Pre-Filed Testimony of Dale Friesen

In Regard to Efficiency Manitoba's Three-Year Energy Efficiency Plan (2020/21-2022/23) Application

Submitted to:

The Manitoba Public Utilities Board (PUB)

On behalf of:

Manitoba Industrial Power Users Group (MIPUG)

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InterGroup CONSULTANTS

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1.0 INTRODUCTION

This Pre-filed Testimony has been prepared for the Manitoba Industrial Power Users Group ("MIPUG") by InterGroup Consultants Ltd. ("InterGroup") under the direction of Mr. Dale Friesen. The qualifications of Mr. Friesen are provided in Appendix A.

This testimony complements another filing being made on behalf of MIPUG under the direction of Mr. Patrick Bowman.

For this Pre-filed Testimony, InterGroup has been asked to review and evaluate Efficiency Manitoba's ("EM") first Efficiency Plan for the years April 1, 2020 to March 31, 2023 ("Plan" or "Three-Year Plan") submitted to the Public Utilities Board ("PUB" or "Board"). The Plan sets out the establishment of the new Crown Corporation and its approach to Demand Side Management ("DSM") in Manitoba over this timeframe. The MIPUG focus is largely on electric programs, although where possible this testimony reviews natural gas programs.

This is the first Plan prepared by Efficiency Manitoba, following the establishment of the arms-length independent agency by the Government of Manitoba in *the Efficiency Manitoba Act.* This is the first public review process of Efficiency Manitoba, with the PUB providing recommendations on the Plan to the Minister prior to the April 1, 2020 plan start date.

For the purposes of this review, the PUB set a scope in its Procedural Order 162/19. This pre-filed testimony focuses on EM's three-year plan with an emphasis on industrial customer efficiency programming.

Based on the PUB's prescribed scope, this pre-filed testimony primarily addresses the following approved areas:[1]

1. Reasonableness of projected electric and natural gas net savings to meet prescribed saving targets:

    a. Reasonableness of methodology to project net savings including participant and Manitoba Hydro benefits

    b. Electric and natural gas net savings compared to savings targets (both near-term and cumulative)

    c. Appropriateness of the methods to select or reject demand-side management initiatives

    d. Consideration of new and emerging technologies that may be included in a future Efficiency Plan

2. Cost-effectiveness of electric and natural gas demand-side management program bundles and portfolio:

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[1] Specific sections as provided in PUB Order 162/19, Appendix A, pages 25 – 27.

a. Reasonableness of methodology to evaluate cost-effectiveness

b. Comparison of levelized cost to Efficiency Manitoba of electricity energy net savings to levelized marginal value to Manitoba Hydro – limited to the marginal value as determined by Manitoba Hydro in its resource planning process

c. Comparison of levelized cost to Efficiency Manitoba of natural gas net savings to levelized marginal value to Centra Gas – limited to the marginal value as determined by Centra Gas

d. Rate impact and customer bill impacts for both participants and non participants and whether the bill impacts are reasonable - limited to lifecycle revenue impact analysis (one-time equivalent change in rates)

e. Reasonableness of Efficiency Manitoba's overhead budget, including the apportionment of Efficiency Manitoba's overhead costs not specifically related to gas initiatives and electric initiatives – limited to 2020/21 to 2022/23 planning horizon

f. Consideration of the total resource costs of the initiatives proposed in the Efficiency Plan

3. Accessibility of Efficiency Plan to Manitobans, including consideration of: a. the interests of residential, commercial and industrial customers, as well as hard-to-reach customers who may have disabilities or be Indigenous, rural, newcomers, renters, customers living in multi-unit residences, or older customers, including consideration of customer investments,

7. Consideration of the demand-side management evaluation framework and plan proposed by Efficiency Manitoba.

In preparation of the pre-filed testimony, EM's three-year plan was reviewed as well as information responses prepared by EM and supporting regulation and provincial filings that preceded this review process. In addition, Mr. Friesen has participated in Efficiency Manitoba's stakeholder engagement process on behalf of MIPUG leading up to this filing.

1.1 OVERVIEW OF THE MIPUG

MIPUG is a membership-based association of major industrial companies operating in Manitoba. The purpose of the association is to work together on issues of common concern related to electricity supply and rates in Manitoba. To that end, MIPUG has intervened in each of the Board's reviews of Hydro rates since 1988, as well as the Board's review of the Centra Gas acquisition in 1999, Hydro's Major Capital Projects in 1990 and Hydro's 2013 Needs For and Alternatives To (NFAT) review, and Hydro's 2006 and 2015 Cost of Service Methodology Reviews. A subset of MIPUG members intervened in the 2019 Centra Gas GRA.

Leading up to this review, MIPUG members and representatives have participated in workshops and consultation lead by Manitoba Hydro, the Province, and recently in Efficiency Manitoba's stakeholder working group.

MIPUG membership currently includes of the following companies:

- Amsted Rail – Griffin Wheel Company, Winnipeg;
- Canadian Kraft Paper Industries (CKPI) Ltd., The Pas;
- Chemtrade Logistics, Brandon;
- Enbridge Pipelines Inc., Southern Manitoba;
- ERCO Worldwide, Virden;
- Gerdau Long Steel North America – Manitoba Mill, Selkirk;
- Hylife Foods, Neepawa;
- Integra Castings, Winkler;
- Koch Fertilizer Canada ULC, Brandon;
- Maple Leaf Foods, Brandon;
- Roquette Pea Protein Manufacturing Plant, Portage la Prairie;
- TransCanada Keystone Pipeline, Southern Manitoba; and
- Winpak Ltd., Winnipeg.

MIPUG companies are significant contributors to Manitoba's economy and are particularly important to some of Manitoba's larger communities outside of Winnipeg. Electricity pricing and opportunities to manage electricity usage matter greatly to industrial customers, including MIPUG companies. Stable and predictable electricity prices are cited as being critical to the success of Manitoba industry and provide a competitive advantage and help to offset some of the challenges of operating in Manitoba, including climate and distance to market. MIPUG companies have made long-term investments in Manitoba, based on expectations of stable, cost-based rates, clear and transparent regulation, and reliable service.

MIPUG members, as long-term operators in the province, are focused on both the short-term and long-term rate impacts, especially in relation to investment by Manitoba Hydro in generation and transmission assets that are newly or shortly to be in-service (Bipole III, Keeyask, US Interconnection) and at considerable investment that Manitoba Hydro has raised concern about in attempts to increase electricity rates, most notably in the 2017/18 & 2018/19 General Rate Application.

Of principle concern to MIPUG members in this proceeding is that any spending on DSM measures is prudently undertaken, not just to meet a legislated target, and that rate impacts in each and every year as a result of DSM spending are minimized or eliminated (i.e. economic DSM spending). MIPUG is also focused on ensuring energy efficiency programming is undertaken when it economically and logistically makes sense to do so both in relation to utility resource planning and for industrial processes (discussed further in Section 2.0 of this evidence).

1.2 SUMMARY OF RECOMMENDATIONS AND CONCLUSIONS

1.2.1 – Program Options for Industrial Customers (Section 3.1)

The Efficiency Manitoba Plan provides a comprehensive approach to industrial energy efficiency programming through a bundle of programs that address a variety of options for industrial electric and natural gas energy efficiency in industrial processes and facilities.

Program measures include Custom options for electricity (i.e. Performance Optimization) and natural gas (i.e. Natural Gas Optimization) consumed by industrial processes, supported by an Energy Manager initiative and Strategic Energy Management Cohorts. Options for addressing facility energy efficiency are provided through programs targeting facility Renovations, HVAC systems and New Construction.

Self-generation is addressed through the Load Displacement program, providing opportunities for industrial operations with energy-rich waste streams or by-products to self-generate all or a portion of their energy consumption. This suite of programs is outlined in EM's Plan (Appendix A, Section A7 of the Application).

Emerging Technologies appear to be an area of opportunity for industrial programming. The evolution of technologies in the industrial sector often occurs quite quickly, and while options exist to address emerging technologies through the Custom program options, a dedicated Emerging Technology initiative would likely draw attention from the industrial sector.

1.2.2 - Energy Savings Targets (Section 3.2)

An analysis of savings targets within this filing places a primary emphasis on electric savings due to time constraints for reviewing natural gas programs and savings targets.

A majority share of industrial savings comes from Load Displacement projects. The proportion of savings from all other industrial programs is reasonable and should be achievable. While the savings target for the Efficiency Manitoba electric portfolio is mandated at 1.5% by Regulation, the Plan specifies industrial savings targets ranging between 1.6% (Year 1) and 1.75% (Year 2) of the reference industrial load.

Due to the large annual savings contribution from Load Displacement programs, other industrial programs are required to contribute a more modest 0.50% of the reference industrial load in order to meet the 1.70% average industrial savings target. This more modest savings target is considered reasonable and achievable.

It should be noted that Load Displacement savings are re-earned in each fiscal year of the Plan and are not cumulative on a year-by-year basis like the other program offerings. The continuation of program savings is therefore somewhat dependent on a stream of performance-based incentives that extend through the estimated 15-year lifecycle of each self-generation project.

1.2.3 – Composition of Savings (Section 3.2)

Industrial sector programs provide a disproportionate share of total program savings under the Plan when compared to the Commercial and Residential sectors.

Unlike savings targets for the Commercial and Residential sectors, which rely extensively on Codes and Standards savings for achievement of their targets, Industrial sector programs rely exclusively on incentive-based programming for achievement of their targets.

In spite of this more aggressive approach, industrial savings are anticipated to provide about 40% of total electric savings under the Plan while 20% of the total electric portfolio budget.

When compared on this basis, Commercial programs rely on incentive-based programming for savings totaling about 1.35% of the reference load, while Residential programs rely on incentive-based programming for savings totaling only 0.30% of reference load.

1.2.4 – Acquisition Costs (Section 3.2)

Industrial program savings are generally lower cost than savings obtained from incentive-based programs in other sectors. Comparing first-year acquisition costs for incentive-based programs reveals that industrial programs have acquisition costs that are about 1/3 of Commercial incentive-based programs and 1/5 of Residential sector incentive-based programs.

The lifecycle methodology used by Efficiency Manitoba for determination of PACT levelized costs and PACT ratios masks this cost advantage to some degree by assuming shorter lifecycles for some industrial measures. It is quite uncommon for industrial users to replace end-of-life equipment with less efficient equipment due to the evolution of technology that naturally occurs during a product lifecycle. These end-of-life replacements are generally funded fully by the industrial user, providing continued savings at no incremental cost to the energy efficiency program administrator.

This is a limitation of Efficiency Manitoba’s program selection methodology.

Despite this treatment, industrial programs still maintain low PACT levelized costs, ranging from about 1.15 – 1.66 cents per kWh for program options providing more than 95% of total industrial savings.

1.2.5 Timing and Flexibility (Sections 2.3 & 2.4)

The timing and flexibility of industrial energy efficiency programming delivery is important for the effective implementation of industrial programs. Opportunities should not be passed by due to strict adherence to mandated targets.

While energy efficiency can provide an important cost advantage, energy costs as a percentage of overall operating costs vary considerably between industrial operations. In general, energy efficiency improvements by themselves do not provide sufficient return on investment to dictate the timeline or approval for capital intensive projects when other factors such as downtime and lost production are considered. Capturing cost-effective savings requires Efficiency Manitoba industrial programming to be readily accessible when customer timelines provide an opportunity for energy efficiency improvements.

1.2.6 Maximizing Cost-Effective Industrial Program Savings (Section 2.4)

Efficiency Manitoba may not have paid enough attention to maximizing industrial uptake. The incentive structure used in its industrial programs limits incentives to no more than 50% of project costs, or the amount required to achieve a one-year payback. Eliminating or reducing caps for low cost programs may expand participation and increase the acquisition of low-cost industrial savings, benefiting the Plan and protecting ratepayers from rate impacts imposed by higher cost programs. Efficiency Manitoba and the PUB should consider the implications of increasing funding for cost-effective industrial programs.

1.2.7 Industrial Energy Efficiency Retains System Load (Section 4.0)

Industrial energy efficiency programming helps retain competitive industrial load on the Manitoba electric system, benefiting the Manitoba economy and Manitoba Hydro's domestic sales revenue. Cost-effective investment in industrial energy efficiency places priority on a competitive economy with vibrant businesses that create jobs, pay taxes and generate economic activity, which supports the residential and commercial sectors. A loss of competitive industrial companies would result in load decline, lost domestic revenue needed to recover Manitoba Hydro investment in utility infrastructure and a loss of employment opportunities and local economic activity.

1.2.8 ~~Industrial Energy Efficiency Retains System Load~~Energy Efficiency Potential Studies Support Better Program Design (Section ~~4.2~~2.1.2)

The most recent potential study undertaken in Manitoba was by Manitoba Hydro in 2012 and numerous advances in technology and equipment have matured since this time.

Given its 15-year mandate and the aggressive overall targets included in the Plan, Efficiency Manitoba should pursue a potential study during the three-year duration of the Plan. A comprehensive potential study should examine cost-effectiveness measures~~,~~ assessed for energy savings potential.

2.0 THE NATURE OF MANITOBA'S INDUSTRIAL LOAD

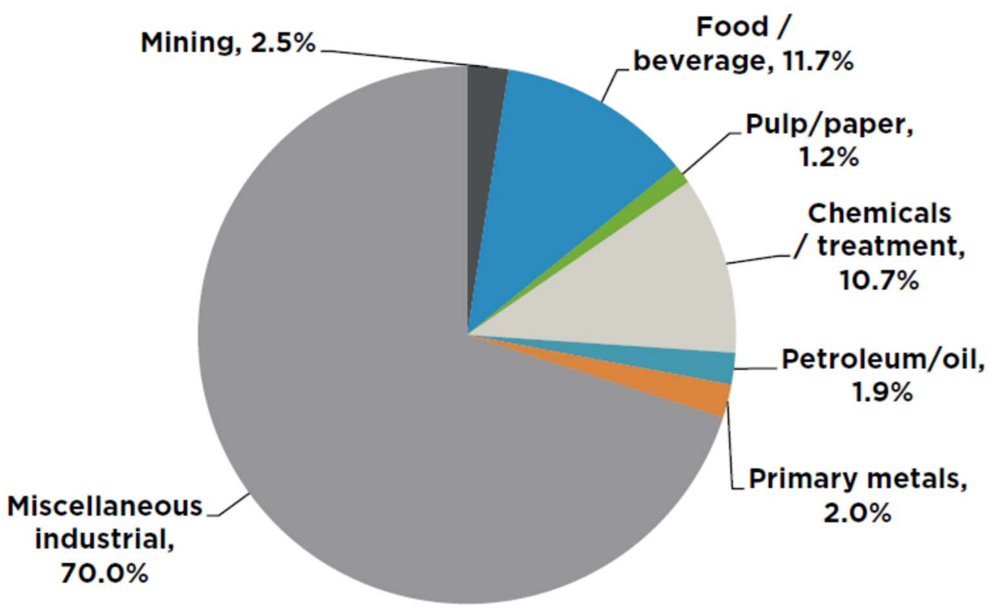
2.1 THE NATURE OF MANITOBA'S INDUSTRIAL LOAD

2.1.1 Manitoba Industrial Sector Composition

Industrial energy consumption in Manitoba is widely distributed across numerous industrial sub-sectors. The Efficiency Manitoba Three-Year Plan (Appendix A – Section A7, Page 9 of 47) characterizes this market as being comprised of approximately 2,300 electric customers with 1,390 of these customers, or about 60%, also served with natural gas.

The Three-Year Plan breaks down the market further by Standard Industrial Classification codes as outlined in Appendix A – Section A7 (p. 365). This illustration proved to be of minimal value given the lack of differentiation between electric and natural gas customers. The large Miscellaneous category also provides minimal insight into the activities undertaken by more than 1600 customers.

FIGURE A7.2 MANITOBA INDUSTRIAL MARKET



Subject to further clarification, information provided in Figures A7.3 and A7.4 related to average natural gas consumption by sub-sector provided minimal value for determination of total energy use by sub-sector.

The conclusion drawn by InterGroup is that additional information regarding the composition of electric and natural gas load in the industrial sector is required to adequately assess opportunities within the industrial sector. This type of information is generally contained in a potential study as described in Section 2.1.2.

2.1.2 Energy Efficiency Potential Studies

Energy efficiency improvements has long been considered one of the most constructive and cost-effective ways for addressing challenges to energy supply, delivery and utilization. Capturing the benefits of energy efficiency requires a well-defined plan that maximizes the use of cost-effective opportunities for capturing desired energy efficiency savings. Three decades of successful energy programming across many jurisdictions have emphasized key elements for capturing efficiency savings across numerous agricultural, commercial, industrial and residential sub-sectors. Energy efficiency potential studies provide key information for informing policies and approaches used to advance energy efficiency programming. The information provided by a potential study supports:

- Setting of attainable energy savings targets
- Quantifying available energy efficiency resources
- Determination of funding levels for delivering of energy efficiency programs
- Designing programs to achieve the most cost-effective long-term potential
- Reassessment of energy efficiency opportunities as conditions change

The most recent Potential Study completed for the Manitoba market was undertaken by Manitoba Hydro in 2012.[2] It is understood that Efficiency Manitoba made use of this potential study in its preparation of the Plan, but also recognizes that an updated study will provide key information needed to support a sustainable and economic energy efficiency plan.

A high-level review of several recent Canadian potential studies was undertaken by InterGroup to develop a better understanding of opportunities that may exist within the Manitoba industrial sector. These findings were used to characterize the Manitoba market and consider the reasonableness and achievability of savings targets established for the industrial sector.

An initial comparison was made related to the composition of industrial load in Ontario, British Columbia, Alberta and Manitoba to evaluate how changes in the composition of industrial load between jurisdictions may impact the Efficiency Manitoba Plan.[3] Figure 2.1 illustrates that the

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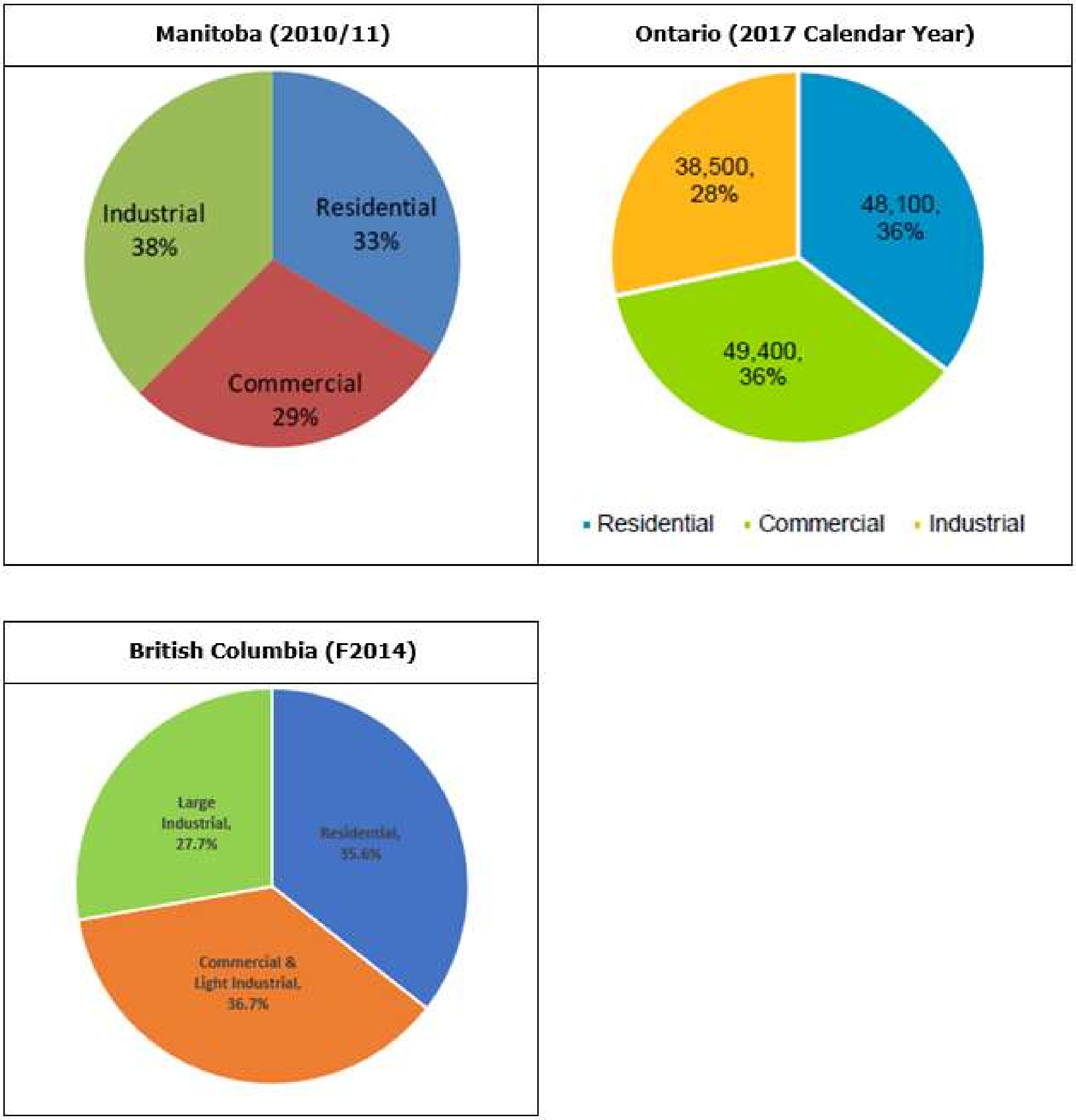
[2] ENERNOC Utility Solutions Consulting. (2013). Demand Side Management Potential Study. Available online: http://www.pubmanitoba.ca/v1/nfat/pdf/hydro_application/appendix_04_3_demand_side_management_potential_study.pdf

[3] 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, available online: http://www.ieso.ca/2019-conservation-achievable-potential-study; British Columbia Conservation Potential Review in 2016, Figure 2-6, page 22, available online: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/reference-documents/F20_F21_RRA_INCE_1_012_03_LES_01.pdf; Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study in 2018, available online: https://www2.auc.ab.ca/Proceeding24116/ProceedingDocuments/24116_X0451_DistIng-EEA-ReportsforFilingMod1_0490.pdf

industrial sector in Manitoba appears to be a more dominant user of energy than either British Columbia or Ontario.

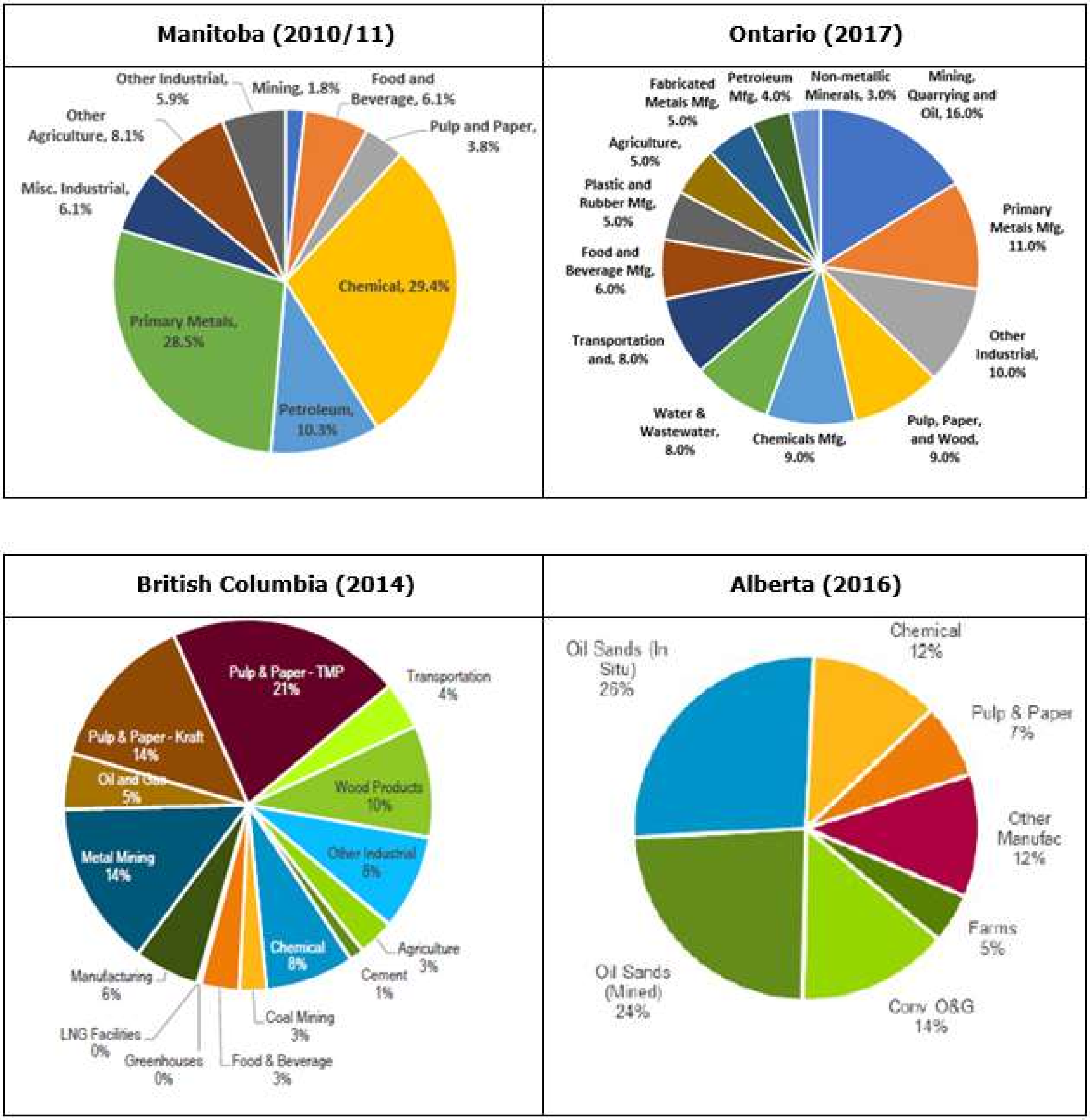
Figure 2.2 illustrates that Manitoba industrial energy consumption is more heavily dependent on Chemical, Primary Metals and Petroleum sub-sectors than British Columbia, which is dominated by Pulp & Paper and Wood Products, while Ontario has a more evenly distributed load across a large number of subsectors, with the Mining and Primary Metals sub-sectors being larger consumers. Energy consumption in Alberta is dominated by the oil and gas industry with the oil sands being a heavy energy user.

Figure 2.1: Sector Level Electricity Use[4]



[4] Manitoba Hydro Demand Side Management Potential Study in 2013, Figure 3-1, page 3-1; 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, Figure 2-3, page 12; BC Hydro's F2020-F2021 RRA, Appendix O, Table G-3, pdf page 1960 of 3006, available online: https://www.bcuc.com/Documents/Proceedings/2019/DOC_53488_B-1-BCH-F20-F21-RR-Application.pdf

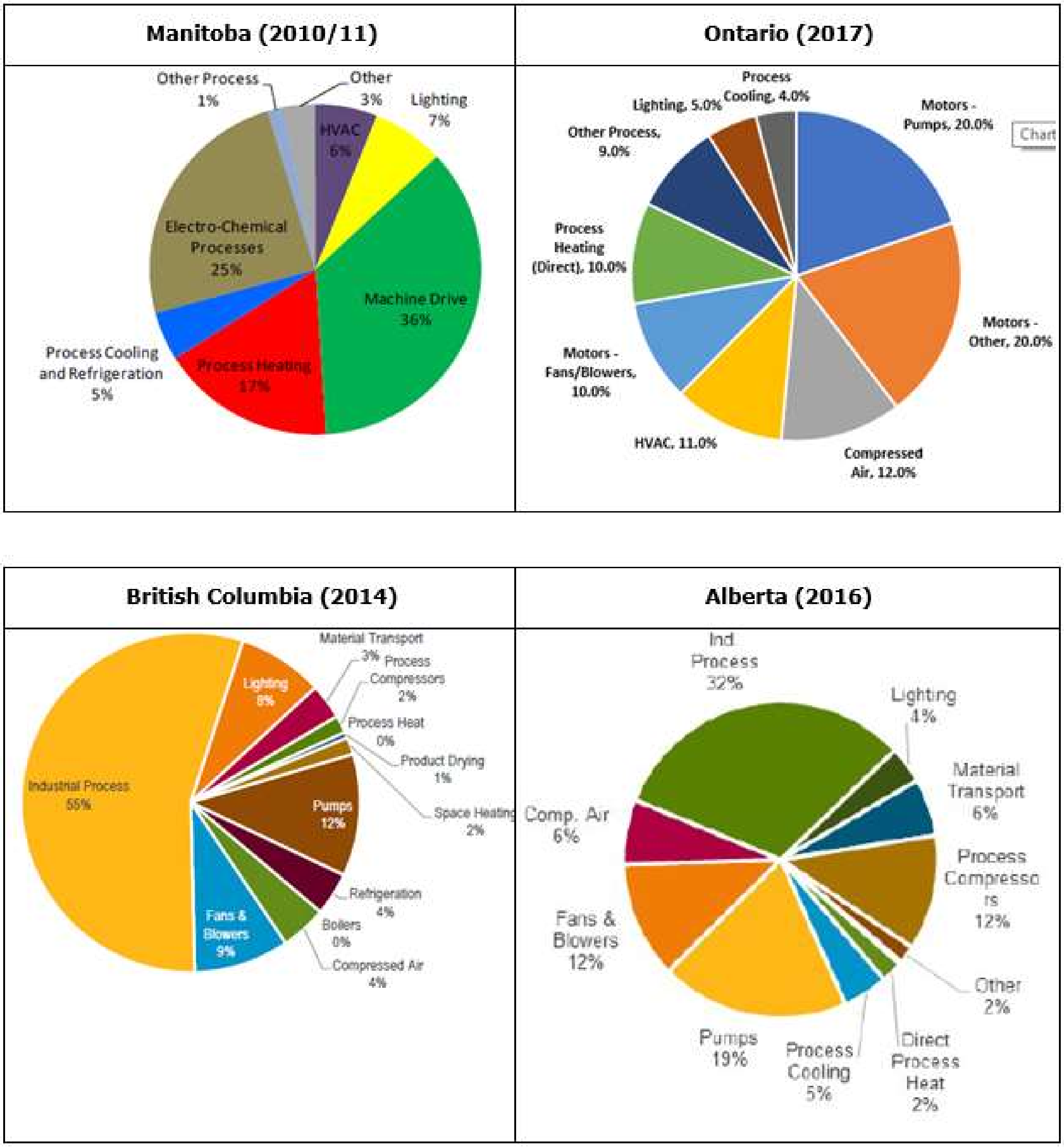
Figure 2.2: Industrial Electricity Consumption by Sub-Sector[5]



[5] Prepared based on Table 3-9 from Manitoba Hydro Demand Side Management Potential Study in 2013, page 3-19; Prepared based on Figure 2-12 from 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, page 18; British Columbia Conservation Potential Review in 2016, Figure 2-6, page 22; Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study in 2018, Figure ES-17, page 13.

Figure 2.3 below illustrates that Manitoba industrial energy consumption is dominated by machine drives (i.e. electric motors) with the electro-chemical processes and process hating being dominate energy users. In the respect, Manitoba was like Ontario, where energy consumption was broken out into similar categories. Segmentation in British Columbia and Alberta appeared less comparable to Manitoba than the Ontario format.

Figure 2.3 – Electricity Use by End-Use[6]



[6] Manitoba Hydro Demand Side Management Potential Study in 2013, Figure 3-15, page 3-21; Prepared based on Figure 2-15 from 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, page 20; British Columbia Conservation Potential Review in 2016, Figure 2-7, page 22; Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study, 2018, Figure ES-16, page 13.

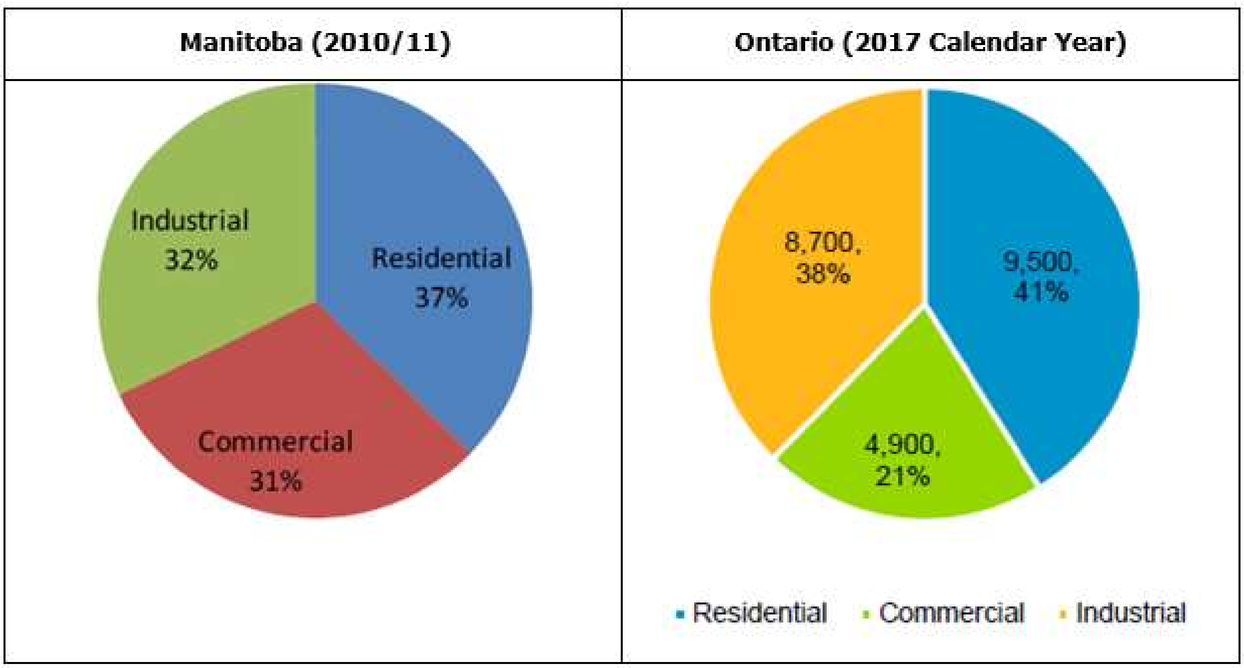
For the reasons noted above, the Ontario potential study was viewed as the most comparable to Manitoba's electric industrial load.

A similar review of natural gas consumption was undertaken using these potential studies with Figure 2.4 illustrates relative natural gas consumption by sector. No comparable data was provided by the BC and Alberta potential studies.

Figure 2.5 illustrates natural gas consumption by industrial sub-sectors. It is important to note that some of Manitoba's largest industries located in the north or in less populated areas do not have access to natural gas. As a result, natural gas use in dominated by the Chemical and Food and Beverage Sectors, while Ontario's natural gas use is more diversified.

Figure 2.6 illustrates natural gas consumption by industrial end-uses, with space and process heating being dominate use of energy in Manitoba. Ontario has a similar profile, with a somewhat more dominant use of natural gas for process heating. While Alberta's industrial natural gas consumption appears dominated by process heating.

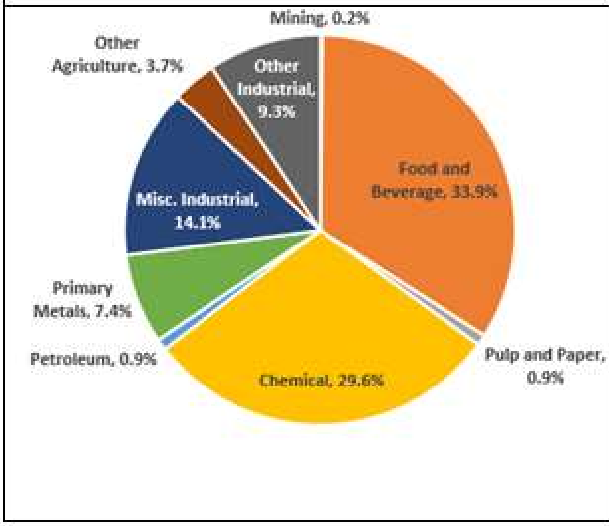
Figure 2.4: Sector-Level Natural Gas Consumption[7]



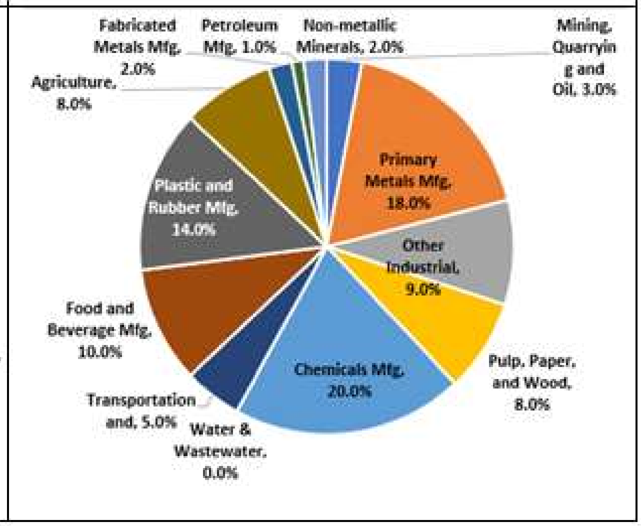
[7] Manitoba Hydro Demand Side Management Potential Study in 2013, Figure 3-2, page 3-2; 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, Figure 2-3, page 12.

Figure 2.5: Industrial Natural Gas Consumption by Sub-Sector[8]

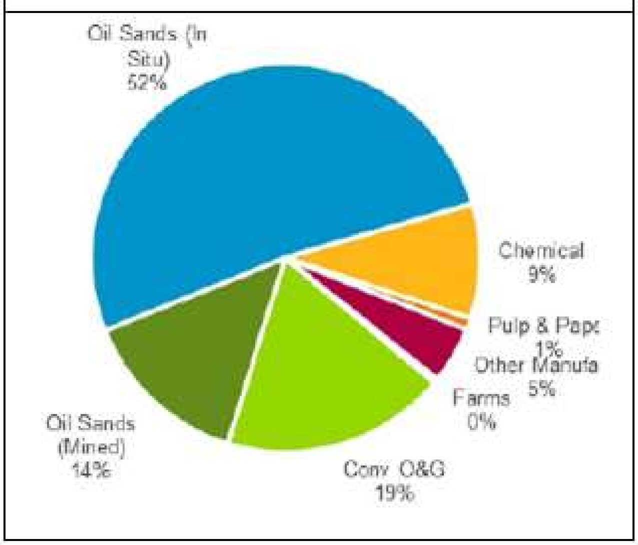
Manitoba (2010/11)



Ontario

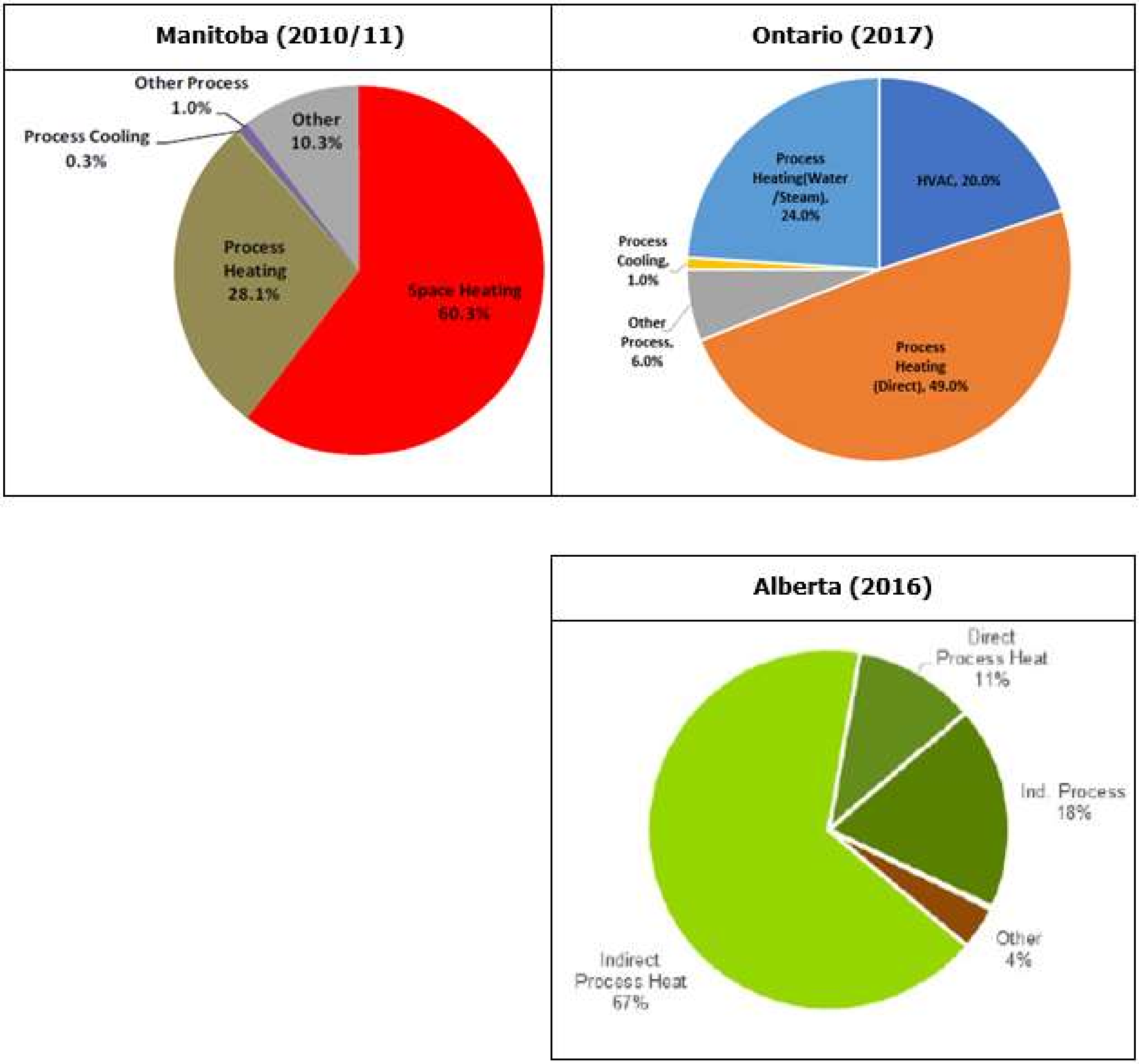


Alberta (2016)



[8] Prepared based on Table 3-11 from Manitoba Hydro Demand Side Management Potential Study in 2013, page 3-22; Prepared based on Figure 2-12 from 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, page 18; Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study in 2018, Figure ES-19, page 13.

Figure 2.6: Industrial Natural Gas Consumption by End-Use[9]



For the reasons noted, Ontario was viewed as a more suitable comparison for Manitoba than Alberta. When comparing the findings of this review to the information provided by Efficiency

[9] Manitoba Hydro Demand Side Management Potential Study in 2013, Figure 3-17, page 3-23; Prepared based on Figure 2-15 from 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, page 20; Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study in 2018, Figure ES-18, page 13.

Manitoba in its Application filing, it was decided that the Ontario potential study most closely aligned with available information characterizing Manitoba industrial load.

2.2 WHY RATES MATTER TO INDUSTRIALS

MIPUG members operate in a competitive world, so opportunities to enhance competitiveness are being examined on a continuous basis. While energy costs are important to all MIPUG members, the focus is generally on rates, not energy efficiency due to the challenges surrounding the implementation of energy efficiency improvements (i.e. disruption to production, capital costs, etc.) and the direct impact that energy rates have on decisions made in regards to market opportunities, and production levels.

Energy is a critical input for industrial operations, particularly those that rely on energy intensive processes for production of high-volume, low-margin commodity products. MIPUG members are some of the largest energy consumers in Manitoba and share a common interest in maintaining stable and predictable energy pricing for their operations. The influence of energy costs varies from industry to industry and the energy intensity of MIPUG members reflects this diversity.

Energy intensive industrials within MIPUG experience input costs for energy that represent more than 50 percent of their total input costs, while other less energy intense sectors have lower relative energy costs ranging from 8 to 15 percent of total input costs. These companies often compete in global markets where pricing is dictated by commodity markets responding to regional and global demand for their products. Competitiveness in these markets is driven by a variety of factors that reach well beyond energy costs, extending to raw material costs, labour and transportation costs, taxes and environmental compliance costs.

Industrial companies are generally sensitive to fluctuations in costs for any of their primary inputs. In many instances, MIPUG members operate facilities across multiple jurisdictions within North America and around the globe. An energy cost advantage in one region may offset a transportation or labour cost advantage in another region. Maintaining a competitive position is often very dependent on a company’s ability to capitalize on a particular cost advantage in the region where they are located. While comparisons of energy costs between regions are common, these comparisons can be short-sighted if they do not reflect the overall competitive position of a company. A reduction in the competitive position for a low-cost input often negatively impacts the overall competitive position of an industrial customer in a global market if other input costs present a competitive challenge. For this reason, industrial customers in Manitoba are often highly sensitive to the impacts of programs or any other costs that negatively impact energy rates, since lower energy costs help to offset other costs, such as transportation, which are higher in Manitoba because of our distance to many primary markets.

The rate structures under which energy is provided can vary significantly between jurisdictions across North America, depending on the preferred source of generation, energy load profiles, market design, and limiting generation, transmission or distribution constraints that establish high energy prices during periods of peak consumption. The design of energy rate structures is heavily influence by these factors, and in some jurisdictions, industrial rate structures include a variety of options for reducing overall energy costs, including such features as market rates, time-of-use energy pricing, and demand response. With energy efficiency programming becoming a fairly universal product offering across North America, rate options such as these can often become a differentiating factor for energy pricing.

Industrial companies generally favour stable and predicable, cost-based rates that rely on cost-of-service determinants as the basis for rates that recover costs for infrastructure, operational expenses and other costs, such as energy efficiency programming. In this way, companies are assured that their energy costs are fair and equitable.

Manitoba's historically low energy rates have provided a competitive advantage that is important to the long-term sustainability of industry in Manitoba. For the reasons outlined above, there is significant interest among MIPUG members, and industrial consumers generally, regarding the rate impact that energy efficiency programming delivered by Efficiency Manitoba and funded through Manitoba Hydro will have on energy rates in the Province.

2.3 WHY INDUSTRIALS HAVE A NARROW WINDOW OF TIME

MIPUG members are active energy consumers that operate substantial facilities consuming large quantities of energy. Realizing significant energy savings within these operations often requires significant and costly upgrades to capital-intensive processing equipment needed for high volume production. While energy efficiency can be an important cost advantage, energy costs as a percentage of overall operating costs vary considerably between MIPUG members. Generally speaking, energy efficiency improvements by themselves do not provide sufficient returns on investment to dictate the timeline or approval for these large capital-intensive projects when other factors such as downtime and lost production are considered.

The timeline for implementing process-related improvements is often dictated by factors unrelated to energy efficiency. Key factors such as market conditions, equipment age and operating condition, variations in raw material inputs, productivity and quality often carry a much higher cost and potential risk than energy efficiency. The highly disruptive nature of process equipment upgrades, including downtime and impact to production schedules, can result in costs for lost production output that must be managed carefully to ensure customer needs are satisfied.

Scheduling these improvements generally requires significant advance planning to assess market conditions, required maintenance intervals, capital cost justifications and other considerations prior to their implementation. For this reason, major process improvements are generally limited to scheduled maintenance intervals occurring on an annual or bi-annual basis. Since the maintenance windows are often quite short, typically less than two or three weeks, careful planning is required to ensure that work can be completed without extending production delays. The complex nature of these process improvements often dictates extensive design work and lead time for specialized equipment to be procured, manufactured and shipped to site. In some instances, procurement of specialized contract labour may be required for installation.

2.4 WHY EFFICIENCY MANITOBA SHOULD KEEP FLEXIBILITY TO SPEND EXTRA TO EXCEED TARGETS SOME YEARS

As outlined previously, energy efficiency alone is often not a top priority for establishing investment priorities or justifying capital expenditures, making it difficult to establish concise three-year plans for capturing potential efficiency improvements in industry. Energy efficiency mandates by government will not advance industrial sector participation if available resources and levels of support do not meet customer-mandated criteria for justifying significant direct investments in energy efficiency improvements. Programming must be ready and easily accessible when the customer is ready to move forward with a project.

Achieving this state of readiness requires Efficiency Manitoba to have the necessary flexibility and freedom to match its investment to the timing and need of industry. A long-term view of the savings cycle would enable Efficiency Manitoba to shift funding between fiscal budgets and capture opportunities that may drive savings levels higher than the targeted 1.5% and 0.75% of load criteria entrenched in the Efficiency Manitoba regulation. Conversely, it may also result in lower spending and lesser savings in periods when opportunities are limited by the timing of industry projects. Mandating the achievement of annual targets, potentially limits the flexibility of Efficiency Manitoba to respond to cost-effective projects and may reduce the cost-effectiveness of the Crown Corporation's resource acquisition by forcing programs with high acquisition costs to be implemented. The resulting reductions in cost-effectiveness and implementation of programming with higher rate impacts create unnecessary hardship for all ratepayers.

2.4.1 Project Spending Caps

Efficiency Manitoba's approach to caps that limit incentive contributions to a fixed percentage of project costs or minimum payback criteria without considering acquisition costs can artificially limit program participation and negatively impact the achievement of broader program objectives for achievement of savings and cost-effectiveness targets.

Acquisition costs should be a key consideration for driving energy savings targets. Achieving higher penetration rates for efficiency improvements may be challenging when imposed incentive caps limit opportunities for industry participation. Many industrial measures have low acquisitions costs, which can boost energy savings in a cost-effective manner when effectively targeted. Investment criteria within industry can vary dramatically from industry to industry depending on market conditions, access to capital and other considerations. Entry level programming with higher incentives for cost-effective projects can also introduce industrial customers to further opportunities for energy efficiency improvements that require larger financial commitments.

2.4.2 Capturing Cost-Effective Savings

The best opportunities for incremental energy-saving improvements generally occur when investments are being made for production-related reasons (i.e. production expansion, infrastructure replacement, and maintenance and reliability). It therefore becomes vitally important for Efficiency Manitoba programs to be responsive to the timing of major capital investments by MIPUG members and other industrial consumers. Efficiency improvements can often align with these projects in a relatively cost-effective manner if the appropriate resources are readily available and aligned with customer processes. To be attractive and effective, Efficiency Manitoba programs must be responsive and well-supported with qualified technical staff and resources that can be deployed to large projects.

The most significant and cost-effective opportunities for acquisition of industrial energy efficiency savings often occur during the design and construction of a new industrial facility or major upgrade/expansion to an existing facility. The optimization of major process elements during the design stage can provide energy savings that are multiples of savings achieved at later stages through replacement of individual process elements. Initial construction costs for energy efficient processes are often similar to those of less-efficient processes, providing incremental energy savings at lower costs than later replacements requiring consideration of additional costs for lost production, removal and replacement of existing equipment.

Capital spending and time constraints are an unavoidable reality for most large industrial projects. The capital-intensive nature of the design and construction process often places pressure on decisionmakers to reduce initial capital spending at a risk to long-term life-cycle operating costs and energy consumption. The desire to capitalize on an advantageous market position, coupled with the need to generate revenue for recovery of capital investments limits the time available for design optimization and the benefits that it provides. Lost production days resulting from a longer design and construction process will often exceed the benefits obtained through energy efficiency improvements, so time is always of the essence.

The construction of a new facility with annual energy consumption of 200 GWh will yield annual savings of about 10 to 20 GWh if a 5% to 10% reduction is achieved through optimization of key processes during the design phase. Obtaining these savings at a levelized cost of $0.02/kWh will cost between $2.5 to $5.0 million assuming a 15 year life. Larger expenditures supporting life-cycle design and construction of new industrial facilities may challenge the limited budget available to program administrators.

2.4.3 Opportunity Identification and Resource Readiness

It is important that Efficiency Manitoba has the resources to respond to time-limited industrial efficiency opportunities and provide sustainable levels of funding to support the potentially large expenditures required for major improvements or expansions of new or existing facilities. The design and construction of an industrial facility can often be a multi-year process involving teams of engineers and equipment suppliers. Industrial decision-makers must have the assurance that funding for energy efficiency improvements will be available when designing the project and when needed during construction.

For these reasons, it is important that Efficiency Manitoba engage industrials at the earliest stage of their deliberations regarding new facilities, expansions and upgrades.

Engaging the industrial sector on process improvements requires knowledgeable and credible technical staff and a strong program for supporting the incremental costs for design, procurement and installation of energy efficient equipment and processes. Efficiency improvements cannot jeopardize production under any circumstances. Given the market sensitivity and confidentiality surrounding major investments by industrial enterprises, it becomes critical for Efficiency Manitoba to nurture a strong ongoing business relationship that educates industrial decisionmakers about programs supporting efficiency improvements in parallel with regular business activities.

Industrial companies view their energy utilities as important suppliers that are vital for their short and long-term existence. For this reason, it is important to engage Manitoba Hydro as part of this process.

3.0 EFFICIENCY MANITOBA'S PROPOSED PROGRAMMING

3.1 SUMMARY OF EFFICIENCY MANITOBA'S PROPOSED PROGRAMMING

3.1.1 Industrial Electric Programs

Descriptions of the electric programs provided to the agricultural, commercial and industrial sectors are provided in Appendix A - Section A7. Segmentation of savings by sector is provided by Efficiency Manitoba in response to MIPUG/EM I-6a).

Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan highlights anticipated energy efficiency measures, savings and expenditures for industrial programming in Figures A3.1 through A3.6 (p. 2 to 10 of 21). Based on responses provide in MIPUG/EM I-6a), industrial programs are anticipated to provide annual electric energy savings of 146.26 GWh, 160.78 GWh and 156.40 GWh respectively in Years 2020-21, 2021-22 and 2022-23.

Efficiency Manitoba indicates in MIPUG/EM I-7a, that industrial electric savings represent 39%, 40% and 39% of total annual savings, including Codes & Standards. Removing codes and standards savings from total savings, indicates that anticipated industrial savings account for 51%, 54% and 53% of total incentive-based electric savings in the Efficiency Manitoba portfolio.

Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.2 (p. 3 of 21) illustrates the relative electric energy savings from each program in the Industrial program bundle, including savings for the following measures. The table below provides the underlying data for this figure:

Table 3.1: Industrial Electric Program Bundle Savings

Industrial Program Bundle	Savings (GWh) 2020/21	Savings (%) 2020/21	Savings (GWh) 2021/22	Savings (%) 2021/22	Savings (GWh) 2022/23	Savings (%) 2022/23
Emerging Technologies	0.00	0.0%	0.00	0.0%	0.00	0.0%
New Construction & High Performance Buildings	0.40	0.3%	0.50	0.3%	0.40	0.3%
Custom	17.91	12.2%	13.10	8.1%	20.95	13.4%
Renovation	28.94	19.8%	26.67	16.6%	24.61	15.7%
Load Displacement	99.00	67.7%	120.52	75.0%	110.45	70.6%
Total	146.25	100.0%	160.79	100.0%	156.41	100.0%

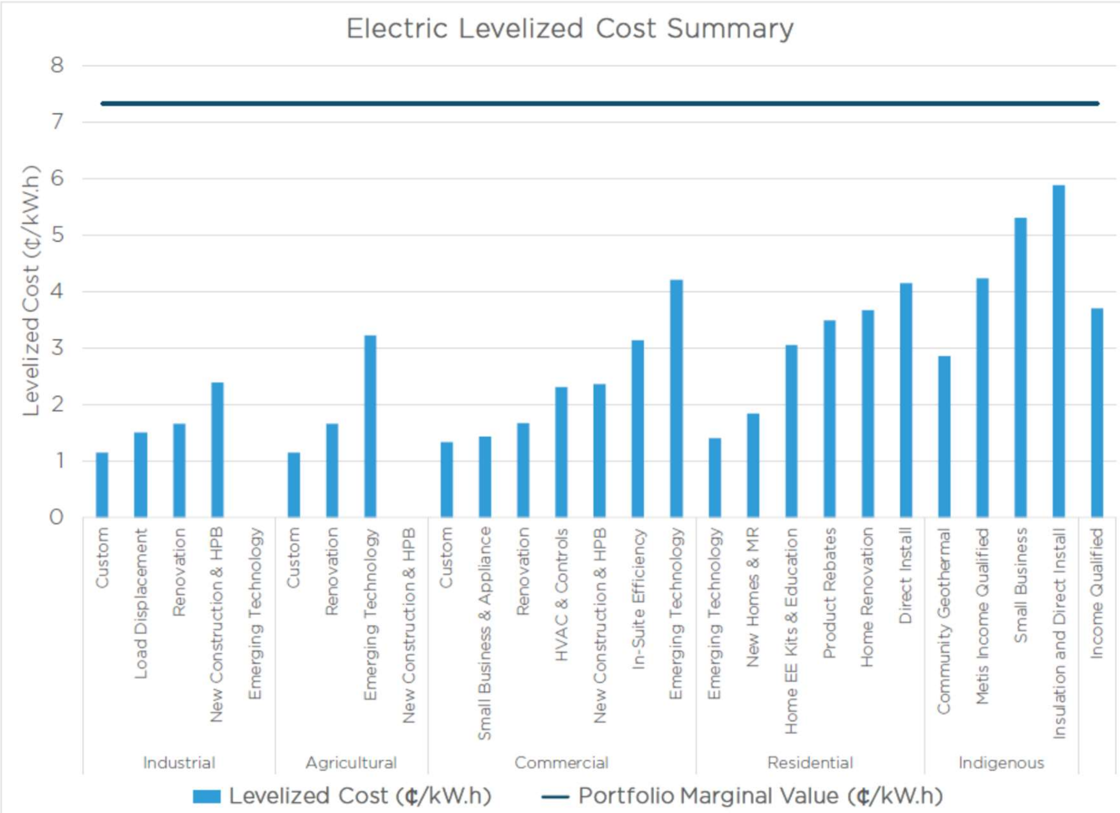
From this table, it is clear that savings pertaining to the Load Displacement program account for the majority of industrial savings, representing 67% to 75% of total electric savings provided by industrial program bundle. A unique aspect of the Load Displacement program is that prior year savings must be re-earned in each subsequent year and therefore do not total cumulatively in the manner that other incentive-based programs do.

Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.5 (p. 8 of 21) illustrates the relative electric program budget for each program in the industrial program bundle. The table below provides the underlying data for this figure:

Table 3.2: Industrial Program Bundle Costs

Industrial Program Bundle	Budget ($) 2020/21	Budget (%) 2020/21	Budget ($) 2021/22	Budget (%) 2021/22	Budget ($) 2022/23	Budget (%) 2022/23
Emerging Technologies	$0	0.0%	$0	0.0%	$0	0.0%
New Construction & High Performance Buildings	$112,000	1.4%	$138,000	1.1%	$116,000	1.1%
Custom	$2,190,000	27.8%	$1,889,000	15.6%	$2,662,000	25.9%
Renovation	$4,462,000	56.7%	$4,229,000	35.0%	$4,016,000	39.1%
Load Displacement	$984,000	12.5%	$5,693,000	47.1%	$3,357,000	32.6%
Program Support	$126,000	1.6%	$129,000	1.1%	$131,000	1.3%
Total	$7,874,000	100.0%	$12,078,000	100.0%	$10,282,000	100.0%

Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.7 (p. 14 of 21) provides the levelized costs for all programs with the industrial electric bundle, providing a comparison to Program Administrator Cost Test (PACT) levelized costs for the program in the other sector bundles. Generally speaking, programs within the industrial bundle trend towards lower levelized costs with the Custom, Load Displacement and Renovation programs that account for over 98% of the total savings within the bundle having levelized costs between 1.15 to 1.66 cents/kWh as noted in MIPUG/EM I-10a).



Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.8 (p. 15 of 21) provides the PACT Net Present Value (NPV) Summary for each program in the industrial bundle. The information provided in MIPUG/EM I-10a) indicates that the respective NPV Benefits of $178 Million, NPV Costs of $41 Million and NPV Net Value of $137 Million represent The total NPV of the industrial portfolio represents about 36%, 27% and 40% of the electric portfolio NPV Benefits, NPV Costs and NPV Net Value respectively. The table below provides the underlying data for this figure:

Table 3.3: Industrial Program Bundle PACT NPV Summary

Industrial Program Bundle	PACT Benefits (NPV)	Benefits (%) 2020/21	PACT Costs (NPV)	Costs (%) 2021/22	PACT NET (NPV)	NET (%) 2022/23
Emerging Technologies	$0	0.0%	$0	0.0%	$0	0.0%
New Construction & High Performance Buildings	$997,000	0.6%	$346,000	0.8%	$652,000	0.5%
Custom	$33,630,000	18.9%	$6,341,000	15.4%	$27,290,000	20.0%
Renovation	$59,145,000	33.2%	$12,025,000	29.1%	$47,120,000	34.5%
Load Displacement	$84,119,000	47.3%	$22,597,000	54.7%	$61,521,000	45.0%
Total	$177,891,000	100.0%	$41,309,000	100.0%	$136,583,000	100.0%

3.1.2 Industrial Natural Gas Programs

Descriptions of the natural gas programs provided to the agricultural, commercial and industrial sectors are provided in EM's Plan (Appendix A - Section A7). Segmentation of savings by sector were provided by Efficiency Manitoba in MIPUG/EM I-8a.

Efficiency Manitoba's Three-Year Plan (Appendix A - Section A3, Figures A3.1 through A3.6, p. 2 to 10 of 21) highlights anticipated energy efficiency measures, savings and expenditures for industrial programming. Based on responses provide in MIPUG/EM I-8a), industrial programs are anticipated to provide annual natural gas savings of 5.05 Million m^3, 3.72 Million m^3 and 3.82 Million m^3 respectively in Years 2020-21, 2021-22 and 2022-23.

Efficiency Manitoba indicates in MIPUG/EM I-9a), that industrial natural gas savings represent 37%, 25% and 26% of total annual savings, including Codes & Standards. Removing codes and standards savings from total savings, indicates that anticipated industrial savings account for 58%, 46% and 50% of total incentive-based natural gas savings in the Efficiency Manitoba portfolio.

Efficiency Manitoba's Three-Year Plan (Appendix A, Section A3, Figure A3.4, p. 6 of 21) illustrates the relative natural gas savings from each program in the Industrial program bundle, including savings for the following measures. The table below provides the underlying data for this figure:

Table 3.4: Industrial Natural Gas Program Bundle Savings

Industrial Program Bundle	Savings (Million m^3) 2020/21	Savings (%) 2020/21	Savings (Million m^3) 2021/22	Savings (%) 2021/22	Savings (Million m^3) 2022/23	Savings (%) 2022/23
Custom	4.89	96.6%	3.53	95.1%	3.64	95.3%
HVAC & Controls	0.03	0.6%	0.02	0.5%	0.02	0.5%
New Construction & High Performance Buildings	0.07	1.4%	0.08	2.2%	0.07	1.8%
Renovation	0.07	1.4%	0.08	2.2%	0.09	2.4%
Total	5.06	100.0%	3.71	100.0%	3.82	100.0%

From this table, it is clear that savings pertaining to the Custom program account for the majority of industrial savings, representing 95% of total natural gas savings provided by industrial bundle.

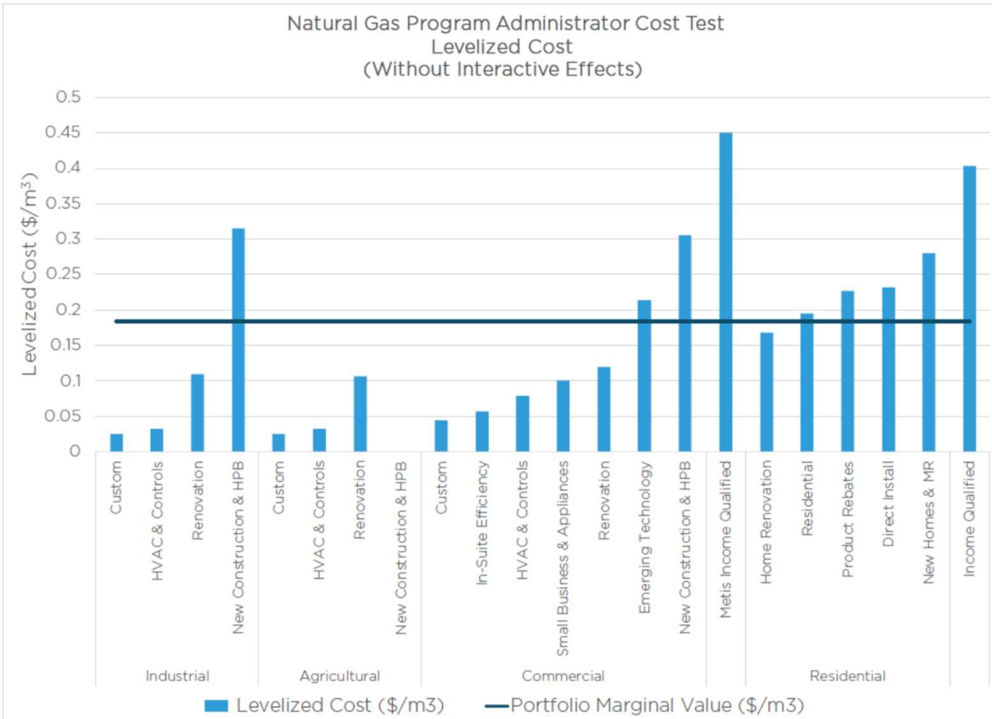
Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.6 (p. 10 of 21) illustrates the relative ~~electric~~ natural gas program budget for each program in the industrial program bundle. The table below provides the underlying data for this figure:

Table 3.5: Industrial Natural Gas Program Bundle Costs

Industrial Program Bundle	Budget ($) 2020/21	Budget (%) 2020/21	Budget ($) 2021/22	Budget (%) 2021/22	Budget ($) 2022/23	Budget (%) 2022/23
Custom	$1,692,000	79.8%	$1,007,000	66.3%	$1,395,000	74.3%
HVAC & Controls	$12,000	0.6%	$12,000	0.8%	$13,000	0.7%
New Construction & High-Performance Buildings	$247,000	11.7%	$307,000	20.2%	$257,000	13.7%
Renovation	$126,000	5.9%	$150,000	9.9%	$168,000	9.0%
Program Support	$42,000	2.0%	$43,000	2.8%	$44,000	2.3%
Total	$2,119,000	100.0%	$1,519,000	100.0%	$1,877,000	100.0%

~~Industrial Program Bundle~~	~~Budget ($) 2020/21~~	~~Budget (%) 2020/21~~	~~Budget ($) 2021/22~~	~~Budget (%) 2021/22~~	~~Budget ($) 2022/23~~	~~Budget (%) 2022/23~~
~~Custom~~	~~$1,692,000~~	~~79.8%~~	~~$138,000~~	~~1.2%~~	~~$116,000~~	~~1.1%~~
~~HVAC & Controls~~	~~$12,000~~	~~0.6%~~	~~$1,889,000~~	~~15.8%~~	~~$2,662,000~~	~~26.1%~~
~~New Construction & High Performance Buildings~~	~~$247,000~~	~~11.7%~~	~~$4,229,000~~	~~35.3%~~	~~$4,016,000~~	~~39.4%~~
~~Renovation~~	~~$126,000~~	~~5.9%~~	~~$5,693,000~~	~~47.5%~~	~~$3,357,000~~	~~32.9%~~
~~Program Support~~	~~$42,000~~	~~2.0%~~	~~$43,000~~	~~0.4%~~	~~$44,000~~	~~0.4%~~
~~Total~~	~~$2,119,000~~	~~100.0%~~	~~$11,992,000~~	~~100.0%~~	~~$10,195,000~~	~~100.0%~~

Efficiency Manitoba's Three-Year Plan (Appendix A - Section A3, Figure A3.10, p. 18 of 21) provides the levelized costs for all programs within the Industrial bundle, allowing a comparison to PACT levelized costs for programs in the other sector bundles. Generally speaking, programs within the industrial bundle trend towards lower levelized costs with the Custom program that represents over 95% of the total natural gas savings within the bundle having levelized costs of 2.53 cents/~~kWh~~ m^3 as noted in MIPUG/EM I-11a (p. 53 of 72).



Efficiency Manitoba's Three-Year Plan (Appendix A - Section A3, Figure A3.11, p. 20 of 21) provides the PACT NPV Summary for each natural gas program in the industrial bundle. The information provided in MIPUG/EM I-11a indicates that NPV Benefits of $28.4 Million, NPV Costs of $5.1 Million and NPV Net Value of $23.3 Million are provided by the industrial sector bundle. The industrial bundle represents about 38%, 10% and 105% of the natural gas portfolio NPV Benefits, NPV Costs and NPV Net Value prior to the inclusion of overhead and interactive effects. The table below provides the underlying industrial sector data for Figure A3.11, while Total NPV Benefits, Total NPV Costs and Total NPV Net Value were drawn from PUB/EM I-11a – Natural Gas Program Cost-Effectiveness Metrics (PACT p.169 of 399):~~The information provided in MIPUG/EM I-11a indicates that respective NPV Benefits of $59 Million, NPV Costs of $12 Million and NPV Net Value of $47 Million represent The total NPV of the industrial portfolio represents about 36%, 27% and 40% of the electric portfolio NPV Benefits, NPV Costs and NPV Net Value respectively.~~ The table below provides the underlying data for this figure:

Table 3.6: Industrial Natural Gas PACT NPV Summary

Industrial Program Bundle	PACT Benefits (NPV)	Benefits (%) 2020/21	PACT Costs (NPV)	Costs (%) 2021/22	PACT NET (NPV)	NET (%) 2022/23
Custom	$27,013,000	95.2%	$3,884,000	76.2%	$23,129,000	99.4%
HVAC & Controls	$203,000	0.7%	$35,000	0.7%	$168,000	0.7%

New Construction & High Performance Buildings	$444,000	1.6%	$765,000	15.0%	-$322,000	-1.4%
Renovation	$721,000	2.5%	$416,000	8.2%	$305,000	1.3%
Total	$28,381,000	100.0%	$5,100,000	100.0%	$23,280,000	100.0%

3.1.3 Relevance of Cost-Effectiveness Metrics to Industrial Participation

The application of cost-effectiveness tests provides important insight into the economics behind energy efficiency programming. Commonly referenced uses of cost-effectiveness tests provide information related to the levelized costs for acquisition of savings, net present values and ratios of benefits to costs.[10]

Cost impacts for consumers (i.e. energy ratepayers), acting either as participants or non-participants in energy efficiency programming, are sometimes over-looked when cost-effectiveness tests are selected and applied. Restricting the use of cost-effectiveness tests in this manner may result in a primary focus on program administrator costs, which can be detrimental to a more complete understanding of why customers participate in energy efficiency programming and what factors encourage or discourage their participation. The end-result of cost-based focus may be an apparent cost-effective program that is unable to achieve its savings objectives due to limited participation.

Industrial sector participation in energy efficiency programming delivered by Efficiency Manitoba is a key ingredient for establishing the viability of the Crown Corporation's Plan.[11] Industrial energy efficiency improvements are often capital intensive, with additional spending by industrial participants often exceeding program administrator spending by a factor 2 to 4 times.

Capital spending within the industrial sector is often constrained by access to capital. Energy efficiency improvements must compete with production considerations, health and safety improvements, infrastructure upgrades and replacements, quality and productivity improvements, along with other spend priorities that compete for limited capital resources. If the net benefits of energy efficiency spending are unable to compete favourably with other spending priorities, it is highly unlikely that customers will actively engage Efficiency Manitoba's programs.

The Efficiency Manitoba Three-Year Plan provides a clear illustration of how a constrained scope for the use of cost-effectiveness tests can limit the ability to understand key factors for determining industry participation.

The primary cost-effectiveness test referenced in the Plan is outlined below;

- The **Program Administrator Cost Test (PACT)** has a primary focus on utility costs and therefore lacks references to the investment required of participants. The test therefore lacks some relevance to key factors that impact consumer participation and their

[10] Economic Effectiveness Metrics - Appendix 8.1, 2015/16 & 2017/18 General Rate Application dated January 23, 2015

[11] Reference to industrial sector participation in the plan, its cost effectiveness and contribution to the overall metrics of the portfolio.

determination of cost effectiveness and rate impacts arising from energy efficiency programming.

A few illustrations regarding the PACT test highlight these deficiencies;

- Codes and Standards initiatives that incorporate minimum energy performance standards (MEPS) are generally viewed favourably by program administrators because of the low costs they impose on program budgets.

  These low upfront costs result in PACT test ratios that are extremely high - to the point of being almost irrelevant. Efficiency Manitoba does not provide PACT test results for Codes & Standards initiatives, nor does it consider the marginal benefits arising from Codes & Standards savings.

  Consumers are however faced with a different reality under a regulatory Codes & Standards scenario, as they become responsible for the full resource cost associated with the measure. While the costs for measure adoption may be positively impacted by mandatory energy efficiency regulations, customers are still mandated to provide the full investment for savings achieve through Codes & Standards initiatives.

  The requirements for determining the cost-effectiveness of regulatory initiatives are however generally more comprehensive than those imposed on energy efficiency program administrators, so a stronger basis exists for establishing the long-term benefits for regulatory adoption of energy efficiency measures.

- Similarly, the **Levelized Program Administrator Cost** ("LPAC", often referred to as "LUC") has a similar bias towards the program administrator costs, ignoring customer investment in its assessment of the levelized measure cost.
  - **Levelized Resource Cost (LRC)** is a better indicator of the full cost for implementing an energy efficiency measure as it considers all costs for adoption, unlike the PACT test, which only takes program administrator costs into account.
  - When taken in perspective with the **Levelized Utility Cost (LUC)**, a better indication is provided of cost sharing between the energy efficiency program provider (i.e. incentives and program admin costs) and the consumer.
- The **Total Resource Cost (TRC)** test ratio is also a better indicator of overall measure cost-effectiveness, as it considers measurable benefits and total costs for adoption. For this reason, the TRC test is a more desirable test than the **Societal Cost Test (SCT)**, which tends to assign somewhat arbitrary value for benefits that are more difficult to measure.
  - The TRC test can serve as a basis on which to establish cost sharing (i.e. between the individual consumer and the general rate base) when the source and relative value of the benefits applicable to the individual customer and general ratebase are made transparently available. It does however become challenging to understand

the value of benefits attributable to the general rate base in the absence of such transparency.

Benefits considered under various forms of the TRC test include:

- Marginal benefits obtained from deferral of infrastructure expenditures (i.e. generation, transmission, and distribution) and/or sales of energy freed through reductions in energy consumption.
- Other measurable savings (i.e. maintenance, operating, and water) obtained through adoption of energy efficiency measures.

Marginal benefits are passed on indirectly to ratepayer through lower rate increase resulting from cost effective programming. Other benefits are typically transferred to participants and often provide lesser value to the general rate base. These benefits are however useful for justifying participant investment in an energy efficient measure.

The relevance of the TRC test for the participant is highly dependent on the benefits and costs that are included in the application of the test. A focus on marginal value alone, provides a perspective that addresses the general rate base (i.e. including both participants and non-participants), while inclusion of other benefits increases the perspective to that of the participant and thereby addresses considerations for consumers that are evaluating whether to engage the measure.

- Efficiency Manitoba's use of the **Levelized Rate Impact (LRI)** provides an indication of the rate impact that consumers may experience through implementation of the Three-Year Plan. While similar in construct to the Rate Impact Measure (RIM), LRI provides a better indication of the magnitude of the rate impact than the RIM ratio. Testimony by Patrick Bowman, InterGroup Consultants, will address this matter in greater detail. Rate impacts are however a key concern for rate sensitive industrial customers.

The Efficiency Manitoba filing did not provide an indication of the LRC, TRC, RIM or other tests commonly used for evaluating measures included in the Three-Year Plan. It was therefore difficult to assess the relative cost sharing expected under the Three-Year Plan and the resulting impacts that the proposed cost sharing incorporated into the design of the industrial programs may have on industry participation.

Subsequent information provided by Efficiency Manitoba in Daymark/EM I-13de – Attachment and PUB/EM I-11a-b provides additional information that will be helpful in this analysis, but time constraints imposed by the late arrival of IR responses has challenged a thorough analysis of this information.

3.2 COMPARISON OF PROPOSED ELECTRIC PROGRAMMING BY DIFFERENT USERS

This section focuses on electric programming. It was not possible to complete a comparison of proposed natural gas programming by different users due to the proceedings compressed schedule.

3.2.1 Industrial Sector Electric Energy Consumption

Annual electric energy consumption values used by Efficiency Manitoba for the purpose of target setting is derived from the information provided in PUB/EM I-45a), which notes Reference Electric Loads at generation:

Table 3.7: Reference Electric Load Used for Target Setting

Reference Fiscal Year	Reference Electric Load (GWh)	Target Fiscal Year	Reference Target (1.5% of Prior Year)
2019/20	26,047	2020/21	391
2020/21	26,029	2021/22	390
2021/22	25,911	2022/23	389

Section 6 of the Efficiency Manitoba Three-Year Plan (Table 6.1, p. 8 of 18), indicates that electric energy consumed by the Agricultural, Commercial and Industrial sectors totaled 66.1% of 2017/18 electric consumption:

Customer segment / category	2020-23 Average		2017/18
	Savings (%)	Budget (%)	Energy consumption (%)
Industrial	39%	20%	66.1%
Agricultural	3%	4%	
Commercial	35%	36%	
Residential	22%	19%	33.9%
Income qualified	1%	3%	
Indigenous	0.5%	3%	
Enabling strategies	-	10%	-
Overhead	-	4%	-
Total	100%	100%	100%

Note. May not add up exactly due to rounding. 2017/18. Energy Consumption from the Manitoba Hydro 2017/18 Annual Report.

The information in MIPUG/EM1-7c) provides a breakdown of electric energy consumption by sub-sector within the Agricultural, Commercial and Industrial sectors.

Table 3.8: Industrial, Commercial and Agricultural Sector Consumption

Agricultural, Commercial and Industrial Sub-Sectors	2017/18 Electric Energy Consumption	Sector	% Share	Sector Share of Reference Load
AGRICULTURE/FOREST/FISH	5.00%	Agricultural	5.00%	3.31%
MINING	1.40%	Industrial	53.10%	35.10%
FOOD/BEVERAGE	4.00%			
PULP/PAPER	1.30%			
CHEMICALS/TREATMENT	15.80%			
PETROLEUM/OIL	9.60%			
PRIMARY METALS	13.40%			
MISCELLANEOUS INDUSTRIAL	5.10%			
INDUSTRIAL NON-BUILDING	1.80%			
ELECTRIC UTILITIES	0.70%			
OFFICE	5.80%	Commercial	41.90%	27.70%
RESTAURANT	1.50%			
RETAIL	4.40%			
GROCERY STORE	2.00%			
WAREHOUSE	2.30%			
SCHOOL	2.50%			
COLLEGE	1.30%			
HOSPITAL	2.10%			
HOTEL/MOTEL	1.50%			
BULK-METERED APARTMENT	4.30%			
COMMON SERVICE	1.50%			
PERSONAL CARE HOMES	0.80%			
RECREATION FACILITY	2.60%			
CHURCH	0.60%			
MISCELLANEOUS COMMERCIAL	6.60%			
COMMERCIAL NON-BUILDING	2.10%			
TOTAL	100.00%		100.00%	66.10%

Based on this information, it was determined that the average annual electric energy consumption for the Industrial sector is approximately 35% of total annual reference consumption provided in PUB/EM I-45a) versus 34% for the Residential sector including Indigenous and Income Qualified consumption, 28% for the Commercial sector and 3.3% for the Agricultural sector.

3.2.2 Industrial Sector Electric Savings Contributions and Budget Allocations

The table below provided in response to MIPUG/EM I—7a) provides an indication of the anticipated electric savings & budget for each sector:

Table 3.9: Allocated Savings & Budget by Sector

Customer Segment / Category	Annual Savings & Budget Allocations						Average Allocation	
	Saving (%) 2020/21	Budget (%) 2020/21	Saving (%) 2021/22	Budget (%) 2021/22	Saving (%) 2022/23	Budget (%) 2022/23	Saving (%) 2020-2023	Budget (%) 2020-2023
Industrial	39%	18%	40%	24%	39%	20%	39%	20%
Agricultural	3%	4%	3%	4%	3%	4%	3%	4%
Commercial	36%	40%	34%	35%	34%	34%	35%	36%
Residential	21%	18%	22%	18%	23%	20%	22%	19%
Income Qualified	0.7%	3%	0.7%	3%	0.7%	3%	1%	3%
Indigenous	0.4%	2%	0.5%	3%	0.5%	3%	0.5%	3%
Enabling Strategies	-	11%	-	10%	-	10%	-	10%
Overhead	-	4%	-	4%	-	6%	-	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Note: May not add up due to rounding								

Table 3.9 clearly indicates that anticipated savings from Industrial sector programs provide for a larger share of total savings than any other sector with a proportionally lower budget relative to the anticipated savings than other sector programs.

The comparison of Savings percentage shown in the Table 3.9 above includes electric savings attributable to Codes & Standards for both the Residential and Commercial sectors, while no additional savings attributable to Codes & Standards are included within the Industrial and Agricultural sectors. Inclusion of Codes & Standards savings, which represent about 25% of Commercial and 70% of Residential sector savings respectively masks the high acquisition costs of incentive-based Residential program savings.

The modest annual budget of approximately $400,000 attributable to Codes & Standards programming included in the Emerging Strategies category (per COALITION/EM I-44a) rather than the Commercial and Residential categories does not significantly skew the Budget percentage attributed to either the Commercial or Residential sectors, and can therefore be largely ignored for the purpose of this analysis.

3.2.3 Industrial Sector Electric Savings Targets

Information provided in the above Tables, along with the targeted electric savings identified in MIPUG/EM I-6a-e, was used to determine that the reference load and savings attributable to the Industrial sector under the Plan as noted in the Tables below:

Table 3.10: Industrial Sector Targets (no applicable Codes & Standards Savings)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticipated Savings (GWh per Plan)	% of Load
2019/20	9,142	2020/21	146	1.60%
2020/21	9,136	2021/22	161	1.76%
2021/22	9,095	2022/23	156	1.72%

Corresponding reference loads and savings attributable to the Commercial, Residential and Agricultural sectors are shown in the tables below:

Table 3.11: Commercial Sector Targets (without Codes & Standards)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticipated Savings (per Plan)	% of Load
2019/20	7,215	2020/21	100	1.38%
2020/21	7,210	2021/22	98	1.36%
2021/22	7,177	2022/23	94	1.31%

Table 3.12: Residential Sector Targets (without Codes & Standards)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticipated Savings (per Plan)	% of Load
2019/20	8,830	2020/21	22	0.25%
2020/21	8,824	2021/22	24	0.28%
2021/22	8,784	2022/23	26	0.30%

Table 3.13: Agricultural Sector Targets (no applicable Codes & Standards)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticipated Savings (per Plan)	% of Load
2019/20	862	2020/21	13	1.50%
2020/21	862	2021/22	12	1.37%
2021/22	858	2022/23	13	1.52%

Table 3.14: Codes & Standards Targets (Commercial and Residential Sectors)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticipated Savings (per Plan)	% of Load
2019/20	16,045	2020/21	88	0.55%
2020/21	16,034	2021/22	103	0.64%
2021/22	15,961	2022/23	108	0.68%

Tables 3.10 – 3.14 illustrate that incentive-based programs targeting the Industrial sector are anticipated to provide greater savings on both a GWh and percent of load basis, targeting savings levels of between 1.60% to 1.75% of industrial load. This table recognizes that cost-effectiveness and strong contribution that industrial energy savings provide to the Three-Year Plan.

3.2.4 Industrial Sector Electric Savings Acquisition Costs

Acquisition costs can be estimated by dividing the annual expenditures per sector for each year of the plan by the incremental savings achieved in each year of the plan. The anticipated savings and budget allocations were drawn from MIPUG/EM I-6a-e.

Table 3.15: Industrial Sector Savings Acquisition Costs (no applicable Codes & Standards)

Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (% of Total)	Anticipated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	146	18%	$7,874,000	$0.054
2021/22	161	24%	$12,077,000	$0.075
2022/23	156	20%	$10,281,000	$0.066

Table 3.16: Commercial Sector Savings Acquisition Costs (without Codes & Standards)

Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (% of Total)	Anticipated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	100	40%	$17,619,000	$0.177
2021/22	98	35%	$17,763,000	$0.181
2022/23	94	34%	$17,494,000	$0.186

Table 3.17: Residential Sector Savings Acquisition Costs (without Codes & Standards)

Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (% of Total)	Anticipated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	22	18%	$8,104,000	$0.362
2021/22	24	18%	$9,388,000	$0.384
2022/23	26	20%	$10,142,000	$0.384

Table 3.18: Agricultural Sector Acquisition Costs (no applicable Codes & Standards)

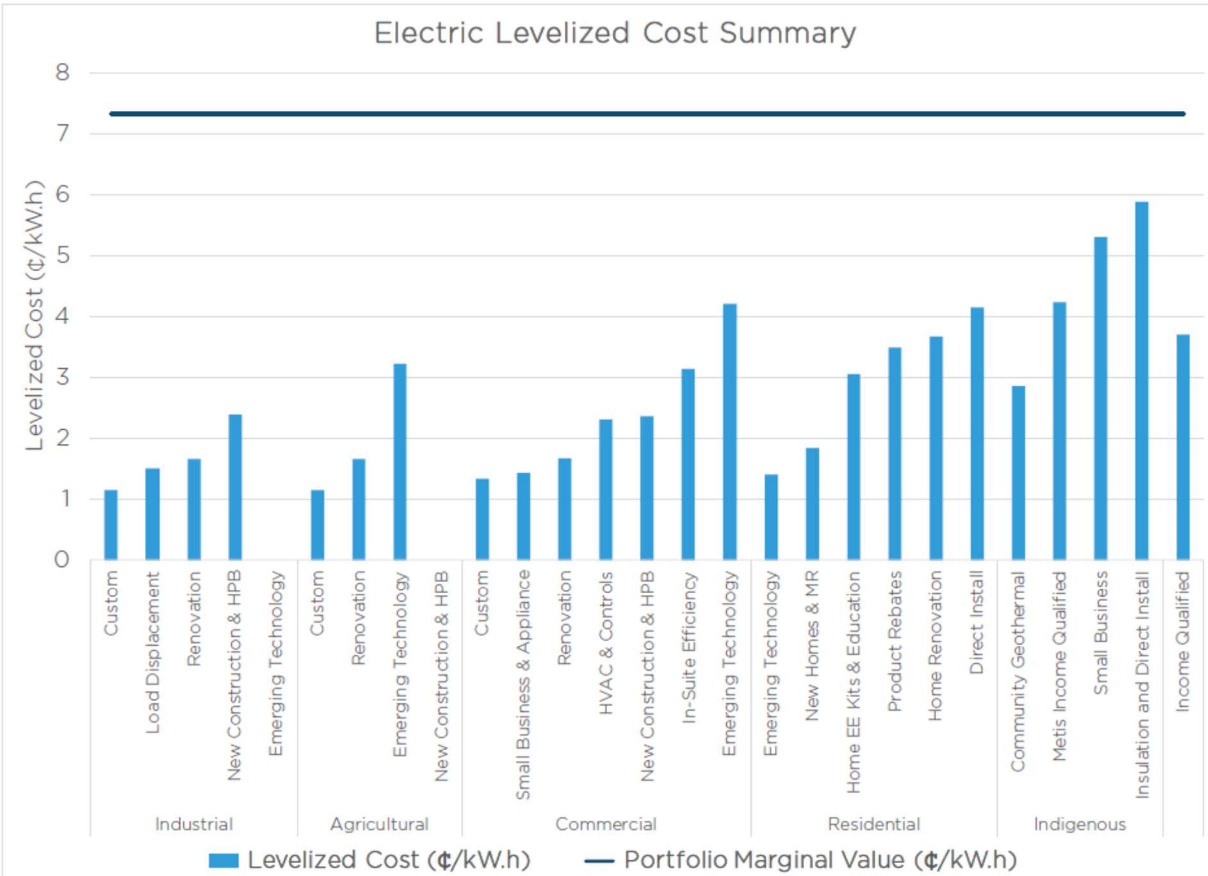
Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (% of Total)	Anticipated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	13	4%	$1,990,000	$0.154
2021/22	12	4%	$1,961,000	$0.166
2022/23	13	4%	$2,170,000	$0.166

Table 3.19: Codes & Standards Acquisition Costs

Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (% of Total)	Anticipated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	88	4%	$382,000	$0.004
2021/22	103	4%	$382,000	$0.004
2022/23	108	4%	$382,000	$0.004

The above analysis demonstrates that acquisition costs for savings from Codes & Standards initiatives and incentive-based Industrial programs are well below those achieved through incentive-based programs for Residential and Commercial programs. Broadly speaking, Industrial savings acquisition costs from incentive-based programs are anticipated to be about 1/3 of incentive-based Commercial sector acquisition costs and about 1/5 of Residential sector acquisition costs.

An examination of Levelized Costs (LUC) provides greater variability when comparisons between Residential, Commercial and Industrial programs are made as illustrated by Appendix A - Section A3 of the Efficiency Manitoba Three-Year Plan Figure A3.7 (p. 14 of 21) below:



While influenced by acquisition costs, levelized costs are highly dependent on the duration of product life cycle and subsequent costs for reinvestment to ensure continued savings after an energy efficient product reaches end-of-life. The lifecycle methodology adopted by Efficiency Manitoba (only looks at one lifecycle) for evaluating savings achieved under the Three-Year Plan limits the analysis to one product lifecycle with no consideration for reinvestment.

The Industrial sector has a demonstrated practice of replacing end-of-life equipment on a like-for-like basis, ensuring a continued stream of energy savings. The lifecycle methodology adopted by Efficiency Manitoba does not recognize this industry practice and thereby ignores potential future benefits that will be accumulated with minimal to no additional investment by the program administrator. This approach does not preclude future programs from supporting the installation of newer technologies with greater energy savings and thereby accruing additional savings in future years.

4.0 EFFICIENCY MANITOBA'S INDUSTRIAL-SPECIFIC PROGRAMMING

4.1 IS EFFICIENCY MANITOBA'S INDUSTRIAL-SPECIFIC PROGRAMMING BEING APPROACHED CORRECTLY?

The industrial bundle provided by Efficiency Manitoba in the Three-Year Plan addresses a broad range of industrial savings opportunities through a comprehensive approach targeting a variety of industrial processes and equipment common to Manitoba industries. While significant savings are achieved through a small number of large load displacement projects, other programs in the industrial bundle provide a broad range of opportunities for engagement by the industrial sector.

Industry must however be motivated to participate in Efficiency Manitoba's program offering if the Three-Year Plan is to achieve its objectives. Key factors influencing participation by the industrial sector include programming that is timely and accessible, with incentive levels that recognize metrics used by industry for evaluating project economics.

Available support, both technical and financial, must be appropriate to the level of complexity and investment required for industrial projects. MIPUG members, and Manitoba industry generally, operate facilities that consume large amounts of energy and have a strong desire to improve the overall productivity, efficiency and competitiveness of their operations. Realizing significant energy savings within these facilities often requires significant and costly changes to processing equipment that can be highly disruptive (i.e. production interruptions), imposing costs that do not appear to be recognized within the metrics used to evaluate the design of industrial programs at Efficiency Manitoba. These hidden costs can be minimized through program delivery that matches available windows of opportunity for facility maintenance when planned production outages have been scheduled.

Large capital expenditures require considerable advance planning prior to implementation, with the timing of these improvements dictated by market conditions, age of equipment, etc. While energy costs vary as a percentage of overall operating costs between specific industrial customers, efficiency improvements by themselves are not often significant enough to drive the timeline or approval for these large capital projects. Continuous and ongoing communication is required for Efficiency Manitoba to realize its objectives for industrial sector.

Since the industrial sector operates in a competitive global market, opportunities to enhance competitiveness are being examined on a continuous basis. While energy costs are important to Manitoba industry, the focus is generally on rates, not energy efficiency due to the challenges surrounding the implementation of energy efficiency improvements (i.e. disruption to production and capital costs) and the direct impact that energy rates have on decisions made in regards to market opportunities and production levels. Energy efficiency is therefore often not a top priority for establishing investment needs or justifying capital expenditures, making it difficult to establish concise plans for potential efficiency improvements. As a result, Efficiency Manitoba's program offering must be flexible and responsive to customer needs.

Since the motivating factors for industrial customers generally relates to production-related priorities (i.e. production expansion, infrastructure replacement, maintenance and reliability), it becomes vitally important that Efficiency Manitoba programs be responsive to the timing of major capital investments by industrial users. Efficiency improvements can often be linked to these projects in a relatively cost-effective manner if the appropriate resources are available. To be attractive and effective, Efficiency Manitoba programs must be responsive and well-supported with qualified technical staff and resources that can be deployed to large projects.

4.2 IS EFFICIENCY MANITOBA'S INDUSTRIAL-SPECIFIC PROGRAMMING ACHIEVABLE?

In the Application filing, Efficiency Manitoba targets electric savings from industrial programs that represent about 1.60% to 1.75% of the relevant reference load for the industrial sector.

A large portion of these savings (i.e. in the range of 1.0% of industrial load) originate with a small number of large load displacement projects that are made feasible by unique circumstance, prior investments in self-generation and specific waste streams or biomass resources that are unique to a small number of industrial facilities in Manitoba. The factors making these projects cost-effective for customers are not generally present on a large scale within the industrial sector. While additional large to medium load displacement opportunities exist, these projects represent large investments with longer lead times for planning, design and construction. Achieving additional load displacement opportunities with the three-year timeframe for this Plan will be challenging and does not appear to be within the scope of the filed Plan.

The remaining industrial savings projected under the plan represent about 0.50% of industrial load. A brief examination of potential studies from other jurisdictions undertaken in the last several years[12] indicate that a target of 0.50% is achievable with proper programming and engagement of the industry. The most recent potential study undertaken in Manitoba was by Manitoba Hydro in 2012 and numerous advances in technology and equipment available to industrial companies have matured over that time.[13] Industrial markets are not uniform across North America. An updated potential study would be of value to Efficiency Manitoba and the industrial sector for identification the quantity and magnitude of energy saving opportunities. Given its 15-year mandate and the aggressive overall targets included in the Plan, Efficiency Manitoba should pursue a potential study during the three-year duration of the Plan.

[12] 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study in 2019, Energy Efficiency Alberta 2019-2038 Energy Efficiency and Small-Scale Renewables Potential Study in 2019, British Columbia Conservation Potential Review in 2016
[13] ENERNOC Utility Solutions Consulting. (2013). Demand Side Management Potential Study.

4.3 CAN YOU DO MORE WITH EFFICIENCY MANITOBA'S INDUSTRIAL-SPECIFIC PROGRAMMING?

Consideration of incentive levels and how they impact the metrics used by industrial companies for justification of capital investments is a key consideration for increasing sector-specific programming and achievement of greater savings from the industrial sector.

The application of incentive scenarios such as those proposed by Navigant Consulting provide alternative views of incentive caps that artificially restrict available support for low-cost measures.[14] Increased spending on low-cost programs while simultaneously reducing spending on high-cost programs can increase participation and savings obtained.

A core focus on cost-effectiveness must not be lost in this effort however, as industrial consumers are highly sensitive to rate impacts that increase their cost of critical energy supplies.

While details within the Application are sparse, Efficiency Manitoba proposes the expanded use of energy managers and strategic energy management cohorts to accelerate the identification of energy savings in industrial facilities. Dedicated on-site energy managers familiar with facility operations have been proven to be successful at increasing energy efficiency program uptake in other jurisdictions, such as BC and Ontario.

4.4 GIVEN WHAT IS ASSUMED TO BE SPENT ON OTHER CLASSES, CAN YOU DO MORE WITH INDUSTRIALS FOR CHEAPER?

Industrial energy efficiency programming has been identified within the Three-Year Plan as a significant contributor to the overall cost-effectiveness of the Efficiency Manitoba portfolio. In addition to having lower acquisition costs, industrial programs provide a strong contribution to the overall NPV value of the portfolio and reduce rate impacts because of their lower rate structures and corresponding revenue losses. These characteristics make industrial programming a prime consideration for priority spending when program budgets are constrained, and cost-effectiveness is a priority for achievement of mandated savings targets.

Cost-effective investment in industrial energy efficiency places a priority on a vibrant economy with competitive businesses that create jobs and economic activity that support the residential and commercial sectors. A loss of competitive industrial companies will result in load decline and a loss of employment and economic activity.

[14] Navigant Consulting Inc. and UNS Energy Corporation. (2012). Incentive Scenarios in Potential Studies: A Smarter Approach. Available online: https://aceee.org/files/proceedings/2012/data/papers/0193-000050.pdf

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