepancy was due to an error in assigning the correct savings value, the EC assigned a new savings value to the measure and re-compared totals (4b). Once the EC resolved the correct savings value (through continued investigation of measure or clarification with utility) the record was verified (4a).

Table 11-147 shows the variables used from the utility tracking data to verify, summarize, and reconcile savings values. While variables such as measure life or free ridership were present in the tracking data, these were not used by the EC to calculate verified savings, but to identify discrepancies between verification and tracking summaries when comparing and reconciling savings totals. The EC used TRM or SD values for the verified savings calculations.

Table 11-147. Tracking variables used for prescriptive savings verification

Tracking Variable	Used In		
	Verification/ Summary	Tracking Summary	Compare & Reconcile Summaries
Scorecard	X		X
Program	X		X
Decision Type (Early Replace, Retrofit, etc.)	X		X
Measure Name	X		X
Building Type	X		X
Equipment Type	X		X
Install Type	X		X
Number of Units	X		X
Capacity	X		X
Measure Life			X
Free Rider			X
Adjustment Factor			X
Gross Annual Natural Gas Savings (m3)		X	X
Net Annual Natural Gas Savings (m3)		X	X
Gross Cumulative Natural Gas Savings (m3)		X	X
Net Cumulative Natural Gas Savings (m3)		X	X

1. Measure Matching

The EC manually mapped measures into groups. Measures were filtered by name to assign them to a group, then matched against the TRM and SD measures to identify the correct savings values. For each project, the EC confirmed that the savings value listed for the measure matched the value listed for that measure type in the TRM and SD. The tables at the end of this appendix list all tracked measure groups and their corresponding savings values and JS or SD source for Enbridge and Union, respectively.

2. Measure Calculations

There are two types of prescriptive measure calculations: Pure-Prescriptive and Quasi-Prescriptive. Quasi-Prescriptive measure savings require more than the per unit savings and the number of units to determine annual gross savings. For example, some boiler measures require the capacity of the boiler. Table 11-148 summarizes the differences between the two types.

Table 11-148. Explanation of calculation inputs for two types of prescriptive measures

Savings Type	Purely Prescriptive	Quasi-Prescriptive
Annual Gross	Per Unit Savings * # of Units	Unit Capacity Savings * Unit Capacity * # of Units
Annual Net	Annual Gross * (1 - Free Ridership) * Adjustment	
Lifetime Gross	Annual Gross * Measure Life	
Lifetime Net (CCM)	Annual Net * Measure Life	

The EC used Excel macros to identity savings inputs and apply savings calculations. The use of macros ensured consistent application of savings calculations and allowed for quick and accurate savings updates. The tables at the end of this appendix list all calculated measure totals, as verified by the EC.

3. Compare & Reconcile Summaries

The EC summed savings values from utility tracking and from EC verification calculations by program and measure type, and tabulated by Annual Gross, Annual Net, Lifetime Gross, Lifetime Net, and project measure counts. The EC did this with the Pivot Table function in Excel, creating Tracking (utility tracking data) and Verification (EC calculated) Summaries, which provided two benefits. First, the EC was able to identify discrepancies between listed measure names, because any differences would result in a different number of summary rows between the two tables. Second, the pivot tables allowed for quick and accurate updates when the EC performed adjustments to our original matches.

By reviewing differences between the two summaries, the EC identified errors in the EC matches and differences between the EC matches and the original utility tracking data, allowing us to investigate the discrepancies. The tables at the end of this appendix lists all verification discrepancies where:

- **The tracking data did not contain sufficient information to identify savings:** In general, these measures were resolved with additional documentation and resulted in no change to savings. They are listed in this appendix to document the evaluation process and communication between the evaluator and the utility.
- **The tracking data was incorrect:** This may have been because different savings factors were identified through the verification process. The tables include the details for each measure.

4. Final Verification

Once all tracked measures were matched to TRM values, the savings calculated, and all discrepancies reconciled or explained, verified savings summaries were finalized. Final savings totals for each program are available within the appropriate appendix in this report.

11.13.3 Savings Calculation Values

Savings tables in this section utilize measure names and units from the TRM wherever possible. Utilities utilized different units (BTU vs kBTU) or name variations, those are not used here.

Table 11-149. Enbridge measure savings calculation values*

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Direct Install	Air Curtain - Dock-In - 10 x 10	Pure	TRM 5.0	5,517.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Dock-In - 8 x 10	Pure	TRM 5.0	4,941.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Dock-In - 8 x 8	Pure	TRM 5.0	4,713.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 10 x 10	Pure	TRM 5.0	4,844.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 12 x 12	Pure	TRM 5.0	5,753.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 14 x 14	Pure	TRM 5.0	6,504.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 16 x 16	Pure	TRM 5.0	7,081.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 18 x 18	Pure	TRM 5.0	7,459.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 20 x 20	Pure	TRM 5.0	7,605.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - 10,001 to 15,000 cfm	Pure	TRM 5.0	17,529.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - 5,001 to 10,000 cfm	Pure	TRM 5.0	10,517.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - Up to 5,000 cfm	Pure	TRM 5.0	4,207.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	2,041.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	1,897.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	1,977.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	5,087.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	4,853.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	4,988.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Shelter (10x10)	Pure	TRM 5.0	1,736.00	unit	10	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Direct Install	Dock Door Seals - Shelter (10x10)	Pure	TRM 5.0	4,501.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Commercial Condensing Unit Heater	Quasi	TRM 5.0	7.89	kBTU/hr input capacity	18	100.00%	0.00%	100.00%
C&I Prescriptive	Commercial Energy Star Combi Oven	Pure	ENERGY STAR Combination Oven Substantiation Document	1,186.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Convection Oven	Pure	TRM 5.0	865.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Double Rack Oven	Pure	TRM 5.0	1,076.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Fryer	Pure	TRM 5.0	1,408.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Steam Cooker	Pure	TRM 5.0	8,889.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Under-Fired Broiler	Pure	TRM 5.0	2,511.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Condensing MUA VFD up to 14,000 CFM - Multi-Residential/Long Term Care [New/Existing]	Quasi	TRM 5.0	3.00	CFM	20	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	1.3600	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	3.09	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	2.22	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	2.22	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	1.3600	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	3.09	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+0.79	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+1.79	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+1.29	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	DCKV 10,001 - 15,000 CFM [New]	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	17,529.00	unit	15	102.74%	38.00%	100.00%
C&I Prescriptive	DCKV 5,001 - 10,000 CFM [Existing]	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	10,517.00	unit	15	102.74%	38.00%	100.00%
C&I Prescriptive	DCKV 5,001 - 10,000 CFM [New]	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	10,517.00	unit	15	102.74%	38.00%	100.00%
C&I Prescriptive	DCKV up to 5,000 CFM [New]	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	4,207.00	unit	15	102.74%	38.00%	100.00%
C&I Prescriptive	DCKV up to 5000 CFM [Existing]	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	4,207.00	unit	15	102.74%	38.00%	100.00%
C&I Prescriptive	DCV Single Zone Office with Maintenance [Existing]	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.1120	sq ft	15	104.14%	92.00%	100.00%
C&I Prescriptive	DCV Single Zone Office with Maintenance [New]	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.1120	sq ft	15	104.14%	92.00%	100.00%
C&I Prescriptive	DCV Single Zone Retail with Maintenance [Existing]	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.3920	sq ft	15	104.14%	92.00%	100.00%
C&I Prescriptive	DCV Single Zone Retail with Maintenance [New]	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.3920	sq ft	15	104.14%	92.00%	100.00%
C&I Prescriptive	Destratification Fan 20 ft [Existing]	Pure	TRM 5.0	2,029.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Destratification Fan 24 ft [Existing]	Pure	TRM 5.0	2,922.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Dock Door Seals 10 x 10 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,736.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 10 x 10 (Baseline w/o Seals) [Existing]	Pure	TRM 5.0	4,501.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 8 x 10 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	2,041.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 8 x 10 (Baseline w/o Seals) [Existing]	Pure	TRM 5.0	5,087.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 8 x 8 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,897.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 8 x 8 (Baseline w/o Seals) [Existing]	Pure	TRM 5.0	4,853.00	unit	10	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Dock Door Seals 8 x 9 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,977.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Dock Door Seals 8 x 9 (Baseline w/o Seals) [Existing]	Pure	TRM 5.0	4,988.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Med Use 65% - 74% (55% Code Baseline) [New/Existing]	Quasi	TRM 5.0	0.4700	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Med Use 75% - 84% (55% Code Baseline) [New/Existing]	Quasi	TRM 5.0	0.9500	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Integrated Office 55% (No Baseline) [New]	Quasi	TRM 5.0	1.6000	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Integrated School 55% (No Baseline) [New]	Quasi	TRM 5.0	1.6000	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Integrated School 65% (No Baseline) [New]	Quasi	TRM 5.0	1.9100	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Integrated School 75% (No Baseline) [New]	Quasi	TRM 5.0	2.21	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Integrated School 85% (No Baseline) [New]	Quasi	TRM 5.0	2.51	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Standalone School 55% (No Baseline) [New]	Quasi	TRM 5.0	1.6000	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Standalone School 65% (No Baseline) [New]	Quasi	TRM 5.0	1.9100	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	ERV Vent Low Standalone School 75% (No Baseline) [New]	Quasi	TRM 5.0	2.21	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	HRV Vent Low Integrated School 55% (No Baseline) [New]	Quasi	TRM 5.0	1.3600	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	HRV Vent Low Standalone Office 65% (No Baseline) [New]	Quasi	TRM 5.0	1.6100	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Air Curtain 8 x 10 S&R	Pure	TRM 5.0	4,941.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Air Curtain Shipping Drive-In Door 12 x 12 [New/Existing]	Pure	TRM 5.0	5,753.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Destratification Fan 20 ft [Existing]	Pure	TRM 5.0	2,029.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Ind Destratification Fan 24 ft [Existing]	Pure	TRM 5.0	2,922.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Ind Dock Door Seals 10 x 10 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,736.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Dock Door Seals 8 x 10 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	2,041.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Dock Door Seals 8 x 10 (Baseline w/o Seals) [Existing]	Pure	TRM 5.0	5,087.00	unit	10	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Ind Dock Door Seals 8 x 8 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,897.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Ind Dock Door Seals 8 x 9 (Baseline w/ Deteriorated Seals) [Existing]	Pure	TRM 5.0	1,977.00	unit	10	100.00%	5.00%	100.00%
C&I Prescriptive	Ozone Washer Extractor =/<60lbs [New]	Quasi	TRM 5.0	0.0383	lbs/yr	15	100.00%	8.00%	100.00%
Home Winterproofing	Bathroom Aerator	Pure	TRM 5.0, TAPS Report	6.40	unit	10	100.00%	0.00%	22.50%
Home Winterproofing	Kitchen Aerator	Pure	TRM 5.0, TAPS Report	11.56	unit	10	100.00%	0.00%	33.50%
Home Winterproofing	Showerhead Replacement 1.25 GPM	Pure	TRM 5.0, Showerhead Verification Study Among Rental Buildings	28.20	unit	10	100.00%	0.00%	87.70%
Home Winterproofing	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	0.00%	100.00%
Home Winterproofing	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	0.00%	100.00%
Home Winterproofing	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	0.00%	100.00%
Home Winterproofing	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	0.00%	100.00%
Low-Income Multi-Residential	Low Income Condensing MUA VFD up to 14,000 CFM - Multi-Residential/Long Term Care [New/Existing]	Quasi	TRM 5.0	3.00	CFM	20	100.00%	0.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0, Adaptive Thermostat Ping Report	185.00	unit	15	100.00%	4.00%	82.52%

*Not all values may compute exactly due to rounding.

Table 11-150. Union measures savings calculation values*

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Direct Install	Air Curtain - Dock-In - 10 x 10	Pure	TRM 5.0	5,517.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Dock-In - 8 x 10	Pure	TRM 5.0	4,941.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Dock-In - 8 x 8	Pure	TRM 5.0	4,713.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Dock-In - 8 x 9	Pure	TRM 5.0	4,845.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 10 x 10	Pure	TRM 5.0	4,844.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 12 x 12	Pure	TRM 5.0	5,753.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 14 x 14	Pure	TRM 5.0	6,504.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 16 x 16	Pure	TRM 5.0	7,081.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 18 x 18	Pure	TRM 5.0	7,459.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Air Curtain - Drive-In - 20 x 20	Pure	TRM 5.0	7,605.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - 10,001 to 15,000 cfm	Pure	TRM 5.0	17,529.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - 5,001 to 10,000 cfm	Pure	TRM 5.0	10,517.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	DCKV- RF - Up to 5,000 cfm	Pure	TRM 5.0	4,207.00	unit	15	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	5,087.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	2,041.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	1,977.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	1,897.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	4,988.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0	4,853.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Shelter (10x10)	Pure	TRM 5.0	1,736.00	unit	10	100.00%	5.00%	100.00%
C&I Direct Install	Dock Door Seals - Shelter (10x10)	Pure	TRM 5.0	4,501.00	unit	10	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Air Curtain - 7 x 3 Door	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	845.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - 7 x 6 Door	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	1,690.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - Dock-In - 10 x 10	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	5,517.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - Dock-In - 8 x 8	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	4,713.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - Drive-In - 10 x 10	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	4,844.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - Drive-In - 12 x 12	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	5,753.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Air Curtain - Drive-In - 16 x 16	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	7,081.00	unit	15	100.00%	50.00%	100.00%
C&I Prescriptive	Commercial Condensing Unit Heater	Quasi	TRM 5.0	7.89	kBTU/hr input capacity	18	100.00%	0.00%	100.00%
C&I Prescriptive	Commercial Condensing Unit Heater	Quasi	TRM 5.0	7.89	kBTU/hr input capacity	18	100.00%	0.00%	100.00%
C&I Prescriptive	Commercial Energy Star Combi Oven	Pure	ENERGY STAR Combination Oven Substantiation Document	1,186.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Convection Oven	Pure	TRM 5.0	865.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Double Rack Oven	Pure	TRM 5.0	1,076.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Fryer	Pure	TRM 5.0	1,408.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Commercial Energy Star Steam Cooker	Pure	TRM 5.0	8,889.00	unit	12	100.00%	20.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	1.3600	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	3.09	kBTU/hr input capacity	15	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	Quasi	TRM 5.0	2.22	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	3.09	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	2.22	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Quasi	TRM 5.0	1.3600	kBTU/hr input capacity	15	100.00%	5.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+0.79	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+1.79	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+1.29	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
C&I Prescriptive	DCKV- NC - 10,001 to 15,000 cfm	Pure	TRM 5.0	17,529.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCKV- NC - 5,001 to 10,000 cfm	Pure	TRM 5.0	10,517.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCKV- NC - Up to 5,000 cfm	Pure	TRM 5.0	4,207.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCKV- RF - 5,001 to 10,000 cfm	Pure	TRM 5.0	10,517.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCKV- RF - Up to 5,000 cfm	Pure	TRM 5.0	4,207.00	unit	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.4410	sq ft	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.3920	sq ft	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.1120	sq ft	15	100.00%	20.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.1120	sq ft	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.3920	sq ft	15	100.00%	20.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	1.4840	sq ft	15	100.00%	5.00%	100.00%
C&I Prescriptive	DCV	Quasi	TRM 5.0	0.4410	sq ft	15	100.00%	20.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Destratification Fan - 20ft	Pure	TRM 5.0	2,029.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Destratification Fan - 20ft	Pure	TRM 5.0	1,472.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Destratification Fan - 24ft	Pure	TRM 5.0	2,922.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Destratification Fan - 24ft	Pure	TRM 5.0	2,120.00	unit	15	100.00%	10.00%	100.00%
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	4,853.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	2,041.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	5,087.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	1,977.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	1,897.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Dock Door Seals - Shelter (10x10)	Pure	TRM 5.0, 2017 C&I Prescriptive Verification Study	1,736.00	unit	10	100.00%	50.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	1.6000	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	1.6000	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	1.9100	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	1.9100	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	2.98	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% SHR - In-Suite	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	5.37	CFM	14	99.55%	70.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% SHR - In-Suite	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	5.37	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	2.21	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	2.21	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	6.22	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	6.22	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% SHR - In-Suite	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	6.22	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	2.51	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	2.51	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	7.07	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.3000	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.6100	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 75% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.9500	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0, 2017 C&I Prescriptive Verification Study	0.9100	CFM	14	99.55%	70.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0	1.3600	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0	1.3600	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0	2.13	CFM	14	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 55% Sensible Heat Recovery	Quasi	TRM 5.0	3.84	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0	2.52	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0	4.54	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0	1.6100	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery	Quasi	TRM 5.0	1.6100	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0	5.93	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 85% Sensible Heat Recovery	Quasi	TRM 5.0	2.11	CFM	14	100.00%	5.00%	100.00%
C&I Prescriptive	Make-Up Air Unit (MUA) - VFD	Quasi	TRM 5.0	3.00	CFM	20	100.00%	5.00%	100.00%
C&I Prescriptive	Make-Up Air Unit (MUA) - VFD	Quasi	TRM 5.0	2.03	CFM	20	100.00%	5.00%	100.00%
C&I Prescriptive	Ozone Laundry - Washer Extractor	Quasi	TRM 5.0	0.0383	lbs/yr	15	100.00%	8.00%	100.00%
C&I Prescriptive	Ozone Laundry - Washer Extractor	Quasi	TRM 5.0	0.0383	lbs/yr	15	100.00%	8.00%	100.00%
Home Weatherization	Bathroom Aerator 1.0 gpm	Pure	TRM 5.0, Low Income Kits Verification Study	6.40	unit	10	100.00%	1.00%	86.10%
Home Weatherization	Kitchen Aerator 1.5 gpm	Pure	TRM 5.0, Low Income Kits Verification Study	11.56	unit	10	100.00%	1.00%	81.20%
Home Weatherization	Pipe Insulation - 2 metres	Pure	TRM 5.0, Low Income Kits Verification Study	3.64	ft	15	100.00%	1.00%	93.90%
Home Weatherization	Showerhead Replacement 1.25 GPM	Pure	TRM 5.0, Low Income Kits Verification Study	28.20	unit	10	100.00%	1.00%	79.90%
Home Weatherization	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	1.00%	100.00%
Home Weatherization	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	1.00%	100.00%
Home Weatherization	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	1.00%	100.00%
Home Weatherization	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	1.00%	100.00%
Multi-family	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Mixed	TRM 5.0	212+1.79	unit + kBtu/hr input capacity	20	100.00%	2.00%	100.00%
Multi-family	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery-LI	Quasi	TRM 5.0	6.22	CFM	14	100.00%	5.00%	100.00%

Program	Measure	Pure or Quasi	Source	Savings Factor (m^3)	Unit	EUL	Gross Realization Rate	Free Ridership	Adjustment Factor
Multi-family	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery-LI	Quasi	TRM 5.0	7.07	CFM	14	100.00%	5.00%	100.00%
Multi-family	Energy Recovery Ventilator (ERV)-GTE 85% SHR - In-Suite-LI	Quasi	TRM 5.0	7.07	CFM	14	100.00%	5.00%	100.00%
Multi-family	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery-LI	Quasi	TRM 5.0	4.54	CFM	14	100.00%	5.00%	100.00%
Multi-family	Make-Up Air Unit (MUA) - VFD	Quasi	TRM 5.0	3.00	CFM	20	100.00%	5.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	217.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0	173.00	unit	15	100.00%	4.00%	100.00%
Residential Adaptive Thermostats	Smart Thermostats	Pure	TRM 5.0, Adaptive Thermostat Ping Report	185.00	unit	15	100.00%	4.00%	84.19%

*Not all values may compute exactly due to rounding.

11.13.4 Savings Calculation Measure Totals

Table 11-151. Enbridge Measure Savings, Tracked and Verified, by Annual and Cumulative, Gross and Net*

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Direct Install	Air Curtain - Dock-In - 10 x 10	82,755	78,617	1,241,325	1,179,259	82,755	78,617	1,241,325	1,179,259
C&I Direct Install	Air Curtain - Dock-In - 8 x 10	232,227	220,616	3,483,405	3,309,235	232,227	220,616	3,483,405	3,309,235
C&I Direct Install	Air Curtain - Dock-In - 8 x 8	89,547	85,070	1,343,205	1,276,045	89,547	85,070	1,343,205	1,276,045
C&I Direct Install	Air Curtain - Drive-In - 10 x 10	130,788	124,249	1,961,820	1,863,729	130,788	124,249	1,961,820	1,863,729
C&I Direct Install	Air Curtain - Drive-In - 12 x 12	356,686	338,852	5,350,290	5,082,776	356,686	338,852	5,350,290	5,082,776
C&I Direct Install	Air Curtain - Drive-In - 14 x 14	234,144	222,437	3,512,160	3,336,552	234,144	222,437	3,512,160	3,336,552
C&I Direct Install	Air Curtain - Drive-In - 16 x 16	56,648	53,816	849,720	807,234	56,648	53,816	849,720	807,234
C&I Direct Install	Air Curtain - Drive-In - 18 x 18	7,459	7,086	111,885	106,291	7,459	7,086	111,885	106,291
C&I Direct Install	Air Curtain - Drive-In - 20 x 20	15,210	14,450	228,150	216,743	15,210	14,450	228,150	216,743
C&I Direct Install	DCKV- RF - 10,001 to 15,000 cfm	87,645	83,263	1,314,675	1,248,941	87,645	83,263	1,314,675	1,248,941
C&I Direct Install	DCKV- RF - 5,001 to 10,000 cfm	147,238	139,876	2,208,570	2,098,142	147,238	139,876	2,208,570	2,098,142
C&I Direct Install	DCKV- RF - Up to 5,000 cfm	25,242	23,980	378,630	359,699	25,242	23,980	378,630	359,699
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	1,095,421	1,040,650	10,954,210	10,406,500	1,095,421	1,040,650	10,954,210	10,406,500
C&I Direct Install	Dock Door Seals - Shelter (10x10)	72,464	68,841	724,640	688,408	72,464	68,841	724,640	688,408
C&I Prescriptive	Commercial Condensing Unit Heater	16,001	16,001	288,017	288,017	16,001	16,001	288,017	288,017
C&I Prescriptive	Commercial Energy Star Combi Oven	7,116	5,693	85,392	68,314	7,116	5,693	85,392	68,314
C&I Prescriptive	Commercial Energy Star Convection Oven	50,170	40,136	602,040	481,632	50,170	40,136	602,040	481,632
C&I Prescriptive	Commercial Energy Star Double Rack Oven	21,520	17,216	258,240	206,592	21,520	17,216	258,240	206,592
C&I Prescriptive	Commercial Energy Star Fryer	725,120	580,096	8,701,440	6,961,152	725,120	580,096	8,701,440	6,961,152
C&I Prescriptive	Commercial Energy Star Steam Cooker	44,445	35,556	533,340	426,672	44,445	35,556	533,340	426,672

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Prescriptive	Commercial Under-Fired Broiler	2,511	2,009	30,132	24,106	2,511	2,009	30,132	24,106
C&I Prescriptive	Condensing MUA VFD up to 14,000 CFM - Multi-Residential/Long Term Care [New/Existing]	12,000	11,400	240,000	228,000	12,000	11,400	240,000	228,000
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	20,348	19,330	305,217	289,956	20,348	19,330	305,217	289,956
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	47,825	45,434	717,381	681,512	47,825	45,434	717,382	681,513
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	21,684	21,251	433,689	425,015	21,684	21,251	433,689	425,015
C&I Prescriptive	DCKV 10,001 - 15,000 CFM [New]	18,009	11,166	270,139	167,486	18,009	11,166	270,139	167,486
C&I Prescriptive	DCKV 5,001 - 10,000 CFM [Existing]	118,857	73,691	1,782,852	1,105,368	118,857	73,691	1,782,852	1,105,368
C&I Prescriptive	DCKV 5,001 - 10,000 CFM [New]	10,805	6,699	162,077	100,488	10,805	6,699	162,077	100,488
C&I Prescriptive	DCKV up to 5,000 CFM [New]	21,611	13,399	324,170	200,986	21,611	13,399	324,170	200,986
C&I Prescriptive	DCKV up to 5000 CFM [Existing]	90,768	56,276	1,361,516	844,140	90,768	56,276	1,361,516	844,140
C&I Prescriptive	DCV Single Zone Office with Maintenance [Existing]	15,742	1,259	236,127	18,890	15,742	1,259	236,127	18,890
C&I Prescriptive	DCV Single Zone Office with Maintenance [New]	512	41	7,686	615	512	41	7,686	615
C&I Prescriptive	DCV Single Zone Retail with Maintenance [Existing]	15,106	1,208	226,583	18,127	15,106	1,208	226,583	18,127
C&I Prescriptive	DCV Single Zone Retail with Maintenance [New]	182,197	14,576	2,732,956	218,637	182,197	14,576	2,732,956	218,637
C&I Prescriptive	Destratification Fan 20 ft [Existing]	6,087	5,478	91,305	82,175	6,087	5,478	91,305	82,175
C&I Prescriptive	Destratification Fan 24 ft [Existing]	81,816	73,634	1,227,240	1,104,516	81,816	73,634	1,227,240	1,104,516
C&I Prescriptive	Dock Door Seals 10 x 10 (Baseline w/ Deteriorated Seals) [Existing]	78,120	74,214	781,200	742,140	78,120	74,214	781,200	742,140
C&I Prescriptive	Dock Door Seals 10 x 10 (Baseline w/o Seals) [Existing]	40,509	38,484	405,090	384,836	40,509	38,484	405,090	384,836

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Prescriptive	Dock Door Seals 8 x 10 (Baseline w/ Deteriorated Seals) [Existing]	626,587	595,258	6,265,870	5,952,577	626,587	595,258	6,265,870	5,952,577
C&I Prescriptive	Dock Door Seals 8 x 10 (Baseline w/o Seals) [Existing]	615,527	584,751	6,155,270	5,847,507	615,527	584,751	6,155,270	5,847,507
C&I Prescriptive	Dock Door Seals 8 x 8 (Baseline w/ Deteriorated Seals) [Existing]	220,052	209,049	2,200,520	2,090,494	220,052	209,049	2,200,520	2,090,494
C&I Prescriptive	Dock Door Seals 8 x 8 (Baseline w/o Seals) [Existing]	24,265	23,052	242,650	230,518	24,265	23,052	242,650	230,518
C&I Prescriptive	Dock Door Seals 8 x 9 (Baseline w/ Deteriorated Seals) [Existing]	23,724	22,538	237,240	225,378	23,724	22,538	237,240	225,378
C&I Prescriptive	Dock Door Seals 8 x 9 (Baseline w/o Seals) [Existing]	29,928	28,432	299,280	284,316	29,928	28,432	299,280	284,316
C&I Prescriptive	ERV Med Use 65% - 74% (55% Code Baseline) [New/Existing]	3,055	2,902	42,770	40,632	3,055	2,902	42,770	40,632
C&I Prescriptive	ERV Med Use 75% - 84% (55% Code Baseline) [New/Existing]	2,090	1,986	29,260	27,797	2,090	1,986	29,260	27,797
C&I Prescriptive	ERV Vent Low Integrated Office 55% (No Baseline) [New]	2,240	2,128	31,360	29,792	2,240	2,128	31,360	29,792
C&I Prescriptive	ERV Vent Low Integrated School 55% (No Baseline) [New]	4,800	4,560	67,200	63,840	4,800	4,560	67,200	63,840
C&I Prescriptive	ERV Vent Low Integrated School 65% (No Baseline) [New]	73,258	69,595	1,025,613	974,332	73,258	69,595	1,025,613	974,332
C&I Prescriptive	ERV Vent Low Integrated School 75% (No Baseline) [New]	28,418	26,997	397,857	377,965	28,418	26,997	397,857	377,965
C&I Prescriptive	ERV Vent Low Integrated School 85% (No Baseline) [New]	5,020	4,769	70,280	66,766	5,020	4,769	70,280	66,766
C&I Prescriptive	ERV Vent Low Standalone School 55% (No Baseline) [New]	35,200	33,440	492,800	468,160	35,200	33,440	492,800	468,160
C&I Prescriptive	ERV Vent Low Standalone School 65% (No Baseline) [New]	4,584	4,355	64,176	60,967	4,584	4,355	64,176	60,967
C&I Prescriptive	ERV Vent Low Standalone School 75% (No Baseline) [New]	884	840	12,376	11,757	884	840	12,376	11,757
C&I Prescriptive	HRV Vent Low Integrated School 55% (No Baseline) [New]	6,392	6,072	89,488	85,014	6,392	6,072	89,488	85,014

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Prescriptive	HRV Vent Low Standalone Office 65% (No Baseline) [New]	122,360	116,242	1,713,040	1,627,388	122,360	116,242	1,713,040	1,627,388
C&I Prescriptive	Ind Air Curtain 8 x 10 S&R	9,882	9,388	148,230	140,819	9,882	9,388	148,230	140,819
C&I Prescriptive	Ind Air Curtain Shipping Drive-In Door 12 x 12 [New/Existing]	11,506	10,931	172,590	163,961	11,506	10,931	172,590	163,961
C&I Prescriptive	Ind Destratification Fan 20 ft [Existing]	4,058	3,652	60,870	54,783	4,058	3,652	60,870	54,783
C&I Prescriptive	Ind Destratification Fan 24 ft [Existing]	40,908	36,817	613,620	552,258	40,908	36,817	613,620	552,258
C&I Prescriptive	Ind Dock Door Seals 10 x 10 (Baseline w/ Deteriorated Seals) [Existing]	59,024	56,073	590,240	560,728	59,024	56,073	590,240	560,728
C&I Prescriptive	Ind Dock Door Seals 8 x 10 (Baseline w/ Deteriorated Seals) [Existing]	89,804	85,314	898,040	853,138	89,804	85,314	898,040	853,138
C&I Prescriptive	Ind Dock Door Seals 8 x 10 (Baseline w/o Seals) [Existing]	15,261	14,498	152,610	144,980	15,261	14,498	152,610	144,980
C&I Prescriptive	Ind Dock Door Seals 8 x 8 (Baseline w/ Deteriorated Seals) [Existing]	1,897	1,802	18,970	18,022	1,897	1,802	18,970	18,022
C&I Prescriptive	Ind Dock Door Seals 8 x 9 (Baseline w/ Deteriorated Seals) [Existing]	25,701	24,416	257,010	244,160	25,701	24,416	257,010	244,160
C&I Prescriptive	Ozone Washer Extractor =/<60lbs [New]	145,666	134,013	2,184,990	2,010,191	145,666	134,013	2,184,990	2,010,191
Home Winterproofing	Bathroom Aerator	661	661	6,610	6,610	661	661	6,610	6,610
Home Winterproofing	Kitchen Aerator	1,247	1,247	12,470	12,470	1,247	1,247	12,470	12,470
Home Winterproofing	Showerhead Replacement 1.25 GPM	10,610	10,610	106,098	106,098	10,610	10,610	106,098	106,098
Home Winterproofing	Smart Thermostats	355,369	355,369	5,330,535	5,330,535	355,369	355,369	5,330,535	5,330,535
Low-Income Multi-Residential	Low Income Condensing MUA VFD up to 14,000 CFM - Multi-Residential/Long Term Care [New/Existing]	63,150	63,150	1,263,000	1,263,000	63,150	63,150	1,263,000	1,263,000
Residential Adaptive Thermostats	Smart Thermostats	3,714,106	3,565,542	55,711,591	53,483,128	3,714,106	3,565,542	55,711,591	53,483,128

*Not all values may compute exactly due to rounding.

Table 11-152. Union Measure Savings, Tracked and Verified, by Annual and Cumulative, Gross and Net*

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Direct Install	Air Curtain - Dock-In - 10 x 10	33,102	31,447	496,530	471,704	33,102	31,447	496,530	471,704
C&I Direct Install	Air Curtain - Dock-In - 8 x 10	83,997	79,797	1,259,955	1,196,957	83,997	79,797	1,259,955	1,196,957
C&I Direct Install	Air Curtain - Dock-In - 8 x 8	32,991	31,341	494,865	470,122	32,991	31,341	494,865	470,122
C&I Direct Install	Air Curtain - Dock-In - 8 x 9	33,915	32,219	508,725	483,289	33,915	32,219	508,725	483,289
C&I Direct Install	Air Curtain - Drive-In - 10 x 10	53,284	50,620	799,260	759,297	53,284	50,620	799,260	759,297
C&I Direct Install	Air Curtain - Drive-In - 12 x 12	178,343	169,426	2,675,145	2,541,388	178,343	169,426	2,675,145	2,541,388
C&I Direct Install	Air Curtain - Drive-In - 14 x 14	214,632	203,900	3,219,480	3,058,506	214,632	203,900	3,219,480	3,058,506
C&I Direct Install	Air Curtain - Drive-In - 16 x 16	177,025	168,174	2,655,375	2,522,606	177,025	168,174	2,655,375	2,522,606
C&I Direct Install	Air Curtain - Drive-In - 18 x 18	52,213	49,602	783,195	744,035	52,213	49,602	783,195	744,035
C&I Direct Install	Air Curtain - Drive-In - 20 x 20	15,210	14,450	228,150	216,743	15,210	14,450	228,150	216,743
C&I Direct Install	DCKV- RF - 10,001 to 15,000 cfm	70,116	66,610	1,051,740	999,153	70,116	66,610	1,051,740	999,153
C&I Direct Install	DCKV- RF - 5,001 to 10,000 cfm	52,585	49,956	788,775	749,336	52,585	49,956	788,775	749,336
C&I Direct Install	DCKV- RF - Up to 5,000 cfm	8,414	7,993	126,210	119,900	8,414	7,993	126,210	119,900
C&I Direct Install	Dock Door Seals - Compression (8x8 - 8x10)	378,175	359,266	3,781,750	3,592,663	378,175	359,266	3,781,750	3,592,663
C&I Direct Install	Dock Door Seals - Shelter (10x10)	50,281	47,767	502,810	477,670	50,281	47,767	502,810	477,670
C&I Prescriptive	Air Curtain - 7 x 3 Door	1,690	845	25,350	12,675	1,690	845	25,350	12,675
C&I Prescriptive	Air Curtain - 7 x 6 Door	6,760	3,380	101,400	50,700	6,760	3,380	101,400	50,700
C&I Prescriptive	Air Curtain - Dock-In - 10 x 10	11,034	5,517	165,510	82,755	11,034	5,517	165,510	82,755
C&I Prescriptive	Air Curtain - Dock-In - 8 x 8	4,713	2,357	70,695	35,348	4,713	2,357	70,695	35,348
C&I Prescriptive	Air Curtain - Drive-In - 10 x 10	4,844	2,422	72,660	36,330	4,844	2,422	72,660	36,330
C&I Prescriptive	Air Curtain - Drive-In - 12 x 12	5,753	2,877	86,295	43,148	5,753	2,877	86,295	43,148

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Prescriptive	Air Curtain - Drive-In - 16 x 16	14,162	7,081	212,430	106,215	14,162	7,081	212,430	106,215
C&I Prescriptive	Commercial Condensing Unit Heater	7,811	7,811	140,600	140,600	7,811	7,811	140,600	140,600
C&I Prescriptive	Commercial Energy Star Combi Oven	8,302	6,642	99,624	79,699	8,302	6,642	99,624	79,699
C&I Prescriptive	Commercial Energy Star Convection Oven	23,355	18,684	280,260	224,208	23,355	18,684	280,260	224,208
C&I Prescriptive	Commercial Energy Star Double Rack Oven	17,216	13,773	206,592	165,274	17,216	13,773	206,592	165,274
C&I Prescriptive	Commercial Energy Star Fryer	399,872	319,898	4,798,464	3,838,771	399,872	319,898	4,798,464	3,838,771
C&I Prescriptive	Commercial Energy Star Steam Cooker	17,778	14,222	213,336	170,669	17,778	14,222	213,336	170,669
C&I Prescriptive	Condensing Storage Water Heater - GT 250 kBTU/hr	35,058	33,305	525,863	499,570	35,058	33,305	525,863	499,570
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	47,999	45,599	719,984	683,984	47,999	45,599	719,984	683,985
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	30,731	30,117	614,625	602,332	30,731	30,117	614,626	602,333
C&I Prescriptive	DCKV- NC - 10,001 to 15,000 cfm	17,529	16,653	262,935	249,788	17,529	16,653	262,935	249,788
C&I Prescriptive	DCKV- NC - 5,001 to 10,000 cfm	21,034	19,982	315,510	299,735	21,034	19,982	315,510	299,735
C&I Prescriptive	DCKV- NC - Up to 5,000 cfm	54,691	51,956	820,365	779,347	54,691	51,956	820,365	779,347
C&I Prescriptive	DCKV- RF - 5,001 to 10,000 cfm	52,585	49,956	788,775	749,336	52,585	49,956	788,775	749,336
C&I Prescriptive	DCKV- RF - Up to 5,000 cfm	63,105	59,950	946,575	899,246	63,105	59,950	946,575	899,246
C&I Prescriptive	DCV	441,728	416,872	6,625,917	6,253,081	441,728	416,872	6,625,918	6,253,081
C&I Prescriptive	Destratification Fan - 20ft	25,820	23,238	387,300	348,570	25,820	23,238	387,300	348,570
C&I Prescriptive	Destratification Fan - 24ft	31,284	28,156	469,260	422,334	31,284	28,156	469,260	422,334
C&I Prescriptive	Dock Door Seals - Compression (8x8 - 8x10)	291,219	145,610	2,912,190	1,456,095	291,219	145,610	2,912,190	1,456,095
C&I Prescriptive	Dock Door Seals - Shelter (10x10)	154,504	77,252	1,545,040	772,520	154,504	77,252	1,545,040	772,520

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 55% Sensible Heat Recovery	109,083	32,725	1,527,161	458,148	109,083	32,725	1,527,161	458,148
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% Sensible Heat Recovery	305,720	91,716	4,280,076	1,284,023	305,720	91,716	4,280,076	1,284,023
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 65% SHR - In-Suite	226,690	68,007	3,173,662	952,099	226,690	68,007	3,173,662	952,099
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery	329,699	98,910	4,615,791	1,384,737	329,699	98,910	4,615,791	1,384,737
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 75% SHR - In-Suite	20,434	6,130	286,071	85,821	20,434	6,130	286,071	85,821
C&I Prescriptive	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery	150,675	45,203	2,109,452	632,836	150,675	45,203	2,109,452	632,836
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 65% Sensible Heat Recovery	5,311	1,593	74,361	22,308	5,311	1,593	74,361	22,308
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 75% Sensible Heat Recovery	4,797	1,439	67,159	20,148	4,797	1,439	67,159	20,148
C&I Prescriptive	Energy Recovery Ventilator (ERV)-Incremental-GTE 85% Sensible Heat Recovery	8,878	2,663	124,290	37,287	8,878	2,663	124,290	37,287
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 55% Sensible Heat Recovery	36,407	34,587	509,699	484,214	36,407	34,587	509,699	484,214
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery	46,770	44,431	654,779	622,040	46,770	44,431	654,779	622,040
C&I Prescriptive	Heat Recovery Ventilator (HRV)-GTE 85% Sensible Heat Recovery	2,030	1,929	28,420	26,999	2,030	1,929	28,420	26,999
C&I Prescriptive	Make-Up Air Unit (MUA) - VFD	239,043	227,091	4,780,868	4,541,825	239,043	227,091	4,780,868	4,541,825
C&I Prescriptive	Ozone Laundry - Washer Extractor	45,294	41,670	679,404	625,051	45,294	41,670	679,404	625,051
Home Weatherization	Bathroom Aerator 1.0 gpm	1,069	1,058	10,690	10,583	1,069	1,058	10,690	10,583
Home Weatherization	Kitchen Aerator 1.5 gpm	2,309	2,286	23,091	22,860	2,309	2,286	23,091	22,860

Program	Measure	Tracked				Verified			
		Annual		Cumulative		Annual		Cumulative	
		Gross	Net	Gross	Net	Gross	Net	Gross	Net
Home Weatherization	Pipe Insulation - 2 metres	6,705	6,638	100,569	99,563	6,705	6,638	100,569	99,563
Home Weatherization	Showerhead Replacement 1.25 GPM	4,889	4,841	48,894	48,405	4,889	4,841	48,894	48,405
Home Weatherization	Smart Thermostats	424,732	420,485	6,370,980	6,307,270	424,732	420,485	6,370,980	6,307,270
Multi-family	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	1,136	1,114	22,728	22,274	1,136	1,114	22,728	22,274
Multi-family	Energy Recovery Ventilator (ERV)-GTE 75% Sensible Heat Recovery-LI	1,244	1,182	17,416	16,545	1,244	1,182	17,416	16,545
Multi-family	Energy Recovery Ventilator (ERV)-GTE 85% Sensible Heat Recovery-LI	99,051	94,098	1,386,710	1,317,374	99,051	94,098	1,386,710	1,317,374
Multi-family	Energy Recovery Ventilator (ERV)-GTE 85% SHR - In-Suite-LI	2,771	2,633	38,800	36,860	2,771	2,633	38,800	36,860
Multi-family	Heat Recovery Ventilator (HRV)-GTE 65% Sensible Heat Recovery-LI	121,581	115,502	1,702,137	1,617,030	121,581	115,502	1,702,137	1,617,030
Multi-family	Make-Up Air Unit (MUA) - VFD	67,221	63,860	1,344,420	1,277,199	67,221	63,860	1,344,420	1,277,199
Residential Adaptive Thermostats	Smart Thermostats	1,609,955	1,545,557	24,149,329	23,183,355	1,609,955	1,545,557	24,149,329	23,183,355

*Not all values may compute exactly due to rounding.

11.13.5 Savings Verification Discrepancies

Table 11-153. Enbridge measure verification discrepancies

Program	Measure	Issue	Resolution	Tracked Cumulative Gross Savings	Tracked Cumulative Net Savings	Verified Cumulative Gross Savings	Verified Cumulative Net Savings
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Rounding.	-	433,689	425,015	433,689	425,015

Table 11-154. Union measure verification discrepancies

Program	Measure	Issue	Resolution	Tracked Cumulative Gross Savings	Tracked Cumulative Net Savings	Verified Cumulative Gross Savings	Verified Cumulative Net Savings
C&I Prescriptive	Condensing Storage Water Heater - GT 75 & LTE 250 kBTU/Hr	Rounding.	-	719,984	683,984	719,984	683,985
C&I Prescriptive	Condensing Tankless Water Heater - GT 75 & LT 200 kBTU/hr	Rounding.	-	614,625	602,332	614,626	602,333

11.14 Appendix N: Program Spending Tables

Table 11-155. Enbridge 2021 approved and spent budget*

Scorecard/Program	OEB-Approved Budget	Utility Spending	Difference	
			$	%
Resource Acquisition Total	**$42,908,517**	**$49,430,837**	**$6,522,320**	**15%**
Home Energy Conservation	$18,727,200	$29,560,475	$10,833,275	58%
Residential Adaptive Thermostats	$2,262,870	$2,312,755	$49,885	2%
C&I Custom	$7,658,968	$6,772,836	-$886,132	-12%
C&I Direct Install	$4,950,581	$2,909,245	-$2,041,337	-41%
C&I Prescriptive	$2,323,114	$2,438,956	$115,842	5%
Energy Leaders Initiative	$0	$251,175	$251,175	-
Run it Right (RA Portion)	$1,653,979	$225,192	-$1,428,787	-86%
Comprehensive Energy Management (RA portion)	$98,838	$19,183	-$79,655	-81%
Resource Acquisition Overhead	$5,232,967	$4,941,020	-$291,947	-6%
Low Income Total	**$13,849,850**	**$13,427,553**	**-$422,297**	**-3%**
Home Winterproofing	$6,736,859	$6,818,367	$81,508	1%
Low Income Multi Residential	$3,967,353	$3,473,475	-$493,878	-12%
Low Income New Construction	$1,456,560	$1,540,866	$84,306	6%
Low Income Overhead	$1,689,078	$1,594,845	-$94,233	-6%
Market Transformation Total	**$7,181,118**	**$5,586,083**	**-$1,595,035**	**-22%**
Residential Savings by Design	$3,392,296	$3,809,618	$417,322	12%
Commercial Savings by Design	$1,122,068	$604,724	-$517,344	-46%
Run it Right (MTEM portion)	$329,209	$244,172	-$85,038	-26%
Comprehensive Energy Management (MTEM portion)	$941,562	$100,646	-$840,916	-89%
School Energy Competition	$520,200	$0	-$520,200	-100%
Market Transformation Overhead	$875,783	$826,923	-$48,860	-6%
Portfolio Overhead	**$3,817,891**	**$1,175,308**	**-$2,642,583**	**-69%**
Process and Program Evaluation	$1,774,228	$518,568	-$1,255,660	-71%
DSM IT Chargeback**	$1,000,000	$0	-$1,000,000	-100%
Collaboration and Innovation**	$1,043,663	$656,740	-$386,923	-37%
Enbridge Total	**$67,757,376**	**$69,619,780**	**$1,862,404**	**3%**

*Not all values may compute exactly due to rounding.
**These line items are collapsed into the Other category in Table 9-2.

Table 11-156. Union 2021 approved and spent budget*

Scorecard/Program	OEB-Approved Budget	Utility Spending	Difference	
			$	%
Resource Acquisition Total	**$36,310,983**	**$31,447,736**	**-$4,863,247**	**-13%**
Resource Acquisition - Residential	$13,907,697	$14,252,979	$345,282	2%
Home Reno Rebate	$12,226,000	$11,528,676	-$697,324	-6%
Residential Adaptive Thermostats	$0	$1,177,701	$1,177,701	-
Residential Overhead	$1,681,697	$1,546,602	-$135,095	-8%
Resource Acquisition - C&I	$22,403,286	$17,194,757	-$5,208,529	-23%
C&I Custom	$7,808,000	$9,244,820	$1,436,820	18%
C&I Direct Install	$2,500,000	$1,897,957	-$602,043	-24%
C&I Prescriptive	$7,149,000	$2,264,922	-$4,884,078	-68%
C&I Overhead	$4,946,286	$3,787,057	-$1,159,229	-23%
Low Income Total	**$15,005,488**	**$11,966,434**	**-$3,039,054**	**-20%**
Home Weatherization	$8,374,000	$8,398,589	$24,589	<1%
Furnace End-of-Life	$917,000	$0	-$917,000	-100%
Indigenous	$448,000	$71,444	-$376,556	-84%
Multi-Family	$3,573,000	$2,566,630	-$1,006,370	-28%
Low Income Overhead	$1,693,488	$929,771	-$763,717	-45%
Large Volume Total	**$4,000,000**	**$2,729,314**	**-$1,270,686**	**-32%**
Large Volume	$3,150,000	$2,329,797	-$820,203	-26%
Large Volume Overhead	$850,000	$399,516	-$450,484	-53%
Market Transformation Total	**$2,338,070**	**$1,453,549**	**-$884,521**	**-38%**
Optimum Home	$841,000	$63,077	-$777,923	-92%
Commercial New Construction	$1,000,000	$816,326	-$183,674	-18%
Market Transformation Overhead	$497,070	$574,146	$77,076	16%
Performance Based Total	**$1,053,000**	**$166,436**	**-$886,564**	**-84%**
RunSmart	$163,000	$27,405	-$135,595	-83%
Strategic Energy Management	$639,000	$86,438	-$552,563	-86%
Performance-Based Overhead	$251,000	$52,593	-$198,407	-79%
Portfolio Overhead	**$5,642,000**	**$5,213,456**	**-$428,544**	**-8%**
Research	$1,000,000	$1,010,783	$10,783	1%
Evaluation	$1,300,000	$347,084	-$952,916	-73%
Administration	$2,842,000	$3,442,573	$600,573	21%
Pilots**	$500,000	$413,090	-$86,910	-17%
Open Bill Project**	$0	($72)	-$72	-
Union Total	**$64,349,541**	**$52,976,925**	**-$11,372,617**	**-18%**

*Not all values may compute exactly due to rounding.
**These line items are collapsed into the Other category in Table 9-7.

11.15 Appendix O: Cost Effectiveness Methodology

11.15.1 Cost Effectiveness Overview

The OEB requires the utilities to deliver portfolios that are cost effective at the "program" level. Each utility defines "program" differently, and both utilities define "program" differently from the OEB, as shown in Table 11-157. Throughout this report, the uses the OEB-defined Programs. The relevant cost effectiveness results are based on the utilities' definition of program.

Table 11-157: 2021 "Programs" as defined by the OEB, Enbridge, and Union

Utility-Defined Programs	OEB-Defined Programs
Enbridge	
Resource Acquisition	Home Energy Conservation
	Residential Adaptive Thermostats
	Commercial and Industrial Custom
	Commercial and Industrial Direct Install
	Commercial and Industrial Prescriptive
	Comprehensive Energy Management
	Run it Right
Low Income	Home Winterproofing
	Multi-Residential
Market Transformation	Residential Savings by Design
	Commercial Savings by Design
	School Energy Competition
	Run it Right
	Comprehensive Energy Management
Union	
Residential Resource Acquisition	Home Reno Rebate
	Residential Adaptive Thermostats
C&I Resource Acquisition	Commercial and Industrial Custom
	Commercial and Industrial Direct Install
	Commercial and Industrial Prescriptive
Low Income	Home Weatherization
	Indigenous
	Furnace End of Life
	Low Income Multi-Family
Large Volume	Large Volume
Market Transformation	Optimum Home
	Commercial New Construction
Performance Based	RunSmart
	Strategic Energy Management

To calculate cost effectiveness, the EC used the cost effectiveness model that has been applied in previous years using the utilities' verified savings, with one notable change (details below).

The key inputs used to calculate the TRC-Plus and PAC tests are shown in Table 11-158

Table 11-158: Key inputs used in the TRC-Plus and PAC tests

Input	Description	TRC	PAC
Overhead & Administration Costs	Fixed costs, including overhead & administration, program management, program support, enabling strategies (communications, marketing, and outreach) done by utilities, costs, and fees for service (e.g., data management, contractor management).	✓	✓
Utility Incentives	Utility provided incentives to encourage adoption of efficiency measures.	✓	✓
Promotion Costs	Variable expenditures to deliver and promote programs.	✓	✓
Evaluation Costs	Expenditures associated with evaluation of programs at the scorecard level.		
Participant Cost	The incremental cost to the participant after subtracting any program rebates.	✓	
Discount Rate	Discount rate used to weight long-term versus short-term benefits provided by the utilities (nominal discount rate of 6.08%).	✓	✓
Net Savings	Savings net of free rider and spillover effects.	✓	✓
Avoided Costs	Utility- avoided costs related to generation and distribution of energy from natural gas lines. Avoided Costs were provided by the utilities (see Section 11.15.3).	✓	✓
Measure EUL	See glossary.	✓	✓
Non-Energy Benefits	A 15% non-energy benefit (NEB) adder is applied to gas, electricity and water avoided costs representing environmental, economic, and health-related externalities.	✓	
Cost of Carbon	The avoided costs of carbon expressed as dollars per m^3 based on established annual carbon pricing increases of $15/tonne from 2023 to 2030. Beyond 2030, a 2% inflation rate for remaining years. See Table 11-163 and Table 11-165 below.	✓	✓

The cost effectiveness model had two main goals, including:

- Using a comprehensive model that can be easily modified to assess the impact of changing assumptions and methodology to calculate the TRC-Plus and PAC tests
- Ensuring consistent cost effectiveness calculations by regrouping both utilities in the same model

The EC model was modified to adjust gross savings using realization rates and free ridership and spillover from the annual savings verification activities. Because the realization rates for other savings (e.g., electricity, water) were generally either not available or much less precise, the gas realization rates were used for all savings.

The EC cost effectiveness methodology applied in 2021 is consistent with what has been done since 2015. This includes the cost of carbon, which was first included in 2017. One notable change has been made with how the cost of carbon is treated.

As part of the OEB's DSM Mid-Term Report, the OEB advised that carbon costs will be added to the cost-effectiveness test. Since the 2017/2018 DSM annual verification cycle, the EC was directed by the OEB to use the approach consistent with the 2019 Achievable Potential Study[116]. The Federal Fuel Charge Rate was applied to all rate classes and avoided cost load profiles. Additionally, there was only set carbon pricing until 2022. After 2022, a GDP FDD IPPI INDEX four month moving average inflation rate of 1.61% was used to calculate the estimated carbon price in remaining years.

[116] Navigant, 2019. Integrated Ontario Electricity and Natural Gas Achievable Potential Study.

In December 2020, a federal regulatory update[117] established annual carbon pricing increases of $15/tonne from 2023 to 2030. The difference is significant. To illustrate, using the previous approach for 2020 avoided costs, the price for carbon in 2023 would have been $50.81/tCO2e and $56.81/tCO2e in 2030. The updated federal prices are $65/tCO2e in 2023 and $170/tCO2e in 2030. Beyond 2030, a 2% inflation rate for remaining years (i.e., year 20 to 30) is applied. See Table 11-163 and Table 11-165 below.

While this deviates from the 2015-2020 Plan, the impact of applying the weightings to account for fully and partially exempt customers and volumes is material. The EC was directed to make this change by the OEB to accurately reflect the impact of carbon pricing in TRC calculations. This is reflected in EGI's proposed DSM Plans and reflects a similar approach to how avoided costs are updated annually to reflect the most current information available.

The 15% non-energy benefit (NEB) adder was applied to gas, electricity, and water avoided costs before adding carbon costs. The cost of carbon and NEB adder is applied to the TRC-Plus. The PAC test includes carbon and natural gas resources only (i.e., there are no electricity and water benefits), but it does not include the NEB adder. In tables later in this section, the EC has reported on what was provided by Enbridge and has not verified avoided figures.

In 2019, the EC began reporting program level cost effectiveness results with and without overhead & administration costs**.** A variety of costs are incurred by utilities to deliver programs, and how they are allocated at various levels (measure, program, sector, scorecard, and portfolio) can impact their perceived economic benefits. Consistent with previous years, the EC did not apply the utilities' portfolio overhead costs for research, evaluation, and administration. However, in past years, the EC has apportioned Enbridge's explicit 'overhead' spend at the scorecard level to individual programs based on the distribution of savings. In 2019, EAC members debated whether this was appropriate. The National Standards Practice Manual[118] provides guidance on how to properly allocate overhead & administrative (O&A) costs (see text box below), however some believe that all O&A costs should be fully accounted for at the program level, and it is not clear what the utilities include in the "overhead & admin costs" and what is truly variable and fixed. The OEB agreed to show program level cost effectiveness results with and without O&A costs. The O&A costs are still applied at the scorecard and portfolio levels.

Allocating Costs to Assess Cost Effectiveness

The National Standards Practice Manual (NSPM) for Benefit-Cost Analysis of Distributed Energy Resources recommends that only truly variable costs (i.e., costs that can be avoided) be included at the appropriate levels (e.g., measure, program, sector, portfolio) and costs that are largely fixed at a particular level be excluded. Including fixed costs at the wrong level may results in removal of programs that do not appear cost effective, reducing the economic benefits of efficiency resource acquisition. Fixed costs at one level should not, however, be excluded altogether and should be included at higher levels where they are variable and thus avoidable. The NSPM provides examples of the costs to include at various levels when assessing cost effectiveness and shown below:

- **Measure level**: Include only costs that increase or decrease in proportion to the number of measures installed. This includes the measure incremental cost and could include some variable program delivery costs such as rebate processing costs (e.g., vendor costs for every rebate processed).
- **Program level**: Costs of administering and evaluating the program should be included at the program level and, in some cases, where marketing is variable. Marketing is often treated as a fixed cost; it can play an important role in raising awareness and driving program participation, but costs do not typically change with participation.
- **Portfolio level**: Portfolio level costs that are largely fixed and do not change in proportion to the number of programs or participation levels (e.g., portfolio level marketing, management, and evaluation costs) should be included at portfolio level analysis.

[117] Update to the Pan-Canadian Approach to Carbon Pollution Pricing 2023-2030. Accessed at https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html#toc3

[118] The National Efficiency Screening Project .2017. National Standards Practice Manual. Accessed at https://www.nationalenergyscreeningproject.org/the-national-standard-practice-manual-for-energy-efficiency/

11.15.2 Summary of Results[119]

Table 11-159 shows summary results for Enbridge TRC-Plus and PAC tests. Table 11-160 shows the same information for Union. The end of this section contains more tables with detailed results.[120]

All the utility-defined programs pass the OEB-defined cost effectiveness threshold of 0.7 for Low Income programs and 1.0 for all other programs using the TRC-Plus test.

Table 11-159. Enbridge summary of cost effectiveness ratio results*

Scorecard	Final Verified Ratio		Final Verified Net Present Value (M$)	
	TRC-Plus	PAC	TRC-Plus	PAC
Resource Acquisition	2.80	4.16	156.48	157.43
Low Income	1.65	2.74	14.71	20.72
Total	**2.56**	**3.89**	**171.19**	**178.15**

*Not all values may compute exactly due to rounding.

Table 11-160. Union summary of cost effectiveness ratio results*

Scorecard	Final Verified Ratio		Final Verified Net Present Value (M$)	
	TRC-Plus	PAC	TRC-Plus	PAC
Resource Acquisition	1.82	4.28	69.74	103.21
Large Volume	5.23	6.00	15.74	13.66
Low Income	1.66	1.53	8.24	6.29
Performance Based	6.60	5.49	0.85	0.75
Total	**1.93**	**3.68**	**94.56**	**123.91**

*Not all values may compute exactly due to rounding.

While federal carbon taxes changes have increased the cost effectiveness of most programs, several OEB-defined programs did not meet the OEB-defined TRC-Plus cost effectiveness threshold with and without overhead & administrative (O&A) costs. Ratios without O&A costs are shown in brackets:

- **Enbridge's Resource Acquisition Run-It-Right program** fell significantly short of 1.0 in the TRC-Plus and PAC tests with a cost effectiveness ratio of 0.21 (0.21) and 0.13 (0.13) respectively.
- **Enbridge's Energy Leaders program** fell short of 1.0 in the TRC-Plus and PAC tests with a cost effectiveness ratio of 0.85 (0.87) and 0.98 (1.01) respectively.
- **Union's Performance Based RunSmart and Low Income Indigenous programs had program costs, but no savings**, thus the cost-effectiveness ratio is 0.

[119] Cost effectiveness results for the 2021 programs do not reflect the significant gas price increases occurring in 2022.
[120] The cost-effectiveness results are based on 2021 carbon tax rates.

11.15.3 Cost Effectiveness Inputs

Avoided Costs

Table 11-161: Enbridge Gas Avoided Costs

Year	Residential/Commercial			
	Baseload ($/m³)		Weather Sensitive ($/m³)	
	Rate	NPV	Rate	NPV
1	0.148	0.148	0.160	0.160
2	0.178	0.316	0.197	0.346
3	0.160	0.458	0.190	0.515
4	0.152	0.585	0.182	0.668
5	0.185	0.731	0.216	0.838
6	0.187	0.870	0.219	1.002
7	0.186	1.001	0.219	1.155
8	0.203	1.135	0.236	1.312
9	0.211	1.266	0.245	1.464
10	0.220	1.395	0.255	1.614
11	0.240	1.529	0.276	1.767
12	0.253	1.661	0.290	1.918
13	0.261	1.790	0.298	2.065
14	0.282	1.921	0.320	2.213
15	0.286	2.046	0.324	2.355
16	0.275	2.159	0.314	2.485
17	0.299	2.275	0.339	2.617
18	0.332	2.397	0.372	2.753
19	0.337	2.513	0.378	2.884
20	0.340	2.624	0.382	3.008
21	0.342	2.729	0.386	3.127
22	0.328	2.824	0.372	3.235
23	0.336	2.916	0.381	3.339
24	0.366	3.010	0.412	3.445
25	0.398	3.107	0.445	3.553
26	0.413	3.201	0.461	3.658
27	0.429	3.293	0.478	3.761
28	0.445	3.384	0.495	3.862
29	0.462	3.472	0.513	3.960
30	0.480	3.559	0.532	4.056

Table 11-162: Enbridge Water and Electricity Avoided Costs

Year	Res/Com/Ind			
	Water ($/1000 litres)		Electricity ($/KWh)	
	Rate	NPV	Rate	NPV
1	0.994	0.994	0.151	0.151
2	1.014	1.950	0.154	0.296
3	1.034	2.869	0.157	0.435
4	1.055	3.753	0.160	0.569
5	1.076	4.603	0.163	0.698
6	1.098	5.420	0.167	0.822
7	1.120	6.206	0.170	0.941
8	1.142	6.962	0.173	1.056
9	1.165	7.688	0.177	1.166
10	1.188	8.387	0.180	1.272
11	1.212	9.058	0.184	1.374
12	1.236	9.704	0.188	1.472
13	1.261	10.325	0.191	1.566
14	1.286	10.922	0.195	1.657
15	1.312	11.496	0.199	1.744
16	1.338	12.048	0.203	1.828
17	1.365	12.579	0.207	1.908
18	1.392	13.090	0.211	1.985
19	1.420	13.580	0.215	2.060
20	1.448	14.052	0.220	2.131
21	1.477	14.506	0.224	2.200
22	1.507	14.942	0.229	2.267
23	1.537	15.362	0.233	2.330
24	1.568	15.765	0.238	2.391
25	1.599	16.153	0.243	2.450
26	1.631	16.526	0.247	2.507
27	1.664	16.885	0.252	2.561
28	1.697	17.229	0.257	2.613
29	1.731	17.561	0.263	2.664
30	1.766	17.880	0.268	2.712

Table 11-163: Enbridge Carbon Avoided Costs

Year	Res/Com/Ind ($/m³)	
	Rate	NPV
1	0.078	0.078
2	0.098	0.171
3	0.127	0.284
4	0.157	0.415
5	0.186	0.562
6	0.216	0.722
7	0.245	0.894
8	0.274	1.076
9	0.304	1.265
10	0.333	1.461
11	0.340	1.649
12	0.347	1.830
13	0.353	2.004
14	0.361	2.172
15	0.368	2.333
16	0.375	2.487
17	0.383	2.636
18	0.390	2.779
19	0.398	2.917
20	0.406	3.049
21	0.414	3.176
22	0.422	3.299
23	0.431	3.416
24	0.440	3.529
25	0.448	3.638
26	0.457	3.743
27	0.466	3.843
28	0.476	3.940
29	0.485	4.033
30	0.495	4.122

Table 11-164: Union Gas Avoided Costs

Year	Residential/Commercial			
	Baseload (m3)		Weather Sensitive (m3)	
	Rate	NPV	Rate	NPV
1	0.130	0.130	0.173	0.173
2	0.127	0.249	0.176	0.339
3	0.131	0.366	0.179	0.498
4	0.122	0.468	0.171	0.641
5	0.159	0.594	0.208	0.806
6	0.165	0.717	0.216	0.966
7	0.163	0.831	0.214	1.117
8	0.182	0.951	0.234	1.272
9	0.193	1.072	0.246	1.425
10	0.198	1.188	0.253	1.574
11	0.218	1.309	0.274	1.726
12	0.234	1.432	0.291	1.878
13	0.238	1.549	0.296	2.024
14	0.259	1.669	0.319	2.172
15	0.265	1.785	0.325	2.314
16	0.250	1.888	0.311	2.442
17	0.270	1.993	0.333	2.572
18	0.306	2.105	0.370	2.707
19	0.311	2.213	0.376	2.837
20	0.312	2.314	0.379	2.961
21	0.313	2.410	0.381	3.078
22	0.295	2.496	0.364	3.183
23	0.299	2.578	0.370	3.284
24	0.329	2.662	0.401	3.387
25	0.359	2.749	0.432	3.492
26	0.371	2.834	0.446	3.594
27	0.384	2.917	0.460	3.693
28	0.397	2.998	0.475	3.790
29	0.411	3.076	0.491	3.884
30	0.425	3.153	0.507	3.975

Table 11-165: Union Carbon Avoided Costs

Year	Res/Com/Ind	
	Baseload/Weather Sensitive	
	Rate	NPV
1	0.078	0.078
2	0.098	0.171
3	0.127	0.284
4	0.157	0.415
5	0.186	0.562
6	0.216	0.722
7	0.245	0.894
8	0.274	1.076
9	0.304	1.265
10	0.333	1.461
11	0.340	1.649
12	0.347	1.830
13	0.353	2.004
14	0.361	2.172
15	0.368	2.333
16	0.375	2.487
17	0.383	2.636
18	0.390	2.779
19	0.398	2.917
20	0.406	3.049
21	0.414	3.176
22	0.422	3.299
23	0.431	3.416
24	0.440	3.529
25	0.448	3.638
26	0.457	3.743
27	0.466	3.843
28	0.476	3.940
29	0.485	4.033
30	0.495	4.122

Table 11-166: Union Water Avoided Costs

Year	Res/Com/Ind	
	Water ($/1000 litres)	
	Rate	NPV
1	0.882	0.882
2	0.899	1.730
3	0.917	2.545
4	0.936	3.329
5	0.955	4.083
6	0.974	4.808
7	0.993	5.505
8	1.013	6.175
9	1.033	6.819
10	1.054	7.439
11	1.075	8.034
12	1.096	8.607
13	1.118	9.158
14	1.141	9.688
15	1.164	10.197
16	1.187	10.687
17	1.211	11.157
18	1.235	11.610
19	1.260	12.045
20	1.285	12.464
21	1.310	12.867
22	1.337	13.253
23	1.363	13.626
24	1.391	13.983
25	1.418	14.327
26	1.447	14.658
27	1.476	14.976
28	1.505	15.282
29	1.535	15.576
30	1.566	15.859

Table 11-167: Union Electricity Avoided Costs

Year	Res/Com/Ind	
	Electricity ($/KWh)	
	Rate	NPV
1	0.151	0.151
2	0.154	0.296
3	0.157	0.435
4	0.160	0.569
5	0.163	0.698
6	0.167	0.822
7	0.170	0.941
8	0.173	1.056
9	0.177	1.166
10	0.180	1.272
11	0.184	1.374
12	0.188	1.472
13	0.191	1.566
14	0.195	1.657
15	0.199	1.744
16	0.203	1.828
17	0.207	1.908
18	0.211	1.985
19	0.215	2.060
20	0.220	2.131
21	0.224	2.200
22	0.229	2.267
23	0.233	2.330
24	0.238	2.391
25	0.243	2.450
26	0.247	2.507
27	0.252	2.561
28	0.257	2.613
29	0.263	2.664
30	0.268	2.712

11.15.4 Results Tables[121,122]

Enbridge Results

Table 11-168: Enbridge overall PAC results*†

Program	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio
Resource Acquisition	206,989,000	49,776,000	157,435,000	4.16
Low Income	32,603,000	11,887,000	20,716,000	2.74
Total	**239,592,000**	**61,662,000**	**178,151,000**	**3.89**

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.

Table 11-169: Enbridge Residential PAC results*†

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A Costs	PAC Ratio w/o O&A Costs
Residential Adaptive Thermostat	3,566,000	1,785,000	882,000	159,000	16,715,000	2,667,000	14,049,000	6.27	7.23
Home Energy Conservation	8,135,000	28,308,000	2,597,000	606,000	58,496,000	30,905,000	27,591,000	1.89	1.98
Verified Final Results	**11,701,000**	**30,092,000**	**3,479,000**	**766,000**	**75,211,000**	**33,571,000**	**41,640,000**	**2.24**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.

[121] Cost-effectiveness results for the 2021 programs do not reflect the significant gas price increases occurring in 2022.
[122] The cost-effectiveness results use 2021 carbon tax rates that increase by $15 per year up to $170 per tCO2e in 2030. Beyond 2030, a 2% inflation rate is applied.

Table 11-170: Enbridge Commercial & Industrial PAC results*†

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A Costs	PAC Ratio w/o O&A Costs
Run it Right‡	45,000	281,000	190,000	1,000	62,000	471,000	-409,000	0.13	0.13
C&I Prescriptive	3,278,000	1,683,000	1,009,000	114,000	11,395,000	2,692,000	8,703,000	4.23	4.67
C&I Direct Install	2,502,000	2,812,000	309,000	95,000	9,761,000	3,121,000	6,640,000	3.13	3.36
C&I Custom	22,517,000	5,983,000	3,540,000	1,240,000	109,743,000	9,523,000	100,220,000	11.52	16.20
Comprehensive Energy Management	130,000	19,000	121,000	9,000	786,000	140,000	646,000	5.60	6.56
Energy Leaders	45,000	240,000	17,000	3,000	252,000	257,000	-5,000	0.98	1.01
Verified Final Results	**28,517,000**	**11,018,000**	**5,187,000**	**1,462,000**	**131,999,000**	**16,204,000**	**115,795,000**	**8.15**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.
‡Run it Right costs include costs attributable to both the Resource Acquisition and Market Transformation scorecards.

Table 11-171: Enbridge Low Income PAC results*†

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A Costs	PAC Ratio w/o O&A Costs
Multi-Residential	4,329,000	2,811,000	1,890,000	263,000	24,866,000	4,701,000	20,165,000	5.29	7.16
Home Winterproofing	1,207,000	4,091,000	3,095,000	79,000	7,737,000	7,186,000	551,000	1.08	1.13
Verified Final Results	**5,536,000**	**6,902,000**	**4,985,000**	**342,000**	**32,603,000**	**11,887,000**	**20,716,000**	**2.74**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.

Table 11-172: Enbridge overall TRC-Plus results*†

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	Program Costs ($)	Overhead ($) ‡	TRC Plus Costs ($)	TRC Plus Value ($)	TRC Plus Ratio w/ O&A costs
Resource Acquisition	40,218,000	78,449,000	243,593,000	3,725,000	4,941,000	87,114,000	156,479,000	2.80
Low Income	5,536,000	17,509,000	37,202,000	3,390,000	1,595,000	22,495,000	14,707,000	1.65
Total	**45,754,000**	**95,958,000**	**280,795,000**	**7,115,000**	**6,536,000**	**109,609,000**	**171,187,000**	**2.56**

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.
‡Portfolio overhead costs for research, evaluation, and administration are not being applied at the program level. Consistent with what was done in 2015, the EC calculated costs as the sum of all OEB-defined program costs, including program admin and overhead costs and spread these costs across all programs based on their weighted savings contribution. Costs do not include market transformation or portfolio overhead costs, with the exception of Run it Right, which includes Market Transformation costs.

Table 11-173: Enbridge Residential TRC-Plus results*†

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Residential Adaptive Thermostat	3,566,000	6,963,000	24,876,000	6,963,000	17,912,000	3.57	882,000	3.17	3.32
Home Energy Conservation	8,135,000	39,733,000	70,267,000	39,733,000	30,534,000	1.77	2,597,000	1.66	1.71
Verified Final Results	**11,701,000**	**46,696,000**	**95,142,000**	**46,696,000**	**48,446,000**	**2.04**	**3,479,000**	**1.90**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.

Table 11-174: Enbridge Commercial/Industrial TRC-Plus results*†

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Run it Right‡	45,000	137,000	68,000	137,000	-69,000	0.49	190,000	0.21	0.21
C&I Prescriptive	3,278,000	4,708,000	13,280,000	4,708,000	8,573,000	2.82	1,009,000	2.32	2.43
C&I Direct Install	2,502,000	3,091,000	11,603,000	3,091,000	8,512,000	3.75	309,000	3.41	3.64
C&I Custom	22,517,000	23,432,000	122,377,000	23,432,000	98,945,000	5.22	3,540,000	4.54	5.05
Comprehensive Energy Management	130,000	86,000	853,000	86,000	767,000	9.92	121,000	4.12	4.57
Energy Leaders	45,000	299,000	270,000	299,000	-29,000	0.90	17,000	0.85	0.87
Verified Final Results	**28,517,000**	**31,752,000**	**148,451,000**	**31,752,000**	**116,698,000**	**4.68**	**5,187,000**	**4.02**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.
‡Run it Right costs include costs attributable to both the Resource Acquisition and Market Transformation scorecards.

Table 11-175: Enbridge Low Income TRC-Plus results*†

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Multi-Residential	4,329,000	14,499,000	27,757,000	14,499,000	13,258,000	1.91	1,890,000	1.69	1.83
Home Winterproofing	1,207,000	3,010,000	9,445,000	3,010,000	6,435,000	3.14	3,095,000	1.55	1.65
Verified Final Results	**5,536,000**	**17,509,000**	**37,202,000**	**17,509,000**	**19,693,000**	**2.12**	**4,985,000**	**1.65**	—

*Not all values may compute exactly due to rounding.
†All dollar values are rounded to the nearest thousand.

Union Results

Table 11-176: Union Resource Acquisition PAC results*

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A costs	PAC Ratio w/o O&A costs
Home Reno Rebate	3,694,000	10,221,000	2,544,000	760,000	26,330,000	12,765,000	13,565,000	2.06	2.28
Residential Thermostats	1,546,000	813,000	675,000	89,000	7,180,000	1,488,000	5,692,000	4.83	6.10
C&I Prescriptive	2,102,000	1,640,000	845,000	148,000	8,769,000	2,485,000	6,285,000	3.53	3.87
C&I Direct Install	1,363,000	1,838,000	194,000	121,000	5,570,000	2,032,000	3,538,000	2.74	2.93
Commercial & Institutional Custom	26,754,000	8,795,000	3,882,000	755,000	86,812,000	12,678,000	74,134,000	6.85	9.39
Verified Final Results	**35,458,000**	**23,308,000**	**8,140,000**	**1,872,000**	**134,662,000**	**31,448,000**	**103,214,000**	**4.28**	—

*Not all values may compute exactly due to rounding.

Table 11-177: Union Low Income PAC results*

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A costs	PAC Ratio w/o O&A costs
Furnace End-of-Life	0	0	0	0	0	0	0	—	—
Indigenous	0	2,000	70,000	4,000	0	71,000	-71,000	0.00	0.00
Home Weatherization	2,012,000	5,375,000	3,693,000	540,000	13,241,000	9,068,000	4,173,000	1.46	1.58
Multi Family	954,000	1,921,000	905,000	168,000	5,016,000	2,827,000	2,189,000	1.77	1.95
Verified Final Results	**2,966,000**	**7,298,000**	**4,668,000**	**712,000**	**18,257,000**	**11,966,000**	**6,290,000**	**1.53**	—

*Not all values may compute exactly due to rounding.

Table 11-178: Union Large Volume PAC results*

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A costs	PAC Ratio w/o O&A costs
Large Volume	9,712,000	2,250,000	479,000	162,000	16,386,000	2,729,000	13,657,000	6.00	7.03
Verified Final Results	**9,712,000**	**2,250,000**	**479,000**	**162,000**	**16,386,000**	**2,729,000**	**13,657,000**	**6.00**	—

*Not all values may compute exactly due to rounding.

Table 11-179: Union Performance Based PAC results*

Program	Annual net savings (m3)	Program-level Incentives ($)	Program-level general admin costs ($)	Portfolio Budget ($)	PAC Benefits ($)	PAC Costs ($)	PAC Value ($)	PAC Ratio w/ O&A costs	PAC Ratio w/o O&A costs
RunSmart	0	0	27,000	2,000	0	27,000	-27,000	0.00	0.00
Strategic Energy Management	970,000	15,000	124,000	8,000	913,000	139,000	774,000	6.57	10.57
Verified Final Results	**970,000**	**15,000**	**151,000**	**10,000**	**913,000**	**166,000**	**747,000**	**5.49**	—

*Not all values may compute exactly due to rounding.

Table 11-180: Union Resource Acquisition TRC-Plus results*

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Home Reno Rebate	3,694,000	19,995,000	30,487,000	19,995,000	10,492,000	1.52	2,544,000	1.35	1.43
Residential Thermostats	1,546,000	2,976,000	10,666,000	2,976,000	7,690,000	3.58	675,000	2.92	3.19
C&I Prescriptive	2,102,000	3,620,000	10,349,000	3,620,000	6,729,000	2.86	845,000	2.32	2.44
C&I Direct Install	1,363,000	2,205,000	6,577,000	2,205,000	4,372,000	2.98	194,000	2.74	2.90
Commercial & Institutional Custom	26,754,000	48,170,000	96,763,000	48,170,000	48,593,000	2.01	3,882,000	1.86	1.99
Verified Final Results	**35,458,000**	**76,966,000**	**154,842,000**	**76,966,000**	**77,876,000**	**2.01**	**8,140,000**	**1.82**	—

*Not all values may compute exactly due to rounding.

Table 11-181: Union Low Income TRC-Plus results*

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Furnace End-of-Life	0	0	0	0	0	—	0	—	—
Indigenous	0	0	0	0	0	—	70,000	0.00	0.00
Home Weatherization	2,012,000	4,797,000	15,580,000	4,797,000	10,782,000	3.25	3,693,000	1.83	1.99
Multi Family	954,000	3,069,000	5,196,000	3,069,000	2,127,000	1.69	905,000	1.31	1.40
Verified Final Results	**2,966,000**	**7,867,000**	**20,776,000**	**7,867,000**	**12,909,000**	**2.64**	**4,668,000**	**1.66**	—

*Not all values may compute exactly due to rounding.

Table 11-182: Union Large Volume TRC-Plus results*

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&A costs	TRC Plus Ratio w/o O&A costs
Large Volume	9,712,000	3,238,000	19,454,000	3,238,000	16,215,000	6.01	479,000	5.23	5.86
Verified Final Results	**9,712,000**	**3,238,000**	**19,454,000**	**3,238,000**	**16,215,000**	**6.01**	**479,000**	**5.23**	**-**

*Not all values may compute exactly due to rounding.

Table 11-183: Union Performance Based TRC-Plus results*

Program	Annual net savings (m3)	Measure Incremental Costs ($)	TRC Plus Benefits ($)	TRC Plus Costs (equipment) ($)	TRC Plus Value (equipment) ($)	TRC Plus Ratio (equipment)	Program Admin Costs ($)	TRC Plus Ratio w/ O&M costs	TRC Plus Ratio w/o O&M costs
Run Smart	0	0	0	0	0	—	27,000	0.00	0.00
Strategic Energy Management	970,000	0	1,000,000	0	1,000,000	—	124,000	8.06	13.99
Verified Final Results	**970,000**	**0**	**1,000,000**	**0**	**1,000,000**	**—**	**151,000**	**6.60**	—

*Not all values may compute exactly due to rounding.

About DNV

DNV is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas, power and renewables industries. We also provide certification, supply chain and data management services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.