InterGroup

CONSULTANTS

Direct Testimony of Dale Friesen, P.Eng.

On behalf of the Manitoba Industrial Power Users Group (MIPUG)

Public Utilities Board Review

Efficiency Manitoba Three-Year Plan

January 20, 2020

Conclusions & Recommendations

- Program Options
- Energy Savings Targets
- Timing & Flexibility
- Composition of Savings
- Acquisition Costs
- Maximizing Savings
- Energy Efficiency Benefits
- Potential Study Rationale
- Codes & Standards

Program Options

Industrial - Electric

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 (Performance Optimization)	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%

Evidence – Table 3.1 (p 24)
Reference - EM Plan, Figure A3.2 (p. 250) & MIPUG/EM I-6a (p. 4)

- Comprehensive plan that provides a range of options for most industrial sectors in Manitoba including consideration for both processes and facilities, augmented by;
  - ✓ Energy Efficiency Screening Studies
  - ✓ Energy Manager Initiative
  - ✓ Strategic Energy Management Cohorts
- Significant opportunity for Load Displacement savings may be de-emphasizing efforts to capture savings that are applicable to a larger cross-section of industries.
- Further opportunities for addressing;
  - ✓ Systems and processes that are NOT motor-driven
  - ✓ Emerging technology adoption within industry
  - ✓ Opportunities exists for non-regulated standards-based programs

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%

Evidence – Table 3.4 (p 27)
Reference - EM Plan, Figure A3.4 (p. 253) & MIPUG/EM I-8a (p. 4)

- Custom Program provides flexibility for addressing a broad range of opportunities across including both processes and facilities, augmented by;
  - ✓ Energy Efficiency Screening Studies
  - ✓ Energy Manager Initiative
  - ✓ Strategic Energy Management Cohorts
- Additional opportunities exist for addressing;
  - ✓ Emerging technology adoption within industry
  - ✓ Electrification of process heating (i.e. may increase electric consumption)
  - ✓ Opportunities exists for non-regulated standards-based programs

Program Options

Industrial Sector Investment

Table 3.2: Industrial Program Bundle Costs

Industrial Program Bundle	Budget ($) 2020/21	(%) 2020/21	Budget ($) 2021/22	(%) 2021/22	Budget ($) 2022/23	(%) 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%

Evidence – Table 3.2 (p 25)
Reference - EM Plan, Figure A3.5 (p. 255) & MIPUG/EM I-6a (p. 6)

Budget of $30.2 Million

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%

Evidence – Table 3.5 (p 28)
Reference - EM Plan, Figure A3.6 (p. 257) & MIPUG/EM I-8a (p. 6)

Budget of $5.5 Million

- The Three-Year Plan requires a direct investment by the industrial sector of about $60 - $76 Million, for achievement of targeted savings, consisting of about $51 - $65 Million and $9 - $11 Million respectively for electric and natural gas savings.

Energy Savings Targets

Industrial Electric Load

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%

Evidence – Table 3.8 (p 33)
Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3)

- Industrial sector load accounts for approximately 35% of total domestic electric load.
- Several sectors will experience significant challenges for participation due to the magnitude of investment required to achieve efficiency improvements in primary infrastructure and potential disruption to their operations for implementing efficiency improvements.

Energy Savings Targets

Industrial Electric Savings Targets

- The overall industrial target of 1.7% is reasonable achievable with the inclusion of load displacement savings.

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%

Evidence – Table 3.10 (p 35)
Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3), MIPUG/EM I-6a (p. 4)

- Industrial target of 0.5% without Load Displacement is reasonably achievable with programming and funding available within the Plan

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticpated Savings (per Plan)	Anticpated Savings (per Plan)
2019/20	35.1%	2020/21	47	12.67%
2020/21	35.1%	2021/22	40	9.99%
2021/22	35.1%	2022/23	46	11.39%

Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3), MIPUG/EM I-6a (p. 4)

Evidence - Table 3.10 (p.35)

Reference Fiscal Year	2018 Electric Load Forecast (GWh)	Target Fiscal Year	Anticpated Savings (per Plan)	% of Load
2019/20	9,142	2020/21	47	0.52%
2020/21	9,136	2021/22	40	0.44%
2021/22	9,095	2022/23	46	0.51%

Energy Savings Targets

Industrial Electric Savings Target Comparisons

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%

Evidence – Table 3.11 (p 35)
Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3), MIPUG/EM I-6a (p. 4)

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%

Evidence – Table 3.12 (p 35)
Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3), MIPUG/EM I-6a (p. 4)

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%

Evidence – Table 3.13 (p 35)
Reference - EM Plan, Table 6.1 (p. 164) & MIPUG/EM I-7c (p. 3), MIPUG/EM I-6a (p. 4)

- When compared to other sectors without Codes and Standards savings, the industrial target of 0.5% without Load Displacement savings is achievable with programming and funding available over the Three-Year Plan

Energy Savings Targets

Industrial Natural Gas Load

Agricultural, Commercial and Industrial Sub-Sector	2017/18 Gas Energy Consumption	Consumption Sector	Agricultural, Commercial and Industrial Share	Share of Reference Load
AGRICULTURE/FOREST/FISH	2.40%	Agricultural	2.40%	1.45%
MINING	0.10%	Industrial	52.60%	31.82%
FOOD/BEVERAGE	11.00%			
PULP/PAPER	0.30%			
CHEMICALS/TREATMENT	31.70%			
PETROLEUM/OIL	0.40%			
PRIMARY METALS	2.20%			
MISCELLANEOUS INDUSTRIAL	6.70%			
INDUSTRIAL NON-BUILDING	0.20%			
ELECTRIC UTILITIES	0.00%			
OFFICE	4.00%	Commercial	45.10%	27.29%
RESTAURANT	1.70%			
RETAIL	3.70%			
GROCERY STORE	1.10%			
WAREHOUSE	2.50%			
SCHOOL	2.60%			
COLLEGE	1.60%			
HOSPITAL	3.30%			
HOTEL/MOTEL	1.30%			
BULK-METERED APARTMENT	3.00%			
COMMON SERVICE	4.80%			
PERSONAL CARE HOMES	0.90%			
RECREATION FACILITY	1.80%			
CHURCH	0.90%			
MISCELLANEOUS COMMERCIAL	11.40%			
COMMERCIAL NON-BUILDING	0.50%			
TOTAL	100.10%		100.10%	60.50%

Evidence – New Reference - EM Plan, Table 6.2 (p. 167) & MIPUG/EM I-7c (p. 3)

- Industrial sector load accounts for approximately 32% of total applicable domestic natural gas load.
- Several sectors will experience significant challenges for participation due to the magnitude of investment required to achieve efficiency improvements in primary infrastructure and potential disruption to their operations for implementing efficiency improvements.

Industrial Natural Gas Savings Targets

- The overall industrial target of 0.82% is reasonable achievable with the inclusion of the Custom program.

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

Reference Fiscal Year	2018 Electric Load Forecast (Mm3)	Target Fiscal Year	Anticpated Savings (per Plan)	% of Load
2019/20	519	2020/21	5.1	0.98%
2020/21	515	2021/22	3.7	0.72%
2021/22	511	2022/23	3.8	0.75%

Evidence – New Table Reference - EM Plan, Table 6.2 (p. 167) & MIPUG/EM I-9b (p. 3), MIPUG/EM I-8a (p. 3)

Energy Savings Targets

Industrial Electric Savings Target Comparisons

New Table: Commercial Sector Targets (without Codes & Standards Savings of Interactive Effects)

Reference Fiscal Year	2018 Electric Load Forecast (Mm3)	Target Fiscal Year	Anticpated Savings (per Plan)	% of Load
2019/20	446	2020/21	2.9	0.65%
2020/21	443	2021/22	3.5	0.80%
2021/22	439	2022/23	3.5	0.80%

Evidence – New Table Reference - EM Plan, Table 6.2 (p. 167) & MIPUG/EM I-9b (p. 3), MIPUG/EM I-8a (p. 3)

New Table: Residential Sector Targets (without Codes & Standards Savings of Interactive Effects)

Reference Fiscal Year	2018 Electric Load Forecast (Mm3)	Target Fiscal Year	Anticpated Savings (per Plan)	% of Load
2019/20	645	2020/21	1.1	0.17%
2020/21	640	2021/22	2.0	0.31%
2021/22	635	2022/23	1.9	0.30%

Evidence – New Table Reference - EM Plan, Table 6.2 (p. 167) & MIPUG/EM I-9b (p. 3), MIPUG/EM I-8a (p. 3)

New Table: Agricultural Sector Targets (without Codes & Standards Savings of Interactive Effects)

Reference Fiscal Year	2018 Electric Load Forecast (Mm3)	Target Fiscal Year	Anticpated Savings (per Plan)	% of Load
2019/20	24	2020/21	0.1	0.57%
2020/21	24	2021/22	0.1	0.53%
2021/22	24	2022/23	0.1	0.50%

Evidence – New Table Reference - EM Plan, Table 6.2 (p. 167) & MIPUG/EM I-9b (p. 3), MIPUG/EM I-8a (p. 3)

- When compared to commercial and residential targets sectors without Codes and Standards savings, the industrial target of 0.82% is higher than targets for incentive-based programming in other sectors.

Industrial Sector Participation

- Industrial participation in energy efficiency programming is often complimentary to other drivers which dictate the timing and pace of capital investment.
  - Energy efficiency gains (i.e. reduced energy costs) alone are often unable to motivate capital spending priorities or drive project timelines for major changes to production processes.
  - Incremental costs for improvements to existing processes are often significantly higher than those considered during program design (i.e. retrofit costs).
  - Changes that increase energy consumption (i.e. automation) may provide larger returns than energy efficiency improvements due to higher cost labour savings.
- The benefits of energy efficiency improvements can be insignificant when compared to potential costs for lost production/downtime and perceived risk.
  - Energy efficiency improvements to critical infrastructure (i.e. processes) can be disruptive and intrusive, creating barriers for effective participation.
  - Program incentives are often perceived as being too small relative to the potential costs and risks that accompany changes to critical infrastructure or impede project timelines.

Industrial Sector Participation

- Speed to market is often a critical concern for industry operating in a competitive global economy.
  - Design and construction delays caused by a demand for extensive analysis, documentation and approvals are simply not tolerated by industry.
  - As a result, processes move on and opportunities are lost for decades.
- Access to capital is often limited and prioritized for mandatory regulatory improvements or production-related needs.
  - Production-related projects are deemed core to a facilities operation and therefore are often given greater latitude when justifications are provided to support capital investment.
  - Energy efficiency projects are usually deemed to provide less value and are therefore subject to more rigorous justifications, including much shorter payback periods or higher rates of return.
- The large size and scale of many industrial operations can lead to projects that delivery a lumpy savings profiles, which may not match well to pre-planned savings targets and budgets.

Recommendations

- Changes to the Efficiency Manitoba Regulations intended to support greater flexibility in program delivery would be helpful;
  - Allowing targeted savings (i.e. annual) to be acquired over a longer period (i.e. three-year planning horizon or longer) with available budget being managed over that time horizon.
  - Provide greater consideration in future target setting for savings acquired during construction of new industrial facilities or large expansions of existing facilities that will increase energy consumption and contribute to economic growth
  - Recognize productivity improvements that reduce output energy intensity when they lead to an increase overall energy consumption (i.e. increased production).
- Enable use of the Contingency Fund to support large projects with cost-effective savings to minimize Lost Opportunities and loss of cost-effective savings;
  - Clarify the definition of Emerging Opportunities to include the acquisition of cost-effective savings from large industrial projects that may otherwise be lost if budgets are exhausted or the approved three-year plan is near completion.
  - Allow such projects to be pursue even if annual savings targets have been met and will be exceeded with inclusion of the savings derived from otherwise lost opportunities.
- Allow incentive commitments beyond the three-year planning horizon to provide certainty for large projects that extend across three-year planning windows.

Industrial Sector Participation

- Implement policies that create well-documented and understood criteria for quick approval of support when large projects with substantial incentive requirements or longer implementation timelines are proposed.
    - Provides industry with the assurance that approval timelines will be appropriate to the pace and timelines for design and construction of large industrial projects.
    - Limits confusion over priorities for achieving strict annual targets (i.e. large projects have longer timelines) and transitions between three-year plans.
    - Responds to industry priorities for speed to market by eliminating decision-making barriers that may prevent the adoption of energy efficiency measures during the construction of new industrial facilities.

Composition of Savings

Industrial Electric Savings vs Budget

- Efficiency Manitoba Plan calls for the industrial sector to provide about 39% of the total three-year electric savings with about 20% of budget.

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								

Evidence – Table 3.9 (p 34)
Reference - MIPUG/EM I-7a (p. 2)

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

Target Fiscal Year	Anticipated Savings (per Plan)	Anticipated Budget (%)	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

Evidence – Table 3.15 (p 36)
Reference - MIPUG/EM I-6a (p. 2 & 5), MIPUG/EM I-7a (p. 2)

Electric Acquisition Cost Comparisons

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

Evidence – Table 3.16 (p 36)
Reference - MIPUG/EM I-6a (p. 2 & 5), MIPUG/EM I-7a (p. 2)

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

Evidence – Table 3.17 (p 37)
Reference - MIPUG/EM I-6a (p. 2 & 5), MIPUG/EM I-7a (p. 2)

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

Evidence – Table 3.18 (p 37)
Reference - MIPUG/EM I-6a (p. 2 & 5), MIPUG/EM I-7a (p. 2)

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

Evidence – Table 3.19 (p 37)
Reference - MIPUG/EM I-6a (p. 2 & 5), MIPUG/EM I-7a (p. 2)

Electric Acquisition Cost Comparisons

Prepared in Response PUB/MIPUG-9

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	47	15%	$6,890,000	$0.146
2021/22	40	12%	$6,384,000	$0.159
2022/23	46	14%	$6,924,000	$0.151

Reference – PUB/MIPUG – 9, Acquisition costs for industrial savings minus load displacement

PUB/MIPUG-8b **Data per MIPUG/EM I-7a-d (p.35)**

Customer Segment / Category	Annual Savings & Budget Allocations						Average		Savings to Budget Ratio
	Savings (%) 2020/21	Budget (%) 2020/21	Savings (%) 2021/22	Budget (%) 2021/22	Savings (%) 2022/23	Budget (%) 2022/23	Savings (%) 2020-2023	Budget (%) 2020-2023	
Industrial - Other Measures	13%	15%	10%	12%	11%	14%	11%	14%	1.21
Industrial - Load Displacement	26%	3%	30%	12%	28%	6%	28%	7%	0.25
Agricultural	3%	4%	3%	4%	3%	4%	3%	4%	1.33
Commercial - without C & S	27%	40%	24%	35%	23%	34%	25%	36%	1.47
Residential - without C & S	6%	18%	6%	18%	7%	20%	6%	19%	2.95
Income Qualified	0.7%	3%	0.7%	3%	0.7%	3%	1%	3%	4.29
Indigenous	0.4%	2%	0.5%	3%	0.5%	3%	0.5%	3%	5.71
Enabling Strategies without C&	-	10%	-	9%	-	9%	0%	9%	
Codes & Standards	24%	0.9%	26%	0.7%	27%	0.7%	26%	0.8%	0.03
Overhead	-	4%	-	4%	-	6%	0%	5%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	
Note: May not add up due to rounding									

Acquisition Costs

Electric Acquisition Cost Comparisons

	Levelized Cost (¢/kW.h)	Portfolio Weighted Marginal Value (¢/kW.h)
Industrial		
Custom	1.15	7.33
Load Displacement	1.50	7.33
Renovation	1.66	7.33
New Construction & HPB	2.39	7.33
Emerging Technology		7.33
Agricultural		
Custom	1.15	7.33
Renovation	1.66	7.33
Emerging Technology	3.22	7.33
New Construction & HPB		7.33
Commercial		
Custom	1.33	7.33
Renovation	1.67	7.33
HVAC & Controls	2.30	7.33
New Construction & HPB	2.36	7.33
Small Business & Appliance	2.51	7.33
In-Suite Efficiency	3.14	7.33
Emerging Technology	4.20	7.33
Residential		
Emerging Technology	1.41	7.33
New Homes & MR	1.84	7.33
Home EE Kits & Education	3.05	7.33
Product Rebates	3.49	7.33
Home Renovation	3.67	7.33
Direct Install	4.15	7.33
Indigenous		
Community Geothermal	2.86	7.33
Metis Income Qualified	4.23	7.33
Insulation and Direct Install	5.88	7.33
Small Business	11.26	7.33
Income Qualified		
Income Qualified	3.70	7.33

Reference – MIPUG/EM I-10a (p. 2)

Composition of Savings

Industrial Natural Gas Savings vs Budget

- Efficiency Manitoba Plan calls for the industrial sector to provide about 39% of the total three-year electric savings with about 20% of budget.

Customer segment/category	Savings (%) 2020/21	Budget (%) 2020/21	Savings (%) 2021/22	Budget (%) 2021/22	Savings (%) 2022/23	Budget (%) 2022/23	Savings (%) 2020-2023 Average	Budget (%) 2020-2023 Average
Industrial	37%	11%	25%	7%	26%	8%	29%	9%
Agricultural	1%	1%	1%	1%	1%	1%	1%	1%
Commercial	23%	28%	26%	28%	25%	26%	25%	27%
Residential	32%	14%	40%	24%	40%	24%	37%	21%
Income Qualified	8%	32%	7%	28%	7%	29%	7%	30%
Indigenous	0.2%	2%	0.2%	2%	0.4%	2%	0.3%	2%
Enabling strategies	-	9%	-	8%	-	7%	-	8%
Overhead	-	3%	-	3%	-	4%	-	3%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Note: May not add up due to rounding

Evidence – New Table Reference - MIPUG/EM I-9a (p. 2)

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

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	5.1	11%	$2,119,000	$0.417
2021/22	3.7	7%	$1,518,000	$0.408
2022/23	3.8	8%	$1,876,000	$0.491

Evidence – New Table Reference - MIPUG/EM I-8a (p. 2 & 5), MIPUG/EM I-9a (p. 2)

Natural Gas Acquisition Cost Comparisons

New Table: Commercial Sector Acquisition Costs (without Codes & Standards Savings or Interactive Effect

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	2.9	28%	$5,299,000	$1.821
2021/22	3.5	3%	$586,000	$0.166
2022/23	3.5	26%	$6,010,000	$1.712

Evidence – New Table Reference - MIPUG/EM I-8a (p. 2 & 5), MIPUG/EM I-9a (p. 2)

New Table: Residential Sector Acquitision Costs (without Codes & Standards Savings or Interactive Effects

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	1.1	14%	$2,647,000	$2.451
2021/22	2.0	24%	$5,155,000	$2.565
2022/23	1.9	24%	$5,484,000	$2.902

Evidence – New Table Reference - MIPUG/EM I-8a (p. 2 & 5), MIPUG/EM I-9a (p. 2)

New Table: Agricultural Sector Acquistion Costs (no applicable Codes & Standards Savings)

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	0.1	4%	$103,000	$0.736
2021/22	0.1	4%	$115,000	$0.885
2022/23	0.1	4%	$128,000	$1.067

Evidence – New Table Reference - MIPUG/EM I-8a (p. 2 & 5), MIPUG/EM I-9a (p. 2)

New Table: Codes & Standards Acquistion Costs (without Interactive Effects)

Target Fiscal Year	Anticpated Savings (per Plan)	Anticipated Budget (% of Total)	Anticpated Budget (per Plan)	Acquisition Cost ($/kWh)
2020/21	3.5	0.7%	$127,000	$0.036
2021/22	4.1	0.6%	$127,000	$0.031
2022/23	4.4	0.6%	$127,000	$0.029

Evidence – New Table Reference - MIPUG/EM I-8a (p. 2 & 5), MIPUG/EM I-9a (p. 2)

Natural Gas Acquisition Cost Comparisons

	Levelized Cost (¢/m3)	Portfolio Weighted Marginal Value (¢/m3)
Industrial		
Custom	2.53	18.45
HVAC & Controls	3.29	18.45
Renovation	10.98	18.45
New Construction & HPB	31.46	18.45
Agricultural		
Custom	2.53	18.45
HVAC & Controls	3.29	18.45
Renovation	10.64	18.45
New Construction & HPB		18.45
Commercial		
Custom	4.43	18.45
In-Suite Efficiency	5.68	18.45
HVAC & Controls	7.91	18.45
Small Business & Appliances	10.06	18.45
Renovation	11.97	18.45
Emerging Technology	21.40	18.45
New Construction & HPB	30.52	18.45
Indigenous		
Metis Income Qualified	44.94	18.45
Residential		
Home Renovation	16.82	18.45
Residential	19.49	18.45
Product Rebates	22.68	18.45
Direct Install	23.19	18.45
New Homes & MR	28.07	18.45
Income Qualified		
Income Qualified	40.29	18.45

Reference – MIPUG/EM I-11a (p. 2)

Cost-Effective Resource Acquisition

- Industrial sector energy efficiency programming provides some of the lowest cost savings available to Efficiency Manitoba.
  - Cost-effective enhancements to incentives and program delivery for low-cost industrial program measures may increase participation and capture otherwise lost opportunities for acquiring low-cost savings.
- The Participant Payback (PUB/EM I-11a) indicates a simple payback of 5.41 years for the Custom Program targeting the industrial sector.
  - This metric does not generally align with key decision-making criteria used by industry for justification of energy efficiency projects.
  - This metric is also considerably lower than many programs with significantly higher levelized acquisition costs and lower PACT ratios.
  - The levelized acquisition costs of 1.17 cents/kWh and a PACT ratio of 5.18 for the Custom Program appears to provide an opportunity to increase incentive contributions, while maintaining cost-effective program metrics.
  - The Participant Cost (PC) test shows a metric of 1.65, which among the lowest of the measures in the electric portfolio with the exception of the Emerging Technologies program.

Cost-Effective Resource Acquisition

- Current program structures can limit participation among industrial consumers through a lack of recognition for key decision-making criteria used by industry.
  - Limiting industrial budget expenditures through incentive caps and mandated programming for higher-cost savings acquisitions increases program spending and rate impacts for all consumers.
  - Cost-effective adjustments to the 50% incentive cap used for industrial programs are likely to increase participation among companies with limited capital and a priority focus on production-related improvements.
  - Greater emphasis on flexibility and timing for engagement of industrial customers expanding their operations or constructing new facilities will minimize lost opportunities for acquiring cost-effective savings.

Industrial Load Retention

- Industrial companies operate in a competitive environment – regionally, nationally and globally – efficiency is important.!!
  - Revenues are often tied directly to commodity markets or long-term contracts where pricing is based on factors unrelated to energy efficiency or energy costs.
  - While energy costs as a share of total costs vary significantly between industrial sectors, they remain an important priority for the entire sector.
  - Industrial operations in Manitoba compete both externally and internally within their organizations for capital and production allocations.
- Industrial companies are large consumers of energy that create a stable consumption base for supporting the costs for generation, transmission and distribution of energy.
  - The efficient use of energy contributes to a competitive industrial sector that grow the economy and generate economic benefits through job creation.
  - Energy efficiency savings achieved through industrial programming are generally very cost-effective with strong persistence.

- Why are the rate impacts of energy efficiency programming important.?
  - Low energy rates have and continue to be a key competitive advantage for Manitoba industry – although it is evident that this advantage is eroding.
  - Not all industries can take advantage of energy efficiency programming and upgrading major infrastructure is often cost-prohibitive.
  - The cost benefits of energy efficiency for Manitoba Hydro must be clearly demonstrated or energy efficiency will result in unacceptable rate increases.
    - ***This hearing has been challenged by a lack of detail within the application and restricted access to information.***
  - Savings targets should be based on a demonstrated need and the ability to mitigate costs for all consumers, both participants and non-participants.
- Industrial companies seeking new locations value energy rates that are competitive, stable and predictable
  - Achieving price certainty requires a long-term approach to energy efficiency programming that is not adequately addressed in this Plan.

- Potential studies provide insight into potential savings opportunities and the capacity to support future savings targets and conservation objectives.
- The last conservation potential study in Manitoba was based on information acquired in 2010/11 timeframe.
    - The energy market and opportunities for energy efficiency have evolved considerably since 2010/11 with technologies such as LED luminaires, solar photovoltaics, and others achieving wide-scale acceptance and maturity.
    - Rapidly evolving technologies pertaining to energy storage, electric vehicles, high-performance net-zero buildings, and heating equipment with higher coefficients of performance, along with concepts such as Beneficial Electrification are beginning to impact the energy market.
    - Regulated and non-regulated Codes and Standards focused on Outcome-Based Objectives will provide greater certainty regarding savings achieved through their implementation.
- Government policies and consumer demand are influencing equipment manufacturers to expanding the marketing and availability of energy efficient equipment, providing greater opportunity for consumers to reduce their energy consumption and manage their demand on the utility grid.
- Most importantly, consumer understanding and behavior in respect to energy consumption, procurement and the environment has evolved considerably leading to significant market changes.

Recommendations

- Codes & Standards Observations;
  - Codes and Standards savings exist and provide the same benefits attributable to incentive-based savings.
  - Manitoba Hydro has been actively involved in Codes and Standards development at the National level for more than 25 years, acting as one the highest per capita provincial contributors in Canada during that time, both financially and through in-kind contributions from subject-matter experts.
  - Regulated Codes and Standards form a comprehensive package that covers a broad array of equipment as demonstrated by the Federal Energy Efficiency Act, which has undergone 16 amendments since it was initially approved in 1993. These standards include residential, commercial and industrial equipment of various types including electric motors and transformers commonly used in the commercial and industrial sector, which continue to provide savings today.
  - Similarly, Building Energy Codes developed Federally, adopted Provincially and implemented Municipally provide a progressive framework with every increasing energy efficiency requirements that have progressed and will continue to progress going forward.
- Claiming versus Reporting Codes and Standards Savings;
  - The multi-party cooperation required to fund and develop Codes and Standards, and facilitate their implementation, makes it rather awkward for any one party to suggest that their contribution is material to the achievement of related energy savings.
  - The process for claiming savings based on material contributions does not align with the processes that recognize the impact that Codes and Standards have on energy consumption.
  - The absence of any one-party can cause the process to fail or become ineffective as well, so full and cooperative funding and participation is required from all parties and **should be mandated in Regulation**.
  - Such a mandate does not create undo hardship for ratepayers as Codes and Standards participation is the lowest cost initiative available to Efficiency Manitoba, accounting for about 1% of total expenditures.

Recommendations

- Claiming versus Reporting Codes and Standards Savings (continued);
  - Reporting savings rather than claiming savings will maximize the contribution of Codes and Standards to the savings targets and thereby decrease the overall cost for achieving those targets.
  - For these reasons, it is preferable to report savings rather than attempt to apportion or claim savings based on respective contributions that are difficult to evaluate objectively.
- Cooperative Quantification and Recognition;
  - Manitoba Hydro includes the impact of Energy Performance Codes and Standards in its load forecast. The process of removing the impacts of those Codes and Standards is at best imprecise and runs the risk of under-reporting the impact of Codes and Standards when they are later "claimed" by Efficiency Manitoba. It is likely that savings will be removed incorrectly and claimed partially at a later date.
  - Codes and Standards savings are applied to load forecasts in layers, with each successive improvement to a regulated Code or Standard further reducing consumption relative to the prior standard. Prior savings are locked into the load forecast by regulated Codes and Standards ensuring their persistence into the future.
  - As new Codes and Standards mandate higher-performing products, prior lesser-performing products are removed from the market and incremental savings are claimed annually for purchases and installations of higher-performing products mandated by the new Codes and Standards.
  - **All energy savings derived form the adoption of Energy Performance Codes and Standards should be included within the savings target mandated for Efficiency Manitoba.** To do otherwise, runs the risk of confusing the load forecast developed by Manitoba Hydro with the partial savings claims made by Efficiency Manitoba. This process becomes needlessly complicated, difficult to manage and more costly than necessary to administer.
  - **Efficiency Manitoba is well-positioned to lead the process for facilitating the development and implementing Codes and Standards applicable to Manitoba**, and should work closely with Manitoba Hydro to ensure that the load forecast aligns with savings targeted and reported by Efficiency Manitoba.

- Energy Performance Codes and Standards;
  - The development and adoption of Energy Performance Codes and Standards is a multi-party process created for the collective benefit of energy consumers, equipment manufacturers, service providers, energy providers, energy efficiency program providers and regulators.
  - The standards development process in Canada is a rigorous consensus-based process managed by Standards Council of Canada (SCC) accredited Standards Development Organizations (SDO), who develop Standards recognized by the SCC as National Standards of Canada (NSC).
  - The SCC requires SDOs to include representative participation from end-users, manufacturers, energy providers, regulators and knowledge experts in the standards development process. No one party can facilitate the process independently of the others.
  - An accredited Standard must be reviewed every five(5) years to evaluate its relevance under current market conditions and ensure that its intended purpose is being fulfilled. Necessary changes are identified and implemented during this process.
  - At its core, the standards development process is designed to facilitate the measurement and reporting of energy performance in energy-consuming equipment, processes and systems.
  - Standards development has traditionally been funded by governments and energy utilities or program administrators with a mandate to advance energy efficiency. Equipment manufacturers contract independent Certification Agencies accredited by SCC to validate the performance of their equipment to remain in compliance with the requirements of voluntary energy efficiency programs and/or regulated energy efficiency requirements.
  - The Federal Energy Efficient Act was implemented in Canada in 1993. Since that time more than 140 regulatory Standards have been adopted for energy-consuming equipment used by residential, commercial and industrial end-users. Some products have seen multiple iterations of Standards adopted through Amendments to the Energy Efficiency Act, with work now commencing on the 17th amendment to the Act. .
  - Building Energy Codes typically reference Energy Performance Standards within their requirements to remain aligned with Energy Efficiency Regulations.

Standards Role in Market Transformation and Regulation

Market Transformation to Energy Efficiency

- Energy Performance Codes and Standards Objectives;
  - The initial objective of a Standard is to create an industry-recognized methodology for measuring and reporting performance, so that the relative performance of energy-consuming equipment and systems can be accurately and repeatably measured, reported and validated.

    In this way, Energy Performance Standards allow for the equipment from competing suppliers to be objectively tested and compared for energy efficiency.
  - The second objective is to establish Minimum Energy Performance Standards (MEPS) that differentiate higher performing energy efficient equipment and systems from lesser performing products. This step allows manufacturers, energy efficiency program administrators and regulators to create categories of energy efficiency that are used for labeling or marking, marketing and program administration.
- Energy Efficiency Regulation using Codes and Standards;
  - The third objective supports the regulation of Standards by Federal, Provincial and Municipal authorities for the specific purpose of removing lesser-performing equipment and systems from the market.
  - Regulation generally occurs when only technologies become mature and adoption is relatively advanced. Regulators are usually required to demonstrate that technologies are cost-effective and beneficial to society before they can be regulated. Regulation with compliance activities support full participation by consumers by removing lesser-performing options from market. In this way, full adoption of more energy efficient technologies is achieved and the market is fully transformed.
  - Compliance is a vital component of this final stage, with Federal and Municipal authorities being the primary authorities for ensuring the compliance for equipment standards and building codes. Efficiency Manitoba has proposed to advance this process through initiatives included with its Three-Year Plan.

- Other Uses of Codes and Standards;
  - Not all Standards are regulated and many Energy Performance Standards serve useful purposes outside of the regulatory environment. Early adoption of Standards for validating the performance of emerging technologies is a common application, and a growing movement towards Outcome-Based Standards versus currently Objective-Based Standards will change the way Energy-Performance Standards are implemented.
  - Outcome-Based standards provide methodologies for measuring and reporting the performance of energy-consuming equipment and systems in-situ after installation and are expected to become a key ingredient for compliance of more complex industrial processes and commercials systems, including buildings, in the future.