



CONFIDENTIAL

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**INDEPENDENT EXPERT REPORT:  
DEMAND SIDE MANAGEMENT  
& ENERGY EFFICIENCY**

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**PREPARED FOR**

Manitoba Public Utilities Board

**PREPARED BY**

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## LIST OF ACRONYMS

<b>Act</b>	Efficiency Manitoba Act
<b>B/C</b>	Benefit/Cost Ratio
<b>C&amp;S</b>	Codes & Standards
<b>Centra</b>	Centra Gas Manitoba Inc.
<b>CRM</b>	Customer Relationship Management
<b>CSI</b>	Commercially Sensitive Information
<b>Cu. m.</b>	Cubic Meters
<b>Daymark</b>	Daymark Energy Advisors
<b>DSM</b>	Demand Side Management
<b>EE</b>	Energy Efficiency
<b>EEAG</b>	Energy Efficiency Advisory Group
<b>EM</b>	Efficiency Manitoba
<b>EM&amp;V</b>	Evaluation, Measurement, & Verification
<b>Gas</b>	Natural Gas
<b>GHG</b>	Greenhouse Gas
<b>GWh</b>	Gigawatt Hours
<b>kWh</b>	Kilowatt hours
<b>LRI</b>	Lifecycle Revenue Impact
<b>m<sup>3</sup></b>	Cubic Meters
<b>MH</b>	Manitoba Hydro
<b>NEBs</b>	Net Energy Benefits
<b>NOMAD</b>	Naturally Occurring Market Adoption
<b>NPV</b>	Net Present Value
<b>PACT</b>	Program Administrator Cost Test
<b>PCT</b>	Participant Cost Test
<b>PMVT</b>	Pure Measure Value Test
<b>PUB</b>	Manitoba Public Utility Board
<b>RIM</b>	Ratepayer Impact Measure Test
<b>TRC</b>	Total Resource Cost Test



## EXECUTIVE SUMMARY

I. The 2018 Efficiency Manitoba Act, and the subsequent Order 119/2019, established the framework for moving responsibility for energy efficiency programs, previously managed by Manitoba Hydro, to a new Crown Corporation, Efficiency Manitoba, charged with establishing and managing DSM programs that increase energy efficiency savings while incurring lower program costs.

The Act established energy savings targets (compared to a baseline projection) of 1.5% per year in the electricity sector and 0.75% per year in the natural gas sector. It tasked Efficiency Manitoba to develop an initial three year plan for meeting these targets and for setting out on a path, over the next 15 years, to achieve 22.5% reductions in the electricity sector and 11.25% in the natural gas sector, compared to baseline projections.

The Act gave the Manitoba Public Utilities Board (PUB) the responsibility of reviewing the Plan and making a recommendation as to whether it should be approved, approved with amendments, or rejected.

Daymark was hired as an independent expert to assist the Public Utilities Board (PUB) in its review of Efficiency Manitoba's Plan. Daymark was tasked with assessing the Plan's compliance the Act and Regulation and evaluating the Plan along a number of dimensions, including its likelihood of delivering required savings, the benefits of the Plan's initiatives, the cost-effectiveness of the proposals, whether the Plan is accessible to all Manitobans, whether savings targets should be increased or decreased, and the adequacy of Efficiency Manitoba's plans for tracking savings in support of a future independent assessment report.

Accordingly, Daymark reviewed Efficiency Manitoba's Plan, including the workpapers showing the analysis behind Efficiency Manitoba's projections. We reviewed the Plan's compliance with the Act and with regulation 119/2019. We reviewed the Plan's capability to deliver the programs to capture the savings, focusing on the continuation of existing programs, target customer participation rates, and progress in identifying the third-party partners who will be responsible for the delivery of many programs. We reviewed the Plan's approach to providing access to all Manitobans. We examined the benefits and costs of the Plan's proposals, using multiple cost-effectiveness tests and drilling down to the measure level. We examined Efficiency Manitoba's plan for

evaluation, measurement, and verification. Taking deliverability and benefit costs questions together, we identified any major issues leading to questions about the Plan's ability to meet its three year and fifteen-year targets, considering the role of codes and standards, conservation rates, and solar programs and net metering. In addition, we assessed the likely accuracy of Efficiency Manitoba's projections of the rate impact of the program.

Our report makes the following major observations about the Plan:

- As a document, the Plan is complete and addresses the requirements of the Act and Regulation in terms of its content. The Plan reports projected savings that are, overall, compliant with the targets established in the Act
- We have some concerns about the ability of Efficiency Manitoba to deliver the volume of services and to recruit the levels of customer participation that it projects in the Plan. On the one hand, the fact that Efficiency Manitoba plans to continue a number of programs already being operated by Manitoba Hydro may help it get off to a good start. However, in some cases, Efficiency Manitoba is projecting customer participation rates significantly higher than those achieved by Manitoba Hydro. In other cases, program delivery may be hindered by the fact that all the third-party partners Efficiency Manitoba plans to work with are not yet on board. Finally, Efficiency Manitoba's Plan highlights the important role to be played by a new Customer Relationship Management system that will ease the process of program sign up for customers. However, a contractor for the system is not scheduled to be selected until 2020. Because computer system development is notorious for delays, there may be a risk that a delayed CRM roll-out will cause Efficiency Manitoba to miss its participation targets
- Reviewing the costs and benefits of Efficiency Manitoba's program proposals in terms of common benefit-cost assessment tests, we concur with Efficiency Manitoba's assessment of the relative efficiency of electric and natural gas programs, which finds a high NPV for electricity programs, and a NPV of roughly one (the break-even level) for natural gas programs. Extending cost-benefit analysis to include customer costs and the benefits of greenhouse gas emissions and water usage reductions changes the numbers for some programs, but does not significantly change the overall picture
- At the measure level, not every measure is cost-effective, even assuming program costs of zero, especially in the natural gas portfolio. Although there may be reasons to preserve these measures, based on considerations like



customer outreach goals or benefits associated with introducing new technologies, they warrant additional scrutiny.

- Although NPV is calculated using a thirty-year time horizon, many of the measures proposed by Efficiency Manitoba have a relatively short measure life. **Forty** percent expire within five years. **Ninety-three** percent expire within fifteen years. The fact that measures expire within a fifteen-year period will add to the challenges faced by Efficiency Manitoba in meeting its fifteen-year overall savings goals
- The extremely modest rate impact estimated by Efficiency Manitoba over a thirty-year period may not be an accurate prediction of how rates will change over the next ten years, if rates fully capture the costs of measures during their productive lives. However, even adjusted to capture most costs within ten years, projected rate increases remain modest
- A significant proportion of the savings projected by Efficiency Manitoba to meet savings targets come from savings attributed to codes and standards. Our analysis suggests that these savings may be overstated, if the intention is to capture accurately their true incremental energy efficiency impact, taking into account the fact that some compliance with codes and standards may be considered “naturally occurring” and that, over time, technology may overtake codes standards, so that the codes and standards themselves, while still technically on the books, may be largely irrelevant to behavior
- Taking into account the challenges posed by the significant role played in the first three years by measures with relatively short lives, and the possible adjustments that should be made to codes and standards savings projections, it is our assessment that, although Efficiency Manitoba has put forward a plan with substantial energy savings in the first three years, Efficiency Manitoba may not be on track, at this point, to meeting the fifteen-year reduction targets set out in the Plan

II.

## INTRODUCTION

The 2020/23 Efficiency Plan submitted by Efficiency Manitoba (“EM”) for review by the Manitoba Public Utilities Board (“PUB”) presents Efficiency Manitoba’s proposed approach to meeting the requirements of the Efficiency Manitoba Act and Order 119/2019 implementing the Act. Daymark Energy Advisors (“Daymark”) was engaged by the Manitoba Public Utilities Board to provide an independent review of the Plan. This report details that review and presents our findings.

## A. Background

### 1. The Efficiency Manitoba Act and Regulation Order 119-2019

The Efficiency Manitoba Act (“Act”), enacted by the Legislative Assembly of Manitoba in 2017, and coming into force on January 24, 2018, established Efficiency Manitoba as a corporation separate from Manitoba Hydro with a mandate to “implement and support demand-side management initiatives” to meet savings targets identified in the Act and achieve additional cost-effective reductions in electricity and natural gas use, while mitigating the impact of rate increases and delaying the need for additional capital investments. Among other provisions, the Act established a requirement that Efficiency Manitoba prepare efficiency plans for each three-year period of operation.

Subsequently, in 2019, the Manitoba Public Utilities Board published Regulation 119/2019, the “Efficiency Manitoba Regulation,” (referred to in this report as Regulation 119/2019). The Regulation includes additional information about how the requirements of the Act should be met, including establishing a commencement date for Efficiency Manitoba DSM programs of April 1, 2020. Most notably for the purposes of this report, it details more precisely how cost-effectiveness should be determined, specifying that this calculation should compare the levelized cost to Efficiency Manitoba of net savings to the levelized marginal value to Manitoba Hydro (“MH”) or Centra Gas Manitoba Inc. (“Centra”) of net savings.

Together, the Act and the Regulation require the PUB to review the efficiency plan and make recommendations as to its approval, amendment, or rejection. To assist in this process, the PUB has contracted with Daymark to assess the Plan’s compliance with the mandate and requirements of the Act and the Regulation.

### 2. Public Utilities Board proceedings in the matter of “Efficiency Manitoba’s 2020/23 Efficiency Plan Submission”

Efficiency Manitoba filed the Efficiency Plan on October 25, 2019, beginning the period of PUB review. The Board conducted a Pre-Hearing Conference to identify interveners; issues included in the scope of the hearing, and finalize the hearings process and schedule. In response to the Pre-Hearing Conference, on November 5, 2019, the PUB issued Order No. 162/19, “Procedural Order in Respect of Efficiency Manitoba’s 2020/23 Efficiency Plan Submission,” approving Applications to Intervene for five groups, approving a list of in-scope

Plan review issues and a list of “deferred or out of scope” issues, and announcing the retention of Daymark as an Independent Expert Consultant to “assist the Board and parties in the review of the Plan.”

The complete text of Order No. 162/19, including the list of specific in-scope and out-of-scope issues, is attached to this report as **Appendix B**. The key “in scope” issues specifically identified include:

- “Reasonableness of methodology to project electric and natural gas net savings to meet prescribed savings targets”
- “Cost-effectiveness of electric and natural-gas demand side management program bundles and portfolio”
- “Accessibility of Efficiency Plan to Manitobans”

In addition, several matters were explicitly declared to be “out of scope,” including, in what is most relevant to Daymark’s work, “Manitoba Hydro’s and Centra Gas’ integrated resource planning and derivation of marginal values and avoided costs in accordance with resource planning processes (electric and natural gas).”

### **3. Minister’s letters**

In addition to the above, Efficiency Manitoba is also subject, in the preparation of its plans, to directions provided in two Minister’s Letters, dated April 24, 2019, and October 18, 2019. Most notably, for the purpose of this report, the two letters are specific in their instruction the Efficiency Manitoba’s Plan should provide at least as good or better results than the previous “Power Smart” program, but “at a significantly smaller percentage of the cost and materially less labour costs.”

### **4. Role of Daymark**

As indicated in Order 162/19, PUB has retained Daymark as an Independent Expert Consultant “to assist the Board and parties in the review of the Plan.”

#### **a) Scope of Work**

The Scope of Work for Daymark is attached as **Appendix D**. The central analytical task required in the Scope of Work is the following:

“Assess whether and the extent to which Efficiency Manitoba’s initial 3-year Efficiency Plan meets the mandate and requirements of The Efficiency Manitoba Act and the Efficiency Manitoba Regulation 119/2019.”

The Scope of Work lists seven specific topics Daymark should address as part of this assessment:

2a) “Whether there is a reasonable expectation that the Efficiency Plan will deliver net savings that meet the legislated electrical energy and natural gas savings targets;”

2b) “Identification of the benefits of the initiatives in the Efficiency Plan;”

2c) “Evaluation of the cost-effectiveness of the initiatives in the Efficiency Plan based on the cost-effectiveness tests set out in the Regulation;”

2d) “Evaluation of the cost-effectiveness of the initiatives based on the cost-effectiveness tests commonly used to evaluate Demand Side Management initiatives;”

2e) “Whether Efficiency Manitoba is reasonably achieving the aim of providing initiatives that are accessible to all Manitobans. In this context, the Efficiency Plan should include initiatives applicable to all geographic regions of the Province as well as all customer segments: residential, commercial, and industrial;”

2f) “Whether the savings targets should be increased or decreased based on cost effectiveness or other considerations;”

2g) “Whether the mechanisms proposed by Efficiency Manitoba to track DSM savings in support of an independent assessment report will provide an accurate portrayal of DSM savings.”

As clarified in Order No. 162/19, the above review does not include drilling down to a review of Manitoba Hydro’s and Centra Gas’ “derivation of marginal values and avoided costs in accordance with resource planning processes (electric and natural gas).” Our cost-benefit analyses, therefore, utilize these numbers as inputs, without offering an opinion on them.

## **b) Deliverables**

Deliverables identified in the Scope of Work are:

- This report, providing Daymark’s “assessments and supporting analysis”
- Responses to information requests with respect to report contents
- Addressing any “other issues that may be identified,” if approved by the PUB
- Availability for cross-examination of the contents of the report

### c) Report Structure

In addressing the issues raised in the Scope of Work, Daymark has divided our analysis into broad categories and structured our report around these categories. The general categories, and the overall structure of the report, are as follows:

- I. **Executive Summary**
- II. **Introduction.** This section reviews the legislative and regulatory background, presents the role of Daymark and its scope of work, gives an overview of the report structure, and provides a summary (without evaluation) of the highlights of the efficiency plan presented by Efficiency Manitoba.
- III. **Assessment of Plan Completeness with respect to Legislation and Regulation.** Is the Plan complete? Does it provide all the information and analysis required in the Act and the Regulation?
- IV. **Deliverability.** In this section, we assess Efficiency Manitoba's ability to deliver the savings projected in the Plan, and we review the Plan's outreach to hard to reach customers.

Under "Deliverability," we consider two distinct, but related, sets of questions identified in the Scope of Work:

- First, the Scope of Work asks Daymark to assess "whether there is a reasonable expectation" that required electrical and natural gas savings will be delivered
- Second, under deliverability, we consider the question of accessibility to all Manitobans

To answer these questions our report addresses these areas:

- We assess whether the savings being targeted by the Plan meets the target savings of the Act and the Regulations and whether the savings that are being counted are consistent with the regulations
- Second, we identify any concerns we have regarding the savings that has been identified, such as analysis errors, quantify any Plan savings that is outside the areas specified by the legislation, whether the basis for the savings is questionable
- Third, we identify whether the bundles and programs that the Plan explains as the initiatives that will be used to achieve implementation of the energy

efficiency measures are likely to deliver the activity level in the Plan at a cost estimated in the Plan

- V. **Cost/Benefit Analysis.** In this section, we assess whether the Plan identifies the costs and benefits of Plan initiatives in the manner described within the regulations, we assess the accuracy of this analysis, and we assess the costs-effectiveness of the initiatives, both using the cost-effectiveness tests set out in the Regulation and also using additional commonly-used cost-effectiveness tests.
- VI. **Plan for Evaluation, Measurement, and Verification.** In this section, we assess the Plan’s proposed mechanisms for tracking savings in preparation for the post-hoc Independent Assessment of the results and cost-effectiveness of the Plan that is required under Section 16(1) of the Act.
- VII. **Savings Targets.** Here, we examine what the cost effectiveness and other considerations related to the Plan’s initiatives might indicate about whether savings targets should be increased or decreased.
- VIII. **Summary of Findings.** We conclude by summarizing our findings.

## **B. Summary of Efficiency Manitoba Plan**

The 2020-2023 Efficiency Plan put forth by Efficiency Manitoba was filed on October 25, 2019. This section summarizes the highlights of the Plan as presented by Efficiency Manitoba and particular points of note identified by Daymark, in order to help set the context for the discussion presented later in this report. Our evaluative comments on the Plan are reserved for Sections II-VII of this report.

### **1. The Plan promises to deliver significant electric and natural gas savings in the first three years of the Efficiency Manitoba program, starting in the first year.**

The Efficiency Manitoba proposed Plan calls for spending approximately \$200 million over three years to attain **total three-year energy savings, inclusive of both program related and codes & standards, of 1,136 GWh** for the electric portfolio and 37.7 million meters cubed for the natural gas portfolio. These projected savings are closely aligned with the Act’s targeted savings rates—an average of 1.51% savings per year in the electric portfolio (compared to a

target of 1.5% per year) and an average of 0.78% per year in the natural gas portfolio (compared to a target of 0.75% per year).

The Plan's savings projections rely on a fast start in the first year of program operation, with budgeted spending and savings rates only slightly lower than rates in the second two years of the program. These projections for a fast start may be supported by the fact that, as Efficiency Manitoba documents, many proposed programs are continuations and/or consolidations of existing programs—only a few programs must be built from scratch.<sup>1</sup> Taking the electric and natural gas portfolios together, the total program budget in Year 1 is approximately \$63 million, reaching \$74 million by the third year. Projected annual savings for electric portfolio, inclusive of program-related and codes & standards, are estimated to be 373 GWh in year 1, followed by 386 GWh in year 2, and 377 GWh in year 3. On the natural gas side, annual savings, inclusive of program related and codes & standards, rise from 11.7 million cubic meters in year 1 to 13.2 million cubic meters in year 3.

Efficiency Manitoba has put together a portfolio of offerings in the natural gas and electricity areas which can be broken down into hundreds of individual technologies and measures offered in different configurations to the residential, commercial, industrial, and agricultural [and other sectors]. These individual offerings have been organized into program “bundles,” which are customized packages of programs intended to serve the needs of different types of customers. In general, measures include elements like rebates for efficient appliances, programs to supply and install specific energy saving technologies, focused on areas such as lighting, heating, cooling, air management, building envelope improvements, and commercial refrigeration.

These savings are estimated by Efficiency Manitoba based on a bottom-up analysis, from the most granular measure and technology level, to reach overall estimates for the electric and gas portfolios. In addition, savings from codes & standards make up a significant share of total savings (almost 1/4 of electricity savings and 1/3 of natural gas savings).

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<sup>1</sup> Plan, Appendix A, Table A4.1

## 2. The Plan aims to provide savings opportunities to all Manitobans

The Plan's budget projections show an allocation of funds to provide programs to industrial, commercial, agricultural, residential, income qualified, and indigenous customers.

### **Reaching hard-to-serve, indigenous, and income-qualified customers.**

Efficiency Manitoba's discussion of the Plan emphasizes that they have attached a high level of importance to designing the plan to serve all Manitoba customers. The Plan notes that it is "imperative" that "all Manitoba customer segments have representation within Efficiency Manitoba's Plan." This importance is reflected in the budget of the Plan, which assigns significant resources to income qualified programs and indigenous programs in both the natural gas and electric portfolios, even though the Plan projects that achieving energy savings for these customers may be relatively costly. Specific programs proposed include community geothermal for indigenous customers, developing programs for communities that rely on diesel-generated electricity and fuel oil, and additional subsidies for income qualified customers for services such as furnace upgrades and new appliances. In total, Efficiency Manitoba reports devoting 6% of the electric efficiency budget and 32% of the natural gas efficiency budget to these customers.<sup>2</sup>

**Programs for all major customer segments.** Other budgetary funds are distributed among industrial, agricultural, commercial, and residential customer segments. In the electric portfolio, the largest share of the budget (39%) goes to the commercial segment, with 20% going to the industrial segment and 19% going to the residential segment, and 4% to the agricultural segment (these percentages do not total 100, because costs associated with enabling strategies and corporate overhead are not assigned to customer segments). All segments are projected to realize savings, with the industrial and commercial sectors accounting for the largest share of total savings (39% and 35%, respectively), residential customers accounting for 22%, and agricultural customers accounting for 3% of the total.

In the natural gas portfolio, after dedicating 32% of the budget to income qualified and indigenous customer segments, commercial customers receive 27% of the budget, followed by residential customers at 21% and then, well

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<sup>2</sup> Plan Overview Section 6.2, p. 12.



behind, followed by industrial customers at 9% and agricultural customers at 1%. Energy savings projections show residential customers as realizing the largest share of total energy savings (37%), followed by industrial customers at 29% (despite their relatively low budget share), commercial customers at 25%, and agricultural customers at 1%.

Overall, then, the plan budgets show significant investments in the industrial, commercial, and residential sectors—a level of investment that may be best understood in the context of Efficiency Manitoba’s NPV cost effectiveness analysis, discussed below.

**Spending that returns funds to Manitobans.** Across all customer segments, as Efficiency Manitoba highlights in its discussion of the Plan, most program spending is returned to Manitobans in some form. As the Plan notes, “87 percent of Efficiency Manitoba’s combined budget is returned to Manitobans through program incentives, private sector energy efficiency delivery partners and outsourced corporate support functions.” Of this amount, approximately 65% is returned directly to customers in the form of customer incentives,<sup>3</sup> an amount that the Plan calls a “powerful driver towards both energy efficiency and further investment in Manitoba homes and commercial operations as well as in the businesses delivering the products and services to the market.”<sup>4</sup>

**Geographic reach.** Daymark’s Scope of Work specifically mentions geographic regions in asking Daymark to assess “Whether Efficiency Manitoba is reasonably achieving the aim of providing initiatives that are accessible to all Manitobans...[including] initiatives applicable to all geographic regions of the Province as well as all customer segments: residential, commercial, and industrial.”

The Efficiency Manitoba Plan itself, although it mentions geography as a potential challenge, does not directly focus on the question of whether the programs it proposes are applicable to all the geographic regions of Manitoba. This is not a compliance issue, since neither the Act nor the Regulation specifically require Efficiency Manitoba to address geographic reach in the Plan. Our later discussion of Deliverability gives our assessment on this question.

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<sup>3</sup> Plan Overview, Section 4

<sup>4</sup> Plan, Section 4.2, page 9 of 17

### **3. Of the five specific “mandates” of the Act, the Plan outlines a path to satisfying three mandates, with two mandates not discussed in detail**

Section 4(1) of the Act identifies five specific “mandates” for Efficiency Manitoba. Paraphrased and summarized, these mandates are:

- a. implementing and supporting DSM initiatives to meet energy savings targets and achieve greenhouse gas emissions reductions
- b. achieving additional cost-effective reductions, if additional cost-effective measures are available
- c. mitigating rate increases and delaying the need for Manitoba Hydro to make capital investments in new generation and transmission
- d. carrying out duties, if prescribed, related to Manitoban demand for electric power, potable water and fossil fuels in the transportation sector
- e. getting the private sector and non-government entities involved in program delivery

As reported by Efficiency Manitoba, the Plan satisfies the mandates of the Act with respect to 4(a), meeting established savings targets, 4(c), mitigating the impact of rate increases and delaying the need for Manitoba Hydro to make capital investments and 4(e), relative to involving the private sector and non-governmental entities. The Plan does not discuss 4(b) and 4(d) in detail. Presumably, the reason is that Efficiency Manitoba does not believe additional cost-effective savings are currently possible, and so far no additional duties have been prescribed related to potable water or energy consumption in the transportation sector.

### **4. The Plan describes Efficiency Manitoba’s efforts to build a first-class efficiency organization**

As provided for in the Act, Efficiency Manitoba has established itself as a new Crown Corporation with a Board of Directors which has developed a corporate strategic plan which includes its “mission vision, guiding principles, and strategic goals.”<sup>5</sup>

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<sup>5</sup> Plan Overview, Section 2.1, p. 4

**Development of Program Bundles.** As contrasted with previous efficiency efforts managed by Manitoba Hydro, the Plan highlights as distinctive a “new approach to customer segment programming and comprehensive engagement.”<sup>6</sup> The Plan gives a prominent role to the development of nineteen distinctive different sets of “program bundles” with “customize[d] marketing, engagement, and delivery efforts” targeted to meet the needs of six distinct “customer segments... selected to be inclusive of all Manitobans and to capture their unique customer behavior characteristics and energy consumption patterns<sup>7</sup>:

- **Residential customers**
- **Income-qualified residential customers**
- **Indigenous customers**
- **Commercial customers**
- **Industrial customers**
- **Agricultural customers**

**Role of Public Engagement.** An additional factor flagged by the Plan is the role that public engagement has played in Plan development, with the formation and participation of a new Energy Efficiency Advisory Group to provide input during Plan development.

**Lean central organization.** Efficiency Manitoba describes itself as a “lean organization,” and projects significantly lower staff costs than were seen in the 2015-2016 Manitoba Hydro program. This lean core staff is supplemented by significant engagement with private sector delivery partners, indicating the continued use of partners previously connected with Manitoba Hydro efficiency program in program delivery. This approach contributes to the Plan’s finding that 87% of its budget is “returned to Manitobans,” establishing Efficiency Manitoba as a force in the Manitoba economy.

## **5. The Plan projects the development of a cost-effective DSM portfolio that could be funded by small, one-time electric and natural gas rate increases**

**Both the natural gas and electric portfolios pass Efficiency Manitoba’s cost-effectiveness test, but the electric portfolio is projected to be significantly more cost-effective than the gas portfolio.** Section 12(1) of Regulation

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<sup>6</sup> Plan Overview, Section 3, p. 7

<sup>7</sup> Plan Overview Section 3, p. 9.

119/2019 outlines the required approach for determining cost effectiveness for both the electricity and natural gas portfolios, by comparing “the levelized cost to Efficiency Manitoba” of the net electrical or gas savings resulting from efficiency initiatives to “the levelized marginal value to Manitoba Hydro of the net savings resulting from those initiatives.” This kind of test is often referred to as a Program Administrator Cost Test (PACT). Using this methodology, the energy efficiency improvements projected to result from the Plan, taken together, achieve cost savings that more than outweigh program expenditures. Overall, the projected net present value of the savings (after accounting for program costs) from the whole portfolio is \$344 million.<sup>8</sup> Broken down into the electric and natural gas segments, the projected overall savings are entirely in the electric portfolio. The natural gas portfolio essentially breaks even in Efficiency Manitoba’s projection.

**Cost-effectiveness varies among different customer segments, with commercial, agricultural, and industrial programs playing an important role.**

The Plan breaks down the budget and projected energy savings by customer segment (industrial, agricultural, commercial, residential, income qualified, and indigenous customers), and reports cost-effectiveness metrics for each segment. In the natural gas portfolio, commercial, industrial, and agricultural programs (which almost all are reported to have a positive NPV) play a crucial role in balancing the net losses of most other programs. For the natural gas programs, the lion’s share of NPV cost savings is expected to come from custom programs serving the commercial, industrial, and agricultural sectors.<sup>9</sup>

In contrast to the natural gas portfolio, within the electric portfolio, all reported programs (reported at a bundled level) show positive net present value. Again, however, the bulk of the NPV savings are attributed to commercial, industrial and agricultural programs, with programs categorized as “renovations” in that sector accounting for about half the NPV of the entire electric portfolio.<sup>10</sup>

Table 1 presents the results of Efficiency Manitoba’s cost-benefit analysis for different customer segments in summary form:

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<sup>8</sup> Plan, Section 1.5, p. 14. Sums reported “overall portfolio metrics” for the electric and natural gas portfolios.

<sup>9</sup> See Plan Attachment 3-Technical Tables, table titled “Natural Gas Program Cost-Effectiveness Metrics.”

<sup>10</sup> See Plan Attachment 3-Technical Tables, table titled “Electric Program Cost-Effectiveness Metrics.”

CUSTOMER SEGMENT(S)	NATURAL GAS			ELECTRICITY		
	C/B	NPV (000'S)	LEVELIZED COST (¢/m <sup>3</sup> )	C/B	NPV	LEVELIZED COST
RESIDENTIAL	1	\$179	19.49	2.74	\$40,338	3.19
Income Qualified	0.5	(\$8,888)	40.29	2.8	\$7,576	3.7
Commercial, Industrial, and Agricultural	2.5	\$31,429	7.19	4.43	\$310,159	1.59
Emerging Technologies	0.9	(\$104)	21.4	2.96	\$4,156	2.11

**Table 1: Cost-Benefit Analysis Using PACT<sup>11</sup>**

Program costs and benefits in the report are reported at the “bundle” level (discussed in more detail below), not the most finely-grained level of individual measures. However, Efficiency Manitoba’s analysis builds these bundle-level cost savings up from an analysis of individual measure data.

**Projected rate impacts are modest but projected over thirty years.** In addition to cost savings, the Plan includes calculations of revenue impacts to clarify potential rate impacts of the Plan. Even for a cost-effective plan, Efficiency Manitoba acknowledges, per-kWh or per-meter cubed rate increases may be necessary to ensure utility costs, including program costs, are collected from the smaller total amount of electricity or natural gas used under the program. Efficiency Manitoba calculates this based on a “lifecycle revenue impact” (LRI) analysis, which looks at the net present value of the next thirty years of revenue impact.

Efficiency Manitoba concludes that electricity rates may need to rise 0.3% (a one-time increase) to cover the program costs and associated utility revenue losses for the next three years. Gas rates may require a one-time rate increase of 1.2%. The Plan does not mention when, if ever, these increases would expire, so we assume that they are intended to continue for the full thirty years used in the calculation.

## 6. The Plan carefully tracks and reports its compliance with law and regulation

Efficiency Manitoba states, in Section 2 of the Plan Overview, that the Plan complies with the essential elements of the Act and of Regulation 119/2019,

<sup>11</sup> Figures here are from EM’s analysis, found in Appendix 3. See Table, “Natural Gas Program Cost-Effectiveness Metrics” and Table, “Electric Program Cost-Effectiveness Metrics”

meeting “prescribed energy targets,” using prescribed methods to evaluate cost-effectiveness, addressing customer accessibility issues, considering non-energy benefits, and proposing an evaluation framework and a performance assessment plan.<sup>12</sup>

In the Plan itself, Efficiency Manitoba provides tables cross-referencing how the Plan corresponds to specific Act and Regulation requirements.<sup>13</sup>

## 7. **The Plan sees a critical role for a planned CRM/DSM system.**

An important part of the Plan (described by Efficiency Manitoba as “key,” a “critical and overarching strategy,” and “foundational to the success of Efficiency Manitoba”) is the development of a new customer relationship management and demand side management system (referred to in the Plan as the “CRM/DSM system.”) In addition to serving as a single point of access to programs for customers, the CRM/DSM system is envisioned as playing a crucial role in Efficiency Manitoba’s program evaluation efforts, by providing the capability for continuous performance monitoring at the program bundle and measure level.<sup>14</sup>

## 8. **Plans for evaluation include ongoing self-evaluation and periodic independent evaluations**

**The Plan envisions a process of ongoing self-assessment.** Efficiency Manitoba proposes that it will adopt an approach of ongoing performance evaluation, improvements, and pursuit of new opportunities, through a process of ongoing monitoring of energy savings and budgets of measures and program bundles (using the CRM/DSM system), benchmarking against other programs using “scorecards”, and “implementing refinements.”

**The Plan’s Evaluation Framework is intended to assist in future independent evaluations of impact and costs.** The Act section 16(1) requires an independent assessment of the results and cost-effectiveness of the efficiency plan. In preparation for meeting this requirement, Efficiency Manitoba has

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<sup>12</sup> Plan Overview, Section 2.3

<sup>13</sup> See Plan, Table 2.2 “Summary of the Efficiency Manitoba Act Cross-Referenced to Corresponding Sections of the Submission;” Plan, Table 2.3, “Summary of the Efficiency Manitoba Regulation Cross-Referenced to Corresponding Sections of the Submission,” Plan Table 2.4, “Summary of the Efficiency Manitoba Act Regulatory Review Requirements Cross-Referenced to Corresponding Sections of the Submission,” and Table 2.5, “Summary of the Efficiency Manitoba Regulation Regulatory Review Requirements Cross-Referenced to Corresponding Sections of the Submission.”

<sup>14</sup> See Plan, 7.1; Plan Overview, Section 7.1

developed an Evaluation Framework to govern its approach to evaluation throughout multiple program periods, and a specific evaluation plan for the immediate three program years.

## **C. Assessment of Plan Completeness with respect to Legislation and Regulation**

In Section II.B.3 (above) we examined whether and how the Plan proposes to comply with the five “Mandates” of the Act (found in Act Part II, Section 4(1)), concluding (without at this point assessing deliverability or cost-effectiveness) that the Plan itself, if executed as proposed, and with the results predicted in the Plan, would satisfy the three key mandates that are currently applicable: meeting savings targets and achieving greenhouse gas reductions, mitigating the impact of rate increases and delaying utility capital investment needs, and promoting and encouraging the involvement of the private and NGO sectors.

In this final introductory section, we review how the Plan maps to and, when applicable, complies with, other elements of the Act and the Regulation. First, we examine the Plan’s relationship to Section 9 of the Act, which lists several requirements of topics that must be addressed in the Plan document. Second, as an aid to the PUB in its review, we examine the Plan in relation to Section 11(4) of the Act and Section 11 of the Regulation, which instruct the PUB to consider several specific factors in reviewing the Plan.

### **1. Efficiency Plan compliance with Section 9 of the Act**

In accordance with the Scope of Work’s directive that Daymark should assess “whether and the extent to which Efficiency Manitoba’s initial 3-year Efficiency Plan meets the mandate and requirements of the Efficiency Manitoba Act and the Efficiency Manitoba Regulation 119/2019,” Daymark reviewed whether the Plan meets the requirements of Part 3, Section 9 of the Act, which details what the Efficiency Plan must include. In this initial section, we reviewed only for completeness--whether all the required elements are included, deferring a substantive assessment of the Plan to the following sections of the report.

Table 2.2 of the Plan cross-references the Efficiency Plan requirements listed in Section 9 of the Act to specific sections of the Plan. After reviewing this table, we concur that all required elements have been included in the Plan.

Although all required topics are addressed in some form, there are a few items that warrant further brief discussion:

- **Greenhouse gas impacts.** Section 9(e) of the Act requires the Plan to include “an analysis of the reductions in greenhouse gas emissions in Manitoba expected to result from the initiatives proposed.” In the Plan’s Section 6.6.3, the Plan does address these impacts with respect to natural gas; however, the Plan does not address GHG impacts of electricity efficiency initiatives, citing the “very low domestic GHG emission intensity of Manitoba’s hydroelectric generation.” Presumably, Efficiency Manitoba’s reasoning is that a reduction in hydroelectric output does not reduce GHG emissions, since hydroelectric generation does not produce such emissions.  
This is true, and, given that the Act specifically mentions greenhouse gas emissions *in Manitoba*, fully compliant. However, because greenhouse gas emissions are a global issue, and reductions elsewhere are just as much of an accomplishment as reductions in Manitoba, it’s worth noting that efficiency improvements in the electric sector in Manitoba likely cause reductions in greenhouse gas emissions in MISO by making more hydro power available to MISO consumers
- **Level of analysis.** Section 9 of the Act requires the Plan to provide information on demand-side management “initiatives,” including an analysis of costs and savings for “each of the initiatives proposed.” There is room for interpretation of how much granularity is intended by the term “initiative.” The Plan reports on costs and savings at the “bundle” level, which is not the most granular level of analysis possible. In communications between Daymark and Efficiency Manitoba, Efficiency Manitoba explained that publicly presenting such an analysis at a more granular level would necessarily reveal confidential information, so that, while they did perform this analysis, they could not report it in detail in the Plan. Daymark and Efficiency Manitoba have worked together to allow Daymark access to the more granular data needed for a full analysis, and this report includes our analysis of Efficiency Manitoba’s planned initiatives on this more detailed basis
- **The Plan’s implications for fifteen-year goals.** Section 9(i) of the Act requires that the Plan should include “a description of how the initiatives proposed... will assist Efficiency Manitoba in positioning itself to secure the net savings that are reasonably anticipated to be required over the next 15 years.” The Plan’s table referring to how it meets this requirement refers only to Section 3.1<sup>15</sup>, where the discussion is very limited. The Act may have envisaged

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<sup>15</sup> In fact, it refers to Section 3.1.1, we think erroneously, because there is no section 3.1.1 in the relevant portion of the Plan



a more strategic analysis that could address how planned programs might pave the way for future programs or, alternatively, to identify any risks of current programs crowding out opportunities for future reductions. In fact, the elements of such an analysis do come up in discussions of specific programs and how they might facilitate further developments—the analysis just does not seem to be brought together into one section

## 2. The Efficiency Plan and Elements Mandated for PUB review

Section 11(4) of the Act, supplemented by Section 11 of the Regulation, identify several Plan elements that should be specifically considered by the PUB in reviewing the Act.

The Act Section 11(4) identifies the following elements for review:

**(a) “[T]he net savings required to meet the savings targets and the plans to address any existing shortfall.”** As we discuss above, the Plan’s net savings targets do (with the trivial exception of a first-year shortfall in the natural gas requirements) overall meet the Act’s targets. We address, more substantively, potential deliverability challenges and the adequacy of plans to cope with any shortfalls that may occur.

**(b) “[T]he benefits and cost-effectiveness of the initiatives proposed in the plan.”** As discussed in the Plan summary, section II.B.5, above, the Plan itself uses the required cost-effectiveness testing approach and finds proposed Plan initiatives to be cost-effective. In our Section IV, below, we report our own findings related to the cost-effectiveness of the Plan.

**(c) “[W]hether Efficiency Manitoba is reasonably achieving the aim of providing initiatives that are accessible to all Manitobans.”** As discussed in the Plan Summary, Section II.B.2, above, the Plan includes elements aimed at six separately-defined customer segments: residential customers, income-qualified residential customers, indigenous customers, commercial customers, industrial customers, and agricultural customers. We present our substantive evaluation of how well the Plan’s approach is likely to perform in reaching all these customer groups.

**(d) “[A]ny additional factors prescribed by the regulations.”** Regulation 119/2019, Section 11, does prescribe several additional factors. These are discussed below.

**Regulation 11a) “[T]he appropriateness of the methodologies used by Efficiency Manitoba to select or reject demand-side management initiatives.”**

Efficiency Manitoba describes its approach to selecting programs in Appendix A, Section A2 of the Plan, using a process that involved both quantitative analysis elements and community engagement (through the Energy Efficiency Advisory Group.) In addition to meeting legislative mandates, Efficiency Manitoba reports that it considered how best to “leverage” longstanding programs, while also getting new programs started, maximizing “value for money,” creating “non-energy benefits,” developing a “diverse and inclusive portfolio” with “breadth of offerings,” and considering technology lifecycles, including which technologies may be approaching “market saturation” and which are emerging that might fill “market gaps.”

**Regulation 11b) “[W]hether the plan adequately considers the interests of residential, commercial and industrial customers.”**

As discussed in Section II.B.4, above, the Plan devotes significant resources to residential, commercial and industrial customers. In our Deliverability section, below, we evaluate plans for these customers in more detail.

**Regulation 11c) “[W]hether, if it is practical to do so, at least 5% of Efficiency Manitoba’s budget for demand-side management initiatives is allocated to initiatives targeting low-income or hard-to-reach customers.”**

As discussed in Section II.B.2, above, the Plan targets “hard to reach” customers by developing tailored sets of programs for indigenous and low-income customer groups, and devotes 6% of the electric efficiency budget and 32% of the natural gas efficiency budget to these customers.

**Regulation 11d) “[W]hether the portfolio of demand-side management initiatives required to achieve the savings targets is cost-effective.”**

As discussed above, according to Efficiency Manitoba’s analysis, the electricity portfolio is highly cost-effective, and the natural gas portfolio about breaks even. Our own analysis is presented in Section IV, “Cost/Benefit Analysis,” below. It may be worth noting in this context that the Act itself requires that cost-effectiveness be considered, and that any initiatives beyond those required to meet the targets must be cost-effective, but not that the initiatives required to meet the targets must necessarily pass the prescribed cost-effectiveness test.

**Regulation 11e) “[I]f the plan includes demand-side management initiatives in excess of those required to achieve the savings targets, whether those initiatives are cost-effective.”** Projected savings in the Plan exceed savings targets only by hundredths of percentage points. Therefore, in Daymark’s opinion, this analysis is not currently required.

**Regulation 11f) “[W]hether Efficiency Manitoba’s administration budget is reasonable when compared to similar organizations.”** As Efficiency Manitoba notes in its Plan, administrative budget comparisons can be tricky, since it is easy to find different definitions of “administrative” costs. Efficiency Manitoba itself reports its costs in four general categories:

- “overhead costs” costs at 2.1% of the total budget
- “staff costs” at 13.4% of the total budget
- “Program costs” (including “private sector program delivery, program administration program advertising and enabling strategies budget items”) at 19.7% of the total budget
- “Customer incentives” at 64.7 percent of the total budget

Of the figures above, only customer incentives seem clearly not to be appropriately considered in the category of “administration budget,” and it is this figure that Efficiency Manitoba uses to benchmark against programs in Massachusetts (69%-76% for direct customer incentives), Oregon (46.8%-54.1% for direct customer incentives), and Nova Scotia (60.1% for direct customer incentives), putting Efficiency Manitoba in the top half of programs examined.<sup>16</sup>

**Regulation 11g) “[T]he impact of the efficiency plan on rates and average customer bill amounts.”** As discussed in Section II.B.5, above, Efficiency Manitoba estimates that funding the first three years of the program will require a one-time increase of 0.3% for electricity rates and 1.2% for natural gas rates, persisting for thirty years. Presumably (although this analysis is not included in Efficiency Manitoba’s Plan), additional one-time rate increases will be needed for each three-year extension of the Plan. Although Daymark does not have an estimate of what these out year rate impacts might be, if the same level of rate impact occurs with each extension, ratepayers might, by the final three years of the 15-year program, see approximately a 1.5% total increase in electricity rates and a 6% increase in natural gas rates. A missing piece of the

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<sup>16</sup> Discussion in this section refers to Plan Overview, Sections 4.1-4.3.

analysis here might be what rate increases customers might expect to see in the absence of an efficiency program, if growing demand necessitated significant new capital investments.

Efficiency Manitoba's analysis does not include a discussion of the likely impact of the program on actual bill amounts faced by non-participating customers. For participating customers, collectively, Efficiency Manitoba projects that electricity bills will decrease by an average of \$14.9 million annually, and natural gas bills will decrease by an average of \$3 million annually.

**Regulation 11h) “[T]he reasonableness of the projected savings and Efficiency Manitoba’s ability to meet the annual savings targets and the 15-year cumulative savings targets.** We address this question in Section III, “Deliverability,” below. One clarifying note here is that, although the 15-year savings target is identified in the Act as 22.5% for electrical energy and 11.25% for natural gas (taking the 1.5% yearly electrical target and the 0.75% yearly natural gas target and multiplying each of these by fifteen), the actual final numbers, even if each yearly target is met exactly, may not be precisely 22.5% and 11.25% less than Year 1 consumption, once changing baselines resulting from potential load growth and the impacts of year-over-year compounding effects are taken into account.

**Regulation 11i) “Efficiency Manitoba’s use of private-sector enterprises and non-governmental organizations to deliver demand-side management initiatives.”** As discussed in Section II.B.3, above, Efficiency Manitoba’s plan does include significant use of private sector enterprises and non-governmental organizations. Any possible issues in the execution of this plan are discussed in our Deliverability section.

**Regulation 11j) “[W]hether the efficiency plan adequately considers new and emerging technologies that may be included in a future efficiency plan.”** In Appendix A, Sections 8 and 9 of the Plan, Efficiency Manitoba sets out two levels of approach to new and emerging technologies. For tested and piloted, but not widespread, technologies, Efficiency Manitoba allocates an “emerging technologies” budget, that starts at \$187,000 in Year 1 and rises to approximately \$1.6 million in Year 3, planning in the first three years to focus on promoting the adoption of solar photovoltaic and customer sited bioenergy. In addition, Efficiency Manitoba proposes to monitor emerging new technologies, and to engage in pilot projects and research partnerships to

explore the possibility of including these technologies in future years. Funding for these activities is included in Efficiency Manitoba's proposed "innovation budget," which totals approximately \$2.6 million over three years.<sup>17</sup>

**Regulation 11k) "[F]or any efficiency plan after the first one, the reasonableness of Efficiency Manitoba's internal retrospective performance assessment."** This does not currently apply.

**Regulation 11l) "[W]hether Efficiency Manitoba has reasonably attempted to comply with the directions of the Minister."** As noted above, the Minister's instruction to Efficiency Manitoba directed that Efficiency Manitoba's Plan should provide at least as good or better results than the previous "Power Smart" program, but "at a significantly smaller percentage of the cost and materially less labour costs." In Section 2.2 of the Plan Overview, Efficiency Manitoba reports that, in compliance with this directive, it is proposing programs that should provide significantly increased energy savings at a somewhat lower average annual cost, with a 30% reduction in staff.

Overall, then, our review of Plan completeness generally finds that all the requirements of the Act and Regulation are addressed in some form. However, crucial to the overall evaluation of the plan is a specific analysis of actual deliverability of what is envisaged, as well as a review of costs and benefits. These follow in Sections III and IV.

### III.

## DELIVERABILITY

### A. Overview

The Efficiency Manitoba (EM) 3-Year Plan is designed to continue the success of the existing Manitoba Hydro (MH) DSM Plan that has been in existence since 2006/07<sup>18</sup> while offering new incentives and enhancements to increase savings for MH's legacy programs and increase awareness and participation across programs and customer segments.

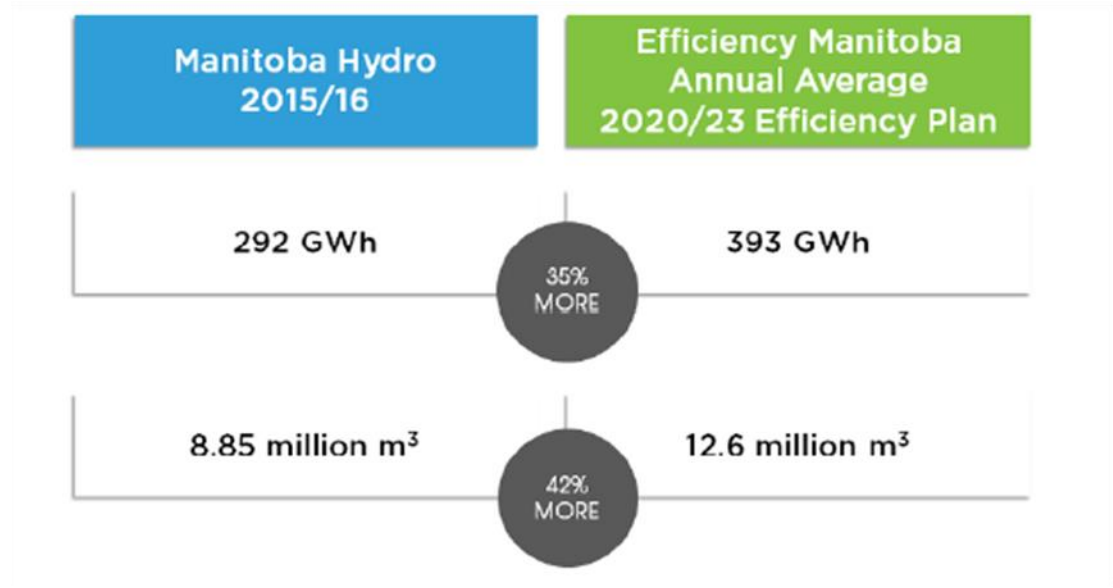
In order to achieve this goal and show benefits for all Manitobans over the next three years, Efficiency Manitoba has committed to increasing energy savings while relying on a lower budget compared to the prior efficiency plan

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<sup>17</sup> Plan, Section 7.4

<sup>18</sup> Certain individual program offerings started later, e.g., MH launched the heat recovery ventilator program (HRV/ERV) program in 2011, MH 2018 DSM Report, p. 26.

for 2015/2016. As shown in the figure below, Efficiency Manitoba has provided an enhanced plan designed to deliver 35% more electric energy savings and 42% more natural gas savings than achieved under the Manitoba Hydro 2015/2016 plan.<sup>19</sup>



**Figure 1: Comparison of Manitoba Hydro’s 2015/16 Plan with Efficiency Manitoba’s 2020/23 Plan**

At the same time Efficiency Manitoba’s plan reduces overall costs by 9% to accommodate a 39% increase in Program costs, which includes incentives for enhanced and new measures, as shown in the Figure below.<sup>20</sup>

This reduction will be achieved in part by reducing staff by 30% to 75 full-time equivalent staff compared to 110 full time equivalent positions at Manitoba Hydro.<sup>21</sup>

<sup>19</sup> 3-Year Plan PDF p. 32, EM Section 1, Figure 5.7 page 22 of 32.

<sup>20</sup> 3-Year Plan PDF p. 33, EM Section 1, Figure 5.7 page 23 of 32.

<sup>21</sup> 3-Year Plan, Section 2, pdf p. 51, page 6 of 27, lines 51-54.

Manitoba Hydro 2015/16		Efficiency Manitoba Annual Average 2020/23 Efficiency Plan	
\$49,329,000	INCENTIVE COSTS	\$45,247,000	8% ↓
\$9,927,000	PROGRAM COSTS	\$13,765,000	39% ↑
\$14,949,000	STAFF COSTS	\$9,375,000	37% ↓
\$2,190,000	OVERHEAD COSTS	\$1,495,000	32% ↓
\$76,396,000	TOTAL COSTS	\$69,881,000	9% ↓

**Figure 2: Budget Comparison by Category between Manitoba Hydro's 2015/16 Plan and EM's 2020/23 Plan**

Further, Efficiency Manitoba expects that its program will have minimal one-time bill impacts of less than 1.0% for electric customers and slightly more than 1% for natural gas customers.<sup>22</sup>

Efficiency Manitoba claims that this 3-year plan will improve the customer experience based in part on the implicit assumption that there will be no or manageable issues with deliverability, even for substantially enhanced programs designed to engage customers. With higher target savings and lower program costs, Efficiency Manitoba recognizes that improving the customer experience will require leveraging and strengthening Manitoba's existing network of private sector delivery partners and that this effort is critical to achieving the goals for its plan.<sup>23</sup>

Deliverability is key to Efficiency Manitoba's success from two perspectives, the customer and the trade partner, where the latter can include third party

<sup>22</sup> 3-Year Plan, EM Section 1, pdf p. 28-29, page 18-19 of 32.

<sup>23</sup> 3-Year Plan, Section A2, pdf p. 212, page 9 of 40, lines 159-168.

intermediaries who agree to engage with customers on Efficiency Manitoba's behalf.

First, from the customer's perspective, deliverability assures success if customers' expectations are met in a timely and complete manner. Successfully installing all participant projects presented in this 3-year plan requires that Efficiency Manitoba accurately assess the target market as well as a reasonable estimate of how many of the incremental sales will occur each year. When no information is given for the former, it is difficult to assess how successful Efficiency Manitoba will be at achieving the latter. For example, if the total market that could benefit from a particular program is 15,000 installs or participants, and Efficiency Manitoba estimates it will install 2,000 projects, this suggests that the market will be fully saturated within eight years, which could be considered aggressive for a major customer investment. Even if customers have the capacity to make this investment, they must be able to have confidence that once they apply for any program incentive, they will begin to see savings in a timely manner. If the time frame until installation is delayed, due to a shortage of resources, and participants have to wait longer to realize the payback they have been led to expect, this could discourage other potential participants.

The second way that deliverability – and in turn program success -- is assured is by Efficiency Manitoba having assembled at the outset of the 3-year term an adequate stable of delivery partners with appropriate training to meet the aggregate savings expected. Many of the programs in this plan continue existing Manitoba Hydro DSM programs, which are supported by existing trade partners that are familiar with these offerings.

Maintaining good relations with these partners is even more important for those programs that require a step increase in the rate of savings, and number of participants/projects, over Manitoba Hydro legacy programs. And because Efficiency Manitoba has committed to reducing its staff from that with which Manitoba Hydro managed the legacy programs, reliance on trade partners will grow along with the addition of new programs; expanding the partnership program is critical for new and modified programs designed to attract new participants and capture enhanced savings. Additional training may need to be provided without disrupting or extending the assumed sales cycle required to meet Efficiency Manitoba's annual targets. In other words, deliverability is tied



to the implied pace of installations, which in some cases appear to be much higher than achieved in the legacy Manitoba Hydro DSM program.

Our initial review finds deliverability concerns because Efficiency Manitoba acknowledges in the report and in responses to discovery that:

- 1) Efficiency Manitoba has committed to increase energy savings under a substantially lower budget compared to the existing Manitoba Hydro program.
- 2) Efficiency Manitoba plans to achieve this savings goal with 30% less staff than Manitoba Hydro relied on.,
- 3) Efficiency Manitoba will not be able to meet its natural gas savings target for the first year,
- 4) Efficiency Manitoba relies on new or updated sources for estimating participation, including consultations with delivery partners, survey data and recent permit applications, which may produce a step change increase in the level of saving expected for existing programs.,
- 5) Efficiency Manitoba's CRM system remains under development at this time and is untested, and
- 6) Efficiency Manitoba has yet to secure agreements with all the trade partners required for proposed new measures to serve hard to reach customer segments.

In summary, Efficiency Manitoba's 3-Year Plan includes a comprehensive list of program offerings for all customer sectors that are combined into program bundles for ease of marketing to customers. Accelerated pace of installs should be expected due to the ease with which customers can sign up for multiple measures through the program bundle interface (once the CRM system is fully deployed) and the addition of new qualifying applications (e.g., foundation insulation), plus new programs designed to attract hard to reach customer classes. Efficiency Manitoba should be able to recognize today that insufficient delivery capacity can derail success, because success is inextricably tied to the pace of installations implicit in its own plan. Without a prompt expansion in the ranks of delivery partners, and early and adequate marketing of the bundling approach and its simplicity for customers, it may be difficult for Efficiency Manitoba to meet its admirably ambitious goals. This concern is key to the first year's targets since ramp up of tools, messaging and partners will encumber the first year probably well into the year.

## B. Performance metrics for Canada

According to the Consortium for Energy Efficiency's (CEE) 2018 Annual Report<sup>24</sup> overall Canadian electric energy efficiency program budgets for 2017 planned that customer rebates and incentives would account for over half (60 percent) of 2017 expenditures, then marketing and administration expenditures account for 31%, followed by research and evaluation at four percent. The "other" category represents funds that could not be separated into the previous three categories, represented five percent. Per the CEE Report, the breakdown is nearly identical to that reported for 2016 expenditures. Figure 3 compares the electric efficiency incentives in particular with the Efficiency Manitoba electricity plan over the next three-years. Efficiency Manitoba is planning to spend nearly 64% of the electric budget on customer incentives over the three years.

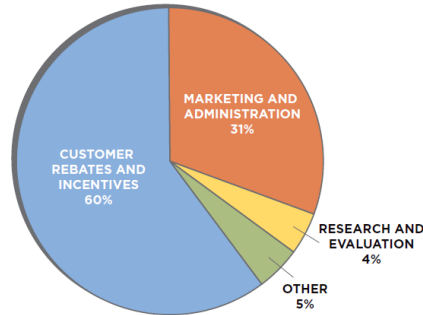
Since this is the introduction or re-introduction of programs to customers, it makes sense for Efficiency Manitoba to have a somewhat higher incentive allocation to bring greater attention and differentiation to the programs; the incentives may be reduced as the programs mature. U.S. based breakdown in 2017 show incentives to customers at 43% in electric programs.

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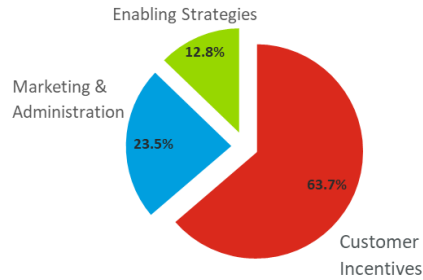
<sup>24</sup> Consortium for Energy Efficiency. State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2018. <http://www.cee1.org/annual-industry-reports>, posted May 2019. © Copyright 2019 Consortium for Energy Efficiency. All rights reserved. The limitations of the data are many. First, this survey represents self-reported data by an individual or group of individuals within each responding organization. Although CEE and our collaborator, the American Gas Association, work closely with each responding organization to help respondents properly interpret survey questions and enter the correct information, the accuracy of the data is not verified outside of these efforts. Second, respondents provide data at different times during the data collection period from June to October, and not all program administrators report their information according to the calendar year. CEE and our collaborator have sought greater consistency in data collection from respondents over the years, however, the accuracy of the data is ultimately dependent upon each individual respondent's interpretation of the survey questions, ability to retrieve the relevant information, and verification of the data provided. Furthermore, variation in state policies and reporting requirements along with what we suspect is inconsistent use of terminology likely adds to variation.

The 2018 report reflects data for 302 utility and nonutility program administrators operating efficiency programs in all 50 US states, the District of Columbia, and eight Canadian provinces.

Canada Budget Allocation 2017-2023



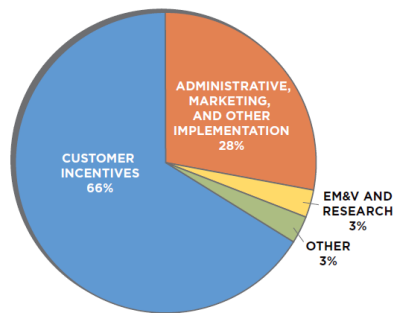
Efficiency Manitoba Budgets 2020-2023



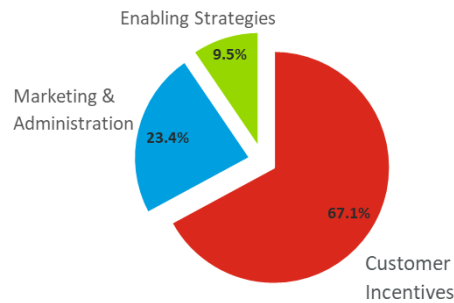
**Figure 3: Cost Breakdowns Efficiency Manitoba Electric Program**

Natural gas program incentives planned by Efficiency Manitoba are right in line with Canadian gas program incentive levels as a percent of total budget at 67% of budgeted expenditures as compared to 66% across Canada (see Figure 4). US natural gas budgets in 2017 included customer incentives of 56%.

Canada Budget Allocation 2017-2023



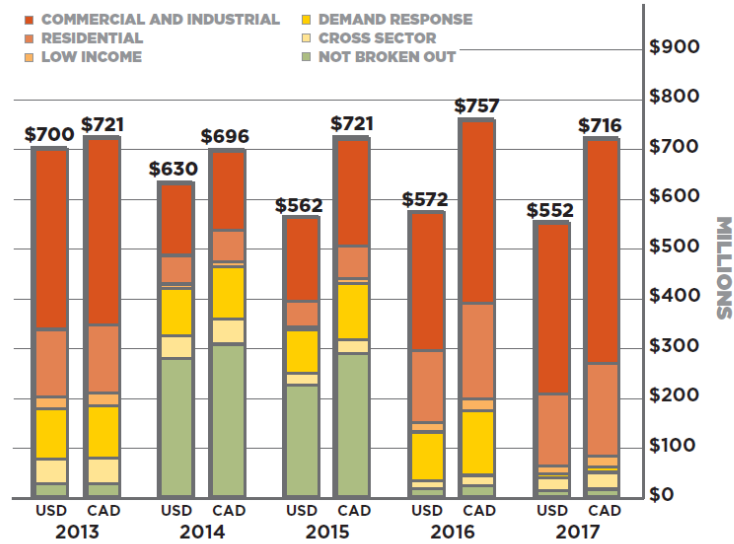
Efficiency Manitoba Budgets 2020-2023



**Figure 4: Comparison of Budgeted Expenditures Natural Gas**

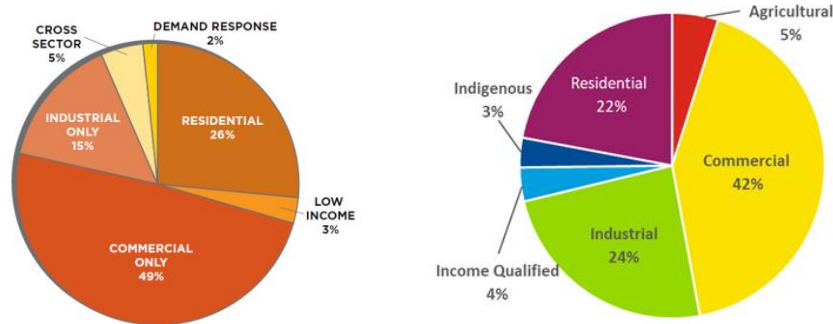
Spending Trends. Canadian DSM expenditures from 2013 to 2017 are shown in Figure 5 below providing information in US dollars and Canadian dollars and for both electric and gas. Electric DSM includes efficiency and demand response

programs. This graphic shows the stability of investment in such programs over the past five years<sup>25</sup>.



**Figure 5: Canadian Budgeted Expenditures for Efficiency**

The figure below shows spending by type of program for Canadian electric efficiency programs. Efficiency Manitoba data are for the total budget over the three-year plan. One would expect this to differ based on its customer base and here we see that industrial is a bit larger in Manitoba.



**Figure 6: Comparison of Efficiency Manitoba's budget by sector to the Canadian average - electric**

<sup>25</sup> According to the CEE Report one program administrator had significantly reduced spending in demand response programs in the 2017 budget. An increase in 2018 budgets is anticipated.

The most common electric energy efficiency program types by 2017 expenditures are highlighted in Table 2 which is reflective of the programs developed or modified by Efficiency Manitoba for the next three program years.

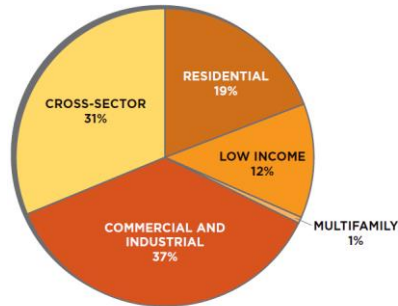
CUSTOMER CLASS	PROGRAM TYPE	2017 EXPENDITURES (USD)	2017 EXPENDITURES (CAD)
COMMERCIAL	PRESCRIPTIVE—LIGHTING	\$96,761,915	\$125,633,222
RESIDENTIAL	CONSUMER PRODUCT REBATE FOR LIGHTING	\$87,705,837	\$113,875,041
COMMERCIAL	RETROCOMMISSIONING	\$65,980,439	\$85,667,333
INDUSTRIAL	CUSTOM INDUSTRIAL OR AGRICULTURAL PROCESSES	\$54,428,047	\$70,668,000
COMMERCIAL	SMALL COMMERCIAL—PRESCRIPTIVE	\$37,940,791	\$49,261,363

**Table 2: Most Common Canadian Electric Energy Efficiency Program Types by 2017 Expenditures**

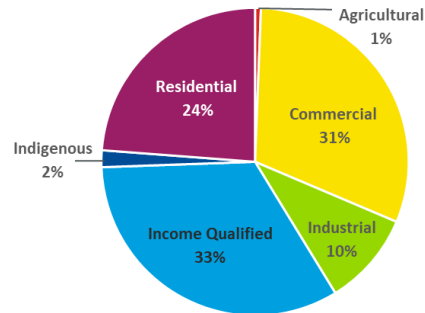
## 1. Natural Gas Spending

Figure 7 depicts program budgets for Canada and Efficiency Manitoba’s natural gas spending by sector, and similar to the electric sector differences are due to the customer makeup in Manitoba.

Canadian Budget 2017  
Budget



Efficiency Manitoba 3-Year



**Figure 7: Comparison of Efficiency Manitoba’s budget by sector to the Canadian average – natural gas**

## 2. Observations

Based upon a review of this higher-level information, Efficiency Manitoba’s Plan fit generally into the picture of practices in other jurisdictions from a sector breakdown and incentive concentration point of view – two areas of interest with regard to deliverability, as they relate to ensuring that the appropriate sectors are adequately targeted and that incentive levels will generate interest.

However, Efficiency Manitoba should monitor program rollout in early 2020 in order to make early tweaks to improve participation by gathering information from both participants and non-participants through process evaluation focus groups or other survey approaches to get a handle on areas for improvement.

Another concern relates to the reliance on the data for evaluation purposes, a potential challenge which we know Efficiency Manitoba leadership recognizes. Because the early program rollout will not be in the final system developed to track information, Efficiency Manitoba must be careful to gather and maintain the information necessary to ensure evaluations are complete.

### C. Manitoba Hydro to Efficiency Manitoba transition and evolution

The foundation of the 3-Year Plan offerings is the existing Manitoba Hydro DSM program. Efficiency Manitoba’s filing represents the continuation of most of these legacy Manitoba Hydro DSM program measures as well as acknowledging that Efficiency Manitoba becomes the surviving custodian

following completion of all individual contract assignments for DSM projects. It is possible that such contracts may need to be amended to reflect enhancements to existing programs and proposed new offers. And, as confirmed by Efficiency Manitoba, this process has only been initiated at this time:

“Service provider procurement has been initiated and will be on-going. Manitoba Hydro’s existing program delivery contracts have transferability clauses related to Efficiency Manitoba that can be executed as needed. Several new initiatives are planned for commencement in years two and three of the plan to allow time for program planning including the procurement of service providers.”<sup>26</sup>

The 3-Year Plan emphasizes the addition of many enhancements to existing Manitoba Hydro DSM programs due to new incentives now available in Manitoba. In addition, Efficiency Manitoba has included new program offerings of its own. The table below showing a subset of the program bundles offered to the Commercial, Industrial and Agricultural Sector illustrates these different types of changes, where the difference is indicated in the Status column or in **red** if it is a new feature. The three types of program status are:

- Legacy Program Status Column: “**Manitoba Hydro program with enhancements**”
- Legacy Program Measure Change: “**\*NEW**”, i.e. a new measure application (e.g. Renovation – Building Envelope - Foundation), or customer sector (e.g., New Construction – School Sector)
- Brand new program: “**New Efficiency Manitoba Offer**” (e.g., New Construction – Deep Energy Retrofit.)

d

The table below illustrates the distribution of each of these status types across just the Commercial sector. The full version of this table lists similar program updates for programs targeted at the Residential, Indigenous and Industrial sectors.

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<sup>26</sup> Daymark/EM 1-13 c), page 7 of 7

Program	Measures	Status
Renovation Offers	<b>Lighting Products:</b> - LED lamps (screw-in, T8, T5) - LED Specialty lamps (HID ballast, line voltage) - LED Fixtures - Backlit signage	Manitoba Hydro program with enhancements
	<b>Lighting Controls</b> - Occupancy Sensors - Control Systems	
	<b>Building Envelope Products and Systems:</b> - Surface and cavity insulation for roof, attic, wall, and foundation applications <b>*NEW for foundation</b> - Window systems including punched, in-fill, curtain wall, and storefront - Glazed doors including overhead, single-swinging, sliding, and garden	Manitoba Hydro program with enhancements
	<b>Building Envelope Financial Assistance:</b> - Incidental and dedicated air sealing <b>*NEW</b> - Blower door testing (for determining equivalent air leakage) <b>*NEW</b> - Building component energy modelling for designing energy-efficient curtain wall and storefront systems	
HVAC and Controls Offers	<b>Heating Technologies:</b> - Condensing Gas Boilers - Condensing gas water heaters - Unit heaters <b>*NEW</b> - Infrared heaters <b>*NEW</b> - Geothermal (ground-source heat pumps)	Manitoba Hydro program with enhancements and new offers
	<b>Cooling Technologies</b> - Air cooled chillers <b>*NEW</b> - Geothermal (ground-source heat pumps)	
	<b>Ventilation Technologies</b> - CO <sub>2</sub> Sensors - HRVs / energy recovery ventilators	
	<b>Other technologies</b> - Variable Frequency Drives - Hotel occupancy sensors - Hotel packaged terminal heat pumps (PTHPs)	New Efficiency Manitoba offer
New Construction & High-Performance Building Offers	<b>New Buildings</b>	Manitoba Hydro programs with enhancements
	<b>Enhanced Building Operations</b> <b>Manitoba Race to Reduce <b>*NEW for school sector</b></b> <b>Energy Scoping Audits</b>	
	<b>Deep Energy Retrofits <b>*NEW</b></b>	New Efficiency Manitoba offer

Table 3: Commercial, Industrial, and Agricultural Offers, from Three-Year Plan Table A7.1



To understand and illustrate the importance and impact of just one of these categories of program enhancements, we prepared a summary table estimating the savings for programs/measures identified with the status “New Efficiency Manitoba Offer”. The table below shows energy savings totaling 14.4 GWh for Electric and 0.81 million m<sup>3</sup> for Natural Gas. While these totals may seem small, they represent between 1% and 2% of the total Efficiency Manitoba programs respective plan budgets.

While the ability for the Efficiency Manitoba program to meet its savings targets summarized above is based on changes to many programs, this table highlights Efficiency Manitoba’s effort to pursue innovative changes, and that even these nascent programs can have a measurable impact in the first three years and could grow over time as delivery partners gain experience with them. This table also shows Efficiency Manitoba has new offers to reach the Indigenous customer group as well as traditional residential and commercial market segments.

<b>New Efficiency Manitoba Offerings - 3 Year Plan Cumulative savings by Sector and Portfolio (*)</b>		
<b>Sector</b>	<b>Energy GWh</b>	<b>Natural Gas Mil m<sup>3</sup></b>
Commercial	8.6	0.65
Indigenous	1.5	0.16
Residential	4.3	0
<b>Total New Offerings</b>	<b>14.4</b>	<b>0.81</b>
<b>Total Sector Budget</b>	<b>1179</b>	<b>37.7</b>
<b>% of Budget</b>	<b>1.2%</b>	<b>2.1%</b>
<b>(*) Est. Based on measure-level projected savings</b>		

**Table 4a: Cumulative savings by sector and portfolio New Efficiency Manitoba 3-yr plan offerings**

The list of programs that are identified as New Efficiency Manitoba Offerings are:

New Efficiency Manitoba Offerings - 3 Year Plan (*)		
Sector	Bundle	Measure
Residential	Direct Install	Online Home Questionnaire
Residential	Direct Install	Home Energy Check-Up
Residential	Home Renovation	Home Energy Audit
Residential	Home Renovation	Major Renovation
Residential	Emerging Tech	Solar Energy Program
Indigenous	Small Business	Product Rebates
Indigenous	Metis Inc Qual	Home EE Upgrades
Commercial	HVAC Controls	VFDs, Hotel Pumps, Sensors
Commercial	New Construction	Deep Energy Retrofits
Commercial	Custom	Strategic Energy Management Cohorts

(\*) PUB/EM 1-33a-b

**Table 4: Savings Attributed to New Programs in the Efficiency Manitoba 3-Year Plan**

#### D. Hard to reach customers

Efficiency Manitoba has provided a detailed plan with program and measure level project and savings targets and included new and enhanced programs to extend opportunities to participate to all Manitobans. Obtaining incremental electric savings of 5% over three years compared to the existing Manitoba Hydro DSM program savings, approximately equivalent to 1.5% per year, is the overall goal of the 3-Year Plan based on the different targets Efficiency Manitoba has set for individual programs. How effective Efficiency Manitoba will be at both the individual and overall program goals requires closer examination of aspects of these programs that contribute to successful delivery.

In this chapter we discuss how well the 3-Year Plan addresses Deliverability, which includes but is not limited to the following issues:

- 1) Has Efficiency Manitoba set targets for number of participants / projects that seem reasonable?
- 2) Is the pace required to meet these targets reasonable?
- 3) What market forces are assumed to drive participation, including customer as well as delivery partner incentives?
- 4) Are more Manitobans being served as a result?

- 5) What caveats should be identified in order to obtain missing information or further clarity in order to gain more confidence in Efficiency Manitoba's ability to deliver savings?

Each of these six deliverability issues will be addressed using sub-components of the Renovation Program Bundle to help illustrate whether Efficiency Manitoba has anticipated these concerns or not.

## **E. Methodology for reasonableness assessment**

We can assess how realistic Efficiency Manitoba's targets for participation and savings are by comparing them to similar information for the same legacy Manitoba Hydro DSM programs. There appears to be a direct correspondence between some Efficiency Manitoba and Manitoba Hydro DSM programs, for example Commercial Building Envelope programs. But there may be other programs that have been improved, expanded or even subtly redefined in some way, making comparison difficult and requiring some interpretation on our part, and thus would benefit from more explanation from Efficiency Manitoba.

Manitoba Hydro's latest DSM plan includes values for key metrics for the period 2006/07 through 2018/19. Using for illustration purposes Manitoba Hydro's description of its Commercial Building Envelope (CBE) insulation program for windows, we found baseline values for the following metrics:

- Total Number of Projects
- Total Energy Savings in GWh, and mil m3 where applicable
- Estimate of the overall size of the market in Manitoba, including:
  - Total potential projects
  - Approximate number of replacement projects done each year
  - Expected share of total market reached by 2018/19, i.e., penetration rate %

Additional metrics from Manitoba Hydro's text description of the program discussed:

- Expected share of total market reached by 2018/19, i.e., penetration rate %
- Barriers to participation present in the market

Using these metrics from Manitoba Hydro's DSM plan report, we are able to compare Efficiency Manitoba's targets to the legacy DSM program to make an initial Deliverability assessment. We supplement this assessment with reference to Efficiency Manitoba's description of what is new about each

program bundle and how Efficiency Manitoba plans to address barriers to participation.

An example of this baseline information for the legacy program is discussed in greater detail further below.

**Electric - List of top ten measures by savings, % of savings**

Measure Name	Total Three-Year Adjusted Savings (GWh)	% of Total Program - level Savings	Incentive Cost (Utility Cost) \$
Load Displacement - Project One	297.0	34%	\$ 8,797,362
CLP Interior Fixtures	166.6	19%	\$ 27,832,861
CLP Exterior Lighting	79.0	9%	\$ 5,837,723
CLP TLEDs	41.9	5%	\$ 5,077,437
Compressed Air	27.2	3%	\$ 3,603,048
Load Displacement - Project Two	21.5	2%	\$ 9,142,780
Gaskets & Strip Curtains - Electric	15.8	2%	\$ -
Refrigerators & Freezers (Electric)	13.9	2%	\$ 3,385,427
New Buildings 2.1	13.0	1%	\$ 3,457,706
Load Displacement - Project Three	11.5	1%	\$ 4,657,282
<b>Total - Top Ten Measures</b>	<b>687.3</b>	<b>78%</b>	<b>\$ 71,791,626</b>
<b>Total - All Measures</b>	<b>880.1</b>		

**Table 5: Top Ten Electric Measures by Savings**

**Natural Gas - List of top ten measures by savings, % of savings**

Measure Name	Total Three-Year Savings (million m3)*	% of Total Savings	Incentive Cost (Utility Cost) \$
NG Optimization Program	5.3	17%	\$ 1,685,107
Industrial Project	4.0	13%	\$ 1,136,409
CBEP Insulation - Heating	2.2	7%	\$ 3,806,402
Large Projects yr2	2.0	6%	\$ 385,975
2020 LRP (AEP Ind & Comm - Insulation) Natural Gas CB	1.8	6%	\$ 6,548,745
Windows and Doors Gas_Windows	1.5	5%	\$ 205,867
New Buildings 2.1	1.5	5%	\$ 5,102,236
Boilers (Gas)	1.2	4%	\$ 621,077
Large Projects yr3	1.0	3%	\$ 469,261
Home Insulation Gas 3-yr combo	1.0	3%	\$ 2,770,436
<b>Total - Top Ten Measures</b>	<b>21.5</b>	<b>69%</b>	<b>\$ 22,731,515</b>
<b>Total - All Measures*</b>	<b>31.3</b>		

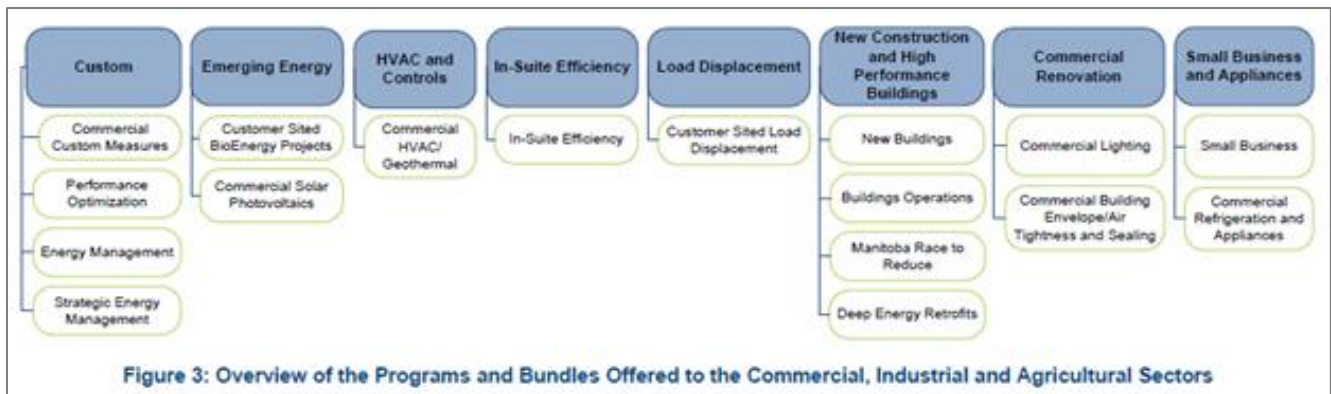
\*Measure-level savings not adjusted for interactive effects.

**Table 6: Top Ten Natural Gas Measures by Savings**

Daymark selected from these Top Ten tables for illustration of deliverability concerns discussed above a program bundle that corresponds closely to one that is also included in the legacy Manitoba Hydro DSM plan, the Commercial Building Envelope lighting and insulation program. This bundle includes measures that represent approximately 35% of total electric program savings and 7% of total natural gas savings among the top ten programs in each category.

While the top ten approach does not provide an exhaustive list of all the programs in the 3-Year Plan, it does cover programs that account for most of the expected savings, lending support to our selection to illustrate the deliverability issues identified above in a detailed discussion below, as well as a discussion of how to improve transparency and program design for the Efficiency Manitoba plan.

We verified this program bundle selection by performing a high-level comparison of all program bundles in the 3-Year Plan Figure 3, shown below, to the legacy DSM programs listed in Manitoba Hydro’s 2018/2019 DSM Plan. We expected that this would allow us to directly compare deliverability metrics for three of the Efficiency Manitoba program bundles: HVAC and Controls, Commercial Renovation, and just the Commercial Appliances segment of the Small Business and Appliances bundle.



**Figure 8: List of Programs and Bundles Offered to C&I, A Sectors from 3-Year Plan, Attachment 5**

There are significant differences among many of the program bundles shown above to their Manitoba Hydro counterparts that meant we could not review all program bundles in Efficiency Manitoba's Figure 3. For example, after comparing the Performance Optimization programs in the Custom Bundle above to a description of Manitoba Hydro's existing Network Energy Management Program, which appeared to involve software installations on customer PCs, we concluded that Efficiency Manitoba has taken a different approach to energy system management by relying on individuals acting as energy managers. These energy managers may be using software already installed, but the incentive available appears to cover personnel costs only. Of course, we discuss separately new programs for which there is no ready basis for comparison, e.g. the Emerging Energy and In-Suite Efficiency program bundles.

For reasons explained below, we were unable to directly compare the HVAC or Commercial Appliances bundles.

This left the Commercial Building Envelope (CBE) program bundle as offering the most direct comparison and therefore the best illustration of deliverability concerns. This is because the sub-programs within this bundle have identical names and almost identical composition as those included in the Manitoba Hydro 2018 DSM report. This comparison is provided in the next section.

## **F. Program Bundle Evaluation**

### **1. Overview of program**

The Renovation Program Bundle combines savings generated by the Commercial Lighting and Commercial Building Envelope (CBE) programs.<sup>27</sup> We focused on the Commercial Lighting sub-component of the Renovation Program Bundle because it offered the most direct comparison to the existing Manitoba Hydro DSM program offering.

The Commercial Lighting program produces energy savings by replacing four different types of lighting fixtures plus two types of lighting control systems. The CBE program is expected to yield energy savings by replacing existing windows and doors with more energy efficient units, plus air sealing and

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<sup>27</sup> 3-Year Plan, Section A7.9.1, pdf Page 569, Econoler Final Report, Figure 3, Overview of the Programs and Bundles Offered to the Commercial, Industrial and Agricultural Sectors, p. 17.

insulation for roof, attic, wall and foundation applications to reduce heat and cooling loss. The CBE program includes insulation projects for buildings heated by natural gas as well as electricity.<sup>28</sup> However, only the CBE program for electric customers includes cooling projects, and within this sub-category incremental natural gas fired cooling equipment upgrades are offered<sup>29</sup>.

This correspondence is illustrated in the figure below, which shows Efficiency Manitoba’s Renovation Bundle of programs on the left and the individual Manitoba Hydro DSM programs listed on the right.

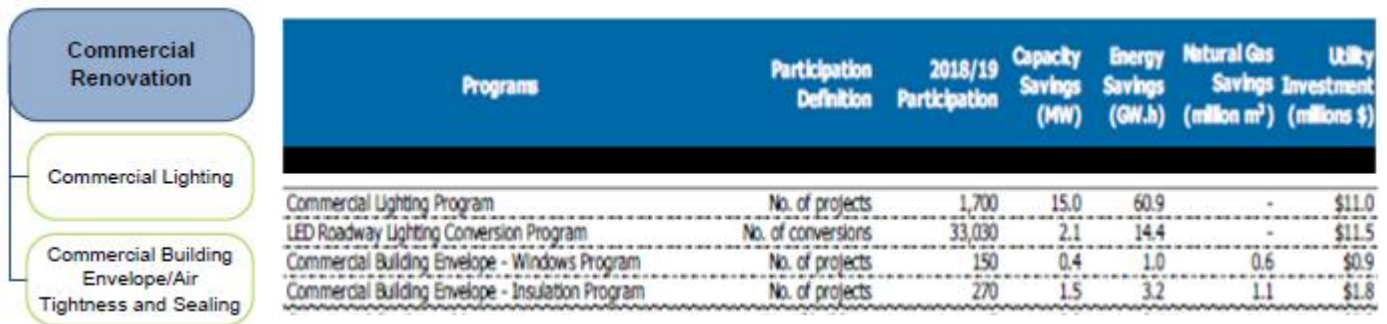


Figure 9: Manitoba Hydro’s Commercial Renovation Programs

## 2. CBE Program Comparison Discussion

The Renovation Bundle includes three insulation sub-programs for the Commercial Building Envelope (CBE) program for lighting fixtures, windows and doors, and the building shell. The sub-program for which both Manitoba Hydro and Efficiency Manitoba provided a baseline metrics for total market and estimated projects per year is the CBE Windows program. Our source for this baseline information for the Manitoba Hydro CBE program is shown in the figure below including selected text and accompanying table with the metrics on Market Size and Penetration Rate and number of projects per year:

<sup>28</sup> PUB/EM 1-33a-b, page 6 of 8, based on 3-Year Plan, Section A7, Table A7.1, page 5 of 47.

<sup>29</sup> 3-Year Plan, Section A7.9.1, pdf Page 569, Econoler Final Report, Figure 3, Overview of the Programs and Bundles Offered to the Commercial, Industrial and Agricultural Sectors, p. 17.



### Commercial Building Envelope - Windows Program<sup>30</sup>

It is estimated that there are approximately 750 potential window replacement projects in Manitoba each year, of a total overall market of 27,000 potential projects.

In 2018/19, program participation is expected to be 150 projects, resulting in 1.0 GW.h and 0.4 MW of electric savings and 0.6 million cubic metres of gas savings. Combined with achievements to date, participation will be 2,023 projects resulting in 25.1 GW.h and 10.3 MW of electric savings and 3.9 million cubic metres of natural gas savings by the end of 2018/19. The program is forecast to reach 7.5% of the total potential market by the end of 2018/19.

	2006/07 to 2017/18*	2018/19	Total to 2018/19
No. of Projects	1,873	150	2,023
Capacity Savings (MW)	10.0	0.4	10.3
Energy Savings (GW.h)	24.1	1.0	25.1
Natural Gas Savings (million m <sup>3</sup> )	3.3	0.6	3.9
Utility Investment (Millions, \$)	\$17.3	\$0.9	\$18.2
Customer Investment (Millions, \$)	\$0.9	\$3.9	\$4.8
Total DSM Investment (Millions, \$)	\$18.2	\$4.9	\$23.1
Estimated Average Annual Bill Reduction per Customer (Electric): \$213			
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$412			

\*Includes estimates for 2017/18

**Table 10: Manitoba Hydro’s Commercial Building Envelope – Windows Program Data**

### 3. CBE Windows Program Deliverability Evaluation:

As discussed above, we find that a basic evaluation of whether Efficiency Manitoba’s CBE Windows program savings will be achieved are influenced by the following deliverability issues:

- 1) Has Efficiency Manitoba set targets for number of participants / projects that seem reasonable?

It is hard to question this definitively but Efficiency Manitoba’s target for number of projects is higher than that for Manitoba Hydro but savings captured appears to be lower.

What installation pace is required to meet these targets?

Efficiency Manitoba is on a pace to increase market penetration by 2 percentage points over three years, or less than 1% per year, leaving a substantial segment of the market unserved. While this change may seem small it contributes to a risk of delivering on its expectations

<sup>30</sup> MH DSM Report March 2018, p. 21, and Centra Gas Manitoba Inc. 2019/20 General Rate Application Appendix 7.3, p. 43 of 204



- 2) If so, how much of the target market will be served?

Using Manitoba Hydro's estimate of Total Market, at the end of 3 years, market penetration would be 10%. What with Efficiency Manitoba's estimate of the Target Market, which is an order of magnitude lower than Manitoba Hydro, the estimated 169 projects per year would require 4 years to reach at least 50% market saturation.

- 3) What market forces and other factors are assumed to drive participation, including customer as well as delivery partner incentives?

Efficiency Manitoba states that the main drivers for the Renovation Bundle, of which the CBE program is a part, are financial incentives and technical assistance. Customers will engage with the contractor or consultant of their choosing. Trade allies must have sufficient expertise to help customers apply for incentives.<sup>31</sup>

- 4) Are more Manitobans being served as a result?

A modest increase to 19 projects is forecast for Efficiency Manitoba with this program over the 150 Manitoba Hydro expected for 2018/19, but it is not clear if these are in different buildings or the same buildings served under the Manitoba Hydro program. So, it is not possible to say if more Manitobans are being served under this program.

- 5) What caveats should be identified in order to obtain missing information or further clarity in order to gain more confidence in Efficiency Manitoba's ability to deliver savings?

Since this program appears to be fairly similar to the legacy Manitoba Hydro DSM program, any additional expertise required for Manitoba Hydro's existing stable of delivery partners should be minimal. In it important for delivery partners to become aware of new features such as the addition of foundation insulation and blower door testing, in order for delivery partners to increase savings – even if a legacy program building participates.

We have focused on just the CBE Windows component of the Renovation Program Bundle for ease of comparability. But we can also say something about other Efficiency Manitoba programs that are not directly comparable

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<sup>31</sup> 3-Year Plan, Appendix A, Section A7, pdf P. 380, p. 25 of 47, lines 276-279.

to their legacy Manitoba Hydro counterparts by showing their respective projected number of project installs per year, as shown in the table below.

Bundle Sub-Group	Measure Group	MH Est for 2018/2019 (*)			EM 2020-2023 Avg /Year			comment
		No. of Projects	Est. Savings/Year		No. of Projects	Est. Savings/Year		
			GWh	Mil m <sup>3</sup>		GWh	Mil m <sup>3</sup>	
Renovation - CBE	Lighting Fixtures	1,700	63.36	-	1,544	87.49	-	(2)
Renovation - CBE	Insulation Windows and Doors	150	1.00	0.60	169	0.74	0.29	
Renovation - CBE	Program - Insulation Heating	270	3.20	1.10	2,122	2.21	0.84	(1)
Commercial Appliances	Kitchen Appliances	265	8.03	-	157	7.28	-	(2)
Commercial Appliances	Refrigeration	19	0.33	0.09	478	1.85	0.15	(3)
HVAC & Controls	HRV (incl ERV, VFD, Heaters, Chillers)	11	0.20	0.10	970	3.47	0.76	(3)
HVAC & Controls	CO2 Sensors	65	0.10	0.06	128	0.07	0.04	(1)
HVAC & Controls	Water Heaters	27	-	0.10	14	-	0.04	
HVAC & Controls	Boilers	112	-	1.23	25	-	0.40	
Subtotal		2,619	76	3	5,607	103	3	(3)

(\*) Manitoba Hydro (MH) 2018 DSM Report  
(1) less savings / more installs  
(2) more savings / fewer installs  
(3) more savings / more installs

**Table 11: Efficiency Manitoba bundles with more installs and/or more savings**

By comparing differences in number of installs across these programs, we can see that Efficiency Manitoba expects to meet its savings deliverability target with a step change in estimated number of projects for significant portion of its overall plan, further illustrating the reasons for the deliverability concerns discussed above.

The savings results for CBE Windows program should also provide a greater understanding of why energy savings are expected to be lower than the legacy program for other program bundles.

#### 4. Hard to Reach

Regulation 119/2019, section 11c) says that, in evaluating the Plan, PUB must consider “whether, if it is practical to do so, at least 5% of Efficiency Manitoba’s budget for demand-side management initiatives is allocated to initiatives targeting low-income or hard-to-reach customers.” Efficiency Manitoba has submitted a plan that meets and exceeds this goal. As shown in the chart below, the percentage of budget allocated to hard to reach programs are 6% for electric customers and 32% for natural gas programs.<sup>32</sup>



**Figure 12: Hard to Reach Customers by Percentage of Budget**

Daymark has confirmed that the percentage of the total Natural Gas budget does indeed equal 30% for Income Qualified and 2% for Indigenous in the table below.

<sup>32</sup> 3-Year Plan, Section 6, pdf p. 157, p. 1 of 18.

Customer segment/category	2020-23 Average		2017/2018
	Savings (%)	Budget (%)	Energy Consumption (%)
Industrial	39%	20%	66.10%
Agricultural	3%	4%	
Commercial	35%	36%	33.90%
Residential	22%	19%	
Income Qualified	1%	3%	
Indigenous	0.50%	3%	
Enabling Strategies	-	10%	-
Overhead	-	4%	-
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 7: Electric Savings, Budget, and Energy Consumption by Sector in 3-Year Plan**

Daymark also confirms that the share of the electric budget allocated to Income Qualified and Indigenous is 3% each respectively, and thus totals 6%.

Customer segment/category	2020-23 Average		2017/2018
	Savings (%)	Budget (%)	Energy Consumption (%)
Industrial	29%	9%	60.50%
Agricultural	1%	1%	
Commercial	25%	27%	33.90%
Residential	37%	21%	
Income Qualified	7%	30%	
Indigenous	0.30%	2%	
Enabling Strategies	-	8%	-
Overhead	-	3%	-
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 8: Natural Gas Savings, Budget, and Energy Consumption by Sector in 3-Year Plan**

The Income Qualified programs and the Indigenous programs are discussed in each of the next sections, respectively. It is also noteworthy to point out that while there are specific programs targeted to the Indigenous customer segment as discussed below, members thereof may also participate in separate

small business and residential programs as summarized in the table in the Indigenous section further below.<sup>33</sup>

## a) Income Qualified Programs

### (1) Overview

The Income Qualified Program is based on the legacy Manitoba Hydro Affordable Energy Program (AEP) that maintains existing incentives, while also adding a new incentive and making innovative changes to this program to increase savings and participation.<sup>34</sup>

Efficiency Manitoba's marketing approach also is similar to the legacy program. Efficiency Manitoba plans to continue working with marketers, community groups (including First Nation community associations), promote the program through advertising and holding customized information sessions. Efficiency Manitoba also commits to grow its contractor network in rural areas.<sup>35</sup>

The eligibility qualification for the 3-Year Plan has not changed and remains based on the same criteria requiring that household income must fall below 125% of Statistics Canada Low Income Threshold known as LICO 125.<sup>36</sup>

All financial incentives have been retained that minimize financial burden on low income customer by providing free insulation and LED light fixtures, and low on-bill financing for a high-efficiency gas *furnace* by charging \$9.50/month for five years.<sup>37</sup>

Efficiency Manitoba's marketing approach also is similar to the legacy program. Efficiency Manitoba plans to continue working with marketers, community groups (including First Nation community associations), promote the program through advertising and holding customized information sessions.

Barriers to Participation:

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<sup>33</sup> 3-Year Plan, pdf p. 334, Section A6, Table A6.1 Indigenous Customer Segment Offers, p. 6 of 23.

<sup>34</sup> 3-Year Plan, Appendix A, Section A5, p. 2 of 13, lines 29-31.

<sup>35</sup> 3-Year Plan, Appendix A, Section A5, p. 2 of 13, lines 32-35.

<sup>36</sup> MH 2018 DSM Report, Affordable Energy Program, p. 5, and 3-Year Plan, Section A5, p. 2 of 13.

<sup>37</sup> MH 2018 DSM Report, Affordable Energy Program, p. 5, and 3-Year Plan, Section A5, p. 7 of 13.

Both the legacy Manitoba Hydro and Efficiency Manitoba programs recognize the importance of targeting multi-unit residential buildings (MURBs) because residency can be substituted for a separate income qualification test that requires sharing tax return information.<sup>38</sup>

This reduces two barriers to participation: MURB owners and residents may be reluctant to sign up because the former pays the customer incentive while the latter receives the energy savings. It is also important to identify rental occupants who are separately metered, rather than pay rent including utilities, in order to interest them in participation and to monitor savings on their bill.

### **(2) Program Incentive Drivers**

Efficiency Manitoba expanded financial incentives to include a rebate towards a high efficiency natural gas *boiler* of \$3,000 and a free front load washing machine. But customers must wait until the 2nd year of the 3-Year Plan to avail themselves of this benefit.

Efficiency Manitoba appears to have pursued further customer segmentation besides the LICO 125 threshold: Efficiency Manitoba is working with Neighborhood Renewal Corporations to identify geo-targeted neighborhoods with older homes to approach more residents directly and function as an alternative means to by-pass the LICO 125 income qualification test.<sup>39</sup>

Efficiency Manitoba wants to enhance outreach and assistance to this customer segment by providing a dedicated energy advocate to help customers with the application process. Efficiency Manitoba will provide funding for the dedicated energy advocate's salary and enhanced marketing expenses and will rely on the community partner organizations to find and hire the energy advocate and report back to Efficiency Manitoba. If this is a new position, then Efficiency Manitoba is also supporting job-creation.

### **(3) Comparability to Best Practices**

ACEEE completed a very recent study that recommends best practices to reach traditionally underserved markets who might not have sufficient funds to participate in discounted equipment upgrades. The first best practice is to

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<sup>38</sup> 3-Year Plan, Section A5, p. 9 of 13.

<sup>39</sup> 3-Year Plan, Section A5, p. 9 of 13.

make sure that over the full loan term on-bill financing costs are no more than the expected savings (bill-neutral) or even below (bill-positive).<sup>40</sup>

The second best practice is to increase the pool of funds that can be used to offset program costs to achieve a bill-positive outcome for low-income customers. Efficiency Manitoba should investigate the availability of funds backed by financing instruments called Commercial Property Assess Clean Energy (C-PACE) for EE and renewable projects. If a similar instrument exists in Manitoba or elsewhere in Canada, it may be accessible to commercial property owners to finance up-front costs to be repaid over time through voluntary tax bill assessment.<sup>41</sup>

A third best practice that Efficiency Manitoba may be doing already but if not should consider, is to offer on-bill financing and C-PACE alternatives that allow the cost obligation (and savings) to remain with the property and rental unit meter even after the owner sells the property and renters move.

#### **(4) Deliverability Drivers: Target Market, Budget, Marketing and Program Features**

The Income Qualified program bundles represents a small percentage of the total plan, the electric energy component of Efficiency Manitoba's Income Qualified Program accounts for only 1% of total energy savings and 0.5% of total budget, while for the Natural Gas Portfolio includes the Income Qualified programs that are expected to provide 7% of energy savings and account for 30% of the budget. This is consistent with the Regulation that requires the Plan to allocate 5 percent its overall budget to hard to reach programs.<sup>42</sup>

Although these allocations seem modest, Efficiency Manitoba has demonstrated an earnest attempt to use this budget to extend its reach across this customer segment. Efficiency Manitoba has shown that it not only plans to meet the requirements of the Act<sup>43</sup>, but also that it has a plan to reduce barriers to participation by working with community organizations. At this

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<sup>40</sup> ACEEE "Extending the Benefits of Nonresidential Energy Efficiency to Low-Income Communities", Report U191-, Nov 2019, p. 48.

<sup>41</sup> ACEEE "Extending the Benefits of Nonresidential Energy Efficiency to Low-Income Communities", Report U191-, Nov 2019, p. 49; C-PACE in the US is authorized by State legislation and can be provided by the government or through a third-party finance firm.

<sup>42</sup> 3-Year Plan, Section 1, p. 26 of 32, lines 224-227, and table on p. 27 of 32.

<sup>43</sup> 3-Year Plan, Section 2, Table 2.5 referencing Section 11(c) of Act, p. 26 of 27.

time, it appears that no member of group Efficiency Manitoba plans to partner with to promote the Income Qualified program sits on the EEAG, including the example given of the “Neighborhood Renewal Corporations” throughout Manitoba.<sup>44</sup> However, their interests may be aligned with the organization Association of Manitoba Municipalities (AMM), who is a current member of the EEAG.<sup>45</sup>

The Manitoba Hydro DSM Affordable Energy Program estimates total market size at 110,000 homes excluding MURBs in Manitoba. As of 2018/19 Manitoba Hydro estimates that approximately 15,500 insulation customers and 3250 standard furnace customers remaining unserved in the market, which suggests about 85% saturation. The Efficiency Manitoba plan updated this data based on the 2017 Residential End Use Survey to show that the total number of homes that fall below the LICO 125 threshold equals 159,000. comprised of 111,000 single detached homes, 18,000 multifamily homes and 28,000 MURBs, and approximately 72%, or 115,000. of these homes are owner occupied while the remaining 28%, or 44,000 customers are renters.<sup>46</sup> This update to include a higher total number of units suggests that the market saturation rate is actually lower.<sup>47</sup> This residential structure distribution is fairly consistent with housing stock across the province; it is age of the structures and customer demographics that require enhance programs to meet the budget target.<sup>48</sup>

Efficiency Manitoba projects cumulative Income Qualified projects (at the measure level) totaling 25,299 (both electric and gas), which is almost the same as the number of apartment suites under the LICO 125 threshold<sup>49</sup>, which could include single family homes in the geo-targeted communities. At the same time, Efficiency Manitoba has projected 18,300 retrofit projects (8,500 for natural gas and 9,800 for electric customers), which is well below their detailed measure level projection.<sup>50</sup> This discrepancy could be explained by one “retrofit” being comprised of energy audits, appliance and/or thermostat installations.

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<sup>44</sup> 3-Year Plan, Section A5, p. 13 of 13, lines 241-242.

<sup>45</sup> 3-Year Plan, Section A2, p. 37 of 40, line 720.

<sup>46</sup> 3-Year Plan, Section A5, p. 3 of 3, lines 44-52.

<sup>47</sup> MH 2018 DSM Report, Affordable Energy Program, p. 5

<sup>48</sup> 3-Year Plan, Section A4, Figure A4.1, p. 9 of 38.

<sup>49</sup> MH 2018 DSM Report, Affordable Energy Program, p. 5

<sup>50</sup> 3-Year Plan, Attachment 3 – Technical Tables, pp. 512 and 518.



Efficiency Manitoba expects increased completion rates for the natural gas furnace incentive by adding a new “Decluttering Service” to prepare the customer site for installation. This will require hiring a separate service provider to assist traditional delivery partners who focus on appliance installation. While this addition adds to cost, it holds promise for increasing participation in other Income Qualified programs.

### **(5) Summary Evaluation**

Efficiency Manitoba is maintaining an existing affordable energy program that successfully reaches the single-family home sector but needs more work to achieve a similar penetration of the MURB cohort. Efficiency Manitoba is expected to achieve its target savings because it is:

- pursuing efforts to connect with local organizations and pay for local residents to promote its programs
- conducting further market segmentation to identify micro-communities that represent opportunities to “meet low-income customers where they live” and reduce the requirement for them to self-identify as low-income
- Adding an innovative de-cluttering service, which may turn out to be a very cost-effective means to increase participation as well, because it shows not only sensitivity to income limitations, but also to senior residents who may not have friends and family members readily available to help them<sup>51</sup>
- Offering potential to qualify – starting in year two -- for a free washing machine and a discount on the cost of a high efficiency natural gas boiler

Success with achieving Income Qualified program savings targets is enhanced by the new features itemized above and the availability of most of the delivery partners by mid-2020, including for free insulation offers and the de-cluttering service, both of which require extended engagements before savings are realized. However, reaching this program’s savings could be delayed by Efficiency Manitoba’s acknowledgement that it won’t be able to identify, or “pre-qualify”, and secure service contracts for delivery partners to provide appliances (including the free washing machine) and thermostats until year two.<sup>52</sup>

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<sup>51</sup> Daymark is aware of other jurisdictional programs where delayed installations have occurred and where delivery partners have taken this responsibility on themselves at the risk of not keeping appointments with other customers who are waiting for service. EM’s solution should be considered for inclusion in other jurisdiction programs for this reason.

<sup>52</sup> 3-Year Plan, Section A5, p. 10 of 13.

The smart thermostat program delay until year two may be appropriate if Efficiency Manitoba's adjustment to participation in this program reflects the results of benchmarking against LICO 125 demographic information for home wifi availability, perhaps revealing that universal access to affordable internet service is lagging within this customer segment compared to non-low-income Manitobans.<sup>53</sup>

## **b) Indigenous Programs**

### **(1) Overview**

The Indigenous population has been singled out for special focus in the energy efficiency programs in Manitoba for many years. The indigenous population includes;

- 63 First Nations
- 15,500 Homes
- 23,100 Businesses or Commercial Buildings

The Indigenous population has been a focus at the federal level as they continue to strive toward reconciliation of the past and establishing some degree of equity today for the indigenous people. The population of the indigenous people lives and works both on and off the reserve. Reserves are located in some of the most isolated parts of the province.

### **(2) Barriers to Participation**

There are specific challenges to bring energy efficiency that clearly affect deliverability and costs to deliver;

- The special nature of condition of the structure for dwellings and business on the reserves
- Qualifying the segment of the indigenous population and businesses that are off reserve
- The distance from population centers and even from other First Nations reserves
- Lack of natural gas access
- Electric isolation of the Diesel Community and the cost structure that results
- Access to capital
- Higher occupancy of first Nations dwellings

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<sup>53</sup> PUB/EM 1-13d-e, p. 7 of 7 and Attachment 1, page 1 of 1, column "How Participation is Determined"

The special nature of the indigenous population and businesses do provide some opportunities that can help overcome the challenges:

- Strong tribal and community organizations exist among the indigenous population as potential allies in marketing programs, delivering programs and even advising on the design of programs
- In these smaller communities the impacts to the local economy are easier to see
- The potential exists for Efficiency Manitoba programs to work in concert with or obtain supplemental funding from provincial and federal programs

To help overcome these barriers, Efficiency Manitoba will be establishing two to three First Nation Community Advocates. They have also pledged to work with AMC to utilize the indigenous population in supplier, vendor and consultant roles, and have held preliminary discussions with Manitoba Indigenous Housing Capacity Enhancement and Mobilization Initiative (MIHCEMI) on development of a First Nations' Building Code, with support from the Northern Manitoba First Nations and the Tribal Council. Further, Efficiency Manitoba has proposed to a volunteer working group with First Nations and Metis representation to discuss and address needs best suited to their needs.<sup>54</sup>

### **(3) Program Drivers**

Just as with the Income Qualified portion of the Hard to Reach customer base, Efficiency Manitoba has designed specific energy efficiency bundles and programs for the Indigenous Group. Throughout the report and responses to IRs Efficiency Manitoba has made it clear that all programs are open to the Indigenous population.

We see the tables below showing savings and budget portions by sector relative to the size of the sector.

In electric we see that generally the savings portion is proportional to the budget. The sectors with the lowest savings compared to budget are not surprising the two hard to reach, Income Qualified and Indigenous people. Combined they use 6% of the budget for about 1.5% of the savings. They are slightly over the amount that the Regulations suggest should be a minimum to spend on this group.

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<sup>54</sup> MKO/EM 1-12 a) and MKO/EM 1-32.

Customer segment/category	2020-23 Average		2017/2018
	Savings (%)	Budget (%)	Energy Consumption (%)
Industrial	39%	20%	
Agricultural	3%	4%	66.10%
Commercial	35%	36%	
Residential	22%	19%	
Income Qualified	1%	3%	33.90%
Indigenous	0.50%	3%	
Enabling Strategies	-	10%	-
Overhead	-	4%	-
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 9: Electric Savings, Budget, and Energy Consumption by Sector in 3-Year Plan**

In natural gas we see that the savings portion is not proportional to the budget. The sectors with the lowest savings compared to budget include one of the hard to reach, the Indigenous sector and not surprising agriculture since we would expect lower relative use of natural gas compared to electricity in that sector. The Efficiency Manitoba plan will spend 30% of its budget within the Income qualified sector, with a highly incented bundle of programs that are expected to produce only 7% of the natural gas savings. The combined funding is over 6 times what the Regulations suggest should be a minimum to spend on this group.

Customer segment/category	2020-23 Average		2017/2018
	Savings (%)	Budget (%)	Energy Consumption (%)
Industrial	29%	9%	
Agricultural	1%	1%	60.50%
Commercial	25%	27%	
Residential	37%	21%	
Income Qualified	7%	30%	33.90%
Indigenous	0.30%	2%	
Enabling Strategies	-	8%	-
Overhead	-	3%	-
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**Table 10: Natural Gas Savings, Budget, and Energy Consumption by Sector in 3-Year Plan**

The table below provides the programs and savings that make up the Indigenous bundle.

Program	Measures	Status	Delivery
Insulation and Direct Install Offers	<b>Home Energy Efficiency Upgrades:</b>		
	- Insulation	Existing program with enhancements	Participating First Nations (installation)
	- Direct Install Measures		
	- Smart Thermostats		
- ENERGY STAR® certified clothes washers			
Small Business Offers	<b>Product Rebates:</b>		
	- Aerators and showerheads	New offer	Contracted third-party (supply, installation)
	- Lighting		
- Smart/programmable thermostats			
Community Geothermal	Geothermal heat pumps	Existing program with enhancements	Indigenous social enterprise (coordination), First Nation (installation)
Metis Income Qualified	<b>Home Energy Efficiency Upgrades:</b>		
	- Insulation	New Offer	Contracted third-party (installation)
	- Direct Install Measures		
	- Smart Thermostats		
- ENERGY STAR® certified clothes washers			

**Table 11: Hard to Reach Customer Programs and Measures in 3-Year Plan**

The programs have been designed with much more aggressive incentives to overcome the significant barriers within this sector. The programs however are typically assuming a slight reduction in the amount of projects than Manitoba Hydro had been experiencing.

The plans for the Community Geothermal Program by Efficiency Manitoba have been further explained in response to PUB/EM 1-6 showing the intent to provide multiple points of engagement into the Indigenous groups, rather than just the program participant;

*“A Community Driven Outcome Contract (CDOC) model is similar to a social impact bond (SIBS). With a CDOC or SIB, the upfront capital costs are provided by investors to a social-purpose organization to implement a new approach in solving a problem. For this model, several foundations and the communities themselves are providing the upfront investment. When implemented, the outcomes purchaser or buyer is typically government or in this case with energy savings, it will be Efficiency Manitoba.*”

*A CDOC must meet the needs which have been prioritized by the communities. For the purpose of the Community Geothermal Program, the desired outcomes or needs set out by the participating communities are; skills training and job creation, lower utility costs, and reduced dependency on social assistance. Community members are trained to install and maintain the geothermal systems. The training and work required meets the need for skills training, job creation, and reduced dependency on social assistance. Once the systems are installed and running, this meets the need of reduced utility costs and saving energy. Efficiency Manitoba will “buy” the saved energy outcome through an outcomes purchase contract with Raven Indigenous Capital Partners, an Indigenous social finance intermediary. Previously, an incentive was used to buy down the cost of a loan which was used to finance the geothermal system. In this model, combining the purchasing power of all of the outcomes buyers means that the installed cost of the geothermal system is completely paid for and therefore First Nations communities are not being burdened with more community debt and are seeing more immediate savings.*

*Efficiency Manitoba’s investment of \$4900 per install in the CDOC model is the same as it was under the previous program.”*

#### **(4) Comparability to Best Practices**

The best practices for Income Qualified discussed above are equally appropriate for the Indigenous program in that they include efforts to reach traditionally underserved markets who might not have sufficient funds to participate in discounted equipment upgrades. These best practices are focused on increasing funding and offering on-bill financing:

- Making sure that over the full loan term on-bill financing costs are no more than the expected savings (bill-neutral) or even below (bill-positive)<sup>55</sup>
- Increasing the pool of funds that can be used to offset program costs to achieve a bill-positive outcome for customers
- Offering on-bill financing and C-PACE alternatives that allow the cost obligation (and savings) to remain with the property and rental unit meter even after the owner sells the property and renters move

#### **Deliverability Drivers: Target Market, Budget, Marketing and Program**

**Features.** The key factor for success is whether Efficiency Manitoba can put its

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<sup>55</sup> ACEEE “Extending the Benefits of Nonresidential Energy Efficiency to Low-Income Communities”, Report U191-, Nov 2019, p. 48.

good ideas, promises and plans for engaging the First Nations populations into place and will be in effect. Efficiency Manitoba outlined its approach in response to PUB/EM 1-3 b, c below:

*“b. The Plan will address barriers for participation in DSM initiatives as follows:*

#### **On Reserve**

*For targeted Indigenous programs, Efficiency Manitoba will work directly with the band and make program participation easier for First Nation on reserve customers by reducing administrative requirements for program participation. Recognizing that many communities do not have resources for administration, Efficiency Manitoba will remove as much administrative work as possible by using bulk application processes. Available program materials and resources will be provided to First Nations band offices and housing managers. In the absence of a housing manager, Efficiency Manitoba will work with First Nation to find out what best suits their needs to disseminate information. Efficiency Manitoba will have dedicated program staff to work closely with First Nations on reserve customers and be available for questions about programs. Additionally, material and labour costs for the Insulation and Direct Install offers for First Nation community members to perform the work will be funded by Efficiency Manitoba.*

*The Community Geothermal Program also reduces barriers to participation by eliminating upfront capital costs for First Nations and by providing training for local community members to perform the installs and any required future maintenance.*

*The Indigenous Small Business Program also reduces barriers to participation for small businesses by providing incentives to cover the majority of the cost for the upgrades offered under the program as well as supplying the materials needed for the upgrades. This applies to band owned buildings or businesses operated by First Nations in the community where the First Nation is paying the utility bill.*

#### **Off Reserve**

*A specific plan to address barriers to participation for First Nations living off reserve has not been developed; however, it should be noted that all energy efficiency programs will be available to First Nations off reserve customers. Efficiency Manitoba will engage with the established Energy Efficiency Advisory*



*Group (EEAG) to establish an Indigenous Energy Efficiency Working Group with First Nation and Metis representation to address barriers for First Nations off reserve if the current available programming is not addressing the needs.*

*c. Efficiency Manitoba will approach engagement with First Nations on-reserve customers in multiple ways. First, Efficiency Manitoba will contact all the First Nation communities to discuss and explain programs and offers. This will be done through different mediums; in-person, phone calls, emails, and distribution of materials. Secondly, Efficiency Manitoba will work to establish relationships with representatives from the First Nation Tribal Councils to capitalize on the Manitoba Indigenous Housing Capacity Enhancement and Mobilization Initiative that currently exists, which has representation from all 63 First Nations. Thirdly, Efficiency Manitoba will work to be a part of any intergovernmental working groups where Manitoba Hydro was previously the representative for energy efficiency. Lastly, in addition to the existing EEAG, Efficiency Manitoba will aim to establish an Indigenous Energy Efficiency Working Group with First Nation and Metis representation. The objective will be for regular communication and for Indigenous groups to receive the same information, share ideas, and create a dialogue for future program design or enhancements that will assist with meeting the needs of Indigenous customers and Efficiency Manitoba's targets. The engagement strategy will be an opportunity to find additional solutions to participation barriers in DSM initiatives, when required."*

The main deliverability drivers for the Indigenous program are:

- Engaging with the Indigenous customer segment by working with key organizations that understand and represent their interests; throughout the responses to IRs and within the Plan document itself Efficiency Manitoba has made it clear that its intentions are to be highly engaged with the First Nations organizations, including establishing 2-3 First Nations Community Advocates. However, the number of organizations is dozens and that may be a stretch for truly being impactful to help assure accessibility to meaningful Indigenous program designs
- Providing training for members of those organizations and communities that may lead to local job growth;

## 5. Limitations to the Deliverability Assessment

Continuity across the Manitoba Hydro DSM and Efficiency Manitoba plans cannot be completely confirmed based on Efficiency Manitoba's plan. This is not just because Efficiency Manitoba includes new and significantly enhanced programs but also because Efficiency Manitoba programs that continue a legacy Manitoba Hydro DSM program appear to define participation differently. For example, the Efficiency Manitoba plan defines CBE insulation projects based on square footage, which may be equal to one or more projects in the parlance used in the Manitoba Hydro 2018 DSM report.

In addition, while the 3-Year Plan states that Efficiency Manitoba program administrators estimated total market size for each program, this estimate was found to be missing for some program components in the Market Analysis tab of the supporting measure-level spreadsheets. For example, this was the case for the Commercial Boiler – Natural Gas Program, which would seem to be capable of being informed by available industry data.

We also found that the CBE Lighting program for Interior Fixtures sized the Total Market to be much larger number than the number appearing in the Manitoba Hydro 2018 DSM report, a difference that should be explained by growth or different calculation methodology.

For its part, the Manitoba Hydro 2018 DSM report did not provide a Total Market estimate for every program either. This was true for the HVAC and Commercial Appliances program bundles. And although Manitoba Hydro did provide estimated projects installed per year for 2018/19, Efficiency Manitoba appears to expect a markedly faster rate of installs per year without an explanation why, leaving us to conclude that the definition of a project install may have been revised under Efficiency Manitoba's plan.

Finally, and just as important, we would like to understand whether the pace of annual installations for the Manitoba Hydro program was limited by budget or an accurate reflection of customer interest. If budget limited, this suggests a faster pace of market penetration might be possible. If instead it reflects less demand, this brings into question why Efficiency Manitoba believes their version of the same or similar program will produce a different result.

## 6. Summary of Findings

Based on our review of the overall program and comparison to the legacy Manitoba Hydro DSM program, it appears that Efficiency Manitoba has included fairly aggressive savings and participation targets for certain programs.

However, we do find savings at risk for the following specific reasons:

- Program Design:  
The Commercial Building Optimization programs are not clearly distinguished from similar programs, for example both In-Suite Efficiency and Renovation include LED lighting and HRV controls. Overlap such as this raises concerns about difficulty with marketing communication and training, as well as double counting of savings in the CRM system.
- Innovative components related to program design include:
  - The addition of a de-cluttering service that should prove very attractive from both the customer and the delivery partner perspective, and should become a best practice that Efficiency Manitoba can contribute to the literature once data are available
  - The Efficiency Manitoba plan includes financial support for a new position called the EBCx agent to support the Enhanced Building Operations program, without an explanation for how this position differs from Efficiency Manitoba staff, existing delivery partners or customer management<sup>56</sup>
- Resource Constraints:
  - There are two deliverability concerns related to resource constraints with the Efficiency Manitoba plan. The first is Efficiency Manitoba's acknowledgement that it will not meet its target for first year Natural Gas savings without an explanation why.<sup>57</sup> The second is Efficiency Manitoba's acknowledgement that it has yet to identify the delivery partners needed to serve its new programs, such as programs designed to serve hard to reach markets<sup>58</sup>
  - Aggressive market penetration assumptions based on ambitious savings targets
  - The comparison of the CBE Windows program above was an example of Efficiency Manitoba projecting lower savings captured per year, but it

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<sup>56</sup> 3-Year Plan, pdf pp. 391-393.

<sup>57</sup> 3-Year Plan, pdf p. 78, page 3 of 26, lines 26-28.

<sup>58</sup> Response to DAYMARK/EM I-13a-f pdf pp. 324-329, pp. 2-7.

served the purpose of illustrating how the market penetration rate differs between Manitoba Hydro’s and Efficiency Manitoba’s plan. However, other programs such as CBE Shell Insulation, HVAC HRV Controls and Commercial Appliances assume an increase in project installations greater than 100% over the Manitoba Hydro program. Reaching this target may be difficult unless the ranks of delivery partners increases, training is sufficient and budgets for incentives are adequate

## COST/BENEFIT ANALYSIS

### A. Introduction

IV.

Efficiency Manitoba has proposed a plan to deliver the 1.5% per year electricity savings and 0.75% per year natural gas savings specified as the targets in the Efficiency Manitoba Act and adopted in the Efficiency Manitoba Regulations. As one would expect with a large variation in the uses for electricity and natural gas energy spread across the full array of sectors and throughout the province, the Efficiency Manitoba Plan includes a long list of energy efficiency initiatives that collectively contribute to the total savings in electricity and natural gas. As you can see below, the savings achieved by Efficiency Manitoba include the efficiency that is gained as a result of government codes & standards that lower the use of energy by many pieces of equipment that are being put in service in Manitoba each year. The codes & standards savings will not be discussed in this section. This section explicitly examines the 77% of the total plan electric savings, and 68% percent for natural gas, that are attributed to the Efficiency Manitoba proposed electric and natural gas efficiency programs. See Table 12 below. The codes and standards projected savings are discussed further in the report.

Description	Electric		Natural Gas	
	Savings (GWh)	Percentage	Savings (Million cu. m.)	Percentage
Program-related savings	880.1	77%	25.7	68%
Codes and Standards Savings	256.0	23%	12.0	32%
<b>Total Savings</b>	<b>1136.1</b>	<b>100%</b>	<b>37.7</b>	<b>100%</b>

Table 12: Three-year Savings for Electric and Natural Gas Portfolios

There is extensive discussion in our report regarding the risks or concerns relative to whether the efficiency program part of the Plan will deliver the 880 GWh of savings in the above table. In this section, except for sensitivity analysis toward the end of the section, the review of cost effectiveness will not focus on any risk of measures, programs, or bundles falling short of the estimates provided by Efficiency Manitoba, but rather on the cost effectiveness of the programs, bundles, and measures proposed, assuming they perform as projected.

The table above shows the savings at the portfolio level. Naturally, it is impossible to perform cost effectiveness analysis at the portfolio level. Efficiency Manitoba's focus for cost effectiveness was at the bundle or program level. As discussed in the Deliverability Section, in order to reach the six sectors of the Manitoba customer base, Efficiency Manitoba is sponsoring 21 bundled program offerings for electric and 17 for natural gas. Within the bundles there are 35 electric programs covering over 200 measures, while correspondingly there are 26 programs and about 100 measures utilized within the bundles to create natural gas savings. To review cost effectiveness, Daymark found that insights would be gained by exploring cost effectiveness at the measure level as well.

## **1. Value creation in addition to energy savings**

The Act itself requires, not only that the savings targets be met, but that Efficiency Manitoba analyze the cost effectiveness of its proposed initiatives. Cost effective programs mean that value is created in Manitoba. The costs of Manitoba Hydro and Centra decrease when energy efficiency occurs.

Regulation 119/2019 further defines this requirement, stating that cost effectiveness should be analyzed by comparing "the levelized cost to Efficiency Manitoba" of the net electrical or gas savings resulting from efficiency initiatives to "the levelized marginal value to Manitoba Hydro of the net savings resulting from those initiatives." This is, in fact, a commonly-used approach to testing the cost-effectiveness of utility programs, slightly adapted to account for the fact that Efficiency Manitoba is an independent entity funded by the utility, whose activities are intended to benefit the utility and its customers. The expectation that is implied is that Efficiency Manitoba will be able to reach the savings targets established with initiatives that have been determined to be cost effective. However, Efficiency Manitoba is expected to propose and execute a plan that meets the targets even if the cost

effectiveness analysis reveals initiatives where the benefits do not outweigh the costs.

Efficiency Manitoba completed the required analysis and reported the results in the Plan. In reporting these results, Efficiency Manitoba reported not only the overall cost effectiveness of its proposed initiatives at the broad portfolio level (natural gas and electricity) and at the “program bundle” level, but also cost effectiveness results for nineteen individual program bundles grouped by six different customer segments.

The table below shows that in its electric portfolio Efficiency Manitoba expects its plan to create significant value measured on a net present value (or NPV) basis, \$345 million, specifically. The value created within each sector for specific bundles of initiatives will vary depending on the scope of the savings achieved and the extent of cost effectiveness within the measures that comprise the bundle.

The table also shows that the natural gas portfolio, while achieving the targets for savings specified in the Efficiency Manitoba Act and Regulations, is essentially breaking even on an NPV basis. Since the natural gas portfolio is made up of many measures within 17 bundles, one would expect that some specific bundles do not produce positive NPVs. This was discussed and significant visibility provided by Efficiency Manitoba in the Plan report. Daymark will offer additional visibility and suggest some insights gained in its review.

Description	Total Three-Year Energy Savings (GWh or million cu m)	PACT Net Benefits (\$ Million)	PACT Ratio
2020-2023 Electric EE Plan	880.1	345.1	3.27
2020-2023 Natural Gas EE Plan	25.7	(0.8)	0.99

**Table 13: Savings and PACT Net Benefits and Ratio at the Portfolio-level**

## 2. Daymark's approach

As part of our review of the overall Efficiency Manitoba Plan, Daymark has been asked to review Efficiency Manitoba's cost effectiveness analysis. The review included the examination of the filing of the Plan, including appendices, issuing Information Requests, reviewing responses to the Information Requests from all parties, and a detailed examination of all the workpapers Efficiency Manitoba used to develop the Plan in the form of several excel workbooks, provided to Daymark with the signing of a Confidentiality Agreement.

The workpapers allowed Daymark to look at methodologies; details regarding budgets; bundle, program and measure level savings in terms of energy and dollars; the marginal values for electric and natural gas energy provided to Efficiency Manitoba by Manitoba Hydro/Centra; the metrics calculated and other information. Daymark's understanding is that Commercially Sensitive Information (CSI) in this Matter is limited to the marginal values for electricity and natural gas, Centra's forecasted volume of natural gas,<sup>59</sup> and information that could lead to the association of any energy cost or consumption data to a specific customer. CSI is to be protected by Daymark in its reports and responses to Information Requests and during appearances at hearings, such that any information that, when combined with other public information, would allow someone to calculate the CSI data defined earlier would require redacting.

Several technical conference calls were held with Efficiency Manitoba staff to assure Daymark's understanding of the work papers.

In our review, presented below, Daymark focused on several areas:

- the accuracy of Efficiency Manitoba's analysis
- the methodologies used by Efficiency Manitoba to determine its cost effectiveness metrics
- the assumptions used by Efficiency Manitoba in the Cost Effectiveness analyses

Daymark also examined cost effectiveness by reviewing the information and results on a more granular or disaggregated level. As we discussed above, there are 38 total electric and natural gas delivery bundles encompassing over 300

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<sup>59</sup> Centra's natural gas load forecast information is inclusive of customer usage coefficients, forecast purchased gas volume information, impact of weather on Manitoba market demand and gas supply operations, forecast and actual average use per customer and actual and forecast effective heating degree-days.

actual measures that when installed and operated consume less electricity or natural gas. Our analysis includes breaking cost effectiveness results down to the level of individual measures.

Daymark was specifically asked to look at cost effectiveness through the lens of some alternative methodologies and metrics that are commonly used in energy efficiency evaluations. This effort will bring more visibility to some of the economic drivers of the overall plan and allow Daymark to discuss these and provide information to the PUB, Efficiency Manitoba and the stakeholders involved in the review. This should allow the parties to have additional information for consideration and should facilitate insights into the impacts of the Efficiency Manitoba Plan.

Lastly, the Daymark review incorporated some sensitivity analysis by changing key assumptions, given there is uncertainty regarding the forecast of certain parameters.

The discussion of the observation and insights from the review of the cost effectiveness analyses that support the development of the three-year Efficiency Manitoba Plan is conducted mostly at the bundle level below, even though much of the inspection and reaggregation of the Daymark analysis was conducted at the specific measure level. Daymark has chosen to provide tables and figures that do not contain Commercially Sensitive Information either explicitly or that can be derived by combining numbers within the report, this section included. The analysis and review process provided Daymark with full visibility of the CSI information; however, Daymark believes that the discussion of its review, findings and insights can be communicated without including information that would need to be redacted.

## **B. Review of Efficiency Manitoba cost effectiveness analysis**

Efficiency Manitoba is proposing a total budget of \$209.6 million for its electric and natural gas portfolio for its 2020 – 2023 Plan. Table 14<sup>60</sup> shows the annual budget proposed for both the electric and natural gas portfolios. The cost effectiveness analyses performed by Efficiency Manitoba were conducted with significant disaggregation and activity cost estimation breaking up the over \$200 million proposed spending in the three-year plan.

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<sup>60</sup> 2020-2023 Efficiency Plan, Section 1, pdf page 21 of 591.



<b>Annual Budget (Million \$)</b>	<b>2020/21</b>	<b>2021/22</b>	<b>2022/23</b>	<b>Total</b>
Electric EE Plan	44.55	51.15	50.98	146.68
Natural Gas EE Plan	18.64	21.27	23.05	62.96
<b>Total Annual Budget</b>	<b>63.19</b>	<b>72.43</b>	<b>74.03</b>	<b>209.64</b>

**Table 14: Proposed Annual Budget for Electric and Natural gas portfolio Plan for 2020-2023 Period.**

## 1. Overall accuracy of the costs and benefits information

In its treatment of costs and savings, Efficiency Manitoba did considerable work to identify the costs of each specific activity necessary to support the creation, promotion, oversight and delivery of the different program. The breakdown is discussed more below. In its review and utilization of the spreadsheets, workpapers and models provided by Efficiency Manitoba, Daymark did not encounter any modeling or spreadsheet-level errors. The linkage of the detailed measure-level activity costs and savings feeding into program and bundle cost effectiveness analyses was handled with intricate spreadsheet modeling.

Savings estimates were built up from individual estimates of measure-specific savings from programming to help ensure that savings counted represented savings attributable to Efficiency Manitoba programs and not to other factors, while addressing key factors that can erode projected savings over time.

## 2. Methodologies used by Efficiency Manitoba

The proposed budget for 2020/23 Efficiency Plan includes incentive costs as well as costs to support administrative activities - program design, administration, customer support, program delivery, and corporate overhead.<sup>61</sup> Efficiency Manitoba estimated these different cost categories at different levels of granularity. The incentive cost was estimated at the measure level. Efficiency

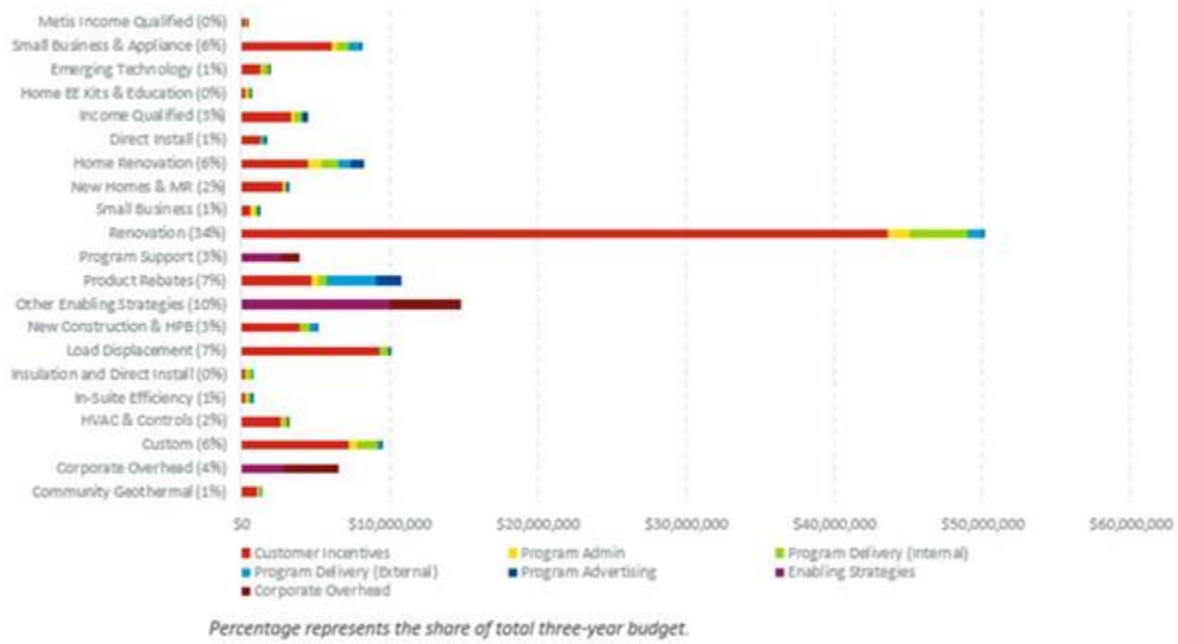
<sup>61</sup> Incentives represent the financial contribution made by EM for installing energy efficiency measures and programs. Program delivery costs represent budget associated with hiring and supporting third-party providers for program delivery functions such as direct install and program rebate offers. Program Administrative portion of the budget represents costs to support EM staff for designing, managing, administering, and supporting the programming. Program advertising includes budgeted amounts for specific programs that are required to achieve the forecasted participation and resulting energy savings. Enabling strategies include general energy efficiency support activities by customer segment that are not specific to a program or offer. Corporate overhead covers cost associated with functions such as leadership and expenses related with office, IT, and corporate support. (2020/23 Efficiency Plan, pdf page 217 – 221 of 591)

Manitoba also included direct program administration cost related to delivering specific measures in the measure-level analysis. The costs associated with program delivery, program advertising, and program administration were added at the program level, whereas program support costs, corporate overhead, and costs to support enabling strategies initiatives were estimated at the portfolio-level.

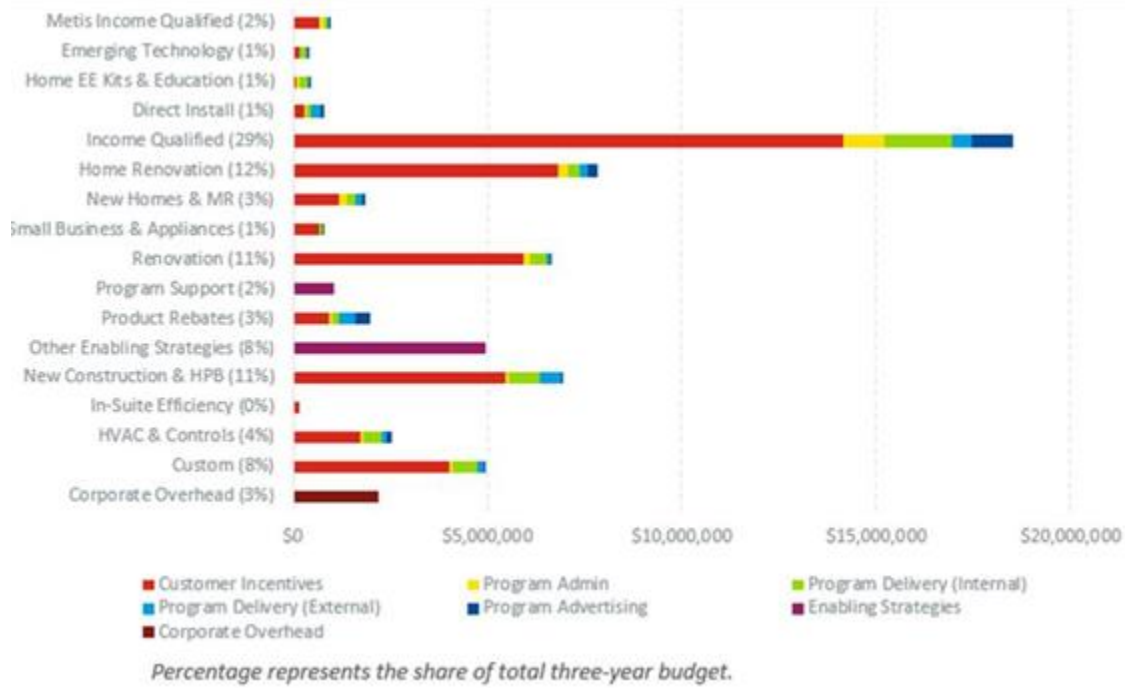
The further breakdown of cost categories at the Bundle level is presented in Figure 13 for the electric portfolio and in Figure 14 for the natural gas portfolio. These figures illustrate the detail used to estimate the costs of the measures, programs and bundles.

Within Figure 13 we see that there is indeed a considerable variation in the funding of the different bundles within the Plan. This variation is dependent on the potential energy savings opportunity available within the measures delivered in the bundle. Seven of the eighteen electric bundles each represent 6% or more of the electric portfolio budget. Figure 13 also shows that the Renovation Bundle receives about 1/3 of the total electric budget.

Figure 14 shows the spread of funding through the 17 bundles in the natural gas portfolio. Six of the bundles each represent 8% or more of the natural gas portfolio budget. The Income Qualified bundle represents almost 30% of the natural gas portfolio budget.



**Figure 13: Electric Portfolio Bundle Costs**



**Figure 14: Natural Gas Energy Portfolio Bundle Costs**

**a) Derivation of energy savings in Efficiency Manitoba’s analysis**

Efficiency Manitoba performed detailed analyses to estimate savings at the measure level. For each measure/initiative, Efficiency Manitoba estimated quantities of installation or adoption of a measure or group of similar measures included in each year of the Plan. Efficiency Manitoba then used savings per unit to calculate the savings associated with each measure. The measure-level savings numbers were then rolled up to generate program-level and bundle-level savings. In addition to the program-related savings, Efficiency Manitoba also considered Codes & Standards savings, which are discussed in the later part of the Report.

Efficiency Manitoba included several adjustments while estimating measure-level savings. Specifically, the analysis accounted for “natural conservation<sup>62</sup>,” free-ridership, and free drivers (spill over), while estimating annual incremental program-driven sales. Natural conservation refers to a measure sponsored by a program that is installed or implemented without participation in the program sponsoring that measure. During the technical conference, Efficiency Manitoba mentioned that the values used for these adjustments are based on historical program information from Manitoba Hydro and on market analysis. Free Ridership estimates vary among the electric and natural gas measures. Free rider level assumptions are frequently set around twenty or thirty percent, but in some cases, the assumed free rider impact is zero, and in other cases, it can be 60%. The total incentive is based on total annual rebates participation, which includes both program-driven rebated sales and free-ridership. Free-ridership accounts for any participants of the program that would have installed measures without financial incentives offered via programs.

In order to adjust per-unit savings, which is another input in estimated total energy savings, Efficiency Manitoba also included a “persistence factor” for each measure in its analysis. The persistence factor, which is expressed in terms of percentage, accounts for any failure, early replacement, and any uninstalled products. Efficiency Manitoba mentioned in the filing that the persistence factor is determined for each technology based on a number of

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<sup>62</sup> Natural conservation, as defined by Efficiency Manitoba, is the estimation of annual energy efficiency sales if the program had never been launched.

factors, including customer surveys, engineering estimates, historical program experiences and industry research.<sup>63</sup>

The analysis then used measure-life information to calculate savings in each year for each measure. The energy savings information, along with the marginal values of energy and capacity (only for electrical savings), was used to estimate monetary benefits resulting from energy savings. In making this calculation, Efficiency Manitoba used marginal values of electrical energy and capacity based on on-peak and off-peak seasonal values developed by Manitoba Hydro.<sup>64</sup> Similarly, natural gas marginal values are based on natural gas primary pricing and natural gas purchasing and transportation costs.<sup>65</sup>

This detailed measure-level information, aggregated up to programs then bundles, yields the information in the tables below. The electric bundles distribution of savings shows that the bundles targeted at commercial and industrial customers, and agriculture, produce over 90% of the savings of the plan. However, examined more closely, over 70% of total electric portfolio savings comes from two bundles within the “Commercial, industrial and agricultural” sector: “Renovation” and “Load displacement.” This concentration is discussed in the Deliverability section of this report.

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<sup>63</sup> 2020/23 Efficiency Plan, pdf page 227 of 591, Line 475 – 482.

<sup>64</sup> 2020/23 Efficiency Plan, pdf page 130 & pdf page 228.

<sup>65</sup> 2020/23 Efficiency Plan, pdf page 229

Sector	DSM Bundle	Total Three-Year Savings (Kwh)	Savings %
Residential	Direct Install	5,693,673	0.6%
	Product Rebates	34,696,632	3.9%
	Home Renovation	15,278,433	1.7%
	New Homes \$ MR	10,612,322	1.2%
	Home EE Kits & Education	2,507,292	0.3%
Income Qualified Programs	Income Qualified	7,881,921	0.9%
Indigenous Programs	Insulation and Direct Install	791,367	0.1%
	Small Business	1,185,774	0.1%
	Metis Income Qualified	554,441	0.1%
	Community Geothermal	3,255,840	0.4%
Commercial, Industrial, & Agriculture	Small Business & Appliance	45,655,479	5.2%
	In Suite Efficiency	3,019,822	0.3%
	Renovation	309,292,587	35.1%
	HVAC & Controls	10,312,458	1.2%
	New Construction & HPB	21,915,904	2.5%
	Custom	70,646,282	8.0%
Emerging Technology Program	Load Displacement	329,967,000	37.5%
	Emerging Technology	6,880,972	0.8%
<b>Total</b>		<b>880,148,200</b>	<b>100%</b>

**Table 15: Three-year Savings by DSM Bundle – Electric Portfolio**

The natural gas bundles distribution of savings shows that the bundles targeted at commercial and industrial customers and agriculture produce only about 2/3 of the natural gas savings. Specifically, the savings from the Income Qualified segment within the natural gas portfolio is much more significant than savings from the Income Qualified segment within the electric portfolio.

Efficiency Manitoba also includes in its savings estimates projected interactive effects for some programs, which are discussed below.

Sector	DSM Bundle	Total Three-Year Savings (m3)	Savings %
Residential	Direct Install	499,384	1.9%
	Product Rebates	1,205,670	4.7%
	Home Renovation	2,737,423	10.6%
	New Homes \$ MR	401,910	1.6%
	Home EE Kits & Education	139,893	0.5%
Income Qualified Programs	Income Qualified	3,237,979	12.6%
Indigenous Programs	Metis Income Qualified	157,774	0.6%
Commercial, Industrial, & Agriculture	Small Business & Appliance	958,599	3.7%
	In Suite Efficiency	346,736	1.3%
	Renovation	3,387,948	13.2%
	HVAC & Controls	2,268,681	8.8%
	New Construction & HPB	2,287,686	8.9%
	Custom	13,348,583	51.9%
Emerging Technology	Emerging Technology	332,286	1.3%
Interactive Effects	Interactive Effects	(5,585,543)	-21.7%
<b>Total</b>		<b>25,725,008</b>	<b>100%</b>

\*Note- Bundle-level PACT values do not account for interactive effects.

**Table 16: Three-year savings by DSM Bundle – Natural Gas**

### b) Measure life

After reviewing all the data in the worksheets and developing an understanding of how the savings, costs and cost effectiveness numbers in the Plan are all derived from measure characteristics, Daymark determined that additional insight into a number of important issues, including the long term impact of the three-year plan and the meaning of cost-effectiveness metrics such as net present value creation, could be provided if we first looked at the make-up of the electric and natural gas portfolio in terms of the life of the individual measures that make them up. The tables below were produced from the detailed worksheets provided by Efficiency Manitoba and shows measure savings by different five-year measure life groups. The chart not only shows the total savings associated with each group of measures but provides the cumulative impacts of the measures from the shortest-lived to the longest-lived. So, for example, for the first measure life group (measures with a lifespan of 1-5 years), the measures expected in the plan total 40% of projected three-

year electric portfolio savings. For the second group of measures (measures with a lifespan of 6-10 years) the percent of total savings is 7%, and for the third group (11-15 years), the percent of total savings is 46%. The cumulative column shows that these three groups total 93% -- that is, it shows that 93% of the electric savings project in the Plan come from measures with expected lives of 15 years or less.

In the natural gas measures table, the same format is used. The table shows that only 22% of the projected natural gas savings comes from measures with lives of 15 years or less.

Year Range	Total Three-Year Savings (kWh)	Savings as % of Total	Cumulative Savings %
1-5	348,505,184	40%	40%
6-10	65,873,774	7%	47%
11-15	400,879,233	46%	93%
16-20	21,957,879	2%	95%
21-25	24,329,811	3%	98%
26-30	13,404,729	2%	99%
31+	5,767,240	1%	100%
<b>Total</b>	<b>880,717,849</b>		

**Table 17: Savings by measure-life strata - electric**

Year Range	Total Three-Year Savings (m3)*	Savings as % of Total	Cumulative Savings %
1-5	1,112,134	4%	4%
6-10	1,070,171	3%	7%
11-15	4,785,178	15%	22%
16-20	7,843,158	25%	47%
21-25	13,344,427	43%	90%
26-30	2,864,947	9%	99%
31+	162,666	1%	100%
<b>Total</b>	<b>31,182,679</b>		

*\*Does not include program-level interactive effects.*

**Table 18: Savings by measure-life strata - natural gas**



This variation of the measure life among the portfolios is another factor that is relevant to a consideration of the economics of the measures.

**c) Cost effectiveness – a positive net present value perspective**

As discussed earlier, Regulation 119/2019 further defines the requirement to analyze cost effectiveness, stating that cost effectiveness should be analyzed by comparing “the levelized cost to Efficiency Manitoba” of the net electrical or gas savings resulting from efficiency initiatives to “the levelized marginal value to Manitoba Hydro of the net savings resulting from those initiatives.”

The most common determination of any investment, and of the funding of efficiency programs (and Efficiency Manitoba in particular) as an investment by the province, is to determine whether the value of the program is positive, in that the present value of all the costs are less than the present value of all the benefits.

To calculate this, one can begin with benefits. Each bundle contains energy savings projections for each measure in each year that the measure is in place. So, a bundle would have an energy savings value that would equal the total of the annual savings produced by each of its measures. The “Present Value” of those savings is a calculation of what all those savings are worth today using a discount factor to adjust for the fact that savings are spread out over thirty years (on the principle that a dollar I will receive in thirty years is worth less to me today than a dollar I can receive immediately). The “Net” in “Net Present Value” reflects the next step, which involves subtracting the present costs of the program from the present value of the program. (Exactly which costs and savings should be counted is an analytical question related to the choice of different cost-benefit tests, an issue which we will discuss later.) The first metric that was produced by Efficiency Manitoba shows the NPV of each bundle over 30 years, calculated incorporating the fact that measures with 5-year life spans will only affect, at most, seven years of savings (i.e., a measure installed in year 3 is project to be in place only through year 7).

The table below, for electric portfolio bundles, shows that, while the energy savings from bundles targeted at the residential, income qualified and indigenous sectors produce less than 10% of the energy savings (in kWh), they produce 14% of the value (NPV) created from the electric portfolio. The electric portfolio table also shows that 50% of the value is created in the Renovation

program that is extended to commercial, industrial and agricultural sector customers.

The table for natural gas bundles provides a very different picture. If you recall, the Efficiency Manitoba report and Table 18 showed that the NPV of the overall natural gas portfolio was approximately zero. The bundles for the residential, income qualified and indigenous sector all show a negative NPV, except for the home renovation bundle. This means that, from a simple utility cost effectiveness perspective (utilizing utility cost savings and Efficiency Manitoba costs), the costs exceed the benefits. We do not point this out to suggest the bundles should be changed dramatically or eliminated. Further examination is warranted. The bundles offered to the commercial, industrial and agricultural sector customers create positive NPV, except for the new construction bundle. The custom bundle produces a very high percentage of the overall NPV for the natural gas portfolio.

Sector	DSM Bundle	Total Three-Year Savings (Kwh)	Savings %	PACT NPV	PACT NPV %
Residential	Direct Install	5,693,673	0.6%	\$ 860,779	0.2%
	Product Rebates	34,696,632	3.9%	\$ 7,533,261	2.0%
	Home Renovation	15,278,433	1.7%	\$ 14,705,108	4.0%
	New Homes \$ MR	10,612,322	1.2%	\$ 16,885,441	4.6%
	Home EE Kits & Education	2,507,292	0.3%	\$ 353,266	0.1%
Income Qualified Programs	Income Qualified	7,881,921	0.9%	\$ 7,576,305	2.1%
Indigenous Programs	Insulation and Direct Install	791,367	0.1%	\$ 613,464	0.2%
	Small Business	1,185,774	0.1%	\$ (461,000)	-0.1%
	Metis Income Qualified	554,441	0.1%	\$ 559,019	0.2%
	Community Geothermal	3,255,840	0.4%	\$ 3,816,177	1.0%
Commercial, Industrial, & Agriculture	Small Business & Appliance	45,655,479	5.2%	\$ 9,945,000	2.7%
	In Suite Efficiency Renovation	3,019,822	0.3%	\$ 1,055,321	0.3%
	HVAC & Controls	309,292,587	35.1%	\$ 187,956,512	50.9%
	New Construction & HPB	10,312,458	1.2%	\$ 5,501,208	1.5%
	Custom	21,915,904	2.5%	\$ 9,311,153	2.5%
	Load Displacement	70,646,282	8.0%	\$ 37,133,059	10.1%
Emerging Technology Program	Emerging Technology	329,967,000	37.5%	\$ 61,521,326	16.7%
		6,880,972	0.8%	\$ 4,156,484	1.1%
<b>Total</b>		<b>880,148,200</b>	<b>100%</b>	<b>369,021,884</b>	<b>100%</b>

**Table 19: Savings and PACT NPV \$ by sector and bundle – Electric**

Sector	DSM Bundle	Total Three-Year Savings (m3)	Savings %	PACT NPV*	PACT NPV %
Residential	Direct Install	499,384	1.9%	\$ (165,898)	-0.8%
	Product Rebates	1,205,670	4.7%	\$ (402,307)	-1.8%
	Home Renovation	2,737,423	10.6%	\$ 1,481,619	6.7%
	New Homes \$ MR	401,910	1.6%	\$ (491,953)	-2.2%
	Home EE Kits & Education	139,893	0.5%	\$ (242,659)	-1.1%
Income Qualified Programs	Income Qualified	3,237,979	12.6%	\$ (8,887,742)	-40.2%
Indigenous Programs	Metis Income Qualified	157,774	0.6%	\$ (519,356)	-2.4%
Commercial, Industrial, & Agriculture	Small Business & Appliance	958,599	3.7%	\$ 540,611	2.4%
	In Suite Efficiency Renovation	346,736	1.3%	\$ 350,568	1.6%
	HVAC & Controls	3,387,948	13.2%	\$ 3,773,917	17.1%
	New Construction & HPB	2,268,681	8.8%	\$ 3,772,840	17.1%
	Custom	2,287,686	8.9%	\$ (2,692,833)	-12.2%
Emerging Technology	Emerging Technology	13,348,583	51.9%	\$ 25,683,933	116.2%
Interactive Effects	Interactive Effects	332,286	1.3%	\$ (103,619)	-0.5%
		(5,585,543)	-21.7%		0.0%
<b>Total</b>		<b>25,725,008</b>	<b>100%</b>	<b>22,097,121</b>	<b>100%</b>

\*Note- Bundle-level PACT values do not account for interactive effects.

Table 20: Savings and PACT NPV \$ by sector and bundle – Natural Gas

### C. Cost effectiveness – multiple perspectives

The question of cost effectiveness can be approached from multiple perspectives, depending on which costs and benefits are included in the analysis and whether programs are analyzed as single entities, or whether the analysis breaks down programs into smaller components and looks at the individual cost-effectiveness of each program.

In our analysis of Efficiency Manitoba’s work, we look at cost-effectiveness from multiple perspectives, including two types of cost effectiveness tests and applying the analysis to multiple levels of program aggregation.

#### 1. Cost effectiveness tests

There are several different “tests” that can be used in the cost-effectiveness analysis of efficiency programs, each of which looks at the benefits and costs of programs from different perspectives. As directed by the act and the regulations in its Plan, Efficiency Manitoba provides the results of the Program

Administrator Cost Test (PACT). This is a common approach used by many other jurisdictions, and we analyze PACT findings below. Another test commonly used as a supplement to the PACT is the Total Resource Cost Test (TRC Test). Although the results were not reported in the Plan, Efficiency Manitoba did in fact do the analysis necessary for TRC tests, and in our discussion, we will include TRC analysis. Below, we discuss what these tests are and what they measure.

The metric for these tests can be either the NPV, as discussed above, or a Benefit-Cost Ratio. The metrics deal with the same costs and benefits. While the NPV is a true measure of value created, it is not helpful in comparing the quantity of energy savings produced by individual programs. As an example, in the electric bundle savings breakdown (Table 20, above), we see that the renovation and the load displacement bundles produce about the same energy savings but have markedly different NPV results. This suggests a large difference in costs of the bundle. Often, instead of the net present value, it is helpful to see the amount of benefits created, compared to the costs, in ratio form. Thus, the NPV and ratio metrics work in concert with each other. A Benefit-Cost ratio of 1.0 means that benefits equal costs. In this case, the NPV would be zero. A benefit-cost ratio of 2.0 means that costs are equal to half the benefits. The corresponding NPV for a B/C ration of 2.0 would depend on the size of the program.

## 2. Program Administrator Cost Test (PACT)

The PACT focuses on the costs and savings of a program from the program administrator's point of view. For utility-run energy efficiency programs, a PACT test (also sometimes called a Utility Cost Test) would look at the utility's costs to administer a program and compare this to what the utility saves because of the program. Savings would consist primarily of savings on the cost of providing electricity and/or natural gas service, including both immediate energy generation or purchase costs and longer-term costs associated with building the capacity required to meet energy demand. Savings in these areas, in turn, translate into a reduction in the payments collected from customers. The PACT analysis deals with the costs and benefits as described in the Efficiency Manitoba Act and the Efficiency Manitoba Regulations. In the case of Efficiency Manitoba, the program administrator is Efficiency Manitoba, but the savings are realized by Manitoba Hydro and Centra and their customers—so

when we develop a ratio within the PACT, the savings to the utility and its customers is compared to Efficiency Manitoba's costs.

A major advantage of the PACT is the relative accessibility and reliability of the necessary data. Because the PACT measures program administrator and utility costs and benefits, program administrators and utilities have good access to this information. In addition, in the case of the Efficiency Manitoba Plan, the PACT is also a perfect match for the testing approach required by Regulation 119/2019, which calls for a comparison of "the levelized cost to Efficiency Manitoba" of the net electrical or gas savings resulting from efficiency initiatives to "the levelized marginal value to Manitoba Hydro of the net savings resulting from those initiatives."

### 3. Other cost effectiveness analyses

As described above, the legislation and regulations pertaining to Efficiency Manitoba mandate the use of a cost-effectiveness test that is consistent with the Program Administrator Cost Test (PACT). Within its worksheets and models, Efficiency Manitoba did calculate two additional tests: Total Resource Cost Test, and a version of a Ratepayer Impact Analysis. In this, Efficiency Manitoba followed a practice common among energy efficiency programs in Canadian provinces including New Brunswick, Ontario, and British Columbia. In each of these cases, regulations provide that the PACT either must or may be supplemented by additional tests—by the Total Resource Cost Test, in Ontario and British Columbia, and by the Participant Cost Test, in New Brunswick. In addition, Nova Scotia utilizes the PACT test to determine which programs should be pursued.

Below, we discuss these four supplementary tests and their potential relevance for Manitoba. We also discuss the Societal Cost Test, which may be considered either an additional supplementary test or an expanded version of the Total Resource Cost Test.

**Participant Cost Test.** The Participant Cost Test (PCT), used in New Brunswick as a supplement to the PACT, includes only quantifiable costs and benefits to program participants—the homeowner, renter, or business owner who adopts a DSM measure. Such benefits would typically include items like utility bill reductions, rebates, or tax benefits. Costs would include any investment the participant makes to take advantage of a DSM program—money spent purchasing a new appliance, for example, or spending on promoted home

improvements. Because the costs reflected in the Participant Cost Test are also incorporated in the Total Resource Cost Test, this test has not been separately called out in our review. While this test does have the potential to show the economics of participating in a program, it does not provide an indication if the program is economic for the utility.

**Ratepayer Impact Measure (RIM) Test.** Another test that is sometimes used in evaluating utility programs is the ratepayer impact test. This test brings in the revenue reduction from customers due to lower consumption from participants in programs, which is termed ‘lost revenue’. This test is not a cost-effectiveness test, but it is an approach to measuring possible bill impacts on hypothetical non-participating customers who would help to support program costs without benefitting directly from savings related to program participation. In the case of a large energy efficiency program, lasting many years and prioritizing wide outreach, one of the challenges of such a test is that, while some customers may reduce their energy consumption more than others, it is not clear that there will be a group of permanent total non-participants over the course of a fifteen-year program. Daymark does not advocate using the RIM ratio or economics at the program level.

The Efficiency Manitoba Regulation 119/2019, Section 11(g), requires the PUB, in its review, to consider “the impact of the efficiency plan on rates and average customer bill amounts.” Noting the difficulty of a full ratepayer impact calculation in the absence of a full rate study, Efficiency Manitoba approaches the analysis of the likely rate impacts of the program, not from the perspective of individual customers, but in overall terms, asking what rate changes would be needed to fund the program, leveling the costs of the program over 30 years. We will be discussing this within a separate section of the report.

**Total Resource Cost Test and Societal Cost Test.** The Total Resource Cost Test (TRC Test) brings in additional information about the economy-wide effects of a program by including customer (and sometimes other local or regional) costs and expenses that do not pass through the utility or program administrator. For example, for a home retrofit program, for which the program administrator provides expertise and subsidies, but homeowners pay some costs as well, the TRC Test incorporates the additional customer costs of program participation. On the benefits side, the TRC Test, applied to a utility’s service territory, might include any applicable federal tax credits for which customers become eligible as a result of participation in efficiency programs.

There is some variation in the other benefits generally included in a TRC Test. The value of greenhouse gas emissions reductions, for example, is included in some TRC tests, but not in others. As a more and more comprehensive set of social benefits and costs are monetized and included, the TRC Test expands into a broad test of all social costs and benefits associated with a program, a test which is sometimes referred to as the “Societal Cost Test.” We have not attempted a full societal cost test in our analysis; however, our TRC Test does include the following:

- Program Administrator costs
- Estimates of additional costs covered by customers
- Program benefits (either in terms of customer savings or utility savings)
- Benefits of avoiding federal charges for greenhouse gas emissions
- Benefits of reduced water consumption associated with energy efficiency programs

The TRC Test does have some limitations and challenges. Once you get beyond utility (or program administrator) costs and benefits, it can be harder to measure these and to know what to count. For example, if a customer spends money on an energy efficient air conditioner, should the full expense be counted? Or just some additional amount that could be attributed to the “high efficiency” quality of the air conditioner, given that the customer probably would have spent money on some air conditioner, even in the absence of incentives? Similarly, not all benefits are easy to monetize and/or quantify. For example, customers may experience increased comfort at home due to weatherization, but it is difficult to attach a specific monetary value to this, so this kind of benefit is often omitted from TRC testing (comfort benefits are not included in our analysis, for instance). However, while keeping these limitations in mind, TRC testing can be a helpful tool in thinking about the overall impact of programs on Manitoba as a whole.

**a) Non-energy benefits**

In addition to direct energy savings, the energy efficiency programs could also provide other non-energy benefits (NEBs) from installing energy efficiency measures. Typical non-energy benefits could include benefits such as reduced costs for operation and maintenance associated with efficient equipment or



practices or reduced environmental and safety costs.<sup>66</sup> There are NEBs attributable to both participants and to society at large.

Although the PACT analysis – the primary cost-effectiveness as per the Efficiency Manitoba Regulation 119/2019 Section 12 (1) and (2), does not consider any non-energy benefits, Efficiency Manitoba included a couple of non-energy benefits in its TRC analysis. Specifically, benefits associated with reduced greenhouse gas emissions and reduced water consumption are the only non-energy benefits quantified and included in the program selection and evaluation.<sup>67</sup>

The difference between TRC and PACT benefits provides non-energy benefits. Daymark calculated portfolio-level NEBs by taking the difference between TRC NPV benefits and PACT NPV benefits estimated by Efficiency Manitoba. We also present NEBs as a percentage of total PACT<sup>68</sup> and TRC benefits. For the electric portfolio, the total NEBs considered comprise of just 4% of the total PACT benefits. Whereas, for the natural gas portfolio, the non-energy benefits are sizeable as compared with either PACT benefits or TRC benefits, primarily attributed by benefits associated with the GHG savings.<sup>69</sup> The non-energy benefits are 61% of total PACT benefits and 38% of total TRC benefits.

Portfolio	PACT Benefits (\$ Million)	TRC Benefits (\$ Million)	Non-energy benefits (\$ Million)	NEB as % of PACT Benefits (additional)	NEB as % of TRC Benefits
Electric	497.0	517.7	20.8	4%	4%
Natural Gas	59.1	94.9	35.8	61%	38%

**Table 21: Portfolio-level non-energy benefits considered in 2020-2023 Efficiency Plan**

<sup>66</sup> Non-energy Impacts Approaches and Values: An Examination of the Northeast, Mid-Atlantic, and Beyond. Northeast Energy Efficiency Partnerships: NEEP. <https://neep.org/file/5856/download?token=u0ZVJqYq>

<sup>67</sup> Response to EM/AMC I-14.

<sup>68</sup> We present NEBs as percentage of PACT benefits to the comparison purpose only. As mentioned in the Report, NEBs are not considered in PACT benefits.

<sup>69</sup> GHG gas emission were estimated using Manitoba Hydro natural gas GHG emission factor of 0.0019 tonnes CO<sub>2</sub>eq /m<sup>3</sup> for the industrial, commercial, and residential combustion of natural gas. (Source: 2020/23 Efficiency Plan, Appendix A- Section A2, pdf pages 229 and 230)



It is a possibility that Efficiency Manitoba could consider other non-energy benefits in its TRC analysis in the future. In the filing, Efficiency Manitoba highlighted other types of non-energy benefits such as reduced waste, economic benefits, societal benefits, improved comfort and convenience, and savings through reduced maintenance frequency. In any event when Efficiency Manitoba considers any additional non-energy benefits in the future, they should be rigorously quantifiable, and the methodology used in estimating should be reviewed by other stakeholders and technical consultants.

#### **b) Interactive effects**

Efficiency Manitoba adjusted the total electric and natural gas savings by accounting the potential change in respective fuel consumption as a result of installing energy efficiency measures. This impact, known as interactive effects, can either increase or decrease energy consumption.<sup>70</sup> An example of such an effect is the increase in fuel for heating requirement (or decrease in cooling requirement) as a result of heat loss from lighting fixtures after installing efficient types. Both electric and natural gas savings and cost-effective analyses are adjusted with the respective interactive effects.

For facilities and homes heated by electricity, the increased electric heating requirements are subtracted from the electric measure savings. For facilities and homes that are electrically cooled, the decreased cooling requirements are added to the measure savings. The net measure savings after considering the estimated heating and cooling interactive effects are used in the measure forecasts in the 2020/23 Efficiency Plan.<sup>71</sup> Similarly, increases in natural gas usage due to the interactive effects from electricity DSM programs are treated as a reduction in natural gas saving for purposes of net savings and percent of the target achieved.<sup>72</sup>

#### **4. Levels of analysis**

In addition to looking at cost effectiveness from the point of view of different cost effectiveness tests, another way to get additional insight is to look at different levels of analysis. In Efficiency Manitoba's Plan, individual efficiency measures are combined into programs, programs are combined into bundles

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<sup>70</sup> 2020/23 Efficiency Plan, pdf page 226 & 227, line 462-468.

<sup>71</sup> Response to Daymark/EM I-40.

<sup>72</sup> Response to PUB/EM I-6.

targeted at customer segments, and bundles roll up into the electric and natural gas portfolios.

In our cost effectiveness analysis, in addition to looking at portfolios, bundles, and programs, we worked with the Efficiency Manitoba data to drill down to the measure level, in order to be able to identify any individual measures that were particularly successful or unsuccessful from the standpoint of cost-effectiveness. There are some challenges in going to the measure level of analysis, as some judgment must be applied to questions of how administrative costs should be assigned to individual measures and whether the benefits of an individual measure (say, a measure contained within a home retrofit) can be counted separately from the measures that accompany it. However, our analysis was facilitated by the fact that, although measure-level results are not reported publicly in Efficiency Manitoba's plan, for most measures, Efficiency Manitoba already had measure-level cost and benefit estimates. We have included a review of this measure-level analysis in our work utilizing only measure costs as will be discussed below.

#### **D. PACT benefit cost ratio analysis**

Efficiency Manitoba estimated the PACT benefit/cost ratio utilizing measure-level benefit-cost analysis along with additional cost considerations.<sup>73</sup> Efficiency Manitoba reported the portfolio-level PACT ratios in the Filing. Bundle-level and program-level PACT ratios were estimated in their workpapers. This section discusses PACT ratio results at the portfolio level and bundle level.

As shown in Table 22, the electric portfolio included in 2020-2023 Plan has a PACT ratio of 3.27 – meaning utility benefits for successfully administering and delivering programs proposed in 2020-2023 plan are at least three times the cost of the program. However, the PACT ratios at the bundle level vary. The bundle-level PACT ratios along with the energy savings of electric portfolio are presented in Table 22<sup>74</sup> where bundles are arranged from high to low PACT ratios. The bundle-level PACT ratios show that all electric bundles proposed for 2020/2023 Plan have a PACT ratio of greater than one showing that, at the bundle-level, utility benefits associated with avoided cost is larger than the cost for delivering these bundles.

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<sup>73</sup> The additional costs are related with associated with program support, delivery, administration, enabling strategies and corporate overhead.

<sup>74</sup> Please note that PACT ratios estimated at the bundle-level do not account for any support cost added at the portfolio-level.

In terms of cost-effectiveness from the utility’s perspective at the bundle level, PACT results show that the new homes & major renovation bundle is the most favorable. However, this bundle comprises only about 1% of the total savings of electric portfolio. The next two bundles on the list - custom and renovation – have very high PACT ratios and also represent almost 43% of total savings. Both bundles have a PACT ratio of around 5, meaning utility benefits are around five times larger than the utility cost at the present value. Efficiency Manitoba’s analysis shows that load displacement<sup>75</sup>, which is projected to deliver 37.5% of the savings, has a PACT ratio of 3.72.

Description	Total Three-Year Electric Savings (GWh)	PACT Ratio
2020-2023 Electric EE Plan	880.1	3.27

**Table 22: Portfolio level results (GWh and PACT ratio)**

<sup>75</sup> We discuss the consideration of load displacement bundle in EM’s plan and its potential impact in savings target and cost-effectiveness in later part of the Report.

<b>DSM Bundle</b>	<b>Total Three-Year Electric Savings (GWh)</b>	<b>PACT Ratio</b>
New Homes & MR	10.6	6.56
Custom	70.6	5.18
Renovation	309.3	4.97
Community Geothermal	3.3	4.03
Load Displacement	330.0	3.72
Emerging Technology	6.9	2.96
New Construction & HPB	21.9	2.95
Home Renovation	15.3	2.90
HVAC & Controls	10.3	2.81
Income Qualified	7.9	2.80
Metis Income Qualified	0.6	2.58
In Suite Efficiency	3.0	2.48
Small Business & Appliance	45.7	2.30
Insulation and Direct Install	0.8	1.90
Product Rebates	34.7	1.74
Home EE Kits & Education	2.5	1.61
Direct Install	5.7	1.53
Small Business	1.2	0.57
Program Support	-	-
<b>Total</b>	<b>880.1</b>	<b>3.27</b>

**Table 23: Bundle level results**

For natural gas, the overall portfolio-level PACT ratio, shown in Table 24, is 0.99 – meaning, at the net present value, the cost associated with the three-year Plan is slightly lower than the benefits. However, at the bundle level, the PACT ratio varies considerably.

Description	Total Three-Year Natural Gas Savings (million cu m)	PACT Ratio
2020-2023 Natural Gas EE Plan	25.7	0.99

**Table 24: Portfolio level results (cu m and PACT ratio)**

Table 25 presents the bundle level PACT ratios of the natural gas portfolio. There are 8 bundles out of 14 that have PACT ratios less than 1. However, the remaining 6 natural gas bundles that have a PACT ratio greater than 1 comprised almost three-quarters of natural gas savings.<sup>76</sup> The 8 bundles that have a PACT ratio less than 1 represent the remaining quarter of total savings.

The bundles considered for the commercial, industrial, & agriculture sectors are more favorable than bundles developed for other sectors. Out of six bundles that have a PACT ratio greater than one, five of them belong to the commercial, industrial, & agriculture sector, and these five bundles represent 65% of the total natural gas savings.<sup>77</sup>

There could be different reasons for the PACT ratio of many natural gas bundles to be lower than one. As discussed earlier in the Report, the PACT ratio only considers benefits associated with the avoided cost and utility cost for delivering these bundles. It could be that the measures considered in the bundles that have low PACT ratios are delivering less savings. It is also a possibility that Efficiency Manitoba’s Plan bears most of the cost<sup>78</sup> for implementing measures included in the bundle. We discuss the PACT test under the lens of other cost effectiveness testing in the next section of the report.

<sup>76</sup> The six bundles with PACT ratio greater than 1 have represent 73.4% (23.05 million out of 31.31 million) of the total natural gas savings. The natural has savings used in this calculation are not adjusted for interactive effects

<sup>77</sup> The percentage is estimated without accounting for interactive effects (20.31 million out of 31.31 million cu m savings)

<sup>78</sup> The other portion of the total cost for delivering Bundles are net customer cost contributed by participating customers

DSM Bundle	Total Three-Year Savings (m3)	PACT Ratio
Custom	13,348,583	6.51
In Suite Efficiency	346,736	3.15
HVAC & Controls	2,268,681	2.59
Small Business & Appliance	958,599	1.75
Renovation	3,387,948	1.60
Home Renovation	2,737,423	1.20
Emerging Technology	332,286	0.89
Product Rebates	1,205,670	0.79
Direct Install	499,384	0.78
New Homes & MR	401,910	0.72
New Construction & HPB	2,287,686	0.59
Income Qualified	3,237,979	0.49
Metis Income Qualified	157,774	0.44
Home EE Kits & Education	139,893	0.41
Program Support	-	-
Interactive Effects	(5,585,543)	-
<b>Total</b>	<b>25,725,008</b>	<b>0.99</b>

**Table 25: Bundle level results**

The natural gas bundles have a considerable amount of savings from bundles that are technically uneconomic from the perspective of the PACT, with ratios below 1.0. The table also included the estimated interactive effects, where introducing electric efficiency measures cause a higher heating requirement for natural gas heated structures and thus increase natural gas usage or reducing the net change in natural gas savings.

The cost-effective test results show that the adjustment of interactive effects, related with the installation of electric measures, in natural gas savings reduces the overall benefits of natural gas portfolio.<sup>79</sup> Daymark agrees that interactive effects should be considered in the analysis. However, in order to assess the

<sup>79</sup>Although this approach reduces natural gas portfolio's cost effectiveness, Efficiency Manitoba mentioned that it would not appropriate to convert the increased natural gas consumption into an equivalent amount of electricity because this would not reflect the actual energy consumption change that is occurring in the province and it would not accurately reflect the actual net savings achieved by the DSM Program portfolio. Moreover, Efficiency Manitoba mentioned that this approach is consistent with the approach previously used by Manitoba Hydro. (Source: Response to Coalition/EM I-6(c))

cost-effectiveness of the “natural gas only” portfolio only, it is important to consider the results by not considering interactive effects as well. **Table 26** shows PACT results with and without considering interactive effects.<sup>80</sup> The overall natural gas portfolio has PACT ratio of 0.99 but when interactive effects are not considered the PACT ratio increases to 1.24.

	PACT ratio	PACT NPV cost	PACT levelized cost (¢/m <sup>3</sup> )
Program only metrics	1.42	\$22 mil.	13.03
No interactive effects metrics	1.24	\$14.4 mil.	14.96
Overall portfolio metrics	0.99	(\$0.8 mil.)	18.69

*Note: Program only metrics do not include impact of interactive effects, enabling strategies or corporate overhead. Overall portfolio metrics include these impacts. No interactive effects metrics do not include impact of interactive effects but do include costs associated with enabling strategies and corporate overhead*

**Table 26: Cost effectiveness of natural gas portfolio with and without considering interactive effects**

### E. Total Resource Cost (TRC analysis)

As a supplement to the PACT analysis, Daymark reviewed program and bundle cost-effectiveness from the point of view of the Total Resource Cost test, which includes any customer costs for program participation, as well as benefits associated with greenhouse gas emission reductions and water conservation.

Overall, as can be seen in Table 27, below, for the electric portfolio, the inclusion of additional costs in the TRC Test reduced the benefit/cost ratio, while still leaving the electric portfolio showing benefits more than twice as great as costs.

<sup>80</sup> Response to Coalition/EM I-6(d)

Description	Total Three-Year Electric Savings (GWh)	PACT Ratio	TRC Ratio
2020-2023 Electric EE Plan	880.1	3.27	2.05

**Table 27: Electric Portfolio level Cost Effectiveness results**

At the bundle level, as shown in Table 28, the results from the TRC test show that, for the electricity portfolio, almost all proposed bundles continue to show benefits exceeding costs (with the exception being emerging technologies). In some cases, however, the numbers do shift considerably. This shift makes sense, in the case of items such as “new homes and major renovations,” for which one would anticipate that considerable customer investment is required. On the other hand, TRC ratios higher than PACT ratios reflect programs involving incentives or payments to customers that go beyond the cost of the measure itself.



<b>DSM Bundle</b>	<b>Total Three-Year Electric Savings (GWh)</b>	<b>PACT Ratio</b>	<b>TRC Ratio</b>
New Homes & MR	10.6	6.56	1.74
Custom	70.6	5.18	1.58
Renovation	309.3	4.97	2.52
Community Geothermal	3.3	4.03	22.26
Load Displacement	330.0	3.72	5.64
Emerging Technology	6.9	2.96	0.56
New Construction & HPB	21.9	2.95	1.19
Home Renovation	15.3	2.90	1.92
HVAC & Controls	10.3	2.81	2.24
Income Qualified	7.9	2.80	3.46
Metis Income Qualified	0.6	2.58	2.94
In Suite Efficiency	3.0	2.48	3.09
Small Business & Appliance	45.7	2.30	2.40
Insulation and Direct Install	0.8	1.90	2.07
Product Rebates	34.7	1.74	1.24
Home EE Kits & Education	2.5	1.61	3.14
Direct Install	5.7	1.53	1.99
Small Business	1.2	0.57	0.80
Program Support	-	-	-
<b>Total</b>	<b>880.1</b>	<b>3.27</b>	<b>2.05</b>

**Table 28: Electric Bundle level Cost Effectiveness results**

For the natural gas portfolio, application of the TRC Test actually results in a slight improvement in the reported benefit/cost ratio, as can be seen in Table 29, below, reflecting the additional value of greenhouse gas emissions reductions being counted as part of the TRC analysis.

Description	Total Three-Year Natural Gas Savings (million cu m)	PACT Ratio	TRC Ratio
2020-2023 Natural Gas EE Plan	25.7	0.99	1.00

**Table 29: Natural Gas portfolio level cost effectiveness results**

Drawing on Efficiency Manitoba’s workpapers, we examined the TRC Ratio for bundles in the natural gas portfolio, compared to PACT ratios, shown in Table 30.

DSM Bundle	Total Three-Year Savings (m3)	PACT Ratio	TRC Ratio
Custom	13,348,583	6.51	3.62
In Suite Efficiency	346,736	3.15	4.47
HVAC & Controls	2,268,681	2.59	1.88
Small Business & Appliance	958,599	1.75	6.83
Renovation	3,387,948	1.60	1.84
Home Renovation	2,737,423	1.20	0.79
Emerging Technology	332,286	0.89	0.32
Product Rebates	1,205,670	0.79	0.49
Direct Install	499,384	0.78	1.81
New Homes & MR	401,910	0.72	0.32
New Construction & HPB	2,287,686	0.59	0.37
Income Qualified	3,237,979	0.49	0.92
Metis Income Qualified	157,774	0.44	0.84
Home EE Kits & Education	139,893	0.41	2.97
Program Support	-	-	0.00
Interactive Effects	(5,585,543)	-	-
<b>Total</b>	<b>25,725,008</b>	<b>0.99</b>	<b>100%</b>

**Table 30: Natural Gas Bundle level Cost Effectiveness results**

The natural gas bundle level results show dramatic improvement for three bundles: Direct Install, Home Energy Kits, Income Qualified, and Metis Income Qualified. The results also show substantial decreases for Product Rebates, New Home & MR, and emerging technology.

Overall, however, the TRC test does not dramatically change the cost-benefit picture at the portfolio level.

## **F. Testing energy efficiency measure values**

In the prior sections of this cost effectiveness review, the data has shown that there are few natural gas bundles that have PACT and TRC ratios below 1.0. Reflecting on the dynamics between the benefits and the different type of costs we thought some additional drill down to the measure level could be helpful. The most basic question that we wanted to answer is, “Is it good for Manitoba for a measure to get installed, whether there is a program or not?”. In order to answer this question, we had to select a cost effectiveness test that was appropriate. We felt that the Manitoba perspective from the benefits side would include at least the marginal value of electricity for electric saving measures and the marginal value of natural gas plus the value of GHG reduction for natural gas savings measure, along with the value of water savings. These are the same benefits as described above in the TRC Test. There are other benefits that could be included in the total resource cost analysis such as non-energy benefits but for now the we are working with the benefits prescribed in the Act and Regulations.

The next question is, “What costs are relevant to answer the question posed for Manitoba at the measure level?” The costs that Daymark is choosing as most relevant are only the costs of the measure itself. That would be, for example, the incremental cost of an efficient piece of equipment compared to a standard piece of the functionally similar equipment. If we wanted to think in program terminology, it would be the sum of participant cost and utility incentive. In this report we are going to refer to this test as the Pure Measure Value Test (PMVT). This PVMT will indicate whether it is good for Manitoba if someone installs a measure without any program existing.

Why is this important? Efficiency Manitoba, in order to meet the target savings established in the ACT and regulations, has put forward a natural gas portfolio where some bundles are producing negative NPV or PACT and TRC ratios less than one. Is this the result of choosing poor measures that do not save enough energy and dollars, or is this the result of having to expend relatively high amounts on program related costs too high? The answer to this question may determine what, if anything, should be changed in the Plan.

Thus, we performed the PMVT on each measure, electric and natural gas. In Table 31 below we show that at the electric portfolio level 4% of the savings come from measures for which the measure cost alone is larger than the benefits. We calculate how removing those measures from the Plan would increase the PACT ratio and the TRC ratio. Similarly, the natural gas portfolio gets 25% of its savings from measures for which the measure cost exceeds the benefits.

Description	Total Three-Year Energy Savings (GWh or million cu m)	PACT Ratio	TRC Ratio	Savings from measures with PMVT ratios <1
2020-2023 Electric EE Plan	880.1	3.27	2.05	4%
2020-2023 Natural Gas EE Plan	25.7	0.99	1.00	25%

**Table 31: Portfolio-level results after the pure measure value test**

This analysis should not be taken as a recommendation to reduce the portfolios or eliminate certain measures. The PACT, TRC and Daymark created PMVT to all look at the energy efficiency program investments in the three-year period in isolation. By this we mean that our analysis does not consider any residual benefits associated with these investments after the measure life of those installed. An example of why this may be important relates to market transformation. An objective of every energy efficiency program is to help the technology become mainstream, either due to customer acceptance or through the technology becoming part of codes & standards. That benefit is not considered in the calculation of the cost effectiveness of the bundles in this Plan.

There can be additional bundle strategic values which are not included in Efficiency Manitoba’s or Daymark’s analyses, such as:

- Market transformation
- Societal benefits
- Important to the local economy, etc.

With this discussion as context, we can now look at the bundles and see what portion of any bundles have measures that perform relatively poorly from an economic perspective.

Table 32: Bundle-level results after pure measure value test – electric portfolio shows that five electric saving bundles have significant savings associated with low PMVT ratio measures;

- New construction & HPB
- Home renovation
- HVAC & Controls
- Direct Install

These bundles warrant some more detailed evaluation to see if all the measures should remain in the offering.

DSM Bundle	Total Three-Year Electric Savings (GWh)	PACT Ratio	TRC Ratio	Savings from measures with PMVT ratios < 1
New Homes & MR Custom	10.6	6.56	1.74	0%
Renovation	70.6	5.18	1.58	4%
Community Geothermal	309.3	4.97	2.52	0%
Load Displacement	3.3	4.03	22.26	0%
Emerging Technology	330.0	3.72	5.64	0%
New Construction & HPB	6.9	2.96	0.56	11%
Home Renovation	21.9	2.95	1.19	22%
HVAC & Controls	15.3	2.90	1.92	91%
Income Qualified	10.3	2.81	2.24	41%
Metis Income Qualified	7.9	2.80	3.46	-2%
In-Suite Efficiency	0.6	2.58	2.94	18%
Small Business & Appliance	3.0	2.48	3.09	0%
Insulation and Direct Install	45.7	2.30	2.40	0%
Product Rebates	0.8	1.90	2.07	1%
Home EE Kits & Education	34.7	1.74	1.24	9%
Direct Install	2.5	1.61	3.14	8%
Small Business	5.7	1.53	1.99	19%
Program Support	1.2	0.57	0.80	-8%
<b>Total</b>	<b>880.1</b>	<b>3.27</b>	<b>2.05</b>	<b>4%</b>

**Table 32: Bundle-level results after pure measure value test – electric portfolio**

Table 33: Bundle-level results after pure measure value test – natural gas portfolio shows that four natural gas saving bundles have the majority or all their savings associated with low PMVT ratio measures;

- Emerging technology
- New construction & HPB
- New home & major renovation
- Product rebates

These bundles warrant some more detailed evaluation to see if all the measures should remain in the offering.

DSM Bundle	Total Three-Year Savings (m3)	PACT Ratio	TRC Ratio	Savings from measures with PMVT ratios < 1
Custom	13,348,583	6.51	3.62	1%
In Suite Efficiency	346,736	3.15	4.47	27%
HVAC & Controls	2,268,681	2.59	1.88	0%
Small Business & Appliance	958,599	1.75	6.83	13%
Renovation	3,387,948	1.60	1.84	3%
Home Renovation	2,737,423	1.20	0.78	55%
Emerging Technology	332,286	0.89	0.32	100%
Product Rebates	1,205,670	0.79	0.49	61%
Direct Install	499,384	0.78	1.81	23%
New Homes \$ MR	401,910	0.72	0.32	100%
New Construction & HPB	2,287,686	0.59	0.37	71%
Income Qualified	3,237,979	0.49	0.92	38%
Metis Income Qualified	157,774	0.44	0.84	35%
Home EE Kits & Education	139,893	0.41	2.97	0%
Program Support	-	-	0.00	0%
Interactive Effects	(5,585,543)	-	-	
<b>Total</b>	<b>25,725,008</b>	<b>0.99</b>	<b>1.0</b>	<b>25%</b>

**Table 33: Bundle-level results after pure measure value test – natural gas portfolio**

Strategically, in evaluating bundles with a relatively questionable economic and strategic value, measure life might also be something to consider. One of the strategic reasons for the increased focus on energy efficiency in the Act is to help defer or avoid a major capital project. The shorter the measure life, the less likely that the bundles are contributing to that objective.

The tables below were produced from the detailed worksheets provided by Efficiency Manitoba and show measure savings grouped by different five-year measure life strata. Table 34: Savings by measure-life Group – electric not only

shows the total savings associated with each group of measures but provides the cumulative impacts of the measures from the shortest-lived to the longest-lived. So, for example, for the first measure life group (measures with a lifespan of 1-5 years), the measures expected in the plan total 40% of projected three-year electric portfolio savings. For the second group of measures (measures with a lifespan of 6-10 years) the percent of total savings is 7%, and for the third group (11-15 years), the percent of total savings is 46%. The cumulative column shows that these three groups total 93% of savings--that is, it shows that 93% of the electric savings projected in the Plan come from measures with expected lives of 15 years or less.

In Table 35: Savings by measure-life group – natural gas, the same format is used. The table shows that only 22% of the projected natural gas savings come from measures with lives of 15 years or less.

Year Range	Total Three-Year Savings (kWh)	Savings as % of Total	Cumulative Savings %
1-5	348,505,184	40%	40%
6-10	65,873,774	7%	47%
11-15	400,879,233	46%	93%
16-20	21,957,879	2%	95%
21-25	24,329,811	3%	98%
26-30	13,404,729	2%	99%
31+	5,767,240	1%	100%
<b>Total</b>	<b>880,717,849</b>		

**Table 34: Savings by measure-life Group – electric**

Year Range	Total Three-Year Savings (m3)*	Savings as % of Total	Cumulative Savings %
1-5	1,112,134	4%	4%
6-10	1,070,171	3%	7%
11-15	4,785,178	15%	22%
16-20	7,843,158	25%	47%
21-25	13,344,427	43%	90%
26-30	2,864,947	9%	99%
31+	162,666	1%	100%
<b>Total</b>	<b>31,182,679</b>		

\*Does not include program-level interactive effects.

**Table 35: Savings by measure-life group – natural gas**

## G. Sensitivity analysis

Efficiency Manitoba conducted sensitivity testing using two different layers – discount rate and time period. First, Efficiency Manitoba adjusted the real discount rate down to 3% from the original 4%, and then adjusted the rate upward by one percent to 5%. The sensitivity analyses performed by Efficiency Manitoba are presented in the Filing Report<sup>81</sup> and are also shown in the tables below. The results can be seen in Table 36: Sensitivity results – electric portfolio for the electric portfolio and Table 37 for the natural gas portfolio. Additionally, Efficiency Manitoba tested a 15-year time period for calculating NPV, also reflected in the respective tables.

Daymark performed sensitivities on PACT NPV under a wider range of discount rates, in addition to introducing a third layer of sensitivity analysis related to savings achieved. The sensitivity analysis surrounding savings achieved allows us to look at the impact on cost-effectiveness, should there be risks of all estimated savings not being realized. In this sensitivity analysis, while costs of programs would remain the same, benefits would be lost should Efficiency Manitoba fail to reach their targeted savings. Daymark considered a sensitivity of only 80% of total savings being achieved for both electric and natural gas portfolios.

<sup>81</sup> 2020/23 Efficiency Plan, pdf page 136 & 137, Table 5.5



## 1. Electric

Table 36 also presents the results of sensitivity analyses for electric portfolio. In the electric portfolio, Efficiency Manitoba's sensitivities showed the portfolio remaining above a \$300 million PACT NPV and above a 3.00 PACT ratio, showing the programs still provide significant value when tested for different discount rates and reduced time frame of 15 years.

Daymark's sensitivities for two discount rates show that the cost-effectiveness of the electric portfolio is robust from the perspective of discount rates. With the lower discount rate of 2%, PACT values improve. And even when the discount rate of 10% is used, the PACT ratio for electric portfolio is 2.44. Daymark's sensitivity around 80% savings being achieved produced sound PACT cost-effectiveness results, even though net PACT NPV decreased by \$100 million, compared to the proposed Plan for the electric portfolio.

	<b>PACT Ratio</b>	<b>PACT NPV (millions)</b>
Base Case per Efficiency Manitoba	3.27	345.1
<b>Sensitivities Considered by EM</b>		
Discount Rate (3%)	3.47	\$380.5
Discount Rate (5%)	3.10	\$313.8
Time frame (15 years)	3.00	\$302.8
<b>Additional Sensitivities</b>		
Discount Rate (2%)	3.68	\$420.5
Discount Rate (10%)	2.44	\$200.6
Savings - Only 80% Achieved	2.62	\$245.7

**Table 36: Sensitivity results – electric portfolio**

## 2. Natural gas

The sensitivity tests around the natural gas portfolio are presented in Table 37. The sensitivity results for the natural gas portfolio point in similar directions as those for the electric portfolio; however, one thing to note is that the PACT ratio of the natural gas portfolio included in the Plan is just 0.99. So, the factors that affect cost effectiveness, such as a higher discount rate than that considered by Efficiency Manitoba and risks of savings not being fully realized, will further reduce the PACT ratios. Under the sensitivity case discount factor of

10%, the PACT ratio drops to 0.62 from 0.99. When sensitivity related to achieving only 80% of savings is considered, the PACT drops to 0.79.

Daymark’s sensitivity test on the discount rate further supports the indications of Efficiency Manitoba’s tests. Discounting the future less gives higher PACT NPV values, showing benefits may either be backloaded or more evenly distributed across time compared to the electric portfolio benefits.

Importantly, the natural gas portfolio already starts at a negative PACT NPV. Any risks associated with savings not being fully realized would only serve to push the entire portfolio further into negative values.

	PACT Ratio	PACT NPV (millions)
Base Case per Efficiency Manitoba	0.99	-0.8
<b>Sensitivities Considered by EM</b>		
Discount Rate (3%)	1.08	5.1
Discount Rate (5%)	0.90	-5.7
Time frame (15 years)	0.72	-16.6
<b>Additional Sensitivities</b>		
Discount Rate (2%)	1.20	12.1
Discount Rate (10%)	0.62	-21.2
Savings - Only 80% Achieved	0.79	-12.6

Table 37: Sensitivity results – natural gas portfolio

## H. Lifecycle Revenue Impact (LRI) analysis

### 1. Efficiency Manitoba analysis

Efficiency Manitoba used a simplified rate and bill impact analysis to provide a directional indicator of the rate impacts that are associated with the three-year Plan. Efficiency Manitoba used a Lifecycle Revenue Impact (LRI) measure to indicate an equivalent one-time change in rates (for both electric and natural gas) that is required to establish a balance between the marginal benefits and the revenue reductions/program investments of the Plan, on a net present value basis. The one-time rate increase would be in place for 30 years in this metric.

Efficiency Manitoba’s LRI analysis was completed on a 30-year net present value basis separately for both the electric and natural gas portfolios. This metric was selected as it applies the standard components of the energy efficiency rate impact measure cost test. In general, if the change in utility revenue plus the energy efficiency costs associated with a portfolio is greater than the utility benefits, the LRI will indicate an increase in rates. Similarly, if the utility benefits associated with a portfolio are greater than the change in utility revenue plus the energy efficiency costs, the LRI will indicate a decrease in rates. Therefore, the LRI test indicates the direction and magnitude (measured per unit energy) of the expected change in utility rate levels attributed to the Plan. The formula to calculate the LRI is as follows:

$$LRI = \frac{[PV(\text{Program Costs} + \text{Incentives}) + PV(\text{Revenue Loss}) - PV(\text{Marginal Benefits})]}{PV(\text{System Energy kWh})}$$

Where:

- program costs and incentives are defined consistently within the Program Administration Cost Test (PACT)
- marginal benefits are defined consistently with the PACT (levelized benefits of the marginal values)
- revenue loss includes the decrease in revenue realized by Manitoba Hydro resulting from lower electricity or natural gas sales as a result of customers’ energy savings. The revenue losses were calculated by applying the current Manitoba Hydro Rate structure<sup>82</sup> with assumed escalation to the reduced sales resulting from the efficiency programs over the 30-year period
- system energy is the Base Electric Load Forecast or Actual Natural Gas extended throughout the 30-year period

## 2. Results of Efficiency Manitoba LRI analysis – 30-year period

Table 38 and Table 39 show the LRI measures for the entire electric and natural gas portfolios respectively. The LRI metrics are represented both as an equivalent single year cents/kWh (electric) or cents/m<sup>3</sup> (natural gas) increase required, and as a percentage assuming various average electric and natural gas rates for the purposes of comparison.

<sup>82</sup> Public Utilities Board (PUB) approved rates from June 1, 2019 and November 2018 and adjusted for inflation were used for electric and natural gas respectively.

Efficiency Manitoba’s plan shows that the one-time equivalent rate increase levelized over a 30-year period was determined to be 0.019 ¢/ kWh and 0.23 ¢/ m<sup>3</sup> for electric and natural gas portfolios respectively. This corresponds to an increase of 0.32% and 1.22% from the current average base rates for electric and natural gas portfolios as shown in Table 38 and Table 39. Results are also shown for two higher electric and natural gas average rates.

	<b>One-Time Equivalent 30- Year Rate Increase</b>
LRI (¢/kWh)	0.019 ¢/ kWh
LRI Percent Increase (using 6¢/kWh)	0.32%
LRI Percent Increase (using 8¢/kWh)	0.24%
LRI Percent Increase (using 10¢/kWh)	0.19%

**Table 38: Lifecycle revenue impact results – electric portfolio<sup>83</sup>**

Similarly, for the natural gas portfolio, if the base natural gas rate of 21¢/m<sup>3</sup> is considered, a 1.10% one-time equivalent rate increase is determined through the LRI.

Table 39 below also shows the results of the directional one-time equivalent rate increase for the natural gas DSM portfolio.

	<b>One-Time Equivalent 30- Year Rate Increase</b>
LRI (¢/m <sup>3</sup> )	0.23
LRI Percent Increase (using 19¢/m <sup>3</sup> )	1.22%
LRI Percent Increase (using 21¢/m <sup>3</sup> )	1.10%
LRI Percent Increase (using 23¢/m <sup>3</sup> )	1.00%

**Table 39: Lifecycle revenue impact results – natural gas portfolio<sup>84</sup>**

<sup>83</sup> 2020/23 Efficiency Plan, Section 5.4, Page 18 of 32, Line 178.

<sup>84</sup> 2020/23 Efficiency Plan, Section 5.5, Page 19 of 32, Line 179.

### 3. Daymark review

The Daymark review found the formulas and modeling in this analysis to be proper and accurate. There is one concern; the equivalent one-time rate increase is based upon spreading the effects of the respective portfolios over 30-years. This spreads the effects of short-lived measures over 30-years, even if the measure life is only 5-years. Any rate effects from an energy efficiency measure would occur only over the measure life. The 30-year equivalent one-time rate increase would be a reasonable approximation if most of the energy savings came from long-lived, 20-year or more measures.

As discussed in an earlier section but repeated here for convenience, the tables below were produced from the detailed worksheets provided by Efficiency Manitoba and shows measure savings grouped by different five-year measure life strata. The chart not only shows the total savings associated with each group of measures but provides the cumulative impacts of the measures from the shortest-lived to the longest-lived. For example, the first measure life group (measures with a lifespan of 1-5 years), the measures expected in the plan total 40% of projected three-year electric portfolio savings. For the second group of measures (measures with a lifespan of 6-10 years) the percent of total savings is 7%, and for the third group (11-15 years), the percent of total savings is 46%. The cumulative column shows that these three groups total 93% -- that is, it shows that 93% of the electric savings project in the Plan come from measures with expected lives of 15 years or less.

In the natural gas measures table, the same format is used. The table shows that only 22% of the projected natural gas savings comes from measures with lives of 15 years or less.

Year Range	Total Three-Year Savings (kWh)	Savings as % of Total	Cumulative Savings %
1-5	348,505,184	40%	40%
6-10	65,873,774	7%	47%
11-15	400,879,233	46%	93%
16-20	21,957,879	2%	95%
21-25	24,329,811	3%	98%
26-30	13,404,729	2%	99%
31+	5,767,240	1%	100%
<b>Total</b>	<b>880,717,849</b>		

**Table 40: Savings by measure-life group – electric**

Year Range	Total Three-Year Savings (m3)*	Savings as % of Total	Cumulative Savings %
1-5	1,112,134	4%	4%
6-10	1,070,171	3%	7%
11-15	4,785,178	15%	22%
16-20	7,843,158	25%	47%
21-25	13,344,427	43%	90%
26-30	2,864,947	9%	99%
31+	162,666	1%	100%
<b>Total</b>	<b>31,182,679</b>		

*\*Does not include program-level interactive effects.*

**Table 41: Savings by measure-life group – natural gas**

#### 4. Daymark LRI analysis

To determine whether the Plan’s LRI analysis based on a 30-year levelization period presents the best indicator of how the one-time equivalent rates should be calculated, Daymark performed additional LRI tests to analyze the rate impact using levelization periods associated with the different measure lives. Daymark’s analysis used the same present value costs, benefits and loss revenue metrics as provided in the Plan and its associated work papers.

### a) Methodology

To determine the LRI<sup>85</sup> by measure life, Daymark conducted the same analysis as Efficiency Manitoba for each of the 5-year groups of measures. The difference is that the rate increases were only spread over the period equal to the highest measure life of the groups. The measures in the group with 1-5 year life produce an estimated average annual LRI for years 1 through 5. This is one piece of the rate impact for those years. All the measure groups will impact rates in years 1 through 5. The measures in the group with 5-10 year life produce an estimated average annual LRI for years 1 through 10 with similar analysis for each group. By looking at the impact of all the groups of measures, we found a much higher average rate impact in the first five years, then decreasing impacts in the subsequent 5-year periods.

- The LRI for the first five years results from all measure life groups combined, since all measures are active in the first five years.<sup>86</sup>
- The LRI for the second five years results from combining all measure life groups with lives greater than 5-years, i.e., excluding the first five years measure group.<sup>87</sup>

While over the 30-year period Efficiency Manitoba used, the impact, on a present value basis, is the same, this methodology more closely estimates the potential impact on rates in the early years. The results for the first two 5-year periods for electric and natural gas portfolios are shown in Table 42 and Table 43 respectively.

### b) Electric portfolio

The table below compares the Efficiency Manitoba LRI equivalent one-time rate increase to the Daymark estimated rate impact in the first 10-years.

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<sup>85</sup> LRI = RIM Benefits - RIM Costs – Revenue Loss

<sup>86</sup> Years 1-5, 6-10, 11-15, 16-20, 21-25, and 26-30.

<sup>87</sup> Years 6-10, 11-15, 16-20, 21-25, and 26-30.

	<b>Efficiency Manitoba One-Time</b>	<b>Measure life adjusted rate increase</b>	
		Equivalent Rate 30-year Increase	Average 1 <sup>st</sup> 5-Years
LRI (¢/kWh)	0.019	0.059	0.031
LRI Percent Increase (using 6¢/kWh)	0.32%	0.99%	0.52%
LRI Percent Increase (using 8¢/kWh)	0.24%	0.74%	0.39%
LRI Percent Increase (using 10¢/kWh)	0.19%	0.59%	0.31%

**Table 42: Electric portfolio – rate impact by measure life**

The Efficiency Manitoba LRI equivalent one-time rate increase of 0.019 ¢/kWh compares to our estimated average impact of 0.059 ¢/ kWh (0.99%) for years 1 through 5, followed by a lower an average impact of 0.031 ¢/kWh (.52%) for the years 6 through ten. There are two important observations in this comparison:

- The first five years of the electric portfolio could have a rate impact three times (3x) as large as the 30-year LRI shown in the Plan
- Both methods show a relatively small impact on rates resulting from the proposed three-year Plan

**c) Natural gas portfolio**

The table below compares the equivalent 30-year one-time rate increase to the rate increase that accounts for measure life, showing the Daymark estimated rate impact in the first 10-years for natural gas rates.



	One-Time Equivalent Rate Increase	Measure Life Adjusted Rate Increase	
		Average 1 <sup>st</sup> 5 Years	Average 2 <sup>nd</sup> 5 Years
Lifecycle Revenue Impact (¢/m <sup>3</sup> )	0.23	0.41	0.24
LRI Percent Increase (using 19¢/ m <sup>3</sup> )	1.22%	2.17%	1.25%
LRI Percent Increase (using 21¢/ m <sup>3</sup> )	1.10%	1.97%	1.13%
LRI Percent Increase (using 23¢/ m <sup>3</sup> )	1.00%	1.79%	1.03%

**Table 43: Natural gas portfolio – rate impact by measure life<sup>88</sup>**

The Efficiency Manitoba LRI equivalent one-time rate increase of 0.23 ¢/ m<sup>3</sup> (1.22%) compares to our estimated average impact of 0.41 ¢/ m<sup>3</sup> (2.17%) for years 1 through 5, followed by the impact being the same as the 30-year LRI, with an average of 0.24 ¢/ m<sup>3</sup> (1.25%) for the years 6 through 10.

There are two important observation in this comparison:

- The impact of capturing measure life in the estimate of LRI for the natural gas portfolio is less than the electric portfolio, due to the higher percentage of savings in the natural gas portfolio attributed to measures with longer lives
- The rate impact of the first five years of the natural gas portfolio could be two times (2x) as large as the 30-year LRI shown in the Plan
- For the natural gas portfolio, both methods show a relatively small impact on rates resulting from the proposed three-year Plan

V.

## PLAN FOR EVALUATION, MEASUREMENT & VERIFICATION (TRACKING)

Efficiency Manitoba is planning multiple approaches to monitor, track, and evaluate its proposed Three-year Plan. Specifically, Efficiency Manitoba is planning to monitor energy savings and budget at the measure-level with the help of the Customer Relationship Management/Demand-Side Management (CRM/DSM) System. In order to self-evaluate its program and corporate performances, Efficiency Manitoba is proposing to implement a scorecard methodology to evaluate its performances and benchmark it's outcome with other jurisdictions' energy efficiency programs. Moreover, Efficiency Manitoba

<sup>88</sup> Levelized over a 30-year period.

is planning evaluation, measurement, and verification (EM&V) of its programs and developed an EM&V Framework that was submitted with the Filing.<sup>89</sup>

The following sub-sections provide an assessment of Efficiency Manitoba's proposed plans to monitor, track, and evaluate the 2020/23 Efficiency Plan.

## **A. Efficiency Manitoba proposed Plan**

### **1. System enhancement**

Efficiency Manitoba is proposing to use the Customer Relationship Management/Demand-Side Management (CRM/DSM) System to monitor and track on savings and budget at measure and program-levels via dashboards and reports. Once the CRM/DSM system is fully deployed, the dashboard will report key parameters such as energy savings, GHG reductions, budget expenditure, and participant information, both at the program bundle-level and sector-level.<sup>90</sup> Moreover, the CRM/DSM system is planned to streamline and centralize operations from both customer-facing and internal operations perspectives.<sup>91</sup>

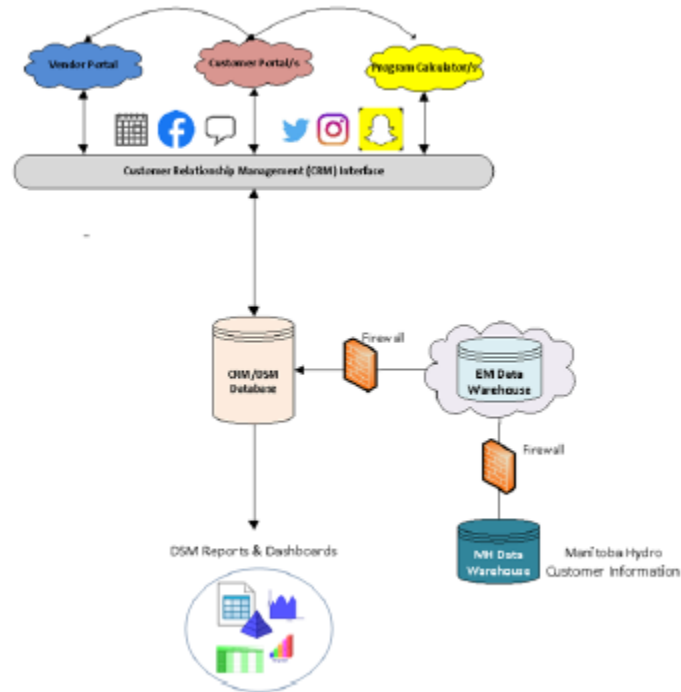
A preliminary proposed architecture of CRM/DSM system is presented in the following figure.

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<sup>89</sup> 2020/23 Efficiency Plan, Attachment 5, pdf page 549 – 591.

<sup>90</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-49.

<sup>91</sup> 2020/23 Efficiency Plan, Section 7, pdf page 180.



**Figure 15: Proposed High-Level Architecture of CRM/DSM System<sup>92</sup>**

The process for procuring and implementing CRM/DSM System is currently ongoing. Efficiency Manitoba mentioned that it plans to issue a request for proposal by December 2019, perform vendor evaluation and selection by February 2020, and start implementation work commencing by March 2020.<sup>93</sup>

As the implementation of CRM/DSM system will begin in March 2020, the full functionality of CRM/DSM functionality will not be available at the beginning of the start of the 2020-23 Efficiency Plan. The various features of the CRM/DSM system are scheduled to be live in a phased approach between August 2020 and November 2020, which is in the middle of Year 1 of the 2020-23 Efficiency Plan.<sup>94</sup> Efficiency Manitoba will continue to be using a legacy tracking system as the CRM/DSM system is fully operated. It is important to make sure that the legacy tracking system is gathering enough information that can be used for on-going program monitoring and evaluation once the program delivery is completed. Moreover, Efficiency Manitoba should make sure that a proper process is set up to successfully transition from the legacy tracking

<sup>92</sup> 2020/23 Efficiency Plan, Section 7, Figure 7.2, pdf page 181.

<sup>93</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-49.

<sup>94</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-49.

system to CRM/DSM system and transfer the data gathered via legacy tracking system to the CRM/DSM System.

As Efficiency Manitoba mentioned that the procurement and implementation of CRM/DSM System is foundational to the success of Efficiency Manitoba, it is important that the procurement of CRM/DSM system and successful transition occurred in the scheduled time:

## 2. Self-evaluation via DSM scorecard

Efficiency Manitoba is planning to assess its portfolio-level and corporate performances with the help of the DSM Scorecard.<sup>95</sup> Efficiency Manitoba developed a baseline DSM scorecard<sup>96</sup> by assessing the performance of Manitoba Hydro regarding DSM activities of Fiscal Year 2018. And it is planning to evaluate its internal performance annually and compare with the baseline data.

The baseline DSM Scorecard was developed by Dunsky Energy Consulting to allow a mechanism for Efficiency Manitoba to self-evaluate their own performance and benchmark their performances with six other anonymized energy efficiency program administrators throughout North America. The scorecard is developed in three equally weighted parts – operations, planning, and delivered value. Operations focuses on present-day activities including stakeholder engagement, DSM design, company culture, and customer participation. Planning primarily focuses on future goals, targets, and program equity. Delivered value scores a program administrator on how they performed relative to their targets, including the difficulty and lasting savings effects of the measures achieved. For each of the scored categories, the Report evaluated and assigned scores on different metrics. And these scores are combined to provide overall score for Manitoba Hydro's DSM activities of Fiscal Year 2018.<sup>97</sup>

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<sup>95</sup> 2020/23 Efficiency Plan, pdf page 40.

<sup>96</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-2a-Attachment 1, Efficiency Manitoba Demand Side Management Balanced Scorecard.

<sup>97</sup> Dunsky praised Manitoba Hydro's Planning section, giving high scores to program equity and strategic planning measures. Operations was identified as an area of improvement for Efficiency Manitoba moving forward, including end-to-end DSM program design, suggestions to include a program theory and logic model into program design, and including an independent EM&V program. In Delivered Value, key

Similarly, for the benchmarking across six different anonymized energy efficiency program administrators, the report compared Manitoba Hydro's performance across three categories.<sup>98</sup> Besides developing baseline scores and benchmarking, the Report also outlines areas of improvements for Efficiency Manitoba to enhance both program and corporate related activities.

Efficiency Manitoba is intending to update the DSM Scorecard on an annual basis and benchmarked energy efficiency program administrators.<sup>99</sup> Any annual scoring or update to the benchmarked program administrators should be done by third-party assessor.

Efficiency Manitoba's plan to evaluate its performance with the goal of improving the energy efficiency plan in a future is a positive step and the DSM Scorecard will help that purpose. However, some of the metrics developed in the Scorecard may be difficult to quantify as they are of qualitative nature. For example, the sub-metrics for leadership & culture,<sup>100</sup> which is one of the metrics of Operation category can either be scored in a yes/no fashion, thus can get either zero or full possible scores. Moreover, the reasoning behind the weights provided to each sub-category were not well discussed in the Report.<sup>101</sup> Thus, the Scorecard results could provide some ideas for future enhancements of program and delivery, but these results should not be taken as a single source for determining the success of Efficiency Manitoba's Plan

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areas of improvement include improving natural gas savings target realization from the current level of 71.4%, and electric from 82%.

<sup>98</sup> When compared to the other six program administrators scored anonymously by Dunsky, Manitoba Hydro's benchmark score fell right in the middle. Three programs fell above Manitoba in the "Top Performer" category, while the three that scored below Manitoba fell into the same "Moderate" category as Manitoba Hydro. Manitoba's ranking was carried by strength in the Planning category, particularly leading all other program administrators in Program Equity and Emerging Programs. The overall Operations score was lowest among the compared administrators, with Manitoba taking the lowest scores in Leadership & Culture and Customer Participation & Satisfaction scores (particularly driven by under-realized participation in the industrial and residential sectors). Delivered Value scored lower than average but had the second-highest DSM Investment Level category. This was brought down by having the second-lowest Achievement of Energy Savings category.

<sup>99</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-51 (d)

<sup>100</sup> 2020-2023 Efficiency Plan, Response to Daymark/EM I-2a-Attachment 1, Efficiency Manitoba Demand Side Management Balanced Scorecard, Page 16.

<sup>101</sup> The three categories scored (Operations, Planning, and Derived Value) are scored out of possible score of 20 for each category. And each category have five metrics with varying level of weights assigned to them.

### 3. Evaluation, measurement, & verification methodology

The savings targets estimated by Efficiency Manitoba for the programs proposed in 2020-2023 Plan are based on assumptions surrounding hours of usage, unit savings, and market studies, and historical experiences. It is possible that the actual incurred savings be different than estimated savings presented with the Filing. For this purpose, it is imperative to perform rigorous, statistically-sound evaluation of each of the programs considered so that the actual savings can be identified and compared against the savings target calculated during the planning and included with the Filing. Thus, evaluation, measurement, & verification (EM&V) process is crucial for the successful delivery of 2020-23 Plan and any future energy efficiency plans.

Efficiency Manitoba considers savings associated with both program-related and codes & standards in its targets. As discussed earlier in the Report, the codes & standards related savings comprise of 22.5% of total savings for electric portfolio and 31.7% of total savings for natural gas portfolio for the next three-year plan. The program-related DSM activities comprise of remaining savings for both portfolios. Thus, evaluation is necessary to verify savings associated with activities considered in both program-related and codes & standards related savings.

As mandated by the Act, Efficiency Manitoba plans to engage third-party assessors to evaluate the programs considered in the 2020/23 Plan.<sup>102</sup> Efficiency Manitoba developed evaluation framework & planning report as a partial requirement under Efficiency Manitoba Act Section 9 (m). The Framework provides a common understanding of EM&V best practices and outlines evaluation guidelines for 2020-2023 Plan.

In addition to providing guidelines to evaluation for the proposed three-year Plan, the EM&V Framework,<sup>103</sup> developed by Econoler, also provides recommendation on timelines, cycles, and priorities for specific types of evaluations. Specifically, Econoler lays out four different evaluations that can be performed for each program – impact, process, market, and cost-effectiveness. Impact evaluation primarily reviews the key performance metrics of the program, such as energy savings. The process evaluation uses both qualitative and quantitative approach to measure other aspects of program

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<sup>102</sup> 2020-23 Efficiency Plan, pdf page 183

<sup>103</sup> 2020/23 Efficiency Plan, pdf page 548 – 549, Attachment 5, Evaluation Framework & Planning Report.

evaluation such as customer reach, customer satisfaction, and tries to identify root cause for a program to be successful or lagging in meeting targets. Market evaluations study how Efficiency Manitoba's programs are impacting the greater market for the measures they are introducing or can be done pre-emptively to determine if goals are realistic to be achieved given supply and demand forces. Cost-effectiveness evaluations help compare the benefits and cost related with the implemented programs and help enhance currently used cost-effectiveness methodology if needed.

The Framework lays out recommendation on specifically which programs and bundles should undergo which types of evaluation, as well as, when they should occur over the three years of the Efficiency Manitoba Plan. While savings verifications for each program should occur every year, the Framework suggested that full impact evaluation for most programs should be conducted at least once over the three years.<sup>104</sup> Additionally, Econoler provides a suggested budget of the evaluations to be undertaken by year.

The evaluation framework was developed based on elements of evaluation best practices and protocols like the uniform methods project (UMP)<sup>105</sup>. Moreover, while selecting an independent assessor, Efficiency Manitoba mentioned that they will be tasked to develop detailed evaluation methodologies using the UMP and other protocols.<sup>106</sup>

#### **a) Codes & standards**

In addition to program-related savings, as mentioned earlier, the codes & standards (C&S) related savings comprise of at least a quarter of total savings for both electric and natural gas portfolios in the 2020/2323 Plan. The share of C&S savings warrants rigorous evaluation to verify savings associated with them. Efficiency Manitoba confirmed that it is planning to perform an evaluation of the codes and standards savings forecast over the 2020/23 Plan

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<sup>104</sup> A full schedule evaluation and their timeline are recommended by Econoler to fully comply with their suggested Framework, with reasoning as to why they have suggested the timings and types of evaluations. For example, process evaluations were recommended in year one for the electric Retail Rebates and Performance Optimization programs (among others) due to the programs contributing the largest amount of energy savings to the portfolio.

<sup>105</sup> Department of Energy, Office of Energy Efficiency & Renewable Energy, Uniform Methods Project for Determining Energy Efficiency Program Savings. Online: <https://www.energy.gov/eere/about-us/ump-home>, Accessed December 7, 2019.

<sup>106</sup> Response to Daymark/EM I-52

period.<sup>107</sup> Although the evaluation Framework acknowledges the need to evaluation savings associated with C&S,<sup>108</sup> the evaluation methodologies were not fully developed as program-specific methodologies.

Efficiency Manitoba is counting C&S related savings to its target as per the mandate by Efficiency Manitoba Regulation Section 8 part 1(c). Specifically, the mandate allows Efficiency Manitoba to claim savings from codes & standards towards its target as a result of Manitoba Hydro's past engagement and Efficiency Manitoba's ongoing and futures activities impacting codes & standards. However, it will be challenging to accurately measure C&S savings that are resulting from historical Manitoba Hydro and Efficiency Manitoba activities. In fact, Efficiency Manitoba recognized that there is no universally accepted standard approach by program administrations<sup>109</sup> for claiming C&S related savings. Thus, it is important that rigorous methodologies are established to appropriately measure and verify C&S savings included in Efficiency Manitoba's 2020/23Plan so that savings targets are accurately represented. Efficiency Manitoba has also recognized this need and has mentioned that the detailed evaluation methodology will be determined by the independent assessor selected through a request for proposal that Efficiency Manitoba is planning to develop within the first half of 2020/21.<sup>110</sup>

#### **b) Role of Energy Efficiency Advisory Group (EEAG)**

Efficiency Manitoba anticipates working with Energy Efficiency Advisory Group (EEAG) for reviewing the scope and selecting third-party evaluation as per the Efficiency Manitoba Act Section 27 (3) (b).<sup>111</sup> This is an important step because it allows EEAG members to provide any feedback to the proposed method. The stakeholder engagement process, as observed in Nova Scotia via DSM Advisory Group and other jurisdictions, has been successful.

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<sup>107</sup> Response to Daymark/EM I-88 (a).

<sup>108</sup> 2020-2023 Efficiency Plan, pdf page 564.

<sup>109</sup> Response to Coalition/EM-71.

<sup>110</sup> Response to Daymark/EM I-88 (b).

<sup>111</sup> Response to Coalition/EM I-125(c).



### c) Recommendation

Even though, Efficiency Manitoba is yet to develop evaluation methodologies and select independent assessor, they mentioned that the Evaluation Framework and Plan document will be used as the basis for Efficiency Manitoba's request for proposal to contract for external private sector evaluation services of the 2020/23 programs.<sup>112</sup> Based on the methodologies outline in the Evaluation Framework and our assessment, Daymark offers following recommendation:

- The programs/bundles that offer large share of portfolio-level savings should undergo annual full program evaluation. In addition to evaluating all the programs within the three-year Plan period, the success of programs that have the largest share of total savings is crucial for overall portfolio success. The programs that have savings greater than 10% of portfolio savings should have a full evaluation performed so that findings/learnings can be used for the next year's plan<sup>113,114</sup>
- Based on the evaluation plan outlined in the evaluation framework, all programs would be fully evaluated at least once in three years. The results of the programs that will be fully evaluated in the third year will not be available while developing the next three-year Plan. Daymark recommends exploring options to perform full evaluations of all programs within the first two-years so that findings can be incorporated in developing the next three-year Plan
- The EM&V framework & plan proposed four types of studies – impact evaluation, process evaluation, market evaluation, and cost-effectiveness analysis. Although the recommended timeline of impact and process evaluations is outlined, Efficiency Manitoba should also develop a list and timeline of market evaluation and cost-effectiveness studies to be conducted during 2020-2023 Plan prior to issuing request for proposal to contract for external private sector evaluation services of the 2020/23 programs
- The codes & standards savings comprise of 33% of total savings for natural gas portfolio and 23% of total savings for electric portfolio. The evaluation method

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<sup>112</sup> Response to Daymark/EM I-86.

<sup>113</sup> In 2020-2023 Plan, there are two bundles with savings greater than 10% in electric portfolio. They are Load Displacement (37.5%) and Renovation (35.1%). Similarly, there are four bundles in natural gas portfolio with savings greater than 10%. They are Home Renovation (10.6%), Income Qualified (12.6%), Renovation (13.2%), and Custom (51.9%).

<sup>114</sup> Efficiency Manitoba confirmed that Load Displacement bundle will have full impact evaluation during each of the Plan. (Response to Daymark/EM I-89)

for codes & standards should be fully developed and reviewed by EEAG members

## SAVINGS TARGETS

VI.

In this section we will discuss the targets that have been established for Efficiency Manitoba in the Act and adopted with the PUB Regulations. We will discuss the issues that arise in relation to the interpretation of the eligibility requirements for savings to be counted and how Efficiency Manitoba is interpreting the eligibility. We will discuss any concerns we have, based on the discussion and observations earlier in this report that present challenges to accomplishing the savings targets on an annual and long-term basis. Daymark recognizes that the PUB's interpretation will be the one that matters. Our intention is not to make a recommendation, but to provide the PUB with insight and some alternatives that might prove useful in informing the PUB's decisions on savings eligibility. Lastly, this section addresses the extent to which Daymark has found information in its review that might mean raising or lowering targets might be worth consideration by the PUB.

### A. Targets in the regulations

The annual savings targets have been established at a 1.5% for electric efficiency and 0.75% for natural gas in the Act and the regulations, as we have discussed several times earlier in this report. The Act and regulations also described what would be eligible to count toward savings achieved:

- Energy efficiency savings that result from activities by Efficiency Manitoba in an approved Plan
- Energy efficiency savings that results from actions by Manitoba Hydro, provided they were part of the approved Efficiency Manitoba Plan
- Energy efficiency savings that results from the adoption of codes & standards to the establishment of which either Efficiency Manitoba or Manitoba Hydro contributed

The percentages above would be applied to the prior year Manitoba Hydro electric sales and to the most recent publicly available annual natural gas sales by Centra. If appropriate, the savings are to be weather normalized.

Efficiency Manitoba proposes a Plan where part of the savings target achievement comes from programs and the remainder from codes &

standards. This applies to both the electric portfolio and the natural gas portfolio, as shown in Table 44 below.

Description	Electric		Natural Gas	
	Savings (GWh)	Percentage	Savings (Million cu. m.)	Percentage
Program-related savings	880.1	77%	25.7	68%
Codes and Standards Savings	256.0	23%	12.0	32%
<b>Total Savings</b>	<b>1136.1</b>	<b>100%</b>	<b>37.7</b>	<b>100%</b>

**Table 44: Electric and natural gas percent savings target achievement for codes and standards**

We will discuss the program Plan savings and the codes & standards savings in the following sections.

## **B. Three-year Efficiency Manitoba program Plan for determining savings**

The three-year Efficiency Manitoba plan proposes quite an expansive array of bundles, programs and measures for each portfolio, both electric and natural gas. The planning of activities is derived from a focus on the annual target achievement for each of the three years of the Plan.

Efficiency Manitoba calculates the annualized savings for measures enacted during any part of the fiscal year, meaning that the same measure, whether installed January 2 and December 31, provides the same contribution to meeting the goal. This means that during the first Plan year the savings amount toward the target would be substantially higher than the actual savings during the first Plan year, since, on average, measures are in place for about six months. This effect could be compounded by the fact that seasonally impactful measures may miss their first year ‘high savings’ season. Daymark does not have any concern about this method as long as everyone recognizes how it is being done.

This annualized savings, using one year of savings for each measure, means that the measure life does not affect the savings that is counted toward a single year achievement. For example, a 5-year life measure and a 30-year life measure each contribute one year of annualized savings toward establishing the plans forecast and towards actual accomplishments and whether targets are met.

## 1. Electricity program savings

When we reviewed the electric savings further, we found that Efficiency Manitoba is interpreting the regulations to mean that programs the result in customer generation behind the meter using renewable energy such as biomass and solar as eligible to count as electric savings since they argue fuel switching to fossil fuel from electricity is explicitly prohibited (and, presumably, the lack of prohibition in the case of renewable energy means these savings are permitted). There is significant behind the meter generation being counted as energy savings in the load displacement program.

The installations and use of behind the meter generation as a 'measure' in the load displacement program present an interesting need for interpretation. If the savings result in any projects requiring continued incentives each year, out of the then current year budget, the Efficiency Manitoba Plan assumes that the savings is counted as contributing to each year's annual target for savings achievement. It is the equivalent of a one-year measure life that is implemented again each single year. The amount of measure savings is a significant portion of the savings Efficiency Manitoba is crediting from programs. This leads to the question, what the best way is to do the accounting, in terms of what savings should be attributed to Efficiency Manitoba's accomplishments each year.

Another program that might have similar accounting and interpretation issues is community geothermal. The Efficiency Manitoba plan describes the potential for alternative financing of the community geothermal program in a way that suggests it could create the need for similar accounting decisions, since Efficiency Manitoba might be making on-going payments rather than incentives.

We singled out this accounting for savings so that the PUB could decide on the way Efficiency Manitoba should do the accounting. Some of our thoughts are:

- The way incentives are paid should not affect the way a measure is accounted.
- Measures should only count in one year
- Measures such as these are long-lived and that should be recognized for long-term targets

Daymark has analyzed the calculation for savings concerns discussed above.

The following items are either open to interpretation as to whether they

should be included or have risk of not being delivered to the extended forecast:

- Savings via customer generation
- Savings from the same measure counting each year, since some incentive payment is made from each year's budget to keep the measure generating or saving (or even perhaps due annualized incentive payments that could occur in a year as an alternative to single year incentives which would only count the installations savings once)
- Savings that would be reduced if bundle offering were reduced to eliminate measures that might be uneconomic (as discussed in the cost effectiveness section, 7% of projected electric savings were found to result from measures found to be uneconomic from the perspective of the Pure Measure Value Test)
- Savings at deliverability risk due to program design
- Savings at deliverability risk due to resource constraints
- Savings at deliverability risk due to new start-up or substantially changed delivery approaches from what Manitoba Hydro has been assuming
- Savings at risk due to aggressive penetration number assumptions

## 2. Natural gas program saving

One of the inherent challenges faced by the natural gas program comes from interactive effects with electricity savings—the more efficient lighting becomes, the less waste heat it emits. This can increase the need for natural gas, pushing the natural gas portfolio towards growth. This effect is nothing that can or should be prevented. It is simply important to keep in mind in planning for natural gas savings.

As discussed in our Deliverability section, certain general risks may pose threats to delivery of projected natural gas savings. These include the following:

- Savings that would be reduced if bundle offering were reduced to eliminate measures that might be uneconomic (as discussed in the cost effectiveness section, 32% of natural gas savings to be attributable to uneconomic measures);
- Savings at deliverability risk due to program design, to the extent that some programs might overlap or seem to overlap, making marketing more difficult;

- Savings at deliverability risk due to resource constraints—there is, of course, the fact that natural gas savings in the first year fall a little short of target, but a potentially much more important issue is whether third party contractor relationships will be fully in place in time to deliver programs;
- Savings at deliverability risk due to new start-up or substantially changed delivery approaches from what Manitoba Hydro has been assuming; and
- Savings at risk due to aggressive penetration number assumptions.

Given that natural gas savings is already projected to just barely make targets, these issues, taken together, have the potential to bring actual realized savings significantly below targeted levels.

### C. Codes & standards

Electric and natural gas savings from improvements in codes & standards make up a significant fraction of the savings projected in Efficiency Manitoba’s three-year plan—approximately 23% of electric savings and 32% of natural gas savings, as shown in Table 45 below. Daymark reviewed Efficiency Manitoba’s approach to including codes & standards-related savings, as well as Efficiency Manitoba’s specific estimates.

Description	Electric		Natural Gas	
	Savings (GWh)	Percentage	Savings (Million cu. m.)	Percentage
Program-related savings	880.1	77%	25.7	68%
Codes and Standards Savings	256.0	23%	12.0	32%
<b>Total Savings</b>	<b>1136.1</b>	<b>100%</b>	<b>37.7</b>	<b>100%</b>

Table 45: Three-year savings for codes & standards

#### 1. Legislative and regulatory background

The inclusion of savings from codes and standards is explicitly permitted in Regulation 119-2019, Section 8(1)(c), which states that “Net savings in the consumption of energy or natural gas count towards the respective savings target established in Section 7 of the Act if the net savings are reasonably attributable to a code, standard or regulation to which Efficiency Manitoba or Manitoba Hydro has made a material contribution.”

The language in the regulation establishes a framework, but leaves open the question of which codes, standards, or regulations should be considered as something to which “Efficiency Manitoba or Manitoba Hydro has made a material contribution.”

Efficiency Manitoba’s position is that Manitoba Hydro can be considered to have made a “material contribution” to a list of thirteen enacted or anticipated codes and/or standards, either by supporting efficiency that helped pave the way for future standards, or through direct advocacy and involvement in the passage of the standards.<sup>115</sup> Accordingly, they consider the impact of all these codes & standards in their three-year plan.

## **2. Efficiency Manitoba’s approach to calculating codes & standards savings**

In calculating codes and standards savings, Efficiency Manitoba developed an approach that is intended to avoid double-counting and to ensure that, in addition to energy savings, any possible increases in energy consumption resulting from codes and standards are also considered. Thus, in each year of the Plan, codes & standards savings are calculated similarly to the impact of program measures. In a given year, Efficiency Manitoba considers codes & standards energy savings to be the annual, one-year savings resulting from new actions taken under the codes & standards—for example, new installations of standard-compliant equipment, or buildings newly constructed in compliance with efficiency codes & standards. The intention is, for a given year, to count only additional savings attributable to the codes & standards—the “incremental savings” compared to the baseline technology.<sup>116</sup>

In addition, Efficiency Manitoba recognizes that savings in one area can potentially result in increased consumption in another. The main example of this is energy-efficient lightbulbs, which emit less heat than incandescent bulbs. This property of efficient light bulbs can help consumers conserve on air conditioning in the summer, but in the winter, heat not produced in the home by light bulbs may need to be replaced by increased use of natural gas for heating. For this reason, in Efficiency Manitoba’s analysis, codes and standards related to lighting show positive savings in the electric sector, but negative savings in the natural gas sector.

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<sup>115</sup> Information request response to PUB-49

<sup>116</sup> Plan, A.9,4.5

Finally, Efficiency Manitoba’s savings estimates from codes and standards is adjusted to reflect imperfect compliance rates. In its Plan, Efficiency Manitoba states that they “will work closely with provincial departments to support compliance activities in the market.” However, in the current Plan, Efficiency Manitoba has only included compliance improvements for savings related to commercial new construction, where Efficiency Manitoba projects compliance rates rising from 50% in year 1 to 85% in year 3 of the Plan.

### 3. Composition of Efficiency Manitoba’s projected codes & standards

Efficiency Manitoba’s projected codes and standards savings are summarized in Table A9.1 of the Plan<sup>117</sup> which is reproduced as Table 46 below.

Codes & standards	Electric savings (GWh)			Natural gas savings (million m3)		
	2020/21	2021/22	2022/23	2020/21	2021/22	2022/23
Residential building code	16.1	14.8	13.6	4.10	4.10	4.00
Residential general service lighting	17.1	9.1	5	(0.80)	(0.40)	(0.20)
Residential appliance standards	17.2	15.4	13.7	-	-	-
Other residential equipment standards	3.8	3.5	3.2	-	-	-
Commercial building code	18.7	28.1	31.8	0.50	0.80	0.90
Commercial general service lighting standards	14.5	14.5	14.5	(0.30)	(0.30)	(0.30)
Other commercial equipment standards	0.6	0.6	0.5	-	-	-
<b>Total</b>	<b>88</b>	<b>86</b>	<b>82.3</b>	<b>3.5</b>	<b>4.2</b>	<b>4.4</b>

**Table 46: Annual forecasted savings from codes & standards initiatives**

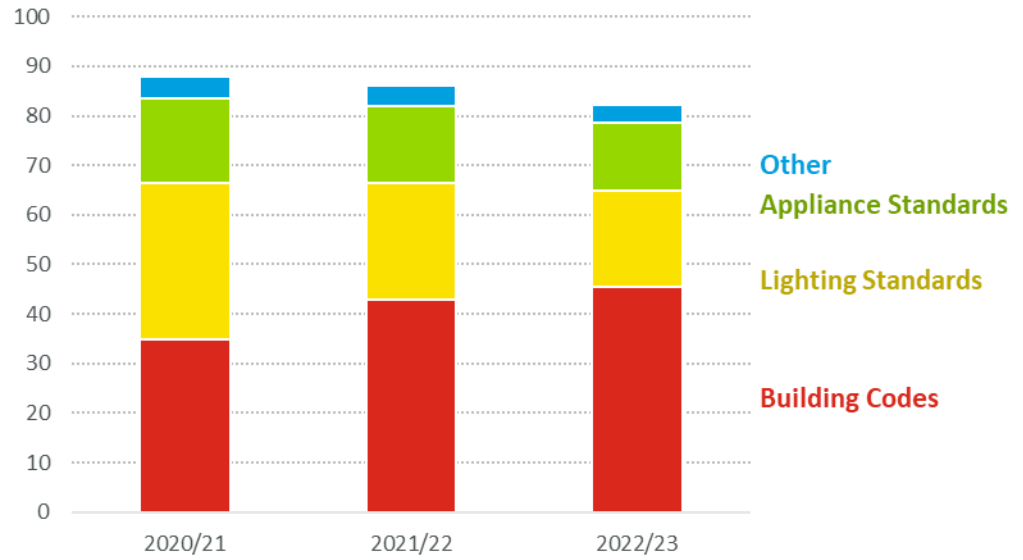
In the electric sector, the vast majority of codes & standards savings (taking the commercial, industrial, and residential sectors together) is made up of savings related to building codes, lighting, and appliance standards, as illustrated by Figure 16.

<sup>117</sup> Some of these values were updated in information request PUB-39



### Electric Savings

(Gwh)



**Figure 16: Electric savings in codes & standards**

In the natural gas sector, all projected savings come from building codes (insulation and other standards), as illustrated by Figure 17. As discussed above, a small negative savings impact on natural gas is seen from conversion to more efficient (but less heat-producing) light bulbs, resulting in greater use of natural gas for heating.

### Natural Gas Savings

(million cubic meters)

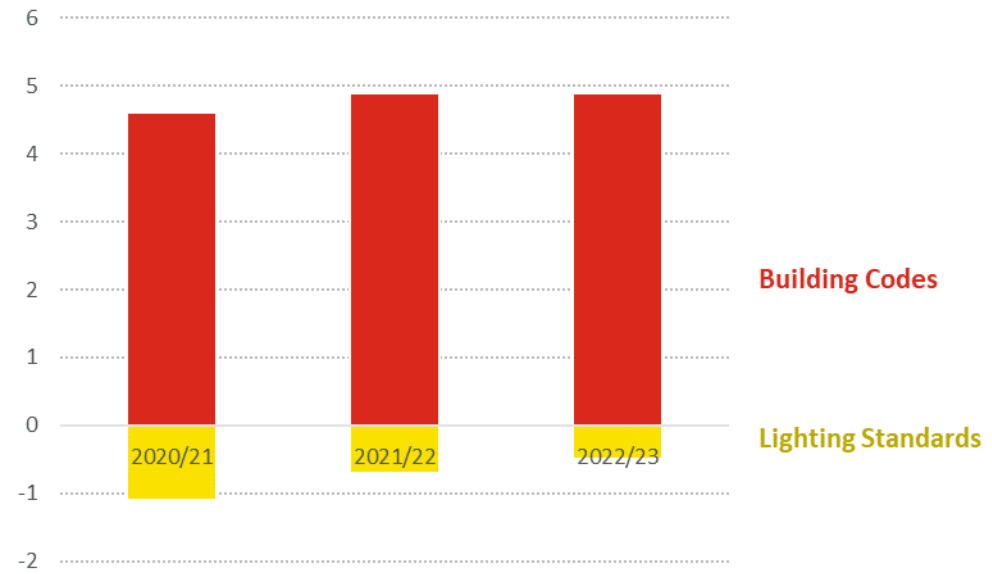


Figure 17: Natural gas savings in codes & standards

#### 4. Additional adjustments to codes & standards savings

There are two main differences between how Efficiency Manitoba treats savings from codes and standards and how they treat savings resulting from programs. First, certain adjustments Efficiency Manitoba makes for program savings—adjustments for natural conservation, free riders, and free drivers—are not made in estimating codes and standards savings. Furthermore, while estimates of measure effectiveness sometime include reductions or phase-out of savings with measure age, there is no similar adjustment of savings for codes and standards as they age.

In both these respects, Efficiency Manitoba is missing something important about understanding the true efficiency impacts of codes & standards. Although “free ridership” is not a concept that applies directly to codes & standards, a very similar phenomenon exists. There will always be some customers who would choose the more energy efficient approach or technology even in the absence of codes & standards. These customers are not “free riders,” since they are not taking advantage of any subsidies or other benefits—but they may be considered analogous to free riders in the codes & standards context. This savings is often referred to as “naturally occurring market adoption” (NOMAD) savings.

Another factor that should be considered in getting a sense of the true energy efficiency impact of codes & standards is whether the impact of codes & standards changes as they age. For some codes & standards, as technologies and markets evolve, it will become more common that the more efficient technologies they require become the default option. An empirical question, in thinking about longstanding codes & standards, could be how much of compliance-related savings should, on an ongoing basis, be attributed to the code or standard itself, and how much may be considered integrated into a new baseline.

Over the long term, failure to make these adjustments could end up significantly distorting Efficiency Manitoba's savings reporting, as more and more savings become attributed to older codes and standards that may no longer have a meaningful effect.

To get a sense of the potential impact of these two factors (NOMAD and aging codes and standards), Daymark did some additional examination of the data. Of the codes & standards whose impacts Efficiency Manitoba considers in its Plan, the earliest enacted dates back to 2004 (a code regulating lighting efficiency in exit signs). Other codes & standards date to as early as 2006, while some are not yet enacted (but are expected to be enacted within the Plan period). Table 47 lists the codes & standards included in the savings projections<sup>118</sup> and the dates in which they were enacted or are expected to be enacted.

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<sup>118</sup> As identified in Efficiency Manitoba's response to PUB-39

Building Codes	<b>12/1/2010</b>	New efficiencies incorporated into new construction and homes undergoing extensive renovations
Provincial Building Code	<b>2020</b>	Promote and offer incentives to customers to install energy efficient technologies and building practices within the new home construction industry
<b>Residential Lighting</b>		
General Service Lamps	<b>1/1/2014<sup>y</sup></b> <b>12/31/2014<sup>†</sup></b>	Introduced Minimum Energy Performance Standards
<b>Residential Appliances</b>		
Residential Appliances	<b>Continuing</b>	New products are added to Energy Efficiency Regulations every year through the Canadian Standards Association Steering Committee on Performance, Energy Efficiency and Renewables (SCOPEER)
<b>Other Residential Equipment</b>		
Central Air Conditioning	<b>11/15/2006</b>	Minimum SEER rating of 13
High Efficiency Furnace	<b>12/30/2009</b>	Minimum of 92% AFUE required for replacement furnaces up to 225,000 Btu/h sold in Manitoba
	<b>12/31/2009</b>	Minimum of 90% AFUE <sup>‡</sup> required for replacement furnaces up to 225,000 Btu/h sold in Canada
<b>COMMERCIAL</b>		
<b>Commercial New Construction</b>		
Building Code	<b>12/1/2014</b>	Energy code for new commercial construction
<b>Commercial Lighting</b>		
General Service Lamps	<b>1/1/2014<sup>y</sup></b> <b>12/31/2014<sup>†</sup></b>	Introduced Minimum Energy Performance Standards
Exit Signs	<b>11/1/2004</b>	22W for signs 120V or less; 27W for signs greater than 120V
Fluorescent Lamp Ballasts	<b>11/15/2006<sup>z</sup></b> <b>4/1/2010<sup>*</sup></b>	Minimum energy performance standard required for fluorescent lamp ballasts
<b>Other Commercial Equipment</b>		
Pre-Rinse Spray Valve	<b>4/1/2011</b>	Maximum flow rate of 6.1L/minute
Commercial Boilers	<b>2020</b>	90% minimum efficiency ratings for new construction, and 85% for replacement

<sup>y</sup>75 to 100W equivalent lamps

<sup>†</sup>40 to 60W equivalent lamps

<sup>z</sup>New Construction Market

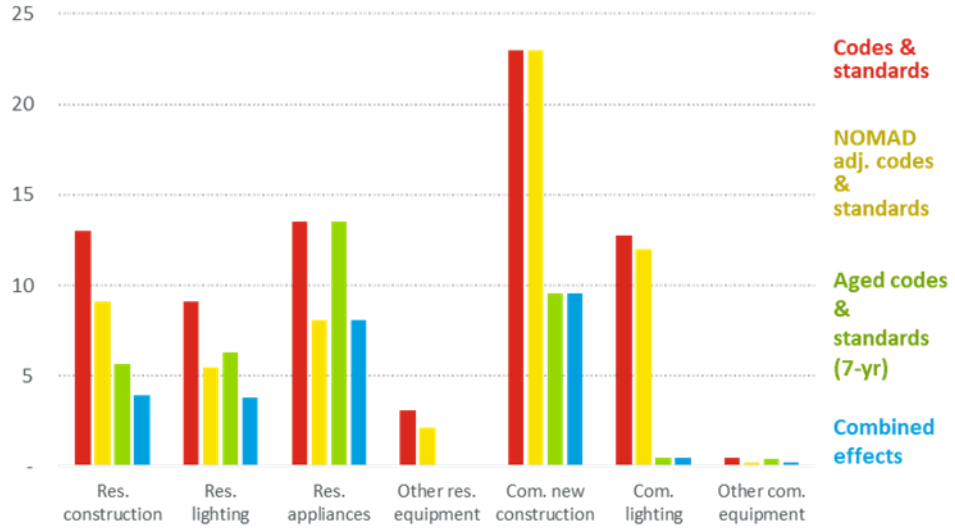
<sup>\*</sup>Renovation Market

**Table 47: Effective dates of respective codes & standards**

To explore the level of impact that accounting for NOMAD and codes & standards aging might have, Daymark did an illustrative analysis for each code & standard area, approximating possible NOMAD rates by using free rider percentages found in Efficiency Manitoba's analysis of programs for related technologies. This analysis shows the potential impact of phasing out codes & standards savings for codes & standards more than seven years old.

For electricity, the hypothetical impacts of these adjustments on codes and standards savings can be seen in Figure 18:

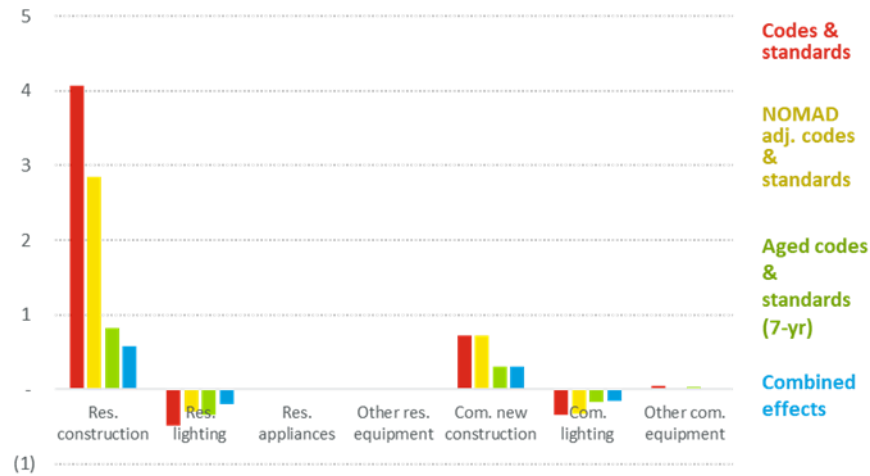
Effects on codes & standards for electric 3-year plan  
(GWh 3-yr plan average savings)



**Figure 18: Effects on codes & standards for the electric 3-year plan**

For natural gas, the hypothetical adjustment impacts are illustrated in Figure 19:

Effects on codes & standards for natural gas 3-year plan  
(million cubic meters 3-yr plan average savings)



**Figure 19: Effects on codes & standards for the natural gas 3-year plan**

In both cases, the impacts of including these adjustments are significant. They would, of course, vary depending on the selected NOMAD adjustment factor and age cut off for codes & standards. Our choice of early adopter adjustment factors based on “free rider” factors and of a seven-year code cut off for codes & standards is not intended to be prescriptive advice that these are the correct factors to use—the point is to create a framework to explore how significant an impact these factors might have.

Our analysis shows that the potential for over-counting codes & standards impacts is potentially significant. Adapting the codes & standards methodology to avoid over-counting could be valuable in the future, in terms of ensuring that the focus is on measuring the realized impact of energy efficiency initiatives. Identifying the correct NOMAD and code aging adjustment factors could, however, prove to be challenging. Simpler options that might be considered by the PUB include capping the share of the annual savings requirement that can be fulfilled through codes and standards or putting a 10-year limit on savings time frames.

## D. Long Term Impact

### 1. Outlook for meeting the 15 year targets/expectations

In addition to the ACT and the Regulations proving annual savings targets for energy efficiency for electric (1.5%) and natural gas (0.75%), long term, 15-year, savings levels were discussed. The ACT and regulations were not very descriptive as to how to account for long-term and ongoing savings.

The 15-year savings expectations were numerically determined in the limited discussion as 15 years of efficiency-driven energy savings x 1.5% each year = 22.5% savings after 15 years for electric, and similarly 15 years of efficiency driven energy savings x 0.75% each year = 11.25% for natural gas. These could be taken as an expectation or a target.

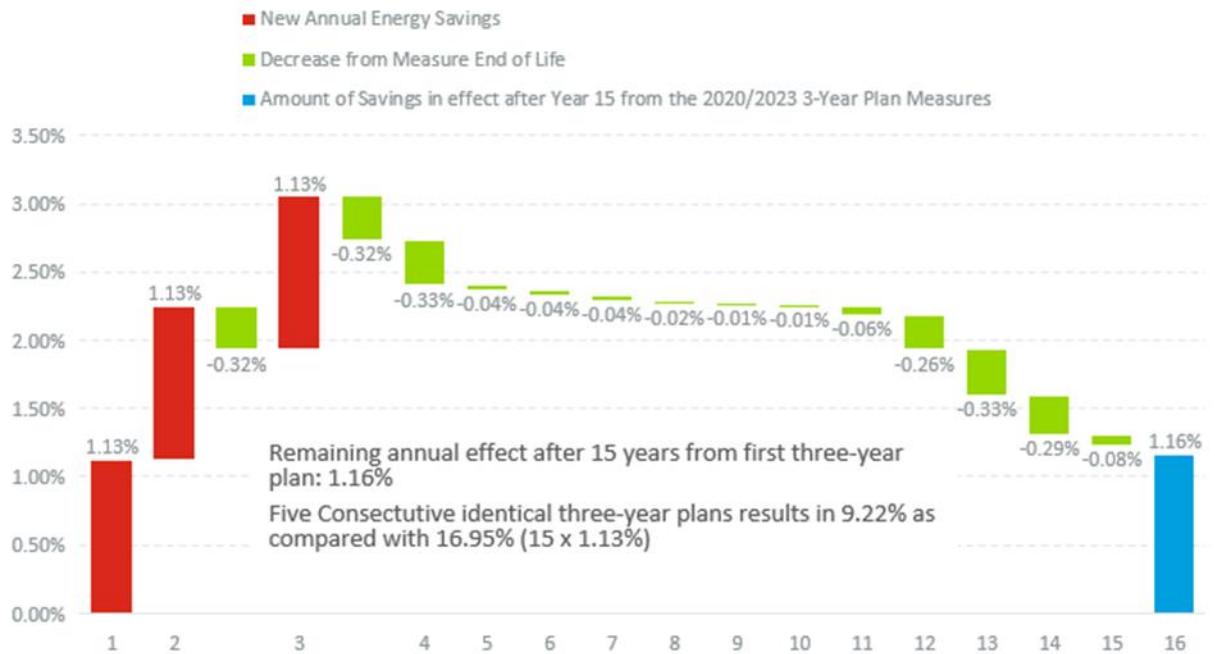
We are not sure if this is meant to be the percentages that are still contributing to savings at the end of the 15 years or the percentages that have contributed over the last 15 years. We will illustrate what savings will be in effect after year 15 to compare to the simple expectations of 22.5% and 11.25% for electric and natural gas respectively.

Daymark was concerned that since many of the measures in the electric programs had lives of 15 years or less, we were expecting a drop off in on-going savings by year 15 from the first 3-year plan. We needed to model how measure life affects the 'still contributing' savings concept and show the 15-year table including a single three-year program illustration.

Since measure life is primarily a program effect, we wanted to illustrate the effect on just the programs. In the total electric savings of 1.5%, the programs make up about 75% or 1.13%. For natural gas programs are about 68% of the 0.75% or 0.51% annually from programs. This would make the 15-year numbers for electric programs about 16.95% and 7.65% for natural gas programs.

The figure below illustrates the effect of this first three-year plan for electric. The red represents increasing the savings by 1.5% each year, the annual target. The green represents the amount of savings that ends after the prior year due to measures reaching the end of their respective lives. We see that for this single three-year program that added 1.13% each year or 3.4% the effect of savings going away after measures reach their life slowly erodes to only 1.16% at the end of 15 years. This occurs since most of the savings for electric comes

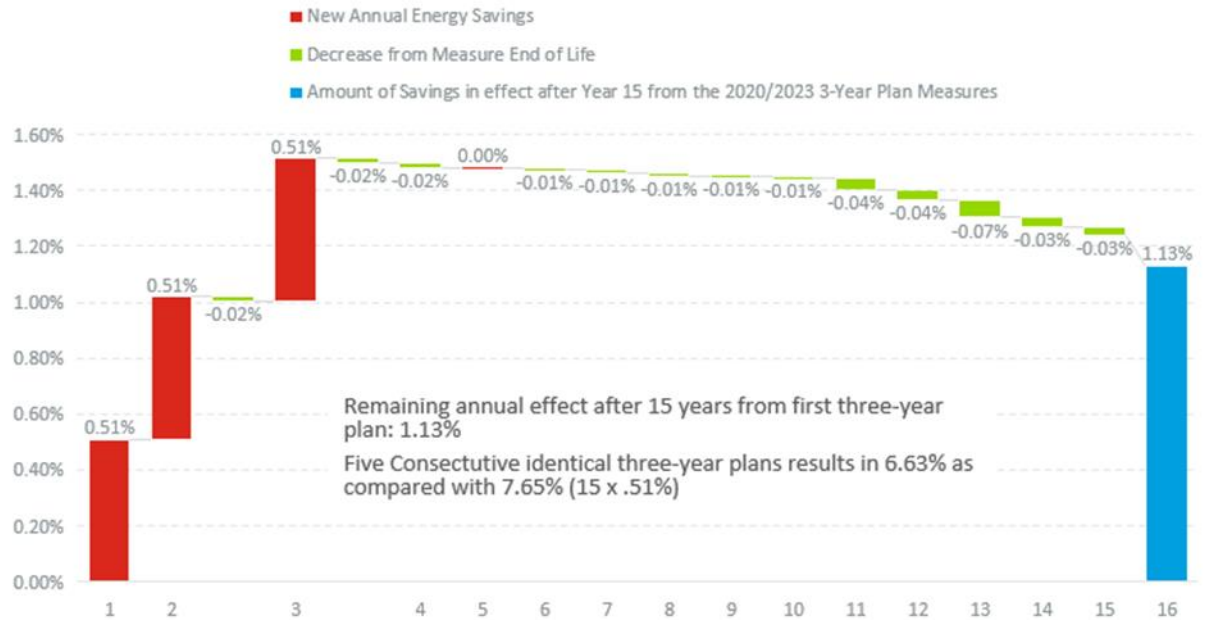
from measures with lives less than 15 years. On the chart, but not illustrated but inside the box we have put the total effect at the end of 15 years if we layered 4 more three-year plans, 9.22%, quite a shortfall from the 16.95% expectation from electric programs.



**Figure 20: Savings in effect after year 15 from electric 2020/23 Plan measures**

The measure life effect on long-term savings is much smaller for the natural gas portfolio since a significant amount of the savings comes from measures with lives longer than 15 years. In the figure below the red represents increasing the natural gas savings from programs by 0.51% each year, the annual target. The green represents the amount of savings that ends after the prior year due to measures reaching the end of their respective lives. We see that for this single three-year program that added 0.51% each year or 1.5% the effect of savings going away after measures reach their life slowly erodes slightly to 1.13% at the end of 15 years. This occurs since most of the savings for electric comes from measures with lives less than 15 years. On the chart, but not illustrated but inside the box we have put the total effect at the end of 15 years if we layered 4 more three-year plans, 6.63%, just a single percentage point lower than the 7.65% expectation from the natural gas programs.





**Figure 21: Savings in effect after year 15 from natural gas 2020/23 Plan measures**

Efficiency Manitoba has not focused on the long-term implications of this first plan. This illustration does not say that anything must change other than the long-term expectation. However, if the long-term 15-year savings for energy demand be lower for electric by 22.5% and for natural gas 11.25% then something would have to change, such as increasing the annual savings target with each plan to account for replacing measures already out of service.

## 2. Potential for revisions to targets

Daymark has not found any compelling data that a higher savings target should be set since we have found that there are challenges ahead for Efficiency Manitoba to achieve savings goals of this plan. Daymark also has not arrived at a recommendation to lower the goals to account for the potential challenges ahead for Efficiency Manitoba.

## SUMMARY

### A. Compliance

VII.

Our review has found that but for a critique in over estimation of deliverability or a misinterpretation in the Regulations that the Efficiency Manitoba Plan complies with the requirements.

- 1) Efficiency Manitoba has proposed a Plan that on average over the three years averages producing enough savings to meet the targets in the Regulations
- 2) Efficiency Manitoba has produced a Plan that should successfully present programs that are highly accessible to the Hard to Reach Manitobans
- 3) Efficiency Manitoba has performed cost effectiveness testing of the Plan programs using the prescribed costs and benefits

### B. Deliverability/implementation plan review

Our initial review finds deliverability concerns because Efficiency Manitoba acknowledges in the report and in responses to discovery that:

- 4) Efficiency Manitoba has committed to increase energy savings under a substantially lower budget compared to the existing Manitoba Hydro program
- 5) Efficiency Manitoba plans to achieve this savings goal with 30% less staff than Manitoba Hydro had
- 6) The transfer of staff and delivery partner contracts will offset some of the start-up challenges Efficiency Manitoba will face to help reduce some of the potential for shortfalls in achieving savings
- 7) Based upon our review of Canadian and US energy efficiency program budgets, Efficiency Manitoba's program plans fit generally from a sector breakdown and incentive concentration
- 8) Efficiency Manitoba has included aggressive market penetration assumptions based on ambitious savings targets
- 9) Efficiency Manitoba relies on new or updated sources for estimating participation, including consultations with delivery partners, survey data and recent permit applications, which produce a step change increase in the level of saving expected for existing programs

- 10) The Commercial Building Optimization programs are not clearly distinguished from similar programs, for example both In-Suite Efficiency and Renovation include LED lighting and HRV controls. Overlap such as this raises concerns about difficulty with marketing communication and training, as well as double counting of savings in the CRM system
- 11) Efficiency Manitoba will not be able to meet its natural gas savings target for the first year
- 12) The second is Efficiency Manitoba's acknowledgement that it has yet to identify the delivery partners needed to serve its new programs, such as programs designed to serve hard to reach markets
- 13) The Efficiency Manitoba Plan has much to accomplish in staffing, infrastructure and public engagement in order to effectively reach the Indigenous population
- 14) The Efficiency Manitoba Plan is relying on immediate and effective collaboration with first Nations leadership groups
- 15) Efficiency Manitoba's CRM system remains under development at this time and is untested

### **C. Accounting for savings from codes & standards**

- 16) Efficiency Manitoba has a very liberal and inclusive interpretation of the eligibility for all codes & standards savings to count toward annual savings targets
- 17) Efficiency Manitoba does not appear to assume that the effects of a code or standard implementation lessens over time as the normal penetration of newer more efficient technologies or practices would be adopted at higher rates without the code or standard, likely resulting in an over-estimation of savings
- 18) Efficiency Manitoba does not appear to be incorporating some sunsetting timetable for the effects of a code or standard, despite some being in place more than 10 years
- 19) Efficiency Manitoba's achievement of the savings targets is relying on the establishment of a few compliance coordinators to successfully move codes & standards compliance by the end on this plan from the current estimate of 50% to **85%**

#### **D. Cost effectiveness and benefit/cost analysis**

- 20) Efficiency Manitoba has performed a rigorous analysis of costs and benefits in its cost effectiveness testing
- 21) Efficiency Manitoba has based its cost effectiveness on the savings and costs prescribed by the Act and the Regulations, utilizing the Program Administrator Cost perspective
- 22) Efficiency Manitoba has produced an electric portfolio of bundles and programs that are cost effective
- 23) Daymark estimates that 7% of the electric savings identified comes from measures where the measure costs alone exceed the benefits
- 24) Efficiency Manitoba has produced a natural gas portfolio of bundles and programs that meets the target prescribed by the Act and Regulations but in aggregate breaks even over the 30-year planning period
- 25) About half the natural gas programs are not cost effective from the program administrator cost perspective
- 26) Daymark estimates that 30% of the natural gas savings identified comes from measures where the measure costs alone exceed the benefits
- 27) Approximately 93% of the Electric Portfolio savings comes from measures with lives of 15 years or less, half of that, 40%, with lives of 5 years or less
- 28) Only 22% of the Natural Gas Portfolio savings comes from measures with lives of 15 years or less
- 29) The metric used by Efficiency Manitoba to measure impact on rates, Lifecycle Revenue Impact, LRI, is calculated in a manner that underestimates significantly the impact during the next 10 years for the Electric Portfolio of the plan due to the high percentage of short-lived measures
- 30) The Efficiency Manitoba LRI metric methodology underestimates the rate impact of the natural gas portfolio but to a lesser extent than the electric portfolio

#### **E. Evaluation & measurement and verification**

- 31) Efficiency Manitoba is proposing to use the Customer Relationship Management/Demand-Side Management (CRM/DSM) System to monitor and

track on savings and budget at measure and program-levels via dashboards and reports

32) The process for procuring and implementing CRM/DSM System is currently ongoing. Efficiency Manitoba mentioned that it plans to issue a request for proposal by December 2019, perform vendor evaluation and selection by February 2020, and start implementation work commencing by March 2020

33) Efficiency Manitoba plans to evaluate its portfolio-level and corporate performances and benchmark it's performances with other energy efficiency program administrators throughout North America with the help of the DSM Scorecard

34) The DSM scorecard, intended to be updated annually, assesses Efficiency Manitoba's performance equally in three categories in operations, planning, and delivered values

35) Some of the metrics included in the Scorecard are of qualitative nature. It may be difficult to assign scores to these qualitative metrics

36) Efficiency Manitoba plans to perform evaluation studies by independent assessors selected through a request for proposal process

37) Efficiency Manitoba filed an evaluation framework and plan with the Filing that forms a guideline for evaluation studies for 2020/23 Plan and outlines common understanding of EM&V best practices

38) The Framework recommends that all programs be fully evaluated at least once in three years. The results of the programs that will be fully evaluated after the end of the third year will not be available while developing the next three-year energy efficiency Plan

39) Although Efficiency Manitoba is planning to perform an evaluation of the codes and standards savings forecast via independent assessors, the methodologies are not fully developed in submitted evaluation Framework

40) Efficiency Manitoba anticipates working with Energy Efficiency Advisory Group (EEAG) for reviewing the scope and selecting third-party assessors for evaluation work

41) Efficiency Manitoba should monitor program rollout in early 2020 in order to make early tweaks to improve participation by gathering information

from both participants and non-participants through process evaluation focus groups or other survey approaches to get a handle on areas for improvement

42) Also, a concern is the data reliance for evaluation purposes, which we know Efficiency Manitoba leadership recognizes, as the early program rollout will not be in the final system developed to track information, Efficiency Manitoba must be careful to gather and maintain the information necessary to ensure evaluations are complete

#### **F. Long-term impact**

43) The 15-year anticipated savings level will not be met without changing annual savings targets, requiring longer lived measure focus, and/or changing the way savings are determined

VIII.

## **APPENDICES**

## **APPENDIX A: EFFICIENCY MANITOBA ACT**

## **APPENDIX B: EFFICIENCY MANITOBA REGULATION 119/2019**



**APPENDIX C: ORDER NO. 162/19, “PROCEDURAL ORDER IN RESPECT  
OF EFFICIENCY MANITOBA’S 2020/23 EFFICIENCY PLAN SUBMISSIONS**

## **APPENDIX D: DAYMARK ENERGY ADVISORS' SCOPE OF WORK**