

## **REFERENCE:**

Efficiency Plan p.237, 238, 250 of 591

## PREAMBLE TO IR (IF ANY):

## **QUESTION:**

- a. Identify programs and initiatives that Efficiency Manitoba considered but rejected and explain why the measures were rejected. Provide the initial high level screen as well as the list of measures that received additional scrutiny. Provide cost effectiveness assessments or program administrator cost test (PACT) results for the rejected measures.
- b. Explain why Efficiency Manitoba is not proposing conservation (or inverted block) rates at this time.
- c. Provide the levelized utility costs of conservation rates identified by Manitoba Hydro in its Power Smart and DSM plans and compare these to the Efficiency Manitoba portfolio levelized costs.
- d. Explain why Efficiency Manitoba did not propose any gas-to-electricity fuel switching programs?

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

- Programs/measures that Efficiency Manitoba considered but did not put forth in the Plan include: small scale wind, dynamic glazing, real-time energy management, energy storage, residential behavioural, personal comfort systems, advanced rooftop units, solar air pre-heating, HVAC maintenance, and variable refrigerant flow systems. The initiatives that were not included after high level screens were rejected for a combination of the following reasons:
  - the technology was not yet approved for use in Canada;
  - the technology would not meet municipal permitting requirements;



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- the potential market for the technology is too small to warrant a dedicated program rather than simply applying for a custom incentive;
- the measure would result in high free ridership;
- the program/technology's energy savings claims are not yet proven or are negligible;
- the program requires a long lead time for implementation;
- based on the current rate structure, the technology provides little to no benefit;
- although the technology is technically available, no local supplier is willing to stock the product;
- the technology saves energy in warm or mild climates but is not meant for use in Manitoba's climate;
- the technology would not effectively operate in Manitoba's climate; and
- the technology is in its early stages and would need more refining before Efficiency Manitoba would recommend it.

Supporting documents and workpapers used in the development of the preliminary portfolio for each technology would require an extensive amount of time to gather and coordinate as it is not kept in a centralized repository nor is it available in a consistent format (i.e. background documentation is different for each technology). Efficiency Manitoba has determined there is not adequate time to gather this information; however, two examples of this type of documentation are provided as attachments. By providing these examples, one can gain a sense of the analysis done, both quantitatively and qualitatively, and how decisions surrounding which measures were included in the Plan were finalized.

## Attachments:

- Supporting documents of the high-level screening completed for the residential windows and doors incentive which was included in the Plan (PUB/EM I-1 -Attachment 1); and
- Analysis undertaken for Behavioural Programming not included in the Plan (PUB/EM I-1 – Attachment 2).



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Other than the technologies that were approved for submission in the proposed plan, staff completed cost benefit analysis for Solar Domestic Water Heaters and Solar Thermal Pool Heaters. These were removed after results of the multi-criteria decision analysis considering both quantitative and qualitative perspectives (see PUB/EM I-4). The following are the metrics from the cost benefit analysis.

Measure	Electric PACT	Natural Gas PACT	Electric Levelized Utility Cost	Natural Gas Levelized Utility Cost
Solar Domestic				
Water Heaters				
Solar Thermal				
Pool Heaters				

- b. The Efficiency Manitoba Regulation 8 (1) d) outlines that net savings from a rate can be counted towards the targets as long as these savings are reasonably attributable to a rate to which Efficiency Manitoba has made a material contribution. The development of a conservation or inverted block rate initiative would be led by Manitoba Hydro and supported by Efficiency Manitoba. A rate initiative was not included in the 2020-2023 DSM Plan, but one may be explored with Manitoba Hydro in future plans.
- c. Conservation Rates were included as a placeholder in Manitoba Hydro's 2015/16 and 2016/17 Power Smart Plan 15 Year Supplement Reports. These included high level estimates of the costs, energy savings and timing of a rates initiative that would have required more detailed analysis. The levelized utility cost of this conceptual Conservation Rates initiative in both plans was estimated to be 0.4 cents/kW.h. The Efficiency Manitoba 2020/2023 Plan's electric portfolio levelized cost is 2.24 cents/kW.h.
- d. Gas to Electricity fuel switching is proposed in the plan. Ground source heat pumps (GSHP) are included within the Residential Home Renovation and Commercial, Industrial, Agricultural (CIA) HVAC and Controls bundles as eligible technologies available to residential, commercial, industrial, and agricultural customers regardless of



the existing heating system being replaced (Plan p.222 of 591). A customer with natural gas could receive an incentive to install a GSHP.

## WINDOWS

Windows per loan (Historical program info)			3
Windows per ecoENERGY application (Historical program info)			7
Square footage per window (PSRL)			20
Cost per sq ft triple pane window (HEEL)	(	\$	95
Cost per triple pane window (HEEL)	( 1	\$	1,900
Cost per sq ft dual pane window	(	5	82
Cost per dual pane window	(	\$	1,640

Incremental product cost per window (Cost per square foot)\*

13 \$ 260 \$

Product Life		25	Years	
Definition of a sale	1 project		7	windows
Square Footage per project			140	
Incremental Project Cost		\$	1,820.00	
Incentive per window		\$	50	19%
Incentive per project		\$	350	

% of Projects from registered PSRL Contractors using the loan

40% Assume with these contractors all of their customers would go through an incentive program if they are already participating in MH Loan program

## Current baseline for residential windows:

60-70s Vintage, aluminum double hung slider, wood window with storm window R2 (U2.8) HEEL Requirement (Energy Star 2020)

Triple pane, low-e coating, sulating spacer, argon gas fill U-Value 1.22

\*Per quote from local supplier

## Doors

Doors per loan	1	
Square footage per window (PSRL)	18	
Cost per sq ft Energy Star door		
Cost per Energy Star door	\$ 2,865	
Cost per sq ft standard door		
Cost per standard door	\$ 2,550	
Incremental product cost per door*	\$ 95	
Based on a door with 1/2 glazing		

Product Life		25 Year	rs		
Definition of a sale	1 project		1 0	door	
Square Footage per project			18		
Incremental Project Cost		\$	95.00		
Incentive per door		\$	50	ļ	53%
Incentive per project		\$	50		

40% % of Projects from registered PSRL Contractors using the loan Assume with these contractors all of their customers would go through an incentive program if they are already participating in MH Loan program

Current baseline for residential doors: R3 door with storm door.

HEEL Requirement (Energy Star 2020)

\*Per Building Evelope Engineering Support

## WINDOWS

Savings information based on 2017-18 annual participation numbers.

Current baseline:	Used to calculate incremental savings
Window:	60-70s Vintage, aluminum double hung slider, wood window with storm window
	R2 (U2.8)
Door:	R3 Door

All savings calculated from PSRL database and PSRL actual projects

## Inputs for CBA:

Windows per project	7	
Savings	2335.710	kwh
Winter Demand	1.222	KW
Summer Demand	0.081	KW

Gas 291.926 m3

	Savings Per Measure								
	E kwh KW KW Summer G m								
Windows		333.67	0.17	0.01		41.70			
Doors		184.83	0.10	0.01		21.52			

\*Average window size 20 sq ft.

		Savings Per Project								
	Measures/loan		kwh	KW	KW Summer	m3				
Windows		7.0	2335.71	1.22	0.08	291.93				
Doors		1.0	184.83	0.10	0.01	21.52				

Summer Demand for Windows/Doors:	
Winter Demand / 15	

WINDOW	Single Detached Homes	373,568			
-	24.6% of SD customers upgraded				
	their windows over 3 years	91,873	REUS Data		
-	10+ Triple Pane windows	22.6%			
	Window replacements per year	30,624			
	Electric	38.1%	Gas	60.0%	
-			Window		1
	Window replacements per year		replacements per		
	based on REUS	11,668	year	18,375	
-	Projects per year	5,212	YES	9,731	YES
-	Natural Conservation Rate	20%			
_	Natural Concernation	2 224		2 675	
-	Natural Conservation	2,334		5,075	
-	PSRL Customer Survey- Customer				
-	stated PSRL did not influence	12%			
	Free Riders	109			
-	Free Drivers	19			
	FIEL DIVEIS	ΤO			

	Electric								
			(D)	(E)	(F) = (E) - (D)	(G)	(H)	(I) = (G) - (H)	(J) = (F) - (I)
					Annual				Program-
					Incremental			Program-	<b>Driven Non-</b>
			Natural	Annual EE Sales with Power	Program-	<b>Total Annual</b>	Free Rider	Driven	<b>Rebated Sales</b>
	Year	Total Market	Conservation	Smart Program	<b>Driven Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	(Free Drivers)
Yr-1	2020/21				0			0	0
Yr-2	2021/22		2,334	2,878	544	860	344	0	0
Yr-3	2022/23		2,334	2,873	539	851	341	0	0
Yr-4	2023/24		2,334	2,868	534	843	337	0	0
Yr-5	2024/25		2,334	2,863	529	834	334	501	28
Yr-6	2025/26		2,334	2,857	524	826	330	496	28
Yr-7	2026/27		2,334	2,852	519	818	327	491	28
Yr-8	2027/28		2,334	2,828	494	777	311	466	28
Yr-9	2028/29		2,334	2,804	471	738	295	443	28
Yr-10	2029/30		2,334	2,782	448	701	280	421	28
Yr-11	2030/31		2,334	2,761	427	666	266	400	27
Yr-12	2031/32				0			0	0
Yr-13	2032/33				0			0	0
Yr-14	2033/34				0			0	0
Yr-15	2034/35				0			0	0

				Gas					
			(D)	(E)	(F) = (E) - (D)	(G)	(H)	(I) = (G) - (H)	(J) = (F) - (I)
					Annual				Program-
					Incremental			Program-	<b>Driven Non-</b>
			Natural	Annual EE Sales with Power	Program-	<b>Total Annual</b>	Free Rider	Driven	<b>Rebated Sales</b>
	Year	Total Market	Conservation	Smart Program	Driven Sales	<b>Rebated Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	(Free Drivers)
Yr-1	2020/21				0			0	0
Yr-2	2021/22		3,675	6,057	2,382	3,869	1,548	2,322	60
Yr-3	2022/23		3,675	6,497	2,822	4,597	1,839	2,758	64
Yr-4	2023/24		3,675	7,159	3,484	5,689	2,275	3,413	71
Yr-5	2024/25		3,675	8,262	4,587	7,509	3,004	4,505	82
Yr-6	2025/26		3,675	8,217	4,542	7,434	2,974	4,460	81
Yr-7	2026/27		3,675	8,172	4,497	7,360	2,944	4,416	81
Yr-8	2027/28		3,675	7,949	4,274	6,992	2,797	4,195	79
Yr-9	2028/29		3,675	7,737	4,062	6,642	2,657	3,985	77
Yr-10	2029/30		3,675	7,535	3,861	6,310	2,524	3,786	75
Yr-11	2030/31		3,675	7,344	3,669	5,994	2,398	3,597	73
Yr-12	2031/32				0			0	0
Yr-13	2032/33				0			0	0
Yr-14	2033/34				0			0	0
Yr-15	2034/35				0			0	0

WINDOW	Single Detached Homes	363,607	_		
	Door replacements per year based				
	on PSRL	1,425			
	Electric	39.0%	Gas	52.0%	
	Door replacements per year		Window replacements		
	through PSRL Contractors	556	per year through PSRL		741
	Natural Conservation Rate	12%			
	Natural Conservation	67		89	
	PSRL Customer Survey Did not				
	influence	12%	_		
	Free Riders	40%			
	Free Drivers	1%			

				Electric					
			(D)	(E)	(F) = (E) - (D)	(G)	(H)	(I) = (G) - (H)	(J) = (F) - (I)
					Annual				Program-
					Incremental			Program-	<b>Driven Non-</b>
			Natural	Annual EE Sales with Power	Program-	<b>Total Annual</b>	Free Rider	Driven	<b>Rebated Sales</b>
	Year	<b>Total Market</b>	Conservation	Smart Program	Driven Sales	<b>Rebated Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	(Free Drivers)
Yr-1	2020/21				0			0	0
Yr-2	2021/22		67	215	148	244	98	146	2
Yr-3	2022/23		67	214	147	241	97	145	2
Yr-4	2023/24		67	212	145	239	96	143	2
Yr-5	2024/25		67	211	144	237	95	142	2
Yr-6	2025/26		67	209	143	234	94	140	2
Yr-7	2026/27		67	208	141	232	93	139	2
Yr-8	2027/28		67	201	134	220	88	132	2
Yr-9	2028/29		67	194	127	209	84	126	2
Yr-10	2029/30		67	188	121	199	79	119	2
Yr-11	2030/31		67	182	115	189	76	113	2
Yr-12	2031/32				0			0	0
Yr-13	2032/33				0			0	0
Yr-14	2033/34				0			0	0
Yr-15	2034/35				0			0	0

				Gas					
			<b>(D)</b>	(E)	(F) = (E) - (D)	(G)	(H)	(I) = (G) - (H)	(J) = (F) - (I)
					Annual				Program-
					Incremental			Program-	<b>Driven Non-</b>
			Natural	Annual EE Sales with Power	Program-	<b>Total Annual</b>	Free Rider	Driven	<b>Rebated Sales</b>
	Year	<b>Total Market</b>	Conservation	Smart Program	<b>Driven Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	<b>Rebated Sales</b>	(Free Drivers)
Yr-1	2020/21				0			0	0
Yr-2	2021/22		89	1,419	1,330	2,194	878	1,316	14
Yr-3	2022/23		89	1,406	1,317	2,172	869	1,303	14
Yr-4	2023/24		89	1,393	1,304	2,150	860	1,290	14
Yr-5	2024/25		89	1,380	1,291	2,129	851	1,277	14
Yr-6	2025/26		89	1,367	1,278	2,107	843	1,264	14
Yr-7	2026/27		89	1,354	1,265	2,086	834	1,252	13
Yr-8	2027/28		89	1,291	1,202	1,982	793	1,189	13
Yr-9	2028/29		89	1,231	1,142	1,883	753	1,130	12
Yr-10	2029/30		89	1,174	1,085	1,789	715	1,073	12
Yr-11	2030/31		89	1,120	1,031	1,699	680	1,020	11
Yr-12	2031/32				0			0	0
Yr-13	2032/33				0			0	0
Yr-14	2033/34				0			0	0
Yr-15	2034/35				0			0	0



AVERAGE LOAN AMOUNT:	\$	4,933
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						LOANS							
			Gas	Elec									
			90%	10%			46	5%		13	3%		
					Ī		Window	ws Loan		Doors	Loans		
	2018 Interim Est	4446					Gas	Elec	Total	Gas	Elec	Total	
	2019LRP	4400	3960	440		2019	1816	202	2018	515	57	572	1
1	2020	4400	3960	440	Y1	2020	1816	202	2018	515	57	572	
2	2021	7500	6750	750	Y2	2021	3096	344	3440	878	98	975	
3	2022	7425	6683	743	Y3	2022	3065	341	3405	869	97	965	
4	2023	7351	6616	735	Y4	2023	3034	337	3371	860	96	956	
5	2024	7277	6550	728		2024	3004	334	3337	851	95	946	
6	2025	7204	6484	720		2025	2974	330	3304	843	94	937	
7	2026	7132	6419	713		2026	2944	327	3271	834	93	927	
8	2027	6776	6098	678		2027	2797	311	3107	793	88	881	
9	2028	6437	5793	644		2028	2657	295	2952	753	84	837	
10	2029	6115	5504	612		2029	2524	280	2804	715	79	795	
11	2030	5809	5228	581		2030	2398	266	2664	680	76	755	
12	2031	5519	4967	552	end incent	2031	2278	253	2531	646	72	717	
13	2032	5243	4719	524		2032	2164	240	2404	613	68	682	
14	2033	4981	4483	498		2033	2056	228	2284	583	65	648	
15	2034	4732	4259	473		2034	1953	217	2170	554	62	615	

	Estimated Participa	tion based	on Loan /	Activity (D	D NOT US	E, TOO HIGH)
	Gas	Elec		Gas	Elec	
	90%	10%		90%	10%	
	Incentive	Windows			Incentive D	)oors
	Gas	Elec	Total	Gas	Elec	Total
40%	7739	860	8599	2194	244	2438
	7661	851	8513	2172	241	2413
	7585	843	8428	2150	239	2389
	7509	834	8343	2129	237	2365
	7434	826	8260	2107	234	2341
	7360	818	8177	2086	232	2318
	6992	777	7768	1982	220	2202
	6642	738	7380	1883	209	2092
	6310	701	7011	1789	199	1987
	5994	666	6660	1699	189	1888

Loans return	o EcoE Level	
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Over the last 5 years participation has been decreasing on average 6 percent per year.

% of customers from registered contractors using PSRL:	20%
Conservative:	40%
2021 participation is set to the average of the highest EcoE participa	iton years.

## Door Replacements per year based on PSRL Activity

Number of door loans:	572
% of contractors customers going through PSRL:	40%
Total number of door projects from PSRL Contractors:	1430

## By 2030 Energy Star is for all windows in Canada to meet a U-Value of 0.8

		Number	of LOANS			
		Average	2014-15	2015-16	2016-17	2017-18
Wi	indows	2025	2556	2209	2021	2028
Do	ors	613	845	647	540	686

Gas         Elec           90%         10%           Incentive Windows         Total           Gas         Elec         Total           3869         860         472           4597         851         544	
90%         10%           Incentive Windows         Total           Gas         Elec         Total           3869         860         472           4597         851         544	
Incentive Windows           Gas         Elec         Total           3869         860         472           4597         851         544	
Gas         Elec         Total           3869         860         472           4597         851         544	
3869 860 <b>47</b> 2 4597 851 <b>54</b> 4	
3869 860 <b>472</b> 4597 851 <b>54</b> 4	
3869 860 <b>472</b> 4597 851 <b>54</b> 4	
4597 851 <b>54</b> 4	29
	48
5689 843 <b>65</b> 3	31
7509 834 <b>83</b> 4	43
7434 826 826	60
7360 818 <b>81</b> 7	77
6992 777 <b>77</b>	68
6642 738 <b>73</b> 8	80
6310 701 <b>70</b> ′	11
5994 666 <b>66</b> 0	60

Y1

Y2 Y3

Y4

UPDATES

## WINDOWS Approximately what percentage of your customers choose to finance their window project through the Power Smart Loan Program?

10%		Frequency	Percent			Contracto	or survey
10%	10%	11	22%			Approxim	ately what
10%	25%	7	14%			0-25%	98
10%	5%	5	10%			26-50%	18
10%	15%	4	8%			51-75%	2
10%	20%	4	8%			76-100%	2
10%	3%	2	4%				122
10%	40%	2	4%				
10%	50%	2	4%				
10%	60%	2	4%				
10%	0%	1	2%				
25%	0.50%	1	2%				
25%	2%	1	2%				
25%	6%	1	2%				
25%	27%	1	2%				
25%	30%	1	2%				
25%	80%	1	2%				
25%	85%	1	2%				
5%	30%	1	2%				
5%	Don't know	1	2%				
5%				-			
5%	AVERAGE:	21%					
5%		•					
15%			Numb	per of LOAI	NS		
15%			Average	2014-15	2015-16	2016-17	2017-18
15%	Windows		2383	2556	2209	2021	2028
15%	Doors		746	845	647	540	686
20%				0.0	• • •		
20%	F	stimated To	tal Project	s hased on	contrator	foodback	
20%	-	Stillated 10	Avorago	2014 15	2015 16	2016 17	2017 19
20%			Average	2014-15	2015-10	2010-17	2017-18
20%	Windows		10493	121/1	10519	9624	9657
3%	Doors		3236	4024	3081	2571	3267
3%							
40%							
40%							
50%							
50%							
60% 60%							
60%							
0%							
1%							
2% 60/							
6%							
27%							
30%							
80%							
85%							

30%

Contractor survey 2017 Approximately what percentage of your customers apply for financing offered through Manitoba Hydro

••	• •	-
0-25%	98	80%
26-50%	18	15%
51-75%	4	3%
76-100%	2	2%
	122	

2028

686

3267

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D?

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## Behavioural Programming Qualitative Pre-Screening Analysis Summary

Below is a detailed summary of the analysis done and the considerations which contributed to the decision to delay implementation of a behavioural initiative in Efficiency Manitoba's 3 Year Plan:

## 1. Program Description

Behavioural initiatives typically involve Home Energy Report (HER) programs provided by a third-party vendor. The HER presents homeowners with timely, regular, easy-tounderstand information about their household energy use and compares their consumption to other, similar homes in their neighborhood. The comparison motivates many customers to take action to reduce their household energy use. While perhousehold impacts are relatively small, these types of programs achieve savings through sheer volume of participants.

## 2. High Cost

An analysis of the cost of HER programs in Canada and the US indicates utilities spend \$0.09 per kWh saved on average (1); however, this type of program can provide significant energy savings in the residential sector.

## 3. Uncertainty in Savings and Persistence

Estimating savings can be difficult as Manitoba's market has unique climate and demographic characteristics which may impact savings potential. An evaluation of Xcel Energy Minnesota's Pilot Project (2) yielded 2.12%, 2.89%, and 3.26% electric savings and 0.6%, 0.81%, and 0.98% natural gas savings over three years. Additionally, persistence of savings for behavioural initiatives is generally understood to decrease at a rate of 20% annually and should be assumed fully depleted by the end of the third year, once HER delivery has been stopped.

## 4. Value of Natural Gas Savings

Despite healthy estimated electric savings, relatively low estimated natural gas savings relative to cost was a factor in the decision to delay implementation of a behavioural initiative. Strategically, there may be value in delaying behavioural energy efficiency until a future time when it could be employed to recover an electric or natural gas savings deficit.

## 5. Long Implementation Timeline

Behavioural initiatives require long lead times for implementation. Once a vendor is selected, data and systems integration will require extensive coordination and significant resources. Customers will need to grant Efficiency Manitoba access to detailed energy use information. The required data transfer, security, and privacy, which may complicate delivery, should be considered when estimating the budget and timeline of such an offer.

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## 6. Lack of AMI

Advanced Metering Infrastructure (AMI) is the recommended platform to support and deliver behavioural activities. AMI facilitates efficient, timely, and accurate delivery of HERs to customers and improves both savings and persistence as real-time, in-home feedback tools can be leveraged to push information to customers about their energy consumption. AMI also addresses the barriers presented by hard-to-reach or geographically distant customer groups. Since data is the basis of the behavioural model, its accuracy is of paramount importance. The current environment of manual meter readings and estimated consumption affects the accuracy and credibility of HERs and will be a major barrier for effective delivery of a behavioural offer in Manitoba without an AMI platform.

## Sources:

(1) E Source: HER Programs: Best Practices and Savings https://www.esource.com/dsm-1700061-001/her-programs-best-practices-and-savings

(2) E Source: HER Programs Design and Implementation https://www.esource.com/dsm-1700061-002/her-programs-design-and-implementation

(3) CEE (Centre for Energy and Environment): Verification of Savings from Xcel Energy Minnesota's Print Energy Feedback Pilot Project <u>http://www.oracle.com/us/industries/utilities/verification-</u> <u>savings-xcel-3696252.pdf</u>



## **REFERENCE:**

Efficiency Plan p.82 of 591, Attachment 4

## PREAMBLE TO IR (IF ANY):

## QUESTION:

- a. Provide the report "Optimizing Power Smart: Options to Achieve Manitoba's New Energy Savings Targets, 2017" by Dunsky Energy Consulting.
- b. Please provide copies of all other memos or other reports that Dunsky Energy Consulting has prepared for Efficiency Manitoba since its inception.

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

- a) Please see PUB/EM I-2a-Attachment 1 for the report entitled "Optimizing Power Smart: Options to Achieve Manitoba's New Energy Savings Targets, 2017" by Dunsky Energy Consultants.
- b) Please see submission Attachment 4, p. 519 as well as the response to DAYMARK/EM I-2a for all memos and reports provided by Dunsky Energy Consultants in 2019. Please see PUB/EM I-2b-Attachment 1 for memos produced for Efficiency Manitoba by Dunsky Energy Consultants in 2018.

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# OPTIMIZING POWER SMART

## OPTIONS TO ACHIEVE MANITOBA'S NEW ENERGY SAVINGS TARGETS

Prepared for: MANITOBA HYDRO

May 2018



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## **OPTIMIZING POWER SMART<sup>TM</sup>**

OPTIONS TO ACHIEVE MANITOBA'S NEW ENERGY SAVINGS TARGETS

#### **PREPARED FOR:**

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**Note:** The report primarily reviewed Manitoba Hydro's portfolio of programs in place prior to November 2017. Additional research, analysis, and formatting was added prior to finalizing the report in May, 2018.

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## ABOUT DUNSKY

**Dunsky Energy Consulting provides strategic analysis and counsel in the areas of ENERGY EFFICIENCY, RENEWABLE ENERGY and SUSTAINABLE MOBILITY.** Based in Montreal, we support clients across North America through three key services: we assess opportunities (technical, economic and market), design strategies (programs, policies and regulatory) and evaluate performance.

Dunsky's team of 20+ experts and analysts is wholly dedicated to helping our clients build an efficient and sustainable energy future.



## **EXECUTIVE SUMMARY**

Manitoba Hydro has administered Demand Side Management (DSM) programs for the last two decades. Recently, the Province of Manitoba passed legislation requiring the DSM program administrator to achieve annual savings of 1.50% of electricity sales and 0.75% of natural gas sales.

These targets are perceived as aggressive and potentially difficult to meet in the Manitoba context. The optimizing Power Smart<sup>™</sup> assessment is intended to respond to the question: **Can Manitoba Hydro meet the new DSM targets for electricity and natural gas?** 

Based on Dunsky Energy Consulting's analysis of the current Power Smart<sup>™</sup> plan and other opportunities, we believe it is possible for Manitoba Hydro to meet its near-term electricity and natural gas targets. It becomes more challenging to meet the targets in the longer-term; however, as those years come into view, additional savings – quantified and not yet quantified – will help close the gap.

The key takeaways from the assessment are:

## NEW DSM TARGETS ARE ACHIEVABLE IN THE SHORT TERM

Over the next four years, Manitoba Hydro can meet and exceed the new DSM targets for electricity. Also, because the targets are a rolling average, surplus savings in the near-term are "rolled over," thereby reducing the electricity target going forward. Based on the Power Smart<sup>™</sup> plan and the new opportunities quantified in this assessment, surplus savings in the 2017/18 to 2020/21 period reduce the target from 1.50% to 1.39% starting in 2021/22 (see Figure ES-1, below).

For natural gas, savings in the Power Smart<sup>™</sup> plan plus the new opportunities go a long way to achieving the new DSM target (in the near- and mid-term). While there is still a savings gap, we believe it can be closed if natural gas savings associated with Home Energy Reports are accounted for and other unquantified opportunities pursued (see Figure ES-2, below).

"KNOWN UNKNOWNS" REPRESENT ADDITIONAL SAVINGS OPPORTUNITIES FOR THE MID- AND LONGER TERMS

Dunsky has quantified savings associated with six opportunity areas (the "Known Knowns"): 1) New & Emerging Technologies, 2) C&I Outreach Capacity, 3) Residential and Commercial Solar, 4) Enhanced Marketing, 5) Updated Technical Assumptions, and 6) Market Transformation. We find that the additional savings help to close the gap in the near and long-term.

However, this report is by no means a comprehensive assessment of the savings potential that exists. There is a long list of technologies that are already part and parcel of programs in other jurisdictions, but have not been quantified in the context of Manitoba. These, along with new innovations that are not yet on our radar, will play an important role in meeting additional savings requirements in the years following the initial five-year period.

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Figure ES-1: Electricity savings levels (GWh) compared to average savings targets (excluding fuel choice)









## **MEETING TARGETS REQUIRES A SHIFT IN APPROACH**

Manitoba currently has a robust portfolio of programs that sets it up for success in meeting new legislated energy savings targets, both in the near and longer terms. However, achieving this success will require changes to Manitoba Hydro's planning approach and expectations. That approach – rooted in near-zero risk tolerance – was built over decades on the basis of an historic assumption that large hydro dams, which require a decade or more to build, were the *de facto* option for meeting electricity demand.

Going forward, there are many reasons to take a different tact. One is the nature of power supply opportunities: with the dramatic cost reductions in wind and solar technologies (among others), competitively priced, clean supply options with significantly shorter lead times make long-term certainty less essential. Another is the rapid pace of technological change on both the supply and demand sides of the energy equation: the advent of (and possible future for) dramatic advances in lighting, heat pumps, controls, data-driven services and vehicles – along with policy changes driven by climate change commitments – add new uncertainty to both baseline demand forecasts, and to forecasts of available, above-baseline energy savings opportunities. Neither can be known, beyond a horizon of a few years, with the degree of certainty that Hydro's historical DSM planning approach may have been accustomed to.

For these reasons as well as those laid out earlier (see A Note on Planning Timeframes on page 1), we urge that Manitoba shift its planning approach to one that relies less on certainty with regard to future technological change, and more on continuous improvement, systems to capitalize on innovation and contingency planning. We provide more specific recommendations in this regard in the section below.

Based on this optimization assessment, we recommend the following:

## NEAR TERM (3-5 YEARS)

3

- Execute on the additional quantified savings opportunities identified in this report, namely: 1) New & Emerging Technologies, 2) C&I Outreach Capacity, 3) Residential and Commercial Solar, 4) Enhanced Marketing, 5) Updated Technical Assumptions, and 6) Market Transformation.
- 2. Immediately launch a targeted, gas savings opportunity assessment. Building from the list of unquantified additional opportunities provided in this report, this assessment would focus on the highest opportunity / lowest risk gas saving options, and develop specific action plans for their inclusion in the Power Smart portfolio. An opportunity assessment is in many ways like a *targeted* potential study. Contrary to a full-scale potential study, this type of assessment can likely be completed in a 3-6 month timeframe, and at considerably lower cost. Given time constraints, we recommend this be conducted early in calendar year 2018, for implementation of new savings measures beginning in the latter half of FY 2018/19.
- **3.** *Execute on that assessment*, i.e. build the additional new initiatives to the portfolio, per the schedule indicated above. Depending on anticipated savings, Hydro may also wish to examine

non-gas saving alternative options, as allowed for in the legislation's flexibility mechanisms to meet targets. Such options can be included in the work described above.

## MID TERM (5-10 YEARS)

- **4.** *Immediately design an Innovation (RDD&C) Program.* In order to build an opportunity "pipeline", we recommend that Manitoba design and launch an Innovation Program. While Hydro currently funds specific projects in the area of innovation (e.g. research on electric buses, demonstration projects in diesel communities), we recommend an integrated program designed specifically to build a pipeline of new savings opportunities across Manitoba. This program would include proactive market and technology research and surveillance, proactive RDD&C funding of targeted new technology or service opportunities, and an open or directed fund for third-party, market-driven proposals. The bulk of efforts would be screened against their likelihood of generating additional mid-term savings opportunities for Hydro's PowerSmart portfolio.
- **5.** *Revisit cost-effectiveness screening approach.* In order to align with the principles laid out in the new legislation, we recommend that Manitoba Hydro revisit its cost-effectiveness screening framework. Assuming PowerSmart is transferred to Efficiency Manitoba in 2018, this work should be conducted as part and parcel of the transition.
- 6. Launch a full-scale potential study process in 2019. In keeping with the scope of the legislation, we recommend a comprehensive potential study to assess electricity and natural gas savings opportunities, as well as opportunities in unregulated fuels (that can count toward legislated targets and supported through funding sources such as carbon tax revenue). The study should target the mid-term period (approximately 2022-27) with reasonable specificity, and should be scoped to indicate notional savings opportunities for the five subsequent years. In order to allow for the study to be executed and results built into plans, we recommend launching an RFP to this end in 2019. Assuming the targeted gas savings opportunity assessment recommended above (recommendation #2) moves forward, we do *not* believe that the potential study need be launched any earlier.

## LONG-TERM (10-15 YEARS)

In our experience, the bulk of demand-side management opportunities cannot reasonably be defined more than a decade in advance. For that period, we recommend that for planning purposes, Manitoba Hydro assume legislated targets will be met, and focus risk mitigation on sensitivity analysis around the cost of procuring marginal savings.

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## INTRODUCTION

## CONTEXT

Manitoba Hydro (Hydro) has administered Demand Side Management (DSM) programs for the last two decades, filing annual plans that outline its energy savings targets and associated costs. These programs have been delivered through the Power Smart<sup>™</sup> brand.

New government-mandated energy-savings targets of 1.50% of electricity sales and 0.75% of natural gas sales require Manitoba Hydro to assess its current Power Smart<sup>™</sup> plan (the Plan), and where necessary, consider new opportunities to fill any gaps between its plan and the targets.

Dunsky Energy Consulting (Dunsky) was tasked with providing an opinion on Manitoba Hydro's ability to achieve these targets.

## A NOTE ON PLANNING TIMEFRAMES

Manitoba Hydro has long held to the practice of requiring detailed, bottom-up forecasts of DSM savings for integration into its power planning process. While this approach aims to ensure consistency with Hydro's historical approach to power generation planning – by necessity long-term because of the lengthy planning and construction cycles for large-scale hydro projects – it is much akin to fitting a square peg into a round hole.

Indeed, energy efficiency is the product of constant technological evolution. Savings to be generated in 10 or 20 years' time are likely to come from technologies that are far different from what are known and available today. By contrast, hydropower is a mature technology, and a project being planned today is unlikely to benefit from significant technological innovation within the same timeframe.

Yet that does not mean that new supply is without uncertainty. In the case of large hydro projects, uncertainty is less a product of technological forecasts as it is of the technology's other key variables: future precipitation, construction costs, interest rates and demand itself.<sup>1</sup> Yet while none are known with certainty, power planners make reasonable, forward-looking assumptions based on historical precedent and expert advice, and use scenario planning to build contingencies if and when reality deviates from forecasts.<sup>2</sup>

They also recognize that forecasts give significant weight to the near-term, because large-scale deviations in the longer-term are difficult to foresee. In sum, planners do not require perfect knowledge of how

<sup>&</sup>lt;sup>1</sup> Or any number of other factors, including labour unrest, community opposition, geological surprises and material supply chain issues, among others.

<sup>&</sup>lt;sup>2</sup> The same is true of natural gas planning: rather than securing fixed price gas contracts to cover all needs for 15 years, planners take a portfolio approach that proactively manages risk (in this case, the risk of supply availability and pricing). While Hydro assumes that sufficient gas supplies will be available into the future, it does not have perfect knowledge as to where such supplies will come from, nor their future procurement price.

capital markets, precipitation or other key factors will evolve far into the future prior to building future power generation into forecasts. Treatment of DSM should be no different.

Applying a similar approach to DSM means allowing experts to forecast savings based not on perfect information, but on historical trends and forward-looking expertise, and then planning for contingencies. Pragmatically, this also means focusing on near-term savings opportunities, where there is greater clarity, and making broader assumptions about longer-term opportunities and associated technological and market evolution. This is also consistent with the demand forecasts that underpin all planning, and that are, by necessity, based heavily on current technology and markets, and then updated on a regular basis as these evolve.

Elsewhere, DSM planning is typically conducted on a 1- to 3-year basis, with some longer-term projections added for information purposes for power planning (see Table 1 below).

	Detailed DSM Plan	Long-Term P	lanning (IRP)
Utility	Planning Period (years)	Planning Period (years)	Frequency of Planning Updates (years)
BC Hydro	1-3**	20	5
NS Power	3	25*	3-5
Xcel Energy	3	15	5
PacifiCorp	n/a	15*	2

Table 1: DSM and power planning time horizons in four regions

\* Includes end-effects beyond the planning period for some EE measures

\*\* Based on rate application filings

The new legislation governing DSM in Manitoba takes a similar approach: Efficiency Manitoba will be required to submit near-term plans with sufficient detail on near-term savings goals; only secondarily will it have to demonstrate that those near-term goals place them on a *trajectory* toward meeting longer-term targets that would be *assumed* for power planning purposes. In other words, their plans will be reviewed and approved on the basis of near-term specificity, and only *in the context* of a longer-term goal.

Program administrators should not be expected to know in advance how they will achieve longer-term savings, any more than hydropower generators should be expected to know precisely how and when it will rain or how and when interest rates will change. They should, however, *seek a realistic view* as to the level of savings they can anticipate in the near-term, and in so doing determine the extent of new opportunities they would need to develop and leverage over time in order to meet longer-term targets.

For the reasons listed above, we have focused our analysis on the near-term (initial 5 years), as this is the timeframe in which Hydro's forecasts and our own analysis are likely to provide sufficient specificity for DSM planning purposes.

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Beyond the near-term, we encourage Hydro to take a contingency approach to planning for the risks and uncertainty associated with all resources, including but not limited to DSM. In this regard, we provide thoughts and recommendations on next steps at the end of this document.

## **STRUCTURE OF REPORT**

This report is structured as follows:

## **PART A - OVERVIEW**

This section presents an overview of Manitoba Hydro's existing efforts and how new opportunities can be leveraged to help close the near- and long-term savings gaps.

## **PART B - OPPORTUNITIES**

This section includes an overview of opportunities and the estimated savings they might provide, as well as one section for each opportunity:

- **Opportunity #1**: New and emerging technologies
- **Opportunity #2**: C&I Outreach Capacity
- **Opportunity #3**: Residential and commercial solar
- **Opportunity #4**: Enhanced marketing efforts
- **Opportunity #5**: Updated technical assumptions
- **Opportunity #6**: Market transformation

## PART C - LOOKING AHEAD

This section summarizes the opportunities and offers recommendations for Manitoba Hydro going forward.

Additional information on C&I Outreach Capacity is provided in Appendix A, and an overview of targets and program offerings in other jurisdictions is included in Appendix B.

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## PART A OVERVIEW

## **BUILDING ON MANITOBA HYDRO'S EXPERIENCE**



## **OVERVIEW: BUILDING ON HYDRO'S EXPERIENCE**

This section explores where we are today in terms of Manitoba Hydro's Power Smart<sup>™</sup> plan relative to the new DSM targets for electricity and natural gas. It also provides a summary of the new opportunities included in Dunsky's assessment, and shows how these additional savings can help close the gap.

In general, the Plan goes a long way in terms of meeting the new DSM targets; however, additional effort is needed.

## SAVINGS ACHIEVEMENTS UNDER CURRENT PLAN

In the near-term – i.e. over the next five years – Hydro's 2016 Power Smart (the Plan) is expected to deliver incremental annual electricity savings that **on average achieve the legislated target of 1.50% over the course of the next five years**; however, as shown in Figure 1, the Plan exceeds the targets in some years while falling short in others. The gap between target and plan becomes more pronounced in the longer term (see Figure 1, below).



Figure 1: Incremental annual DSM electric savings as a % of annual load compared to long-term target

In the case of natural gas, the Plan is expected to deliver incremental annual savings that are lower than the legislated target in both the short and long-term, as shown in Figure 2 on the following page.

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Figure 2: Incremental annual DSM natural gas savings as a % of annual load compared to long-term target

Table 2 presents the gap between Manitoba Hydro's planned efforts and the new DSM targets in terms of gigawatt-hours (GWhs) of electricity and million cubic meters (mm<sup>3</sup>) of natural gas.

	2017/18	2018/19	2019/20	2020/21	2021/22	
ELECTRICITY (GWH)						
New Target	400	400	400	394	402	
Power Smart Plan	367	414	521	333	294	
Gap / Savings Needed	33	(14)	(121)	61	108	
NATURAL GAS (MM3)						
Power Smart Plan	9.9	9.0	9.2	9.6	10.3	
New Target	12	12	12	12	12	
Gap / Savings Needed	2.1	3.0	2.8	2.4	1.7	

**Table 2**: Gap between the new provincial electricity and natural gas savings targets and the Power Smart Plan

So how do we address the gap? There is no silver bullet; it will take a suite of solutions to achieve additional electricity and natural gas savings and meet the targets. The good news is that Manitoba Hydro is well on its way.

## **CLOSING THE GAP**

Dunsky quantified a number of opportunities to optimize Manitoba Hydro's programs. The following is an overview of the opportunities and the quantified impact. Each opportunity is assessed in more detail in Part B of the report. It is important to note that these are conservative estimates. We know there is additional potential that has yet to be quantified but could help close the gap, and additional information on these "known unknowns" is provided in Part B.

The opportunities that were explored include:

Opportunity #1: New and emerging technologies
 Opportunity #2: C&I Outreach Capacity
 Opportunity #3: Residential and commercial solar
 Opportunity #4: Enhanced marketing efforts
 Opportunity #5: Updated technical assumptions
 Opportunity #6: Market transformation

The electricity and natural gas savings from the six "opportunity bundles" are summarized in Tables 3 and 4. We look at the opportunities **over the near term**, and conservatively estimate the following **annual** electricity and natural gas savings.

Opportunity	2017/18	2018/19	2019/20	2020/21	2021/22
New and emerging technologies	1.78	33.88	63.08	67.98	7.82
Increased C&I outreach capacity	15.69	15.15	14.81	14.52	15.74
Residential and commercial solar	1.20	2.10	3.50	1.30	0.00
Enhanced marketing efforts	1.00	1.00	1.00	1.00	1.00
Updated technical assumptions	0.15	0.04	-0.06	-0.10	-0.15
Market transformation efforts	0.20	0.20	0.20	0.20	0.20
Total	20.02	51.87	76.33	78.71	18.41

#### Table 3: Additional electricity savings opportunities (GWh/year incremental annual)

The electricity "opportunity bundles" reflect a combination of new opportunities (such as the addition of new measures into Hydro's portfolio), revisions to program delivery, updates to assumptions and savings calculations, and additions or changes to Hydro's outreach activities. Based on the measures and interventions that were quantified, new and emerging technologies and increased C&I outreach capacity are responsible for the bulk of the new electricity savings opportunity in the near-term.

Opportunity	2017/18	2018/19	2019/20	2020/21	2021/22
New and emerging technologies	0.21	0.38	0.56	0.65	0.65
Increased C&I outreach capacity	0.00	0.39	0.42	0.53	0.46
Residential and commercial solar	n/a	n/a	n/a	n/a	n/a
Enhanced marketing efforts	0.01	0.01	0.01	0.01	0.01
Updated technical assumptions	0.61	0.38	0.14	0.02	0.03
Market transformation efforts	0.02	0.02	0.02	0.02	0.02
Total	0.85	1.18	1.14	1.22	1.16

#### Table 4: Additional natural gas savings opportunities (million m³/year incremental annual)

For natural gas opportunities, the greatest contribution comes from updated technical assumptions in year one, but again here we see new and emerging technologies and increased C&I outreach capacity contribute the bulk of the new natural gas savings opportunity in years two through five.

Combined, the opportunities quantified in this report, on average, provide **49 GWh of additional** electricity savings, and **1.1 mm<sup>3</sup> of additional natural gas savings**.

What does this mean in terms of meeting the average annual savings targets?



## ELECTRICITY

For electricity, in years 2017/18 through 2020/21, savings in the current Plan plus additional opportunities approximately meet or exceed the DSM target of 1.50%. Because the target is a long-run rolling average, the surplus savings in this period reduce the target going forward. Based on this assessment, exceeding the target in earlier years reduces the average target to 1.39% starting in 2021/22.

Figure 3 on Page 9 summarizes the results of the electricity savings assessment.



## NATURAL GAS

For natural gas, the additional savings help close the gap but do not reach the DSM target of 0.75%. As with electricity, since this assessment only considers a limited number of new opportunities and measures, Manitoba Hydro can look to other existing and emerging opportunities – not yet quantified – to further close the gap.

Figure 4 on Page 10 summarizes the results of the electricity savings assessment.

More detailed information on each of the opportunity areas – both quantitative and qualitative – is provided in Part B starting on page 12.



#### Figure 3: Electricity savings levels (GWh) compared to average savings targets (excluding fuel choice)



## Figure 4: Natural gas savings levels (mm<sup>3</sup>) compared to average savings target (excluding fuel choice)

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PART B OPPORTUNITIES CLOSING THE GAP



## **OPPORTUNITY #1: NEW & EMERGING TECHNOLOGIES**

## OVERVIEW OF THE OPPORTUNITY

As Manitoba Hydro is well aware, the energy efficiency industry is evolving rapidly, with new offerings being developed every year. It is impossible to know with certainty where future energy savings will come from as technologies are changing and creating new opportunities not anticipated in prior years' planning. For example, as late as Hydro's 2012/13 Power Smart Plan, Residential LED lights were not included, but in 2014/15 they made up almost 13 GWh of energy savings, the largest component of the Residential portfolio by far. And Hydro was not the only DSM utility to face this issue: in 2013, Efficiency Nova Scotia's Instant Savings program had a target of 9.9 GWh and achieved savings of 26.5 GWh, primarily due to an increase of LED lamps sold (from 25,177 in 2012 to 229,480 in 2013).

Below we explore six near-term opportunities that we can quantify today, what can be considered as "known knowns", to borrow a term from a former U.S. Cabinet Secretary. We then discuss additional opportunities – "known unknowns", that are on our radar but the potential savings have yet to be quantified that the scope of our mandate does not allow us to quantify at this stage. Finally, we provide thoughts on emerging trends that are likeliest to lead to new opportunities in the future ("unknown unknowns", and that Hydro should closely monitor going forward.

## QUANTIFIED TECHNOLOGIES ("KNOWN KNOWNS")

In the table below, we highlight six known measures that can provide additional savings to the Power Smart<sup>™</sup> portfolio in the near term.

Measure	Description	Potential Savings (measure level)
Home Energy Report	The Home Energy Report or similar initiatives offered by other vendors, provides feedback to residential customers as to their energy consumption in comparison to other, similar homes in their neighbourhood or category. The reports also provide energy savings tips tailored to the home's energy use. While the reports are not an emerging opportunity, Hydro has not yet finalized a specific year or years to offer the program, so we are including it in this section to indicate the potential impacts. (We note that the electricity savings are based on Hydro's calculations and the natural gas savings are Dunsky's estimate based on evaluation studies and experience in other jurisdictions.)	~50 GWh/year and ~ 0.6 mm³/year
Smart Thermostats	Manitoba Hydro conducted a Smart Thermostat Pilot study in 2016 and 2017 for gas- and electric-heated homes, and will again offer rebates in 2018/19. WiFi-connected smart thermostats generated energy savings by optimizing the use of furnaces (and other HVAC equipment) using occupancy detection and automation, behavioural nudges, and sensors	6.2 GWh/year and 0.6 mm³/year

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that measure humidity and weather conditions to reduce HVAC ru	JN
times while maintaining comfort.	

Based on a number of evaluation studies, in practice, savings from smart thermostats range from 1-15% for heating and 1-20% for cooling. For this assessment, an estimate of 8% savings per household was used. This is based on ENERGY STAR® certified connected thermostats, which can save at least 8% of the energy used for space heating and cooling in the residential sector, and are eligible for Manitoba Hydro Bill Credit Rebate Program.

It was assumed that 25% of eligible households (those with central heating/cooling but without a smart thermostat) receive a smart thermostat over a 5-year period, and that the thermostats are split 50/50 between gas- and electric-heated homes. Average household natural gas and electricity consumption for space heating is based on NRCan OEE NEUD data for Manitoba in 2015.

In its assessment of air-source heat pumps, Manitoba Hydro assumes a Seasonal COP of 1.5 for high efficiency heat pumps, based on monitoring of two whole-house variable speed heat pump systems. This SCOP – much lower than is common elsewhere – has been calculated based on a harsher temperature in Manitoba (triggering the AUX lock out, and requiring a more frequent defrost cycle) and installation quality issues.

Our review and subsequent analysis is based on the following assumptions, which we would be pleased to discuss with Hydro after submitting the more in-depth report:

A "Cold Climate" Heat Pump specification now requires a minimum 1.75 COP at -15°C. Performance has been demonstrated in-field.

Field Studies have demonstrated COPs between 1 and 1.5 at -20°C for air-source heat pumps.

- Field Studies have also demonstrated similar (although not identical) COPs as manufacturer statements for ductless heat pumps, at 1.75 at -15°C.
- AUX Lockout temperature can be as low as -20°C.
- On average between 2013 and 2016, 11% of the total hours (not runtime) during the heating season were below -20°C, with 30% of those occurring during the night. The period in which AUX lockout would occur is likely below 10%.

Based on these assumptions, we believe that Hydro has a potentially significant savings opportunity by offering incentives for air-source and ductless heat pumps equal to the incremental cost between standard heat pumps and high-efficiency heat pumps, provided they include cold climate specifications. 1.1 GWh/year and 0.5 mm<sup>3</sup>/year

**Heat Pumps** 

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Engine Generator Block Heater	Pump-Driven (PD) block heaters rely on an electrically-driven mechanical pump to circulate coolant throughout the engine's block. The electric heating element is controlled by a thermostat to maintain the return coolant temperature. The higher flow rates of the pumped coolant shift the heat transfer mode from natural convection into forced convection realm. The result is a small temperature difference between the heater outlet and inlet.	0.19 GWh/year
Outdoor Reset Controls	Outdoor reset controls adapt the hot water supply temperature from the boiler based on the outdoor temperatures. If the outside temperature rises, the controls will decrease the supply water temperature, thereby saving energy.	0.03 mm³/year
Hotel/ Motel Automation	Guest-room energy management systems use occupancy sensors to control the heating, ventilation and air conditioning (HVAC) system of a hotel room. When a guest room is unoccupied, either because it is not booked or during unoccupied periods, the system enables a setback in the temperature controlled by the thermostat, thus reducing the air conditioning or heating requirement when not needed. It may also control the room's lighting system.	0.6 GWh/year

## NON-QUANTIFIED TECHNOLOGIES ("KNOWN UNKNOWNS")

The table below provides a brief summary of additional measures and services that Manitoba Hydro can adopt in the near-term to drive additional savings, but that we have not sought to quantify at this stage.

Measure	Description	Potential Savings (measure level)
Appliance Marketplace	Web-based platform for efficiency products and services to facilitate microtargeting of customers, guide customers to recommended savings opportunities from among a suite of measures, and enable integration of rebates in online purchasing, streamlining the customer experience.	TBD
ENERGY STAR <sup>®</sup> Water Heater Program	Replace aging water heaters with a qualifying natural gas/electrical ENERGY STAR model.	TBD
CO2 Refrigerant Heat Pump Water Heater	Residential heat pump domestic water heating systems use synthetic refrigerants with high global warming potential (GWP). High efficiency is an important benefit of such systems; they operate at a coefficient of performance (COP) of about 4.0. If they are configured to provide space cooling in addition to hot water, the COP can be as high as 8.0.	TBD
Commercial Pool and Spa Heater	Heater to replace existing commercial pool heater.	TBD
Multi-Family Waste Water Heat Pump	The concept is to locate a waste water holding vault on the ground floor or first level of parking in the building. All waste water from the multifamily units will be directed to the vault which will provide the heat source for a heat pump water heater. The vault will house stainless steel heat exchanger plates, used by the heat pump, to extract heat from the vault and heat a bank of domestic water storage tanks.	TBD
Thermosorber for Hospitals	Hospitals simultaneously use large amounts of hot and chilled water. The two commodities are traditionally generated by two separate systems: a gas boiler and an electric or an absorption chiller. The Thermosorber combines the two processes to save as much as 40% of gas and 90% of electricity usage by utilizing the heat rejected in the chiller process to heat the water up to 140°F.	TBD
Variable frequency drives on irrigation systems	DTE Energy offers incentives for the installation of variable frequency drives on existing agricultural irrigation systems. The new pumps must operate a minimum of 500 hours per year to qualify.	TBD
Upstream effort to promote "smart" agriculture pump sets	Upstream programs to encourage the distribution and uptake of equipment to optimize irrigation pump performance and reduce energy and water use.	TBD
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	Measures can include frequency drives, control systems and sensors to adjust motor to match irrigation needs.	
Dairy refrigeration Tune-up	Tune-up of existing commercial-grade, on-farm dairy refrigeration equipment.	TBD
Grain Storage Temperature/Moisture Controller	If the existing non-controlled fan aeration system is operating at a minimum of 1,000 hours per year, it could be interesting to install a grain storage temperature / moisture management controller. The proposed system must consist of hanging multiple temperature and/or moisture sensors within the grain storage bin. The grain data must be sent to a controller to evaluate the internal bin conditions as well as outside air temperature and outside air relative humidity, to control the aeration fans.	TBD
High Efficiency Grain Dryers	A grain drying system may be the most energy- intensive operation in the cropping system. The installation of high efficiency grain dryers can make a major difference in total farm fuel needs.	TBD
Ozone Laundry Systems	Applicable to small hotels/motels, sport centers. Systems that generate ozone and inject it into laundry water can reduce hot water use in large laundry operations as well as reducing the amount of cleaning chemicals used and producing cleaner, brighter linens and clothing.	TBD
Infrared Heaters	The infrared heaters with electronic ignition are efficient heating units. They work by warming the objects in the room rather than warming the air. The replacement of the existing heaters with this technology will reduces the energy consumption of the facility improving relevant heating required at the facility.	TBD
Intelligent Multi-Socket Surge Protector	Energy-saving surge protectors can be a means of saving energy and they allow some devices to be automatically controlled based on whether a primary device is on or off. Incentives can be offered per protector.	TBD
High-Speed & High Performance Commercial Doors	An automated high-speed rolling door opens and closes at a much faster speed than conventional doors. It is integrated with a sensor for automated door operation. The savings come from a reduction in heating and cooling needs for a conditioned space due to reduction in air flow in and out of the facility.	TBD
Algae	Algae cultivation may reduce the emissions of carbon dioxide and purify waste water to minimize over-fertilization of waters and at the same time produce an energy-rich algae mass that is raw	TBD

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	material for biodiesel (algae with high fatty acid content), animal feed (protein-rich algae) etc.	
Small Retail Demand-Control Ventilation	Control strategy that improves building energy performance while maintaining indoor air quality by varying the amount of outside air delivered to a space based on carbon dioxide concentration. The system utilizes a group of CO2 sensors to provide an appropriate amount of outside air to the space based on actual occupant density through measured CO2 levels, as opposed to a constant outside airflow based on the design occupancy of the space.	TBD
Packaged Terminal Heat Pumps for Hotels/Motels	A self-contained heat pump unit intended to provide year-round heating and cooling to a single hotel room.	TBD

While none of these technologies is a "silver bullet" to achieve significantly higher levels of savings, in combination with additional opportunities they can contribute to securing a greater share of the overall pool of savings potential that exists in the province.

#### FUTURE TECHNOLOGIES ("UNKNOWN UNKNOWNS")

Looking forward, we expect continued incremental energy efficiency improvements across the broad array of end-uses. Such improvements may already be built into baseline load forecasts.

In addition to such incremental efficiency gains, we further anticipate new savings opportunities to emerge alongside the continued progress in data-driven processes and services. These are likely to include such areas as lighting controls, smart thermostats, building diagnostics, and energy information management systems, as well as improved data analytics to drive enhanced behavioural efficiency opportunities. We encourage Manitoba Hydro to monitor these developments closely, and to introduce technology tests and pilots in these areas.

#### **CONTRIBUTION TO CLOSING THE GAP**

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
Electricity Savings (GWh)	1.78	33.88	63.08	67.98	7.82
Natural Gas Savings (mm <sup>3</sup> )	0.21	1.00	1.97	2.05	1.27

These quantified measures noted above would help close the near-term gap as follows:

As noted previously, additional but not-yet-quantified savings opportunities can add additional savings if needed.

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## **OPPORTUNITY #2: C&I OUTREACH CAPACITY**

#### **OVERVIEW OF THE OPPORTUNITY**

As part of our mandate, the Dunsky team conducted an initial assessment of the outreach structure of Hydro's DSM team, specifically in the Commercial/Industrial sector. In the process, we have identified ways in which Hydro can achieve higher energy savings through enhancements to its DSM outreach strategy.

By way of background, the customer-facing staff at Manitoba Hydro that support commercial and industrial DSM programs fall under two categories:

- Dedicated Power Smart Sales Representatives;
- ) Other staff members that support DSM programs alongside other duties.

Table 8 provides a summary of the different roles. We estimate that these staff amount to approximately 12 Full-Time Equivalent (FTE) positions.

Role	Number of Staff	Assignment	% of time devoted to DSM
Power Smart Sales Representatives	9	Assigned according to:	100
Key Account Officers	4	12 largest customers	10
Major Account Officers	12	Next 250 largest customers	15
Energy Service Advisors	10	Rural commercial/industrial customers	10

#### Table 7: Staff supporting commercial and industrial DSM programs at Manitoba Hydro

The majority of the Power Smart Sales Representatives are based in Winnipeg and focus on specific sectors, allowing them to become more deeply involved in that sector in terms of expertise and industry relationships. A smaller number are devoted to specific regions outside of Winnipeg, specific accounts (e.g. government accounts) or specific programs (e.g. new construction or emerging technologies). The key and major account officers and energy service advisors all receive Power Smart training to enable them to support DSM programs, although they are mainly responsible for core business activities such as service extensions.

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The Power Smart team employs a number of strategies for engaging with customers and encouraging participation in DSM programs, including sector-specific promotional activities, training and information sessions, and participating in industry associations.

#### **OPPORTUNITIES FOR INCREASED OUTREACH**

Due to limited capacity, the Power Smart Sales Representative team is largely reactive and has little time (nor is incented) for conducting cold calls and proactively seeking out new customers. This indicates that there may be an opportunity to increase participation in Power Smart programs with additional resources.

Based on our assessment, it appears as though **three additional dedicated resources** could be immediately useful for obtaining additional participation levels. An additional three Power Smart sales representatives would represent about a 25% increase in team capacity. We created an interval as follows:

#### / Higher limit

As an upper limit, we can assume that a 25% increase in team capacity would result in at most a 25% increase in program participation.

#### Lower limit

However, since the lowest hanging fruit may already be picked, these additional team members may be chasing after diminishing returns. As such, we assume a lower limit of 10% for the increase in DSM program participation as a result of this capacity increase.

The following graphs show established forecasts for incremental energy savings for all incentive-based commercial programs and the industrial performance optimization program, with the upper and lower limits for increased participation added starting in 2018/2019. Commercial-only results are presented in Appendix A.

To note, we recognize that the commercial sales staff do not support the Industrial programs and that doing so requires, for certain industrial customers, a very different knowledge base and skill set. However, a dedicated sales representative focusing on agricultural customers (which are often classified as industrial) would allow Hydro to focus on a targeted customer segment within this sector. This is a strategy used by other jurisdictions such as Vermont, Minnesota, Massachusetts, and others and is often delivered by third-party specialists. If Hydro considers the addition of a team member who specializes in Industrial (focusing on agriculture) clients, the following results for all related programs, using the same assumptions as with the Commercial programs, could be achieved.

Based on the annual savings in Figures 5 and 6 (see following page), additional commercial and industrial sales capacity could increase electricity savings by, on average, 9 GWh (lower limit) to 22 GWh (higher limit). For natural gas, based on our assumptions, increased savings are, on average, 0.27 mm<sup>3</sup> (lower limit) to 0.67 mm<sup>3</sup> (higher limit). The additional Power Smart sales representatives add capacity thus allowing for a greater number of projects to be initiated and close in a given year.

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#### Figure 5: Incremental electricity savings – commercial and industrial – from increased sales team capacity



#### Figure 6: Incremental natural gas savings - commercial and industrial - from increased sales team capacity



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#### CONTRIBUTION TO CLOSING THE GAP

The addition of commercial and industrial sales representatives would help close the near-term gap as follows:

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
E	ectricity Sav	ings (GWh)			
Increased Savings – Lower Limit	0.00	9.11	8.79	8.68	8.45
Increased Savings – Higher Limit	0.00	22.78	21.97	21.71	21.13
Na	atural Gas Sa	vings (mm³)			
Increased Savings – Lower Limit	0.00	0.31	0.33	0.35	0.36
Increased Savings – Higher Limit	0.00	0.78	0.82	0.87	0.90

## **OPPORTUNITY #3: RESIDENTIAL & COMMERCIAL SOLAR**

#### **OVERVIEW OF THE OPPORTUNITY**

In April 2016, Manitoba Hydro launched its Solar Energy Pilot Program to encourage the adoption of solar energy technologies for both the residential and commercial segments. The pilot permitted Manitoba Hydro the opportunity to learn more about how customer-sited solar photovoltaic systems would interconnect with Manitoba Hydro's overall system, what processes and systems need to be in place to accommodate the potential future larger scale adoption, and to provide better understanding of current market pricing and expected customer adoption under these price signals. The program offers two distinct, but not independent, mechanisms for supporting solar PV deployment:

- **The Residential Earth Power Loan (REPL)**: customers can borrow up to \$30,000 at attractive loan terms: 4.9% interest and up to 15-year amortization periods.
- **Solar Incentives**: direct incentive of \$1/W to partially cover the system's initial costs.

Manitoba Hydro will claim energy savings resulting from the energy produced from installed systems supported through the program.

Our team used Hydro's existing program features to model potential additional upfront savings from the program and assessed two distinct financing options: purchased systems and leased systems. Our modelling is based on two key factors:

- ) The **technology adoption curve:** the rate at which customers adopt new technologies, a well-documented phenomenon in solar PV adoption.
- ) The **economic adoption curve:** the expected uptake of a product depending on economic considerations.

Using this methodology, which is documented in a separate report to Hydro, our team forecasted potential scenarios for Hydro for a **four-year solar program**. Solar was only modeled during the 2017/18 to 2021/22 period, because, beginning in 2020/21, Manitoba Hydro's Power Smart plan begins to include/ramp up savings from residential and commercial solar PV programs. We have not undertaken to assess the opportunity for higher solar penetration than anticipated by Hydro at this time.

#### **CONTRIBUTION TO CLOSING THE GAP**

Additional solar savings would help close the near-term gap as follows:

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
Electricity Savings (GWh)	1.20	2.10	3.50	1.30	n/a
Natural Gas Savings (mm <sup>3</sup> )	n/a	n/a	n/a	n/a	n/a

To note, these are conservatives estimates of the incremental savings that behind-the-meter solar could contribute to the Manitoba electricity grid based on historic adoption rates, among other factors. Manitoba Hydro's continued support through incentives and/or other mechanisms (e.g. financing programs) can help build the solar industry and unlock future savings from solar. Market transformation

efforts stemming from the program, such as marketing and helping to streamline inter-connection permit requirements, can have a long-term impact on solar uptake beyond the program lifespan. It is also worth noting that solar hot water heaters were not included in the assessment but have the potential to contribute to natural gas savings.

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## **OPPORTUNITY #4: ENHANCED MARKETING EFFORTS**

#### **OVERVIEW OF THE OPPORTUNITY**

Notwithstanding the additional measures and sales capacity issues noted above, we find that Hydro's current plans are comprehensive, in that they address the vast majority of *areas* of savings opportunity. That said, one consideration we have raised with Hydro is how the utility categorizes its programs. Currently, Hydro organizes its programs according to end-use category, which may be beneficial for a focus on market penetration and long-term estimation of opportunities. However, there are drawbacks:

Marketing: Hydro's comprehensive set of programs is valuable when customers know what is being offered and whether or not they can obtain rebates on energy-efficient products. However, because Hydro's incentives are generally offered for specific technology categories, there is a level of energy efficiency literacy required in order to understand many of the savings opportunities. We understand that trade allies may "sell" opportunities when installing furnaces and other equipment (though we are concerned about over-reliance on un-incented firms and tradespeople for this purpose); however, by focusing on these specific end-uses, Hydro may be missing out on opportunities to cross-promote other savings opportunities. To use the example above, by combining multiple building-envelope measures into one program, trade allies such as windows distributors can cross-promote an entire home retrofit program rather than simply focusing on the benefits of energy-efficient windows.

These drawbacks focus on the level of granularity at which Hydro conducts its analyses and administers its programs. By doing so, the utility may be missing out on additional savings opportunities, for example, by bundling measures or options together for greater savings (e.g. by providing a higher incentive if two or three measures are installed together). Specifically, we recommend that Hydro consider "rolling up" some of its programs to a higher level. In table 3 below, we provide an example of one potential way to categorize technologies into higher-level programs. **We note that it is not intended as a recommendation for a particular categorization**.

Sector	Existing Program	Program Category Option
Residential	Home Insulation	Heating and Inculation
	Community Geothermal Program	neating and insulation
	Refrigerator Retirement Program	
	HRV Controls	
	Power Bars	Efficient Products
	Smart Thermostats	
	Plug-in Timers	
	Residential LED Lighting Program	Lighting
	Drain Water Heat Recovery	Water and Energy Saver
	Water & Energy Saver	water and therey saver
	Affordable Energy Program	Low Income

#### Table 8: Program category examples

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Commercial/Industrial	Commercial Lighting	
	Commercial Refrigeration	
	HVAC – Chillers	Prescriptive Measures
	Commercial Kitchen Appliances	
	HVAC - CO2 Sensors	
	Commercial Geothermal	Custom Measures
	Custom	Custom measures
	Commercial Building Optimization	
	Network Energy Manager	
	New Buildings	Optimization
	Commercial Insulation	-
	Commercial Windows	

Specific program categories would need to be developed further – the table above provides one sample option only. However, organizing programs at these higher levels addresses the drawbacks identified above. Specifically, it reduces complexity from a planning and filing perspective; allows measures that do not independently pass CE testing to be offered, thereby minimizing lost opportunities for energy savings; and provides Hydro a more customer-friendly option for marketing to customers by focusing on their needs and projects rather than on specific categories of EE options.

#### ENHANCED RESIDENTIAL MARKETING ACTIVITIES

New and emerging technologies and approaches to social marketing are changing the way companies engage with their customers. Doubling down on efforts to provide a customer-centric experience will improve the uptake of energy efficiency programs and a customer's overall experience with the utility.

Manitoba Hydro should consider incorporating into its marketing activities a customer engagement platform that facilitates frictionless transactions between Hydro and its customers. New analytics that allow for microtargeting customers when information about energy efficiency opportunities is most useful and impactful can help nudge and guide customers toward energy efficiency decisions. To do this we need to be collecting the right data, optimizing process flows, and then mapping them in digital ways that engage customers at the right time with the right tools.

There are a number of jurisdictions that are making a concerted effort to overcome onerous processes and analogue software methods to improve the customer experience and chance of success – i.e. overcoming the "last mile" and getting those energy savings flowing. They are in various stages of the process. Some like EfficiencyOne and Efficiency Alberta are optimizing their business process and improving their on-line tools. Others, such as Con Edison in New York, have integrated into their website an appliance "marketplace" that links directly to available incentives. Customers can make purchases directly from the site or are directed to a dealer.

There are companies that assist utilities in developing their customer digital strategies, platform design planning and user experience, etc. which could enhance Hydro's current approach and drive new savings. We estimate that enhanced marketing techniques will increase residential savings adoption by approximately 1 GWh/year. This is based on savings associated with marketing activities in Massachusetts in 2014, which were prorated based on Manitoba Hydro's level of electricity and natural gas sales.<sup>3</sup>

#### CONTRIBUTION TO CLOSING THE GAP

Enhancing marketing activities would help close the near-term gap as follows:

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
Electricity Savings (GWh)	1.00	1.00	1.00	1.00	1.00
Natural Gas Savings (mm <sup>3</sup> )	0.01	0.01	0.01	0.01	0.01

<sup>&</sup>lt;sup>3</sup> Appendix C, Exhibit 1 in Updated 2016-2018 Plan Data Tables (Statewide electricity and gas tables for 2014). Available online at: <u>http://ma-eeac.org/plans-updates/</u>

## **OPPORTUNITY #5: UPDATED TECHNICAL ASSUMPTIONS**

#### **OVERVIEW OF THE OPPORTUNITY**

As Manitoba Hydro is aware, a significant focus of our work was on reviewing Hydro's deemed savings calculations. This work was focused on ensuring that key calculations are as accurate and reflective of best practices as possible, rather than identifying new savings opportunities. Results can lead to increases, decreases or no change whatsoever in savings assumptions.

Interactive effects are those effects that arise when savings in one fuel or end-use leads to changes in consumption (additional savings or additional consumption) in other fuels or end-uses. For example, electricity savings from more efficient lighting, by reducing heat loss within a home or building, can lead to increased heating loads in winter (whether electric or gas), as well as decreased cooling loads in summer (electric, where mechanical cooling is used). These effects are not 1:1 – heat produced from a recessed ceiling lamp, for example, does not heat occupants as efficiently as a furnace or baseboard unit might – which leads to an analytical challenge with significant implications for savings calculations.

#### **COMMERCIAL SECTOR**

Our review of Manitoba Hydro's methodology for **calculating Commercial Interactive Effects has yielded no recommendations.** The methodology is solid, rigorous, and does not require updating to align with best practices or a changing industry.

#### **RESIDENTIAL SECTOR**

For the Residential sector, Hydro's calculations are based on a Canadian Electricity Association Report that results in a reduction of lighting savings by 74% from heating and an increase in lighting savings by 4.25% for cooling.

While there is limited literature available to assess residential interactive effects, Hydro Quebec's evaluation reports include a review of multiple reports, including the one used in Manitoba. Our team considers Hydro Quebec an appropriate comparator in this instance due to its winter climate and because its residential interactive effects are deemed to be robust and well-vetted.

The severity of reductions related to interactive effects is linked predominantly to:

- / Heating Season duration
- Annual Lighting Load Shape (coincidence with heating season)
- Insulation Level
- Other Internal Gains

When considering these impacts, Hydro Quebec uses a base of 58% reduction for heating interactive effects. Winnipeg has a somewhat longer heating season compared to Montreal, and its lighting load shape is more heavily slanted towards the winter period. We calculate that these two factors combined would lead to a maximum increase of 10% over Quebec's heating interactive effects.

We therefore **recommend that Manitoba adopt a reduction in its residential lighting savings of 63.8%,** which uses Quebec's 58% and adjusts it by 10% to account for the longer heating period and coincidence with lighting load shape. We believe that this estimate is sufficiently robust, aligning with Hydro-Quebec's

methodology. However, it is still conservative, as it is also based on a home that has higher-than-average insulation (based on 1992 housing stock) rather than on average or poor insulation, which would shift the balance point temperature.

#### **CONTRIBUTION TO CLOSING THE GAP**

Updating technical assumptions related to interactive effects would help close the near-term gap as follows:

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
Electricity Savings (GWh)	0.10	0.03	-0.09	-0.20	-0.37
Natural Gas Savings (mm <sup>3</sup> )	0.62	0.74	0.71	0.70	0.69

For electricity, this change results in additional savings in 2017/18 and 2018/19 and then additional load starting in 2019/20; however, for natural gas, the change results in relatively significant additional savings. A key driver of this change is the penetration of natural gas heating in the New Homes Program and Affordable Energy Program (AEP). Initial calculations assumed a higher percentage of natural gas heated homes than what was reflected when the New Home and AEP programs were delivered. When corrected, the natural gas IE are reduced, but they transfer to electricity.

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## **OPPORTUNITY #6: MARKET TRANSFORMATION**

#### OVERVIEW OF THE OPPORTUNITY

Market transformation initiatives are, by definition, long-term in nature. They involve removing barriers and advancing opportunities to increase uptake of, and participation in, energy efficiency products and services. Because of their long-term nature, it can be difficult to quantify results. Nevertheless, attempting to do so addresses an important part of Hydro's work: fostering a culture in Manitoba that thinks about energy efficiency and considers it in regular decision-making.

Manitoba Hydro is committed to transforming markets toward greater energy efficiency, outlining its market transformation strategy in its DSM Plans, including its successful transformation of the natural gas furnace market. In addition to Hydro's existing efforts, this report includes some examples of early market transformation efforts (e.g. education, research, demonstrations, or standards development) that have been evaluated in other jurisdictions. We recognize that not all of them would be applicable to Manitoba (or that Manitoba Hydro may already be in a later stage of offering incentives); they are intended as examples of what is possible to demonstrate that savings can be assessed and contribute to Hydro's goals.

Initiative	Description	Jurisdiction
Lighting Savings	General support activities including contribution to development of standards; research and development efforts to increase quality and reliability of products; work with distributors to ensure availability of products; training and co- marketing with retailers; and education campaigns for the general public.	Hydro Quebec
Residential Energy Star Windows	A market transformation program that built demand for high-efficiency windows in the residential market by addressing awareness and higher incremental costs. Regional standards for energy efficiency windows were brought in-line with national ENERGY STAR <sup>®</sup> standards.	Northwest Energy Efficiency Alliance
Building Operator Certification	A professional development program that provided courses for buildings operators, etc. on how to improve the energy (and other resource) efficiency of commercial buildings. The program developed a market for certified building operators.	Northwest Energy Efficiency Alliance
Surveyor Network Manager	An initiative to commercialize a software tool that enables remote power management of computers on a central network; eventually to make power management software an industry standard in commercial businesses.	Northwest Energy Efficiency Alliance
Commissioning in Commercial	Two related efforts that include: 1) a partnership between NEEA and the Building Commissioning Association to promote special commissioning	Northwest Energy Efficiency Alliance

#### Table 9: Interim savings estimates from market transformation activities

and Public	projects; and 2) an initiative to make commissioning
Buildings	standard practice in public buildings (government
	facilities and schools) through educating facility and
	project managers, etc. on the benefits; initiating
	demonstration projects; adopting state
	requirements and model policies; and, analyzing and
	disseminating results.

In the above examples, savings from market transformation activities ranged from 2.6 GWh/year for the Surveyor Network Manager program (it was based on 14,500 licenses/workstations) up to 77 GWh/year for the Certified Building Operator program (which was based on ~540 certified operators. Because these jurisdictions have unique attributes and specific evaluations into market transformation efforts would be required for Manitoba Hydro before determining a potential level of savings with more confidence, we have estimated the total impact to be very low in order to be conservative.

Our estimates are based on results of a literature review study and benchmarking analysis of electric and gas programs that use behavioral techniques (including those that focus on market transformation) which was commissioned by the Minnesota Department of Commerce's Division of Energy Resources. The exercise showed savings in the range of 1-12% within the sub-set of programs that are considered comparable based on the evaluation framework. As mentioned above, we use the lower end of the range as a conservative estimate (for both electricity and natural gas.

#### CONTRIBUTION TO CLOSING THE GAP

New & Emerging Technologies	2017/18	2018/19	2019/20	2020/21	2021/22
Electricity Savings (GWh)	0.20	0.20	0.20	0.20	0.20
Natural Gas Savings (mm <sup>3</sup> )	0.02	0.02	0.02	0.02	0.02

These measures would help close the gap in the near term as follows:

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PART C LOOKING AHEAD SUMMARY AND RECOMMENDED NEXT STEPS



### SUMMARY OF FINDINGS

This section presents the key findings from the optimization assessment, which inform the recommended next steps that follow. Based on Dunsky's analysis of Manitoba Hydro's 2016 Power Smart<sup>™</sup> plan and other opportunities that could lead to additional electric and natural gas savings, our **key takeaways** are:

#### NEW DSM TARGETS ARE ACHIEVABLE IN THE SHORT TERM

Over the initial five years, Manitoba Hydro can meet and exceed the new DSM targets for electricity. Also, because the legislated targets are a rolling average, surplus savings in the near-term are "rolled over," thereby reducing the electricity target going forward. Based on the Power Smart<sup>™</sup> plan and the new opportunities quantified in this assessment, surplus savings in the 2017/18 to 2020/21 period reduce the remaining target from 1.50% to 1.39% starting in 2021/22.

For natural gas, savings in the Power Smart<sup>™</sup> plan and the new opportunities go a long way to achieving the new DSM target (in the near- and mid-term). While there is still a savings gap, we believe it can be closed if natural gas savings associated with Home Energy Reports are accounted for and other unquantified opportunities pursued. We address this below under Next Steps.

#### "KNOWN UNKNOWNS" REPRESENT ADDITIONAL SAVINGS OPPORTUNITIES FOR THE MID- AND LONGER TERMS

Dunsky has quantified savings associated with six opportunity areas (the "Known Knowns"): 1) New & Emerging Technologies, 2) C&I Outreach Capacity, 3) Residential and Commercial Solar, 4) Enhanced Marketing, 5) Updated Technical Assumptions, and 6) Market Transformation. We find that the additional savings help to close the gap in the near and long-term.

However, this report is by no means a comprehensive assessment of the savings potential that exists. There is a long list of technologies that are already part and parcel of programs in other jurisdictions, but have not been quantified in the context of Manitoba. These, along with new innovations that are not yet on our radar, will play an important role in meeting additional savings requirements in the years following the initial five-year period.

#### 3

#### **MEETING TARGETS REQUIRES A SHIFT IN APPROACH**

Manitoba currently has a robust portfolio of programs that sets it up for success in meeting new legislated energy savings targets, both in the near and longer terms. However, achieving this success will require changes to Manitoba Hydro's planning approach and expectations. That approach – rooted in near-zero risk tolerance – was built over decades on the basis of an historic assumption that large hydro dams, which require a decade or more to build, were the *de facto* option for meeting electricity demand.

Going forward, there are many reasons to take a different tact. One is the nature of power supply opportunities: with the dramatic cost reductions in wind and solar technologies (among others), competitively priced, clean supply options with significantly shorter lead times make long-term certainty less essential. Another is the rapid pace of technological change on both the supply and demand sides of the energy equation: the advent of (and possible future for) dramatic advances in lighting, heat pumps, controls, data-driven services and vehicles – along with policy changes driven by climate change commitments – add new uncertainty to both baseline demand forecasts, and to forecasts of available, above-baseline energy savings opportunities. Neither can be known, beyond a horizon of a few years, with the degree of certainty that Hydro's historical DSM planning approach may have been accustomed to.

For these reasons as well as those laid out earlier (see A Note on Planning Timeframes on page 1), we urge that Manitoba shift its planning approach to one that relies less on certainty with regard to future technological change, and more on continuous improvement, systems to capitalize on innovation and contingency planning. We provide more specific recommendations in this regard in the section below.

### **RECOMMENDED NEXT STEPS**

We recommend the following steps to Manitoba Hydro, designed to address savings targets across threetime periods to facilitate implementation.

#### NEAR-TERM (3-5 YEARS)

#### **REASONABLE EXPECTATIONS**

In the near-term, it is reasonable to expect a high degree of clarity regarding the origin of the bulk of energy savings. As a rough guide, plans should provide clear guidance on approximately 80-90% of targeted savings; proactive and nimble management can focus on executing on those opportunities, and on generating a near-term pipeline of additional savings opportunities to achieve the "last-mile" of goals and/or to provide contingencies in case of unanticipated change.

#### MANITOBA'S CHALLENGE

- ) Electricity savings: Current plans already provide reasonable visibility on savings opportunities for achieving the full target during the initial 5-year period. Additional opportunities identified and quantified in this plan would bring savings to approximate 10% above target.<sup>4</sup> Executing on those programs efficiently and effectively during the transition to a new entity is the biggest challenge, one for which we have no specific recommendations beyond Hydro's current and successful approach.
- ) Natural gas savings: Current plans provide a reasonably clear path for approximately 75% of savings targets during the initial five-year period. This report identifies additional savings opportunities that raise that to approximately 85% of targeted savings.

#### RECOMMENDATIONS

Going forward, we recommend Manitoba Hydro:

**1. Execute on the additional quantified savings opportunities** identified in this report, namely: 1) New & Emerging Technologies, 2) C&I Outreach Capacity, 3) Residential and Commercial Solar, 4) Enhanced Marketing, 5) Updated Technical Assumptions, and 6) Market Transformation.

**2.** Immediately launch a targeted, gas savings opportunity assessment. Building from the list of unquantified additional opportunities provided in this report, this assessment would focus on the highest opportunity / lowest risk gas saving options, and develop specific action plans for their inclusion in the Power Smart portfolio. An opportunity assessment is in many ways like a *targeted* potential study. Contrary to a full-scale potential study, this type of assessment can likely be completed in a 3-6 month timeframe, and at considerably lower cost. Given time constraints, we

<sup>&</sup>lt;sup>4</sup> Because of the cumulative nature of Manitoba's new targets, as written into its legislation, excess savings in one period count against targets for the subsequent periods. As a result, exceeding targets early on can be an appropriate strategy.

recommend this be conducted early in calendar year 2018, for implementation of new savings measures beginning in the latter half of FY 2018/19.

**3.** *Execute on that assessment*, i.e. build the additional new initiatives to the portfolio, per the schedule indicated above. Depending on anticipated savings, Hydro may also wish to examine nongas saving alternative options, as allowed for in the legislation's flexibility mechanisms to meet targets. Such options can be included in the work described above.

#### MID-TERM (5-10 YEARS)

#### **REASONABLE EXPECTATIONS**

In the mid-term, it is reasonable to have a rough sense of where savings may come from, including a combination of conventional savings opportunities ("knowns") and new areas that are likely to emerge over time ("known unknowns"). As a guide, the former should be expected to provide for at least half to two-thirds of savings expectations. The latter – which may be viewed as notional savings "buckets" as opposed to specific measures or programs – should provide a sense of where the remainder of the savings targets can be sourced.

#### MANITOBA'S CHALLENGE

- Electricity savings: Current plans already provide a degree of visibility on approximately 55-60% of the net savings target in the mid-term (5-10 years out).<sup>5</sup> We have identified additional, quantified savings opportunities that, combined with the rolled-over excess savings from the initial five-year period, would cover approximately 65% of target savings in the mid-term.
- **Natural gas savings:** Current plans already provide a degree of visibility on approximately 85% of the mid-term savings target. Additional quantified savings identified in this report would raise that to above 90% of the target during the mid-term period.

#### NEXT STEPS

In order to prepare to secure the remainder of savings required, we recommend two immediate and one near-term initiative, applicable to both energy sources:

**4.** Immediately design an Innovation (RDD&C) Program. In order to build an opportunity "pipeline", we recommend that Manitoba design and launch an Innovation Program. While Hydro currently funds specific projects in the area of innovation (e.g. research on electric buses, demonstration projects in diesel communities), we recommend an integrated program designed specifically to build a pipeline of new savings opportunities across Manitoba. This program would include proactive market and technology research and surveillance, proactive RDD&C funding of targeted new technology or service opportunities, and an open or directed fund for third-party, market-driven proposals. The bulk of efforts would be screened against their likelihood of generating additional mid-term savings opportunities for Hydro's Power Smart portfolio.

<sup>&</sup>lt;sup>5</sup> Hydro's plan provides for 55% of the legislated target 5-10 years out. However, that increases to 60% if Hydro achieves and rolls over the excess savings opportunity we have quantified herein for the initial five-year period.

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**5.** *Revisit cost-effectiveness screening approach*. In order to align with the principles laid out in the new legislation, we recommend that Manitoba Hydro revisit its cost-effectiveness screening framework. Assuming PowerSmart is transferred to Efficiency Manitoba in 2018, this work should be conducted as part and parcel of the transition.

**6.** Launch a full-scale potential study process in 2019. In keeping with the scope of the legislation, we recommend a comprehensive potential study to assess electricity and natural gas savings opportunities, as well as opportunities in unregulated fuels (that can count toward legislated targets). The study should target the mid-term period (approximately 2022-27) with reasonable specificity, and should be scoped to indicate notional savings opportunities for the five subsequent years. In order to allow for the study to be executed and results built into plans, we recommend launching an RFP to this end in 2019. Assuming the targeted gas savings opportunity assessment recommended above (recommendation #2) moves forward, we do *not* believe that the potential study need be launched any earlier.

#### LONG-TERM (10-15 YEARS)

In our experience, the bulk of demand-side management opportunities cannot reasonably be defined more than a decade in advance. For that period, we recommend that for planning purposes, Manitoba Hydro assume legislated targets will be met, and focus risk mitigation on sensitivity analysis around the cost of procuring marginal savings.

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## APPENDICES



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## APPENDIX A: C&I OUTREACH CAPACITY

Dunsky also considered C&I Outreach Capacity (Opportunity #2) absent the industrial sector as requested by Manitoba Hydro. The results are presented in the figures and table below.







Figure 8: Incremental natural gas savings - commercial only - from increased sales team capacity

In terms of the contribution to closing the gap, increased commercial sector outreach capacity capacity contributes:

C&I Outreach Capacity (Commercial Only)	2017/18	2018/19	2019/20	2020/21	2021/22		
Electricity Savings (GWh)							
Lower Limit	0.00	7.05	6.47	6.11	5.87		
Higher Limit	0.00	17.62	16.17	15.26	14.68		
Natural Gas Savings (mm <sup>3</sup> )							
Lower Limit	0.00	0.21	0.23	0.25	0.26		
Higher Limit	0.00	0.53	0.57	0.62	0.65		

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### **APPENDIX B: REGIONAL ANALYSIS**

Manitoba Hydro has been in the energy efficiency market for 20 years. As such, the utility has offered an extensive array of programs and technologies to Residential, Commercial, and Industrial customers over the years. In this section, we explore how this product offering fares relative to other jurisdictions.

#### **Targets**

Through its program offerings, the utility is currently achieving energy savings of approximately 0.6% of electricity sales and 0.3% of natural gas sales (not including savings from codes and standards), or 1.1% of electricity sales and 0.5% of natural gas sales (including codes and standards). As part of our regional analysis, we examined these results in the context of other jurisdictions:



#### Figure 9: Electricity Regional Savings Targets



#### Figure 10: Natural Gas Regional Savings Targets

For this analysis of overall savings, we included a wide range of jurisdictions as summarized by the American Council for an Energy Efficiency Economy (ACEEE). Jurisdictions include ones that have been in market for a lengthy period of time (e.g., Vermont, California), winter climates (e.g., Minnesota, New York), and those known as leaders (e.g., Massachusetts, Vermont) and those not considered leaders (e.g., Nevada, Texas). We have also added Canadian jurisdictions for comparability purposes. Additional information on each of these jurisdictions is provided below.

Manitoba Hydro is currently achieving savings on the lower end of the spectrum for both fuel sources when codes and standards are not included (the majority of jurisdictions do not include codes and standards in their savings targets or results).<sup>6</sup> It is this initial finding that led Hydro to request the Dunsky team to examine in more detail considerations such as savings and climate considerations, program offerings, and other considerations included throughout this report.

It is important to note that, as with any jurisdictional scan, it is not possible to have a completely "applesto-apples" comparison. For example, some jurisdictions have a higher electric water-heating load than others, some have a greater percentage of load from either residential or industrial customers, and yet others may have different market baselines that lead to different savings opportunities. For this reason, the majority of our analysis focuses on Manitoba on its own. Providing context with information on other jurisdictions can give a high-level sense of what others are doing. However, each jurisdiction will have its

<sup>&</sup>lt;sup>6</sup> We note that existing Power Smart Plans do include codes and standards.

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own constraints and opportunities, so examining jurisdiction-specific opportunities are likely to provide a more useful analysis.

#### **PROGRAM OFFERINGS**

As part of the regional analysis, we also examined programs offered by other jurisdictions. Hydro is somewhat unique in its program offerings, in that it has a large number of programs delineated by end-use category. Many other jurisdictions organize their programs in larger groupings, such as direct-install products, small business, and prescriptive rebates. Therefore, in order to provide a reasonable comparison of offerings, we analyzed measures and offerings from each jurisdiction and placed them into the Consortium for Energy Efficiency (CEE)'s program categories. Our findings were not surprising, in that Hydro offers a comprehensive suite of measures for Manitoba residents and businesses.

For Residential customers, Hydro offers a comprehensive portfolio of options, with some variations on traditional programs. The key differences are highlighted in table 1 below, demonstrating that the only program not currently being offered is a behaviour-based option such as Opower's Home Energy Reports. Hydro has examined the feasibility of offering this program and is in initial planning stages, with the potential of offering such a program in a future year to address a potential savings gap. To note, this analysis was conducted in 2016 and reflects Hydro's offerings at that time.

PROGRAM TYPE	MB	BC	MN	VT	NS
Residential					
Appliance recycling	٠	•	•	•	•
Behaviour, online audit, feedback		•	•	•	0
Consumer product rebate for appliances	•	•			•
Consumer product rebate for electronics		•			
Consumer product rebate for lighting	•	•	•		•
Financing	٠	•	•	•	•
Multifamily	(		•	•	•
New construction	•	•	•	•	•
Prescriptive HVAC	٠	•	•	•	•
Prescriptive insulation	٠	•	•	•	•
Prescriptive water heater	*		•	•	•
Prescriptive windows				•	•
Whole home audits	•	•	•	•	•
Whole home direct install	•				•
Low income	٠	•	•	•	•

**Table 10**: Regional Analysis of Residential Program Offerings

Included. O Now considered an 'enabling activity'. 
 Planned in PowerSmart Supplemental Report (October 2015).

 Energy Saving Devices (e.g., power strips w/ timers). \* Residential solar thermal water heating program available. 
 Offered to select groups. A whole home audit (without a blower door test) is performed for select programs.

Our analysis of program offerings in the Commercial/Industrial sector led to a similar result: Hydro offers customers a comprehensive mix of options to save energy:

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#### Table 11: Regional Analysis of Commercial/Industrial Program Offerings

PROGRAM TYPE	MB	BC	MN	VT	NS
Commercial					
Custom audit	•	•	•	•	•
Custom retro-commissioning	•		•	•	•
Financing	•		•	•	•
New construction	•	•	•	•	•
Prescriptive HVAC	•	•	•	•	•
Prescriptive IT and office equipment	•		•	•	•
Prescriptive lighting	•	•	•	•	•
Small commercial custom	•			•	•
Small commercial prescriptive	•	•	•	•	•
Street lighting	•			•	0

• Included.  $\bigcirc$  Mandated by the province, not Efficiency NS.

Overall, these analyses indicate that Manitoba Hydro's Power Smart Plan includes a detailed, comprehensive suite of program offerings. Where specific measures within these program categories are not offered as a full-scale program by the utility (such as air-source heat pumps, smart thermostats, etc.), further discussions have shown that Hydro has generally completed calculations on the cost-effectiveness of those offerings and they have not been determined to be cost-effective or to achieve energy savings (such as with heat pumps) or they are currently being piloted (as with smart thermostats). We have conducted further work on some of these options to understand Hydro's calculations, and our results are presented further in this report.

Additional detail on Program Administrators is provided on the following page.

#### Table 12: DSM Program Administrator Details

Jurisdiction	Start year for DSM	Rely Significantly on Hydro?	Notes on Hydro Supply
Massachusetts	1997 electricity, late 1980s gas		Small
Arizona	2010		Small
Rhode Island	Shareholder incentive since 2005 (elec) and 2007 (gas). DSM requirements increased significantly in 2006		None
Vermont	1999 electricity, 1993 for gas programs	$\checkmark$	48% of generation*
Maryland	1980s, ended late 1990s, returned 2008		Small
Maine	2010		25% of generation
BC (all DSM)	1989	$\checkmark$	>90%
Minnesota	Since 1990s		Small
Washington	1983	$\checkmark$	70% of generation
Connecticut	1998		None
Hawaii	mid-1990s		None
Colorado	DSM increased substantially in 2007		Small
Oregon	1980s	$\checkmark$	62% of generation
Nova Scotia	2008		8% (with tidal)
lowa	long EE records, notable decrease late 1990s, returned early 2000s		Small
California	1970s		Small
Michigan	aggressive until 1995, nothing 1996-2008, returned 2008		Small
Arkansas	DSM increased substantially 2007		Small
New York	1996		22% of generation
Pennsylvania	DSM increased substantially 2008		Small
Wisconsin	mid-1980s		Small
Illinois	2007		None
New Mexico	2005		None
Ohio	2008 (financing available from 1999)		Small
BC (EE only)	1989	$\checkmark$	>90%
Nevada	late 1990s		Small
North Carolina	2007		Small
Saskatchewan	2002		14% of generation (2015)
Texas	1999		None

\* Primarily imported from Canada.

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PREPARED FOR



## MANITOBA HYDRO: <u>PHASE 1</u> of REGIONAL ANALYSIS

April 2016



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#### **EXPERTISE**

dunsk

- Energy Efficiency and Demand-Side Management
- Renewable Energy and Emerging Technologies
- Greenhouse Gas Reductions

#### **SERVICES**

- Design and evaluation of programs, plans and policies
- Strategic and regulatory support
- Technical support and analysis

#### **CLIENTELE**

- Utilities
- Governments
- Solution Providers
- ► Large consumers
- ► Non-profits

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## **CONTENTS**

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**INITIAL THOUGHTS + NEXT STEPS** 

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# CONTEXT

## MANDATE

Conduct a benchmarking analysis of DSM portfolios across North America, in order to understand similarities and differences between Manitoba Hydro's efforts and those of its peers.

We conducted this exercise through two key activities:

- Secondary research: jurisdictional scan and literature review through publically available documents, including regulatory filings, program plans, and other sources.
- **Primary research:** interviews with select DSM program managers.

*This presentation offers initial results (Phase 1). Phase 2 will delve deeper into specific jurisdictions and factors.* 

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# PROJECT TIMELINE



February - March	<ul> <li>Kick-off meeting, needs assessment</li> <li>Primary and secondary research</li> <li>Analysis</li> </ul>
April	• Phase 1: High-level analysis
May	<ul> <li>Phase 2: Deeper dive into specific factors</li> <li>Identify, in collaboration with MH, factors of interest.</li> </ul>
Longer term	Relationship building with select jurisdictions



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## REGIONAL ANALYSIS HGH-LEVEL
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### HIGH-LEVEL ANALYSIS METRICS



SAVINGS TARGETS ELECTRICITY	Savings as a % of load, annual 2015+, as available
SAVINGS TARGETS GAS	Savings as a % of load, annual 2015+, as if available
BUDGET	Budget by sector (magnitude + % of total)
North America	2014, where available
BUDGET	Budget by sector (% of total)
Canada	2014, where available



\***Sources**: ACEEE State Scorecard (2015), CEE State of the Efficiency Program Industry (2014), Manitoba Hydro 2015 DSM Plan, individual annual reports/DSM plans where needed.

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# **SAVINGS TARGETS**: ELECTRICITY



Looking to the 2015/16 period, Manitoba Hydro exhibits an average annual electric savings target of :

- 0.6% (EE only)
- 1.1% (EE + all DSM activities)

These values **depend on the timeframe observed**. Over 2015-2030, EE savings average 0.4%, while all DSM savings average 1.2% for Manitoba Hydro.

Note that other jurisdictions don't typically include C&S in their targets, as they do not have jurisdiction over the entire state.



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# SAVINGS TARGETS: GAS





Looking at targets for 2015/16 and later (not all jurisdictions have far-reaching targets for gas), **Manitoba Hydro** exhibits an average annual gas savings target of 0.3% (EE only) or 0.5% (all DSM).

Here again, most jurisdictions typically only include EE in their savings targets.

Note that **Minnesota**, **Illinois**, and **Massachusetts**—heating climates—top the list.



\*Net savings targets. Source: analysis based on ACEEE State Scorecard + primary research.

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# **BUDGET:** MAGNITUDE (N. America)







\* Analysis based on data from CEE, 2014, Efficiency Program Industry by State and Region.

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# **BUDGET:** PRIORITIES (N. America)



In line with its customer makeup, Manitoba Hydro explicitly committed about 65% of its 2014 DSM Plan budget to the Commercial & Industrial (C&I) sector.

Of all jurisdictions in North America with DSM programs (some of which don't have mandatory targets), only Oregon commits more funds to this sector.

This picture varies significantly from jurisdiction to jurisdiction, and helps contextualize local priorities, targets, and costs.



\* Analysis based on data from CEE, 2014, Efficiency Program Industry by State and Region.

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### **HIGH-LEVEL ANALYSIS BUDGET:** PRIORITIES (Canada)





budget profile is roughly in line Quebec. Newfoundland and Labrador commits most of its budget to residential activities.





100%

\* Analysis based on data from CEE, 2014, Efficiency Program Industry by State and Region.

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# HIGH-LEVEL ANALYSIS



This high-level analysis is a first glance at the wider DSM ecosystem in North America. It reveals a few **partial insights**:

- From a purely **savings target** perspective, **as reported**, Manitoba Hydro's electricity and gas targets appear to be on the lower end of the North American spectrum in the 2015-2020 horizon. <u>However</u>, Manitoba Hydro has differences in baseline C&S (e.g. gas furnaces) and interactive effects that could contribute to part of the difference.
- For the most part, the most ambitious jurisdictions remain **northern US states**. The top tier includes heating-climate states such as Massachusetts, Vermont, Rhode Island, and Minnesota.
- Sectoral priorities vary widely by jurisdiction, with Manitoba putting a stronger emphasis on commercial programs than its peers.
- Information on the make-up of savings targets—types of programs, inclusion/exclusion of C&S, etc.—must be gathered to refine the analysis.

This is only the start—let's dig deeper.



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### BENCHMARKING MD-LEVEL ANALYSIS

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# JURISDICTIONS



The mid-level analysis takes a deeper look at <u>11 relevant jurisdictions</u> across North America, based on DSM plans and primary research. In all cases, the jurisdiction is represented by its largest utility or DSM entity—and note **the time difference relative to the high-level analysis**:

JURISDICTION	UTILITY / ORGANIZATION	ROOT PLAN
МВ	Manitoba Hydro	PowerSmart Plan 2015/16 (2016-31)
BC	BC Hydro	2015-16 (rate application)
NS	Efficiency Nova Scotia	2016-18 DSM Plan
MN	Xcel Energy Minnesota	2016 Electric and NG Conservation Improvement Plan
MA	All six Mass Save utilities	2016-18 Energy Efficiency Plan Term Sheet
VT	Efficiency Vermont	Triennial Plan 2015-17
CA	PG&E	CPUC docket 13-11-005 (2015)
СТ	All CT utilities	2016-18 Electric and NG Conservation & Load Mgmt Plan
ME	Efficiency Maine Trust	Triennial Plan 2017-19
OR	Energy Trust of Oregon	2016-17 Action Plan + 2016 Annual Budget
WA	Puget Sound Energy	2016-17 Biennial Conservation Plan
RI	National Grid	Energy Efficiency Plan 2015-17



\* The first year in the future (typically 2016/17) was used, where available. Otherwise, the nearest year to today. Note that the high-level analysis was using **past data**.

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### MID-LEVEL ANALYSIS METRICS



TARGETS AT A GLANCE TARGETS BY PROGRAM TYPE (ELECTRICITY) TARGETS BY PROGRAM TYPE (GAS) TARGETS EE ONLY, BY SECTOR (ELECTRICITY) TARGETS EE ONLY, BY SECTOR (GAS) BUDGET BY TYPE (ELECTRICITY) BUDGET BY TYPE (GAS) **UNIT COSTS** vs TARGETS COST EFFECTIVENESS AT A GLANCE COST EFFECTIVENESS

*Elements included in savings targets (general)* 

Breakdown of electricity savings targets (by program type)

Breakdown of gas savings targets (by program type)

Breakdown of EE electricity savings targets (by sector)

Breakdown of EE gas savings targets (by sector)

Breakdown of electricity program budgets (incentives, admin, other)

Breakdown of gas program budgets (incentives, admin, other)

First year cost of electricity savings, plotted against targets

Cost effectiveness metric used by each jurisdiction

Total Resource Cost, portfolio level



TRC

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# **TARGETS:** AT A GLANCE



JURISDICTION	ELECTRIC TARGET (2015/16 or nearest year)	EXPLICITLY INCLUDED IN TARGET		ET		
	% load	EE	DR	C&S	Rate structure	<b>Others</b> <sup>†</sup>
MB	1.1%	•	•	•	•	•
BC	1.5%	•	•	•	•	
NS	1.2%	•				
MN	1.5%	•				
MA	2.3%	•				
VT	1.9%	•				•
CA	0.8%	•		•		
СТ	2.3%	•	•			
ME	2.2%	•				
OR	1.6%	•				
WA	1.2%	•				•
RI	2.6%	•				

### Not all targets are created equal.

While all jurisdictions have energy efficiency targets, few also include codes & standards (C&S), rate structure, and other initiatives in their targets.

Of the jurisdictions studied, Manitoba Hydro is the only one to include DR, C&S, rate structure, and several other program categories in its DSM plan.

<sup>+</sup> Fuel switching, self-generation, customer credit, etc.



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# **TARGETS:** BY TYPE (ELECTRICITY)



Taking a closer look at the make-up of electric savings targets, one finds that **most targets include only energy** *efficiency initiatives*.

In this context, Manitoba Hydro's targets remain modest.

Note that BC Hydro claims a higher savings target than Manitoba Hydro, due to significant C&S efforts. Its EE target is lower than Manitoba Hydro's.

Note that these are energy, not capacity, targets. DR does not register here.



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# **TARGETS:** BY TYPE (GAS)





In the case of gas, only Manitoba Hydro explicitly publishes the impact of interactive effects on its gas savings targets. Others do consider them (figures are net of interactive effects), but do not report them separately.

We took a first glance at interactive effects in the Deeper Dive, and will delve deeper in Phase 2 of this project.

Lastly, here again, without C&S, Manitoba Hydro's targets remain less ambitious than its peers. (Note that the utilities without a target are, for the most part, electric utilities.)



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# TARGETS: EE BY SECTOR (ELECTRICITY)



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# TARGETS: EE BY SECTOR (GAS)





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# **BUDGET:** BY TYPE (ELECTRICITY)



Budgetary allocations vary significantly, notably by type of program and delivery method (in-house vs third-party implementation).

Manitoba Hydro spends about 70% of its budget on incentives (electricity). A similar figure emerged for gas programs.

This should not be interpreted as a measure of program efficiency; some jurisdictions spend more on incentives, others on sales/outreach, yet they are reported and categorized differently.

Note that not all jurisdictions are willing to share detailed budgetary information.



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# **BUDGET:** BY TYPE (GAS)





Similar to its electricity program budget, Manitoba Hydro spends about 70% of its gas DSM budget on incentives.



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### MID-LEVEL ANALYSIS UNIT COSTS





Manitoba Hydro's unit costs (budget divided by savings, first year basis) **are among the lowest of the programs surveyed**.

Select jurisdictions, such as Maine and Minnesota, exhibit both high savings targets and low unit costs. The portfolio make-up, as well as the maturity of the DSM market, are key influencing factors.

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### **MID-LEVEL ANALYSIS COST EFFECTIVENESS:** TRC





among the highest of the programs studied. However, the definition of TRC

may vary by jurisdiction. For instance, non-energy benefits (NEBs) are often treated differently among jurisdictions.

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# INITIAL THOUGHTS



This mid-level analysis offers a broader understanding of targets and DSM efforts across North America. It reveals a few **partial insights**:

- Most jurisdictions do not include C&S, alternative generation and other initiatives into their targets. If looking only at EE, Manitoba Hydro's targets remain modest.
- Other jurisdictions do claim their interactive effects, but do not report them separately. Program administrators often claimed that the impact of effects was buried deep in their spreadsheets, and few could speak at length about them.
- Overall, the utility achieves savings at a comparable unit cost and cost-effectiveness level, relative to its peers.

#### More digging is required in Phase 2. Let's take a first look.



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### REGIONAL ANALYSIS DEEPER DIVE FIRST GLANCE

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# **KEY JURISDICTIONS**





We have begun a deeper dive into **five key jurisdictions**, each covering different ends of the DSM spectrum:

- **California**: a DSM leader located in a cooling climate.
- Vermont: a DSM leader located in a heating climate.
- *Minnesota:* an ambitious jurisdiction with much in common with MB.
- **Nova Scotia:** an experienced Canadian jurisdiction.
- **British Columbia:** an experienced Canadian jurisdiction.

Each helps us better situate Manitoba Hydro relative to key aspects of savings targets, portfolio design, and planning approaches. The following slides are a first glance into interactive effects; a presentation in May will offer a detailed analysis.



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# LIGHTING





Proportionally, **Manitoba Hydro's lighting savings are lower** than other utilities studied, both in the residential and commercial segments.

Recall that Manitoba Hydro spends nearly 65% of its DSM budget on C&I activities, well above most other jurisdictions.

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# INTERACTIVE EFFECTS



JURISDICTION	EFFECT	REPORTING
Manitoba Hydro	Negative	Separate
Efficiency Nova Scotia	Negative	By measure
Efficiency Vermont	Negative	By measure
PG&E	Negative	By measure
Xcel Energy Minnesota	Negative	By measure
BC Hydro	Negative	By measure

All studied jurisdictions included **negative interactive effects** in their savings, including PG&E in California.

Unlike Manitoba Hydro, other utilities may not publish interactive effects as a separate line item. They are considered in the calculation of savings only. Program managers were often not able to provide figures on short notice.

Nevertheless, in all cases, interactive effects lead to **negative savings** associated with lighting programs.

Further research is required.

Yes, but how much? To be explored in Phase 2.



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# REGIONAL ANALYSIS

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### THOUGHTS FOR MANITOBA HYDRO



#### PHASE 1: FIRST THOUGHTS

- Manitoba Hydro is ambitious in the **breadth** of its DSM portfolio, with programs ranging from energy efficiency to alternative generation and codes & standards, beyond most other utilities.
- There is room to add **depth**, by raising Manitoba Hydro's savings targets closer to the level achieved by its North American peers, both for electricity and natural gas.
- Overall, the utility achieves savings at a comparable unit cost and cost-effectiveness level, relative to its peers.

#### PHASE 2: NEXT STEPS

• This **Phase 1 analysis** offers a first glance. **Phase 2** of this project will dig deeper in select jurisdictions and examine specific elements of their DSM portfolio more closely.



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# REGIONAL ANALYSIS

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# PROJECT TIMELINE



February - March	<ul> <li>Kick-off meeting, needs assessment</li> <li>Primary and secondary research</li> <li>Analysis</li> </ul>
April	Phase 1: High-level analysis
May	<ul> <li>Phase 2: Deeper dive into specific factors</li> <li>Identify, in collaboration with MH, factors of interest.</li> </ul>
Longer term	Relationship building with select jurisdictions



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## CONTACT

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#### EFFICIENCY MANITOBA THE FIRST SIX MONTHS (PRIORITY ACTIVITIES) JUNE 18<sup>th</sup>, 2018



To:	Grant Doak, Robert Marrese, Jim Crone
	Government of Manitoba

From: Philippe Dunsky & Leslie Malone, Dunsky Energy Consulting

Re: The First Six Months: Priority Activities, for Efficiency Manitoba leadership's consideration

Date: June 18th, 2018

#### CONTEXT

Efficiency Manitoba is set to inherit a portfolio of programs from Manitoba Hydro. That portfolio – with its successes and its setbacks – arose from the culture, strategies, tools and practices that were honed at (or that guided) Hydro's Powersmart team over nearly two decades.

Today, Efficiency Manitoba ("EM") has an opportunity to take a proactive approach to the coming transition. Rather than merely inheriting *faits accomplis*, it can act quickly to revisit key tenets of the previous approach; to deliberately review, reconsider, adjust and, where relevant, reset. Doing so will require balancing the desire for thoughtfulness with an essential need for speed, lest old practices and assumptions settle in.

Below we outline five areas in which EM should move expeditiously. Each file will require thought and consideration, and most will require preparatory work (studies, consultation, iterations with the Board and/or CEO) before being acted upon. In some cases, decisions themselves can be quickly implemented; in others, they may lead to an RFP for delivery of services that itself may require another year before fulfillment. If decisions are to be made early enough – say, within 12 months – work will need to begin almost immediately, and whenever possible should be significantly advanced within 6 months.

We have grouped our recommendations into five areas:

- A. Develop a *communications* and marketing strategy
- B. Define a new planning framework and related policies
- C. Design new programs and initiatives
- D. Initiate urgent research to support strategies, programs and planning
- E. Develop new tools for improved consumer engagement

These recommendations are submitted for EM's consideration, and are based on our experience as well as best practices in leading jurisdictions across North America. Our goal is to provide "quick wins" that will position the agency for success in the short and longer-term.



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#### A. DEVELOP A COMMUNICATIONS & MARKETING STRATEGY

### **WHY:** The launch of Efficiency Manitoba provides an opportunity on three levels: to re-engage with Manitobans on efficiency, to introduce a visual brand identifier and, significantly, to test new marketing approaches to better target and nudge potential participants.

#### A.1 REBRANDING

With the pending loss of rights to the PowerSmart brand, one of Efficiency Manitoba's immediate tasks is to develop a new marketing, education, and outreach brand under which to coordinate its province-wide programs. It should be focused and fresh, and clearly communicate that solutions are readily available through a new entity – Efficiency Manitoba.

At the launch of Efficiency Manitoba, the website will be one of the key customer engagement platforms, and should be fully integrated with the visual brand identifier and campaign messaging.

In addition to presenting its "look and feel," Efficiency Manitoba will want to start talking about its programs. As outlined in Dunsky's *Program "Bundling" Opportunity* memo, we recommend EM group its services into a smaller number of discrete program bundles as part of a new program delivery approach, but also to enhance branding (and marketing) efforts. Capturing a simplified decision-making and streamlined process in Efficiency Manitoba's brand can help make the agency more accessible and improve customer experience.

#### A.2 MARKETING

As part of its rebranding efforts, Efficiency Manitoba will need to develop a marketing and outreach campaign. This is an important opportunity to get the word out about Efficiency Manitoba and its new programs and use this first touch to engage on efficiency.

New and emerging technologies and approaches to social marketing are changing the way companies engage with customers. As we outline in our *Optimizing Power Smart* report, new analytics that allow for microtargeting customers when information about energy efficiency opportunities is most useful and impactful can help actively *nudge* customers toward energy efficiency decisions. For example, reaching out with targeted information about opportunities and incentive when someone is planning to build a home or renovating in advance of a new baby.

Advanced marketing techniques require a customer engagement platform that facilitates frictionless transactions between the agency and EM's program participants. It also requires collecting the right data, optimizing process flows, and then mapping them in digital ways that engage customers at the right time with the right tools. To this end, there are companies that assist program administrators in developing their customer digital strategies, platform design, and user experience. Efficiency Alberta and EfficiencyOne have both engaged outside support and are making a concerted effort to overcome onerous processes and analogue software methods to improve customer experience.

ACTION> Launch a rebranding exercise, including brand identity, program rebundling and the launch of new customer engagement tools. Consider including former PowerSmart staff.



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#### **B. PLANNING FRAMEWORK & POLICIES**

WHY: Efficiency Manitoba has a unique opportunity to reset the clock on the energy efficiency planning framework, policies and culture that resided at Manitoba Hydro (this is arguably one of the key reasons the PUB recommended – and government created – an independent agency in the first place). Yet without a clear reset at the very outset, that opportunity may be lost, as inertia gains ground and former staff, stakeholders and the PUB assume "old ways" still apply. We urge that work be undertaken immediately to revamp the framework's key components – from performance indicators to cost-effectiveness screening and evaluation planning – that will influence key decisions going forward.

#### **B.1 BALANCED SCORECARD**

An efficient organization should be driven by a balanced scorecard of KPIs and other measures of success. Manitoba's legislature brought this foresight to the *Efficiency Manitoba Act*, which directs EM to establish, beyond the defined energy savings targets, other performance measures to evaluate success.

Before deciding what to measure (and how), EM needs to clearly define its desired outcomes: For example, is EM's priority to reduce customer bills in the short-term, or to transform markets in the longer-term? Does it give more weight to the value it delivers for Manitoba Hydro (avoided energy and capacity costs) or for society (avoided energy bills, increased economic activity and/or carbon emission reductions)? Is it driven purely by bang-for-the-buck cost efficiency (e.g. lowest \$/kWh or \$/tCO<sub>2</sub>e), or does it also care about equity (e.g. benefitting low-income households)?

Designing a Balanced Scorecard is a critical opportunity for EM to "get off on the right foot" and set the tone regarding how its success will be measured.

ACTION> Launch initial work toward developing a Balanced Scorecard of KPIs, beginning with a focus on clarifying issues, options and tradeoffs for board/CEO consideration, and then moving to prepare an appropriate scorecard for Efficiency Manitoba.

#### **B.2 COST-EFFECTIVENESS SCREENING**

Cost-effectiveness screening is a central element of the planning framework. Cost-effectiveness screening tells us how much energy efficiency returns a net benefit to – depending on the test – ratepayers, program administrators, and/or society. It can also be used to help determine whether it is economically efficient to use ratepayer funds to incentivize specific measure adoption (but not the extent to which they should be supported).

The wrong approach can introduce questions of accuracy (are the inputs to the test correct?), bias (are material costs or benefits neglected?), ratepayer value (is this the optimal level of investment from the perspective of ratepayers?), and policy conflict (is the test consistent with public policy goals?).



Manitoba Hydro's past use of cost-effectiveness screening raised four concerns that EM will want to address: First, Hydro applied a multiplicity of screens, offering decision-makers broad perspective but also leading to confusion – internally and externally – as to how decisions were made. Second, among those tests, Hydro seemed to place greatest emphasis on the Total Resource Cost (TRC) test, a common practice that has been subject to growing critique over the past several years across North America because (a) too often, the TRC is applied in a way that accounts for *all* resource costs, but only a *portion* of resource benefits, and (b) the test is incapable of measuring how efficiently ratepayer funds are being used. Third, it was unclear at what *level* the tests were applied (EM will need to determine whether to apply tests as hard or soft screens to each potential energy efficiency measure, to each program, to each sector or to the portfolio as a whole). And fourth, with the move to a government agency, EM will need to determine whether it continues to focus on value to Manitoba Hydro alone, or broadens the focus to a more societal perspective (impacting both the types of benefits and costs examined, as well as the discount rate to apply to future benefit streams).

While these issues may seem technical in nature, they are in fact foundational to building a new energy efficiency plan. The framework they create will likely define EM's choices – its "sandbox" – for years to come. We encourage EM to define its own approach quickly and sufficiently prior to completion of its first transitional plan.

ACTION> Launch a process to define EM's cost-effectiveness framework. Plan for sufficient time for board/CEO to absorb key issues and tradeoffs, and for framework to be adopted at least three (3) months prior to submitting the transitional plan.

#### **B.3 EVALUATION FRAMEWORK**

Following the adage "you cannot manage what you don't measure", a proper evaluation framework is crucial in delivering best-in-class energy efficiency programs. Evaluation activities include those that quantify program impacts, assess the effectiveness of program processes, and better define baseline market activity.

Standard evaluation plans consist of (a) an evaluation framework document, which provides a consistent framework for program evaluation with industry definitions and best practices, and (b) a detailed, multi-year evaluation plan indicating the specific choice and timing of evaluation activities to be applied to each program. As a general rule, those activities are broken into three components:

- Evaluation Includes studies and activities that determine the effects of a program, or portfolio of programs, causation, and improvement opportunities. The types of evaluation studies include impact evaluations, process evaluations, and/or market assessments.
- Measurement Centers around the data collection, monitoring, and analysis activities used to determine gross energy and peak savings from projects (prior to assessing causation). This component typically involves measurement at individual sites (e.g.


installing data loggers to measure equipment performance) or of large batches of participants (e.g. aggregated analysis of thousands of utility bills).

• Verification – Includes activities that ensure that measures are actually installed as planned (e.g. verifying how many incented lightbulbs are actually installed in sockets). This can also extend to verifying that program processes are being delivered as expected.

Historically, Manitoba Hydro conducted its evaluations in-house. In recent years, however, Hydro began subjecting more of its programs to external evaluations, bringing it more in line with best practices and, incidentally, with the requirements of EM's own enabling legislation (legislation requires Efficiency Manitoba to retain an independent evaluator to assess its programs).

ACTION> Define EM's first evaluation framework, including budgets, timing and the type of evaluation activities to be applied to specific programs or types of programs.

# B.4 COST ALLOCATION / ACCOUNTING

Increasingly, organizations like EM are being challenged on the share of costs that are returned to consumers in the form of true value, vs. the share that are used for administrative purposes. Some such challenges stem from serious management issues, but others stem from confusion in how costs are allocated, with some methods needlessly *inflating* the perceived share of administrative costs.

The launch of Efficiency Manitoba is an opportunity to start fresh, including by defining cost categories using principles that are rooted in best practices *and* in a keen understanding of risk related to external perception.

Currently, Manitoba Hydro uses two high-level program cost categories: (a) Administrative Costs and (b) Incentives. The Incentives category is straightforward in that it includes all financial support provided to program participants. Administrative Costs group everything else, including both strictly internal administration (e.g. clerical support, IT, etc.) and functions that are arguably *not* administrative in nature (customer support, both general and specialized/technical, program design and management, evaluation, planning and others).

We believe that EM would be wise to reconsider the current cost allocation methodology. While there is no one-size-fits-all approach to defining and allocating costs, some approaches more accurately mirror the business of administering and delivering energy efficiency programs and services. For example, in Nova Scotia, costs are classified under three categories: (a) Administrative Costs, (b) Direct Program Costs, and (c) Program Support Costs. This or similar approaches can enhance reporting transparency, avoid unintended internal incentives, and support proper reviews of administrative cost levels, which can sometimes be the focus of regulatory proceedings, political inquiries or media attention.

**ACTION>** Establish a cost allocation methodology designed to properly capture and communicate administrative and other costs, including defining categories, methodologies for shared costs and a clear process for tracking and reporting.



# **B.5 STAKEHOLDER ENGAGEMENT**

The *Efficiency Manitoba Act* requires the Board to establish a stakeholder committee to act as an advisory body to Efficiency Manitoba (§27). If properly designed, the stakeholder committee can enhance the quality of EM's work, facilitate broad acceptance and stakeholder support, and minimize contentious and drawn out regulatory procedings. Inversely, if improperly designed, it could inflate grievances, push EM toward poor and/or regrettable decisions, and/or be entirely additive to the regulatory process.

We have worked with countless such committees across Canada and the U.S., and cannot argue enough for a considered approach to *who* should be invited and, just as critically, to the committee's *terms of reference*. EM can choose among a broad variety of experiences and approaches: from occasional consultative sessions to deeper collaborative approaches; from a stance rooted in opinions to one supported by experts and evidence; from a focus on market players to a focus on advocacy organizations, etc.

# ACTION> Define a stakeholder engagement strategy and process, including the types of stakeholders to invite, the degree of external support they should be provided, their independence, whether to offer funding (across the board, in limited cases or none at all), and related issues.



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## C. LAUNCH NEW PROGRAMS & INITIATIVES

**WHY:** The launch of Efficiency Manitoba presents a unique opportunity to revisit the efficiency programs currently offered in the province. While there is much work to be done in the agency's first year, including comprehensive evaluations of existing programs and processes as well as assessments of new and emerging opportunities and approaches designed to inform future improvements, there is also a lot that Efficiency Manitoba can start working on immediately.

### C.1 NEW INITIATIVES

In our "quick hits" memo (April 16<sup>th</sup>), we recommend six initiatives that Efficiency Manitoba can begin moving forward on almost immediately. These include:

- 1. *Rebrand* and streamline existing programs (see A.1 above)
- 2. Expand Smart Thermostats initiative
- 3. Introduce new Home Energy Reports initiative
- 4. Introduce new Advanced Heat Pump initiative
- 5. *Revisit* the Solar incentive
- 6. *Implement* new/advanced consumer outreach techniques

We refer Efficiency Manitoba to our previous memo, in which we expand on each of these, and highlight next steps that Dunsky can get started on immediately, at your request, and that are required *prior* to making any go/no-go decisions. These include:

- Engage with smart thermostat manufacturers ecobee and Nest in particular in order to inform plans for broad programs and/or programs targeted at hard-to-reach markets.
- Engage with Hydro staff and/or potential Home Energy Report solution providers to better define potential strategies and associated energy saving opportunities.
- Launch a best practices / lessons learned review of cold-climate heat pump programs, with a view to defining whether to move forward in Manitoba.
- Develop technical guidelines for eligible cold-climate heat pumps, adapted to Manitoba's harsh winter conditions.
- Design a green energy program, similar to the one we designed for Efficiency Nova Scotia and are currently working on for NYSERDA.
- Apply our Solar Adoption Model to forecast solar adoption at various incentive levels, and then advise on the parameters of a revamped program (or an eliminated one), as we have done for Alberta and others.
- Engage with Enervee, Lightspark and others to assess near-term opportunities and potential timeframes.
- Engage with myHeat and its early customers, including our client Enbridge, to assess the value and feasibility of a Manitoba pilot.

ACTION> Review the "Quick Hits" memo and engage initial steps required for go/no-go decisions, including program opportunity analytics and solution providers interviews.



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## D. INITIATE URGENT RESEARCH

**WHY:** There are a number of critical studies that must be undertaken by Efficiency Manitoba immediately in order to develop the next plan. Without a comprehensive assessment of current opportunities as well as targeted studies that consider specific opportunities in greater depth, Efficiency Manitoba, regulators, and stakeholders risk basing decisions on outdated and incomplete information.

### D.1 POTENTIAL STUDY

As recommended in our *Optimizing Power Smart* report, and in keeping with the scope of the legislation, EM should initiate a comprehensive "potential study" to assess the technical, economic and achievable potential for electricity and natural gas savings, as well as for savings of unregulated fuels (e.g. propane, which can count toward legislated targets).

We recommend that study target the mid-term period (approximately 2020-26) with reasonable specificity, and should be scoped to indicate notional savings opportunities for the five subsequent years. Given EM's legislated targets, the study scope should include reasonable emphasis on emerging technologies and services. Collaboration with Hydro can also ensure that time and effort invested into primary data collection is optimized.

In order to allow for the study to be executed and results built into plans, we recommend preparing an RFP in the fall of 2018 for launch before year's end; assuming the study launches by March 2019, EM can expect to receive results by late 2019 or early 2020. These results will serve as critical inputs to its next plan (as well as to its regulatory review process).

ACTION> Initiate an RFP to assess the potential for energy savings over the next two 3-year cycles, with a focus on all fuels and emerging technologies applicable specifically to Manitoba.

### D.2 TARGETED MARKET STUDIES

Efficiency Manitoba should also scope additional studies to be conducted in 2019 which will inform near-term planning process.

We previously identified a number of untapped opportunities in Manitoba that should be explored in more depth prior to designing programs or initiatives (studies are required to better understand customer needs, barriers, and motivations, among other issues that can help inform program design). Some of these new and unquantified measures are outlined in Dunsky's *Optimizing Power Smart* report.

Efficiency Manitoba may also wish to explore strategic opportunities for engagement within important and potentially underserved market segments. One such segment is the agricultural



sector, where it is unclear if the current Powersmart portfolio includes potential savings measures such as grain storage temperature/moisture controllers, high efficiency grain dryers, and dairy refrigeration tune-ups.

**ACTION>** Initiate market studies to inform new programs and initiatives designed to capture additional opportunities noted in our Optimizing Power Smart report.

# D.3 STRATEGIC INNOVATION PROGRAM

In order to build an efficient opportunity "pipeline" for your portfolio, we recommend that EM design and launch a Strategic Innovation Program.

While Hydro currently funds specific projects in the area of innovation (e.g. research on electric buses, demonstration projects in diesel communities), we recommend an integrated program designed specifically to build a pipeline of new savings opportunities across Manitoba. This program would include proactive market and technology research and surveillance, proactive RDD&C funding of targeted new technology or service opportunities, and an open or directed fund for third-party, market-driven proposals. The program would systematize the innovation funding process, and in so doing help to insulate EM from pressure to fund unworthy initiatives.

To this end, Efficiency Manitoba will need to develop clear criteria for funding requests from outside partners while at the same time proactively engaging with stakeholders to generate new opportunities (e.g. pilots).

ACTION> Design a Strategic Innovation Program to systematize innovation funding, build a pipeline of new energy savings opportunities and encourage a reasonable combination of both EM- and externally-driven projects.

### D.4 TECHNICAL RESOURCE MANUAL

A Technical Resource Manual (TRM) is a commonly used tool for systematizing the planning and evaluation of energy savings programs. The TRM provides, for a given jurisdiction, either the deemed savings or the methodology for determining custom savings from all major energy saving measures applicable in that region. Standardized values or algorithms are developed for a region's specific characteristics – climate, markets, customer types and more – using primary and/or secondary data.

A TRM is in some respects the "bible" of efficiency measures that will be used by EM's staff, its contractors, its evaluators, as well as stakeholders and the PUB. It will be used to inform program design, to forecast cost-effectiveness, to evaluate impacts and to judge the appropriateness of its plan.



This is a key reference manual that should be developed by Efficiency Manitoba at the outset of its tenure so that the TRM can be used as a guide for the next planning cycle and available for the first round of evaluations. It should be designed as a "living document" to be continuously updated as markets and technologies evolve.

ACTION> Launch an RFP to design Manitoba's first ever Technical Resource Manual (TRM), designed as a transparent guide to planning decisions, impact evaluations and more.



# **NEXT STEPS**

For Efficiency Manitoba to seize the opportunity and "reset" longstanding approaches, practices and culture, it will need to launch a broad array of initiatives – we've identified 11 priority areas in this memo – within its initial six months.

In practice, we recognize that the current context – a CEO search is (or soon will be) underway and the organization is essentially unstaffed – does not lend itself easily to launching a plethora of initiatives. Nonetheless, we would be pleased to help guide the EM board forward, including prioritizing those initiatives that are most urgent, and/or identifying those initiatives for which timeliness should take a back seat to waiting until a CEO is named and/or staff have arrived.



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# EFFICIENCY MANITOBA PROGRAM "BUNDLING" MEMO



JUNE 28<sup>th</sup>, 2018

- To: Grant Doak, Robert Marrese, Jim Crone Efficiency Manitoba
- From: Philippe Dunsky & Leslie Malone Dunsky Energy Consulting
- Re: Program "bundling" opportunity for current PowerSmart portfolio
- Date: June 28, 2018

## CONTEXT

In our "Quick Hits" memo of April 16<sup>th</sup>, and again in our "*The First Six Months (Priority Activities)*" memo of June 18th, we recommended that Efficiency Manitoba (EM) consider bundling and rebranding the current suite of Powersmart programs as part of your public-facing launch. Below we expand on this and, per your request, provide go-forward recommendations.

# WHY BUNDLE MEASURES & SERVICES INTO DISCRETE BUNDLES?

Over time, Manitoba Hydro's PowerSmart portfolio of efficiency programs has expanded to cover a broad range of energy savings opportunities in the province. Currently, the public has access to – and is being marketed – no less than 36 programs: 14 in the residential sector, 20 in the commercial and institutional sector, and two industrial programs.

There are a number of persistent barriers that limit participation in energy efficiency programs. These include high transaction costs, program complexity, and lack of reliable information.<sup>1</sup> Bundling programs can help drive participation by:

- 1. Simplifying marketing and communications
- 2. Streamlining internal processes
- 3. Easing customer analysis and decision-making

<sup>&</sup>lt;sup>1</sup> M. Socks et al. (2016). The Energy Efficiency Extra Value Menu: Streamlining Energy Efficiency Delivery. Available on-line at: <u>https://aceee.org/files/proceedings/2016/data/papers/7\_801.pdf</u>



# **BENEFITS OF PROGRAM BUNDLING**

# 1. Simplifying Marketing & Communications

Simplicity is a friend when it comes to product promotion. Having a smaller number of uniform packages can help program administrators establish a recognizable brand, and ultimately enhance marketing efforts. Similarly, trade allies such as windows distributors can be more easily led to cross promote broader savings opportunities (e.g. home retrofit) rather than simply focusing on the benefits of their single measure.

## 2. Streamlining Internal Processes

A large number of programs can create needless administrative burden, as internal processes for each program evolve in different ways over time. They also increase the risks associated with managing multiple silos, which include suboptimal program designs and inconsistent methods applied across the portfolio (e.g. are measures in one program treated the same way as measures in another program?).

### 3. Decision Making

Too much choice can become a barrier to action. Presenting potential participants with a large number of opportunities that they then have to match with a long list of programs can be daunting, and customers may not have the time or expertise to navigate the decision-making process. Reducing complexity can increase participation and customer satisfaction.



## MANITOBA'S APPROACH COMPARED TO OTHER JURISDICTIONS

Different jurisdictions take different approaches to program design, delivery, and marketing – and there is no one "right" way to categorize programs. However, as a general rule, leading jurisdictions tend toward limiting the number of customer-facing programs by bundling measures and services.

A review of leading jurisdictions' program categories can help inform how Efficiency Manitoba might approach organizing the various existing programs in the province. Below we compare Manitoba Hydro's planned 2018/19 residential programs with those of two recognized leaders in the U.S. and Canada – Massachusetts (utilities) and Nova Scotia (Efficiency NS). Both of the comparison regions generate significantly more energy savings than PowerSmart, yet Manitoba Hydro's 14 residential programs compares with half as many (7) in Nova Scotia, and one fifth as many (3) in Massachusetts.

	Manitoba (Hydro)	Nova Scotia (ENS)	Massachusetts (utilities)
	New Homes Program	Appliance Retirement	Whole House Program <sup>2</sup>
	Home Insulation Program	Instant Savings	Products Program <sup>3</sup>
	Affordable Energy Program	Home Energy Assessment	Low Income Whole House <sup>4</sup>
	Water and Energy Saver Program	Green Heat	
	Refrigerator Retirement Program	Residential Direct Install	
	Residential LED Lighting Program	Rental Properties and Condos Services	
ENTIAI	Community Geothermal Program	New Home Construction	
ESIDE	Appliances and Electronics Initiative		
	Smart Thermostats		
	Solar Energy Program		
	Community Energy Plan		
	Power Smart Residential Loan		
	Power Smart PAYS Financing		
	Residential Earth Power Loan		

<sup>&</sup>lt;sup>4</sup> Includes two variants: Single-family and Multi-family.



<sup>&</sup>lt;sup>2</sup> Includes four variants: New Construction, Home Energy Services, Multi-Family Retrofit, and Behavior/Feedback.

<sup>&</sup>lt;sup>3</sup> Includes three variants: Heating and Cooling Equipment, Consumer Products, and Lighting.

Similarly, the table below presents the commercial and industrial programs included in Manitoba Hydro's 2018/19 annual DSM plan, along with those in Massachusetts and Nova Scotia. **Compared with Manitoba Hydro's 20 programs, Nova Scotia has one-quarter (5), and Massachusetts one-tenth (2) the number of programs, while generating greater relative savings.** 

	Manitoba (Hydro)	Nova Scotia (ENS)	Massachusetts (Utilities)
	Commercial Lighting Program	Business Energy Rebates	C&I New Construction Program <sup>5</sup>
	LED Roadway Lighting Conversion Program	Custom	C&I Retrofit Program <sup>6</sup>
	Commercial Building Envelope – Windows Program	Energy Management Information System	
	Commercial Building Envelope – Insulation Program	Strategic Energy Management	
	Commercial Geothermal Program	Small Business Energy Solutions	
	Commercial HVAC Program – Boilers		
	Commercial HVAC Program – C02 Sensors		
lal	Commercial HVAC Program – HRV/ERV		
DUSTR	Commercial HVAC Program – Water Heaters		
& IND	Commercial Custom Measures Program		
SCIAL	Enhanced Building Operations Program		
MME	New Buildings Program		
O	Commercial Refrigeration Program		
	Network Energy Management Program		
	Power Smart Shops Program		
	Race to Reduce		
	Parking Lot Controller		
	Power Smart for Business PAYS Financing		
	Performance Optimization Program		
	Natural Gas Optimization Program		

<sup>&</sup>lt;sup>6</sup> Includes four variants: Existing Building Retrofit, Small Business, Multi-Family Retrofit, Upstream Lighting.



<sup>&</sup>lt;sup>5</sup> Includes two variants: New Buildings & Major Renovations, and Initial Purchase & End of Useful Life.

We note that while Manitoba Hydro offers significantly more programs, it has indicated that they effectively bundle some of the offerings when sales representatives present options to potential program participants, which would help reduce customer burden. However, from a public-facing marketing and outreach perspective, it would appear that programs are presented distinctly.

# **COST-EFFECTIVENESS & REPORTING**

In addition to improved customer experience, program uptake, and potentially greater and deeper energy savings, bundling will impact program cost effectiveness in two ways: (a) greater efficiencies in program delivery and adoption, and (b) reporting bundled C-E values as opposed to disaggregated ones.

It is too early to predict how bundling may generate efficiencies (or other value, e.g. improved satisfaction) and thereby impact cost-effectiveness. However, from the standpoint of strict math, bundling programs helps address those situations in which programs/measures on their own are not cost-effective viewed in isolation, but are nonetheless important contributors to the overall package. For example, smart thermostats can be a nice "hook" to entice customers into a more comprehensive program and/or lead to more savings in the future with additional functionality that enables direct nudges in a home. Similarly, "white good" appliances can play the role of high-visibility loss leaders to encourage greater efficiency elsewhere.

As an example, the table below provides current program TRC results for electricity and natural gas, as well as weighted average TRC results of program bundles (weighted using Hydro's most recent savings data).

Current PowerSmart Programs	Electric TRC B/C	Gas TRC B/C	Bundled Progra	ms	
New Homes	2.4	0.7	Whole home focused	2 2	1 1
Home Insulation	3.5	1.2	program bundle	5.5	1.1
Water and Energy Saver	6.2	13.7			
Refrigerator Retirement	1.3	-			
Drain Water Heat Recovery	-	-			
Residential LED Lighting	14.2	-			
Appliances	2.9	-	Equipment-focused	9.5	12.3
HRV Controls	-	-	P0		
Power Bars	1.1	-			
Smart Thermostats	2.9	0.7			
Plug-in Timers	1.2	-			



Manitoba Hydro's current program offerings provide broad coverage in terms of available energy savings opportunities across the province. To help overcome persistent barriers to efficiency program engagement and achieve deeper energy savings, we recommend that Efficiency Manitoba move to rebundle programs to simplify decision-making, marketing and customer support.

To this end, we would advise EM to prepare one or several options and consult with key stakeholders, including Hydro's PowerSmart team as well as market actors.

As a starting point, we believe that Hydro's 11 current *residential* programs (excluding financing) could be bundled into **three flagship programs: Warm Homes** (focused on weatherization), **Energy Savers** (appliances, lighting, and products), and **Green Energy** (heating and power systems). All measures would still be offered, but marketing, internal management and customer experience would all be simplified.



Similarly, we believe that the suite of 18 C&I programs (excluding financing) could be bundled into four flagship programs: "Energy Smart Buildings" (focused on major building renovations), Energy Smart Equipment (primarily lighting, HVAC and refrigeration), Small Business Solutions (focused on hard to reach small and medium businesses), and Smart Energy Management (primarily energy management and optimization). As with the residential sector, all current measures would still be offered; however, processes and communications would be streamlined.



Program Bundling memo | 6

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The bundles above would cut the number of programs from 30 to 7, without cutting services themselves. These do not include the current financing programs, which could be addressed separately.

### **NEXT STEPS**

Above we have developed illustrative options for the residential and non-residential incentive program portfolios. At your request, we would be glad to:

- Incentive programs: Using the above as starting points, we can engage with key Manitoba stakeholders (e.g. Hydro's PowerSmart team, key implementation contractors, trade allies), on your behalf, to finalize a recommended rebundling package.
- **Financing:** Manitoba Hydro was among the early adopters of financing mechanisms to support energy efficiency. As with incentive programs, over time new financing programs were added. Several of these programs overlap, and in some cases their nomenclatures no longer reflect their targeted measures (e.g. the Earth Loan, initially designed to encourage geothermal systems, now applies to ductless heat pumps and solar PV, among others). We can begin the process of considering how to bundle financing programs, recognizing that this will raise broader questions about which financing strategies to continue using in the future.

As always, please don't hesitate if you would like to discuss anything in this memo.

Phippe



Program Bundling memo | 7

# **EFFICIENCY MANITOBA "QUICK-HITS" MEMO** APRIL 16, 2018



- To: Grant Doak, Government of Manitoba
- From: Philippe Dunsky & Leslie Malone, Dunsky Energy Consulting
- Re: "Quick Hits" change options for current PowerSmart portfolio
- Date: April 16<sup>th</sup>, 2018

### CONTEXT

The launch of Efficiency Manitoba presents a unique opportunity to revisit the efficiency programs currently offered in the province. While there is much work to be done in the agency's first year, including comprehensive evaluations of existing programs and processes as well as assessments of new and emerging opportunities and approaches designed to inform future improvements, there is also a lot that Efficiency Manitoba can start working on immediately.

This memo is based on our previous quantitative and qualitative research, as well as a high-level review of Manitoba Hydro's current programs. It is intended to provide options for "quick hits" that Efficiency Manitoba can begin implementing almost immediately. These include:

- 1. Rebrand and streamline existing programs
- 2. Expand Smart Thermostats initiative
- 3. *Introduce* new Home Energy Reports initiative
- 4. Introduce new Advanced Heat Pump initiative
- 5. Reduce Solar incentive
- 6. Implement new/advanced consumer outreach techniques

Below we briefly expand on each of these near-term opportunities. We also indicate actions that our firm can take immediately, at Efficiency Manitoba's request, to advance each of these initiatives.



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### 1. REBRAND AND STREAMLINE EXISTING PROGRAMS

# **WHAT:** Group Manitoba Hydro's current residential, commercial, and industrial programs into a smaller number of high-level program areas.

As suggested in Dunsky's 'Program "Bundling" Opportunity' memo, one potential area of improvement is to group Manitoba Hydro's programs. Program bundling refers to a simplified, customer-facing approach to comprehensive energy savings by grouping measures and services into a smaller number of program bundles.

### HOW

- 1. **Rapid review of approaches in best practice jurisdictions**. There is no one "right" way to categorize programs. However, leading jurisdictions are tending toward limiting the number of customer-facing programs they offer by bundling various measures and services into packages. A review of leading jurisdictions' program categories can help inform how Efficiency Manitoba might approach organizing the various existing programs in the province.
  - At EMB's request, we can quickly develop sample portfolios from relevant regions.
- 2. Develop potential program bundles. Work with Manitoba Hydro, contractors, retailers, and others to group existing (and any new) measures into program bundles. By way of illustration, Manitoba Hydro's 11 existing residential programs (excluding financing offers) could be bundled into three flagship programs: 1) Warm Homes (focus on weatherization), 2) Energy Savers (appliances, lighting and products), and 3) Green Energy (heating and power systems). All measures would still be offered, but the customer experience would be simplified.



- At EMB's request, we can consult Hydro and key stakeholders, and finalize one or several proposed new program structure across all sectors, for consideration.
- 3. Work with market research experts to test potential messaging. Because these programs effectively become Efficiency Manitoba's new flagship programs, there would be value in quickly testing program name options (e.g. focus groups) to ensure that the new programs will



resonate with customers and reflect back their motivations, barriers, and needs (see Rebranding in 'Six-Month Action Plan' memo.)

4. **Finalize program rebrands and develop internal and external protocols**. In advance of launching Efficiency Manitoba, the agency will need to finalize the program bundles and develop internal protocols that will help guide program implementation as well as protocols for any third-party delivery agents.

In addition to streamlining and rebranding incentive programs, we note a similar opportunity on the financing side, where three financing programs coexist: Power Smart Residential Loan (on-bill financing for a broad array of measures, from furnaces to EV chargers); Pay-As-You-Save (also onbill); and Residential Earth Power Loan. These three programs largely overlap, and in some cases their nomenclatures no longer reflect their targeted measures (e.g. the Earth Loan, initially designed to encourage geothermal systems, now applies to ductless heat pumps and solar photovoltaic panels, among others).



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### 2. EXPAND SMART THERMOSTATS INITIATIVE

# **WHAT:** Continue to offer incentives for smart thermostats, and significantly expand the number of installations per year over Manitoba Hydro's 2018/19 target.

Manitoba Hydro currently offers a Smart Thermostat Pilot program, which Efficiency Manitoba should continue to administer; however, we believe Efficiency Manitoba can quickly ramp up the number of smart thermostats installed per year.

WiFi-connected smart thermostats generate energy savings by optimizing the use of furnaces (and other HVAC equipment) using occupancy detection and automation, behavioural nudges, and sensors that measure humidity and weather conditions to reduce HVAC run times while maintaining comfort. Based on a number of evaluation studies, in practice, savings from smart thermostats range from 1-15% for heating and 1-20% for cooling.

Based on our high-level estimates, a moderately more aggressive smart thermostat program (approximately doubling current efforts) could save 6.2 GWh and 0.6 mm<sup>3</sup> per year.

### HOW

- 1. Increase the annual smart thermostat target. Smart thermostats, like Home Energy Reports, are a good public engagement tool that can build awareness of Efficiency Manitoba while providing significant energy savings to Manitoba. For this reason, and based on penetration levels in other jurisdictions, we recommend that Efficiency Manitoba plan to significantly increase the number of smart thermostats installed per year.
  - At EMB's request, we can immediately engage with smart thermostat manufacturers ecobee and Nest in particular in order to inform plans.
- 2. **Consider targeting hard-to-reach customers**. Based on discussions with manufacturers, there may be an opportunity to target hard-to-reach customers in Manitoba. We encourage assessing this opportunity immediately.
  - At EMB's request, we can immediately engage with smart thermostat manufacturers ecobee and Nest in particular in order to assess opportunities for HTR-targeted efforts.
- 3. **Fully integrate the measure into residential programs and marketing efforts**. To the extent possible, bundle smart thermostats with other measures when programs are being marketed. In addition, because smart thermostats are a useful public engagement tool, Efficiency Manitoba's marketing efforts may choose to feature this measure prominently.



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### 3. INTRODUCE NEW HOME ENERGY REPORTS INITIATIVE

#### WHAT: Introduce a behavioral initiative, such as HER, for electricity and natural gas customers.

Home Energy Reports (HERs)<sup>1</sup> have been shown to reduce electricity and natural gas consumption by up to 2% per household. Implementing behavioural programs such as HERs is an important near-term opportunity for Efficiency Manitoba – based on Manitoba Hydro estimates, a HER program could save approximately 50 GWh of electricity per year, and Dunsky estimates the behavioural program could save approximately 0.6 mm<sup>3</sup> of natural gas per year.

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- 1. Pilot HERs in electric and natural gas heated homes. HERs offer a widespread, public-facing engagement opportunity that can simultaneously build awareness of Efficiency Manitoba while providing information and energy savings opportunities to Manitoban households in the near term. Efficiency Manitoba can include HERs in its initial program offerings for a sub-set of electric and natural gas customers across the province and track uptake, impact, and customer satisfaction.
  - At EMB's request, we can engage with Hydro staff and/or potential HER suppliers to better define potential strategies and associated energy saving opportunities.
- 2. Full roll out based on results of potential study and lessons learned through pilot. Ensure that behavioural programs, in particular HER are included in a comprehensive potential study, which ideally will be conducted in 2019 to inform the next energy efficiency plan. Based on the results and using lessons learned from the initial pilot, Efficiency Manitoba should expect to roll out a province-wide HER program in the near term.



<sup>&</sup>lt;sup>1</sup> We use "Home Energy Report (HER)" here as shorthand for a broader array of market solutions that compare home energy performance against neighbours or other comparables, and nudge households toward action.



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### 4. INTRODUCE NEW ADVANCED HEAT PUMP INITIATIVE

# **WHAT:** Offer awareness and incentives for high-efficiency, cold-climate air-source heat pumps (ducted and ductless).

Efficiency Manitoba has a potentially significant savings opportunity by offering information and incentives for a new generation of high-efficiency air-source heat pumps, provided they meet new "cold climate" specifications. Such heat pumps could save 1.1 GWh per year in electricity and 0.5 mm3 per year in natural gas in the near term.

### HOW

- 1. **Review efficiency heat pump programs in other jurisdictions**. A number of jurisdictions have introduced cold-climate heat pumps into their energy efficiency programs. As a first step, Efficiency Manitoba can review these programs to see what has worked. Jurisdictions to consider include: Minnesota, Maine, Vermont, New Brunswick, Nova Scotia and Ontario.
  - At EMB's request, we can immediately launch this review (we have conducted countless such reviews for clients from coast to coast).
- 2. **Develop guidelines**. Tie into the Northeast Energy Efficiency Partnerships' Cold Climate Heat Pump initiative, including its list of approved heat pumps.
  - At EMB's request, we can provide these guidelines (we sit on the NEEP CCHP working group)
- 3. **Include heat pumps when new programs are launched**. Efficiency Manitoba should include heat pumps when it launches its new programs at the end of 2018. While heat pumps may not be a standalone program (perhaps an element of a Green Energy program), the marketing team may choose to specifically promote the technology since it will be new to potential participants.
  - At EMB's request, we can design a green energy program, similar to the one we designed for Efficiency Nova Scotia and are currently working on for NYSERDA.



# 5. REDUCE SOLAR POWER INCENTIVE

### WHAT: Consider reducing the \$1 per watt incentive level of solar PV systems.

Manitoba Hydro's current Solar Photovoltaics (PV) Pilot Program offers a direct incentive of \$1 per watt to partially cover the initial costs of a solar PV installation. This is in addition to the Residential Earth Power Loan<sup>2</sup>, which offers up to \$30,000 at 4.9% over a 15-year term. Considering the continuously improving economics of distributed solar PV systems, we recommend that Efficiency Manitoba revisit this generous incentive level to determine if the \$ per watt compensation level should be reduced.

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- 1. Explore the impact of lower incentive levels. The market is advancing quickly, and solar PV can now cost as little as \$2.00 to \$3.00 per watt installed for residential and commercial systems, with prices expected to continue to decline. Efficiency Manitoba should revisit the current incentive levels needed to encourage uptake at a range of desired solar PV system penetration levels.
  - At EMB's request, we can apply our Solar Adoption Model to forecast adoption at various incentive levels.
- 2. **Consider a program update in the near term**. Manitoba's near-neighbour, Alberta, offers incentives of \$0.75 per watt (with maximum caps and other program parameters). Based on its assessment, Efficiency Manitoba may decide to lower the compensation provided for solar PV in the province to ensure that ratepayer dollars are being used in the most effective way.
  - At EMB's request, we can advise on the parameters of a revamped program, as we have done for Alberta and others.

<sup>&</sup>lt;sup>2</sup> As noted earlier, we encourage rebranding of the *Residential Earth Power Loan* to better reflect its broader scope, and/or streamlining with overlapping financing programs.



### 6. IMPLEMENT NEW/ADVANCED CONSUMER OUTREACH TECHNIQUES

# **WHAT:** Aim to become a leader in customer outreach and engagement by incorporating new techniques such as microtargeting, nudges, infrared thermographic imagery and others.

New and emerging technologies and approaches to social marketing are changing the way companies engage with customers. Microtargeting customers and actively nudging them toward timely and customized energy savings opportunities in line with their own interests and decision timeframes, can encourage higher uptake of energy efficiency opportunities. Efficiency Manitoba can establish itself as a leader in this field.

### HOW

- 1. **Develop a new customer engagement strategy and platform**. There are a number of companies that offer advanced marketing services to energy efficiency program administrators (e.g. Lightspark and Enervee). Efficiency Manitoba could partner with one of these companies and develop a customer engagement strategy that incorporates tools such as an on-line platform and dynamic nudges using social media.
  - At EMB's request, we can engage with Enervee, Lightspark and others to assess near-term opportunities and potential timeframes.





- 2. Incorporate innovative tools. Innovative tools can help overcome the "last mile" challenge and turn interest and intention into action. Home Energy Reports and on-line marketplaces that facilitate frictionless transactions are helpful. Other tools, such as myHEAT (currently being tested by Enbridge Gas in Ontario), have been shown to boost participation by make energy savings (or waste) more "real" and personal (see below).
  - At EMB's request, we can engage with myHeat and its early customers, including our client Enbridge, to assess the value and feasibility of a Manitoba pilot.



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Utility Solutions Case Studies Vote for Your City More ---



We are empowering urban energy efficiency<sup>™</sup> by helping homeowners visualize the amount and location of heat leaving their homes, communities and cities.

A MyHEAT

Utility Solutions Case Studies Vote for Your City More ---

#### **Customer Spotlight**

We recently partnered with a Canadian utility to test the use of our platform-in combination with a low-income weatherization program and a general energy efficiency rebate program. Both direct mail and social media advertising were tested, with the social media advertising campaign outperforming the direct mail campaign.

5.7% Direct Mail Response Rate

7.5% Social Media Response Rate

After viewing MyHEAT content, 8.2% of users either completed a program application, or visited the utility's website for more information about energy efficiency incentive programs.





# **NEXT STEPS**

Manitoba Hydro has developed a comprehensive portfolio of energy efficiency programs. Nonetheless, the creation of Efficiency Manitoba provides an opportunity for initial "quick hit" improvements, while longer-term changes are being developed.

We have identified a series of near-term changes that we recommend moving forward on. At Efficiency Manitoba's request, we could advance through the next steps, none of which would engage EMB in formal change, but all of which would be geared toward providing EMB with greater clarity on their feasibility, timeliness, cost and value prior to board or CEO decisions.

In addition to the six items outlined above, we believe there is value in designing a program aimed at advancing and harnessing *innovation* in energy efficiency.





## **REFERENCE:**

Efficiency Plan p.80 of 591

# PREAMBLE TO IR (IF ANY):

## QUESTION:

- Explain how the Plan addresses the accessibility of hard-to-reach customers who may have disabilities or be rural, newcomers, renters, customers living in multi-unit residences, or older customers.
- d. How does Efficiency Manitoba define "customer interests" with respect to 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.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

a. Efficiency Manitoba will ensure energy efficiency programming is available to all Manitobans. Hard-to-reach customers will be targeted through directed efforts and initiatives to ensure they are able to access Efficiency Manitoba's offers. In addition to information provided in the 2020/23 Efficiency Plan ("Plan"), Section 3.2 (p. 18 - 19), 6.1 (p. 33 - 35), Appendix A – Section A2.1.4 (p. 212 - 216), and Appendix A – Section A4 through A8 (p. 273 - 412), a further description of the activities Efficiency Manitoba will undertake to ensure accessibility of hard-to-reach customers is outlined below.

Contractors throughout the province, including those in rural and remote locations, will be brought on board to deliver Efficiency Manitoba's programs. Onboarding will consist of contacting the suppliers and contractors currently delivering energy efficiency programs through Manitoba Hydro and encouraging them to continue offering Efficiency Manitoba programs. For a detailed description of the onboarding process, please see the response to DAYMARK/EM I-13c.



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Online applications will be available and are easily accessible to customers who prefer to access information on computers, mobile devices, or tablets. As well, paper versions of applications will be available for those without access to the internet. Personalized support will be provided to all customer segments through energy advisors, sales representatives or customer contact centre resources.

Through the instant rebate offer to residential customers, Efficiency Manitoba will aim to secure contracts with retailers that are located throughout Manitoba, including in northern areas of the province. It is important to ensure that retailers with rural reach, including both "big-box" stores and independent shops, are engaged and adequately supported with point-of-purchase materials and sales associate training. The online rebates offer also addresses rural accessibility by allowing customers to purchase eligible products both in store and online from whichever retailer or website they choose.

Income Qualified Offers and financing programs are designed to minimize financial burden by providing free, subsidized or no-money-down energy efficiency upgrades to customers. The process is also simplified and made easily accessible with guidance provided through both Efficiency Manitoba and the province-wide participating contractor network.

Renters who are living in multi-unit residences will be specifically targeted through the In-Suite Efficiency initiatives. Income Qualified Offers also focus on renters and multiunit residences and will work with property managers, landlords, social housing providers, and non-profit housing associations to ensure these customers have access to energy efficiency programming.

Efficiency Manitoba will work with neighbourhood groups, landlord associations, newcomer associations, and special interest groups to provide energy efficiency program information to hard-to-reach consumers. Some of these organizations include:

- North End Community Renewal Corporation;
- Supporting Employment & Economic Development Winnipeg (SEED Winnipeg);
- The Salvation Army Neighbours Helping Neighbours;
- Daniel Mcintyre/St Matthews Community Association;



- Spence Neighbourhood Association;
- Brandon Neighbourhood Renewal Corporation;
- Dakota Ojibway Tribal Council;
- New Journey Housing;
- William Whyte Neighbourhood Immigrant Settlement Program;
- Winnipeg Rental Network;
- Chalmers Neighbourhood Renewal Corporation;
- Professional Property Managers Association;
- Manitoba Metis Federation;
- Manitoba Non-Profit Housing Association;
- Age & Opportunity;
- Community centres;
- food banks and pantries;
- Community resource centres and councils; and
- Seniors support programs, services, and resource Councils.
- d. Efficiency Manitoba determines customer interests based on qualitative and quantitative research as well as feedback from customers, contractors and other stakeholders who previously participated in energy efficiency programs through Manitoba Hydro. A review of customer satisfactions surveys, program evaluation metrics and informal customer and stakeholder engagement activities (including the review of the Plan with the EEAG), was undertaken to determine the energy efficiency interests and needs of Manitobans. Efficiency Manitoba expects to continuously learn about new and evolving customer interests through ongoing engagement efforts.



## REFERENCE:

Efficiency Plan p.80 of 591

# PREAMBLE TO IR (IF ANY):

## QUESTION:

- b. Explain how the Plan addresses barriers to participation in DSM initiatives for First Nations customers living on reserve and off reserve.
- c. Explain the engagement strategy specifically for First Nations on-reserve customers.

## **RATIONALE FOR QUESTION:**

### **RESPONSE:**

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

### On Reserve

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

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



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

### Off Reserve

A specific plan to address barriers to participation for First Nations living off reserve has not been developed; however, it should be noted that all energy efficiency programs will be available to First Nations off reserve customers. Efficiency Manitoba will engage with the established Energy Efficiency Advisory Group (EEAG) to establish an Indigenous Energy Efficiency Working Group with First Nation and Metis representation to address barriers for First Nations off reserve if the current available programming is not addressing the needs.

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



## **REFERENCE:**

Efficiency Plan p.250, 253-256 of 591

PREAMBLE TO IR (IF ANY):

## QUESTION:

For each program bundle, provide a table comparing the budgeted costs and savings (i) as per the Plan versus (ii) as per the preliminary plan prior to adjustments based on the Multi-Criteria Decision Analysis. Provide details of the specific programs that were increased and decreased with the reasons for the changes.

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

As documented in PUB/EM I-1a high-level screen of programs was considered, and a number of measures were rejected prior to the development of a preliminary portfolio. Efficiency Manitoba used the resulting programs to develop a preliminary portfolio with the intent of achieving the mandated electric and natural gas energy savings targets. The following tables provide a program bundle comparison of the electric and natural gas energy savings, budgets and program administrator cost test ("PACT") results for both the preliminary portfolios and the portfolios included within the 2020/23 Efficiency Plan ("Plan").

There were a number of changes to the natural gas and electric portfolio program bundles that were driven by the results of the multi-criteria decision analysis considering both quantitative and qualitative perspectives. Additional changes between the preliminary portfolio and the portfolio included within the Plan are the result of methodology changes and general quality control corrections. Resulting changes by program bundle are summarized as follows:



# **RESIDENTIAL PROGRAMS**

# Direct Install

- Revised energy savings and interactive effects from residential lighting based on quality control improvement. Change reduced electric energy savings and decreased electric interactive effects for natural gas energy savings.
- Revised budget downward based on quantitative analysis results for other portfolio offers.

## Product Rebates

 Revised energy savings and interactive effects from residential lighting based on quality control improvement. Change reduced electric energy savings and decreased electric interactive effects for natural gas energy savings.

## Home Renovation

- Removed Solar Pool Heaters & Solar Hot Water from program. Projected participation in these respective programs was less than ten customers per year due to factors such as the improved efficiency and declining price of solar PV panels reducing the solar domestic water heating market and the market trend of electric pool water heating through air source heat pumps which significantly increases the efficiency of pool heating compared to the previous electric heating options and limit the energy savings opportunity through a solar pool water heater. Please see PUB/EM I-1a for program administrator cost test (PACT) metrics for these specific measures.
- Reduced windows incentive based on results of quantitative analysis to improve the cost effectiveness of the Home Renovation program bundle.
- Updated geothermal program to include fuel-switching from natural gas to geothermal.
- Revised budget downward based on quantitative analysis results for other portfolio offers.

New Homes & Major Renovation

- Energy savings and budget changes based on quality control review. Home Energy Efficiency Kits & Education
- Revised energy savings and interactive effects from residential lighting based on quality control improvement. Change reduced electric energy savings and decreased electric interactive effects for natural gas energy savings.



# INCOME QUALIFIED PROGRAMS

# Income Qualified Offers

• Furnace Replacement Program costs were missed in the program cost tables within the preliminary natural gas portfolio (the PACT however, did capture these program costs).

### INDIGENOUS PROGRAMS

Insulation and Direct Install

- No change between preliminary and Plan portfolios.
- Small Business
- Changes reflect increased participation to Metis communities through targeted efforts and collaboration with Manitoba Metis Federation.
- Included budget for indigenous small business natural gas programming. Community Geothermal
- No change between preliminary and Plan portfolios.
- Metis Income Qualified
- A Metis Income Qualified program bundle was not contemplated within the preliminary portfolio. This change increased electric and natural gas energy savings and overall electric and natural gas portfolio budgets.

### COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROGRAMS

Small Business & Appliances

- Revised refrigeration system participation, energy savings and budget.
- In-Suite Efficiency
- Revised energy savings and interactive effects from residential lighting based on quality control improvement. Change reduced electric energy savings and decreased electric interactive effects for natural gas energy savings.

### Renovation

 Lighting program electric energy savings were reduced through revised participation assumptions in each of the Plan years. The intent of this was to reduce overall electric energy savings to better align with the electric energy savings target, reduce electric portfolio costs and reduce the interactive impact on natural gas energy savings.



• Updated geothermal program to include fuel-switching from natural gas to geothermal.

HVAC & Controls

Minor energy savings changes based on quality control review.

New Construction & High-Performance Buildings

• No change between preliminary and Plan portfolios.

Custom

 Revisions to the economic development / large industrial projects to reduce targeted natural gas energy targets associated with these activities.

Load Displacement

• No change between preliminary and Plan portfolios.

EMERGING TECHNOLOGY PROGRAMS

Emerging Technology

• Preliminary plan was missing budget required to reflect residential & commercial solar PV program design costs prior to the 2022/23 program launch.

Differences within the PACT results shown in the tables below are due to a methodology change in addition to the program energy savings and budget revisions identified above. The preliminary portfolio was based on an initial approach that included incremental annual estimated program activity for each program bundle for a 15-year time horizon with consideration of persistent savings in order to complete the 30-year PACT analysis. This methodology was revised as detailed within the Plan such that only 3-years of incremental annual estimated program activity for each program bundle was included along with consideration of persistent savings for the 30-year PACT analysis.

Annual Electric En	ergy Savin	ngs (GW.h	) Comparise	n		
	10/0202	2021/22	2022/23	2020/21	2021/22	2022/23
	Initial F	Portfolio Dev	eloped	2020	/23 Efficienc	v Plan
RESIDENTIAL PROGRAMS						
Direct Install	1.3	2.1	2.9	1.2	1.9	2.6
Product Rebates	15.5	16.3	15.0	14.3	11.7	8.7
Home Renovation	3.0	6.4	6.3	3.0	6.2	6.1
New Homes & Major Renovation	3.5	3.6	3.6	3.3	3.6	3.7
Home Energy Efficiency Kits & Education	0.6	1.0	1.0	0.6	1.0	1.0
Subtota	al 23.9	29.3	28.8	22.4	24.5	21.9
INCOME QUALIFIED PROGRAMS						
Income Qualified Offers	2.5	2.7	2.7	2.5	2.7	2.7
Subtota	al 2.5	2.7	2.7	2.5	2.7	2.7
INDIGENOUS PROGRAMS						
Insulation and Direct Install	0.2	0.3	0.3	0.2	0.3	0.3
Small Business	0.2	0.2	0.2	0.4	0.4	0.4
Community Geothermal	0.8	1.2	1:2	0.8	1.2	1.2
Metis Income Qualified	1	1	1	0.2	0.2	0.2
Subtota	al 1.1	1.7	1.8	1.5	2.1	2.2
COMMERCIAL. INDUSTRIAL & AGRICULTURAL PROGRAMS						
Small Business & Annliances	12.3	12,2	14.2	14.8	15.2	15.6
In-Suite Efficiency	0.0	4.	2.2	0.7	- 1.0	1.3
Renovation	120.2	121.5	121.9	110.7	103.1	95.5
HVAC & Controls	3.4	3.5	3.6	3.3	3.5	3.5
New Construction & High-Performance Buildings	6.0	8.0	7.2	6.0	8.00	7.2
Custom	24.2	17.9	28.6	24.2	17.9	28.6
Load Displacement	0.96	120.5	110.5	0.06	120.5	110.5
Subtota	al 265.8	287.0	288.0	258.7	269.9	262.2
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology	1	1.0	5.9		1.0	5.9
Subtota	-	1.0	5.9	T	1.0	5.9
Program Impact Totals	293	322	327	285	300	295
Codes, Standards & Regulations	œ	103	108	88	103	108
Total Energy Savings (GW.h) at Generation	381	425	436	373	403	403
Note: May not add up due to rounding.						



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Annual	Electric Cc	osts (000	's \$)				
	2020/21	2021/22	2022/23	2020/21	2021/22	2022/23	
	Initial I	Portfolio Dev	'eloped	2020	/23 Efficienc	y Plan	
RESIDENTIAL PROGRAMS							
Direct Install	\$663	\$891	\$1,124	\$406	\$578	\$753	
Product Rebates	\$4,033	\$3,638	\$3,120	\$4,033	\$3,638	\$3,120	
Home Renovation	\$2,105	\$3,777	\$3,898	\$1,971	\$3,107	\$3,169	
New Homes & Major Renovation	\$1,103	\$1,117	\$1,148	\$913	\$1,149	\$1,168	
Home Energy Efficiency Kits & Education	\$158	\$230	\$234	\$158	\$230	\$234	
Subtot	al \$8,062	\$9,652	\$9,525	\$7,482	\$8,701	\$8,445	
INCOME QUALIFIED PROGRAMS							
Income Qualified Offers	\$1,169	\$1,639	\$1,618	\$1,188	\$1,660	\$1,637	
Subtot	tal \$1,169	\$1,639	\$1,618	\$1,188	\$1,660	\$1,637	
INDIGENOUS PROGRAMS							
Insulation and Direct Install	\$196	\$256	\$272	\$196	\$256	\$272	
Small Business	\$172	\$176	\$216	\$313	\$370	\$472	
Community Geothermal	\$323	\$505	\$515	\$323	\$505	\$515	
Metis Income Qualified	\$0	0\$	\$0	\$97	\$141	\$140	
Subtot	tal \$692	\$937	\$1,003	\$929	\$1,272	\$1,398	
COMMERCIAL INDUSTRIAL & AGRICULTURAL PROGRAMS							
Small Business & Appliances	\$2.727	\$2.786	\$2.848	\$2.636	\$2,698	\$2,763	
In-Suite Efficiency	\$204	\$253	\$303	\$204	\$253	\$303	
Renovation	\$19,146	\$19,732	\$20,168	\$17,425	\$16,710	\$15,961	
HVAC & Controls	\$1,006	\$1,083	\$1,142	\$1,006	\$1,083	\$1,142	
New Construction & High-Performance Buildings	\$1,516	\$1,771	\$1,667	\$1,516	\$1,875	\$1,667	
Custom	\$3,071	\$2,642	\$3,723	\$3,021	\$2,668	\$3,749	
Load Displacement	\$984	\$5,693	\$3,357	\$984	\$5,693	\$3,357	
Subtot	al \$28,655	\$33,961	\$33,207	\$26,793	\$30,980	\$28,942	
EMERGING TECHNOLOGY PROGRAMS							202
Emerging Technology	\$124	\$276	\$1,472	\$124	\$317	\$1,463	20-
Subtot	al \$124	\$276	\$1,472	\$124	\$317	\$1,463	202
Program Totals	\$38,702	\$46,465	\$46,824	\$36,515	\$42,930	\$41,885	23 E
Enabling Strategies & Corporate Overhead	\$8,278	\$8,054	\$9,005	\$8,030	\$8,221	\$9,098	ffici PU
Total Electric Costs (000's \$)	\$46,980	\$54,519	\$55,829	\$44,545	\$51,151	\$50,983	ency JB/E
Note: May not add un due to rounding							y Pla M I
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# 2020-2023 Efficiency Plan PUB/EM I-4

Electric Program Cost-Effectiveness Metrics						
		PACT			PACT	
			Levelized Cost			Levelized Cost
	Ratio Init	NPV (000's \$) tial Portfolio Deve	(cents/kWh)	Ratio	NPV (000's \$) 020/23 Efficiency	(cents/kWh)
RESIDENTIAL PROGRAMS						
Direct Install	1.00	\$11	6.21	1.53	\$861	4.15
Product Rebates	1.64	\$7,288	3.67	1.74	\$7,533	3.49
Home Renovation	2.37	\$48,457	4.80	2.90	\$14,705	3.67
New Homes & Major Renovation	5.07	\$18,554	2.40	6.56	\$16,885	1.84
Home Energy Efficiency Kits & Education	1.41	\$8,935	4.40	1.61	\$353	3.05
Subtotal	2.01	\$83,245	4.38	2.74	\$40,338	3.19
INCOME QUALIFIED PROGRAMS						
Income Qualified Offers	2.61	\$22,660	4.30	2.80	\$7,576	3.70
Subtotal	2.61	\$22,660	4.30	2.80	\$7,576	3.70
INDIGENOUS PROGRAMS						
Insulation and Direct Install	2.09	\$3,247	5.53	1.90	\$613	5.88
Small Business	1.27	\$7,179	6.02	1.31	\$1,803	5.31
Community Geothermal	4.21	\$9,254	2.84	4.03	\$3,816	2.86
Metis Income Qualified		-	-	2.58	\$559	4.23
Subtotal	1.61	\$19,680	5.43	1.84	\$6,792	4.67
COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROGRAMS						
Small Business & Appliances	4.84	\$30,622	1.18	3.61	\$7,680	1.43
In-Suite Efficiency	2.54	\$1,746	3.05	2.48	\$1,055	3.14
Renovation	5.48	\$1,011,697	1.68	4.97	\$187,957	1.67
HVAC & Controls	3.52	\$38,850	2.43	2.81	\$5,501	2.30
New Construction & High-Performance Buildings	2.69	\$25,541	2.75	2.95	\$9,311	2.36
Custom	5.34	\$155,887	1.23	5.18	\$37,133	1.17
Load Displacement	3.40	\$59,410	1.64	3.72	\$61,521	1.50
Subtotal	5.06	\$1,323,755	1.65	4.43	\$310,159	1.59
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology	2.94	\$7,845	1.69	2.96	\$4,156	2.11
Subtotal	2.94	\$7,845	1.69	2.96	\$4,156	2.11
Program Impact Totals	4.18	\$1,457,184	2.01	3.88	\$369,021	1.89
Program Support Epabling Strategies & Corporate Overhead		(\$54727)			(\$23,883)	
		( , 7 , ' + 0 + /			(000'04+)	
Overall Portfolio Metrics	3.73	\$1,402,457	2.25	3.27	\$345,138	2.24
Note: May not add up due to rounding.						
Annual Natural G	ias Energ	y Savings	(million m <sup>3</sup> )			
---	-----------	---------------	---------------------------	---------	---------------	---------
	2020/21	2021/22	2022/23	2020/21	2021/22	2022/23
	Initial I	Portfolio Dev	eloped	2020/	/23 Efficienc	y Plan
RESIDENTIAL PROGRAMS						
Direct Install	0.10	0.16	0.21	0.10	0.17	0.23
Product Rebates	0.55	0.47	0.19	0.55	0.47	0.19
Home Renovation	0.34	1.17	1.27	0.33	1.15	1.25
New Homes & Major Renovation	0.14	0.15	0.16	0.07	0.16	0.17
Home Energy Efficiency Kits & Education	0.03	0.05	0.05	0.03	0.06	0.06
Subtotal	1.16	2.00	1.88	1.08	2.01	1.90
INCOME QUALIFIED PROGRAMS						
Income Qualified Offers	1.08	1.07	1.09	1.08	1.07	1.09
Subtotal	1.08	1.07	1.09	1.08	1.07	1.09
INDIGENOUS PROGRAMS						
Metis Income Qualified	I	-	-	0.05	0.05	0.05
Subtotal			1	0.05	0.05	0.05
COMMERCIAL. INDUSTRIAL & AGRICULTURAL PROGRAMS						
Small Business & Appliances	0.32	0.32	0.32	0.32	0.32	0.32
In-Suite Efficiency	0.06	0.08	0.09	0.08	0.12	0.15
Renovation	1.00	1.13	1.25	1.00	1.13	1.25
HVAC & Controls	0.78	0.74	0.70	0.79	0.76	0.72
New Construction & High-Performance Buildings	0.61	0.96	0.71	0.61	0.96	0.71
Custom	5.29	3.93	7.13	5.29	3.93	4.13
Subtotal	8.06	7.16	10.20	8.10	7.22	7.29
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology	1	0.17	0.17		0.17	0.17
Subtotal	ı	0.17	0.17	1	0.17	0.17
Interactive Effects	(3.16)	(3.20)	(3.16)	(2.12)	(1.85)	(1.62)
Drocram Imnact Totals	7 1 J	06 2	10.19	8 10	8 66	8 8 7
	<u>t</u>	07: /	2.2	2.0	0000	6.00
Codes, Standards & Regulations	3.51	3.28	3.13	3.51	4.09	4.36
Total Annual Energy Savings (million m <sup>3</sup> )	10.65	10.48	13.32	11.70	12.75	13.23



Note: May not add up due to rounding.



Annual Nat	tural Gas	Costs (00	0(s \$)			
		,				
	2020/21	2021/22	2022/23	2020/21	2021/22	2022/23
	Initial	Portfolio Dev	'eloped	2020,	/23 Efficienc	y Plan
RESIDENTIAL PROGRAMS						
Direct Install	\$456	\$577	\$697	\$199	\$264	\$327
Product Rebates	\$890	\$813	\$272	\$890	\$813	\$272
Home Renovation	\$1,018	\$4,665	\$5,899	\$933	\$3,066	\$3,839
New Homes & Major Renovation	\$675	\$690	\$719	\$371	\$742	\$769
Home Energy Efficiency Kits & Education	\$135	\$149	\$152	\$135	\$149	\$152
Subtotal	\$3,174	\$6,894	\$7,740	\$2,528	\$5,033	\$5,360
INCOME QUALIFIED PROGRAMS						
Income Qualified Offers	\$3,737	\$3,996	\$3,916	\$5,934	\$5,992	\$6,606
Subtotal	\$3,737	\$3,996	\$3,916	\$5,934	\$5,992	\$6,606
INDIGENOUS PROGRAMS						
Metis Income Qualified	\$0	\$0	\$0	\$292	\$330	\$362
Subtotal	0\$	0\$	\$0	\$292	\$330	\$362
COMMERCIAL INDLISTRIAL & AGRICULTURI PROGRAMS						
Small Business & Appliances	\$249	\$254	\$260	\$249	\$254	\$260
In-Suite Efficiency	\$38	\$58	\$79	\$38	\$58	\$79
Renovation	\$2,102	\$2,151	\$2,387	\$2,102	\$2,151	\$2,387
HVAC & Controls	\$799	\$843	\$888	\$797	\$841	\$886
New Construction & High-Performance Buildings	\$2,079	\$2,514	\$2,301	\$2,079	\$2,570	\$2,301
Custom	\$1,933	\$1,160	\$1,820	\$1,959	\$1,262	\$1,702
Subtotal	\$7,201	\$6,980	\$7,735	\$7,224	\$7,136	\$7,615
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology	\$63	\$139	\$168	\$63	\$139	\$168
Subtotal	\$63	\$139	\$168	\$63	\$139	\$168
Program Totals	\$14,175	\$18,009	\$19,559	\$16,041	\$18,631	\$20,110
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Enabling Strategies and Corporate Overhead	\$2,685	\$2,588	\$2,905	\$2,600	\$2,644	\$2,956
Total Natural Gas Costs (000's \$)	\$16,858	\$20,597	\$22,465	\$18,641	\$21,275	\$23,047
Note: May not add up due to rounding.						

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Natural Gas	Program Co	st-Effectiv	eness Metrics			
		PACT			PACT	
			Levelized			Levelized
	0.4:0		COSL (conte/m³)	+.⊂ □		COSL (conto/m3)
	Initial P	ortfolio Develo	(Lettes/ III )		(000 s \$) 0/23 Ffficiency	Cents/III /
RESIDENTIAL PROGRAMS	3		5			5
Direct Install	0.41	(\$3,361)	47.11	0.78	(\$166)	23.19
Product Rebates	0.78	(\$447)	23.10	0.79	(\$402)	22.68
Home Renovation	0.67	(\$22,611)	31.78	1.20	\$1,482	16.82
New Homes & Major Renovation	0.78	(\$868)	26.67	0.72	(\$492)	28.07
Home Energy Efficiency Kits & Education	0.40	(\$5,598)	49.44	0.41	(\$243)	43.90
Subtotal	0.63	(\$32,884)	33.14	1.01	\$179	19.49
INCOME QUALIFIED PROGRAMS						
Income Qualified Offers	0.48	(\$28,990)	43.68	0.49	(\$8,888)	40.29
Subtotal	0.48	(\$28,990)	43.68	0.49	(\$8,888)	40.29
INDIGENOUS PROGRAMS						
Metis Income Qualified	-	\$0		0.44	(\$519)	44.94
Subtotal	-	\$0		0.44	(\$519)	44.94
COMMERCIAL. INDUSTRIAL & AGRICULTURAL PROGRAMS						
Small Business & Annliances	3, 78	\$7 013	5 70	175	\$541	10.06
	3.01	\$660	612	3.15	\$351	2000 1000
Renovation	168	\$20.272	11 99	160	\$3774	11.85
HVAC&Controls	2.12	\$8.322	9.33	2.59	\$3.773	7.35
New Construction & High-Performance Buildings	0.52	(\$10,646)	36.93	0.59	(\$2,693)	30.62
Custom	9.23	\$152,749	2.09	6.51	\$25,684	2.72
Subtotal	3.19	\$178,370	6.10	2.52	\$31,429	7.19
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology	0.89	(\$104)	21.40	0.89	(\$104)	21.40
Subtotal	0.89	(\$104)	21.40	0.89	(\$104)	21.40
Program Impact Totals	1.51	\$116,392	13.10	1.42	\$22,097	13.03
Program Support, Enabling Strategies & Corporate Overhead		(\$17,509)			(\$7,707)	
Interactive Effects	_	(\$96,172)			(\$15,146)	
Overall Portfolio Metrics	1.01	\$2,711	19.42	0.99	(\$756)	18.69
Note: May not add up due to rounding.						



Efficiency Plan p.157 of 591; DAY/EM-46

PREAMBLE TO IR (IF ANY):

## QUESTION:

How does the greater affordability of gas space heat compared to electric space heat factor into the decisions to have a budget of 6% for hard-to-reach and income qualified customers for the electric portfolio while a 32% of the budget for the gas portfolio?

## **RATIONALE FOR QUESTION:**

### **RESPONSE:**

The affordability of gas space heat compared to electric space heat is not a factor in the budget breakdown by fuel source for hard-to-reach customers (Income Qualified Offers and Indigenous Programs). In developing the plan for the hard-to-reach market, demographics such as participant's geography, heat sources and historical participation through Manitoba Hydro's Affordable Energy Program, have all been considered in projecting participation. These factors, along with the cost of the installed measure(s), directly impact the budgets of the electric and natural gas portfolios.

The chart below illustrates how the electric and natural gas budgets for the Indigenous and Income Qualified segments are allocated. While most of the total Income Qualified budget is allocated to natural gas, the majority of the total Indigenous Programs budget is allocated to electric programming.



	(A)	(B) = (A)/(E)	(C)	(D) = (C)/(E)	(E)
Hard to Reach	3-year Average		3-year Average		
Budget	Electric	% Share of	Natural Gas	% Share of	3-year
(annual average)	Budget	Budget	Budget	Budget	Average
Indigenous	\$1,200,000	79%	\$328,000	21%	\$1,528,000
Income Qualified	\$1,495,000	19%	\$6,177,000	81%	\$7,672,000
Total Hard to Reach	\$2,695,000	29%	\$6,505,000	71%	\$9,200,000
Average Annual EM Budget	\$48,894,000	70%	\$20,988,000	30%	\$69,882,000

As shown in the table, the 3-year average natural gas budget for Hard to Reach customers is 71% of the total costs. This is inverse to the overall Efficiency Manitoba portfolio split between electric and gas for the following reasons:

- More customers who heat with gas participate in Income Qualified Offers. Historical trends from Manitoba Hydro's Affordable Energy Program indicate that over 70% of participants used gas space heat. This is supported by the customer demographics in the 2017 Residential End Use Survey, 75% of lower income customers in Manitoba reside in gas available areas (46% directly in Winnipeg, and 29% outside Winnipeg). Further, while the Plan (p. 315 of 591 line 48) states 49% of low income homes are heated with electricity (78,000 homes) more than half of these homes consist of MURB suites and First Nation on-reserve homes. Programming measures for MURBS are significantly less costly as the upgrades do not include furnaces or insulation. Programming measures for First Nation on Reserve homes are covered and budgeted under the Indigenous Program.
- The largest energy saving measures under the Income Qualified Offers are furnace upgrades and insulation upgrades, both of which are only eligible in single or multifamily homes. These measures account for the majority of the budget as follows:
  - Only gas heated customers are eligible for a furnace or boiler upgrade. This represents 36% of the gas budget for the Income Qualified portfolio, and 29% of the entire Income Qualified Offers budget.



- Insulation upgrades in gas heated homes represents 44% of the gas budget for the Income Qualified portfolio, and 35% of the entire Income Qualified Offers budget.
- Insulation upgrades in electrically heated homes account for 47% of the electric budget for the Income Qualified portfolio, and 9% of the entire Income Qualified Offers budget.



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PREAMBLE TO IR (IF ANY):

## QUESTION:

Elaborate further on the Community Driven Outcomes Contract model (CDOC) to be used for the Community Geothermal program, where instead of giving an incentive to a customer once they install a geothermal system, Efficiency Manitoba will "buy" the outcome of saved energy.

## **RATIONALE FOR QUESTION:**

### **RESPONSE:**

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

A CDOC must meet the needs which have been prioritized by the communities. For the purpose of the Community Geothermal Program, the desired outcomes or needs set out by the participating communities are; skills training and job creation, lower utility costs, and reduced dependency on social assistance. Community members are trained to install and maintain the geothermal systems. The training and work required meets the need for skills training, job creation, and reduced dependency on social assistance. Once the systems are installed and running, this meets the need of reduced utility costs and saving energy. Efficiency Manitoba will "buy" the saved energy outcome through an outcomes purchase contract with Raven Indigenous Capital Partners, an Indigenous social finance intermediary. Previously, an incentive was used to buy down the cost of a loan which was used to finance the geothermal system. In this model, combining the purchasing power of all of the outcomes buyers means that the



installed cost of the geothermal system is completely paid for and therefore First Nations communities are not being burdened with more community debt and are seeing more immediate savings.

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



Bill Affordability Collaborative Process

# PREAMBLE TO IR (IF ANY):

While bill affordability is out of scope in this proceeding, the Bill Affordability Collaborative Process initiated through Board Order 73/15 Directive 5 identified a number of issues related to energy efficiency, accessibility, and barriers to participation in DSM programs.

## QUESTION:

- a. Provide the following reports from the Bill Affordability Collaborative Process:
  - (I) January 2017 Summary Report & Recommendations
  - (II) Summary of Feedback Received from Organizations that Participate in the Delivery of Manitoba Hydro's Affordable Energy Program
  - (III) Manitoba Hydro's Response to Recommendations of the Bill Affordability Working Group
- b. Explain whether and how Efficiency Manitoba considered the findings and recommendations from the reports in (a) in the development of the Plan.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

a. (I) The requested document is publicly available at the link below. http://billaffordabilitymb.ca/wp-content/uploads/collaborative\_process\_summary\_report.pdf

Efficiency Manitoba notes that bulk of the information in this report relates to bill affordability measures that are outside the scope of this proceeding. With respect to matters in scope for this proceeding, the information on lower income energy efficiency programing can primarily be found in Section 5.4 at pages 22 through 24 and in the Recommendations in Sections 8.1 on pages 34 through 36 of the report.

(II) The requested document is publicly available at the link below.



https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/general\_rate\_application\_2017/ 10.06 appendix 10.6 summary of feedback from other organizations\_regarding\_bill\_afford ability.pdf

(III) The requested document is publicly available at the link below.

https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/general\_rate\_application\_2017/ 10.07\_appendix\_10.7\_mh\_response\_to\_recommendations\_of\_the\_bill\_affordability\_working\_g roup.pdf

- b. The information below summarizes the recommendations related to lower income energy efficiency initiatives from the Bill Affordability Report and how Efficiency Manitoba considered them in the development of the Plan.
- Recommendation: Emphasis on existing Manitoba Hydro low-income energy efficiency and weatherization initiatives be maintained at their current level, or enhanced with additional funding or programming where possible, whether those initiatives or funding are provided by Manitoba Hydro or otherwise.

**Efficiency Manitoba Plan:** Income Qualified Offers at Efficiency Manitoba will include and enhance the offerings of the former Affordable Energy Program delivered by Manitoba Hydro to achieve additional energy savings and participation.

 Recommendation: Manitoba Hydro to assess the potential to modify the terms of the existing natural gas Furnace Replacement Program to include the replacement of midefficiency natural gas furnaces with high efficiency natural gas furnaces for qualifying lower-income customers.

**Efficiency Manitoba Plan:** An enhancement included under the Income Qualified Offers at Efficiency Manitoba will include the replacement of mid-efficiency natural gas furnaces with high efficiency natural gas furnaces with a customer copayment of \$36.67 per month for five years (for a total cost of \$2,200). This program enhancement is set to begin in year three of the Plan.

• **Recommendation:** Subject to evaluation against provincial and federal environmental climate policies, Manitoba Hydro to consider the development of incentive programs for



qualifying lower-income customers to promote the replacement of residential electric heating systems with high-efficiency natural gas furnaces in areas where natural gas service is available, and to further explore the development of incentive programs to promote residential space heating conversions from electricity to biomass, geothermal or heat-pump technologies, if those programs are determined to be or can be made to be economically viable.

**Efficiency Manitoba Plan:** With respect to fuel switching, conversion of an electric heating system to natural gas is not aligned with both the Efficiency Manitoba Act and accompanying Regulation as this would result in an increase in GHG emissions and therefore is not included in the Plan for lower income customers or otherwise.

Conversion of a heating source from natural gas or electric to a biomass source is in included in the Plan as there would be either a decrease in GHG emissions in the case of an existing natural gas heating source or a negligible change in GHG emissions in the case of an existing electric heating source. A conversion of an electric supply from grid electricity to another renewable energy source of distributed generation such as solar, bioenergy, or waste products is included as there would be a negligible change in GHG emissions. Offerings for technologies such as geothermal, bioenergy and solar photovoltaic are for all customer segments and not specific to income qualified customers. Financing is also available for these projects under the Home Energy Efficiency Loan.

 Recommendation: Manitoba Hydro work with Employment and Income Assistance, the Residential Tenancies Branch, the Professional Property Management Association, the Winnipeg Rental Network, Manitoba Housing, All Aboard, First Nations, tribal councils, Manitoba Metis Federation, other Indigenous entities, neighborhood renewal organizations, the provincial government and other large lower income housing providers to investigate opportunities to reduce barriers to landlord/tenant participation and/or increase landlord participation in affordable energy programs including energy efficiency and weatherization initiatives.

**Efficiency Manitoba Plan:** Under the Income Qualified Offers, Efficiency Manitoba will target landlord/tenants through the following initiatives:



- Additional outreach channels, such as property management, landlord associations, and tenancy branches in addition to the traditional paid media advertising.
- Work with non-profit social housing providers, who provide low-cost housing for lower income individuals. The program will target these social housing providers through trade shows, conferences, information sessions, and direct outreach activities.
- Work with community groups and partner with Neighbourhood Renewal Corporations. This includes enlisting an energy advocate in the targeted communities to act as a champion of Income Qualified offers. The energy advocate will be part of grassroots initiatives such as door-to-door canvassing and geo-targeted blitzes on a block-by-block basis. Homes located in the preselected, geo-targeted neighbourhoods with a higher prevalence of lower income customers can bypass the income qualification process and will be automatically approved to receive a free Home Energy Check-Up. Furthermore, the energy advocate's duties will include attending various seminars and meetings hosted by housing and tenancy branches within the community organizations to enlist their support, build relationships, and reach potential lower income customers.
- Educating community groups, senior's organizations, newcomer groups and resource centres with program materials, meetings and presentations on the program and energy efficiency tips. Presentations can be modified for their client's needs (such as plain language or use of a translator to remove language barriers).
- Customers residing in multi-unit residential buildings will be reached directly under traditional marketing initiatives, neighbourhood or social housing organizations, or their dedicated housing/rental tenancy branches.
- Alternative documentation from an approved list, including Employment and Income Assistance statements, are accepted by the program as income verification. This option is available to help minimize barriers to participation.

Additionally, under the Indigenous Programs, Efficiency Manitoba will coordinate efforts with, but not limited to: First Nation Tribal Councils; Southern Chief's



Organization (SCO); Manitoba Keewatinowi Okimakanak (MKO); Assembly of Manitoba Chiefs (AMC); Manitoba Metis Federation; Natural Resources Canada; and Canada Mortgage and Housing Corporation to offer energy efficiency initiatives and leverage other programs or services which may complement proposed energy efficiency initiatives.



Residential Energy Use Surveys

PREAMBLE TO IR (IF ANY):

### **QUESTION:**

Provide the 2017 Manitoba Hydro Residential Energy Use Survey results.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

The requested document is publicly available at the link below.

https://www.hydro.mb.ca/docs/regulatory affairs/pdf/natural gas/general rate application 2019/07-7 appendix 7-7 2017 residential energy use survey.pdf



Efficiency Plan p.30 of 591

PREAMBLE TO IR (IF ANY):

## QUESTION:

Explain why benchmarking of the levelized costs to Efficiency Manitoba of conserved energy with other jurisdictions' levelized costs is not possible.

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

Dunsky Energy Consulting provided their perspectives on the benchmarking of various metrics to Efficiency Manitoba in a memo dated September 30, 2019, found on pages 526 to 533 of the submission. In that memo, the consultant cautioned Efficiency Manitoba about benchmarking PACT results against other jurisdictions. As noted on page 527 of the submission;

"cost-benefit tests commonly applied to the DSM industry are not typically retained for benchmarking purposes, for a number of reasons, including (a) because while known as "standard" tests, they can be applied in vastly different ways across jurisdictions, including accounting for different types of benefits, and (b) because most benefits are unique to each region (e.g. avoided costs), and are largely outside of each PA's (program administrator) control."

Efficiency Manitoba finds value in benchmarking as a tool to continuously improve its programs and operations and intends to benchmark to other program administrators on metrics that can be equitably compared.



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### PREAMBLE TO IR (IF ANY):

### **QUESTION:**

- a. Given that the Furnace Replacement Program was not cost effective, explain why this initiative is being continued and expanded to include the replacement of mid-efficiency furnaces.
- b. Provide the gas savings to be achieved by the Income Qualified furnace replacement initiative for each year of the Plan.
- c. Provide the cost effectiveness metrics for the Income Qualified furnace replacement initiative when replacing i) a standard efficiency furnace and ii) a mid-efficiency furnace.
- d. For the three-year period of the Efficiency Plan, provide a table showing the annual opening and closing balances (including the April 1, 2020 opening balance following the transfer of the FRP funds from Centra), disbursements, numbers of furnace and boiler replacements, and whether there are any transfers of funds into or out of the funds earmarked for the Income Qualified furnace replacement program.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

a) The Furnace Replacement (FRP) program is being continued as part of the Income Qualified Offers because the replacement of a standard efficiency furnace is one of the measures that will provide the largest energy savings to a customer in the lower income market segment. The other measure that provides significant energy savings for a naturally gas heated low-income customer is an insulation upgrade. Recognizing the objective of the Income Qualified Offers is to assist lower income customers in implementing upgrades which have the potential to reduce their monthly energy bills, it



is important to continue with the FRP.

As per the Efficiency Manitoba Regulation 15(2)(b), the residual amount in the FRP account as of April 1, 2020 is to be used to offset the cost of natural gas demand-side management initiatives set out in an approved efficiency plan. The FRP account was established directly as a result of Order 99/07 to fund furnace replacements for lower income customers. Efficiency Manitoba is aware of importance this initiative and recognizes funds have been allocated to complete the conversion of standard to high efficiency furnaces for income qualifying customers. Efficiency Manitoba therefore feels it is prudent to continue with this initiative.

The replacement of mid-efficiency furnaces is made available in year three of the Plan. While the energy savings and bill impacts are not as large when compared to the replacement of a standard efficiency furnace, the measure is made available to address other factors for lower income customers such as affordability and high upfront cost of a new furnace as well as to target deeper energy savings with natural gas as the opportunities available in the market decline.

Income Qualified Offers are assessed for cost effectiveness at a bundled program level and not at the individual measure level. Although the bundled gas program is not cost effective, the EM natural gas portfolio overall is cost effective. The FRP is being continued because it will provide natural gas and GHG savings overall as well as valuable bill savings for lower income customers.



b) The table below outlines the gas savings associated with furnace and boiler replacements for each year of the plan.

Measure	2020/21	2021/22	2022/23
Standard Efficiency	333,303 m <sup>3</sup>	300,216 m <sup>3</sup>	270,355 m <sup>3</sup>
Furnace Upgrade			
Mid-Efficiency	N/A	N/A	68,796 m <sup>3</sup>
Furnace Upgrade			
Boiler Upgrade	11,940 m <sup>3</sup>	11,940 m <sup>3</sup>	11,940 m <sup>3</sup>
Total Savings	345,243 m <sup>3</sup>	312,156 m <sup>3</sup>	351,091 m <sup>3</sup>

c) The cost effectiveness metrics for the Income Qualified furnace replacement initiative are as follows, and includes boiler upgrades which are funded through the FRP Program:

Program Administrator Cost Tests	i) Standard Efficiency Furnace	ii) Mid-Efficiency Furnace	Boiler
Ratio			
Net Present Value			
(\$)			
Levelized Cost			

1a & 2b

d) The below table provides an estimate of the funds that will be transferred to Efficiency Manitoba at April 1, 2020.

	2020/21	2021/22	2022/23
Opening Balance (estimated)	\$8,666	\$6,518	\$4,611
Disbursements (estimated)	\$2,148	\$1,907	\$2,542
Ending Balance	\$6,518	\$4,611	\$2,069
Number of Standard Furnace Replacements	413	372	335
Number of Mid-Efficiency Furnace Replacements	0	0	300
Number of Boiler Replacements	10	10	10



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### PREAMBLE TO IR (IF ANY):

### QUESTION:

- a. Provide the total resource cost ratios, total resource cost net present values, levelized resource costs, simple customer paybacks, participating customer cost ratios, and participating customer cost net present values for each initiative in the Plan.
- b. File Efficiency Manitoba's analysis of the social, economic, or environmental benefits by DSM initiative or bundle.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

a. Based on PUB, COALITION and MIPUG information requests, the following tables provide the electric portfolio cost effectiveness results for the program administrator cost test (PACT); total resource cost test (TRC); participating customer cost test (PC); simple customer payback; and rate impact measure (RIM) for each initiative in the Plan.

Please note that the electric portfolio PACT results have been revised for the Indigenous Small Business and commercial, industrial and agricultural Small Business & Appliances program bundles. The corrected values are highlighted.



Electric Program Cost-Effectiveness Metrics							
				PACT			
	PACT Benefit	PACT Costs	Ratio (A)	PACT NPV (000's \$)	LC Savings	Levelized Cost (cents/kWh) (B)	A * B (cents/kWh)
			20	20/23 Efficiency	Plan		
RESIDENTIAL PROGRAMS							
Direct Install	\$2,482	\$1,622	1.53	\$861	39,071,794	4.15	6.35
Product Rebates	\$17,776	\$10,242	1.74	\$7,533	293,339,658	3.49	6.06
Home Renovation	\$22,428	\$7,723	2.90	\$14,705	210,642,446	3.67	10.65
New Homes & Maior Renovation	\$19.922	\$3.036	6.56	\$16.885	164.588.619	1.84	12.10
Home Enerav Efficiency Kits & Education	\$936	\$583	1.61	\$353	19.111.747	3.05	4.90
Subtotal	\$63,544	\$23,206	2.74	\$40,338	726,754,266	3.19	8.74
INCOME QUALIFIED PROGRAMS							
Income Qualified Offers	\$11.786	\$4.210	2.80	\$7.576	113.670.365	3.70	10.37
Subtotal	1 \$11,786	\$4,210	2.80	\$7,576	113,670,365	3.70	10.37
INDIGENOUS PROGRAMS							
Insulation and Direct Install	\$1,293	\$680	1.90	\$613	11,564,118	5.88	11.18
Small Business	\$620	\$1,081	0.57	(\$461)	9,608,801	11.26	6.45
Community Geothermal	\$5,075	\$1,259	4.03	\$3,816	44,013,674	2.86	11.53
Metis Income Qualified	\$913	\$354	2.58	\$559	8,372,693	4.23	10.90
Subtotal	106,7\$	\$3,373	2.34	\$4,527	73,559,287	4.59	10.74
COMMERCIAL INDUSTRIAL & AGRICULTURAL PROGRAMS							
	\$17 585	\$7 641	02 0	40 945	204 763 314	ر م	5 77
In-Suite Efficiency	\$1.768	\$712	2.48	\$1.055	22.696.213	3.14	7.79
Renovation	\$235,351	\$47,395	4.97	\$187,957	2,844,426,058	1.67	8.27
HVAC & Controls	\$8,545	\$3,044	2.81	\$5,501	132,429,999	2.30	6.45
New Construction & High-Performance Buildings	\$14,080	\$4,769	2.95	\$9,311	201,789,888	2.36	6.98
Custom	\$46,008	\$8,875	5.18	\$37,133	757,347,189	1.17	6.07
Load Displacement	\$84,119	\$22,597	3.72	\$61,521	1,506,392,254	1.50	5.58
Subtotal	\$407,456	\$95,032	4.29	\$312,423	5,769,844,915	1.65	7.06
EMERGING TECHNOLOGY PROGRAMS							
Emerging Technology	\$6,272	\$2,115	2.96	\$4,156	100,048,602	2.11	6.27
Subtotal	1 \$6,272	\$2,115	2.96	\$4,156	100,048,602	2.11	6.27
Program Impact Totals	\$496,959	\$127,937	3.88	\$369,021	6,783,877,435	1.89	7.33
Droarom Climport Ecologian Ctratanion & Corporato Ocorhood	Ç	¢ 77 00 Z		1472 002)			
Program support, Enabling surategies & Corporate Overnead	O o	\$2000		(000'07¢)			
Overall Portfolio Metrics	\$496,959	\$151,821	3.27	\$345,138	6,783,877,435	2.24	7.33
Note: May not add up due to rounding.							



Electric Program Cost-Effectiveness Met	rics					
			Total F	Resource Cos	st Tests	
		TRC Benefit	TRC Costs	TRC Ratio	TRC NPV (000's \$)	Levelized Cost (cents/kWh)
SESIDENTIAL PROGRAMS						
Direct Install		\$4.355	\$2.183	1.99	\$2.171	5.59
Product Rebates		\$25.053	\$20.274	1.24	\$4.778	6.91
Home Renovation		\$23.232	\$12.075	1.92	\$11,157	5.73
New Homes & Maior Renovation		\$19.922	\$11.421	1.74	\$8.501	6.94
Home Energy Efficiency Kits & Education		\$1.766	\$563	3.14	\$1,203	2.94
	Subtotal	\$74,327	\$46,516	1.60	\$27,811	6.40
NCOME QUALIFIED PROGRAMS						
Income Qualified Offers		\$13,970	\$4,035	3.46	\$9,936	3.55
	Subtotal	\$13,970	\$4,035	3.46	\$9,936	3.55
NDIGENOUS PROGRAMS						
Insulation and Direct Install		\$1.375	\$665	2.07	\$709	5.75
Small Business		\$863	\$1,081	0.80	(\$218)	11.26
Community Geothermal		\$5,075	\$228	22.26	\$4,847	0.52
Metis Income Qualified		\$1,018	\$346	2.94	\$672	4.13
	Subtotal	\$8,331	\$2,321	3.59	\$6,010	3.15
COMMERCIAL INDUSTRIAL & AGRICULTURAL PROGRAM	٩S					
Sources of the second sec	2	\$24.215	\$10.074	0.40	\$14 141	ב צו
Unidan publicada a Applications In-Stritte Efficiency		\$2.401	τ 10.04 4 0.04	001-2	41,41 81,626	- 0.0 7 7 7
Renovation		\$235,351	\$93.499	3.03	\$141.852	0.00
HVAC & Controls		\$8.545	\$3.811	2.24	\$4.735	2.88
New Construction & High-Performance Build	dings	\$14,080	\$11,786	1.19	\$2,294	5.84
Custom		\$46,008	\$29,109	1.58	\$16,899	3.84
Load Displacement		\$84,119	\$14,922	5.64	\$69,197	0.99
	Subtotal	\$414,809	\$164,006	2.53	\$250,803	2.84
EMERGING TECHNOLOGY PROGRAMS						
Emerging Technology		\$6,272	\$11,223	0.56	(\$4,951)	11.22
	Subtotal	\$6,272	\$11,223	0.56	(\$4,951)	11.22
Program Impact Totals		\$517,709	\$228,101	2.27	\$289,608	3.36
Orocram Sumort Enabling Strategies & Cornorate Overhe	Dec	¢	77887¢⊅		(\$02 B27)	
רו טפומווו טנוטטרין, בומטווויש טנומנפטפא א לטוסט מנפ לעפודא	2	) 7	00000		(000'07#)	
Overall Portfolio Metrics		\$517.709	\$251.984	2.1	\$265.725	3.71
				i		
Note: May not add up due to rounding.						



Electric Program Cost-Effectiveness M	1etrics				
			Participant	: Cost Tests	
					PC NPV
					(\$ \$ 000)
RESIDENTIAL PROGRAMS					
Direct Install		\$5,369	\$1,703	3.15	\$3,666
Product Rebates		\$31,125	\$14,573	2.14	\$16,552
Home Renovation		\$20,754	\$8,535	2.43	\$12,219
New Homes & Major Renovation		\$15,082	\$10,962	1.38	\$4,120
Home Energy Efficiency Kits & Education		\$2,260	\$241	9.38	\$2,019
	Subtotal	\$74,590	\$36,013	2.07	\$38,576
INCOME QUALIFIED PROGRAMS					
Income Qualified Offers		\$13,448	\$2,942	4.57	\$10,505
	Subtotal	\$13,448	\$2,942	4.57	\$10,505
INDIGENOUS PROGRAMS					
Insulation and Direct Install		\$1,215	\$257	4.74	\$958
Small Business		\$1,407	\$572	2.46	\$835
Community Geothermal		\$4,328	0\$		\$4,328
Metis Income Qualified		\$961	\$233	4.12	\$727
	Subtotal	\$7,911	\$1,062	7.45	\$6,849
COMMERCIAL INDUSTRIAL & AGRICULTURAL PROGE	U M C				
COMPERCIAL, INUCOLINICAL & AGRICOLIURAL FROGR		400 A0E	40 JJC	2 46	400 JEO
		4400,400	\$0,220 #7.40	0.40	\$20,239
		\$2,551 \$27 \$74	\$540 \$01 401	0./9	\$2,005 #110.050
		\$255,454	\$8/,50/ #7.077	/ 9.7	\$140,000 #0.001
Now Controls		49,475 415 740	\$5,2/5 \$10,674	2.90	\$6,2U5 #E07E
	Suluindo	010,740 0110,40	¢0,0,4	1.40	¢17,627
L ad Disnlarement		\$845039 \$84577	\$14 220	00.1 202	\$70 357
	Subtotal	\$418,729	\$151,127	2.77	\$267,602
EMERGING TECHNOLOGY PROGRAMS					
Emerging Technology		\$8,938	\$10,687	0.84	(\$1,749)
	Subtotal	\$8,938	\$10,687	0.84	(\$1,749)
Program Impact Totals		\$523,615	\$201,832	2.59	\$321,784
Program Support, Enabling Strategies & Corporate Ove	erhead	\$0	\$0		0\$
Overall Portfolio Metrics		\$523,615	\$201,832	2.6	\$321,784
Note: May not add up due to rounding.					



]	Pa	Irticipant Pay	/back
U	ustomer Cost	lst Year : Bill Reduction S	Simple Paybad
	\$161	\$208	0.77
	\$4,997	\$2,203	2.27
	\$2,631	\$636	4.14
ç	\$2,996	\$272	11.03
Education	\$0	\$126	0.00
Subtotal	\$10,785	\$3,446	3.13
	\$0	\$292	0.00
Subtotal	\$0	\$292	0.00
	0\$	\$31	0.00
	0\$	\$40	0.00
	\$0	\$57	0.00
	\$0	\$19	0.00
Subtotal	\$0	\$147	0.00
AL PROGRAMS		110	, I I
	\$908	\$1,255	0./4
	\$59	\$221	0.27
	\$17,354	\$8,011	2.17
	\$485	\$175	2.77
ormance Buildings	\$2,255	\$467	4.83
	\$9,154	\$1,692	5.41
	\$8,252	\$5,767	1.43
Subtotal	\$38,468	\$17,566	2.19
	\$9,003	\$439	20.50
Subtotal	\$9,003	\$439	20.50
	\$58,255	\$21,890	2.66
oorate Overhead	\$0	0\$	
	\$58,255	\$21,890	2.7
AL PROGRAMS AL PROGRAMS An Programs Subtotal Subtotal Subtotal Subtotal Subtotal		\$2.596 \$10,785 \$10,785 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	\$7.5631 \$6.36   \$2,6531 \$6.36   \$2,996 \$2.52   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$126   \$0 \$292   \$0 \$292   \$0 \$292   \$0 \$292   \$0 \$1,175   \$0 \$1,175   \$0 \$1,175   \$17,354 \$1,175   \$17,354 \$1,175   \$17,354 \$1,175   \$17,354 \$1,175   \$17,354 \$1,175   \$17,354 \$1,175   \$2,155 \$1,175   \$2,169 \$1,566   \$2,156 \$1,566   \$2,003 \$1,566   \$50,003 \$1,566   \$50,003 \$1,566   \$50,003 \$1,566   \$50,003 \$1,566   \$50,003



Electric Program C	Cost-Effectiveness Metrics				
			Rate Impa	ct Measure	
					RIM NPV
		RIM Benefit	RIM Costs	RIM Ratio	(\$ \$,000)
RESIDENTIAL PROGRAMS					
Direct Install		\$2,482	\$4,361	0.57	(\$1,879)
Product Reb	Dates	\$17,776	\$31,043	0.57	(\$13,267)
Home Renov	vation	\$22,428	\$23,654	0.95	(\$1,227)
New Homes	& Major Renovation	\$19,922	\$15,541	1.28	\$4,381
Home Energy	3y Efficiency Kits & Education	\$936	\$1,923	0.49	(\$986)
	Subtot	al \$63,544	\$76,522	0.83	(\$12,978)
INCOME QUALIFIED PROG	GRAMS				
Income Quali	lified Offers	\$11,786	\$12,804	0.92	(\$1,018)
	Subtot	al \$11,786	\$12,804	0.92	(\$1,018)
INDIGENOUS PROGRAMS					
Insulation and	nd Direct Install	\$1,293	\$1,559	0.83	(\$266)
Small Busines	SSS	\$620	\$1,723	0.36	(\$1,103)
Community (	Geothermal	\$5.075	\$4,556		\$519
Metis Income	e Qualified	\$913	066\$	0.92	(\$77)
	Subtota	al \$7,901	\$8,828	0.89	(\$927)
COMMERCIAL, INDUSTRIA	AL & AGRICULTURAL PROGRAMS				
Small Busine:	ess & Appliances	\$17,585	\$25,064	0.70	(\$7,479)
In-Suite Effici	ciency	\$1,768	\$2,235	0.79	(\$467)
Renovation		\$235,351	\$239,565	0.98	(\$4,214)
HVAC & Con	ntrols	\$8,545	\$10,013	0.85	(\$1,468)
New Constru	uction & High-Performance Buildings	\$14,080	\$16,861	0.84	(\$2,781)
Custom		\$46,008	\$46,746	0.98	(\$739)
Load Displac	cement	\$84,119	\$85,279	0.99	(\$1,160)
	Subtot	al \$407,456	\$425,764	0.96	(\$18,308)
EMERGING TECHNOLOGY	/ PROGRAMS				
Emerging Te	schnology	\$6,272	\$9,474	0.66	(\$3,202)
	Subtota	al \$6,272	\$9,474	0.66	(\$3,202)
Program Impact Totals		\$496,959	\$533,392	0.93	(\$36,434)
Program Support, Enabling	g Strategies & Corporate Overhead	0\$	\$23,883		(\$23,883)
Overall Dortfolio Metrice		\$196 959	¢бб7 775	σc	(¢60 217)
		4430'3J3	C / 7' / CC¢	0.9	(110,004)
Note: May not add up due .	to rounding.				

Based on PUB, COALITION and MIPUG information requests, the following tables provide the natural gas portfolio cost effectiveness results for the program administrator cost test (PACT); total resource cost test (TRC); participating customer cost test (PC); simple customer payback; and rate impact measure (RIM) for each initiative in the Plan.



Natural Gas Program Cost-Effectiveness M	<b>1etrics</b>								
					PAG	L L			
		i		PACT Ratio	PACT NPV			Levelized Cost (cents/m <sup>3</sup> )	й
		ACT Benefit	PACT Costs	Ð	(000's \$) 2020/23 Effi	LC Costs ciency Plan	LC Savings	(R)	(cents/m3)
RESIDENTIAL PROGRAMS					50507 53 EIII				
Direct Install		\$573	\$739	0.78	(\$166)	\$739	3,186,430	23.19	17.99
Product Rebates		\$1,497	\$1,899	0.79	(\$402)	\$1,899	8,375,592	22.68	17.87
Home Renovation		\$8,723	\$7,242	1.20	\$1,482	\$7,242	43,044,390	16.82	20.27
New Homes & Major Renovation		\$1,264	\$1,756	0.72	(\$492)	\$1,756	6,254,531	28.07	20.20
Home Energy Efficiency Kits & Education		\$168	\$411	0.41	(\$243)	\$411	936,220	43.90	17.98
<i>й</i>	ubtotal	\$12,225	\$12,047	1.01	\$179	\$12,047	61,797,163	19.49	19.78
INCOME QUALIFIED PROGRAMS									
Income Qualified Offers		\$8,578	\$17,465	0.49	(\$8,888)	\$17,465	43,354,587	40.29	19.79
	ubtotal	\$8,578	\$17,465	0.49	(\$8'888)	\$17,465	43,354,587	40.29	19.79
		\$ 10C	\$07E	0.4.4	/#E101	¢07E	2 050 000	1104	10.7.0
	ubtotal	\$406	\$925	0.44	(\$519)	\$925	2,058,909	44.94	19.72
COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROGRAMS									
Small Business & Appliances		\$1,261	\$720	1.75	\$541	\$720	7,158,684	10.06	17.61
In-Suite Efficiency		\$514	\$163	3.15	\$351	\$163	2,866,691	5.68	17.91
Renovation		\$10,029	\$6,256	1.60	\$3,774	\$6,256	52,785,779	11.85	19.00
HVAC & Controls		\$6,152	\$2,380	2.59	\$3,773	\$2,380	32,369,206	7.35	19.01
New Construction & High-Performance Building	3S	\$3,859	\$6,552	0.59	(\$2,693)	\$6,552	21,393,894	30.62	18.04
Custom		\$30,348	\$4,664	6.51	\$25,684	\$4,664	171,635,753	2.72	17.68
ν σ	ubtotal	\$52,163	\$20,734	2.52	\$31,429	\$20,734	288,210,006	7.19	18.10
EMERGING TECHNOLOGY PROGRAMS									
Emerging Technology		\$844	\$948	0.89	(\$104)	\$948	4,429,031	21.40	19.06
S.	ubtotal	\$844	\$948	0.89	(\$104)	\$948	4,429,031	21.40	19.06
Program Impact Totals		\$74,216	\$52,119	1.42	\$22,097	\$52,119	399,849,696	13.03	18.56
Program Support, Enabling Strategies & Corporate Overhead		\$0	\$7,707		(\$7,707)	\$7,707			
			;						
Interactive Effects		(\$15,146)	0\$		(\$15,146)	\$0	- 79,668,997		
Overall Portfolio Metrics		\$59,070	\$59,827	0.99	(\$756)	\$59,827	320,180,699	18.69	18.45
Note: May not add up due to rounding.									



Natural Gas Program Cost-Effectiveness Metrics					
		Total R	esource Cos	st Tests	
				TRC NPV	Levelized Cost
	TRC Benefit	TRC Costs	TRC Ratio	(\$ \$,000)	(cents/m³)
		202	0/25 Efficiency	Plan	
Direct Install	\$2.827	\$1.560	1.81	\$1.267	48.97
Product Rebates	\$2,191	\$4,480	0.49	(\$2,289)	53.49
Home Renovation	\$11,983	\$15,257	0.79	(\$3,274)	35.44
New Homes & Major Renovation	\$1,738	\$5,426	0.32	(\$3,688)	86.75
Home Energy Efficiency Kits & Education	\$1,215	\$410	2.97	\$805	43.75
Subtotal	\$19,953	\$27,133	0.74	(\$7,179)	43.91
INCOME QUALIFIED PROGRAMS					
Income Qualified Offers	\$13,339	\$14,445	0.92	(\$1,106)	33.32
Subtotal	\$13,339	\$14,445	0.92	(\$1,106)	33.32
INDIGENOUS PROGRAMS					
Metis Income Qualified	\$647	\$771	0.84	(\$124)	37.45
Subtotal	\$647	\$771	0.84	(\$124)	37.45
COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROGRAMS					
Small Business & Appliances	\$6,859	\$1,004	6.83	\$5,855	14.02
In-Suite Efficiency	\$2,439	\$546	4.47	\$1,893	19.04
Renovation	\$14,041	\$7,613	1.84	\$6,427	14.42
HVAC & Controls	\$8,648	\$4,603	1.88	\$4,045	14.22
New Construction & High-Performance Buildings	\$5,596	\$15,219	0.37	(\$9,623)	71.14
Custom	\$43,731	\$12,081	3.62	\$31,650	7.04
Subtotal	\$81,314	\$41,066	1.98	\$40,248	14.25
EMERGING TECHNOLOGY PROGRAMS					
Emerging Technology	\$1,192	\$3,759	0.32	(\$2,567)	84.87
Subtotal	\$1,192	\$3,759	0.32	(\$2,567)	84.87
Program Impact Totals	\$116,445	\$87,175	1.34	\$29,271	21.80
Program Support, Enabling Strategies & Corporate Overhead	\$0	\$7,707		(\$7,707)	
Interactive Effects	(\$21,375)	\$0		(\$21,375)	
Overall Portfolio Metrics	\$95,071	\$94,882	1.0	\$189	29.63
Note: May not add up due to rounding.					

M	EFFICIENCY
2	MANITOBA

Natural G	as Program Cost-Effectiveness Metrics				
			Participant	Cost Tests	
		PC Benefit	PC Costs	PC Ratio	PC NPV
			2020/23 Eff	iciency Plan	
RESIDENTIAL	PROGRAMS				
	Direct Install	\$3,082	\$1,079	2.86	\$2,003
	Product Rebates	\$3,152	\$3,481	0.91	(\$328)
	Home Renovation	\$18,851	\$14,304	1.32	\$4,547
	New Homes & Major Renovation	\$2,925	\$4,774	0.61	(\$1,849)
	Home Energy Efficiency Kits & Education	\$1,310	\$88	14.89	\$1,222
	Subtotal	\$29,321	\$23,726	1.24	\$5,595
INCOME QU/	ALIFIED PROGRAMS				
	Income Qualified Offers	\$27,208	\$10,296	2.64	\$16,912
	Subtotal	\$27,208	\$10,296	2.64	\$16,912
INDIGENOUS	PROGRAMS				
	Metis Income Qualified	\$1,296	\$469	2.76	\$827
	Subtotal	\$1,296	\$469	2.76	\$827
COMMERCIA	L INDUSTRIAL & AGRICUL TURAL PROGRAMS				
	Small Business & Appliances	\$7.387	\$908	8.14	\$6.480
	In-Suite Efficiency	\$2.549	\$546	4.67	\$2,003
	Renovation	\$17,897	\$6.956	2.57	\$10,941
	HVAC & Controls	\$8,987	\$3,839	2.34	\$5,148
	New Construction & High-Performance Buildings	\$9,782	\$13,813	0.71	(\$4,031)
	Custom	\$37,325	\$11,230	3.32	\$26,095
	Subtotal	\$83,927	\$37,291	2.25	\$46,636
EMERGING T	ECHNOLOGY PROGRAMS				
	Emerging Technology	\$1,753	\$3,576	0.49	(\$1,823)
	Subtotal	\$1,753	\$3,576	0.49	(\$1,823)
Program Imp	act Totals	\$143,505	\$75,358	1.90	\$68,147
Program Sup	port, Enabling Strategies & Corporate Overhead	\$0	\$0		\$0
Interactive Et	fects	(\$20,644)	\$0		(\$20,644)
Overall Por-	tfolio Metrics	\$122,861	\$75,358	1.6	\$47,503
Note: May nc	t add up due to rounding.				



2020-2023	Effi	icien	су	Plan
Р	UB/	/EM	I-1	1a-b

Natural Gas Program Cost-Effectiveness Metrics			
	Part	icipant Payb	ack
0	ustomer Cost	1st Year Bill Reduction	Simple Payback
	202(	0/25 Efficiency F	Jan
Direct Install	\$191	879	2.43
Product Rebates	\$1.509	\$129	11.74
Home Renovation	\$5,465	\$365	14.99
New Homes & Major Renovation	\$1,595	\$38	41.58
Home Energy Efficiency Kits & Education	\$0	\$70	0.00
Subtotal	\$8,761	\$681	12.87
INCOME QUALIFIED PROGRAMS			
Income Qualified Offers	\$0	\$340	0.00
Subtotal	\$0	\$340	0.00
INDIGENOUS PROGRAMS			
Metis Income Qualified	\$0	\$17	0.00
Subtotal	\$0	\$17	0.00
COMMERCIAL, INDUSTRIAL & AGRICULTURAL PROGRAMS			
Small Business & Appliances	\$100	\$387	0.26
In-Suite Efficiency	\$89	\$63	1.43
Renovation	\$783	\$211	3.71
HVAC & Controls	\$1,013	\$143	7.07
New Construction & High-Performance Buildings	\$2,782	\$158	17.65
Custom	\$3,499	\$1,223	2.86
Subtotal	\$8,266	\$2,185	3.78
EMERGING TECHNOLOGY PROGRAMS			
Emerging Technology	\$1,754	\$31	55.77
Subtotal	\$1,754	\$31	55.77
Program Impact Totals	\$18,781	\$3,255	5.77
Program Support, Enabling Strategies & Corporate Overhead	\$0	\$0	
Interactive Effects	\$0	(\$650)	
Overall Portfolio Metrics	\$18,781	\$2,605	7.2
Note: May not add up due to rounding.			



Natural G	ias Program Cost-Effectiveness Metrics	10			
			Rate Impa	ct Measure	
					RIM NPV
		RIM Benefit	RIM Costs	RIM Ratio	(\$ \$,000)
			2020/23 Ef	ficiency Plan	
RESIDENTIAL	PROGRAMS		-		
	Direct Install	\$573	\$1,575	0.36	(\$1,001)
	Product Rebates	\$1,497	\$4,144	0.36	(\$2,647)
	Home Renovation	\$8,723	\$19,804	0.44	(\$11,080)
	New Homes & Major Renovation	\$1,264	\$3,577	0.35	(\$2,313)
	Home Energy Efficiency Kits & Education	\$168	\$663	0.25	(\$495)
	Subtotal	\$12,225	\$29,762	0.41	(\$17,537)
INCOME QUA	ALIFIED PROGRAMS				
	Income Qualified Offers	\$8,578	\$29,911	0.29	(\$21,333)
	Subtotal	\$8,578	\$29,911	0.29	(\$21,333)
INDIGENOUS	PROGRAMS				
	Metis Income Qualified	\$406	\$1,515	0.27	(\$1,109)
	Subtotal	\$406	\$1,515	0.27	(\$1,109)
COMMERCIA	L. INDUSTRIAL & AGRICULTURAL PROGRAMS				
	Small Business & Appliances	\$1,261	\$2,476	0.51	(\$1,215)
	In-Suite Efficiency	\$514	\$861	0.60	(\$348)
	Renovation	\$10,029	\$18,554	0.54	(\$8,525)
	HVAC & Controls	\$6,152	\$9,751	0.63	(\$3,598)
	New Construction & High-Performance Buildings	\$3,859	\$11,188	0.34	(\$7,329)
	Custom	\$30,348	\$38,177	0.79	(\$7,829)
	Subtotal	\$52,163	\$81,007	0.64	(\$28,844)
EMERGING TE	ECHNOLOGY PROGRAMS				
	Emerging Technology	\$844	\$1,936	0.44	(\$1,092)
	Subtotal	\$844	\$1,936	0.44	(\$1,092)
Program Imp;	act Totals	\$74,216	\$144,131	0.51	(\$69,915)
Program Supt	port Enabling Strategies & Corporate Overhead	C <del>\$</del>	\$7.707		(\$7,707)
) ) ) ) )		)			
Interactive Ef	fects	(\$15,146)	(\$20,644)		\$5,498
Overall Port	folio Metrics	\$59,070	\$131,194	0.5	(\$72,124)
Note: May no	t add up due to rounding.				

b. Efficiency Manitoba did not complete a quantitative analysis of the social, economic, or environmental benefits by DSM initiative or bundle with the exception of greenhouse gas (GHG) environmental benefits associated with the reduction of natural gas consumption within Manitoba. Analysis of these environmental benefits are included in Attachment 3 of the Plan (p. 509 of 591).



Efficiency Plan p.237-238 of 591

# PREAMBLE TO IR (IF ANY):

Efficiency Manitoba states: "From the quantitative analysis perspective, program costs, savings, and cost-effectiveness were primarily relied upon at program bundle, customer segment, and overall portfolio evaluation levels."

# QUESTION:

- a. Confirm whether, in developing the portfolios, Efficiency Manitoba initially used a quantitative screen based on program costs, savings, and cost effectiveness, and then adjusted the programs within the portfolio based on the other factors indicated in the multi-criteria decision analysis.
- Provide a table comparing the list of programs in the portfolios based on the initial quantitative screen and the list of programs in the final portfolios, including the Program Administrator Cost Test ratios for each program.

# **RATIONALE FOR QUESTION:**

# **RESPONSE:**

a. Efficiency Manitoba did not use a prescriptive qualitative screen based on program costs, savings, and cost effectiveness to develop the portfolio. As documented PUB/EM I-1a high-level screen of programs was considered, and a number of measures were rejected. Efficiency Manitoba developed a preliminary portfolio with the intent of achieving the mandated electric and natural gas energy savings targets. As documented in PUB/EM I-4, there were a number of changes to the natural gas and electric portfolio program bundles that were driven by the results of the multi-criteria decision analysis considering both quantitative and qualitative perspectives. Additional changes are the result of methodology changes and general quality control corrections. Resulting changes by program bundle are summarized within PUB/EM I-4.



Please refer to PUB/EM I-4 for tables that provide a program bundle comparison of the electric and natural gas energy savings, budgets and program administrator cost test ("PACT") results for both the preliminary portfolios and the portfolios included within the 2020/23 Efficiency Plan.



Efficiency Plan p. 566 of 591; Manitoba Hydro 2016/17 DSM Plan 15-Year Supplemental Report Appendix E.3

# PREAMBLE TO IR (IF ANY):

Econoler states: "A secondary cost-effectiveness analysis will involve the Total Resource Cost (TRC) test. The Rate Impact Measure test may also be calculated and analyzed for information purposes."

## **QUESTION:**

- a) Identify which of the cost effectiveness tests used by Manitoba Hydro in its Power Smart and DSM plans to screen DSM measures and develop the portfolio were also used by Efficiency Manitoba. If any of these tests were not used, explain why not.
- b) Explain how the overall cost of the DSM resources factored into the development of the Plan.
- c) Does Efficiency Manitoba agree that cost effectiveness of the portfolio for the program administrator is just one of many factors to consider in developing the portfolio of programs? Does Efficiency Manitoba agree that it would it be reasonable to consider PACT as a determinative factor for the overall portfolio, but that Efficiency Manitoba should consider other screens when determining what programs to include in the portfolio?
- d) Explain why it is important to measure the PACT of program bundles.
- e) Of the 14 gas program bundles, eight have PACT scores less than 1.0. Provide quantifiable metrics that support inclusion of these eight bundles in the gas portfolio despite not being cost effective according to the PACT.

### **RATIONALE FOR QUESTION:**



# **RESPONSE:**

- a) Efficiency Manitoba used the Program Administrator Cost Test (PACT) to screen DSM measures and develop the portfolio. This was the sole cost-effectiveness test used as it is prescribed by the Efficiency Manitoba Act. Other cost-effectiveness metrics calculated for information purposes can be found in PUB/EM I-11.
- b) Program bundle budgets were reviewed and revised through quantitative analysis and quality control reviews. The revisions are discussed in PUB/EM I-4.
- c) Efficiency Manitoba agrees that the PACT is one of the factors to consider in developing the portfolio of programs. Efficiency Manitoba does not agree that it should consider other cost-effectiveness screens when determining what programs to include in the portfolio. The Efficiency Manitoba Regulation (Section 11d and Section 12) has prescribed the PACT as the cost-effectiveness test that should be applied at the portfolio level. In considering the mandated electric and natural gas targets, applying additional non-prescribed cost-effectiveness screens to eliminate or reduce programming to customer segments may restrict Efficiency Manitoba's ability to satisfy the energy savings targets or to provide equitable and accessible programming. As provided in PUB/EM I-11, information on additional cost-effectiveness test results for program bundles and the overall portfolio have been made available.
- d) The Efficiency Manitoba Regulation requires consideration of the cost-effectiveness by way of the PACT at the portfolio level only. The PACT of each program bundle was provided as additional information.
- e) The Efficiency Manitoba Regulation requires consideration of the cost-effectiveness by way of the PACT at the portfolio level only. The Efficiency Manitoba Regulation does not consider individual program bundles, measures or individual technologies to pass a specific cost-effectiveness test. Inclusion of the eight program bundles within the natural gas portfolio enables Efficiency Manitoba to achieve the legislated natural gas savings target.



Efficiency Plan p.129 of 591

## PREAMBLE TO IR (IF ANY):

The list of factors considered in determining the PACT energy benefits at page 129 does not include consideration of free riders.

## QUESTION:

a. Confirm whether free-ridership has been factored in to the determination of PACT energy benefits for all programs bundles with free ridership estimated at the individual program level.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

Confirmed, free-ridership has been factored into the determination of PACT energy benefits for all programs bundles with free ridership estimated at the individual program level.



Efficiency Plan p.129 of 591

# PREAMBLE TO IR (IF ANY):

The list of factors considered in determining the PACT energy benefits at page 129 does not include consideration of free riders.

## QUESTION:

 Provide details of the free-ridership levels used for each program in determining the PACT energy benefits as these values do not appear in the tables presented in Appendix A – Sections A4, A5, A6, A7, A8 or Attachment 3.

### **RATIONALE FOR QUESTION:**

## **RESPONSE:**

Free-ridership levels for all measures included in the 2020/23 Efficiency Plan, are presented in column I (Free Riders %) of the attachment to DAYMARK/EM I-13.



Efficiency Plan p.136, 140-142 of 591

## PREAMBLE TO IR (IF ANY):

## QUESTION:

- a. Confirm whether Efficiency Manitoba has examined the discount rates used for DSM programs in other jurisdictions. If confirmed, provide a table of discount rates used in other jurisdictions.
- b. What impact would higher discount rates, consistent with those of investor owned utilities, have on the DSM initiatives selected by Efficiency Manitoba?

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

- a. Efficiency Manitoba did not examine the discount rates used for DSM programs in other jurisdictions. Efficiency Manitoba used the discount rates provided by Manitoba Hydro.
- b. Efficiency Manitoba completed a program administrator cost test (PACT) sensitivity analysis assuming incremental changes to the discount rate used for both the electric and natural gas portfolios. The results of this analysis are provided in Table 5.5 in the 2020/23 Efficiency Plan (p. 136 of 591).


Daymark IR DAY/EM-25

PREAMBLE TO IR (IF ANY):

#### QUESTION:

Further to Daymark's request in DAY/EM-25 for marginal values, provide Manitoba Hydro's response to PUB/MH II-57 from the 2017/18 Electric GRA in unredacted form.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

Efficiency Manitoba does not have the requested document in unredacted form and therefore cannot provide a response.



PUB/EM - 17 Efficiency Plan p.258 of 591

#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

- a. Provide justification for the schedule of payments from Manitoba Hydro, including both the magnitude and timing of payments. Provide a working capital analysis and an explanation why payment is required on the first of the month.
- b. Confirm whether Manitoba Hydro has agreed to the payment schedule or whether any objections were raised.
- c. Explain how Efficiency Manitoba will address variations in expenditures that may exceed the monthly funding received from Manitoba Hydro, or conversely if the monthly funding is in excess of monthly expenditures.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a. Efficiency Manitoba created the cash flow schedule based on an estimate of when programming would be delivered and when the cash outlays are expected. Efficiency Manitoba plans to hold working capital of approximately 50% of one month's expected cash outflows, or approximately \$2.6 million. Efficiency Manitoba will monitor that level of working capital and adjust as necessary to ensure adequate working capital levels on hand. Payment is requested on the first of the month as Efficiency Manitoba has done its budget on a monthly basis and the funds would be required on the first of the month to satisfy those cash requirements.
- b. Yes, Manitoba Hydro has agreed to the payment schedule.
- c. Variations in spending are a certainty. Efficiency Manitoba will maintain a monthly cash flow forecast to estimate the immediate cash flow requirements. Prior to the cash draw



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from Manitoba Hydro at the beginning of the month, Efficiency Manitoba will provide Manitoba Hydro with a current cash flow balance, as well as a forecast for the upcoming month to arrive at a determination for the cash draw required for that month. This will ensure that Manitoba Hydro is not pre-funding Efficiency Manitoba's operations by providing more cash than is necessary. Manitoba Hydro is also aware that actual cash requirement in excess of the budgeted amounts may be necessary and Manitoba Hydro is prepared to fund Efficiency Manitoba based on the process described.



Efficiency Plan p.189, 427 of 591

#### PREAMBLE TO IR (IF ANY):

"Efficiency Manitoba has budgeted for an innovation and research fund that will drive activity in pilot projects and partnerships in research."

#### QUESTION:

- a. Identify the parties that Efficiency Manitoba anticipates providing external funding to through research partnerships.
- b. Provide the annual funding forecasted by Efficiency Manitoba for the innovation budget separately by pilot projects and research partnerships for each year of the Plan and identify which cost category this funding is from (e.g. program costs, staff costs, overhead costs).

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a. Efficiency Manitoba has established a budget for innovation and research but the strategy for deploying those funds has not yet been finalized.
- b. As per PUB/EM 18 a), the strategy for the innovation budget has not yet been finalized and therefore there are no specific pilots nor research partnerships which have had funding allocated.



Efficiency Plan p.41, 584 of 591

#### PREAMBLE TO IR (IF ANY):

"Efficiency Manitoba has earmarked an average of 1.7 percent of the annual portfolio budget to complete independent savings and cost-effectiveness verifications of every program annually and full impact evaluations on every program at least once during the three-year Plan period."

#### QUESTION:

- a. Explain how Efficiency Manitoba determined that 1.7% of the annual portfolio budget was the optimal or appropriate budget for evaluation, measurement, and verification activities.
- b. Provide the EM&V budgets of comparable organizations in other jurisdictions.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a. The evaluation budget included in the 2020-2023 DSM Plan was based on the recommendations in Econoler's Evaluation, Measurement and Verification Framework and Plan Report on page 583 of the application.
- b. Efficiency Manitoba is not in possession of the EM&V budgets of comparable organizations in other jurisdictions.



Efficiency Plan p.234, 235 of 591

PREAMBLE TO IR (IF ANY):

#### QUESTION:

Confirm whether the revenue loss used in the calculation of the lifecycle revenue impact for natural gas programs refers to total revenue loss related to upstream (of Centra's city gates) costs or only the portion of lost revenue related to downstream costs.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

The revenue loss used in the calculation of the lifecycle revenue impact for natural gas programs refers to total revenue loss related to upstream transportation and commodity costs and downstream distribution costs.



Efficiency Plan p.234 of 591

#### PREAMBLE TO IR (IF ANY):

Section 11(g) of the Regulations states that the PUB must consider the impact of the Plan on rates and average customer bill amounts.

#### **QUESTION:**

- a) Confirm that, all else being equal, the lifecycle revenue impact (LRI) is not equivalent to the effective average rate increases needed by Manitoba Hydro or Centra in the year corresponding to the DSM Plan year in order to maintain their projected net incomes taking into account EM costs recovered from the utility in the year, utility revenue decreases, and the utility benefits.
- b) Confirm whether, all else being equal, the Lifecycle Revenue Impacts given in Tables 5.6 and 5.7 are the rate increases that if introduced in the first year and maintained for 30 years, would generate revenue in NPV terms that exactly offsets the financial impacts of the recovery of EM costs from the utility, utility revenue decreases, and the utility benefit. Is it correct to view the LRI metric as the levelized impact over 30 years of EM's Plan on customer rates and bills, on average? If not, please explain.
- c) Please confirm that the LRI impacts show the total impact of the three years of the Plan. Please provide the individual LRI metrics for each year of the three-year Plan.
- d) Confirm whether an additional Lifecycle Revenue Impact that is, a one-time equivalent rate increase - will be required for Efficiency Manitoba's next three-year Efficiency Plan for 2023-25, assuming similar levels of expenses and savings.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

a) Confirmed.



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- b) Confirmed. The Lifecycle Revenue Impacts ("LRI") given in the 2020/23 Efficiency Plan ("Plan") Table 5.6 for electricity (Plan, Section 5.4.1, p. 139 of 591) and Table 5.7 for natural gas (Plan, Section 5.4.2, p. 141 of 591) represent a one-time (at the beginning of first year) equivalent increase in rates that will re-equate: the present value of the utility revenues; utility marginal benefits associated with the energy savings; and the program costs associated with the Plan electric and natural gas portfolios, respectively within the Plan over the 30 year period considered. Determination of this metric means that this one-time increase in rates does not require annual incremental increases or decreases to balance the net present value of costs and benefits associated with the Plan. To illustrate, using the LRI of the electric portfolio from Table 5.7, requires a 0.019 ¢/kWh (\$0.00019/kWh) electric rate increase in year 1 of the Plan. Assuming no additional increases or decreases to this initial rate increase over a 30-year period will provide the required net present value balance to the costs and benefits associated with the electric portfolio provided in the Plan.
- c) Confirmed. The LRI calculation considers the present value of the cost and benefit impacts from the Plan electric and natural gas portfolios and are completed on a 30-year NPV basis. Annual LRI metrics are not available.
- d) Confirmed.



Efficiency Plan p.137-141 of 591

#### PREAMBLE TO IR (IF ANY):

Section 11(g) of the Regulations states that the PUB must consider the impact of the Plan on rates and average customer bill amounts.

#### QUESTION:

- a) Calculate the residential bill impacts that arise from the gas and electric portfolios in the Plan, maintaining the utility's net income at the same level, as compared to ceasing DSM activities. With assistance and data provided by Manitoba Hydro and Centra, use the customer bill impact schedules (showing consumption at varying levels for the Residential and SGS classes) commonly used by Manitoba Hydro and Centra in their GRA filings. Use currently approved gas and electric rates as a basis. Confirm that these bill impacts reflect the bill impacts for non-participants; that is, these are the bill impacts for those whose consumption is not reduced by participating in DSM programs.
- b) Provide Efficiency Manitoba's best estimate of the dollar impact of each portfolio (electricity and natural gas) on the typical residential participant's annual bills for electricity and gas and for each of the three years in the Plan. For purposes of this calculation, use as the energy savings of the typical residential participant the total energy saving of the portfolio divided by the number of customers that participate in at least one program and exclude the rate increases calculated in (c) of this IR. State any additional assumptions that are needed to complete this calculation.
- c) The LRI for the gas portfolio assumes receiving the funds for the Furnace Replacement Program from Centra according to section 15(2)(b) of the Regulations. What amount of funds did Efficiency Manitoba expect to receive from Centra when calculating the gas LRI? If the expected FRP funds are materially different than the funds that will be transferred to Efficiency Manitoba as a result of Board Order 152/19 Directive 10, recalculate the gas portfolio LRI and one-time rate increases in Table 5.7, as well as the response to (a) of this IR.



d) Confirm whether EM reviewed or is aware of the rate and bill impact analysis that is filed by EfficiencyOne (Nova Scotia) with its regulator. If confirmed, comment on the feasibility of adopting a similar analysis for Efficiency Manitoba.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

a) Efficiency Manitoba has been advised by Manitoba Hydro that the information required to provide a response to this information request is not currently available. Any response to calculate the actual rate impacts as is being requested would require an updated resource plan and integrated financial forecast (IFF) from Manitoba Hydro to identify the revenue and cost implications associated with Efficiency Manitoba's plan. As a result of the strategic planning and independent review process that Efficiency Manitoba is advised is currently ongoing at Manitoba Hydro, Manitoba Hydro does not currently have an IFF or rate strategy in place. Manitoba Hydro advised Efficiency Manitoba that it will not have a current IFF or rate strategy in place until the processes currently ongoing at Manitoba Hydro are complete. Any response prepared without all these inputs would require a number of assumptions to be made which would render any output unreliable to such an extent that no accurate conclusions could be drawn or substantiated from the output.

Efficiency Manitoba has been advised by Manitoba Hydro that any near term rate and bill impacts of Efficiency Manitoba's three year plan are not anticipated to be material when compared to the rate impacts resulting from the recent significant investments projects such as Bipole III, Keeyask and MMTP and the rate impacts of those projects coming into service.

- b) Please see Table 5.8 and Table 5.9 of the 2020/23 Efficiency Plan, p. 142 and 144 of 591.
- c) Please see the response to PUB/EM I-10 d) for the funds that are expected to be transferred to Efficiency Manitoba on April 1, 2020. Please see the 2020/23 Efficiency Plan, p. 140 of 591, lines 215-217 for the FRP amounts removed when calculating the natural gas LRI.



 d) Efficiency Manitoba is aware of the rate and bill impact analysis that is filed by EfficiencyOne (Nova Scotia). Efficiency Manitoba has not reviewed that approach in detail and is unable to comment on the feasibility of adopting a similar analysis for Efficiency Manitoba.



Efficiency Plan p.17, 21, 24 of 591

#### PREAMBLE TO IR (IF ANY):

The forecasted electric and gas savings are below the legislated targets in the first year of the Plan.

#### QUESTION:

- a. Estimate the 2020/21 budgets, PACT ratios, PACT NPVs, and PACT levelized costs (both program-only and overall portfolio) for electric and gas portfolios in order to meet the legislated savings targets of 1.5% and 0.75% in 2020/21.
- b. Estimate the annual budgets, PACT ratios, PACT NPVs, and PACT levelized costs (both program-only and overall portfolio) for electric and gas portfolios in order to exceed the legislated savings targets of 1.5% and 0.75% by 10% in each year in order to provide a buffer for less-than-expected customer participation in the Plan years as well as a surplus for future years.
- c. Paragraph 4(1)(b) of the Act specifies Efficiency Manitoba's mandate is to achieve additional reductions if the reductions can be achieved in a cost effective manner.
  Considering the overall cost effectiveness of the electric portfolio, identify whether there are additional opportunities to increase the electric savings in each of the years of the Plan.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

a. The positive PACT NPV for the electric DSM portfolio does suggest that there are additional electric DSM opportunities that could be pursued which would be costeffective. When determining the electric DSM portfolio, PACT was one of several considerations. Although achieving savings in excess of the prescribed electricity savings target may be possible with incremental cost-effective changes to the electric portfolio,



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the interactive effects may then reduce natural gas savings and result in additional or incremental natural gas programming which may not be cost-effective.

Besides, a positive PACT ratio, PUB/EM I-1a provides an overview of additional qualitative reasons for DSM opportunities may be rejected from the electric DSM portfolio including: the technology's energy savings claims are not yet proven, unavailability of local supply of the technology, or appropriateness for use in Manitoba's climate.

The requested analysis does not exist and would require scenario analysis and modelling which cannot be produced with reasonable effort in the time available.

Incremental cost-effectiveness electric programming was not the only consideration that influenced Efficiency Manitoba. As described in Section 3.3 of the 2020/23 Efficiency Plan ("Plan"), key outcomes of engagement completed during the Plan development process included: ensuring continuity of programs for customers; developing strategies and tools to streamline the application process; adopting new programs within the Plan; and adopting additional customer customization for program design, delivery, implementation and program supporting activities to successfully reach the targeted program participants within each customer segment. See Section 3.3 (Plan, p. 92 – 94 of 591) for further details of these outcomes. Therefore, besides cost-effectiveness considerations Efficiency Manitoba also considered the practicality of developing a new Crown Corporation, incorporate additional technology such as through the CRM/DSM System while also reaching Manitoba's diverse customer base with program enhancements. Based on the priority and desire to achieve balance of these additional important considerations, pursuing additional programming to exceed the mandated energy savings target was deferred to future efficiency plans.

- b. The requested analysis does not exist and would require scenario analysis and modelling which cannot be produced with reasonable effort in the time available.
- c. In addition to the quantitative and qualitative considerations addressed by Efficiency Manitoba and outlined in PUB/EM I-23a, subsequent Efficiency Plans will have the benefit of the retrospective performance evaluation, information technology systems in



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place, additional data and research and established resources to evaluate and potentially pursue additional opportunities to increase the electric savings beyond the mandated 1.5%.

As per the 2020/2023 Plan (pages 189 – 192 of 591), if additional cost-effective opportunities arise with the three years of the current proposed Plan, Efficiency Manitoba has outlined a process to obtain approval for use of the contingency fund.



Efficiency Plan p.178 of 591

#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

- a. Explain how Efficiency Manitoba will know whether participation and achieved savings are below target in advance of receiving the independent assessor's report.
- b. If participation and achieved savings are lagging Efficiency Manitoba's expectations, explain how quickly Efficiency Manitoba can adapt existing programs or design and implement new programs to get back on track to meeting the savings targets.
- c. Explain how Efficiency Manitoba will make adjustments to the portfolios which may be necessary to address underachievement of savings, considering the requirements of paragraph 12(5)(b) of the Act which preclude increasing portfolio budgets.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- As discussed in Section 7.1 (p. 180 of 591) of the 2020/23 Efficiency Plan ("Plan")
  Efficiency Manitoba will use the CRM/DSM system to continuously monitor and report on savings and budget at the measure and program bundle level.
- b. As discussed in Section 7.5 (p. 188 of 591) of the Plan one of the benefits of the program bundling approach taken is that it provides a mechanism to alter or re-direct activities and/or incentives within a program bundle. The CRM/DSM system will enable the ongoing identification of performance gaps. Adjustments can then be made to marketing and delivery activities to ensure intended performance is being achieved on an ongoing basis within the Plan year.
- c. Since the largest component of the Plan budget is program incentives at 64.7% of the budget (Plan, Section 4.4.1, Table 4.5, p. 113 of 591), it is expected that if participation is



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below targeted levels, expenditures will also be below targeted levels. This will allow adjustments to program marketing and delivery activities to increase participation and savings. Section 12(5) within the Act allows Efficiency Manitoba to modify the Plan as deemed necessary during any approved three-year period, provided these changes maximize the amount or cost-effectiveness of net savings and do not exceed approved costs for the Plan. As described in part (a) and (b) above, this will allow Efficiency Manitoba the flexibility to make adjustments over the three years and adapt as required to ensure overall portfolio savings and budget targets are achieved.



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#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

- a. Confirm whether Efficiency Manitoba has estimated the probability of each program achieving its target level of savings. If confirmed, explain how this was done and what level of confidence is attached to each program savings forecast.
- b. If Efficiency Manitoba has identified probabilities of reaching savings goal for each initiative or bundle, estimate the increase in budget necessary to achieve 75% confidence that the savings will be realized.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a. In the development of its Plan, Efficiency Manitoba did not prepare any analysis of the probability of programs or bundles achieving the targeted level of savings.
- b. Not available as per response to PUB/EM I-25a.



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#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

Provide the following Manitoba Hydro DSM plans:

- a. 2015/16 Power Smart Plan 15-Year Supplement
- b. 2016/17 Power Smart Plan 15-Year Supplement
- c. 2017/18 DSM Plan
- d. 2018/19 DSM Plan
- e. 2019/20 DSM Plan

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a) The requested document is publicly available at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/supplemental\_filing\_20</u> <u>15/26\_attachment\_24\_load\_forecast\_and\_power\_smart\_plans\_mfr\_1.pdf</u>
- b) The requested document is publicly available at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/general\_rate\_applicatio</u> <u>n\_2017/07.2\_appendix\_7.2\_15\_year\_supplement\_to\_the\_power\_smart\_plan.pdf</u>
- c) The requested document is publicly available at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/general\_rate\_application\_2017/</u> <u>mfrs/pub\_mfr\_61\_attachments.pdf</u>



- d) The requested document is publicly available at pages 1 to 76 at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/natural\_gas/general\_rate\_applic</u> <u>ation\_2019/07-3\_appendix\_7-3\_2018\_dsm\_plan\_and\_2016-17-</u> <u>15\_year\_supplement.pdf</u>
- e) 2019/20 Power Smart Plan please see PUB/EM I-26e-Attachment 1.

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# 2019/20 DEMAND SIDE MANAGEMENT PLAN



## **MARCH 2019**

## HELPING MANITOBANS MOVE TOWARD A MORE SUSTAINABLE ENERGY FUTURE



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## Message from Manitoba Hydro's CEO

2019-20 will be an exciting year for demand side management in Manitoba.

Under the new Efficiency Manitoba Act, a new standalone Crown corporation — Efficiency Manitoba — has been recently established with accountability to deliver electric and natural gas demand side management (DSM) programs and services to consumers, businesses and industry to achieve 1.5% and 0.75% of annual electricity and natural gas consumption respectively.



Over the next year, more than 70,000 customers are expected to save \$15 million on their collective energy bills by participating in these valued DSM programs and services. To meet our targets, we must continue to focus on engaging customers and working with communities to promote energy efficiency. In addition to incentives, such as rebates and free energy-saving devices, we offer technical guidance and on-bill financing to make saving energy as easy and convenient as possible. Thanks to these programs, many customers have already realized benefits that go far beyond lower energy bills—including more comfortable homes and businesses, and improved air quality.

Manitoba Hydro will continue to support our customers in meeting their energy needs. Through these programs, Manitobans who invest in improving the energy efficiency of their homes and businesses will also minimize their impact on the environment. Their investments through these programs are estimated to reduce greenhouse gas emissions by over 250,000 tonnes in 2019-20— the equivalent of eliminating annual emissions from nearly 59,000 typical residential homes heated by natural gas.

Building on the momentum of our past DSM successes, we at Manitoba Hydro look forward to working with Efficiency Manitoba as it develops and begins implementing its first three-year plan. We will continue to work with government, consumers, businesses, industry partners and Efficiency Manitoba as we move our province towards achieving greater energy efficiency.

Jay Grewal President & Chief Executive Officer, Manitoba Hydro



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## HIGHLIGHTS

This report outlines Manitoba Hydro's Demand Side Management (DSM) plan for the 2019/20 fiscal year. The plan involves activity related to incentive-based programs and efforts associated with energy codes, performance standards and energy efficiency regulations. Manitoba Hydro has a strong commitment to DSM with a focus intent on pursuing all cost effective opportunities and continually monitoring the market for emerging trends and additional opportunities. Manitoba Hydro updates its DSM plan every year to reflect current market conditions and additional experience gained on customer response.

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#### Helping our Customers Save

In 2019/20, customers who participate in Manitoba Hydro's Demand Side Management Programs are anticipated to enjoy a reduction of \$15 million on their energy bills; \$4 million for residential customers, \$6 million for commercial customers, \$1 million for industrial customers, and \$4 million for load displacement and alternative energy customers. These are dollars that customers can choose to invest in their homes, businesses or to spend elsewhere in Manitoba.







## **Reducing Environmental Impacts**

Greenhouse gas emission reductions arising from Manitoba Hydro's DSM investments are expected to be over 250,000 tonnes from 2019/20 activity alone. This is equivalent to eliminating the annual emissions from nearly 59,000 typical residential homes heated by natural gas.



### Partnering with Customers for Deeper Savings

Manitoba Hydro has been offering DSM programming to residential, commercial and industrial customers for over two and a half decades. In 2019/20, it is forecast that there will be over 117,000 participants in Manitoba Hydro's DSM incentive-based and support programs, representing approximately 89,000 residential customers, 28,000 commercial customers, and 96 industrial customers who will benefit through lower bills through their participation in Manitoba Hydro's DSM programs.

Manitoba Hydro will continue to leverage customer and stakeholder relationships to create partnerships that provide deeper energy savings and encourage harder-to-reach customers to take advantage of DSM opportunities and programs.



The following are examples of initiatives driving increased customer engagement and deeper energy savings:

#### Achieving Deeper Savings with Hard-to-Reach Customers



The Affordable Energy Program has long recognized the value in partnering with a number of different government and non-government groups, including; First Nation Communities, Indigenous groups, social enterprise groups and community-based organizations. Through these partnerships, many hard-to-reach lower income customers have benefitted from energy efficiency upgrades. Partnerships established with the North End Community Renewal Corporation will continue through 2019/20 to promote the Affordable Energy Program.

Through the Indigenous Energy Efficiency Program, staff members work directly with local Band leadership and Housing Coordinators to improve the energy efficiency of homes in the community. Working with these communities, 2019/20 will see approximately 200 homes receive energy efficiency upgrades.

#### Partnerships and Collaboration will Drive Race to Reduce to the Finish Line

The first behavioural energy efficiency initiative of its kind in Manitoba, Race to Reduce successfully demonstrates collaboration among customers, industry associations, and other key stakeholders while working in partnership with Manitoba Hydro to find even greater levels of savings than ever before. Race to Reduce encourages landlords and tenants to publicly commit to working together to reduce their buildings' total energy use by 10 per cent over the four year race.



Race to Reduce participants are publicly recognized and celebrated during the initiative's annual award ceremonies. In April 2018 landlords, property managers, tenants, and industry partners gathered at the RBC Convention Centre to honour the first-year winners of the Manitoba Race to Reduce.

Awards included Most Improved Energy Use (360 Main Street) while other winners included Largest Energy Reduction (360 Main Street), Largest Greenhouse Gas Emissions Reduction (330 St. Mary Avenue), Most Improved Reductions of Greenhouse Gas Emissions (240 Graham Avenue), and Most Improved Energy Use Intensity (333 Main Street).

The four-year Manitoba Race to Reduce started in January 2017 and challenges commercial office buildings over 30 000 square feet to publicly commit to reducing energy consumption and greenhouse gas emissions. So far, 34 buildings are participating in the race — equating to 8 million square feet of office space. By the end of the challenge, all participating buildings will reduce their energy consumption by at least 10 per cent.



## Meeting Future Energy Needs of Manitobans

#### **Electric Energy Savings**

In 2019/20, Manitoba Hydro plans to capture electricity savings of 284 MW and 350 GW.h. Along with constructing new renewable hydro generation, Demand Side Management is a key component of Manitoba Hydro's strategy for meeting the province's future energy needs. The energy savings achieved through DSM will represent 1.3% of the actual Manitoba electric load for 2018/19. In 2019/20, Manitoba Hydro plans to capture electricity energy savings of 10 MW and 44 GW.h in the residential sector, 22 MW and 106 GW.h in the commercial sector, 215 MW and 10 GW.h in the industrial sector, 14 MW and 100 GW.h through load displacement and alternative energy opportunities and 23 MW and 90 GW.h resulting from efforts relating to codes and standards.



DSM Impacts on Electric Load Forecast





**Electric Energy Savings** 

#### Natural Gas Savings

In 2019/20, the plan sets out to capture natural gas savings of 10.8 million cubic metres before interactive effects which represents 0.65% of the natural gas consumption for 2018/19, further reducing natural gas consumption in Manitoba. The percentage of volume calculation excludes the natural gas consumption of both Manitoba Hydro Power Stations and Special Contracts in the volume forecast.

In 2019/20, Manitoba Hydro plans to capture natural gas savings of 2.5 million cubic metres in the residential sector, 2.6 million cubic metres in the commercial sector, 1.0 million cubic metres in the industrial sector, and 4.7 million cubic metres resulting from efforts relating to codes and standards.



Note: The above graph excludes the natural gas consumption of both Manitoba Hydro Power Stations and Special Contracts in the volume forecast.



#### Natural Gas Energy Savings (2019/20)



As a result of some electric DSM programming, there is an increase in natural gas consumption for space heating purposes – interactive effects. The interactive effects result from the need to replace heat lost from the use of more efficient lighting and other interior equipment that use electricity.

Including an increase of 2.8 million cubic metres in natural gas consumption due to interactive effects, the plan is expected to result in net natural gas savings of 8.0 million cubic metres which represents 0.49% of the natural gas consumption for 2018/19. This percentage of volume calculation also excludes the natural gas consumption of both Manitoba Hydro Power Stations and Special Contracts in the volume forecast.



Note: The above graph excludes the natural gas consumption of both Manitoba Hydro Power Stations and Special Contracts in the volume forecast.



## Codes, Standards & Regulations Savings

In addition to utility-directed DSM programs, Manitoba Hydro's strategy to affect change in codes and standards involves being an aggressive and active participant and, in many cases, a driving force on a number of provincial and national energy efficiency building codes and performance standards committees. These codes and standards are subsequently referenced in national and provincial regulations that mandate minimum energy performance levels for a variety of appliances, buildings and other energy consuming measures. The focus of Manitoba Hydro's efforts on these committees is to advance the progress of product efficiency improvements which are then incorporated into Manitoba Demand Side Management programs, and subsequent energy efficiency regulations and building codes proposed by national and provincial regulators.

Efforts to achieve energy savings through Codes, Standards and Regulations are forecast to achieve electric capacity savings of 23 MW, electric energy savings of 90 GW.h and natural gas savings of 4.8 million cubic metres in 2019/20.





## Investing in Demand Side Management

Over the next year, Manitoba Hydro expects to invest \$74 million in Demand Side Management initiatives with \$62 million of the costs funded through Manitoba Hydro's DSM electricity budget, \$9 million funded through Manitoba Hydro's DSM natural gas budget, \$0.3 million funded through the Affordable Energy Fund and \$2.4 million funded through the Lower Income Natural Gas Furnace Replacement budget. Actual expenditures are significantly dependent on customer's decisions to participate.



## Building Manitoba's Green Economy

The economic benefits of energy efficiency and alternative energy extend far beyond lowering energy bills for households and businesses in Manitoba. These investments contribute to local economic development and job creation through investments by customers and services provided by Manitoba businesses. As cited by the well-known energy efficiency industry advocate, The American Council for an Energy-Efficient Economy (ACEEE);

"Energy efficiency investments create jobs in two ways. First, the investment itself creates jobs. Often, as in construction work for a building upgrade, these projects create local jobs that cannot be outsourced. Second, the energy savings due to the investment create more jobs for years afterward as people spend the money they save on energy bills."

This year's Demand Side Management Plan is projecting activity related to energy efficient construction, retrofits and other Demand Side Management initiatives to total over \$105 million in 2019/20 alone. In addition, this investment in demand side management is anticipated to generate bill savings of \$15 million in 2019/20 alone. When a household or business lowers their energy costs, they are then able to spend that money elsewhere in the economy.

In addition to the economy wide creation of jobs arising from this local construction and renovation activity, Manitoba Hydro's programs have and will result in the direct creation of green jobs through the service providers delivering the following DSM programs. The following are examples of these initiatives:

#### Supporting Social Enterprises through the Affordable Energy Program

The Affordable Energy Program continues to support the efforts of Building Urban Industries for Local Development (BUILD), a Manitoba social enterprise contractor. This organization is a non-profit contractor that provides training programs for people who face barriers to employment and have limited experience in the formal labour market to retrofit housing stock in a fashion that reduces poverty and benefits the environment. Through this partnership, BUILD will employ five individuals this year, developing candidates for future job opportunities in the social enterprise and private sector overall.

Working with First Nation Communities, the Indigenous Energy Efficiency Program provides free basic energy saving measures and free insulation along with funding which creates employment for members in the community to complete the installation. Over 6,100 total homes have been retrofitted through the program to date, generating 28 equivalent full time jobs of First Nation employment.



#### Partnering with Retailers to Offer Rebates on Energy Efficient Products



The Residential LED Lighting Program continues to offer instant rebates on ENERGY STAR<sup>®</sup> certified lighting products province-wide at participating retailers. In 2019/20, a contract service provider is again coordinating retailer promotions, and hiring energy efficiency ambassadors to staff in-store engagement events during campaigns. One full time project manager and up to 15 part time ambassadors are employed in Manitoba as a result of the program.

#### Water and Energy Saver Program, Creating Savings and Jobs

The ongoing Water and Energy Saver Program employs technicians, through the contracted service provider, to coordinate community events and go door-to-door promoting the program and installing water saving devices. A total of three full time staff and up to six part time technicians are currently employed in Manitoba.



#### Retiring Old Fridges, Hiring New Faces



The Refrigerator Retirement Program provides in home pickup, decommissioning, and recycling of older working inefficient second fridges and freezers. The program is delivered by a contracted service provider and continues to employ up to 20 green collar workers supporting the program in various roles in the office, the warehouse, and on the trucks visiting customers' homes. Since the program launch in 2011, approximately 70,000 refrigerators and freezers have been collected from homes around the province. An additional outcome of the program is the recycling of an additional 14,000 coolant

containing appliances from various municipalities around the province, further supporting the preservation of these green collar jobs.

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#### Installing Geothermal Systems in First Nations with First Nations

The Community Geothermal Program converts electric furnaces to geothermal heat pump systems in First Nation communities. The program supports and provides funding for AKI Energy, a nonprofit social enterprise group working as liaison with individual communities to promote and coordinate installations. Jobs are created within the participating First Nation Community through the installation of the geothermal systems in the community' homes. This community approach creates meaningful employment as they install green heating



systems in their communities. To date, approximately 55 band members have received various training as it relates to ground source heat pump systems, including installation, maintenance, and fusion certification; 21 have received full installer accreditation granted by the International Ground Source Heat Pump Association (IGSHPA).

## Small Business Program Creates Jobs While Helping Small Businesses and Communities Thrive



The Small Business Program is a full-service program that offers small businesses direct installation of a variety of water and energy-saving measures, lighting walkthroughs, and enhanced incentives for lighting retrofits.

The program is delivered by a contracted service provider that employs one regional manager, one account coordinator, and four technicians, all who directly support the program. Electrical services for lighting projects requiring a licensed electrician are subcontracted to seven electrical companies based in Winnipeg, Portage la Prairie, Dauphin, Brandon and The Pas, to support projects across Manitoba. Altogether, these subcontractors have a team of 37 electricians and apprentices working on Small Business Program projects. Since the program began in October 2015, over 2,200 businesses in 68 communities across Manitoba have participated in the program.

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# **DSM STRATEGY**

Manitoba Hydro's DSM initiative is designed to encourage the efficient use of energy in residential, commercial, and industrial customer sectors. Manitoba Hydro's overall DSM strategy involves taking a broad approach to capturing energy efficiency opportunities: educating customers and industry to build awareness and understanding, creating foundations through the support of standards, motivating customers with the aid of financial tools, and entrenching energy savings through the support of federal and provincial codes and regulations.

In assessing options for pursing a DSM opportunity, Manitoba Hydro uses a number of metrics as guidelines to assess energy efficient opportunities. These metrics assist in determining whether to pursue an opportunity, how aggressive an opportunity will be pursued, the effectiveness of program design options, and the relative investment sharing between ratepayers and participating customers. These metrics include the Total Resource Cost, Societal Cost, Rate Impact Measure, Levelized Utility Cost, and Customer Simple Payback. In addition to quantitative assessments, Manitoba Hydro also considers various qualitative factors including equity (i.e. reasonable participation by various ratepayer sectors such as lower income) and overall contribution towards having a balanced energy conservation strategy and plan.

As outlined in the following graph, Manitoba Hydro takes a three stage approach to achieving market transformation. In the infancy stage of emerging opportunities, Manitoba Hydro supports these

technologies by building customer awareness, funding demonstration projects, and investing in research and development. As market acceptance increases and the opportunity becomes cost-effective, financial incentives and/or other market intervention strategies are pursued to encourage customers to install the technology. As the product matures and market adoption grows, incentivebased programming generally becomes uneconomic. During this phase, Manitoba Hydro's strategy involves pursuing the remaining opportunities through the adoption of codes and regulations. This latter strategy also ensures permanent market transformation for the specific energy efficiency opportunity.



An Example: Changing Furnace Efficiencies in Manitoba

In 2001, only 30% of all natural gas furnaces being installed in Manitoba were high-efficient models and customer awareness of higher efficiency options was low. In response to this market situation, Manitoba Hydro launched a Residential Loan Program and supporting Home Comfort and Energy Savings campaign to educate and promote the installation of high efficient natural gas furnaces. This approach laid the foundation for customers to consider the energy efficient alternative, and provided a tool for contractors to promote this technology. In 2005, to further increase market acceptance, a \$245 incentive was introduced to encourage customers to choose high efficient natural gas furnaces over the less efficient alternative. By 2007, high efficiency furnaces had grown to represent 76% of all furnaces being replaced in Manitoba homes. In 2008, to accelerate the number of customers upgrading their furnaces, Manitoba Hydro increased their rebate to \$500 for a limited time offering and aggressively promoted the financial and comfort benefits of upgrading a furnace. As market acceptance increased, Manitoba Hydro worked with the Province of Manitoba to develop the framework to regulate the minimum efficiency of all natural gas furnaces installed in Manitoba. On December 30, 2009, with market penetration of 86%, the incentive ended and the Provincial regulation took effect requiring a minimum 92% AFUE for natural gas furnaces installed in Manitoba.

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# DEMAND SIDE MANAGEMENT PLAN

The 2019/20 DSM Plan was developed through an intensive planning process and it offers programs and initiatives to pursue opportunities in all market sectors; residential, commercial, and industrial. These programs are designed based on in-depth knowledge of the technology and the market environment. An in-depth understanding is essential to ensure that the program design is adequately and effectively addressing the appropriate target market and contains the tools and strategies to address market barriers. The following table outlines the forecasted achievements for 2019/20:

Programs	Participation Definition	2019/20 Participation	Capacity Savings (MW)	Energy Savings (GW.h)	Natural Gas Savings (million m³)	Utility Investment (millions \$)
New Homes Program	No. of houses	380	1.6	3.2	0.1	\$1.1
Home Insulation Program	No. of houses	1,658	1.4	3.0	0.5	\$2.6
Water and Energy Saver Program	No. of houses	13,275	0.2	2.0	0.5	\$1.0
Affordable Energy Program	No. of retrofits	2,118	0.8	2.4	0.9	\$6.3
Reingerator Retirement Program	No. of appliances	6,150	0.7	12.2	-	\$1.5
Community Coothermal Program	No. of systems	200,137	0.6	12.3	-	\$1.7
	No. of appliances	5 550	0.0	1.1	-	\$0.5
Power Bars	No. of power bars	5,550	0.1	0.0	0.0	\$0.0
Smart Thermostats	No. of thermostats	3 250	0.0	0.0	0.2	\$0.3
Plug-in Timers	No. of timers	5,230	0.2	0.3	0.2	\$0.0
Home Energy Efficiency Loan	No. of loans	3,000	0.0	0.3	0.4	\$0.0
PAYS Financing	No. of loans	26	0.0	0.0	0.0	\$0.0
Residential Earth Power Loan	No. of loans	47	0.3	0.7	0.0	\$0.0
Residential Programs			9.9	33.3	2.5	\$15.5
Commercial Lighting Program	No. of projects	1,700	15.1	63.3		\$10.8
LED Roadway Lighting Conversion Program	No. of conversions	24,469	1.7	12.2	-	\$12.0
Commercial Building Envelope - Windows Program	No. of projects	110	0.3	0.8	0.2	\$0.7
Commercial Building Envelope - Insulation Program	No. of projects	183	0.9	1.9	0.9	\$1.7
Commercial Geothermal Program	No. of buildings	5	0.2	0.4	-	\$0.1
Commercial HVAC Program - Boilers	No. of boilers	75	-	-	0.6	\$0.4
Commercial HVAC Program - CO2 Sensors	No. of sensors	142	0.1	0.1	0.1	\$0.2
Commercial HVAC Program - HRV/ERV	No. of units	31	0.4	0.8	0.2	\$0.5
Commercial HVAC Program - Water Heaters	No. of water heaters	12	-		0.0	\$0.1
Commercial Custom Measures Program	No. of projects	27	0.3	2.5	0.3	\$0.7
Enhanced Building Operations Program	No. of buildings	3	0.1	0.6	0.1	\$0.2
New Buildings Program	No. of buildings	20	1.1	3.7	0.1	\$1.7
Commercial Refrigeration Program	No. of locations	210	0.5	3.8	0.0	\$0.3
Commercial Kitchen Appliance Program	No. of appliances	19	0.0	0.1	0.0	\$0.1
Network Energy Management Program	No. of licenses	250	0.0	0.0	0.0	\$0.0
Internal Retrofit Program	No. of projects	44	0.2	1.0	0.0	\$0.5
Small Business Program	No. of projects	976	0.8	3.4	0.0	\$1.1
Manitoba Race to Reduce Commercial Programs	No. of buildings	6	0.1 21.9	0.9 <b>95.6</b>	0.1	\$0.1 \$31.2
Performance Optimization Program	No. of projects	80	1.6	10.1	-	\$1.7
Natural Gas Optimization Program	No. of projects	10	-	-	1.0	\$0.4
Industrial Programs			1.6	10.1	1.0	\$2.1
Energy Efficiency Subtotal			33.4	139.1	6.0	\$48.9
Curtailable Rate Program	No. of Annual Participants	3	213.2	-	-	\$6.8
Load Management			213.2	0.0	0.0	\$6.8
Bioenergy Optimization Program	No. of projects	2	0.2	0.8	-	\$0.3
Customer Sited Load Displacement	No. of customers	1	13.8	99.0	-	\$1.0
Load Displacement & Alternative Energy			14.0	99.8	0.0	\$1.4
Residential Solar Photovoltaics Program (PV)	No. of systems	325	0.0	10.5	0.0	\$7.0
Commercial Solar Photovoltaics Program (PV)	No. of systems	70	0.0	10.6	0.0	\$6.7
Other Emerging Technologies			0.0	21.1	0.0	\$13.8
Codes, Standards & Regulations			23.1	89.7	4.7	-
Interactive Effects			-	-	-2.8	-
Program Support			-	-	-	\$2.9
Demand Side Management Plan - 2019/20			284	350	80	\$73.8

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# Residential

Manitoba Hydro offers a number of innovative programs, using a variety of market intervention tools including but not limited to, incentives, financing, education, and energy assessments to address opportunities in the residential market.

# New Homes Program

The New Homes Program is a residential new construction program providing incentives to builders and customers for the optimized design and construction of energy efficient homes.

To be eligible for incentives, the home must be at least 20 per cent more energy efficient than a conventional new home. Completed homes automatically qualify for both the Canada Mortgage and Housing Corporation (CMHC) and Genworth Canada mortgage premium refund programs, and homeowners receive an official Certificate of Designation and an EnerGuide label and detailed report, if applicable.

The New Homes Program offers two participation paths and will accept applications for homes built under a variety of energy efficient, sustainable, or green construction programs. The program strongly encourages builders to apply under its Performance Path, and covers the costs of technical design assistance and energy modelling services provided by a nationally-certified energy advisor. This option provides a higher incentive potential while also serving to prepare home builders for incoming future code changes.

In 2019/20, program participation is expected to be 380 new residential dwellings, which includes 327 single detached and 53 multi attached units, resulting in 3.2 GW.h and 1.6 MW of electric savings and 0.1 million cubic metres of natural gas savings. Combined with achievements to date, approximately 820 new residential dwellings will have participated resulting in 5.2 GW.h and 3.4 MW of electric savings and 0.1 million cubic metres of natural gas savings by the end of 2019/20.





	2015/16 to 2018/19*	2019/20	Total to 2019/20	
No. of Houses	440	380	820	
Capacity Savings (MW)	1.7	1.6	3.4	
Energy Savings (GW.h)	1.9	3.2	5.2	
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.1	0.1	
Utility Investment (Millions, \$)	\$1.3	\$1.1	\$2.4	
Customer Investment (Millions, \$)	\$2.8	\$3.6	\$6.4	
Total DSM Investment (Millions, \$)	\$4.1	\$4.7	\$8.8	
Estimated Average Annual Bill Reduction per Customer (Electric Home): \$578				
Estimated Average Annual Bill Reduction per Customer (Natur	i Estimated Average Annual Bill Reduction per Customer (Natural Gas Home): \$208			

#### Home Insulation Program

The Home Insulation Program was launched in May 2004. The program encourages owners of electric and natural gas heated homes built before 1999 to upgrade their insulation to program levels and perform air sealing in their attics, walls, and foundations. The overall target market for the program is approximately 48,000 electric and 80,000 natural gas homes. The program addresses the multiple barriers to completing these upgrades, focusing on the lack of customer awareness regarding the financial and comfort benefits of increased insulation levels, the upfront capital cost of the upgrade, and the lack of priority when compared to more aesthetic and visible renovation projects. These market barriers are addressed through a comprehensive strategy that includes financial incentives to reduce the cost of the upgrade, informational materials in the form of advertising



campaigns, and renovation "how to" guides that provide technical guidance for upgrading insulation to program levels. The program is delivered through a large network of industry contractors and retailers across the province. Qualifying home owners can receive incentives covering up to 100% of the cost of their insulation materials on projects that meet program requirements.



A targeted outreach initiative, offering free in-home energy assessments, assists customers in identifying opportunities for qualifying insulation upgrades. In past years, during residential campaigns, the program has offered rebates on weatherization products such as weather stripping and window kits at participating retailers.

In 2019/20, the program is targeted to retrofit 658 electrically heated homes and 1,000 natural gas heated homes, achieving 3.0 GW.h and 1.4 MW of electric savings and 0.5 million cubic metres of natural gas savings. Combined with achievements to date, approximately 16,000

electrically heated homes and 29,400 natural gas heated homes will be retrofitted, resulting in 81.1 GW.h and 39.5 MW of electric savings and 15.2 million cubic metres of natural gas savings by the end of 2019/20. The program is forecast to reach 33% of targeted electric customers and 37% of targeted natural gas customers by the end of 2019/20.

	2004/05 to 2018/19*	2019/20	Total to 2019/20
No. of Houses	43,751	1,658	45,409
Capacity Savings (MW)	38.1	1.4	39.5
Energy Savings (GW.h)	78.1	3.0	81.1
Natural Gas Savings (million m <sup>3</sup> )	14.7	0.5	15.2
Utility Investment (Millions, \$)	\$45.9	\$2.6	\$48.4
Customer Investment (Millions, \$)	\$22.3	\$1.0	\$23.3
Total DSM Investment (Millions, \$)	\$68.2	\$3.5	\$71.7
Estimated Average Annual Bill Reduction per Customer (Electric): \$436			
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$98			

# Affordable Energy Program

The Affordable Energy Program (AEP) was launched in December 2007. In 2019/20, program participation is expected to be 2,118 customers, resulting in 2.4 GW.h and 0.8 MW of electric savings and 0.9 million cubic metres of natural gas savings. Combined with achievements to date, approximately 26,827 customers will have participated resulting in 37.8 GW.h and 16.1 MW of electric savings and 12.7 million cubic metres of natural gas savings by the end of 2019/20.

The program assists lower income homeowners and renters in implementing energy efficiency upgrades. It was designed recognizing the unique barriers these customers face, encouraging participation in this market by minimizing the financial burden with free insulation upgrades, a high efficiency natural gas furnace for \$9.50/month for 5 years, and free basic energy efficiency measures (e.g. LEDs, showerheads, faucet aerators, etc.). These upgrades can provide significant energy savings, decreasing the customer's monthly energy bills while increasing the comfort of their home.

The criteria for determining program eligibility are the Low Income Cut-Off (LICO) thresholds set by Statistics Canada; customers' total household income must fall below 125% of the LICO thresholds for inclusion in the program. Based on the 2014 Residential End Use Survey data, there are approximately 115,000 homes in Manitoba, excluding multi-unit residential buildings, which fall below the LICO 125% threshold; 97,630



customers own their home, while 17,512 customers rent. The primary targets within this market are homes with poor or fair insulation levels and standard efficient natural gas furnaces. In addition, the Affordable Energy Program targets multi-unit residential buildings (apartment style) for basic energy efficiency upgrades. There are approximately 24,300 remaining apartment suites which fall within the LICO 125% market. The program is currently working with landlords and property managers to retrofit suites with basic energy efficiency measures.

The program is delivered through a number of approaches including direct participation with individual customers, through the social enterprise contractor Building Urban Industries for Local Development (BUILD), or through community groups (e.g. First Nation communities and neighbourhood or community associations). Through these approaches, customers are made aware of the value of energy efficiency retrofits, along with the benefits of participating in the program. Customers are targeted through advertising and community-based campaigns, customized information sessions, and community networks. A community-led initiative, the Neighbourhood Approach, began in fall 2012 with the goal of completing energy efficiency upgrades on a block-by-block basis in lower income neighbourhoods. Under this approach, North End Community Renewal Corporation employs local residents BUILD to bring energy efficiency upgrade opportunities direct to the customer's door.

To date, an estimated 24,709 homes have completed energy efficiency retrofits. Of the total retrofits, approximately 12,600 insulation projects and 6,220 furnace replacements have been completed. The program is forecast to reach 5% (702) of the remaining targeted homes with poor or fair insulation levels within the total LICO 125% market in 2019/20. The program is forecast to reach 18% (459) of the remaining standard furnaces in the LICO 125% market in 2019/20.

	2007/08 to 2018/19*	2019/20	Total to 2019/20
Total Participation	24,709	2,118	26,827
No. of Insulation Projects	12,600	702	13,302
No. of Furnaces Installed	6,220	459	6,679
No. of Boilers Installed	141	10	151
Capacity Savings (MW)	15.3	0.8	16.1
Energy Savings (GW.h)	35.5	2.4	37.8
Natural Gas Savings (million m <sup>3</sup> )	11.8	0.9	12.7
Utility Investment (Millions, \$)	\$69.5	\$6.3	\$75.8
Customer Investment (Millions, \$)	\$2.7	\$0.1	\$2.7
Total DSM Investment (Millions, \$)	\$72.2	\$6.4	\$78.6

Estimated Average Annual Bill Reduction per Customer - Basic Measures (Electric): \$66

Estimated Average Annual Bill Reduction per Customer - Basic Measures (Natural Gas): \$29

Estimated Average Annual Bill Reduction per Customer (Electric) - Insulation: \$59

Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Insulation: \$20

Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Furnace: \$185

## Water and Energy Saver Program

The Water and Energy Saver Program reduces residential water heating energy consumption through the use of low flow, energy efficient plumbing fixtures. Customers are offered a free water and energy saver kit with program messaging focused on the energy and water benefits and bill reductions associated with energy efficient plumbing fixtures. The program offers a number of channels for customers to participate including: mail, phone, online, targeted door-to-door, a bulk mail or installation option for multi-unit residential facilities, community events, as well as a limited time in-store rebate on qualifying showerheads.





Program participation in 2019/20 is expected to be 13,275 households, achieving 2.0 GW.h and 0.2 MW of electric savings and 0.5 million cubic metres of natural gas savings. Combined with achievements to date, 219,508 customers will have participated resulting in 36.6 GW.h and 6.4 MW of electric savings and 7.3 million cubic metres of natural gas savings by the end of 2019/20. The program is forecast to reach 62% of targeted customers by the end of 2019/20.

The target market includes residential dwellings (non-LICO) that use electricity or natural gas to heat water, totaling approximately 355,000 customers.

The program continues to engage and educate customers about the environmental benefits of energy and water conservation and bill saving opportunities for customers. The program is scheduled to run until the end of March 2020.

	2010/11 to 2018/19*	2019/20	Total to 2019/20
No. of Houses	206,233	13,275	219,508
Capacity Savings (MW)	6.1	0.2	6.4
Energy Savings (GW.h)	34.6	2.0	36.6
Natural Gas Savings (million m <sup>3</sup> )	6.8	0.5	7.3
Utility Investment (Millions, \$)	\$12.1	\$1.0	\$13.1
Customer Investment (Millions, \$)	\$0.0	\$0.0	\$0.0
Total DSM Investment (Millions, \$)	\$12.1	\$1.0	\$13.1
Estimated Average Annual Bill Reduction per Kit (Electric): \$30			

Estimated Average Annual Bill Reduction per Kit (Natural Gas): \$13

#### **Refrigerator Retirement Program**

The Refrigerator Retirement Program was launched in June 2011. In 2019/20, the program expects to retire 4,400 refrigerators and 1,100 freezers and has been expanded to also retire 650 window air conditioners, dehumidifiers and bar fridges or small freezers. This results in an estimated 6.5 GW.h and 0.7 MW of electric savings. Combined with achievements to date, 75,910 customers will have participated resulting in 89.1 GW.h and 9.0 MW of electric savings by the end of 2019/20. The program is forecast to reach an additional 2% of the remaining potential market by the end of 2019/20, bringing the total market penetration to 19%.



The program reduces residential energy consumption through the removal of old, inefficient, and often nearly empty refrigerators and freezers. Manitoba Hydro also collects old window air conditioning units, dehumidifiers and small fridges/freezers if accompanied with a qualifying full size refrigerator or freezer. Customers receive free in-home pick-up of qualifying working units plus a financial incentive of \$50 for each qualifying full size fridge or freezer. Pick up and recycling of an air conditioner and/or dehumidifier and bar fridge or small freezer is complimentary but customers will not receive a financial incentive for these units. The program ensures environmental recycling of each unit retired and encourages customers to retire their secondary unit and not replace it in order to maximize their savings.

The remaining target market includes all single family residential homes yielding approximately 150,000 older fridges as well as another 150,000 older freezers and approximately 70,000 older window air conditioners and dehumidifiers, bar fridges and small freezers.

Most customers do not know the costs of operating an underutilized refrigerator or freezer, and many lack assistance in removing the appliance from the home. Through the Refrigerator Retirement Program, customers are made aware of the costs of their second appliance and the benefits of "retiring" it. The program makes retiring easy by providing a convenient in-home pickup service and pays them to participate.

	2011/12 to 2018/19*	2019/20	Total to 2019/20	
Total Participation	69,760	6,150	75,910	
No. of Fridges	57,108	4,400	61,508	
No. of Freezers	12,652	1,100	13,752	
No. of Dehumidifiers	0	400	400	
No. of Window Air Conditioning Units	0	250	250	
Capacity Savings (MW)	8.3	0.7	9.0	
Energy Savings (GW.h)	82.6	6.5	89.1	
Utility Investment (Millions, \$)	\$14.5	\$1.5	\$16.0	
Customer Investment (Millions, \$)	\$4.6	\$0.6	\$5.2	
Total DSM Investment (Millions, \$)	\$19.1	\$2.1	\$21.2	
Estimated Average Annual Bill Reduction per Customer (Electric) without fridge replacement: \$118				
Estimated Average Annual Bill Reduction per Customer (Electric) without freezer replacement: \$89				
Estimated Average Annual Bill Reduction per Customer (Electric) without dehumidifier replacement: \$73				
Estimated Average Annual Bill Reduction per Customer (Electr	ic) without AC Unit repl	acement: \$24		

# Residential LED Lighting Program

The Residential LED Lighting Program is designed to encourage residential customers to choose the most energy efficient lighting technology for each application within their home. The program aims to increase the adoption of Light Emitting Diode (LED) technology as a replacement for incandescent and halogen screw-in lighting. The program offers two channels of participation: mass market retail rebate campaigns and rebates for property managers of multi-unit residential buildings.



The program was launched in October 2014. In 2019/20, program participation is expected to be over 47,000 residential dwellings (over 566,000 LED bulbs) resulting in 12.3 GW.h and 3.9 MW of electric savings. Combined with achievements to date, program participation will be more than 306,000 residential dwellings (over 3.6 million LED bulbs) resulting in 111.0 GW.h and 35.0 MW of electric savings by the end of 2019/20.

The target market includes 530,000 residential dwellings and approximately 18 million screw-based sockets in which LED bulbs can be used.

	2014/15 to 2018/19*	2019/20	Total to 2019/20
No. of Bulbs	3,107,815	566,157	3,673,972
Capacity Savings (MW)	31.1	3.9	35.0
Energy Savings (GW.h)	98.7	12.3	111.0
Utility Investment (Millions, \$)	\$13.9	\$1.7	\$15.7
Customer Investment (Millions, \$)	\$0.0	\$0.0	\$0.0
Total DSM Investment (Millions, \$)	\$13.9	\$1.7	\$15.7
Estimated Average Annual Bill Reduction per Bulb (Electric): \$	2		

#### Community Geothermal Program

The Community Geothermal Program aims to reduce customers' electric space heating costs through the adoption of geothermal heat pump systems. The program is designed to offer a customized approach for each community, with the assistance of AKI Energy, a non-profit indigenous social enterprise. Another component of the program includes creating job opportunities and training for First Nations to take part in the installation and the ongoing maintenance of the geothermal systems, with training funded by the First Nation. Manitoba Hydro provides technical guidance, assesses the energy bills to determine which homes would most benefit from



geothermal installations, and explores opportunities to further maximize the number of geothermal installations within the community.

Manitoba Hydro and AKI Energy have assisted five First Nations communities with 380 installs to date. In 2019/20, the program is expected to achieve 1.1 GW.h and 0.6 MW of electric savings. Combined with achievements to date, 455 systems will be installed, resulting in 5.9 GW.h and 1.6 MW of electric savings by the end of 2019/20.

	2013/14 to 2018/19*	2019/20	Total to 2019/20	
No. of Geothermal Systems	380	75	455	
Capacity Savings (MW)	1.0	0.6	1.6	
Energy Savings (GW.h)	4.8	1.1	5.9	
Utility Investment (Millions, \$)	\$2.9	\$0.5	\$3.4	
Customer Investment (Millions, \$)	\$5.4	\$0.0	\$5.4	
Total DSM Investment (Millions, \$)	\$8.3	\$0.5	\$8.8	
Estimated Average Annual Bill Reduction per Customer (Electric): \$1,061				

# Appliances and Electronics Initiative

The Residential Appliances and Electronics Initiative promotes the installation of the most energy efficient appliances as well the use of additional devices to reduce their energy consumption on electronics. Instant rebates on Advanced Power Bars and Plug in Timers will be offered during a four week campaign as part of Fall 2019 Retail Rebate Campaign, which also includes rebates on LED lighting, weather stripping and other energy saving devices. Bill credits will also be offered for the purchase of designated residential appliances and will run for four months from November 2019 to February 2020.

#### Appliances

The program helps customers reduce their energy consumption by choosing appliances that meet the highest levels of energy efficiency. A financial incentive will be available for top energy performing clothes washers, clothes washer/dryer combinations, as well as top performing refrigerators. Customers will receive the incentive by way of a credit applied directly to their Manitoba Hydro bill.



The target market includes approximately 30,000 customers who will be purchasing a new clothes washer or clothes washer/dryer combination and approximately 20,000 customers who will be purchasing a new refrigerator. The initiative is expected to reach approximately 4% of the market.

## **Plug-in Timers**

Plug-in Timers help customers reduce their energy consumption by using an indoor and/or outdoor plug-in timer for lights, block heaters, pool pumps, etc. Operating household devices with a plug-in timer will help save energy resulting in lower energy bills.

The target market for plug-in timers includes 105,000 residential customers who plug their vehicle block heater in for more than seven hours a day and do not use a plug-in timer, as well as customers who leave indoor lights on for more than seven hours per day. The program is expected to reach 3% of the target market through the rebate campaign.



#### **Advanced Power Bars**

Advanced Power Bars help customers reduce the amount of electricity their household electronics consume. Electronics that are left plugged in can continue to consume electricity even when not in use. This category of products includes power bars that contain features such as integrated timers or smart features with automatic shut off functions that will help customers save electricity.

Virtually all households operate at least one TV and set top box, representing 470,000 customers. As many as 275,000 of these customers will operate a DVD player, and a further 135,000 customers will operating some sort of gaming consoles all which



make up the target market. In 2019/20, this initiative aims to reach a small percentage of customers by educating customers about these energy saving devices. This is a complementary initiative as part of a retail campaign working with retailers to increase the availability on these types of energy saving devices. The target market for power bars includes all residential Manitoba Hydro residential customers using electronic devices.

In 2019/20, program participation for all components is expected to be 11,150 units resulting in 1.5 GW.h and 0.1 MW of electric savings and 10,000 cubic metres of natural gas savings. Combined with achievements to date, program participation will be approximately 24,826 units resulting in 2.9 GW.h and 0.4 MW of electric savings and 0.1 million cubic metres of natural gas savings by the end of 2019/20.

	2016/17 to 2018/19*	2019/20	Total to 2019/20
No. of Units	13,676	11,150	24,826
Capacity Savings (MW)	0.3	0.1	0.4
Energy Savings (GW.h)	1.4	1.5	2.9
Natural Gas Savings (million m <sup>3</sup> )	0.0	0.0	0.1
Utility Investment (Millions, \$)	\$0.9	\$0.6	\$1.5
Customer Investment (Millions, \$)	\$1.4	\$0.1	\$1.5
Total DSM Investment (Millions, \$)	\$2.3	\$0.7	\$3.0
Estimated Average Annual Bill Reduction per Customer (Electric) - Clothes Washer: \$28			
Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Clothes Washer: \$2			

Estimated Average Annual Bill Reduction per Customer (Electric) - Clothes Washer & Clothes Dryer: \$32

Estimated Average Annual Bill Reduction per Customer (Natural Gas) - Clothes Washer & Clothes Dryer: \$

Estimated Average Annual Bill Reduction per Customer (Electric) - Refrigerator: \$10

Estimated Average Annual Bill Reduction per Customer (Electric) - Power Bar: \$4

Estimated Average Annual Bill Reduction per Customer (Electric) - Plug-in Timer: \$5

# Smart Thermostats

Wi-Fi connected "smart" thermostats have the potential to achieve more energy savings than manual or simple programmable units. Smart thermostats vary in the system's individual algorithms and achieve enhanced savings in several ways: by learning occupant patterns; by coordinating temperature settings with occupancy; by optimizing system performance; and by taking humidity and weather conditions into account, thereby reducing HVAC runtimes. Smart thermostats also give consumers a new level of control over their household climate by enabling remote activation, voice activation, or geo-fencing to modify settings.



Manitoba Hydro first offered rebates on smart thermostats in the

2016/17 fiscal year with its fall/winter Bill Credit Rebate offer. A second promotional campaign ran in the winter of the 2017/18 fiscal year.

ENERGY STAR® recently began certifying connected thermostats and Natural Resources Canada advises ENERGY STAR certified connected thermostats can save at least 8% of the energy used for space heating and cooling in residential applications. ENERGY STAR certified connected thermostats were automatically eligible for rebates under Manitoba Hydro's 2017/18 Bill Credit Rebate program.

Smart thermostats form part of a rapidly growing smart home technology category and it is estimated that by the year 2020, as many as 50% of homes will contain a smart or connected thermostat. Connectivity and the high upfront cost of these products continues to be a barrier for some households.

The 2019/20, the smart thermostat rebate program is estimated to generate sales of 3,250 devices, with annual electric savings of 0.3 GW.h and 0.2 MW and natural gas savings of 0.2 million cubic metres. Combined with achievements to date, program participation will be approximately 8,904 devices resulting in 1.8 GW.h and 1.2 MW of electric savings and 0.6 million cubic metres of natural gas savings by the end of 2019/20.

	2015/16 to 2018/19*	2019/20	Total to 2019/20		
No. of Thermostats	5,654	3,250	8,904		
Capacity Savings (MW)	1.0	0.2	1.2		
Energy Savings (GW.h)	1.4	0.3	1.8		
Natural Gas Savings (million m <sup>3</sup> )	0.4	0.2	0.6		
Utility Investment (Millions, \$)	\$0.9	\$0.3	\$1.2		
Customer Investment (Millions, \$)	\$1.2	\$0.9	\$2.1		
Total DSM Investment (Millions, \$)	\$2.1	\$1.2	\$3.3		
Estimated Average Annual Bill Reduction per Customer (Electr	Estimated Average Annual Bill Reduction per Customer (Electric): \$45				

Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$14

#### Solar Energy Pilot Program

In April 2016 Manitoba Hydro expanded Manitobans' renewable energy options by introducing the Solar Energy Pilot Program (SEP). This two-year pilot program, which stopped accepting new applications on April 30, 2018, offered a financial incentive towards the purchase of a Solar Photovoltaic (PV) system, and was open to residential, commercial and industrial customers who are connected to the Manitoba Hydro grid. The incentive of \$1 per watt covered approximately 37 per cent of the installed cost of the system.



The pilot program offered Manitoba Hydro the ability to evaluate the opportunities and challenges of solar PV in the Manitoba market, the processes required to support the technology, and most importantly to quantify the impact on the distribution grid. The program has resulted in growth in the number of solar industry suppliers, created more jobs for electrical trade workers, provided competition and drove prices down in the market, while growing Manitoba's green economy.

With enrollment in the pilot ending April 30, 2018, pilot participation is expected to be 325 residential customers and 70 commercial customers in 2019/20, resulting in 21.1 GW.h of electric savings. Combined with achievements to date, 981 customers will have participated resulting in 41.8 GW.h of electric savings by the end of 2019/20. This initiative also leverages the existing Residential Earth Power Loan, which offers on-bill financing to residential customers installing solar PV.

	2016/17 to 2018/19*	2019/20	Total to 2019/20
No. of Systems - Residential	539	325	864
No. of Systems - Commercial	47	70	117
Energy Savings (GW.h)	20.7	21.1	41.8
Utility Investment (Millions, \$)	\$14.5	\$13.8	\$28.3
Customer Investment (Millions, \$)	\$20.2	\$20.7	\$40.9
Total DSM Investment (Millions, \$)	\$34.7	\$34.5	\$69.2
Estimated Average Annual Bill Reduction per Customer (Electric) - Residential: \$2,510			
Estimated Average Annual Rill Reduction per Customer (Electric) - Commercial: \$6,732			

The following convenient financing programs offered by Manitoba Hydro support energy efficiency upgrades by allowing customers to finance initial project costs and pay these costs back on their monthly Manitoba Hydro bill.

# Home Energy Efficiency Loan

The Home Energy Efficiency Loan (HEEL) was launched in March 2001. It provides customers with convenient on-bill financing to assist them in making energy efficiency upgrades. Under the Home Energy Efficiency Loan, the following energy efficiency improvements can be made to the home: insulation, ventilation equipment, air leakage sealing, windows and doors, electric vehicle chargers, and space and water heating equipment. Participants can borrow up to \$7,500 (exceptions to this are \$5,500 for natural gas furnaces and \$3,000 for electric vehicle chargers) and repay the amount on their energy bill over a term of up to five years (up to 15 years for natural gas furnaces and boilers). The target market consists of electric and natural gas homeowners in Manitoba.

In 2019/20, the program is expected to finance energy efficient upgrades for 3,729 homes, achieving 0.3 GW.h and 0.1 MW of electric savings and 0.4 million cubic metres of natural gas savings. Combined with achievements to date, 103,153 homes will be retrofitted, resulting in 12.3 GW.h and 7.0 MW of electric savings and 17.1 million cubic metres of natural gas savings by the end of 2019/20.



A Manitoba

	2001/02 to 2018/19*	2019/20	Total to 2019/20
No. of Loans	99,424	3,729	103,153
Capacity Savings (MW)	6.8	0.1	7.0
Energy Savings (GW.h)	12.0	0.3	12.3
Natural Gas Savings (million m <sup>3</sup> )	16.7	0.4	17.1
Average Lean Amount: \$1,600			

# **PAYS Financing**

Launched in November 2012, Pay-As-You-Save (PAYS) Financing Program offers on-bill financing for energy efficiency upgrades. This offering complements and supports existing incentive-based programs by assisting customers in managing the installation cost of their upgrade. To qualify, upgrades must have sufficient estimated annual utility bill savings to offset the monthly financing payment, thereby resulting in an energy bill that is less than or equal to the total bill prior to the upgrade. PAYS Financing also differs from Manitoba Hydro's other financing programs in that the loan is transferable between homeowners when a property is sold, and is transferable from a landlord to a tenant where the tenant is responsible for paying the energy bill.

Financing is available over a term of up to 25 years (depending on the technology financed) with a five-year fixed interest rate. Energy efficient upgrades that may qualify for financing are:

- Space heating equipment:
  - High efficiency natural gas furnaces;
  - Natural gas boilers (minimum AFUE of 85%);
  - o Geothermal heat pump systems;
- Insulation;
- Drain water heat recovery systems;
- WaterSense-labeled toilets (in conjunction with energy efficient equipment).



In 2019/20, the program is expected to finance energy efficient upgrades for 26 homes, achieving 0.1 GW.h and 0.03 MW of electric savings. Combined with achievements to date, 995 homes will be retrofitted, resulting in 2.1 GW.h and 0.5 MW of electric savings by the end of 2019/20.

	2012/13 to 2018/19*	2019/20	Total to 2019/20
No. of Loans	969	26	995
Capacity Savings (MW)	0.5	0.0	0.5
Energy Savings (GW.h)	2.0	0.1	2.1
Natural Gas Savings (million m <sup>3</sup> )	-0.1	0.0	-0.1
Average Loan Amount: \$6.581			

#### Residential Earth Power Loan

The Residential Earth Power Loan (REPL) launched in April 2002. The program supports the adoption of geothermal heat pump technology, and fosters awareness and growth of new, emerging technologies. Solar hot water systems were added to the loan in 2010 and solar photovoltaic (PV) systems and cold climate air source heat pump systems were added to the suite of eligible measures in 2016. Although more expensive to install, these technologies offer significant electricity savings, thereby reducing customers' monthly utility bills. The convenience and flexibility of the on-bill REPL reduces the financial barrier that exists when installing these systems.

Customers are eligible to finance up to \$20,000 for geothermal heat pump systems, \$7,500 for solar domestic water heating systems, \$30,000\* for solar PV systems, and \$10,000 for cold climate air source heat pump systems. The financial terms include a five-year fixed interest rate over a 15-year maximum amortization term. The interest rate for the balance of the financing period is established at Manitoba Hydro's cost of borrowing at the time the fixed interest rate term expires.



In 2019/20, the program participation is expected to be 47 loans, resulting in 0.7 GW.h and 0.3 MW of electric savings and 9,900 cubic metres of gas savings. Combined with achievements to date, 1,535 customers will participate resulting in 16.0 GW.h and 5.0 MW of electric savings and 3.2 million cubic metres of natural gas savings by the end of 2019/20. The program is forecasted to reach 0.6% of targeted customers by the end of 2019/20.

	2002/03 to 2018/19*	2019/20	Total to 2019/20
No. of Loans	1,488	47	1,535
Capacity Savings (MW)	4.7	0.3	5.0
Energy Savings (GW.h)	15.4	0.7	16.0
Natural Gas Savings (million m <sup>3</sup> )	3.2	0.0	3.2
Average Loan Amount: \$16,891			

\*Amount eligible to finance a solar PV system is based on an installed price per watt, up to a maximum of \$30,000.

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# Commercial

Manitoba Hydro offers a number of innovative programs, using a variety of market intervention tools including but not limited to, incentives, financing, technical assistance, industry education and training, to address opportunities in the commercial market.

# **Commercial Lighting Program**

The Commercial Lighting Program, launched in May 1992, reduces electricity consumption by accelerating the acceptance and adoption of energy efficient lighting technologies in Manitoba. Commercial, industrial, and agricultural customers are encouraged to install qualifying energy efficient lighting technologies in their facilities to reduce energy bills, improve the quality of lighting, as well as increase safety, security, and productivity.



The target market consists of all existing commercial, industrial, and agricultural buildings with inefficient lighting installations in Manitoba, where lighting systems operate a minimum of 2,000 hours per year. Lighting systems that operate between 1,000 to 1,999 hours per year may qualify for prorated incentives. The estimated market size is 52,500 potential lighting projects overall. Many energy efficient lighting options have higher initial capital costs, and oftentimes customers lack awareness of the technologies available and the non-energy related benefits of energy efficient lighting, thereby creating a barrier to the adoption of higher efficiency systems. In addition, many customers operate in commercial lease space where the person making decisions related to lighting upgrades may not pay the utility bill and therefore, does not realize the direct financial return. Strategies in place to address these market barriers include financial incentives, education and training, as well as technical and customer service support.

In 2019/20, program participation is expected to be 1,700 projects, resulting in 63.3 GW.h and 15.1 MW of electric savings. Combined with achievements to date, 21,262 projects will be completed resulting in 782.4 GW.h and 157.0 MW of electric savings by the end of 2019/20. The program is forecast to reach 41% of the target market by the end of 2019/20.

	1992/93 to 2018/19*	2019/20	Total to 2019/20	
No. of Projects	19,562	1,700	21,262	
Capacity Savings (MW)	141.9	15.1	157.0	
Energy Savings (GW.h)	719.1	63.3	782.4	
Utility Investment (Millions, \$)	\$134.7	\$10.8	\$145.5	
Customer Investment (Millions, \$)	\$55.6	\$5.3	\$60.9	
Total DSM Investment (Millions, \$)	\$190.3	\$16.1	\$206.4	
Estimated Average Annual Bill Reduction per Customer (Flectric): \$197				

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## LED Roadway Lighting Conversion Program

Through the LED Roadway Lighting Conversion Program, launched in June 2015, Manitoba Hydro will convert existing High Pressure Sodium (HPS) roadway, decorative, lane and area lights to Light Emitting Diode (LED) lights over a seven-year period. Manitoba Hydro provides energy and maintenance services to over 130,000 roadway lights across the Province of Manitoba.

The current roadway lighting technology is High Pressure Sodium (HPS), which produces



a yellow/orange light and has a four-year lamp life. The wattages range from 70 to 1,000 and these light fixtures were originally installed in 1991 under a past Roadway Lighting Conversion Program to replace Mercury Vapour and Incandescent lighting.

In addition to energy savings, LED roadway lighting has a significantly longer life than HPS lighting, quick turn on and off, and improved contrast and colour rendering due to their white light output. LED lights also provide the added benefit of directing the light downward onto the roadway, increasing the amount of light on the road and improving drivers' visibility.

In 2019/20, program participation is expected to be 24,469 conversions, resulting in 12.2 GW.h and 1.7 MW of electric savings. Combined with achievements to date, 138,018 conversions will take place resulting in 61.5 GW.h and 9.0 MW of electric savings by the end of 2019/20.

	2014/15 to 2018/19*	2019/20	Total to 2019/20
No. of Conversions	113,549	24,469	138,018
Capacity Savings (MW)	7.2	1.7	9.0
Energy Savings (GW.h)	49.4	12.2	61.5
Utility Investment (Millions, \$)	\$47.0	\$12.0	\$59.0
Customer Investment (Millions, \$)	\$0.0	\$0.0	\$0.0
Total DSM Investment (Millions, \$)	\$47.0	\$12.0	\$59.0

#### Commercial Building Envelope - Windows Program

The Commercial Building Envelope (Windows) Program, launched in 1995, improves building envelope performance and reduces energy consumption through the installation of high performance window and doors in existing commercial buildings. In 2016/17, the program expanded its offering to include financial incentives for doors and extending incentives for curtain wall upgrades to natural gas heated buildings. The target market consists of all existing commercial customers, primarily focused on sectors such as multi-unit residential buildings, schools, hotels/motels, personal care homes, and health care facilities. The program targets facilities planning to replace existing windows and/or doors, thus presenting an economic opportunity to install higher efficient qualifying systems at the time of replacement.

Market barriers include the incremental product cost of high performance windows, along with a lack of awareness of the



significant potential energy savings and other non-energy benefits. Windows are also a measure that is often deferred if other building maintenance upgrades are required. Providing financial incentives to help offset incremental material costs, working closely with local fabricators and window suppliers and contractors, while promoting the benefits of high performance windows is effectively addressing these barriers.

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

In 2019/20, program participation is expected to be 110 projects, resulting in 0.8 GW.h and 0.3 MW of electric savings and 0.2 million cubic metres of natural gas savings. Combined with achievements to date, participation will be 2,089 projects resulting in 25.3 GW.h and 10.5 MW of electric savings and 3.8 million cubic metres of natural gas savings by the end of 2019/20. The program is forecast to reach 8% of the total potential market by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20	
No. of Projects	1,979	110	2,089	
Capacity Savings (MW)	10.2	0.3	10.5	
Energy Savings (GW.h)	24.5	0.8	25.3	
Natural Gas Savings (million m <sup>3</sup> )	3.6	0.2	3.8	
Utility Investment (Millions, \$)	\$18.4	\$0.7	\$19.1	
Customer Investment (Millions, \$)	\$0.7	\$0.2	\$0.9	
Total DSM Investment (Millions, \$)	\$19.1	\$0.9	\$20.0	
Estimated Average Annual Bill Reduction per Customer (Electric): \$671				

Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$497

#### Commercial Building Envelope - Insulation Program

The Commercial Building Envelope (Insulation) Program, launched in April 2006, improves building envelope performance and reduces energy consumption by upgrading insulation levels in roof and wall areas of existing buildings. In 2016/17, the program expanded and began offering a pilot program for air leakage reduction in commercial buildings. Since launching, the pilot has completed four projects. As this technology continues to emerge in the Manitoba market, Manitoba Hydro will maintain the offering as a pilot program in an effort to better understand the market potential.



The target market is comprised of all commercial customers with insulation levels that do not meet energy efficiency levels. The program targets facilities planning to undergo extensive repairs to existing roofs and walls, presenting an economic opportunity to improve existing insulation levels at the time of renovation.

Market barriers include the capital cost of major upgrades to roofs and exterior facades, and a lack of awareness of the significant potential energy savings and other non-energy benefits associated with upgraded insulation levels. Insulation upgrades typically happen at the time of renovation, resulting in a lost opportunity if customers do not increase insulation at that time. Providing financial incentives to help offset incremental material costs and promoting the benefits of better insulated buildings are effectively addressing these barriers.

It is estimated that there are approximately 400 potential insulation replacement projects in Manitoba each year, of a total overall market of 15,000 potential projects.

In 2019/20, program participation is expected to be 183 projects, resulting in 1.9 GW.h and 0.9 MW of electric savings and 0.9 million cubic metres of natural gas savings. Combined with achievements to date, participation will be 2,605 projects resulting in 50.8 GW.h and 24.5 MW of electric savings and 16.7 million cubic metres of natural gas savings by the end of 2019/20. The program is forecast to reach 17% of the total potential market by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20
No. of Projects	2,422	183	2,605
Capacity Savings (MW)	23.6	0.9	24.5
Energy Savings (GW.h)	48.8	1.9	50.8
Natural Gas Savings (million m <sup>3</sup> )	15.8	0.9	16.7
Utility Investment (Millions, \$)	\$24.2	\$1.7	\$26.0
Customer Investment (Millions, \$)	\$17.5	\$0.3	\$17.7
Total DSM Investment (Millions, \$)	\$41.7	\$2.0	\$43.7
Estimated Average Annual Bill Reduction per Customer (Electric): \$123			
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$109			

#### **Commercial Geothermal Program**

The Commercial Geothermal Program, launched in 2007, encourages the installation of geothermal heat pumps in electrically heated commercial buildings. Through the program, customers are provided with information on how the geothermal heat pump technology works, the energy savings available, and other benefits to increase understanding and acceptance of the technology including mandating specific technical requirements to increase the successful operation of geothermal heat pump installations. Financial incentives are offered to help offset the higher capital costs of the system and increase adoption of this green heating option. The program also financially supports feasibility studies, ensuring the installation of a geothermal heat pump system is an economic option for the customer. Benefits of geothermal systems and program opportunities are



communicated through the broad network of engineers, architects, consultants, contractors, and trade allies in Manitoba who have established relationships with the commercial and industrial customer base. The target market consists of existing commercial buildings that use conventional electric technologies for space heating at or approaching end of life. The high capital cost of installing a geothermal heat pump system, combined with the available supply of qualified installers and contractors in some regions of the province; challenging drilling and trenching conditions due to varying geological conditions; limited land area of many properties to accommodate the loop installation; and the proximity to the ground loop of underground facilities and services (water and sewer lines that may freeze, etc.) can make choosing geothermal as a heating/cooling option more challenging for the customer.

In 2019/20, program participation is expected to be five customers, resulting in 0.4 GW.h and 0.2 MW of electric savings. Combined with achievements to date, 155 customers will participate resulting in 55.9 GW.h and 21.5 MW of electric savings by the end of 2019/20. The program is forecast to reach 4% of targeted customers by the end of 2019/20.

	2007/08 to 2018/19*	2019/20	Total to 2019/20	
No. of Buildings	150	5	155	
Capacity Savings (MW)	21.3	0.2	21.5	
Energy Savings (GW.h)	55.5	0.4	55.9	
Utility Investment (Millions, \$)	\$5.5	\$0.1	\$5.7	
Customer Investment (Millions, \$)	\$25.3	\$0.1	\$25.4	
Total DSM Investment (Millions, \$)	\$30.8	\$0.3	\$31.1	
Estimated Average Annual Bill Reduction per Customer (Electric): \$5,782				

#### Commercial HVAC Program – Boilers

Launched in April 2006, the Commercial HVAC Program for Boilers seeks to transform the commercial boiler market in Manitoba by increasing awareness and adoption of energy efficient condensing and near-condensing boilers. Energy efficient boilers offer significant natural gas savings, reducing customers' monthly utility bills. The program focuses on educating building owners and operators about the benefits of energy efficient equipment and works with industry contractors, engineers, consultants, designers, and equipment dealers to promote these systems. Financial incentives ranging from \$2/MBH (thousands of BTUs per hour) to \$8/MBH are provided for qualifying systems. The program is designed to build market acceptance prior to a proposed minimum efficiency regulation, which is projected for adoption in April 2020.

The program's primary target market consists of commercial buildings with existing heating equipment that is at or nearing end of life. Boiler replacements are not likely to occur until existing equipment is nearing end of life and are often completed in an



emergency situation during the heating season. Therefore, purchasing decisions are made with limited lead time and primarily based on the initial capital cost, not considering the annual operating costs of the system over its 25-year life. Condensing or near-condensing natural gas boilers are also more expensive to install than conventional boilers, and require modifications to the ventilation system. Financial incentives, combined with educational materials and information on the lifecycle cost advantage of installing energy efficient systems, endeavor to address these market barriers.

In 2019/20, program participation is expected to be 75 boilers, resulting 0.6 million cubic metres of gas savings. Combined with achievements to date, 1,479 boilers will be installed resulting in 14.5 million cubic metres of natural gas savings by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20	
No. of Boilers	1,404	75	1,479	
Natural Gas Savings (million m <sup>3</sup> )	13.9	0.6	14.5	
Utility Investment (Millions, \$)	\$13.2	\$0.4	\$13.7	
Customer Investment (Millions, \$)	\$11.0	\$0.5	\$11.4	
Total DSM Investment (Millions, \$)	\$24.2	\$0.9	\$25.1	
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$1,887				

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#### Commercial HVAC Program - C02 Sensors

Launched in April 2009, the Commercial HVAC Program for CO2 Sensors is designed to increase the awareness and adoption of CO2 sensors in commercial facilities. CO2 sensors reduce energy consumption by matching ventilation supply to occupant demand, reducing customers' monthly utility bills. CO2 sensors also improve occupant comfort by providing more consistent air quality and can extend the life of heating and cooling equipment by putting less demand on these systems.

The program's primary target market consists of over-ventilated commercial facilities with variable occupancy that have, or are considering, direct digital control systems or rooftop units to control heating, cooling, and ventilation. Installations typically occur when other major renovations are being made to the ventilation system.

CO2 sensors are not required in commercial building operation and therefore, are often one of the first retrofit measures to be



overlooked, particularly in the presence of budgetary constraints. Also, customers tend to be unfamiliar with the operation of their ventilation systems and therefore, may be unaware when their building is being over-ventilated. Aggressive financial incentives, combined with promoting the lifecycle cost advantage and improved ventilation benefits of CO2 sensor technology, endeavor to address these market barriers.

In 2019/20, program participation is expected to be 142 sensors, resulting in 0.1 GW.h and 0.1 MW of electric savings and 0.1 million cubic metres of gas savings. Combined with achievements to date, 746 sensors will be installed resulting in 0.8 GW.h and 0.4 MW of electric savings and 0.9 million cubic metres of natural gas savings by the end of 2019/20.

	2009/10 to 2018/19*	2019/20	Total to 2019/20	
No. of Sensors	604	142	746	
Capacity Savings (MW)	0.3	0.1	0.4	
Energy Savings (GW.h)	0.7	0.1	0.8	
Natural Gas Savings (million m <sup>3</sup> )	0.8	0.1	0.9	
Utility Investment (Millions, \$)	\$0.7	\$0.2	\$0.8	
Customer Investment (Millions, \$)	\$0.1	\$0.0	\$0.1	
Total DSM Investment (Millions, \$)	\$0.8	\$0.2	\$1.0	
Estimated Average Annual Bill Reduction per Customer (Electric): \$83				

Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$1

#### Commercial HVAC Program – HRV/ERV

The Commercial HVAC Program for Heat Recovery Ventilators (HRV) and Energy Recovery Ventilators (ERV) was launched in May 2016. An HRV/ERV introduces fresh air by having the stale and polluted air from the building pass through the heat exchanger core with a continuous stream of fresh air. As the stale air being expelled moves through the HRV system and passes the fresh air being drawn in, heat or cold is transferred and recovered. The installation of an HRV/ERV can reduce ventilation heating load from 50 to 80 per cent.



The program's primary target market consists of existing commercial buildings with mechanical ventilation and dense occupancy, such as multi-unit residential buildings, health care facilities, retail spaces, restaurants, offices, and schools. Financial incentives and educational materials serve to build awareness and understanding of HRV/ERV technology and encourage participation in the program.

In 2019/20, program participation is expected to be 31 buildings, resulting in 0.8 GW.h and 0.4 MW of electric savings and 0.2 million cubic metres of gas savings. Combined with achievements to date, 49 buildings will participate resulting in 2.0 GW.h and 1.0 MW of electric savings and 0.3 million cubic metres of natural gas savings by the end of 2019/20.

	2016/17 to 2018/19*	2019/20	Total to 2019/20	
No. of Buildings	18	31	49	
Capacity Savings (MW)	0.7	0.4	1.0	
Energy Savings (GW.h)	1.2	0.8	2.0	
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.2	0.3	
Utility Investment (Millions, \$)	\$0.6	\$0.5	\$1.1	
Customer Investment (Millions, \$)	\$0.1	\$0.5	\$0.5	
Total DSM Investment (Millions, \$)	\$0.7	\$1.0	\$1.7	
Estimated Average Annual Bill Reduction per Customer (Electric): \$2,168				
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$1,545				

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#### **Commercial HVAC Program - Water Heaters**

The Commercial HVAC Program for Water Heaters was launched in April 2015. The program is designed to reduce natural gas consumption by accelerating the adoption of high efficiency natural gas water heaters, which are approximately 30% more efficient than standard efficiency units.

The program's primary target market consists of commercial buildings with high levels of domestic hot water consumption where the current water heating system is at or nearing end of life.





High initial product costs and long payback periods serve as barriers to the purchase and installation of condensing water heaters. Financial incentives, educational materials, and information seminars endeavor to address these market barriers.

The program also supports the potential for future regulations by advancing market acceptance of condensing water heating technology in Manitoba. The program will prepare the market for a condensing water heater regulation by educating customers, contractors, and distributors about the benefits of condensing water heaters. Advertising and promotional activities increase consumer and contractor awareness of the program and the benefits of choosing high efficiency water heating options.

In 2019/20, program participation is expected to be twelve water heaters, resulting in 34,000 cubic metres of natural gas savings. Combined with achievements to date, 108 water heaters will be installed resulting 0.1 million cubic metres of natural gas savings by the end of 2019/20.

	2015/16 to 2018/19*	2019/20	Total to 2019/20	
No. of Water Heaters	96	12	108	
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.0	0.1	
Utility Investment (Millions, \$)	\$0.5	\$0.1	\$0.5	
Customer Investment (Millions, \$)	\$0.2	\$0.1	\$0.3	
Total DSM Investment (Millions, \$)	\$0.7	\$0.1	\$0.8	
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$470				

#### **Commercial Custom Measures Program**

The Commercial Custom Measures Program, launched in 2006, is designed to encourage commercial customers to explore and implement energy efficient upgrades of their operations or facilities. This program offers support for customer-specific and unique projects or newer technologies that are not currently eligible under the other Commercial Program offerings. Technologies and projects may include digital control systems, hot water and space heating equipment, waste energy recovery systems, variable speed drive systems, and solar air and water heating systems. The program provides funding to help cover the cost of feasibility studies that are often required for larger projects and newer or emerging technologies, and implementation incentives based on projected savings from the project.

The program targets all commercial customers planning new construction, renovation or expansion projects. Often the high incremental cost of energy efficient technologies and systems, customer uncertainty of payback, and lack of awareness of energy



efficient alternatives limit a customer's propensity to invest in an energy efficient project. The Custom Measures Program addresses these barriers by promoting new and innovative technologies, by offering a feasibility study incentive to provide confidence in energy savings estimates, and by offering incentives to help reduce the implementation cost. An enhanced Custom Measures Program was launched in 2015/16 addressing one of the barriers to participation, the cost of identifying and investigating savings opportunities. The cost of feasibility study proposals and reports are now completely funded by the program for large electric projects.

In 2019/20, program participation is expected to be 27 projects, resulting in 2.5 GW.h and 0.3 MW of electric savings and 0.3 million cubic metres of gas savings. Combined with achievements to date, 146 projects will participate resulting in 29.5 GW.h and 2.6 MW of electric savings and 2.7 million cubic metres of natural gas savings by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20
No. of Projects	119	27	146
Capacity Savings (MW)	2.2	0.3	2.6
Energy Savings (GW.h)	27.0	2.5	29.5
Natural Gas Savings (million m <sup>3</sup> )	2.4	0.3	2.7
Utility Investment (Millions, \$)	\$5.4	\$0.7	\$6.1
Customer Investment (Millions, \$)	\$12.2	\$0.9	\$13.2
Total DSM Investment (Millions, \$)	\$17.6	\$1.7	\$19.3
Estimated Average Annual Bill Reduction per Customer (Electric): \$8,577			
Estimated Average Annual Bill Reduction per Customer (Natur	al Gas): \$4,109		

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#### **Enhanced Building Operations Program**

The Enhanced Building Operations Program (formerly called Commercial Building Optimization Program), launched in 2006, encourages commercial customers with existing buildings to engage in an assessment and adjustment process known as retrocommissioning (RCx) to help return their buildings' mechanical systems to their designed operating characteristics and even further optimize their operation to save energy and improve occupant comfort. The program utilizes local engineering and energy service companies to identify noncapital intensive energy conservation opportunities with relatively short payback periods. Incentives are offered to cover a portion of the cost for hiring the RCx agent as well as for implementation of the energy efficient measures identified through the investigation process.



The market consists of existing commercial buildings larger than 50,000 square feet and between two and 25 years of age with direct digital control systems and functioning heating, ventilating and air conditioning mechanical systems. There are approximately 500 buildings in this market, however there are significant barriers that must be overcome to reach these customers including lack of experience and availability of RCx providers in Manitoba, lack of customer awareness of the cost-saving benefits of RCx, and lack of customer time and competing priorities for capital to invest in energy efficiency projects. The program addresses these barriers by providing training and information sessions for potential and existing RCx providers, by promoting RCx at relevant industry events, and by offering incentives to reduce the capital cost and payback cycle of the RCx process. Further addressing these barriers, an enhanced program with increased incentives and revised RCx templates designed to yield more per-project savings was introduced in 2016/17 and re-named the Enhanced Building Operations Program.

In 2019/20, program participation is expected to be three buildings, resulting in 0.6 GW.h and 0.1 MW of electric savings and 0.1 million cubic metres of natural gas savings. Combined with achievements to date, 21 buildings will participate resulting in 4.2 GW.h and 0.6 MW of electric savings and 0.9 million cubic metres of natural gas savings by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20
No. of Buildings	18	3	21
Capacity Savings (MW)	0.5	0.1	0.6
Energy Savings (GW.h)	3.6	0.6	4.2
Natural Gas Savings (million m <sup>3</sup> )	0.7	0.1	0.9
Utility Investment (Millions, \$)	\$3.2	\$0.2	\$3.4
Customer Investment (Millions, \$)	\$0.1	\$0.1	\$0.2
Total DSM Investment (Millions, \$)	\$3.2	\$0.3	\$3.5
Estimated Average Annual Bill Reduction per Customer (Electric): \$11,739			
Estimated Average Annual Bill Reduction per Customer (Natur	al Gas): \$7,590		

# New Buildings Program

The New Buildings Program, introduced in 2010, offers technical assistance and financial incentives for customers designing and constructing new, energy efficient commercial buildings. The program is designed to transform the commercial new construction industry in response to recent building code changes which require significant improvements in overall building energy efficiency.



The first version of the program aimed to prepare the Manitoba commercial building industry for the province's adoption of the National Energy Code of Canada for Buildings (NECB) 2011. Ninety-two buildings have been completed through this program since 2010 and more than 90 new projects are currently in design or under construction. As of December 1, 2014, all commercial buildings in Manitoba must now adhere to the province's version of the NECB called the Manitoba Energy Code for Buildings (MECB).

With the new code in force, the New Buildings Program has evolved to once again seek higher levels of energy performance in new buildings. To qualify as an official Energy Efficient Building, projects must be designed with an energy target that is at least 10% better than a standard, code-compliant building. Financial incentives range from \$0.50/ft2 to \$2.00/ft2 depending on the project's overall energy target. An Energy Modeling Assistance Incentive of up to \$10,000 is also available to encourage the use of energy modeling early in a building's design process and to help develop the local energy modeling industry in support of Manitoba Hydro and the MECB.

The target market is all new commercial buildings that are bound by the requirements of the MECB. The industry faces fundamental changes to the current methods of designing, constructing, and commissioning commercial buildings. Manitoba Hydro also worked closely with the Province's Green Building Coordination Team to develop the Green Building Policy for Government of Manitoba Funded Projects. This policy ensures the Province's investments in new construction will help transform the local market and will help build industry capacity within Manitoba.

In 2019/20, program participation is expected to be twenty new buildings, resulting in 3.7 GW.h and 1.1 MW of electric savings and 0.1 million cubic metres of natural gas savings. Combined with achievements to date, 151 new buildings will participate resulting in 39.9 GW.h and 11.3 MW of electric savings and 4.7 million cubic metres of natural gas savings by the end of 2019/20. The program is forecast to reach 10% market penetration of the new construction market in 2019/20.

	2009/10 to 2018/19*	2019/20	Total to 2019/20
No. of Buildings	131	20	151
Capacity Savings (MW)	10.2	1.1	11.3
Energy Savings (GW.h)	36.1	3.7	39.9
Natural Gas Savings (million m <sup>3</sup> )	4.6	0.1	4.7
Utility Investment (Millions, \$)	\$15.8	\$1.7	\$17.4
Customer Investment (Millions, \$)	\$21.1	\$1.6	\$22.7
Total DSM Investment (Millions, \$)	\$36.8	\$3.2	\$40.1
Estimated Average Annual Bill Reduction per Customer (Electric): \$13,213			
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$860			

#### **Commercial Refrigeration Program**

The Commercial Refrigeration Program, launched in 2006, encourages commercial customers to reduce energy consumption by offering over 10 different product incentives for energy efficient upgrades to refrigeration display cases, walk-in boxes, mechanical rooms, and lighting. Savings are achieved by providing customers with information about best practices for maintenance, promoting energy efficient refrigeration technologies, and optimizing the operation of new and existing refrigeration equipment.

The target market is commercial customers with foodservice refrigeration equipment, primarily restaurants, grocery and convenience stores. Many of the qualifying energy efficient refrigeration systems have higher incremental costs, and equipment upgrade decisions are



frequently based on aesthetics over energy efficiency. Offering financial incentives to lower incremental costs and promoting the energy and associated bill savings along with non-energy benefits of efficient refrigeration systems, such as increased comfort in refrigeration aisles for customers and employees, reduced product spoilage, and extended equipment life for refrigeration motors and compressors, is effectively addressing these barriers.

In 2019/20, program participation is expected to be 210 projects, resulting in 3.8 GW.h and 0.5 MW of electric savings. Combined with achievements to date, participation will be 2,892 projects resulting in 78.2 GW.h and 10.9 MW of electric savings by the end of 2019/20. The program is forecast to reach 64% of targeted customers by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20
No. of Locations	2,682	210	2,892
Capacity Savings (MW)	10.4	0.5	10.9
Energy Savings (GW.h)	74.4	3.8	78.2
Utility Investment (Millions, \$)	\$5.9	\$0.3	\$6.2
Customer Investment (Millions, \$)	\$5.8	\$0.1	\$5.9
Total DSM Investment (Millions, \$)	\$11.7	\$0.4	\$12.1
Estimated Average Appual Bill Reduction per Customer (Electric): \$308			

## **Commercial Kitchen Appliances Program**

The Commercial Kitchen Appliances Program encourages restaurants and foodservice establishments to purchase high-efficiency kitchen equipment. The program provides rebates to customers who purchase and install high-efficiency steam cookers (electric and gas) and deep-fat fryers (gas only). To qualify, the model must either be ENERGY STAR® certified or tested for compliance with ENERGY STAR® requirements.



In comparison to standard models, many ENERGY STAR® appliances may have a higher initial purchase cost but many customers are not



aware that ENERGY STAR® appliances can improve food quality, decrease cooking times, and lessen operating and maintenance costs. By providing financial incentives and promoting the various energy and nonenergy benefits of high-efficiency appliances, the program endeavors to address these market barriers.

In 2019/20, the program is expected to support the installation of nineteen appliances, achieving 0.1 GW.h and 0.04 MW of electric savings and 6,000 cubic metres of natural gas savings. Combined with achievements to date, 1,310 appliances will be installed resulting in 3.8 GW.h and 1.1 MW of electric savings and 1.1 million cubic metres of natural gas savings by the end of 2019/20.

	2008/09 to 2018/19*	2019/20	Total to 2019/20
No. of Appliances	1,291	19	1,310
Capacity Savings (MW)	1.1	0.0	1.1
Energy Savings (GW.h)	3.7	0.1	3.8
Natural Gas Savings (million m <sup>3</sup> )	1.1	0.0	1.1
Utility Investment (Millions, \$)	\$1.1	\$0.1	\$1.1
Customer Investment (Millions, \$)	\$0.1	\$0.0	\$0.1
Total DSM Investment (Millions, \$)	\$1.2	\$0.1	\$1.2
Estimated Average Annual Bill Reduction per Customer (Electric): \$602			
Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$237			

# Network Energy Management Program

The Network Energy Management Program, launched in 2009, encourages customers to install program-approved software that conserves energy by sending personal computers (PCs) into a mode that consumes less energy when they are not in use. The program is aimed at commercial and institutional organizations that manage a network of PCs.

The target market is comprised of approximately 2,500 physical locations in the school/college and office sectors, representing approximately 300,000 PCs. Installation, configuration, and testing of this new software on existing networks can require a significant time investment. Although management may realize operational cost savings, IT staff is often cautious when implementing software that they perceive may in any way restrict their ability to access individual PCs remotely to perform maintenance and system upgrades. The program provides financial incentives and promotes the product benefits through direct marketing to both management and IT staff in order to address these barriers to adoption.

In 2019/20, program participation is expected to be 250 software licenses, resulting in 0.04 GW.h and 0.01 MW of electric savings. Combined with achievements to date, participation will be 5,596 software licenses resulting in 2.7 GW.h and 0.3 MW of electric savings by the end of 2019/20.

	2009/10 to 2018/19*	2019/20	Total to 2019/20
No. of Licenses	5,346	250	5,596
Capacity Savings (MW)	0.3	0.0	0.3
Energy Savings (GW.h)	2.7	0.0	2.7
Utility Investment (Millions, \$)	\$0.3	\$0.0	\$0.3
Customer Investment (Millions, \$)	\$0.1	\$0.0	\$0.1
Total DSM Investment (Millions, \$)	\$0.3	\$0.0	\$0.3

Estimated Average Annual Bill Reduction per Customer (Electric): \$4,165

\*Includes estimates for 2018/19

# How many PCs are left on overnight in your office?

Act now to receive a rebate for 100 per cent' of the cost of energy saving software.

For more information, call 204-360-3676 (Winnipeg) or 1-888-624-9376 (toll free), or visit hydro.mb.ca/your\_business.


#### Internal Retrofit Program

The Internal Retrofit Program (IRP), launched in 1993, targets energy efficient upgrades in Manitoba Hydro buildings including, but not limited to, generating stations, commercial facilities, office spaces and corporate housing. The program's efforts demonstrate Manitoba Hydro's commitment to energy conservation at large. The program provides technical assistance and financial support for the installation of energy efficient measures such as lighting, windows, insulation, heating, ventilation, and air conditioning systems and other custom measures.

In addition to achieving energy savings, the IRP strives to improve workplace safety, address operational issues, reduce maintenance costs and optimize employee comfort.



In 2019/20, it is anticipated that the program will complete 44 projects, resulting in 1.0 GW.h and 0.2 MW of electric savings. Combined with achievements to date, the program will have completed 1,861 projects resulting in 75.3 GW.h and 16.1 MW of electric savings and 0.1 million cubic metres of natural gas savings by the end of 2019/20.

	1992/93 to 2018/19*	2019/20	Total to 2019/20
No. of Projects	1,817	44	1,861
Capacity Savings (MW)	16.0	0.2	16.1
Energy Savings (GW.h)	74.3	1.0	75.3
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.0	0.1
Utility Investment (Millions, \$)	\$25.7	\$0.5	\$26.2

#### Small Business Program

Since October 2015, the Small Business Program has promoted energy efficiency to the hard-to-reach small commercial market such as small restaurants, offices, clinics, and salons. More recently, the program was also extended to non-profit organizations, charities, and religious facilities across Manitoba. To be eligible, the business must be 10,000 square feet or less in size and a Manitoba Hydro commercial customer with either an electric or natural gas heating system. National chains and new construction projects are not eligible to participate.



The Small Business Program utilizes a full-service contractor delivery model and consists of a three-part offering:

- 1. On-site direct installation of various free measures, such as bathroom and kitchen faucet aerators, low-flow pre-rinse spray valves, and basic lighting measures.
- 2. Free lighting assessment that identifies further opportunities to upgrade inefficient lighting.
- 3. Qualifying lighting retrofits identified in the assessment are eligible for an incentive of 70% of the material and labour costs. Materials and labour are sourced through the program contractor.

The small commercial market is a proven late adopter of energy efficient technologies due to a number of unique barriers that have not been specifically addressed by Commercial Programs in the past. Budgetary restrictions, limited resources, and a lack of industry exposure are all barriers that the Small Business Program endeavors to overcome. The program's aggressive incentives are intended to lessen upfront capital costs to the customer.

In 2019/20, program participation is expected to be 976 projects, resulting in 3.4 GW.h and 0.8 MW of electric savings and 13,000 cubic metres of natural gas savings. Combined with achievements to date, participation will be 4,760 projects resulting in 15.2 GW.h and 3.4 MW of electric savings and 0.1 million cubic metres of natural gas savings by the end of 2019/20.

	2009/10 to 2018/19*	2019/20	Total to 2019/20
No. of Projects	3,784	976	4,760
Capacity Savings (MW)	2.6	0.8	3.4
Energy Savings (GW.h)	11.8	3.4	15.2
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.0	0.1
Utility Investment (Millions, \$)	\$5.1	\$1.1	\$6.2
Customer Investment (Millions, \$)	\$0.3	\$0.3	\$0.6
Total DSM Investment (Millions, \$)	\$5.4	\$1.4	\$6.8
Estimated Average Annual Bill Reduction per Customer (Electric): \$45			

Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$2

#### Manitoba Race to Reduce

Manitoba Race to Reduce, launched January 2017, is a competition-based initiative designed to reduce energy consumption in participating office buildings by 10 per cent over a four year race. Collaboration among customers, industry associations, and other key stakeholders is an important principle of the race. Encouraged energy reduction behaviours include turning off lights in unoccupied spaces, setting back thermostats,



closing window blinds in cooling season, enabling energy-saving features of office equipment, and more.

By increasing the energy efficiency, or simply reducing the energy use in these buildings, landlords and tenants can reduce operating costs while making a direct improvement to Manitoba's environment by reducing carbon emissions and improving air quality. The initiative has secured almost seven million square feet of office space in Manitoba to participate in the competition. Successful Race to Reduce participants will be publicly recognized and celebrated annually during the initiative's award ceremonies.

In 2019/20, it is expected that six commercial buildings will participate, resulting in 0.9 GW.h and 0.1 MW of electric savings and 0.1 million cubic metres of natural gas savings. The program is forecast to enroll 71% of targeted customers by the end of 2019/20.

	2016/17 to 2018/19*	2019/20	Total to 2019/20
No. of Buildings	35	6	41
Capacity Savings (MW)	0.1	0.1	0.2
Energy Savings (GW.h)	0.9	0.9	1.9
Natural Gas Savings (million m <sup>3</sup> )	0.1	0.1	0.1
Utility Investment (Millions, \$)	\$0.5	\$0.1	\$0.6
Customer Investment (Millions, \$)	\$0.0	\$0.0	\$0.0
Total DSM Investment (Millions, \$)	\$0.5	\$0.1	\$0.6
Estimated Average Annual Bill Reduction per Customer (Electric): \$7,388			

Estimated Average Annual Bill Reduction per Customer (Natural Gas): \$2,05

### Industrial

Manitoba industry competes in a global economy and energy efficiency is often a key indicator of the overall productivity and competitiveness of an industrial customer. Energy consumption is impacted by every aspect of an industrial operation, from the way employees work to the facilities they work in, and the way in which they process, package and deliver raw materials into finished goods for their local, national and international customers.

Manitoba Hydro offers incentive-based programs to address opportunities within the industrial market for energy efficiency improvements and co-generation of electricity. These programs take a customerfocused approach to identifying and addressing operating and production challenges in a manner that not only improves overall energy efficiency, but enhances productivity and competitiveness for Manitoba industry.

Manitoba's industrial market can be characterized as consisting of a large variety of industries with a broad demographic of customers within each classification. While some sectors are responsible for higher percentages of consumption than others, no one industry sector is dominant within the province. In Manitoba, each sector is typically dominated by less than six customers, with the remaining customers being smaller with more specialized operations or substantively lower outputs. This diversity presents some unique challenges with program delivery as opportunities to capture substantive savings are tied directly to specific industry business cycles within each industry sector that dictate major events such as equipment change-outs, plant overhauls, facility expansions, and new plant construction. These cycles are periodic and can stretch across decades, with timing influenced heavily by global market cycles and competitive pressures.

Investing in the energy efficiency of our industrial customers increases their competitiveness in the global economy. On average, energy costs account for 5% to 15% of total operating costs for the majority of these companies, while energy intensive resource companies employing thousands of Manitobans across the north and rural regions of southern Manitoba have energy costs that range from 15% to 70% of total operating costs.

Manitoba Hydro's total industrial energy efficiency investment is returned annually to the Province's industrial sector through reduced energy costs. These investments in energy efficiency reduce operating costs, further helping to make Manitoba industry increasingly productive and globally competitive, and supporting further investment in energy efficiency and productivity improvements.

#### Performance Optimization Program

The Performance Optimization Program, launched in June 1993, is designed to promote energy efficiency through the optimization of electric motor-driven industrial systems such as air compressors, pumps, fans and blowers, optimization of industrial refrigeration, process heating, electro-chemical processes systems, and implementation of plant-wide energy management systems. The program supports customers with financial incentives to assist in the identification, investigation, and implementation of system efficiency improvements throughout a facility.

The focused target market consists of approximately 2,000 industrial customers, with the



program being available to both existing facilities and new construction projects. The average duration of a project from identification of the opportunity to implementation ranges from six months to two years, averaging approximately eighteen months.

The actual number of project applications facilitated in any fiscal year and the savings achieved per project can vary dramatically based on project size, equipment age, and remaining life of the individual systems being optimized. However, savings levels are relatively consistent, thereby reflecting the capability within Manitoba Hydro's programs to adapt to available opportunities.

In 2019/20, the program is expected to achieve 10.1 GW.h and 1.6 MW of electric savings. Combined with achievements to date, the program is expected to achieve 603.9 GW.h and 112.4 MW by the end of 2019/20.

	1993/94 to 2018/19*	2019/20	Total to 2019/20
Capacity Savings (MW)	110.8	1.6	112.4
Energy Savings (GW.h)	593.8	10.1	603.9
Utility Investment (Millions, \$)	\$39.6	\$1.7	\$41.3
Customer Investment (Millions, \$)	\$96.0	\$2.7	\$98.6
Total DSM Investment (Millions, \$)	\$135.5	\$4.4	\$140.0
Estimated Average Appual Bill Peduction per Customer (Flectr	ic), \$6 016		

Estimated Average Annual Bill Reduction per Customer (Electric): \$6

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#### Natural Gas Optimization Program

The Natural Gas Optimization Program (NGOP), launched in September 2006, is designed to support the systematic improvement of natural gas equipment and processes for industrial and large institutional customers. The program supports customers by offering financial incentives for steam trap audits, feasibility studies and energy efficient project implementation. NGOP responds to all industrial customer inquiries, regardless of the size of the facility or volume of natural gas consumed.

Like the Performance Optimization Program, the NGOP is a custom program that supports a variety of technologies across a wide variety of applications, including; boiler conversions, process water and air heat recovery, process equipment and pipe insulation, boiler economizers, and other



available technologies. The program is designed to address key market barriers related to project costs, available benefits, cost/benefit ratios and desired return on investment.

Current low natural gas commodity prices are challenging Manitoba Hydro customers' ability to achieve desired rates of return on investments in conservation initiatives. This highlights the importance of Manitoba Hydro being actively involved when new facilities and uses of natural gas are being constructed, as any inefficiencies in the original facility design or process will be hard to rectify in coming years.

The actual number of project applications facilitated in any fiscal year and the savings achieved per project can vary dramatically based on project size, equipment age, and remaining life of the individual systems being optimized. However, savings levels are relatively consistent, thereby reflecting the capability within Manitoba Hydro's programs to adapt to available opportunities.

In 2019/20, the program is expected to achieve 1.0 million cubic metres in natural gas savings. Combined with achievements to date, the program is expected to achieve 21.9 million cubic metres in natural gas savings by the end of 2019/20.

	2006/07 to 2018/19*	2019/20	Total to 2019/20
Natural Gas Savings (million m <sup>3</sup> )	20.9	1.0	21.9
Utility Investment (Millions, \$)	\$7.3	\$0.4	\$7.6
Customer Investment (Millions, \$)	\$33.3	\$0.7	\$33.9
Total DSM Investment (Millions, \$)	\$40.5	\$1.0	\$41.6
Estimated Average Annual Bill Reduction per Customer (Natur	al Gas): \$15,648		

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### Load Displacement & Alternative Energy

Load Displacement occurs when customer-owned and operated facilities capable of generating heat and/or power are used to displace energy purchases that would otherwise be made from the Manitoba Hydro system in the form of electric and/or natural gas consumption. This displacement is achieved in an environmentally sustainable manner using renewable energy resources such as process waste and byproduct streams from common industrial processes.

Displaced energy provided under long-term contracts with customers is used by Manitoba Hydro to serve other customers' energy needs, including the export market, where the sale of renewable electric energy displaces generation that is largely fossil fuel-based. The widely distributed nature of load displacement projects can in some cases defer the need for costly transmission and distribution infrastructure upgrades required to move energy across the Province.

The productive use of available waste and by-product streams enhances the economics of local industries and reduces environmental impacts and costs for disposal. In this manner, Manitoba Hydro's Load Displacement and Bioenergy Optimization Programs provide an important opportunity to support and expand the local economic footprint of Manitoba's energy industry in an environmentally sustainable manner. Any alternate energy resources used to facilitate load displacement are to be obtained locally, contributing to the Manitoba economy and displacing purchases of fossil fuels from out-of-province suppliers.

Investments in load displacement by Manitoba Hydro and its customers are an important opportunity for Manitoba business to enhance their economic competitiveness and reduce their environmental footprint. Manitoba Hydro's Load Displacement and Bioenergy Optimization Programs are intended to support these investments and capture their associated investments for all Manitobans.

#### **Bioenergy Optimization Program**

The Bioenergy Optimization Program, launched in 2006, is designed to encourage customers to install, operate, and maintain customer-sited load displacement generation systems that employ heat only and/or combined heat and power (CHP) applications fueled by renewable energy sources, such as biomass.

Initially the target market consisted primarily of agricultural customers that have readily available, low-cost sources of biomass, continual needs for heat and power, and the capability to operate and



maintain biomass-to-energy conversion systems. The knowledge gained through the delivery of the program has helped to focus the program towards biomass heating applications.

The program is currently targeting schools, institutes, and public buildings. The sizes of systems anticipated under the program are less than one MW of electrical equivalent capacity.

In 2019/20, the program participation is expected to be two projects, resulting in 0.8 GW.h and 0.2 MW of electric savings. Combined with achievements to date, participation will be 49 projects resulting in 66.2 GW.h and 9.8 MW of electric savings by the end of 2019/20.

	2005/06 to 2018/19*	2019/20	Total to 2019/20
No. of Projects	47	2	49
Capacity Savings (MW)	9.6	0.2	9.8
Energy Savings (GW.h)	65.4	0.8	66.2
Utility Investment (Millions, \$)	\$13.0	\$0.3	\$13.4
Customer Investment (Millions, \$)	\$66.8	\$0.2	\$67.0
Total DSM Investment (Millions, \$)	\$79.8	\$0.5	\$80.3

Estimated Average Annual Bill Reduction per Customer (Electric): Variable depending on project size

#### Load Displacement Program

The Load Displacement Program, launched in 2014, encourages industrial and municipal customers to install, operate, and maintain customer-sited load displacement generation systems that rely on waste streams, by-products and locally-available, low-cost sources of biomass and other renewable energy sources as the fuel source. The target market consists of customer sectors that are striving to optimize their operations while also achieving reduced energy costs and improved environmental performance.

Industrial and municipal operations typically incur costs for the disposal and treatment of their waste and by-products streams required to mitigate environmental liabilities. Converting waste and by-product streams into useful energy for use within the manufacturing operation is often a more sustainable practice environmentally, and a means of reducing overall energy and disposal costs. Similarly, locally-available low-cost sources of biomass such as waste wood and crop residues can be harnessed as a sustainable and economic fuel source for on-site heat and power generation.

Experience to date has shown that a typical load displacement generation project can take from two to three years from initial analysis, to design and equipment implementation, through to start-up and operation. To support this process, the Manitoba Hydro Load Displacement Program provides financial support for feasibility studies, engineering design, and the implementation of customer-sited generation projects, on the condition that long-term contractual commitments can be secured.

Major customer sectors targeted by the program include forestry, chemicals, metals, oil and gas, and municipal wastewater treatment facilities. The capacity of these on-site generation systems is anticipated to provide more than one MW of electrical load displacement. Existing self-generation systems may also be eligible for financial support if additional investment results in stable and reliable long-term output.

	2014/15 to 2018/19*	2019/20	Total to 2019/20
Capacity Savings (MW)	19.4 **	13.8	13.8
Energy Savings (GW.h)	129.0 **	99.0	99.0
Utility Investment (Millions, \$)	\$14.7	\$1.0	\$15.7
Customer Investment (Millions, \$)	\$10.6	\$0.0	\$10.6
Total DSM Investment (Millions, \$)	\$25.3	\$1.0	\$26.3
Estimated Average Annual Bill Reduction per Customer (Electric): Variable depending on project size			

In 2019/20, the program is expected to achieve 99.0 GW.h and 13.8 MW of electric savings.

\*Includes estimates for 2018/19

\*\*Annual capacity and energy savings not subject to long-term contractual commitments do not persist beyond the year achieved and therefore are not included in the cumulative savings in future years. These savings must be re-earned annually.

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### Load Management

### Curtailable Rate Program

Under the Curtailable Rate Program, qualifying customers receive a monthly credit on load (kW) which can be curtailed on notice from Manitoba Hydro. To be eligible, customers' load/processes must be configured to allow them to meet the requested curtailment within the notification period as outlined under their chosen contract option.

	1990/00 to 2018/19*	2019/20	Total to 2019/20
No. of Annual Participants	62	3	65
Capacity Savings (MW)	213.3	213.2	213.2
Utility Investment (Millions, \$)	\$112.1	\$6.8	\$119.0



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### Codes, Standards & Regulations

In addition to utility-directed DSM programs, Manitoba Hydro's strategy to affect change in codes and standards involves being an aggressive and active participant and, in many cases, a driving force on a number of energy efficiency building codes and performance standards committees. These codes and standards are subsequently referenced in national and provincial regulations that mandate minimum energy performance levels for a variety of appliances, buildings and other energy consuming measures. The focus of Manitoba Hydro's efforts on these committees is to advance the progress of product efficiency improvements which are then incorporated into Manitoba DSM programs, and subsequent energy efficiency regulations and building codes proposed by national and provincial regulators.

While the total costs for all participants in achieving codes and standards savings are largely the same as those incurred through other methods of encouraging energy efficiency, the cost for Manitoba Hydro to participate in codes and standards processes is considerably less, as the Corporation is able to leverage efforts from the other stakeholders participating in these processes including consumers, industry, and government.

There are several areas of focus for the 2019/20 year.

#### **Building Energy Codes**

Manitoba adopted the Manitoba Energy Code for Buildings (MECB 2011) in December 2014. Given this was the first time energy efficiency was introduced into building code, Manitoba Hydro has continued to support the market in designing buildings that are compliant.

In 2019/20, Manitoba Hydro will continue to offer regular consultation to the various code authorities across the Province, including the Manitoba Office of the Fire Commissioner, City of Winnipeg, and City of Brandon, etc. Widely recognized as the province's experts on energy use, and commercial and residential energy codes, Manitoba Hydro technical personnel will also consult on code interpretations and plan reviews to supplement the available resources within the various planning districts and permitting offices throughout Manitoba. In addition, energy code-related training and education sessions will continue to be offered for customers in collaboration with industry and trade associations.

Late in 2016, the 2015 National Building Code was reviewed at the Manitoba Building Standards Board (BSB) which included updates to the National Energy Codes for Buildings (NECB) and Section 9.36. The BSB recommended adoption of these changes to the Minister of Labour but formal approval, and hence adoption, has yet to be granted. The BSB was officially disbanded in December 2017. In addition to assisting the market with the current codes, Manitoba Hydro has also increased the requirements for its voluntary based incentive programs in the New Buildings Program and the New Homes Program. The intent is to encourage home builders and commercial building designers to pursue higher levels of energy efficiency and position themselves more favourably for the next code cycle which will see further improvements to energy efficiency in buildings. A specific program design strategy is to continue offering incentives for homes that are designed to meet higher performance thresholds. These strategies are continuing to address a specific gap in the Manitoba market which is a lack of energy modeling professionals. Early indications are that the codes nationally will be moving towards performance based

codes versus prescriptive based requirements. Having a more robust and experienced industry in place to support designing for energy efficiency will assist with this transition.

The Government of Canada released the Pan Canadian Framework in December 2016 which outlined a future strategy pertaining to energy use in buildings and, in particular, a defined path for improving efficiency in buildings through increasingly stringent changes to the National Building Code. With a goal of "net-zero energy ready" construction mandated across Canada in buildings codes by the year 2030, Manitoba Hydro will play a key role to move both Manitoba industry and customers towards these standards over the next 10 years.

The Federal Government has also signaled the desire to pursue a retrofit code for existing buildings by 2022. A code for existing buildings will help guide energy efficiency improvements that can be made when Canadians renovate their homes and buildings. The aim of Manitoba Hydro staff will be to ensure that the codes that are developed keep pace with the trajectory of adoption that exists in Manitoba due to many years of Demand Side Management offerings. To this end, Manitoba Hydro has secured representation on the Standing Committee on Energy Efficiency (SC-EE) that will make recommendations to the Canadian Commission on Building and Fire Codes on specific technologies and measures to include for both Part 3 (Commercial) and Part 9 (Residential) buildings.

#### **Energy Performance Standards**

At a national level, Manitoba Hydro continues to be an integral member of the CSA Steering Committee for Performance, Energy Efficiency and Renewables (SCOPEER) and SCOPEER Resource Task Force (SRTF) providing and directing financial support, technical expertise and leadership to the national effort. SCOPEER is responsible for the creation and maintenance of energy performance guides and standards, typically National Standards of Canada that are used to validate the energy performance and efficiency of many commonly used residential, commercial and industrial products and systems. In 2018/19 a new Technical Committee named Building Energy Systems (BES) was created to direct the creation of new standards and guidelines which combine subject matters traditionally covered by many of the existing equipment or sector based technical committees. The BES Technical Committee will oversee the creation of a new Retrofit Commissioning Standard for Existing Buildings and a Thermal Bridging Methodology for Building Envelope Systems. The standardized test methods and energy performance benchmarks created by CSA are fundamental to supporting government, end users and utilities in achieving energy savings and transforming markets through regulations.

#### **Energy Efficiency Regulations**

As a priority action item under Manitoba's Clean Energy Strategy and Manitoba Climate Change and Green Economy Action Plan, Manitoba Hydro involvement plays an important role in the Provincial regulation of energy consuming products under The Energy Act. The provision of technical support and market data that creates the supporting justification to gain industry acceptance and government approval play a key role in Manitoba Hydro's involvement. Members from Manitoba Hydro's marketing

and technical staff have been invited to consult with the Province on the development of a Framework for Minimum Energy Performance Standards in Manitoba that will form the basis of the Provincial strategy moving forward. Manitoba Hydro provided input in early 2018 and is awaiting further direction.

At the federal level, in 2019/20 efforts will be focused on the development of Energy Performance Standards supporting implementation of Amendments 15 and 16 to Canada's Energy Efficiency Act covering energy consuming products commonly used by the residential, commercial and industrial sectors. In addition, given the direction of the Canadian Energy Strategy (CES), Manitoba Hydro will be providing guidance and support for alignment and harmonization of various Canadian and US standards. Harmonization across North America supports industry attempts to improve the energy efficiency of common energy consuming goods.

Manitoba Hydro's support for this national effort provides important consideration for Manitoba's energy needs, as they relate to our local climate and other energy drivers. As an example, common white goods purchased by Manitoba consumers are imported into Canada by local wholesalers and retailers, who are subject to federal regulations at the point of entry into Canada. Federal regulations that include consideration of Manitoba needs support the goals and objectives of Manitoba Hydro's DSM strategy, and provide an important compliance mechanism to prevent under-performing products from entering the Manitoba market.

Manitoba Hydro's expertise and knowledge surrounding energy consuming equipment and the drivers for the Province's heating and cooling requirements are well respected across Canada, making Manitoba Hydro's voice an important influence at the federal and provincial level when changes to codes and standards are discussed. In providing this service, Manitoba Hydro projects a strong image of Manitoba's proficiency in supporting energy efficiency and climate change within Canada.

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Demand Side Management Plan | 2019/20



#### **REFERENCE:**

Efficiency Plan p.148 of 591

#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

Provide the following Manitoba Hydro Power Smart Annual Reviews and DSM reports:

- a. 2015/16 Power Smart Annual Provincial Report
- b. 2016/17 Power Smart Annual Provincial Report
- c. 2017/18 Provincial Annual DSM Report
- d. 2018/19 Provincial Annual DSM Report
- e. 2016/17 Affordable Energy Program Annual Report (Order 73/15 Directive 6)
- f. 2017/18 Affordable Energy Program Annual Report (Order 73/15 Directive 6)
- g. 2018/19 Affordable Energy Program Annual Report (Order 73/15 Directive 6)
- h. Affordable Energy Program quarterly reports for 2018/19 and 2019/20 to date.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

- a) 2015/16 Power Smart Annual Provincial Report Please see PUB/EM I-27-Attachment 1.
- b) The requested document if publicly available at the following link. <a href="https://www.hydro.mb.ca/docs/regulatory">https://www.hydro.mb.ca/docs/regulatory</a> affairs/pdf/natural gas/general rate applic ation 2019/07-4 appendix 7-4 power smart annual provincial report for the year ended march 31 2017.pdf
- c) The requested document is publicly available at pages 739 to 770 at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/natural\_gas/general\_rate\_applic\_ation\_2019/information\_requests/pub\_irs\_1-99.pdf</u>



- d) 2018/19 Provincial Annual DSM ReportThis report has not yet been completed.
- e) The requested document is publicly available at pages 563 to 583 at the following link. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/general\_rate\_applicatio</u> <u>n\_2017/information\_requests/round\_1\_pub\_irs.pdf</u>
- f) 2017/18 Affordable Energy Program Annual Report (Order 73/15 Directive 6)
  Please see PUB/EM I-27-Attachment 2.
- g) 2018/19 Affordable Energy Program Annual Report (Order 73/15 Directive 6)
  Please see PUB/EM I-27-Attachment 3.
- h) The requested documents are publicly available at the following link. <a href="https://www.hydro.mb.ca/docs/regulatory">https://www.hydro.mb.ca/docs/regulatory</a> affairs/pdf/natural gas/general rate applic ation 2019/07-5 appendix 7-5 affordable energy program quarterly reports 2015-16 to 2018-19 to date.pdf

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# **Power Smart Annual Provincial Report**

For the Year Ended March 31, 2016



March 2017



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wailable in accessible formats upon reques

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# Message from Manitoba Hydro's CEO

While Manitoba's population and economy continues to grow, so does our demand for electricity. At Manitoba Hydro, we have met our province's current and future energy needs through a combination of resources including conservation and energy efficiency.

In 2015/16, our employees continued to work hard to develop and deliver consumer-friendly programs empowering people and businesses to save energy and money. This commitment to educating and helping Manitobans engage in Power Smart programs saw almost 75,000 customers participate in the 2015/16 year and in turn save nearly \$16 million on their energy bills.

In addition to helping customers save money, these programs also helped to minimize our collective impact on the environment. The reduced greenhouse gas emissions due to energy savings from 2015/16 Power Smart programs are equivalent to removing over 41,000 vehicles from the road for one year.

Manitoba Hydro staff continued to work closely with industry partners to deliver energy and cost saving programs to Manitobans. In the 2015/16 spring and fall Residential Light-emitting diode (LED) Lighting Program's retail rebate promotion, we partnered with several retailers to reach 68 communities across Manitoba. The success of the campaign exceeded expectations, surpassing its forecasted goal by 39 per cent after rebating 671,000 bulbs.

The leadership role Manitoba Hydro has played in demand side management has been recognized within Canada and around the world. Included in our achievements for the 2015/16 year was the esteemed 2016 ENERGY STAR Utility of the Year Award recognizing excellence in promoting energy efficiency to customers in the 2015 year.

We are proud of our dedicated employees who have continued to raise awareness and champion the growing culture of energy conservation in Manitoba. They have worked with customers, manufacturers, retailers, and industry to increase the market acceptance and adoption of energy efficient products. This approach to energy conservation will continue to reduce our impact on the environment and will assist in meeting Manitoba's energy needs now and into the future.

Kelvin Shepherd, President & Chief Executive Officer, Manitoba Hydro

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# HIGHLIGHTS

### 2015/16 Year in Review



Nearly **75,000** participants in Power Smart programs and initiatives.

Nearly **460,000** LED light bulbs purchased by Manitobans through the Residential LED Lighting Program.

Customer electricity and natural gas bills reduced by nearly **\$16 million**.





The electric energy saved in 2015/16 is enough to power over 17,000 homes.

The natural gas energy saved in 2015/16 is enough to serve nearly **3**,000 homes.

Reduced greenhouse gas emissions resulting from Power Smart energy savings equate to removing over **41,000** cars off the road.





Customers are very satisfied with Manitoba Hydro's efforts to encourage customers to be more energy efficient – 81% of customers rated Manitoba Hydro as 7 or higher out of 10.

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### Achievements to Date

Over **630,000** participants in Power Smart programs and initiatives.

Over **890,000** LED light bulbs purchased by Manitobans through the Residential LED Lighting Program.

Over **340,000** CFL light bulbs purchased by participants of the Residential Compact Fluorescent Lighting Program.





Customers enjoy bill reductions of more than **\$1 billion** on their electricity and natural gas bills.

The electric energy saved is enough to power **half** of the residential and commercial electric needs of Winnipeg.





The natural gas energy saved is enough to serve 2¼ times the residential and commercial natural gas needs of Brandon.

Reduced greenhouse gas emissions resulting from Power Smart energy savings equate to removing over 460,000 cars off the road.





# **2015/16 ACHIEVEMENTS**

### Partnering with Our Customers

In 2015/16, Manitoba Hydro engaged nearly 75,000 customers to participate in Manitoba Hydro's incentivebased and DSM support programs. In addition, nearly 460,000 LED light bulbs were purchased by customers through the Residential LED Lighting Program.

The following chart provides a breakdown of 2015/16 program participation, excluding participants of the Residential LED Lighting Program.











### **Reducing Customer Bills**

Customers who participated in Manitoba Hydro's Power Smart programs in 2015/16 will enjoy savings of \$16 million on their energy bills each year going forward. As displayed in the following chart, in 2015/16 approximately \$4 million was saved by the residential sector, \$6 million by the commercial sector, \$1 million by the industrial sector and \$5 million by participants of load displacement and alternative energy programs.







### Achieving Electric Energy Savings

Manitoba Hydro's Power Smart electric programs were successful in 2015/16, surpassing targets by achieving 276 GW.h in electric energy savings.

The residential portfolio was successful in achieving 40 GW.h of energy savings. The Residential LED Lighting Program experienced higher program participation than planned and surpassed its forecast savings, achieving 15 GW.h in energy savings. The commercial portfolio surpassed its 2015/16 forecast energy savings, achieving 96 GW.h. This achievement was mainly due to the success of the Commercial Lighting Program with higher participation than anticipated.

The industrial portfolio achieved 17 GW.h, meeting forecasted energy savings in this sector. The load displacement and alternative energy portfolio achieved 123 GW.h in electric energy savings in 2015/16, doubling the planned savings. This success was mainly due to higher than planned participation in the Bioenergy Optimization Program.

Along with constructing new renewable hydroelectric generation, DSM is a key component of Manitoba Hydro's strategy for meeting the province's future energy needs. The 276 GW.h of electric energy savings achieved in 2015/16 is equivalent to 78% of the average annual load growth in Manitoba and 1.1% of total Manitoba electric load in 2015/16.







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### Achieving Electric Capacity Savings

Manitoba Hydro's Power Smart electric programs also surpassed the forecast capacity savings in 2015/16, achieving savings of 225 MW.

The residential portfolio was successful in achieving 11 MW of capacity savings. The commercial portfolio surpassed its 2015/16 targets and achieved 23 MW of capacity savings. The Commercial Lighting Program alone contributed 14 MW of electric capacity savings.

The industrial portfolio achieved 2 MW of electric capacity savings, meeting forecasted capacity savings in this sector. The load displacement and alternative energy portfolio surpassed its planned capacity savings, achieving 28 MW of savings in 2015/16.

The load management portfolio achieved 160 MW of electric capacity savings in 2015/16. The load management portfolio is the largest contributor to electric capacity savings, with all of the savings coming from the Curtailable Rates Program. Due to the nature of the curtailment contracts signed with participating customers, these capacity savings are assumed to continue for only one year.



■Actual ■Plan

**Electric Capacity Savings** 



# Achieving Natural Gas Energy Savings

Manitoba Hydro's Power Smart natural gas programs were successful in 2015/16, surpassing energy savings targets by achieving 7.4 million cubic metres in natural gas savings.

The residential portfolio was successful in achieving 2.6 million cubic metres of natural gas savings. The most successful residential program was the Affordable Energy Program which achieved 1.2 million cubic metres of natural gas savings in 2015/16. The commercial portfolio surpassed its forecast energy savings, achieving 4.3 million cubic metres of natural gas savings. This achievement was mainly due to the success of the insulation component of the Commercial Building Envelope Program which experienced significantly higher participation than anticipated. The industrial portfolio was successful in achieving 0.5 million cubic metres of natural gas savings, with all of the savings coming from the Industrial Natural Gas Optimization Program.

The 7.4 million cubic metres of natural gas savings achieved is equivalent to 0.4% of natural gas volume in 2015/16 (excluding natural gas volume from power stations and special contracts), further reducing natural gas consumption in Manitoba.









## Achieving Natural Gas Energy Savings – Integrated Results

Some electric Power Smart programs result in interactive effects which increase the consumption of natural gas. Even with interactive effects from electric programs being higher than planned, Manitoba Hydro's net natural gas savings after taking into account interactive effects surpassed savings targets by 13%.

The 6.1 million cubic metres of natural gas savings achieved after interactive effects is equivalent to 0.4% of natural gas volume in 2015/16 (excluding natural gas volume from power stations and special contracts), further reducing natural gas consumption in Manitoba.







# Reducing Environmental Impacts

As Manitobans conserve electric energy through Power Smart programs, more hydro generated electricity is available for export. These exports displace coal and natural gas fuelled generation outside of Manitoba, which result in a significant global reduction of greenhouse gases and other emissions.

By decreasing natural gas consumption within Manitoba, the Power Smart programs further contribute to emissions reduction within the province.

The energy savings achieved by Manitoba Hydro in 2015/16 resulted in a reduction of greenhouse gases and other air polluting emissions of nearly 198,000 tonnes of CO2e, comprised of approximately 12,000 tonnes of CO2e reduced inside Manitoba and over 186,000 tonnes of CO2e reduced outside the province. This emissions reduction is equivalent to removing over 41,000 cars off the road for one year.




## Investing in Power Smart

Manitoba Hydro invested a total of \$69 million in Power Smart initiatives in 2015/16. This investment is comprised of \$55 million from the Power Smart electric budget, \$10 million from the Power Smart natural gas budget, \$2 million from the Affordable Energy Fund and \$2 million from the Lower Income Natural Gas Furnace Replacement Budget. Approximately 80% of this investment went towards electric Power Smart programs, with the remaining 20% supporting natural gas Power Smart initiatives.



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# **DEMAND SIDE MANAGEMENT EVALUATION**

Manitoba Hydro evaluates its Demand Side Management (DSM) programs on an annual basis to validate electric and natural gas savings.

	Proper Names # Calling
The Ca	alifornia Evaluation Frameworl
4	Commission and the Project Advisory Grou
	June 200
	Last Review, January 34, 300
1.1	TecMarket Work And the project Team Members
	Megdal & Associate
	RLW Analytic
	B & B Resource
	Ken Keating and Associate Ed Vine and Associate
'	American Gouncil for an Energy Efficient Econom Ralph Prahl and Associate Innevolopi
TECMM	Works
	100143

The California Evaluation Framework is used as a guide in Manitoba Hydro's DSM evaluations and related activities. This framework, which is widely used in the DSM evaluation industry, provides a consistent, systemized, cyclic approach for planning and conducting evaluations of energy efficiency programs.

When verifying the energy and demand savings of its DSM programs, Manitoba Hydro uses the International Performance Measurement and Verification Protocol (IPMVP) and the Uniform Methods Project (UMP) as guides. Both of these resources provide an overview of current best practices for verifying the impacts of DSM activities in program impact evaluations.







Manitoba Hydro takes a comprehensive approach to evaluating its DSM programs. Impact evaluations are undertaken internally on an annual basis on all DSM programs to determine the electric and natural gas savings and cost-effectiveness of the DSM programs.

Manitoba Hydro's internal evaluations are complemented by undertaking third-party impact evaluations of a number of programs on a regular basis. These evaluations provide third-party reviews of the DSM programs and also validate achieved energy and demand savings and cost-effectiveness results. The results of three third-party program evaluations are included in the DSM results for 2015/16.

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# **2015/16 SUCCESS STORIES**

## Manitoba Hydro Presented with 2016 Energy Star Utility of the Year Award

Manitoba Hydro was the recipient of the prestigious 2016 Utility of the Year award, presented by the ENERGY STAR Program of Natural Resources Canada.

The award recognized excellence in the promotion of energy efficiency in the 2015 year by a utility to its customers. Energy efficient products save energy, lower utility bills and reduce impacts on the environment. Manitoba Hydro promotes the use of ENERGY STAR certified products as critical for energy conservation and sustainability goals.



## Manitoba Hydro Says Farewell to 30,000th Refrigerator



The Refrigerator Retirement Program celebrated the removal of 30,000 refrigerators from Manitoba households.

Since the launch of the program in 2011, 30,000 refrigerators and 7,500 freezers have been retired. The removal of these appliances from the electrical grid has resulted in savings to the province of approximately 50 GW.h of electricity. This level of electric energy savings is equivalent to the electricity required to power a town the size of Stonewall for one year.

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## LEDs Lighting Their Way into Manitoba Homes

The 2015 spring Residential LED Lighting Program retail rebate promotion ran from March 12th to April 12th, 2015. Manitoba Hydro partnered with 11 participating retailers, reaching 68 communities across Manitoba through 119 retail outlets. The 2015 fall campaign also ran a promotion through 13 participating retailers across the province from October 1st to October 31st, 2015.

The goal of these two campaigns was to rebate 483,000 bulbs by offering a discount at participating retailers. A total of 671,000 bulbs were rebated which was 39% higher than forecasted.



# New Flyer Delivers on Energy Efficiency and Environmental Responsibility



With technical assistance and financial support from Power Smart, New Flyer Industries optimized energy efficiency, safety, lighting quality and control, as well as staff comfort through upgrades to existing lighting systems.

The massive lighting project upgraded existing metal halide fixtures to LED fixtures, which use only one-third the energy to produce the same amount of light. The installation of this lighting system will provide an estimated annual energy savings of over 2 GW.h, resulting in

annual utility bill reductions of nearly \$100,000. The project also reduces greenhouse gas emissions by nearly 1,500 tonnes of CO2e annually, which is equivalent to taking over 300 cars off the road each year.

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## Brandon General Hospital Caring for Patients and the Environment

Made possible through the support of Power Smart, Brandon General Hospital significantly enhanced energy efficiency while simultaneously reducing water consumption. Supplied and installed free-of-charge to the customer, over 20 inefficient spray valves were replaced with low-flow spray valves throughout Brandon General Hospital operations. The new lowflow spray valves use nearly 50 percent less water than standard flow valves and therefore use less energy to heat the water.

The project is estimated to provide annual savings of 10 thousand cubic metres of natural gas and over 2 million litres of water, resulting in combined energy and water utility bill reductions of nearly \$10,000 per year. The project also reduces greenhouse gas emissions by nearly 20 tonnes of CO2e annually, which is equivalent to taking 5 cars off the road each year.



## New Power Smart Water Heater Program Launched for Commercial Customers



The Commercial Water Heater Program launched on April 1st, 2015, serving to complement the existing suite of programs designed to reduce commercial customers' energy use. Tank and tankless condensing water heaters have several benefits over standard efficiency water heaters, including reduced heating costs, improved first-hour heat recovery, more hot water per input BTU and due to sealed combustion, they are not impacted by negative building air pressure.

Savings over the life of the program are expected to be 18 million cubic metres of natural gas, thus reducing greenhouse gases emissions by 35 thousand tonnes of CO2e, which is comparable to taking nearly 7,000 cars off the road each year.

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## École Taché – One of Winnipeg's Newest Power Smart Buildings

The new 22,000 square foot school expansion and childcare centre at École Taché exceeds the requirements of the Power Smart New Buildings Program and is designed to be nearly 45% more energy efficient than a typical centre its size. The school has also been designed to obtain a Leadership in Energy and Environmental Design (LEED®) Silver certification.

Energy efficient features of the building include high performance roof and wall insulation, energy efficient dual and triple-pane windows, a high-efficiency electric boiler for in-floor space and water heat, demand-control ventilation with heat recovery, energy efficient fluorescent and LED lighting systems with occupancy controls, low-flow water fixtures and direct digital controls for optimizing HVAC systems.



# **POWER SMART 2015/16 ACHIEVEMENTS**

# **Residential Sector**

Manitoba Hydro invested \$17.4 million towards programs and initiatives for residential customers in 2015/16. There were 4 residential DSM support programs and 7 residential incentive-based programs offered to customers in 2015/16, with approximately 44,000 customers participating in these programs. As well, nearly 460,000 LED light bulbs were purchased by Manitobans through the Residential LED Lighting Program. This activity resulted in electric savings of 40.3 GW.h and 11.0 MW, and natural gas savings of 2.6 million cubic metres.

The following table summarizes the achievements by program for the residential sector.

		2015/16 Achievements				
	Customer	Elec	ctric	Natural Gas		
RESIDENTIAL PROGRAMS	Participation	GW.h	MW	Millions of m <sup>3</sup>		Utility Cost
Residential DSM Support Programs						
Power Smart Residential Loan	4,922	0.4	0.2	0.2	\$	(570,544)
Mail-In/On-Line Energy Assessments	223	-	-	-	\$	-
Power Smart Residential PAYS	165	0.1	0.0	-	\$	43,710
Residential Earth Power Loan	15	0.0	0.0	0.1	\$	(63,155)
Residential DSM Support Programs Subtotal	5,325	0.6	0.3	0.3	\$	( <i>589,989</i> )
Residential Incentive-Based Programs						
Residential LED Lighting	458,890	15.0	4.7	-	Ş	2,516,889
Water & Energy Saver	22,852	3.9	0.7	0.6	Ş	1,615,979
Refrigerator Retirement	10,710	10.7	1.1	-	\$	2,291,539
Affordable Energy Program	2,759	4.7	1.9	1.2	\$	7,825,895
Home Insulation	2,103	4.4	2.2	0.6	\$	2,793,982
Community Geothermal	67	1.0	0.2	-	\$	548,875
Drain Water Heat Recovery	36	0.0	0.0	-	\$	48,070
Solar Hot Water Heater Pilot	-	-	-	-	\$	10,989
Air Source Heat Pumps	-	-	-	-	\$	18,886
Residential Conservation Rates	-	-	-	-	\$	4,919
New Home (Re-design)	-	-	-	-	\$	105,676
Smart Thermostats	-	-	-	-	\$	138,893
Solar Technologies	-	-	-	-	\$	50,505
Residential Incentive-Based Programs Subtotal	497,417	39.7	10.8	2.3		17,971,098
Residential Discontinued Programs	-	-	-	-	\$	4, 745
Residential Programs Total	502,742	40.3	11.0	2.6	\$	17,385,855

**Notes:** The Power Smart Residential Loan Program is a cost recovery program; however, at this stage of the program, it is earning revenue in order to cover costs incurred during earlier years of the program.

## **Commercial Sector**

Manitoba Hydro invested \$32.8 million towards programs and initiatives for commercial customers in 2015/16. There were 3 commercial DSM support programs and 13 commercial incentive-based programs offered to customers in 2015/16, and nearly 31,000 customers participated in these programs. This activity resulted in electric savings of 96.2 GW.h and 22.9 MW, and natural gas savings of 4.3 million cubic metres.

The following table summarizes the achievements by program for the commercial sector.

COMMERCIAL PROGRAMS		2015/16 Achievements			Utility Cost
	Customer	Electric		Natural Gas	
	Participation	GW.h	MW	Millions of m <sup>3</sup>	
Commercial DSM Support Programs					
Power Smart for Business PAYS	27	-	-	-	\$ 159,943
Religious Buildings Initiative	2	-	-	-	\$ -
Power Smart Recreation Facility Survey	2	-	-	-	\$ -
Race to Reduce	-	-	-	-	\$ 25,119
Commercial DSM Support Programs Subtotal	31	-	-	-	\$ 185,061
Commercial Incentive-Based Programs					
LED Roadway Lighting	27,932	11.2	1.5	-	\$ 14,824,329
Commercial Lighting	1,059	52.0	13.6	-	\$ 8,090,923
Commercial Kitchen Appliances	587	1.5	0.2	0.6	\$ 279,774
Commercial Building Envelope	359	8.4	4.1	1.7	\$ 3,112,229
Commercial Refrigeration	290	6.4	0.8	-	\$ 513,282
Power Smart Shops	195	0.6	0.1	0.0	\$ 240,735
Internal Retrofit	145	1.8	0.3	-	\$ 839,839
Commercial HVAC	142	3.6	0.0	0.9	\$ 1,528,608
New Buildings	29	6.2	1.2	0.7	\$ 2,116,624
Commercial Custom Measures	6	1.0	0.1	0.3	\$ 455,418
Commercial Geothermal	5	1.4	0.6	-	\$ 237,220
Commercial Building Optimization	-	-	-	-	\$ 301,688
Network Energy Management	-	-	-	-	\$ 1,919
Heat Recovery Ventilation	-	-	-	-	\$ 14,502
Commercial Incentive-Based Programs Subtotal	30,749	94.0	22.7	4.3	\$ 32,557,090
Commercial Discontinued Programs	-	2.2	0.2	-	\$ 16,174
Commercial Programs Total	30,780	96.2	22.9	4.3	\$ 32,758,324

# Industrial Sector

Manitoba Hydro invested \$14.3 million towards programs and initiatives for industrial customers in 2015/16. There were 5 industrial incentive-based programs offered to customers in 2015/16, and over 80 customers participated. This activity resulted in electric savings of 139.5 GW.h and 190.7 MW, and natural gas savings of 0.5 million cubic metres.

The following table summarizes the achievements by program for the industrial sector.

INDUSTRIAL PROGRAMS		2015/16 Achievements		Utility Cost	
	Customer	Electric Natural Gas			
	Participation	GW.h	MW	Millions of m <sup>3</sup>	
Industrial Incentive-Based Programs					
Performance Optimization	55	16.6	1.9	-	\$ 2,033,140
Natural Gas Optimization	9	-	-	0.5	\$ 551,201
Industrial Incentive-Based Programs Subtotal	64	16.6	1.9	0.5	\$ 2,584,341
Industrial Discontinued Programs	-	-	-	-	\$ -
Customer Self-Generation Programs					
Bioenergy Optimization Program	13	39.7	15.3	-	\$ 533,487
Load Displacement	1	83.3	13.2	-	\$ 4,993,291
Customer Self-Generation Programs Subtotal	14	123.0	28.5	-	\$ 5,526,779
Rate/Load Management Programs					
Curtailable Rates	3	-	160.2	-	\$ 6,144,421
Industrial Programs Total	81	139.5	190.7	0.5	\$ 14,255,541

## Power Smart Portfolio

Manitoba Hydro invested \$68.9 million towards programs and initiatives for customers in 2015/16. There were 7 DSM support programs and 25 incentive-based programs offered to customers in 2015/16, with approximately 75,000 customers participating in these programs and nearly 460,000 LED light bulbs purchased by Manitobans through the Residential LED Lighting Program. This activity resulted in electric savings of 276.0 GW.h and 224.6 MW, as well as natural gas savings of 7.4 million cubic metres before interactive effects and 6.1 million cubic metres after interactive effects.

The following table summarizes the achievements by sector for the Power Smart portfolio.

		2015/16 Achievements		nents		
	Customer	Electric		Natural Gas		
SUMMARY	Participation	GW.h	MW	Millions of m <sup>3</sup>	Utility Cost	
RESIDENTIAL						
Residential DSM Support Programs	5,325	0.6	0.3	0.3	\$ (589,989)	
Residential Incentive-Based Programs	497,417	39.7	10.8	2.3	\$ 17,971,098	
Residential Discontinued Programs	-	-	-	-	\$ 4,745	
Residential Total	502,742	40.3	11.0	2.6	\$ 17,385,855	
COMMERCIAL						
Commercial DSM Support Programs	31	-	-	-	\$ 185,061	
Commercial Incentive-Based Programs	30,749	94.0	22.7	4.3	\$ 32,557,090	
Commercial Discontinued Programs	-	2.2	0.2	-	\$ 16,174	
Commercial Total	30,780	<i>96.2</i>	22.9	4.3	\$ 32,758,324	
INDUSTRIAL						
Industrial Incentive-Based Programs	81	139.5	190.7	0.5	\$ 14,255,541	
Industrial Discontinued Programs	-	-	-	-	\$-	
Industrial Total	81	139.5	190.7	0.5	\$ 14,255,541	
Total Before Interactive Effects and Support Costs	533,603	276.0	224.6	7.4	\$ 64,399,720	
INTERACTIVE EFFECTS	-	-	-	(1.3)	-	
SUPPORT COSTS	-	-	-	-	\$ 4,505,141	
TOTAL	533,603	276.0	224.6	6.1	\$68,904,861	

#### Notes:

Some electric Power Smart programs have interactive effects which increase the consumption of natural gas. For example, a more energy efficient lighting system will emit less heat and therefore more energy will be required for space heating. The table above includes integrated natural gas results which have been adjusted for interactive effects.

Support costs are related to providing overall support to the Power Smart portfolio. These costs include promoting and advertising the Power Smart brand, supporting sustainability and standards efforts and DSM planning and evaluation functions.

# **POWER SMART 1989/90 - 2015/16 ACHIEVEMENTS**

This section outlines Manitoba Hydro's Power Smart achievements since the inception of the program in 1989/90 through to the end of 2015/16.

## Partnering with Our Customers

To date, there have been more than 630,000 participants in Manitoba Hydro's Power Smart programs. In addition, there have been over 890,000 LED light bulbs purchased by customers through the Residential LED Lighting Program and over 340,000 CFLs purchased by participants of the Residential Compact Fluorescent Lighting Program. To provide a better indication of participation trends, these two residential lighting programs have been excluded from the following chart.



## **Reducing Customer Bills**

As displayed in the following graph, customers who have participated in Power Smart programs since its inception in 1989/90 saved \$138 million on their electric and natural gas bills in 2015/16. Cumulatively, over \$1 billion has been saved by participants on their electric and natural gas bills.



### **Customer Bill Reductions to Date**

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## Achieving Electric Energy Savings

Cumulatively, the Power Smart portfolio has achieved a total of 2,928 GW.h in electric energy savings to the end of 2015/16. The following graphs display incremental and cumulative electric energy savings achieved.



## Electric Energy Savings to Date



# Achieving Electric Capacity Savings

Since 1989/90, the Power Smart portfolio has achieved a total of 797 MW in electric capacity savings. The following graphs demonstrate incremental and cumulative electric capacity savings achieved. Electric capacity savings resulting from the Curtailable Rates Program have been excluded from the incremental savings graph to better represent incremental results. The high incremental capacity savings in 1998/99 were due to a large industrial project with substantial capacity savings.







# Achieving Natural Gas Energy Savings

To date, Manitoba Hydro's Power Smart program has achieved a total of 112 million cubic metres in natural gas savings – including interactive effects. The following graphs display incremental and cumulative natural gas savings achieved.





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## **Reducing Environmental Impacts**

The 2,928 GW.h of electric energy savings and 112 million cubic metres of natural gas savings achieved to date by Manitoba Hydro's Power Smart program equates to a greenhouse gas emissions reduction of approximately 2.2 million tonnes of CO2e. This is comparable to removing more than 460,000 cars off the road for one year. The following graph displays greenhouse gas emissions reduction achieved to the end of 2015/16.



## **Emissions Reduction to Date**

🔳 Inside Manitoba 🛛 🔳 Outside Manitoba

## Investing in Power Smart

Since 1989/90, Manitoba Hydro has invested \$644 million in Power Smart initiatives. This investment is comprised of \$490 million from the Power Smart electric budget, \$108 million from the Power Smart natural gas budget, \$31 million from the Affordable Energy Fund and \$14 million from the Lower Income Natural Gas Furnace Replacement Budget.



Power Smart Investment to Date



360 Portage Avenue (22) • Winnipeg Manitoba Canada • R3C 0G8 Telephone / N° de téléphone: (204) 360-3633 • Fax / N° de télécopieur: (204) 360-6147 • ofernandes@hydro.mb.ca

June 29, 2018

Mr. D. Christle Secretary and Executive Director Public Utilities Board 400-330 Portage Avenue Winnipeg, Manitoba R3C 0C4

Dear Mr. Christle:

#### RE: AFFORDABLE ENERGY PROGRAM ANNUAL REPORT FOR FISCAL 2017/18 – DIRECTIVE 6 OF ORDER 73/15

Please find attached Manitoba Hydro's 2017/18 Annual Report on the Affordable Energy Program and Power Smart programming for all-electric customers, filed in accordance with Directive 6 of Order 73/15.

Should you have any questions with respect to this submission, please contact the writer at 204-360-3633 or Shannon Gregorashuk at 204-360-4270.

Yours truly,

MANITOBA HYDRO LEGAL SERVICES DIVISION

Per:

**ODETTE FERNANDES** Barrister & Solicitor

Att.

Available in accessible formats upon request

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# Affordable Energy Program Annual Report

April 1, 2017 – March 31, 2018



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#### INTRODUCTION

During 2017/18, Manitoba Hydro continued its activities under the Affordable Energy Program ("AEP") to assist lower-income customers in managing their energy use by capturing energy efficient opportunities, which results in lower energy bills.

Manitoba Hydro also continued its efforts to assist those customers who heat their homes with electricity. Manitoba Hydro has enhanced its programs and has undertaken several new projects during 2017/18 to provide additional support to those customers without access to natural gas service.

The following sections of this report provide an overview of customer participation for the 2017/18 fiscal year for Manitoba Hydro's AEP and Power Smart Programs.

#### RESIDENTIAL

#### Affordable Energy Program

The AEP is designed to assist lower income homeowners and renters across the Province in implementing energy efficiency upgrades. The program offers free basic energy efficiency measures (e.g. LED light bulbs, showerheads, faucet aerators, window weatherization kits, draft stoppers, safety caps and fridge/freezer thermometers), free insulation upgrades, and the installation of a high efficiency natural gas furnace at a cost of \$9.50/month over 5 years or a rebate of \$3,000 for the installation of a high efficiency natural gas boiler. These upgrades can provide significant energy savings and decrease the customer's monthly energy bills while increasing the comfort of their home.

Under the Individual and Community approaches, the criteria for determining program eligibility are 125% of the Low Income Cut-Off (LICO) thresholds set by Statistics Canada. Customers are asked to provide copies of their Income Tax Return and Notice of Assessment as proof of income. If they are unable to provide tax documentation there are other forms of documents accepted to verify their eligibility. This includes proof of participation in programs such as Manitoba Employment and Income Assistance, Homeowner Renovation Assistance Program, Manitoba Emergency Repair Program, Legal Aid, and other programs that have similar income qualifying thresholds to the AEP.

Through the Indigenous approach community members are not required to income qualify; instead all eligible housing stock is able to participate. In addition, under the Multi Unit Residential Buildings (MURB) approach each individual suite is not required to provide income tax documents for verification. If a social housing provider owns the building, they will automatically qualify. Otherwise, per-unit income guideline documentation (e.g. mandate, lease agreement, tenant handbook etc.) that states the income guidelines for tenants must be provided by the building owner or property manager. For example, tenants who pay "rent geared to income", where their monthly rent is a percentage of their total household income, may qualify.

Energy efficiency retrofits have been completed in 22,365 homes under the AEP since the inception of the program in 2007. Of these, 46% were through the Individual Approach, 14% Community Approach, 27% Indigenous Approach, and 13% MURB. Of the total retrofits, 11,695 insulation projects have been completed and 5,707 furnaces and 130 boilers have been replaced. The following table provides an overview of the AEP participation for 2017/18 fiscal year.

AEP Participation Overview - April 2017 to March 2018*				
Initiative	Homes Completed			
Insulation Installations	1,717			
Furnace Installations	561			
Boiler Installations	12			
Total Number of Homes Completed				
(including Basic Efficiency Measures)	3,179			

\*Includes both natural gas and electric heated homes

The AEP is offered through four different approaches, Individual, Community, Indigenous, and MURB, with each approach customized to meet customer needs. The Individual Approach involves customers working directly with Manitoba Hydro's staff and external contractors. Dedicated staff, energy advisors, and contractors ensure energy upgrades are completed in a timely manner and provide direct customer service to individuals as needed. Staff work with customers from the initial application through to the completion of the upgrade.

The Community Approach is designed to assist and encourage lower income Manitobans to participate in the energy efficiency upgrades through various community outreach activities. Manitoba Hydro partners with social housing groups, community groups, social organizations, and non-profit organizations in order to increase AEP program participation through the various groups which represent more than an individual customer. Under the Community Approach is the Neighbourhood Power Smart Project (NPSP), which was implemented in November 2012 to assist and encourage lower income Manitobans to participate in energy efficiency upgrades. Manitoba Hydro has worked with multiple community organizations, including the North End Community Renewal Corporation (NECRC), the Brandon Neighbourhood Renewal Corporation (BNRC), the Selkirk Community Renewal Corporation (SCRC), Dakota Ojibway Tribal Council (DOTC) in Portage la Prairie, and the Manitoba Metis Federation (MMF) in Thompson. The goal of the NPSP is to increase customer participation by using a "block by block" approach. The Energy Advocates from the community organizations are responsible for promoting the AEP and assisting customers when completing the required documentation.

The Indigenous Approach is designed to provide energy efficiency upgrades to Indigenous Communities by providing energy efficiency materials, as well as training and funding for labour to enable local residents to install materials.

The MURB Approach is designed to provide basic energy efficiency items such as low flow showerheads and faucet aerators, draft stoppers, socket caps, window kits and LED light bulbs to lower income tenants living in apartment style buildings. Manitoba Hydro works with private landlords as well as community housing co-ops or social housing groups to provide these measures, which can be installed by a Manitoba Hydro contracted installer or left for the building manager to install.

#### AEP Activities in 2017/18

In addition to the regular marketing of the program such as through television, radio, newspaper and print advertisements, autodialer campaigns, bus shelter and transit advertisements, the following activities were undertaken during 2017/18 to promote participation in the AEP:

- Bill inserts promoting the AEP were sent to residential customers across the province in the months of April, July, September, December, and March. Specific messaging indicating that both natural gas and electric customers can qualify for insulation upgrades was used.
- The Neighbourhood Street Pilot Project seasonal canvassing resumed in the spring of 2017, with Manitoba Hydro staff and the NECRC promoting the project door-to-door. The pilot is an extension of the NPSP and aims to make participation in the AEP easier for customers. The specific streets being targeted have higher incidences of lower income customers, and all customers within the targeted areas are eligible to participate in the AEP regardless of their income levels. Any residences that were not reached the day of the event are then followed up with by the community energy advocate in the area. Events were held each week from May 4<sup>th</sup> October 12<sup>th</sup>, with a total of 23 events during 2017.
- In April 2017, a presentation was made to the Winnipeg Rental Network. Approximately 30 landlords were in attendance to learn how they can receive upgrades for their rental homes or apartment units.
- Throughout the summer of 2017 the AEP was promoted at multiple community events with the Neighbourhood Power Smart Project, such as the Newcomer Welcome Fair, the Austin Street Festival, Picnic in the Park, and the Dufferin Community BBQ.
- In May 2017, staff attended the Age &Opportunity 55+ Housing & Active Lifestyles Expo. A booth was set up to provide AEP information and applications to attendees.
- In May 2017, a presentation on the AEP was given at the Chalmers Neighbourhood Renewal Corporation.
- In the months of May, September, and October, staff set up a booth for an afternoon in the Bill Payment Centre at 360 Portage to advise customers paying their energy bill of the AEP and other Power Smart programs.
- In June 2017, two direct mail pieces (a letter and brochure) promoting the program were mailed out to all households (excluding apartments) in the forward sorting areas of R3G and R3E respectively.
- AEP and the Home Insulation Program (HIP) collaborated to develop a joint letter advertising the Home Energy Assessment to customers with higher than average consumption levels. The letter

mentions both programs to educate customers on all available options. A subsequent piece was developed to explain the differences and next steps for each program which will be left with the customer at the end of their assessment.

- A generic version of the Indigenous Energy Saving Tips booklet was created to be distributed at events and through the Neighbourhood Street Pilot Project canvassing initiative.
- In July 2017, bookmarks advertising the program's insulation and furnace offerings were created and distributed to 87 rural and 21 Winnipeg public libraries.
- In July 2017 the DOTC hired an energy advocate for the Portage La Prairie community. The energy advocate canvassed from July to September, but unfortunately was unsuccessful in obtaining any applicants.
- The Community Outreach Program continued throughout 2017 with efforts focused on rural areas of Manitoba, particularly all-electric areas. Seniors organizations, recreation and community centres, social agencies, and other public places in these areas were contacted and AEP posters and brochures were distributed to the organizations in the table below.

Name of Organization
Arborg & District Seniors Resource Council
Living Independence for Elders (Ashern)
Prairie Oasis Senior Centre (Brandon)
Dauphin Multi-Purpose Senior Centre
Services to Seniors Serving Erickson, Onanole, Sandy Lake
& Areas Inc. (Erickson)
Eriksdale Community Resource Council Inc
Gladstone Area Seniors Support Program
Seniors Independent Services (Glenboro)
Grandview & District Community Resource Council
Hamiota/Blanchard Senior Services
Two Rivers Seniors Resource Council (Lac du Bonnet)
Lundar Community Resource Council
MacGregor-Austin Senior Support Program
Pembina Community Resource Council (Manitou)
Senior Services of Antler River (Melita/Pierson)
Minnedosa & District Services to Seniors
Morden Services for Seniors, Inc. (Friendship Centre)
Home Assistance Neepawa and District
Louise Community Services for Seniors (Pilot Mound)
Senior Services of Banner County (Russell)
Rossburn Community Resource Council
Selkirk and District Seniors Resource Council
Senior Services of Prairie-Parkland Inc. (Shoal Lake)
St Laurent Seniors Resource Council
East Beaches Resource Centre (Traverse Bay)

• In September 2017, Manitoba Hydro presented at the Professional Property Managers Association Breakfast meeting on MURBs & Landlord/Tenant Rental Properties.

- In September 2017, AEP brochures were mailed to approximately 11,270 customers in the rural Manitoba towns of Souris, Melita, Beausejour, Morden and Neepawa.
- An AEP customer testimonial was included in the Fall Rebate Campaign freestanding insert.
- In September 2017, AEP brochures were provided to RONA on Panet Road in Winnipeg as they had indicated they received a number of inquiries about the program.
- From September 22 24, 2017, AEP sponsored and manned a booth at the Manitoba Metis Federation Annual General Assembly.
- In October 2017, approximately 1,755 box mailers were sent to rural electric customers which contained a letter notifying them of their above average energy use along with the AEP and HIP brochures.
- In October and November 2017, presentations on the AEP and energy savings tips were provided for participants in the Supporting Employment & Economic Development Inner City Homebuyer Program.
- In November 2017, Manitoba Hydro Power Smart sponsored the delegate bags for the Manitoba Non-Profit Housing Association Conference and staff operated a booth at the tradeshow.
- Throughout 2017/18 an AEP video series to explain steps to participation and the benefits of the program was developed. In December 2017, the program posted the first of five videos that serve as an alternative method to explain the program offer and steps to participate as opposed to the existing website text.
- Facebook ads ran the last two weeks of December 2017 asking customers to share the ad (which linked to the new video) with those that need it most this heating season, capitalizing on the giving feelings people experience during the holidays.
- In March 2018, 1,600 customers within the FSAs of R2L and R3A were mailed an AEP brochure. These areas were selected as they fall within the program's target market area having a higher incidence of lower income populations.
- In March 2018, the program refreshed two brochures (homeowner brochure and rental property brochure) using the existing creative concept to bring more focus to the upgrades offered under the program based on observations/customer feedback gathered at tradeshows. Agreements are in progress with the Winnipeg Housing Rehabilitation Corporation (15 properties), Keewatin Housing Association (67 properties), Southwest Community Options (9 properties), Kinew Housing, Brandon Friendship Housing Authority (42 properties), Forward Housing Ministries (5 properties), and Birdtail Sioux First Nation (33 properties).
- The DOTC has completed in-home reviews for the majority of their housing stock. Work to complete eligible upgrades is currently in progress.

#### Financing Programs

Manitoba Hydro offers a variety of convenient on-bill financing options. Manitoba Hydro promotes these financing options to customers across Manitoba, with an increased focus through print and radio advertising campaign in various all-electric communities to educate customers about financing options offered by Manitoba Hydro.

During 2017/18, the Power Smart Residential Loan provided over \$20 million in financing for upgrades for 4,505 customers. Of that amount, over \$3.4 million in financing was provided to 645 all-electric homeowners. Popular upgrades under the program among electrically heated households include high performance triple pane window upgrades and space heating equipment.

Manitoba Hydro's Pay As You Save or PAYS program enables homeowners to upgrade the energy efficiency of their homes and their monthly bill savings pay for the upgrade. During 2017/18, 91 customers chose the PAYS option for financing their upgrades; this includes 52 First Nations participants through the Community Geothermal Program.

In the spring of 2017, Manitoba Hydro's third-party delivery agent Summerhill reached out to retail locations throughout Manitoba to inform them of program materials and training opportunities offered for financing programs and the Home Insulation Program. Summerhill sent each retailer a customized package of program materials and conducted in-store visits or phone calls to ensure the materials were received and properly displayed. In total, 66 communities had retailers that participated, 26 of which were in all-electric areas.

Communities with Participating Retailers				
Altona	Grunthal	Rosser		
Anola – all-electric	Kenton – all-electric	Russell		
Arborg	Killarney	Sanford		
Ashern – all-electric	Kola	Snow Lake – all-electric		
Benito	La Broquerie	Souris		
Birtle – all-electric	Lac du Bonnet – all-electric	St Jean Baptiste – all-electric		
Boissevain	Laurier – all-electric	St Laurent		
Brandon	Lundar – all-electric	St Lazare		
Brunkild –all-electric	MacGregor	St Leon – all-electric		
Carman	Melita	Ste Rose – all-electric		
Cartwright – all-electric	Miniota	Steinbach		
Churchill – all-electric	Minnedosa	Stonewall		
Cypress River – all-electric	Morden	Strathclair		
Dauphin	Morris	Swan River – all-electric		
Deloraine	Neepawa	Teulon		
Erickson – all-electric	Niverville	The Pas – all-electric		
Fisher Branch – all-electric	Oakbank	Thompson – all-electric		
Flin Flon – all-electric	Pilot Mound	Treherne – all-electric		
Gimli	Portage la Prairie	Virden		
Gladstone	Rivers	Whitemouth – all-electric		
Glenboro – all-electric	Rosenort	Winkler		
Glenella – all-electric	Rossburn – all-electric	Winnipeg		

#### Home Insulation Program

The Home Insulation Program (HIP) has been offering insulation level upgrade education and rebates to

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Manitoba Hydro customers since 2004. In June 2014, free Home Energy Assessments were introduced under this program for all-electric customers. The energy assessment initiative was launched in an effort to reduce market barriers preventing a customer from upgrading their home's insulation by providing them with guidance on insulation upgrades, benefits, and the HIP offerings. The in-home assessment is supplemented by promoting other value-added services, such as the installation of basic water and lighting measures (i.e. Water and Energy Saver Program and Residential Lighting Program), and recommending the AEP and Refrigerator Retirement Program, where applicable.

The communication strategy for this initiative involves sending addressed mail and warm calling customers who had previously received a mailer in rural locations to encourage participation. Since 2014/15, 53,231 mailers offering the Home Energy Assessment have been delivered and 8,399 calls have been made through a dedicated call campaign conducted by additional student resources to 608 targeted communities and towns where all-electric customers reside. This initiative has resulted in 2,982 customers who heat their home with electricity participating in the free assessment. Of these customers, 527 assessment participants applied to the Home Insulation Program and 79 applied to the Affordable Energy Program.

In 2017/18, radio, outdoor, online and print advertisements were run in rural markets for the Home Insulation Program. Additionally, a joint advertising campaign continued with the Commercial Building Envelope Program.

#### Community Energy Efficiency Plan

In September 2016, Manitoba Hydro launched a two year pilot to partner with both The Pas and Dauphin to approach energy efficiency at the community level.

Energy Advocates were funded in both communities to promote energy efficiency and raise awareness of programs available through Manitoba Hydro. Targeted program initiatives through Water and Energy Saver Program, Fridge Retirement Program, Residential LED Lighting, AEP, and Power Smart Shops resulted in an increase in participation in each community, with additional community specific initiatives being planned. To date the Community Energy Efficiency Plan has had over 1,100 residential and commercial participants in Dauphin, and over 1,100 residential and commercial participants in The Pas.

#### **HRV Control Program**

The Heat Recovery Ventilator (HRV) Control Program is available to eligible electric and natural gas customers and is delivered through 105 heating contractors throughout Manitoba. The program offers customers up to a \$150 rebate when they upgrade to an advanced HRV control.

In 2017/18 the program had 25 participants that use electricity as their primary space heating fuel. Of those 25 participants, one was in all-electric areas.

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#### **LED Lighting Program**

Annual spring and fall retail rebate campaigns are offered province-wide through the LED Lighting Program. Customers received instant rebates on a variety of energy efficient products including ENERGY STAR<sup>®</sup> certified LED bulbs and fixtures in 2017/18. This offer was available in approximately 23 all-electric communities at 36 participating stores.

#### **Refrigerator Retirement Program**

The Refrigerator Retirement Program, launched in June 2011, continues to provide free in-home pickup of older working refrigerators and freezers and provides a \$50/unit incentive to homeowners. During 2017/18, the program had 1,989 participants who heat their home with electricity.

Various methods were used to reach program participants which included bill inserts, geographic targeted print and radio advertising, as well as 10 second TV spots, billboards and social medial.

#### **New Homes Program**

The New Homes Program encourages the construction of energy efficient residential buildings by offering financial incentives to homebuilders. Rebates for the costs of energy modeling work are also provided under the Program. During 2017/18, the program saw 157 homes constructed using electricity as their primary space heating fuel, of which 100 were in all-electric areas, and a further 57 located in gas available areas. The program is open to participants province-wide, including both occupant-owned and band-owned housing.

#### **Smart Thermostats**

From November 1, 2017 – February 28, 2018, Manitoba Hydro offered a rebate in the form of a \$75 residential bill credit for the purchase of qualifying smart thermostats. A total of 803 customers with electric heat received a rebate during this offer, more than twice the expected participation level.

#### Appliance Rebate Program

2017/18 was the second year that a 4-month seasonal bill credit rebate program was offered for the purchase of energy efficient appliances. A \$100 rebate was offered on qualifying energy efficient clothes washer, \$150 on the purchase of qualifying washer/dryer pairs, and new for the 2017/18 program, \$50 or \$100 on energy efficient refrigerators depending on the efficiency. The rebates were applied directly to the customer's monthly hydro bill, following an automated online submission process. The program had 501 applicants who heat their homes with electricity.

#### Solar Energy Pilot Program

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The introduction of the Solar Energy Pilot Program in spring 2016 expanded on existing renewable energy options to Manitobans and added to the incentive programs offered through Manitoba Hydro. The two year pilot offers incentives to help offset the capital cost of installing Solar Photovoltaic (PV) systems to displace customers' electricity load, targeting residential and commercial customers throughout the province. In 2017/18, the final year of the pilot program, over 650 applications were approved, bringing the total pre-approved applications over 1 000. This fiscal year also saw 166 completed projects for all electric rural customers and 10 completed all electric urban customers. As many of the applications recently received were for rural Manitoba, it is anticipated that the number of all electric solar installations will grow significantly in the upcoming year.

The pilot, which ends April 30th 2018, allows for the evaluation of the opportunities and challenges of solar PV in the Manitoba market, the processes required to support the technology, and the effects on the Manitoba Hydro distribution system.

#### Water & Energy Saver Program

The Water and Energy Saver Program (WESP) is offered throughout Manitoba whereby customers can apply to receive a free kit in the mail. In addition, as part of the Program, contracted technicians go door-to-door in target areas offering on-the-spot installation of energy efficient devices. The kit includes low-flow showerheads, bathroom and kitchen faucet aerators, pipe wrap, plumber's tape and a refrigerator/freezer thermometer.

In 2017/18, technicians visited homes approximately 15,600 times in rural communities. The direct install initiative specifically targeted The Pas, a non-gas available area.

In efforts to increase WESP participation in non-gas available areas, WESP also partnered with The Pas Community Energy Efficiency Project again to complete 328 on-the-spot direct installations in The Pas during August and September 2017. In total, 360 customers in the community received water and energy saver kits as part of the project.

WESP also partnered with the Dauphin Community Energy Efficiency Project to complete 515 on-thespot direct installations in Dauphin during the month of April 2017. In total, 565 customers in the community received water and energy saver kits as part of the project. Of these customers, 348 had electric water heaters and the remaining 217 were natural gas water heaters.

#### COMMERCIAL

#### Power Smart Shops Program

The Power Smart Shops Program was launched in October 2015. The program promotes water and energy saving measures to the hard-to-reach small commercial market. When it comes to prioritizing energy efficiency in one's business, small business owners face a number of unique barriers, such as

limited financial resources, competing priorities, and limited industry exposure.

The Power Smart Shops Program utilizes a full-service contractor delivery model and consists of a threepart offering. First, the direct installation of various free measures such as bathroom and kitchen faucet aerators, low-flow pre-rinse spray valves, and light emitting diode (LED) screw-in lamps. Second is a free lighting assessment and written report that identifies opportunities to retrofit inefficient lighting systems. Finally, an incentive that will cover 70 per cent of material and installation costs of qualifying lighting retrofits as identified in the lighting assessment, including T12 to T8 fixture upgrades, LED T8 lamps, LED specialty screw-in lamps, and LED exit signs.

In the 2017/18 fiscal year, a total of 640 direct installation projects and 322 deeper lighting retrofit projects were completed through the Power Smart Shops Program. To date, the program has serviced small businesses in 48 communities across Manitoba, nine of which are all-electric (Anola, Balmoral, Brokenhead, Carrot Valley, Opaskwayak Cree Nation, Peguis First Nation, St. Genevieve, The Pas, and Vita).

Building on the success of Manitoba Hydro's Community Energy Efficiency Projects, the Power Smart Shops Program dedicated resources to servicing both The Pas and Dauphin at-large. These communities participated in a pilot stream of the Power Smart Shops Program wherein the program's eligibility criteria were expanded in two ways to capture a slightly larger portion of commercial customers in the area:

- The program was extended to qualifying commercial customers that are 15,000 square feet or less in size. The program normally accepts customers that are 10,000 square feet or less in size.
- The program was extended to qualifying municipal facilities that satisfy all other program criteria. The program normally excludes municipal facilities from its scope.

Moreover, the pilot also extended a special limited time offer to The Pas and Dauphin, wherein the program incentive was revised to cover 100 per cent of the material and installation costs of qualifying deeper lighting retrofits. To further support economic development in these communities, local electricians were subcontracted to fulfill much of the electrical services required by the program.

The program's first visit to The Pas was in fall of the 2016/17 fiscal year, at which time 32 direct installation projects and 15 deeper lighting retrofits were completed. The program made a second trip to the community in fall of the 2017/18 fiscal year, at which time an additional 41 direct installation projects and three deeper lighting retrofits were completed. Another 64 deeper lighting retrofits will be completed in the 2018/19 fiscal year.

The program's first visit to Dauphin was in spring of the 2017/18 fiscal year, at which time 106 direct installation projects and 108 deeper lighting retrofits were completed. Another 70 deeper lighting retrofits will be completed in the 2018/19 fiscal year.

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#### **Commercial Geothermal Program**

The Commercial Geothermal program provides financial rebates to help reduce the barriers of high capital costs for the installation of geothermal heat pump systems for commercial buildings. In addition to financial incentives the Commercial Geothermal Program has mandated new eligibility criteria for program participants in order to reduce the risk of poor system design. To the end of March 31, 2018, one customer in a rural all-electric building participated in the program.

#### Indigenous

#### Indigenous Power Smart Program

Manitoba Hydro developed a customized approach in 2008/09 to address the unique barriers facing Indigenous communities in completing energy efficiency upgrades. This customized approach includes: the provision of funding to complete upgrades, use of a Band Council Resolution and agreement form instead of individual application forms, and a dedicated Indigenous Energy Advisor who coordinates all administrative processes and provides awareness along with education on energy efficiency opportunities. With the approach specifically targeting Indigenous communities, increased interest and participation within this market sector has been experienced.

Through the AEP, the Indigenous approach is designed to provide energy efficiency upgrades to Indigenous communities by providing energy efficiency materials, as well as training and funding for labour allowing local residents to install materials. Energy saving seminars can also be arranged to provide community members with information and tips on what they can do to make their communities more energy efficient.

Manitoba Hydro has initiated a two channel ("insulation" and "direct install") targeted approach allowing Indigenous communities to improve energy efficiency and home quality and comfort. Each Indigenous community works with the Energy Advisor who identifies qualifying homes and recommends energy efficient measures. The Insulation Channel provides basement, wall, and attic insulation upgrades for qualifying homes. The Direct Install Channel, launched December 1, 2014, provides basic energy efficient upgrades to qualifying homes to increase energy efficiency and save water. The Direct Install kit includes the following:

- Socket Draft Stoppers
- Socket Caps
- Water Heater Pipe Wrap
- Window Weatherization Kits
- LED Lighting
- Low Flow Shower Head
- Low Flow Bathroom Aerators

Manitoba Hydro has contacted all Indigenous Communities to discuss their participation in the program, and participation in the AEP has been initiated within 97 per cent of the Indigenous Communities. The total number of homes for on-reserve Indigenous communities is approximately 16,000. To date, Manitoba Hydro has completed energy efficiency upgrades in 6,109 homes representing approximately 38% of the market.

In 2017/18 a total of 1,190 homes in Indigenous communities were completed of which 941 received insulation upgrades and 683 received basic energy upgrades. Some homes will have received both upgrades. Cumulatively, a total of 6,109 homes have been completed of which 3,730 have received insulation upgrades and 3,701 received basic energy efficient upgrades.

Along with free basic energy savings measures and free insulation, the Indigenous Power Smart Program provides the funding of labour to complete installations which creates employment for members of the community. With over 6,100 homes having received retrofits through the program, the equivalent of 22 full time jobs of Indigenous employment has been generated.

Translation of the Heat Recovery Ventilation (HRV) video into Ojibway was also completed and distributed to the following communities in May 2017: Beren's River First Nation, Bloodvein First Nation, Brokenhead Ojibway First Nation, Buffalo Point First Nation, Dauphin River First Nation (Gypsumville), Ebb & Flow First Nation, Gamblers First Nation (Binscarth), Hollow Water First Nation (Wanipigow), Keeseekoowenin Ojibway Nation (Elphinstone), Kinonjeoshtegon First Nation, Lake Manitoba First Nation (Dog Creek), Lake St. Martin First Nation, Little Black River First Nation (O'Hanley), Little Grand Rapids First Nation, Little Saskatchewan First Nation, Long Plain First Nation, O-Chi-Chak-Ko-Sipi (Crane River), Pauingassi, Peguis, Pinaymootang (Fairford), Pine Creek (Camperville), Poplar River (Negginan), Rolling River (Erickson), Roseau River (Anishinabe), Sagkeeng (Fort Alexander), Sandy Bay (Marius), Skownan (Waterhen), Swan Lake, Tootinaowaziibeeng (Valley River), Waywayseecappo, Garden Hill First Nation , Red Sucker Lake, Sapotaweyak (Pelican Rapids), St Theresa Point, Wasagamack and Wuskwi Sipihk (Birch River).

Translation of the HRV video into Dene was completed in 2017/18 and distributed to the following communities in January 2018: Northlands Dene (Lac Brochet) and Sayisi Dene (Tadoule Lake).

The video translations are available on the Manitoba Hydro website (<u>https://www.hydro.mb.ca/powersmart/indigenous\_communities.shtml</u>).

#### Power Smart Staff Promotes Designing for the Future in First Nation Communities

The inaugural *Canada Mortgage and Housing Corporation* (*CMHC*) 2018 First Nation Housing Symposium – Designing for the Future was held from January 23 to 25, 2018 in Winnipeg. The event was targeted to First Nation housing managers to expand their knowledge of durable, energy-efficient,

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culturally appropriate housing design.

Manitoba Hydro staff were asked by the event organizer to assist with the development and delivery of the symposium. The event was originally presented to staff as an opportunity to speak on energy efficient housing in First Nation communities, however, Power Smart staff saw this as an opportunity to take the event to the next level by discussing high performance building principles and approaching the event through a lens of innovation. This strategy was adopted by CMHC with enthusiasm.

Power Smart staff were instrumental in connecting CMHC with industry experts and trade show sponsors. A number of national experts were sourced by Manitoba Hydro staff to share case studies and best practices. Manitoba Hydro staff also arranged four of the five event workshops featuring hands-on demonstration stations for innovative building insulation, HRV installation and maintenance, window installation, and window repair. Manitoba Hydro also helped to facilitate a seminar for Cross Lake housing innovation. Power Smart for New Homes and Indigenous Power Smart Program staff worked the trade show booth at the symposium, which provided an opportunity to more intimately promote their respective programs while also deepening social networks with First Nation contacts. A summary of the New Homes program was also presented to the entire conference group.

The event was very successful as it provided access to representatives from 48 Manitoba First Nations communities and generated many conversations, new relationships, and participation opportunities. The collaborative, interactive, and informative nature of the event provided councilors, housing directors, and housing maintenance supervisors with the opportunity to learn about the importance of building homes correctly from the start and about potential upgrades to existing homes. In addition, by promoting Power Smart for New Homes, high performance construction and energy efficient building alternatives were brought to the forefront.

As a direct result of the conference, program staff joined in the creation of a monthly working group with representation from Indigenous Services Canada (formerly Indigenous and Northern Affairs Canada), CMHC, First Nation & Inuit Health Branch, and Manitoba Hydro. Program materials and contact information was also shared widely across the three-day event.

#### Community Geothermal Program

The Community Geothermal Program provides funding and financing to support the installation of geothermal heat pump systems in Indigenous communities. Manitoba Hydro's PAYS Financing Program allows community members to pay for the majority of the geothermal system through the energy savings realized by converting their heating/air conditioning systems to a geothermal system.

Through a partnership with AKI Energy, a non-profit indigenous social enterprise, the Community Geothermal Program creates job opportunities and training for members of the community to install and maintain the geothermal systems. Fifty-one band members have received installation training

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through this initiative and 21 of those band members have been fully IGSHPA (International Ground Source Heat Pump Association) certified to install geothermal systems. In 2017/18, 54 geothermal heat pump systems were installed under this program, in four participating Indigenous communities including Peguis First Nation, Fisher River Cree Nation, Long Plain First Nation, and Sagkeeng First Nation.

#### Solar Energy Pilot Program

Through the Solar Energy Pilot Program, Manitoba Hydro had discussions with a number of Indigenous communities or their consultants. Nelson House has submitted applications for seven commercial projects totaling over 1 300 kW dc of solar PV. Manitoba Hydro worked with Nelson House and their contractor directly over the past year to determine program eligibility and system sizing. Nelson House plans to use their ATEC training centre to train local band members to install the solar PV system, creating social economic benefits for the community as a whole.

Fisher River Cree Nation and Northlands First Nation had initial inquiries into the program, however, these discussions have evolved into large scale solar projects outside of the program parameters.

#### Power Smart Shops Program

In addition to the program pilots recently conducted in The Pas and Dauphin, pilots of a similar nature were also conducted in two Indigenous communities in the 2017/18 fiscal year:

The program's first visit to Opaskwayak Cree Nation was in fall of the 2016/17 fiscal year, at which time two direct installation projects (i.e. low-flow faucet aerators, low-flow spray valves, and basic LED screw-in lamps) were completed and 40 lighting assessments were conducted. Forty deeper lighting retrofits will be completed in the 2018/19 fiscal year with the services of a local electrician. As with The Pas and Dauphin pilots, the full material and installation costs associated with these direct installation and deeper lighting retrofit projects are being covered by the program.

The program's first visit to Peguis First Nation was in spring of the 2016/17 fiscal year, at which time nine direct installation projects were completed and 24 lighting assessments were conducted. Twenty-four deeper lighting retrofits were completed in the 2017/18 fiscal year, with the help of a local electrical apprentice. Again, the full material and installation costs associated with these direct installation and deeper lighting retrofit projects are being covered by the program.

#### **New Homes Program**

Indigenous Communities are frequently contacted to encourage participation in the New Homes Program by way of energy efficient new residential construction projects.

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In 2017/18, 77 energy efficient new homes were completed and incentives paid through the New Homes Program. A further 97 applications were received over the year and these new homes are expected to be completed in 2018/19.

The New Homes Program is involved in a green building code project known as the Cross Lake Sustainability Guide. It is expected that 29 new homes at Cross Lake will receive certification and incentives from the program, and that future residential construction projects will also be eligible due to increased levels of energy efficiency.

Program staff participates in regular meetings with CMHC, Manitoba Housing, and Indigenous Services Canada to discuss and share information about First Nations housing initiatives, programs, and procedures. A coordinated process flow document is being created to help Indigenous Communities take advantage of the various funding and program benefits available. Presentations at the CMHC First Nations Housing Symposium provided information about the program to approximately 45 different communities.

All new residential homes being constructed for Indigenous Communities are eligible to apply for incentives and energy modeling assistance, provided the homes are designed to meet the minimum requirements of the program.

#### **Power Smart for Business**

#### Waywayseecappo Community School benefits from Power Smart

With technical assistance and financial support from Manitoba Hydro Power Smart, Waywayseecappo Community School in Waywayseecappo First Nation, received upgrades to its lighting system resulting in increased energy efficiency, enhanced learning experience, and ongoing comfort and safety for students, staff, and visitors.

Throughout the school, inefficient lighting systems were upgraded to modern, energy efficient LED systems. Fluorescent lamp fixtures were upgraded – cutting energy consumption in half while tripling product life. Halogen and incandescent lamps that lit various washrooms, storage rooms and change rooms were upgraded – reducing energy consumption by 80 per cent and increasing product life by 10 times. Lastly, metal halide fixtures in the gym and on school exterior walls were upgraded – reducing energy consumption by half and tripling product life.

The installation of these lighting technologies will provide estimated annual energy savings of 130,000 kWh, resulting in annual lighting bill reductions of \$7,000 while reducing greenhouse gas emissions by an estimated 100 tonnes of CO2e annually, which is equivalent to taking 20 cars off the road for a year.

Waywayseecappo Community School is a nursery to grade eight elementary school with 31 teachers and 339 students. Waywayseecappo First Nation is a First Nations band government whose reserve is located 32 kilometers east of Russell, Manitoba, Canada.

#### Chemawawin Cree Nation Arena brightens up with Power Smart

With technical assistance and financial support from Manitoba Hydro Power Smart, the Chemawawin Cree Nation arena, also known as the Geordie George Memorial Centre, received upgrades to its lighting system resulting in increased energy efficiency, ongoing safety, and improved lighting quality for players and spectators.

In the hockey arena, 40 metal halide fixtures were replaced with 40 LED fixtures with a rated life of 200,000 hours; which is a more than a 10 times increase in product life. Long life means significantly less relamping, re-ballasting and maintenance, resulting in significant savings for Chemawawin Cree Nation. Using less than half the energy of the outgoing metal halide system, the new LED fixtures produces enough light to brighten the rink, eliminating dark patches on the ice and allowing spectators to record hockey games in high definition.

The installation of these lighting technologies will provide estimated annual energy savings of 45,000 kWh, resulting in annual lighting bill reductions of over \$2,000 while reducing greenhouse gas emissions by an estimated 35 tonnes of CO2e annually, which is equivalent to taking nearly 10 cars off the road for a year.

The Chemawawin Cree Nation is located next to Easterville, Manitoba in Central Manitoba. The population of this First Nation is identified as Swampy Cree and Rocky Cree.

#### Little Saskatchewan Arena shines with Power Smart

With technical assistance and financial support from Manitoba Hydro Power Smart, the Little Saskatchewan First Nation arena received upgrades to its lighting system resulting in increased energy efficiency, improved lighting quality, and ongoing safety. These changes will provide a better experience for players, spectators, and staff.

In the arena, 36 metal halide fixtures were replaced with 36 LED fixtures. Using less than half the energy of the previous metal halide system, the new LED fixtures will provide a more uniform lighting pattern while simultaneously giving Little Saskatchewan First Nation substantial savings.

Power Smart had a significant influence on this project, as the Band Manager indicated the system would not have been upgraded without the available incentives.

The installation of these LED lighting upgrades will provide estimated annual energy savings of 25,000 kWh, resulting in annual lighting bill reductions of over \$1,000. The retrofit will reduce greenhouse gas emissions by an estimated 20 tonnes of CO2e annually, which is equivalent to taking 5 cars off the road for a year.

Little Saskatchewan First Nation is located in Gypsumville, Manitoba, 78 km north of Ashern, Manitoba. The community on-reserve population consists of 682 members.

#### Bunibonibee Cree Nation benefits from Power Smart New Buildings Program

With technical assistance and financial support from Manitoba Hydro Power Smart, the emergence of energy modelling as a design tool for local new construction developments has taken hold in Manitoba First Nation community projects – which will result in saved energy and reduced operating costs.

Bunibonibee Cree Nation is constructing a new high school located in the community of Oxford House. The 57,000 square foot facility consists of classrooms, a gymnasium, a library, a cafeteria, offices, supporting spaces, with options for classroom expansion.

Designed to be 26% more energy efficient than a code-compliant building, the energy efficient design will provide estimated annual energy savings of nearly 450,000 kWh, resulting in annual bill reductions of \$25,000 while reducing greenhouse gas emissions by an estimated 350 tonnes of CO2e annually, which is equivalent to taking 70 cars off the road.

The building is expected to be complete by 2019.

#### Manto Sipi Cree Nation benefits from Power Smart New Buildings Program

Manto Sipi Cree Nation is constructing a new school, expected to be complete by 2019, located in the community of God's River. The 52,000 square foot facility consists of classrooms, a gymnasium, a library, a cafeteria, offices, and supporting spaces for kindergarten through senior year students.

Designed to be over 30% more energy efficient than a code-compliant building, the energy efficient design will provide estimated annual energy savings of over 500,000 kWh, resulting in annual bill reductions of \$25,000 while reducing greenhouse gas emissions by an estimated 400 tonnes of CO2e annually, which is equivalent to taking 80 cars off the road.

#### Wasagamack First Nation benefits from Power Smart New Buildings Program

Wasagamack First Nation is constructing a new high school located in the community of Wasagamack. The 85,000 square foot facility consists of classrooms, a gymnasium, a library, a cafeteria, offices, and supporting space, with options for classroom expansion.

Designed to be 35% more energy efficient than a code-compliant building, the energy efficient design will provide estimated annual energy savings of nearly 850,000 kWh, resulting in annual bill reductions of \$50,000 while reducing greenhouse gas emissions by an estimated 650 tonnes of CO2e annually, which is equivalent to taking 130 cars off the road.

The building is expected to be complete by 2019.

#### God's Lake First Nation benefits from Power Smart New Buildings Program

God's Lake First Nation is constructing a new K-12 school located in the community of God's Lake. The 65,000 square foot facility consists of classrooms, a gymnasium, a library, a cafeteria, offices, and supporting space, with options for classroom expansion.

Designed to be 28% more energy efficient than a code-compliant building, the energy efficient design will provide estimated annual energy savings of nearly 550,000 kWh, resulting in annual bill reductions of \$30,000 while reducing greenhouse gas emissions by an estimated 450 tonnes of CO2e annually, which is equivalent to taking nearly 100 cars off the road.

The building is expected to be complete by 2019.

#### **Opaskwayak Shopping Mall Saves with Power Smart**

With technical assistance and financial support from Manitoba Hydro Power Smart, the Otineka Mall in Opaskwayak Cree Nation received upgrades to its lighting system resulting in increased energy efficiency, improved lighting quality, and ongoing comfort and safety. These changes will provide an enhanced experience for both customers and employees.

In the mall's Super Thrifty Drug Mart, 78 fluorescent T12 fixtures were replaced with 78 LED fixtures. Using only a third of the energy of the removed fluorescent system, the new system will provide significant energy and bill savings. In addition, the LED replacements have an increased product life, resulting in less maintenance time spent relamping and reballasting, and therefore resulting in additional maintenance cost savings.

The installation of these LED lighting upgrades will provide estimated annual energy savings of 30,000 kWh, resulting in annual lighting bill reductions of nearly \$1,500. The retrofit will reduce greenhouse gas emissions by an estimated 22 tonnes of CO2e annually, which is equivalent to taking nearly 5 cars off the road for a year.

Otineka Mall is the largest mall in the North and has been serving the Opaskwayak community for 40 years. Opaskwayak Cree Nation is located just outside The Pas in northern Manitoba. The community on-reserve population consists of 3 206 members.
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#### Brokenhead Grocery & Pharmacy Committed to Energy Efficiency

With technical assistance and financial support from Manitoba Hydro Power Smart, recent upgrades to refrigeration equipment at Brokenhead Grocery & Pharmacy have enhanced the store's operational efficiency while improving the shopping experience for its customers. The upgrades will also help lengthen the life of perishable foods, increase overall profitability for the store, and offer improved comfort levels for customers and staff while in refrigerated aisles.

The project included the installation of new strip curtains and night covers to existing refrigeration equipment, which are estimated to provide annual energy savings of nearly 20,000 kWh, resulting in annual bill reductions of over \$1,000. The retrofit will reduce greenhouse gas emissions by an estimated 15 tonnes of CO2e annually, which is equivalent to taking nearly 5 cars off the road for a year.

Brokenhead Grocery is the first retailer of its kind for the First Nation, where elderly residents and other people without cars previously had to find a 37-kilometre ride to Selkirk to purchase fresh produce.

#### Sioux Valley Dakota First Nation Project Spans Eight Buildings

With technical assistance and financial support from Manitoba Hydro Power Smart, Sioux Valley Dakota First Nation (Sioux Valley) underwent a series of lighting upgrades to eight different buildings in the community. Retrofits took place in the self-governing office, the fire hall, the elementary school, the high school, the recreation centre, a grocery store, a storage unit, and an apartment complex. By undergoing these retrofits, Sioux Valley increased energy efficiency while improving lighting quality and comfort for all its community members.

The building exteriors were retrofitted from metal halide and high pressure sodium fixtures to LED fixtures. Inside the buildings, metal halide, fluorescent, and incandescent lighting systems were retrofitted to LED as well. The new LED system will provide significant energy, utility bill, and maintenance savings.

The installation of these LED lighting upgrades will provide estimated annual energy savings of nearly 215,000 kWh, resulting in annual lighting bill reductions of over \$10,000. The retrofit will reduce greenhouse gas emissions by an estimated 165 tonnes of CO2e annually, which is equivalent to taking 35 cars off the road each year.

Sioux Valley Dakota Nation is located in Griswold, Manitoba, 45 km west of Brandon, Manitoba. The community is the largest Dakota Nation in Canada and is also the first self-governing First Nation in the prairies.

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#### Sagkeeng First Nation Committed to Energy Efficiency

With technical assistance and financial support from Manitoba Hydro Power Smart, recent upgrades to refrigeration equipment at Sagkeeng Superstore located in Sagkeeng First Nation, have enhanced the store's operational efficiency while improving the shopping experience for its customers. The upgrades will also help lengthen the life of perishable foods, increase overall profitability for the store, and offer improved comfort levels for customers and staff while in refrigerated aisles.

The project included the installation of new strip curtains, new door gaskets, and adding night covers to existing refrigeration equipment. These upgrades are estimated to provide annual energy savings of nearly 90,000 kWh, resulting in annual bill reductions of over \$4,500. The project will also reduce greenhouse gas emissions by an estimated 70 tonnes of CO2e annually, which is equivalent to taking nearly 25 cars off the road for a year.

Sagkeeng First Nation is an Anishinaabe First Nation that holds territory upon Turtle Island in the southern part of Lake Winnipeg, Manitoba, 120 kilometers north of the city of Winnipeg. The Sagkeeng reserve, once called Fort Alexander, has a total population of 7,637 registered band members, with 4,285 members living off reserve.

# PROGRAM PARTICIPATION

The following table outlines participation by all-electric customers in residential and commercial Power Smart Programs in 2017/18. Some customers may have participated in more than one program.

Program	Urban All Electric Homes/Buildings	Rural All Electric Homes/Buildings	Indigenous Homes	Total
RESIDENTIAL				
Affordable Energy Program	203 <sup>1</sup>	267 <sup>1</sup>	1,190	1,660
Financing Programs (PSRL & PAYS)	112	432	153 <sup>2</sup>	645
Home Insulation Program	47	769	0	816
HRV Control Program	24	1	0	25
Community Geothermal	n/a³	n/a³	54	54
Refrigerator Retirement Program	434	1,542	13	1,989
New Homes Program	57	23	77	157
Smart Thermostat Rebate	205	559	0	764
Appliance Rebate	153	345	3	501
Solar Energy Program	10	156	0	166
Water & Energy Saver Program	643 <sup>4</sup>	2,045	60	2,748
COMMERCIAL				
Power Smart Shops	165 <sup>5</sup>	129 <sup>5</sup>	1 <sup>6</sup>	295
Solar Energy Program	1	9	0	10
Commercial Geothermal	0	1	0	1

#### Participation in Power Smart Programs (all electric) – FY 2017/18

<sup>1</sup>Participants have both electric heat and electric hot water tanks.

<sup>2</sup>Participation in the Community Geothermal program and the Cross Lake Power Smart Residential Loan.

<sup>3</sup>The Community Geothermal Program provides funding and financing to support the installation of geothermal heat pump systems in Indigenous communities only.

4Denotes electric water heaters. The Water and Energy Saver Program does not collect/track space heating fuel type.

<sup>5</sup>Denotes number of participating businesses with electric water heaters that received water saving measures through the Power Smart Shops Program in 2017/18. Urban is representative of Winnipeg only and Rural is representative of all other communities, excluding Indigenous communities.

<sup>6</sup>Denotes number of band buildings in Indigenous communities with electric water heaters that received water saving measures through the Power Smart Shops Program in 2017/18. Applicable Indigenous community was Opaskwayak Cree Nation.



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360 Portage Ave (22) • Winnipeg, Manitoba Canada • R3C 0G8 Telephone / N° de téléphone: (204) 360-3633 • Fax / N° de télécopieur: (204) 360-6147 • ofernandes@hydro.mb.ca

June 28, 2019

Mr. D. Christle Secretary and Executive Director Public Utilities Board 400-330 Portage Avenue Winnipeg, Manitoba R3C 0C4

Dear Mr. Christle:

## RE: AFFORDABLE ENERGY PROGRAM ANNUAL REPORT FOR FISCAL 2018/19- DIRECTIVE 6 OF ORDER 73/15

Please find attached Manitoba Hydro's 2018/19 Annual Report on the Affordable Energy Program, including programs to assist all-electric customers, filed in accordance with Directive 6 of Order 73/15.

Should you have any questions with respect to this submission, please contact the writer at 204-360-3633 or Shannon Gregorashuk at 204-360-4720.

Yours truly,

MANITOBA HYDRO LEGAL SERVICES DIVISION Per:

**ODETTE FERNANDES** Barrister & Solicitor

Att.

Available in accessible formats upon request

# Affordable Energy Program Annual Report

April 1, 2018 – March 31, 2019



# INTRODUCTION

During 2018/19, Manitoba Hydro continued its activities under the Affordable Energy Program ("AEP") to assist lower-income customers in managing their energy use by capturing energy efficient opportunities, which results in lower energy bills. Manitoba Hydro also continued its efforts to assist those customers who heat their homes with electricity.

The following sections of this report provide an overview of customer participation for the 2018/19 fiscal year for Manitoba Hydro's AEP and Energy Efficiency Programs.

#### RESIDENTIAL

#### Affordable Energy Program

The AEP is designed to assist lower income homeowners and renters across the Province in implementing energy efficiency upgrades. The program offers free basic energy efficiency measures (e.g. LED light bulbs, showerheads, faucet aerators, window weatherization kits, draft stoppers, safety caps and fridge/freezer thermometers), free insulation upgrades, and the installation of a high efficiency natural gas furnace at a cost of \$9.50/month over five years or a rebate of \$3,000 for the installation of a high efficiency natural gas boiler. These upgrades can provide significant energy savings and decrease the customer's monthly energy bill while increasing the comfort of their home.

The AEP is offered through four different approaches, Individual, Community, Indigenous, and Multi Unit Residential Buildings (MURB), with each approach customized to meet customer needs.

The Individual Approach involves Manitoba Hydro's staff and external contractors working directly with customers. Dedicated staff, energy advisors, and contractors ensure energy upgrades are completed in a timely manner and provide direct customer service to individuals as needed. Staff work with customers from the initial application through to the completion of the upgrade.

The Community Approach is designed to assist and encourage lower income Manitobans to participate in the energy efficiency upgrades through various community outreach activities. Manitoba Hydro partners with social housing groups, community groups, social organizations, and non-profit organizations in order to increase AEP program participation through the various groups which represent more than an individual customer. Under the Community Approach is the Neighbourhood Energy Efficiency Project (NEEP), which was implemented in November 2012 to assist and encourage lower income Manitobans to participate in energy efficiency upgrades. Manitoba Hydro has worked with multiple community organizations, including the North End Community Renewal Corporation (NECRC), the Brandon Neighbourhood Renewal Corporation (BNRC), the Selkirk Community Renewal Corporation (SCRC), Dakota Ojibway Tribal Council (DOTC) in Portage la Prairie, and the Manitoba Metis Federation (MMF) in Thompson. The goal of the NEEP is to increase customer participation by using a "block by block" approach. Energy advocates from the community organizations are responsible for promoting the AEP and assisting customers when completing the required documentation.

Under the Individual and Community approaches, the criteria for determining program eligibility are 125% of the Low Income Cut-Off (LICO) thresholds set by Statistics Canada. Customers are asked to provide copies of their Income Tax Return and Notice of Assessment as proof of income. If they are unable to provide tax documentation there are other forms of documents accepted to verify their eligibility. This includes proof of participation in programs such as Manitoba Employment and Income Assistance, Homeowner Renovation Assistance Program, Manitoba Emergency Repair Program, Legal Aid, and other programs that have similar income qualifying thresholds to the AEP.

The MURB Approach provides basic energy efficiency items such as low flow showerheads and faucet aerators, draft stoppers, socket caps, window kits and LED light bulbs to lower income tenants living in apartment style buildings. Manitoba Hydro works with private landlords as well as community housing co-ops or social housing groups to provide these measures, which can be installed by a Manitoba Hydro contracted installer or left for the building manager to install.

The Indigenous Approach is designed to provide energy efficiency upgrades to Indigenous Communities by providing energy efficiency materials, as well as training and funding for labour to enable local residents to install materials.

Through the Indigenous approach, community members are not required to income qualify; instead all eligible housing stock is able to participate. In addition, under the MURB approach each individual suite is not required to provide income tax documents for verification. If a social housing provider owns the building, they will automatically qualify. Otherwise, per-unit income guideline documentation (e.g. mandate, lease agreement, tenant handbook etc.) that states the income guidelines for tenants must be provided by the building owner or property manager. For example, tenants who pay "rent geared to income", where their monthly rent is a percentage of their total household income, may qualify.

Energy efficiency retrofits have been completed in 24,513 homes under the AEP since the inception of the program in 2007. Of these, 48% were through the Individual Approach, 14% Community Approach, 25% Indigenous Approach, and 13% MURB. Of the total retrofits, 12,638 insulation projects have been completed and 6,203 furnaces and 144 boilers have been replaced. The following table provides an overview of the AEP participation for 2018/19 fiscal year.

AEP Participation Overview - April 2018 to March 2019*							
Initiative	Homes Completed						
Insulation Installations	943						
Furnace Installations	496						
Boiler Installations	14						
Total Number of Homes Completed							
(including Basic Efficiency Measures)	2,148						

\*Includes both natural gas and electric heated homes

#### AEP Activities in 2018/19

The following activities were undertaken during 2018/19 to promote participation in the AEP:

- Bill inserts promoting the AEP were sent to over 330,000 residential customers across the province in the months of May, July, September, November and March. Specific messaging indicating that both natural gas and electric customers can qualify for insulation upgrades was used.
- Biweekly autodial campaigns were ran throughout the year advertising the program to customers in arrears, alternating between all-electric and gas customers every two weeks.
- On May 29<sup>th</sup>, 2018 the remaining four of five AEP video series that serve as an alternative method to explain the program offer and steps to participate as opposed to the existing website text was posted to the Manitoba Hydro website. Customers have the option to watch one continuous video or five separate chapters.

http://www.hydro.mb.ca/your\_home/affordable\_energy/index.shtml

- The Neighbourhood Street Pilot Project, in partnership with Winnipeg's North End Community Renewal Corporation (NECRC) resumed in the spring of 2018. This initiative promotes participation in the AEP through targeting specific streets that have higher incidences of lower income customers. The program takes a grass roots door-to-door approach and allows all customers to participate, regardless of income levels. From May 10<sup>th</sup> until October 18<sup>th</sup> a total of 18 events took place which targeted a total of 578 homes. These events reached at total of 146 customers resulting in the distribution of over 90 AEP applications. Residences that were not reached the day of the event were then followed up with by the community energy advocate. As of March 31, 2019 a total of 50 applications were received from the events held this year.
- On June 16, 2018 an AEP staff member and the NECRC Energy Advocate attended the Newcomer Welcome Fair held at the Freight House in the Centennial neighbourhood. A table was set up to hand out program information to attendees.
- Staff of the AEP participated in the 20<sup>th</sup> annual Picnic in the Park, organized and hosted by NECRC on August 18, 2018 in order to promote the program. The event took place at St. Johns Park Located and was estimated that over 2,000 members were in attendance.
- In August of 2018, AEP had discussions with Empower Me, an equity-based energy transformation program designed for and delivered by underserved and underrepresented populations such as new Canadians, Indigenous people living off reserve, seniors and families living in energy poverty, to discuss possible future collaboration activities to further reach these

markets.

- In September and December 2018, Facebook and Instagram posts and stories on the AEP were completed as part of the overall Power Smart Social Media campaign.
- During October 2018, posters and brochures on AEP were distributed to 51 community and social organizations consisting of resource councils, community centres, and seniors organizations, as listed in the table below.

Name of Organization
Arborg & District Seniors Resource Council
Living Independence for Elders (Ashern)
Prairie Oasis Senior Centre (Brandon)
Dauphin Multi-Purpose Senior Centre
Services to Seniors Serving Erickson, Onanole, Sandy Lake
& Areas Inc. (Erickson)
Eriksdale Community Resource Council Inc
Gladstone Area Seniors Support Program
Seniors Independent Services (Glenboro)
Grandview & District Community Resource Council
Hamiota/Blanchard Senior Services
Two Rivers Seniors Resource Council (Lac du Bonnet)
Lundar Community Resource Council
MacGregor-Austin Senior Support Program
Pembina Community Resource Council (Manitou)
Senior Services of Antler River (Melita/Pierson)
Minnedosa & District Services to Seniors
Morden Services for Seniors, Inc. (Friendship Centre)
Home Assistance Neepawa and District
Louise Community Services for Seniors (Pilot Mound)
Senior Services of Banner County (Russell)
Rossburn Community Resource Council
Selkirk and District Seniors Resource Council
Senior Services of Prairie-Parkland Inc. (Shoal Lake)
St Laurent Seniors Resource Council
East Beaches Resource Centre (Traverse Bay)
Bord-Aire Community Club
Kelvin Community Centre
Burton Cummings Community Centre
Maples Community Centre
Champlain Community Centre
Chalmers Community Centre
West Kildonan Community Centre
Valour Community Centre
Norwood Community Centre
Robert A Steen Memorial Community Club
Bronx Park Community Centre
River Osborne Community Club
Northwood Community Centre Rink
Lord Roberts Community Centre
Garden City Community Centre

Ralph Brown Community Centre
Vince Leah Recreation Centre
Tyndall Park Community Centre
Red River Community Centre
Melrose Park Community Centre
Norquay Community Centre
Luxton Community Centre
Weston Memorial Community Centre Rink
Morse Place Community Centre
Notre Dame Recreational Centre
Sinclair Park Community Centre

- On October 15, 2018 Manitoba Hydro staff attended the Manitoba Non Profit Housing Association (MNPHA) Conference and Trade Show and provided sponsorship for the delegate bags. Staff set up a booth at a trade show to promote the Affordable Energy Program and other Energy Efficiency programs to social housing providers across Manitoba. Five social housing providers indicated interest in the Affordable Energy Program for both their housing and MURB units and have been contacted in order to discuss participation.
- In October 2018, program staff distributed an electronic customer satisfaction survey to 198 program participants. This survey was distributed to those participants who had completed home energy efficiency updates on their homes in the second quarter of FY2018/19 and who had their home energy assessment completed within the last year. The survey included questions about the technologies the customer received under the program, their experience(s) with the energy advisor and if applicable contractors, what they would have done in the absence of the program and whether they would be willing to give a customer testimonial for future marketing pieces. The information gathered will be used to make improvements to the program and the survey will be distributed on an ongoing basis, quarterly.
- On November 17, 2018 a presentation on the Affordable Energy Program and energy savings tips was given to participants of the Supporting Employment & Economic Development (SEED) Inner City Homebuyer Program.
- In March of 2019 follow-up phone calls were made to 50 approved AEP customers who had a
  recommendation to upgrade their furnace. All outstanding recommended furnace upgrade
  customers have now been contacted and resulted in several work-orders coming in. An
  additional 29 calls were made to approved AEP customers who had been recommended
  insulation upgrades and work will continue on this front.

# Financing Programs

Manitoba Hydro offers a number of financing programs that provide customers convenient financing for energy saving upgrades. During 2018/19, the Home Energy Efficiency Loan provided over \$19 million in financing for upgrades for 4,298 customers. Of that amount, over \$3.4 million in financing was provided to 472 all-electric homeowners. Popular upgrades under the program among electrically heated households include high performance triple pane window upgrades and space heating equipment.

Manitoba Hydro's Pay As You Save, also known as the PAYS program, enables homeowners to upgrade the energy efficiency of their homes and allows customers to use the estimated annual utility savings from making an energy efficiency upgrade to pay for the upgrade (or a part thereof). During 2018/19, 24 customers chose the PAYS option for financing their upgrades; this includes five First Nations participants through the Community Geothermal Program.

#### Home Insulation Program

Since 2004, the Home Insulation Program (HIP) has been offering education and rebates to help Manitoba Hydro customers reduce their energy use by upgrading the level of insulation in their home. In June 2014, free Home Energy Assessments were introduced under this program for all-electric customers. The energy assessment initiative was launched in an effort to reduce market barriers preventing a customer from upgrading their home's insulation by providing them with guidance on insulation upgrades, benefits, and the HIP offerings. The in-home assessment is supplemented by promoting other value-added services, such as the installation of basic water and lighting measures (i.e. Water and Energy Saver Program and Residential Lighting Program), and recommending the AEP and Refrigerator Retirement Program, where applicable.

The communication strategy for this initiative involves sending addressed mail and warm calling customers who had previously received a mailer in rural locations to encourage participation. Since 2014/15, 55,713 mailers offering the Home Energy Assessment have been delivered and 9,267 calls have been made through a dedicated call campaign conducted by additional student resources to 608 targeted communities and towns where all-electric customers reside. This initiative has resulted in 3,176 customers who heat their home with electricity participating in the free assessment. Of these customers, 616 assessment participants applied to the Home Insulation Program and 87 applied to the Affordable Energy Program.

Bill inserts were utilized throughout 2018/19 to promote the program.

#### HRV Control Program

The Heat Recovery Ventilator (HRV) Control Program is available to eligible electric and natural gas customers and is delivered through 105 heating contractors throughout Manitoba. The program offers customers up to a \$150 rebate when they upgrade to an advanced HRV control.

In 2018/19 the program had 32 participants that use electricity as their primary space heating fuel. Of those 32 participants, 10 were in all-electric areas.

#### LED Lighting Program

In 2018/19, an annual spring rebate campaign was offered province-wide through the LED Lighting Program. Customers received instant rebates on a variety of energy efficient products including ENERGY STAR<sup>®</sup> certified LED bulbs and fixtures in 2018/19. This offer was available in approximately 20 all-electric communities at 29 participating stores.

#### Refrigerator Retirement Program

Launched in June 2011, the Refrigerator Retirement Program offers residential homeowners free inhome pick-up of older working refrigerators and freezers. Homeowners also receive a \$50 incentive for each unit retired. The program's contracted service provider travels to all areas of the province to pick up these old and inefficient units.

During 2018/19, the program saw 2,039 participants who heated their homes with electricity.

#### New Homes Program

The New Homes Program encourages the construction of energy efficient residential buildings by offering financial incentives to homebuilders. Rebates for the costs of energy modeling work are also provided under the Program. During 2018/19, the program saw 134 homes constructed using electricity as their primary space heating fuel, of which 114 were in all-electric areas, and 20 located in gas available areas. The majority of the electric projects in gas available areas were built by Habitat for Humanity. The New Homes Program is open to participants province-wide, including band-owned and on-reserve housing. In total, 104 new homes in First Nations communities were certified by the New Homes Program in the 2018/19 fiscal year.

#### Solar Energy Pilot Program

The introduction of the Solar Energy Pilot Program (SEP) in spring 2016 expanded on existing renewable energy options to Manitobans. The two year pilot offered incentives to help offset the capital cost of installing Solar Photovoltaic (PV) systems to displace customers' electricity load, targeting residential and commercial customers throughout the province. The SEP pilot stopped accepting applications after April 30, 2018, and in total over 1,600 applications were pre-approved. This year saw 325 completed projects for all electric rural customers and 10 completed all electric urban customers.

#### Water & Energy Saver Program

The Water and Energy Saver Program (WESP) is offered throughout Manitoba whereby customers can apply to receive a free kit in the mail. In addition, as part of the Program, contracted technicians go door-to-door in target areas offering on-the-spot installation of energy efficient devices. The kit includes low-flow showerheads, bathroom and kitchen faucet aerators, pipe wrap, plumber's tape and a refrigerator/freezer thermometer.

In 2018/19, 452 urban all electric homes/buildings, 1,119 rural all electric homes/buildings, and 38 Indigenous homes/buildings participated in the program.

## COMMERCIAL

#### Small Business Program

The Small Business Program was launched in October 2015. The program promotes water and energy saving measures to the hard-to-reach small commercial market. When it comes to prioritizing energy efficiency in one's business, small business owners face a number of unique barriers, such as limited financial resources, competing priorities, and limited industry exposure.

The Small Business Program utilizes a full-service contractor delivery model and consists of a three-part offering. First, the direct installation of various free measures such as bathroom and kitchen faucet aerators, low-flow pre-rinse spray valves, and basic light emitting diode (LED) screw-in lamps. Second is a free lighting assessment and written report that identifies opportunities to retrofit inefficient lighting systems. Finally, an incentive that will cover 70 per cent of material and installation costs of qualifying lighting retrofits as identified in the lighting assessment, including T8 ballasts, LED T8 lamps, T8 tandem fixtures, LED specialty screw-in lamps, dimmer switches and LED exit signs.

In the 2018/19 fiscal year, a total of 657 direct installation projects and 482 deeper lighting retrofit projects were completed through the Small Business Program. To date, the program has serviced small businesses in 74 communities across Manitoba, 19 of which are all-electric:Anola, Balmoral, Brokenhead, Carrot Valley, Long Plain First Nation, Opaskwayak Cree Nation, Peguis First Nation, Pinawa, Portage la Prairie, Rapid City, St. Genevieve, The Pas, Thompson, Vita, Douglas, Falcon Lake, Fisher Branch, St. Ambroise and St. Rose du Lac.

In the 2018/19 fiscal year, the Small Business Program completed initiatives for Manitoba Hydro's Community Energy Efficiency Projects. The two communities that saw participation in 2018/19 were Opaskwayak Cree Nation and Long Plain First Nation. These applications were for direct install and deeper retrofit measures. The full material and installation costs associated with these applications were covered by the program.

#### **Commercial Geothermal Program**

The Commercial Geothermal program provides financial rebates to help reduce the barriers of high capital costs for the installation of geothermal heat pump systems for commercial buildings. In addition to financial incentives the Commercial Geothermal Program has mandated new eligibility criteria for program participants in order to reduce the risk of poor system design. This fiscal year saw three customers in rural all-electric buildings participate in the program.

# Indigenous

#### Indigenous Energy Efficiency Program

Manitoba Hydro developed a customized approach in 2008/09 to address the unique barriers facing Indigenous communities in completing energy efficiency upgrades. This customized approach includes: funding to complete upgrades for materials and labour, use of a Band Council Resolution and agreement form instead of individual application forms, and a dedicated staff who coordinates all administrative processes and provides awareness along with education on energy efficiency opportunities. Energy saving seminars can also be arranged to provide community members with information and tips on what they can do to make their communities more energy efficient. With the approach specifically targeting Indigenous communities, increased interest and participation within this market sector has been experienced.

Manitoba Hydro has initiated a two channel ("insulation" and "direct install") targeted approach allowing Indigenous communities to improve energy efficiency and home quality and comfort. The Community Energy Efficiency Specialist works with the community to identify qualifying homes and recommend energy efficient measures. The Insulation Channel provides basement, wall, and attic insulation upgrades for qualifying homes. The Direct Install Channel, launched December 1, 2014, provides basic energy efficient upgrades to qualifying homes to increase energy efficiency and save water. The Direct Install kit includes the following:

- Socket Draft Stoppers
- Socket Caps
- Water Heater Pipe Wrap
- Window Weatherization Kits
- LED Lighting
- Low Flow Shower Head
- Low Flow Bathroom Aerators

Manitoba Hydro has contacted all Indigenous Communities to discuss their participation in the program, and participation in the AEP has been initiated within 97 per cent of the Indigenous Communities. The total number of homes for on-reserve Indigenous communities is approximately 16,000. To date, Manitoba Hydro has completed energy efficiency upgrades in 6,203 homes representing approximately 39% of the market.

In 2018/19 a total of 57 homes in Indigenous communities were completed of which 30 received insulation upgrades and 55 received basic energy upgrades. Some homes will have received both upgrades. Cumulatively, a total of 6,203 homes have been completed of which 3,760 have received insulation upgrades and 3,756 received basic energy efficient upgrades.

Along with free basic energy savings measures and free insulation, the Indigenous Energy Efficiency Program provides the funding for labour to complete installations which creates employment for members of the community. With over 6,203 homes having received retrofits through the program, the equivalent of 28 full time jobs of Indigenous employment has been generated.

#### Community Geothermal Program

The Community Geothermal Program provided funding and financing to support the installation of geothermal heat pump systems in Indigenous communities. Manitoba Hydro's PAYS Financing Program allowed community members to pay for the majority of the geothermal system through the energy savings realized by converting their heating/air conditioning systems to a geothermal system. Indigenous Services Canada made a decision to no longer consider the PAYS financing fee an eligible expense and it will no longer be used to cover the capital cost of the geothermal system. A different model to continue with the program has been created and is currently being piloted.

This new model will be a Community Driven Outcomes model, project managed by AKI Energy, where the desired outcomes, such as reduced energy bills and increased employment are predetermined by the communities.

#### Solar Energy Pilot Program

Through the Solar Energy Pilot Program, Manitoba Hydro had discussions with a number of Indigenous communities or their consultants. Nelson House submitted applications for seven commercial projects totaling over 1,300 kW DC of solar PV. In 2018/19, Manitoba Hydro continued to work with Nelson House and their contractor directly to finalize a system design which will meet the parameters of the SEP while also being cost effective for the community. Nelson House plans to use their ATEC training centre to train local band members to install the solar PV system, creating social economic benefits for the community as a whole.

Fisher River Cree Nation and Northlands First Nation had initial inquiries into the program; however, these discussions have evolved into large scale solar projects outside of the program parameters.

#### **Small Business Program**

The program's first visit to Opaskwayak Cree Nation was in fall of the 2016/17 fiscal year, at which time two direct installation projects (i.e. low-flow faucet aerators, low-flow spray valves, and basic LED screw-in lamps) were completed and 40 lighting assessments were conducted. There were 22 deeper lighting retrofits completed in the 2018/19 fiscal year with the services of a local electrician. The full material and installation costs associated with these deeper lighting retrofit projects were covered by the program.

Additionally, there were 15 direct installation projects and 15 deeper retrofit projects completed in Long Plain First Nation with the help of a local electrician. Again, full material and installation costs associated with these direct installation and deeper lighting retrofit projects were covered by the program.

#### New Homes Program

Indigenous Communities are frequently contacted to encourage participation in the New Homes Program by way of energy efficient new residential construction projects.

In 2018/19, 104 energy efficient new homes were completed and incentives paid through the New Homes Program. A further 130 applications were received during the fiscal year and these new homes are expected to be completed in either 2019/20 or 2020/21.

Program staff participates in regular meetings with CMHC, Manitoba Housing, and Indigenous Services Canada to discuss and share information about First Nations housing initiatives, programs, and procedures. Presentations at the CMHC First Nations Housing Symposium and other First Nations conferences provided information throughout the year to invitees from the 63 Manitoba First Nation communities.

All new residential homes being constructed for Indigenous Communities are eligible to apply for incentives and energy modeling assistance, provided the homes are designed to meet the minimum requirements of the program.

#### Energy Efficiency for Business

#### Sagkeeng First Nation benefits from Energy Efficiency New Buildings Program

Made possible through technical assistance and financial support from Manitoba Hydro, the emergence of energy modelling as a design tool for local new construction developments is seeing increased uptake in Manitoba First Nation community projects – which will result in saved energy and reduced operating costs.

Sagkeeng First Nation is constructing Anicinabe Community School in the community of Fort Alexander. The 42,000 square foot facility consists of classrooms for all grade levels, a gymnasium, offices and supporting spaces.

Designed to be over 20% more energy efficient than a code-compliant building, the energy efficient design will provide estimated annual energy savings of approximately 200,000 kWh, resulting in annual

bill reductions of \$10,000 while reducing greenhouse gas emissions by an estimated 150 tonnes of CO2e annually, which is equivalent to taking 30 cars off the road.

#### God's Lake Narrows First Nation benefits from Energy Efficiency

With technical assistance and financial support from Manitoba Hydro, God's Lake Narrows First Nation School increased energy efficiency, improved lighting quality, and ensured ongoing productivity, comfort and safety through recent upgrades to its lighting system. These changes will provide an enhanced experience for students, staff, and visitors.

The LED lighting upgrades completed will provide estimated annual energy savings of 20,000 kWh, resulting in annual lighting bill reductions of nearly \$1,000. The retrofit will also reduce greenhouse gas emissions by an estimated 15 tonnes of CO2e annually, which is equivalent to taking nearly 5 cars off the road.

The K-12 school in God's Lake Narrows First Nation is a 65,000 square foot facility consisting of classrooms, a gymnasium, a library, a cafeteria, offices, and supporting space. God's Lake Narrows First Nation is located over 1,000 kilometers Northeast of Winnipeg.

# PROGRAM PARTICIPATION

The following table outlines participation by all-electric customers in residential and commercial Energy Efficiency Programs in 2018/19. Some customers may have participated in more than one program.

#### Participation in Energy Efficiency Programs (all electric) - FY 2018/19

Program	Urban All Electric Homes/Buildings	Rural All Electric Homes/Buildings	Indigenous Homes	Total
RESIDENTIAL				
Affordable Energy Program	71 <sup>1</sup>	379 <sup>1</sup>	57	507
Financing Programs (HEEL & PAYS)	132	.32 342		479
Home Insulation Program	42	783	0	825
HRV Control Program	5	27	0	32
Community Geothermal	n/a³	n/a³	5	5
Refrigerator Retirement Program	484	1,553	2	2,039
New Homes Program	16	14	104	134
Solar Energy Program	10	271	0	281
Water & Energy Saver Program	452	1,119	38	1,609
COMMERCIAL				
Small Business Program	269 <sup>4</sup>	306 <sup>4</sup>	<b>2</b> 9 <sup>5</sup>	604
Solar Energy Program	0	54	0	54
Commercial Geothermal	0	3	0	3

<sup>1</sup>Participants have both electric heat and electric hot water tanks. Includes Individual, Community and MURB approaches.

<sup>2</sup>Participation in the Community Geothermal program.

<sup>3</sup>The Community Geothermal Program provides funding and financing to support the installation of geothermal heat pump systems in Indigenous communities only.

<sup>4</sup>Denotes number of completed applications in small businesses with electric water heaters that received water saving measures through the Small Business Program in 2018/19. Urban is representative of Winnipeg only and Rural is representative of all other communities, excluding Indigenous communities.

<sup>5</sup>Denotes number of completed applications in Indigenous communities with electric water heaters that received water saving measures through the Small Business Program in 2018/19. Applicable Indigenous community was Opaskwayak Cree Nation and Long Plain First Nation.



#### **REFERENCE:**

Efficiency Plan p.21, 148-150, 161-162, 165-166, of 591

#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

a. In a table, compare the Plan spending totals on electricity programs with the forecasted and actual spending for 2015/16, 2016/17, and 2017/18, broken down by customer segment. For each prior forecast year, use the Manitoba Hydro Power Smart Plan with the most recent forecast for that year. Present the response in a table similar to the one below:

Spending	Efficiency	2015	5/16	2016/17		2017	7/18
	Manitoba						
	Plan						
	Average	Forecast	Actual	Forecast	Actual	Forecast	Actual
Residential							
(excl. AEP)							
AEP/Income							
Qualified/							
Indigenous							
Commercial							
(incl.							
Agricultural)							
Industrial							
Emerging							
Technology							
Total							

b. Provide a table similar to (a) for gas programs.



- c. In a table similar to (a), compare the Plan savings totals from electricity programs with the forecasted and actual savings for 2015/16, 2016/17, and 2017/18, broken down by customer segment.
- d. Provide a table similar to (c) for gas programs.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

While preparing the response to this interrogatory, Efficiency Manitoba identified a data input error. This resulted in an overstatement of electric energy savings from residential general service lighting standards of 43 GWh over the three years of the Plan. The revised electric energy savings in the 3-year Plan represent an average of 1.46% of the electric load. Efficiency Manitoba is confident that the flexibility of the Plan will allow for modifications to the offerings to enable the achievement of the 1.5% target.

This revision impacts the response to PUB/EM I-39 and the electric energy savings in Attachment 3. Please see the revised response to PUB/EM I-39 for the updated information.

 a) The following table compares the 3-year average electric budget for the Plan to the forecast and actual electric spending from the 2015/16, 2016/17 and 2017/18 Manitoba Hydro DSM plans.



											<u>/</u>			
Electric Costs (millions \$\$'s)	Ef M	ficiency anitoba												
(		Plan		201	5/1	5		201	5/1-	7		201	7/19	2
	-		_	201.	57 1		_	201	5/1	/ 	_	201	// 10	,
	3-yr	· Average	For	recast	A	ctual	For	recast	A	ctual	For	recast	A	ctual
Residential (excl. AEP)	\$	8.2	\$	11.7	\$	8.0	\$	10.4	\$	9.9	\$	10.2	\$	9.0
AEP/Income Qualified/														
Indigenous	\$	2.7	\$	1.4	\$	2.4	\$	2.1	\$	2.5	\$	1.6	\$	2.7
Commercial (incl.														
Agricultural)	\$	19.0	\$	27.8	\$	27.5	\$	26.2	\$	23.2	\$	25.1	\$	35.0
Industrial*	\$	9.9	\$	17.5	\$	13.7	\$	14.2	\$	11.5	\$	16.5	\$	9.5
Emerging Technology	\$	0.6	\$	-	\$	-	\$	0.0	\$	-	\$	0.9	\$	4.7
Program														
Support/Enabling														
Strategies	\$	8.5	\$	4.9	\$	3.8	\$	4.2	\$	4.3	\$	4.0	\$	3.3
Total	\$	48.9	\$	63.3	\$	55.4	\$	57.1	\$	51.4	\$	58.3	\$	64.4
Note: May not add up d	lue t	o roundin	g.											
* 2015/16 to 2017/18 in	form	nation incl	ude	s budg	get	and ac	tua	l spend	ling	for Cu	usto	mer-Si	ited	Load

Displacement, Bioenergy Optimization and Curtailable Rates.

 b) The following table compares the 3-year average natural gas budget for the Plan to the forecast and actual natural gas spending from the 2015/16, 2016/17 and 2017/18 Manitoba Hydro DSM plans.

Natural Gas Costs	Effic	ciency												
(millions \$\$'s)	Man	itoba												
	Р	lan		201	5/16	5		201	6/17	7	2017/18			3
	3-yr A	verage	For	ecast	Α	ctual	For	recast	A	ctual	For	ecast	A	ctual
Residential (excl. AEP)	\$	4.3	\$	5.1	\$	1.6	\$	3.6	\$	2.2	\$	2.5	\$	1.9
AEP/Income Qualified/														
Indigenous	\$	6.5	\$	4.0	\$	5.4	\$	6.3	\$	5.0	\$	5.2	\$	5.2
Commercial (incl.														
Agricultural)	\$	5.5	\$	5.0	\$	5.2	\$	4.9	\$	4.2	\$	4.0	\$	4.8
Industrial	\$	1.8	\$	0.5	\$	0.6	\$	0.5	\$	0.7	\$	1.0	\$	0.6
Emerging Technology	\$	0.1	\$	-	\$	-	\$	0.0	\$	-	\$	-	\$	-
Program														
Support/Enabling														
Strategies	\$	2.7	\$	1.0	\$	1.2	\$	1.0	\$	1.1	\$	0.8	\$	1.0
Total	\$	20.9	\$	15.6	\$	13.9	\$	16.3	\$	13.2	\$	13.5	\$	13.5



c) The following table compares the 3-year average forecast electric energy savings from the Plan to the forecast and actual electric energy savings from the 2015/16, 2016/17 and 2017/18 Manitoba Hydro DSM plans.

						-	
Electric Savings	Efficiency						
(GWh)	Manitoba						
	Plan	201	5/16	201	6/17	201	7/18
	3-yr Average	Forecast	Actual	Forecast	Actual	Forecast	Actual
Residential (excl. AEP)	23	44	36	48	54	42	55
AEP/Income Qualified/							
Indigenous	5	6	5	3	6	3	5
Commercial (incl.							
Agricultural)	109	89	96	92	103	98	140
Industrial*	154	78	140	141	124	94	136
Emerging Technology	2	-	-	-	-	1	6
Codes & Standards	85	75	50	74	60	72	60
Total	378	292	326	359	347	310	403
Nata, Marris at a dal una	line the menus alter	-					

Note: May not add up due to rounding.

\* 2015/16 to 2017/18 information includes forecast and actual energy savings for Customer-Sited Load Displacement and Bioenergy Optimization.



 d) The following table compares the 3-year average forecast natural gas savings from the Plan to the forecast and actual natural gas savings from the 2015/16, 2016/17 and 2017/18 Manitoba Hydro DSM plans.

Natural Gas Savings	Efficiency							
(million m <sup>3</sup> )	Manitoba							
	Plan	201	5/16	201	6/17	2017/18		
	3-yr Average	Forecast	Actual	Forecast	Actual	Forecast	Actual	
Residential (excl. AEP)	1.7	1.8	1.5	2.1	2.3	2.0	1.8	
AEP/Income Qualified/								
Indigenous	1.2	1.4	1.2	1.3	1.0	0.9	1.1	
Commercial (incl.								
Agricultural)	3.3	3.2	4.3	3.5	2.9	3.4	2.2	
Industrial	4.2	1.0	0.5	1.0	1.0	2.5	1.6	
Emerging Technology	0.1	-	-	-	-	-	-	
Codes & Standards	4.0	3.4	2.8	4.3	3.0	3.6	3.0	
Interactive Effects	(1.9)	(1.9)	(1.3)	(3.5)	(5.0)	(3.0)	(4.0)	
Total	12.6	8.9	8.9	8.8	5.2	9.4	5.7	
Note: May not add up o	lue to roundin	g.						



#### **REFERENCE:**

Efficiency Plan p.148 of 591

PREAMBLE TO IR (IF ANY):

#### **QUESTION:**

Identify and explain the differences between the Efficiency Plan and Manitoba Hydro's DSM 2015/16 Power Smart Plan (such as for program design, marketing, delivery approach, or incentives) that allow Efficiency Manitoba to project additional electricity and gas savings compared to the 2015/16 Manitoba Hydro plan.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

There are several sections within the 2020/23 Efficiency Plan ("Plan") that identify and explain how Efficiency Manitoba will be different and provides details on those differences which, collectively, enable Efficiency Manitoba to achieve higher energy savings.

Section 1 (beginning at p. 12 of 591) within the Plan provides an overview of key organizational and operational differences including the mandated energy savings targets; the small focused nature of the organization; the enhanced customer programming and engagement; and the prioritization of use of technology, innovation and continuous improvement. An overview of Section 3.2.1 (beginning at p. 79 of 591) within the Plan describes the customer segment approach taken. This customer segmented programming leverages decades of demand side management ("DSM") experience in Manitoba while identifying the unique characteristics found within the residential, residential income qualified, Indigenous, and commercial, industrial and agricultural customer segment.

Section 3.2.3 (beginning at p. 83 of 591) within the Plan describes the importance of maintaining continuity of offers while making enhancements and organizing offers in program bundles. New program bundles group offerings that share features and comparable delivery models, will reduce paperwork, streamline the process and provide targeted customer segments with the information they need to make decisions to improve their home or



businesses energy efficiency. In addition, an increased use of upstream incentives will mobilize industry to take part.

Section 7.1 (p. 180 of 591) and Appendix A - Section A2.1.2 (p. 208 of 591) within the Plan describe and provide details regarding the convergence of DSM programming with technology, specifically Efficiency Manitoba's intent to leverage a Customer Relationship Management ("CRM")/DSM System. Efficiency Manitoba's CRM/DSM system will streamline the delivery approach and enhance operations. It will be the system used to manage all relationships and interactions with existing and potential customers. Customized direct marketing, e-campaigns, reminders and follow ups will improve customer service and application turnaround time.

Appendix A – Section A4 (p. 276 of 591) within the Plan provides details regarding customers increasingly high expectations for real-time information and tailored content, due to the rise of mobile technology, e-commerce, and social media. Efficiency Manitoba's social media strategy will include providing content that will be tailored to unique customer needs and will appeal to a range of consumers from first-time homeowners, families building a new home, renovators, or do-it-yourself customers. This tailored content will be delivered on a consistent basis to maximize engagement, assist in driving participation, and transform Manitobans attitudes towards energy efficiency.

Section 7.4 (p. 188 of 591) and Appendix A – Section A9.3.4 (p. 427 of 591) within the Plan provide details regarding the innovation / research and development budget included within the Enabling Strategies approach. A budget specifically set aside for innovation will provide the opportunity to explore new emerging energy savings opportunities through pilot projects, complete a DSM market potential study, and explore partnerships to further energy efficiency research.



#### **REFERENCE:**

Efficiency Plan p.407 of 591; Manitoba Hydro 2017/18 GRA Exhibit Manitoba Hydro-132

#### PREAMBLE TO IR (IF ANY):

#### QUESTION:

Provide a summary of Manitoba Hydro's Non-Utility Generation policy(ies) for connecting solar PV or other generating systems for residential and commercial customers. Explain how excess energy that is "spilled" (electricity generated that is surplus to the customers consumption and as a result absorbed by the grid) is addressed, including whether credits are provided for spilled electricity, the rate applicable to spilled electricity, and whether credits can be carried over from month-to-month or year-to-year in the event the amount spilled exceeds the amount consumed.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

Information on the self-generation of electricity and the connection to Manitoba Hydro's grid is publicly available on Manitoba Hydro's website at the following links:

"Generating your own electricity"

https://www.hydro.mb.ca/accounts and services/generating your own electricity/

"Connecting to our grid"

https://www.hydro.mb.ca/accounts and services/generating your own electricity/connecting to our grid/

Efficiency Manitoba is respectfully not in a position to interpret or elaborate on Manitoba Hydro's Corporate Policies, such as the Non-Utility Generation Policy.



#### **REFERENCE:**

Efficiency Plan p.400 of 591

#### PREAMBLE TO IR (IF ANY):

#### **QUESTION:**

Provide additional details of each of the load displacement and alternative energy projects proposed in the Plan:

- Customer and location
- Description of the project
- Maximum generation capacity (MW) and expected annual generation (GWh)
- Efficiency Manitoba investment
- Type of fuel or waste stream
- Expected start date (first power)
- Customer payback period

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**













#### **REFERENCE:**

Efficiency Plan Attachment 3; Daymark/Efficiency Manitoba-65 to Daymark/Efficiency Manitoba-76

#### PREAMBLE TO IR (IF ANY):

#### **QUESTION:**

In the responses to Daymark IRs Daymark/Efficiency Manitoba-65 through Daymark/Efficiency Manitoba076, provide details and formulas at the individual initiative level.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

Efficiency Manitoba has provided electronic workpapers to Daymark based on the Non-Disclosure Agreement executed between Efficiency Manitoba and Daymark.



#### **REFERENCE:**

Efficiency Plan p.14, 278, 334, 359 of 591

#### PREAMBLE TO IR (IF ANY):

Efficiency Manitoba's Mission statement is: "Efficiency Manitoba reduces energy consumption using innovative approaches that respect the environment and lead to economic benefits for Manitobans."

#### QUESTION:

- a. Explain whether Efficiency Manitoba views its Plan to be based on innovative and new approaches, or whether the Plan is based on continuation of established approaches that have been shown to be effective in Manitoba. If the Plan is weighted more towards innovative and new approaches, explain how Efficiency Manitoba has addressed the increased risk that comes from innovative approaches which are unproven.
- b. The tables on pages 278, 334, and 359 identify whether the offerings are new or a continuation of existing programs. Re-file the tables identifying whether the new offerings are new to Manitoba or new to the DSM industry. Also, file a table for the Income Qualified segment.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE**:

a. Efficiency Manitoba's plan is based on innovative and new approaches which build upon the established programs that have shown to be successful in Manitoba and provide continuity with Manitoba to enable a smooth customer transition to Efficiency Manitoba. Section 3 of the 2020/23 Efficiency Plan ("Plan") discusses various innovative approaches such as bundling, program enhancements and customer segments. These are not new to the DSM industry, and will be factors in meeting the mandated energy savings targets.



**b.** There are no offers that are new to the DSM industry in general. The below tables identify which specific measures or technologies being offered within a program bundle are new to Manitoba.

# **Residential Offers**

BUNDLES	MEASURES	NEW OR CONTINUING OFFER		
	Online Home Energy Questionnaire	New Efficiency Manitoba offer		
	Home Energy Check-Up	New Efficiency Manitoba offer		
	Free basic energy-efficient upgrades:			
	<ul> <li>Up to two energy-efficient showerheads (5.7 LPM)</li> </ul>			
	<ul> <li>Up to two energy-efficient bathroom aerators (5.7 LPM)</li> </ul>	Manitoba Hydro		
DIRECT INSTALL OFFERS	Up to five LED bulbs	program with		
	Tier 2 advanced power strips *NEW	ennancements		
	<ul> <li>Window insulating kits *NEW</li> </ul>			
	Weatherstripping *NEW			
	Outdoor car plug timers *NEW			
	Incentive-based energy-efficient upgrades:	Manitoba Hydro		
	Heat recovery ventilator (HRV) controls	program with		
	Smart thermostats *NEW	cinancements		
	Retail Rebates			
	ENERGY STAR <sup>®</sup> certified LED bulbs			
	<ul> <li>ENERGY STAR certified integrated LED fixtures</li> </ul>			
	Lighting controls			
	Outdoor car plug timers & smart plugs			
	<ul> <li>Energy-efficient showerheads (5.7 LPM)</li> </ul>			
	Tier 1 advanced power strips	Manitoba Hydro		
PRODUCT REBATE	Weatherstripping	program with		
OFFERS	Window insulating kits	enhancements		
	ENERGY STAR certified clothes washers			
	<ul> <li>ENERGY STAR certified clothes washer/dryer pairs</li> </ul>			
	ENERGY STAR certified refrigerators			
	ENERGY STAR certified dishwashers *NEW			
	ENERGY STAR certified smart thermostats			
	Clotheslines (giveaways at select events)			
	Appliance Recycling Program	Manitoba Hydro		



BUNDLES	MEASURES	NEW OR CONTINUING OFFER
	<ul> <li>Refrigerators</li> <li>Freezers</li> <li>Dehumidifiers *NEW</li> <li>Window air conditioners *NEW</li> <li>Bar fridges *NEW</li> </ul>	program with enhancements
	Home Energy Audit	New Efficiency Manitoba offer
HOME RENOVATION OFFERS	<ul> <li>Rebates:</li> <li>Building envelope: insulation upgrades (attic, wall, foundation), windows &amp; doors, air sealing *NEW rebates for windows, doors, air sealing</li> <li>Appliances: clothes washers &amp; dryers, refrigerators, dishwashers *NEW as per product rebates</li> <li>Drain water heat recovery *NEW</li> <li>HVAC: geothermal, HRV controls, smart thermostats *NEW</li> <li>Pool pumps *NEW</li> <li>Air source heat pumps *NEW</li> <li>Bonus incentive (with Home Energy Audit) *NEW</li> </ul>	Manitoba Hydro program with enhancements
	Loans: Building envelope Space and water heating Ventilation Emerging technologies Custom energy efficiency projects	Manitoba Hydro program
NEW HOMES & MAJOR RENOVATION OFFERS	New Homes         • Individual measures *NEW         • Prescriptive Path         • Performance Path         Major Renovation	Manitoba Hydro program with enhancements New Efficiency Manitoba offer
HOME ENERGY EFFICIENCY KITS & EDUCATION OFFERS	<ul> <li>Energy Efficiency Kits</li> <li>Up to two energy-efficient showerheads (5.7 LPM)</li> <li>Up to two energy-efficient bathroom aerators (5.7 LPM)</li> <li>Shower timer</li> <li>Up to five LED bulbs</li> <li>Tier 2 advanced power strip</li> </ul>	New Efficiency Manitoba offer



BUNDLES	MEASURES	NEW OR CONTINUING OFFER
	Window insulating kit	
	Weatherstripping	
	Outdoor car plug timer	

# **Income Qualified**

PROGRAM	MEASURES	STATUS
INCOME QUALIFED OFFERS	<ul> <li>Home Energy Check-Up</li> <li>installation of free energy-saving and water- saving devices</li> <li>air sealing measures</li> <li>insulation upgrades</li> <li>a gas furnace or boiler upgrade</li> <li>a front load clothes washer *NEW</li> <li>a smart thermostat *NEW</li> <li>guidance and support to facilitate installation of qualifying measures and implementation of energy-efficient upgrades *NEW</li> </ul>	Manitoba Hydro program with enhancements

# Indigenous

PROGRAM	MEASURES	STATUS
	Home energy efficiency upgrades:	
INSULATION AND DIRECT INSTALL OFFERS	Insulation	Manitoba Hydro program with enhancements
	Direct install measures	
	Smart thermostats *NEW	
	<ul> <li>ENERGY STAR<sup>®</sup> certified clothes washers *NEW</li> </ul>	
	Product rebates:	
SMALL BUSINESS OFFERS	Aerators and showerheads	New Efficiency
	• Lighting	Manitoba offer
	Smart / programmable thermostats	
COMMUNITY GEOTHERMAL	Geothermal heat pumps	Manitoba Hydro program with enhancements
METIS INCOME	Home energy efficiency upgrades:	New Efficiency



PROGRAM	MEASURES	STATUS
QUALIFIED	Insulation	Manitoba offer
	Natural gas furnace	
	Direct install measures	
	Smart thermostats	
	• ENERGY STAR certified clothes washers	

# Commercial, Industrial, and Agricultural Offers

BUNDLES	MEASURES	STATUS
	Commercial Kitchen Appliances ENERGY STAR® certified appliances listed below may qualify for rebates under this initiative: • Steamers • Fryers • Convection ovens *NEW • Dishwashers *NEW • Griddles *NEW • Hot food holding cabinets *NEW	Manitoba Hydro program with enhancements
SMALL BUSINESS & APPLIANCES OFFERS	Commercial Refrigeration Equipment Products listed below may qualify for rebates under this initiative: New vertical display case with standard doors New vertical display case with special (heat free) doors Anti-sweat heater (ASH) controls Night covers High-efficiency compressor ECM evaporator fan motors Strip curtains Automatic door closers LED display case and walk-in box lighting Door gaskets Evaporator efficiency controller	Manitoba Hydro program with enhancements
	Small Business <ul> <li>Kitchen aerators</li> <li>Bathroom aerators</li> <li>Pre-rinse spray valves</li> <li>A-line LEDs</li> </ul>	Manitoba Hydro program with enhancements



BUNDLES	MEASURES	STATUS
	Dimmer switches	
	T8 ballasts	
	LED T8 linear lamps	
	T8 energy-efficient lamps	
	T8 tandem fixtures	
	Specialty LED lamps	
	• Exit signs	
	Showerheads *NEW	
	Smart thermostats *NEW	
	HVAC and controls offers *NEW	
	Cross promote renovation offers	
	Energy-efficient upgrades installed at no charge include:	
	<ul> <li>Up to two energy-efficient showerheads (5.7 LPM)</li> </ul>	
	<ul> <li>Up to two energy-efficient bathroom aerators (5.7 LPM)</li> </ul>	Manitoba Hydro
IN-SUITE EFFICIENCY	Up to nine LED bulbs	enhancements
	Energy-efficient upgrades eligible for incentives:	
	<ul> <li>Heat recovery ventilator (HRV) controls</li> <li>*NEW</li> </ul>	
	Smart Thermostats *NEW	
	Lighting products	
	LED lamps (screw-in T8, T5)	
	LED specialty lamps (HID ballast, line voltage)	
	LED fixtures	Manitoba Hydro
	Backlit signage	enhancements
	Lighting controls	
	Occupancy sensors	
	Control systems	
	Building Envelope Products and Systems	
RENOVATION OFFERS	<ul> <li>Surface and cavity insulation for roof, attic, wall, and foundation applications *NEW for</li> </ul>	
	<ul> <li>Window systems including punched, in-fill, curtain wall, and storefront</li> </ul>	
	<ul> <li>Glazed doors including overhead, single- swinging, sliding, and garden</li> </ul>	Manitoba Hydro
	Building Envelope Financial Assistance	enhancements
	<ul> <li>Incidental and dedicated air sealing *NEW</li> </ul>	
	<ul> <li>Blower door testing (for determining equivalent air leakage) *NEW</li> </ul>	
	<ul> <li>Building component energy modelling for designing energy-efficient curtain wall and storefront systems</li> </ul>	


BUNDLES	MEASURES	STATUS
HVAC AND CONTROLS OFFERS	Heating technologies         • Condensing gas boilers         • Condensing gas water heaters         • Unit heaters *NEW         • Infrared heaters *NEW         • Geothermal (ground-source heat pumps)	Manitoba Hydro program with enhancements and new offers
	Cooling technologies <ul> <li>Air cooled chillers *NEW</li> <li>Geothermal (ground-source heat pumps)</li> </ul>	Manitoba Hydro program with enhancements and new offers
	Ventilation technologies <ul> <li>CO<sub>2</sub> sensors</li> <li>HRVs / energy recovery ventilators</li> </ul>	Manitoba Hydro program with enhancements and new offers
	Other technologies <ul> <li>Variable frequency drives</li> <li>Hotel occupancy sensors</li> <li>Hotel packaged terminal heat pumps (PTHPs)</li> </ul>	New Efficiency Manitoba offer
	New Buildings Enhanced Building Operations Manitoba Race to Reduce *NEW for school sector	Manitoba Hydro programs with enhancements
PERFORMANCE BUILDING OFFERS	Energy Scoping Audits	Manitoba Hydro program with enhancements New Efficiency
	Industrial / Agricultural Custom	Manitoba offer Manitoba Hydro program with enhancements
CUSTOM OFFERS	Energy Manager Initiative	Manitoba Hydro program with enhancements
	Strategic Energy Management Cohorts *NEW Commercial Custom	Manitoba offer Manitoba Hydro program with
LOAD DISPLACEMENT OFFERS	Load Displacement Program	Manitoba Hydro program with enhancements

# **Emerging Technologies**



PROGRAM	MEASURES	STATUS
EMERGING TECHNOLOGY PROGRAMS	Solar Energy Program	New Efficiency Manitoba offer
	Customer Sited Bioenergy Program	Manitoba Hydro program with enhancements



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PREAMBLE TO IR (IF ANY):

## QUESTION:

For each budget category shown in the pie chart on page 22 (except Customer Incentives), provide a breakdown of dollars and percentage of total budget that are related to:

- (i) Manitoba-based private companies
- (ii) Non-Manitoba base private companies
- (iii) Manitoba-based non-governmental organizations
- (iv) Non-Manitoba-based non-governmental organizations
- (v) Manitoba-based Crown Corporations
- (vi) Non-Manitoba-based Crown Corporations

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

The budget categories in the pie chart on page 22 of 591 (expect Customer Incentives) are as follows:

Program Costs \$13.765 million Staff Costs \$9.375 million Overhead \$1.495 million

For each of these categories, the following has been contemplated as far as distribution to the types of companies referenced above:

Program costs:

The Efficiency Manitoba budget did not contemplate which type of company would be related to the program costs. Given that the services to deliver on these programs have not yet been



procured, an assessment of the type and location of companies that will be providing the service cannot be made at this time.

## Staff Costs:

The staff costs included in the budget relate to employees who will be directly employed by Efficiency Manitoba, therefore will relate to individuals and employee benefit providers.

## Overhead:

Similar to program costs, overhead costs will be awarded upon the approval of the Plan and an assessment of the type and location of companies that will be providing the service cannot be made at this time.

The procurement process is underway in anticipation of the April 1, 2020 commencement date. Apart from staff costs, Efficiency Manitoba expects that the majority of program and overhead costs will be related to Manitoba and non-Manitoba based private companies.



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## PREAMBLE TO IR (IF ANY):

In prior Power Smart and DSM plans, Manitoba Hydro identified emerging technologies including solar thermal, cold climate air source heat pumps, and variable frequency drives.

## **QUESTION:**

Explain why Efficiency Manitoba is not pursuing these technologies in its Plan, with the exception of solar thermal programs under the Custom Offers programs.

## **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

Efficiency Manitoba is pursuing air source heat pumps through a rebate in the Home Renovation program (p. 279 of 591). Variable frequency drives are incented through either the HVAC and Controls bundle or Custom Offers in the commercial, industrial and agricultural customer segment (p. 362 of 591).



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## PREAMBLE TO IR (IF ANY):

#### QUESTION:

- a. Confirm whether Efficiency Manitoba has retained an independent assessor as required by the Act s.16(1). If confirmed, provide the qualifications of the assessor in conducting evaluation, measurement, and verification (EM&V) of DSM savings and copies of any reports submitted to date by the independent assessor to Efficiency Manitoba. If not confirmed, provide the timeline for the engagement of the independent assessor and the qualifications that will be required of the assessor.
- b. Provide the terms of reference for the engagement of the independent assessor.
- c. Has Efficiency Manitoba developed the detailed EM&V plan including the determination of the data that will be required and the data collection systems that will be required to collect them? If not, explain when this will be developed.
- d. Confirm whether the independent assessor (or other EM&V specialist) has reviewed the data collection systems and the proposed data to be collected and has agreed that Efficiency Manitoba has the necessary processes in place. Have any gaps or shortfalls been identified in the data collection systems or the data that Efficiency Manitoba intends to collect?

## **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

a. Efficiency Manitoba has not yet retained an independent assessor. As per the Efficiency Manitoba Act Section 27 (3) (b), the Energy Efficiency Advisory Group (EEAG) will provide advice to Efficiency Manitoba on the selection of the assessor and the terms of reference for the independent assessment. Efficiency Manitoba plans to develop requests for proposal with input from the EEAG within the first half of 2020/21 such that data collection and key activities may commence in advance of 2021/22.



- b. Please see response to PUB/EM I-36a.
- c. The detailed EM&V plan will be developed by the independent assessors. The detailed EM&V plan will be based on the preliminary schedule developed in the Evaluation, Measurement and Verification Framework and Plan.
- d. Not confirmed. Efficiency Manitoba has not yet retained an independent assessor. The 2020/23 Evaluation, Measurement and Verification Framework and Plan prepared for Efficiency Manitoba and included as Attachment 5 (2020/23 Efficiency Plan, beginning p. 548 of 591) provides a number of program specific key considerations for residential, income qualified and indigenous customer segments (Attachment 5, p. 574 576 of 591) for commercial, industrial and agricultural customer segments (Attachment 5, p. 579 582 of 591). These key considerations provide a sample of the data that will be collected by an independent assessor and include items such as market evaluations to collect data to contribute to the impact evaluation baseline study (for example analyzing and monitoring Manitoba's lighting market to understand market share of LED lighting technologies); technology specific metering activities; and studies of product installation rates. In these cases, the independent assessor will be responsible for the data collection with the support of Efficiency Manitoba as required.

The 2020/23 Evaluation, Measurement and Verification Framework and Plan also provided recommendations to Efficiency Manitoba for additional EM&V studies to collect data about program portfolio results including (see Plan, Attachment 3, p. 582 – 583 of 591):

- Regular-interval surveys to be conducted among program participants in every sector to assess qualitative performance indicator (such as satisfaction levels);
- Assessment of the general population's attitudes toward energy efficiency and awareness of Efficiency Manitoba's offerings and brand;
- A socio-economic study to assess non-energy program impacts; and
- A jurisdictional scan to collect data on appropriate non-energy benefits adder for cost-effectiveness analysis.



Efficiency Plan p.50 of 591

PREAMBLE TO IR (IF ANY):

## QUESTION:

Provide a table of concordance showing where in the Plan Efficiency Manitoba is addressing each item in the April 24, 2019 mandate letter received from the Minister.

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

The April 24, 2019 letter from the Minister articulates four key priorities for Efficiency Manitoba. Section 2.2.1 starting on page 50 of the submission provides an update on each of these items along with additional section references regarding where additional information and evidence of concordance with the key priorities can be located within the Plan.

Efficiency Manitoba is working with Government to facilitate additional policy and process expectations articulated in the April 24, 2019 letter. The letter indicates an expectation of reporting out on these priorities as part of Efficiency Manitoba's 2019/20 Annual Report. Efficiency Manitoba will fulfill this expectation for public reporting in the manner articulated by Government in the April 24, 2019 letter.



Efficiency Plan p.20, 449-450 of 591

## PREAMBLE TO IR (IF ANY):

The Act, s. 27(2) states:

Committee expertise

27(2) In appointing members to the stakeholder committee, the board must seek to appoint persons with expertise and experience in energy efficiency and an understanding of the functioning of the PUB's role in relation to energy efficiency.

## QUESTION:

Provide details of the appointed members to the Energy Efficiency Advisory Group showing the qualifications in fulfillment of the requirement that the Efficiency Manitoba Board has appointed "persons with expertise and experience in energy efficiency and an understanding of the functioning of the PUB's role in relation to energy efficiency."

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

The following members that formed the Energy Efficiency Advisory Group had intervened in past Manitoba Hydro General Rate Applications and had also expressed specific interest in the demand side management component of the review:

- Green Action Centre (GAC)
- Consumers' Association of Canada (Manitoba Chapter)
- Manitoba Keewatinowi Okimakanak
- Manitoba Metis Federation
- Association of Manitoba Municipalities
- Manitoba Industrial Power Users' Group



Each of the members from the above noted groups had a range of expertise or experience with respect to energy efficiency. Remaining members that participated had less experience with the Public Utilities Board process but were invited due to the customer group that they represented.



## **REFERENCE:**

Efficiency Plan p.435 of 591

## PREAMBLE TO IR (IF ANY):

"Net savings in the consumption of energy or natural gas count towards the respective savings target established in Section 7 of the Act if the net savings are reasonably attributable to a code, standard or regulation to which Efficiency Manitoba or Manitoba Hydro has made a material contribution to."

## QUESTION:

Identify each code and standard that Efficiency Manitoba will count savings from, provide the year enacted, and provide a fulsome explanation of the contribution made by Efficiency Manitoba or Manitoba Hydro towards the development of the code or standard, including justification that supports Efficiency Manitoba or Manitoba Hydro having made a material contribution.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

This revised response is adjusted to provide the updated codes and standards electric energy savings identified in PUB/EM I-28. Please see the updated table below.

The following shows the updated codes and standards electric savings located at page 513 of 591 of the submission in Attachment 3.

EMERGING TECHNOLOGY PROGRAMS				
Emerging Technology		-	1.0	5.9
	Subtotal	-	1.0	5.9
Program Impact Totals		285	300	295
Codes, Standards & Regulations		88	<del>-103</del> 86	<del>-108</del> 82
Total Energy Savings (GW.h) at Generation		373	<del>403</del> 386	<del>403</del> 377



The following table shows the revised codes and standards electric savings as a percent of load. The revised annual electric energy savings that have decreased by 0.05% are still aligned with both the near-term 1.5% annual target and the cumulative 15-year 22.5% electric energy savings target prescribed in The Efficiency Manitoba Act.

Nevised Savings as a referre of Load								
	2020/21	2021/22	2022/23	Average				
Original value	1.43%	1.55%	1.56%	1.51%				
Revised value	1.43%	<mark>1.48%</mark>	<mark>1.45%</mark>	<mark>1.46%</mark>				

# Revised Savings as a Percent of Load

Efficiency Manitoba plans to continue with the important historical work completed by Manitoba Hydro's Demand Side Management efforts as it relates to the continuation of the strategy to affect change in codes and standards.

Annual forecasted savings from codes and standards can be seen below as per the 2020/23 Efficiency Plan, Appendix A - Section A9, Table A9.1, p.435 of 591.

	Electric savings						Nati	ural gas sav	vings	
	202	0/21	202	1/22	202	2/23	2020/21	2021/22	2022/23	
	MW	GWh	MW	GWh	MW	GWh	million	million	million	Date
							m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>	implemented
										Various - see
Residential Building	4.2	16.1	3.8	14.8	3.5	13.6	4.1	4.1	4.0	descriptions
Code										below.
Residential General			11.0	26.1	12 1	21 1				
Service Lighting	7.2	17.1	2 0	<u>20.1</u>	$\frac{15.1}{21}$	<u>51.1</u>	-0.8	-0.4	-0.2	January 2014
Standards			5.0	9.1	2.1	<b>5.0</b>				
Residential										Various - see
Appliance	2.8	17.2	2.4	15.4	2.1	13.7	1.0	0.0	0.0	descriptions
Standards										below.
Other residential										Various - see
equipment	0.0	3.8	0.0	3.5	0.0	3.2	0.0	0.0	0.0	descriptions
standards										below.
Commercial	5.6	10 7	0.2	20.1	0.5	21.9	0.5	0.8	0.0	December
Building Code	5.0	10.7	0.5	20.1	9.5	51.0	0.5	0.0	0.5	2014



									,	
	Electric savings						Nati	Natural gas savings		
	202	0/21	202	1/22	202	2/23	2020/21	2021/22	2022/23	
	N // \\/	GWb	N // \ \ /	GWb	N // N/	GWb	million	million	million	Date
	10100	UVII		UVVII		UVII	m <sup>3</sup>	m <sup>3</sup>	m³	implemented
Commercial										Various - see
General Service	3.1	14.5	3.1	14.5	3.1	14.5	-0.3	-0.3	-0.3	descriptions
Lighting Standards										below.
Other commercial										Various - see
equipment	0.0	0.6	0.0	0.6	0.0	0.5	0.0	0.0	0.0	descriptions
standards										below.
			<del>28.8</del>	<del>102.9</del>	<del>31.3</del>	<del>108.4</del>				
Total Savings	22.9	88.0	<mark>21.6</mark>	<mark>85.9</mark>	<mark>20.4</mark>	<mark>82.3</mark>	3.5	4.1	4.4	
Total Budget (000's)	\$3	75	\$3	882	\$3	889	\$125	\$127	\$129	

Many Canadian and U.S. electric utilities, including Manitoba Hydro, have been engaged in DSM activities for more than two decades. In addition to utility specific Demand Side Management programs, Manitoba Hydro's historical strategy, being adopted by Efficiency Manitoba, is to affect change in codes and standards by being an aggressive and active participant on several provincial and national energy efficiency codes and standards committees. These codes and standards are subsequently referenced in national and provincial regulations that mandate minimum energy performance levels for a variety of appliances, buildings and other energy consuming measures.

Efficiency Manitoba and energy efficiency staff at Manitoba Hydro currently have representation on both the national Standing Committee on Energy Efficiency (SC-EE) and the national Canadian Standards Association's Steering Committee on the Performance of Energy Efficiency and Renewables (SCOPEER). Efficiency Manitoba, through Manitoba Hydro energy efficiency staff, also has representation on a Task Group<sup>1</sup> that supports the work of SC-EE and six Technical Sub-committees<sup>2</sup> that support the work of SCOPEER.

<sup>&</sup>lt;sup>1</sup> National Energy Code for Buildings Building Envelope Task Group

<sup>&</sup>lt;sup>2</sup> Existing Building Commissioning for Energy Using Systems (CSA Z5001), Building Energy Systems (CSA TC424), Efficiency Performance Standards for Lighting Technologies (CSA TC419), Thermal Bridging Standard (CSA Z5010), Drain Water Heat Recovery Systems (CSA B55), Industrial Equipment (CSA TC402), Existing building commissioning for energy using systems (CSA Z5001-19)



SC-EE is responsible for recommendations, technical content, and user guides associated with the National Energy Code for Buildings (NECB) and the Energy Efficiency portion of the National Building Code (Section 9.36). SCOPEER provides oversight and guidance for the development of energy performance standards related to electric and fuel-burning equipment used in residential, commercial and industrial applications and buildings.

Efforts by local efficiency staff on these and past committees has been to advance the progress of product efficiency improvements through the development of test methodologies that facilitate measurement and comparison of energy performance and provide for minimum energy performance levels that reasonably represent performance improvements available from commercially viable product advancements, which are then incorporated into Demand Side Management programs, and subsequent energy efficiency regulations and building codes proposed by national and provincial regulators.

Efficiency Manitoba will continue to offer voluntary programs that encourage customers and industry to pursue higher levels of efficiency in advance of the building code cycle or prior to the implementation of energy efficiency regulations on products. These energy efficiency programs are critical to achieving market-readiness for the implementation of new codes or regulations. Program staff work closely with industry to increase awareness and build expertise. The programs promote energy efficiency products and practices which increase the demand for and availability of the products and services in the market. The increased demand and availability also drive down pricing over time, improving the economics of the energy efficiency products and practices. These program efforts ready the market and facilitate a smoother transition and adoption of the building codes and product standards.

Efficiency Manitoba recognizes that having staff participate actively on codes and standards committees as well as promoting energy efficiency and preparing the market through programming ensures an alignment of efforts towards codes and standards. This combined effort by one organization ensures



Descriptions of each of the past codes and standards that have been taken into consideration when developing a forecast for projected savings are found below.

## **Residential Construction**

Building Code Manitoba Building Code, amendment (PROVINCIAL) Regulation 4/2008 Registered: January 11, 2008 Effective date: October 1, 2008

Manitoba Hydro has been offering the New Home Program to customers across the province since 2004. The New Home Program promoted and offered incentives to customers for the installation of energy efficient technologies and building practices within the new home construction industry. Local efficiency staff worked closely with industry stakeholders like the Manitoba Home Builders' Association when developing requirements for the program. Specifically, the New Home Program has required and has been promoting a minimum requirement for R20 insulation in the foundation walls of new homes since 2004.

Changes to Table 9.25.5.2. (Minimum Thermal Resistance for the Building Envelope) of the Manitoba Building Code (Regulation 127/2006) came into effect on October1, 2008. The changes related to the minimum requirement for insulation R-value for the interior and exterior foundation walls of new homes. The code change increased the minimum required insulation value from R12 to R20.

# <u>Building Code</u> Manitoba Building Code, amendment (PROVINCIAL) Regulation 142/2010 Registered: October 4, 2010 Effective date: December 1, 2010

Manitoba Hydro has promoted energy efficient technologies and building practices within the residential new construction segment through delivery of the New Home Program. When developing program requirements, Manitoba Hydro worked closely with industry stakeholders like the Manitoba Home Builders Association.

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Through the delivery of the Gold New Home offering, Manitoba Hydro planned to aid the advancement of future building code by promoting and offering incentives to customers to build their home with recommended technologies and construction practices. The Gold standard announced in 2007 required the use of heat recovery ventilators (HRV), 94 % AFUE furnaces, electronic ignition for natural gas fireplaces, R50 attic insulation, water efficient fixtures and many other building envelope improvements.

Effective December 1st, 2010, Manitoba implemented changes to the building and plumbing codes that increased energy and water efficiencies. These changes were the result of extensive consultations by the Office of the Fire Commissioner involving new homebuilders, contractors and technical experts with the Sub-committee of the Building Standards Board on Energy Efficiency; which was chaired by a Manitoba Hydro staff person. The new efficiencies incorporated into new construction and homes undergoing extensive renovations included:

- Specifying minimum energy-efficiency requirements for windows,
- Eliminating the pilot light in gas fireplaces,
- Increasing the required level of attic insulation to R50,
- Requiring a minimum 94 per cent fuel-efficiency rating for furnaces,
- Specifying a mid-efficient heat-recovery ventilator, and
- Introducing energy-modeling software that will allow builders to model alternatives to the code requirements.
- Requiring a maximum flow rate for primary showerheads to 1.75 GPM

Through its close working relations with key industry stakeholders and the New Home Program offering, local efficiency staff succeeded in advancing these changes to the Manitoba Building code. In fact, a majority of the technologies adopted by the Manitoba Building Code for the December 1, 2010 update were part of the aforementioned Gold New Home standard requirements. Had local efficiency staff not provided information, education, training, and incentives for these technologies and building practices, the industry would have been less likely to adopt these technologies and transform the market. The program created demand for these technologies, provided builders an opportunity to gain experience using them, and provided trades and contractors training opportunities to advance their expertise and knowledge of the technologies.

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**Building Code** 

Manitoba Building Code, amendment (PROVINCIAL) Regulation 52/2015 Registered: April 27, 2015 Effective date: April 1, 2016

In December 2012, the National Building Code (NBC) published its first attempt at incorporating energy efficiency into code for Part 9 buildings was published as Section 9.36 of the NBC. Although Manitoba had already incorporated energy efficiency into the Manitoba Building Code (MBC) in advance of this publication, an effort was made by the energy sub-committee of the Manitoba Building Standards Board to review the contents of 9.36 with the intent to align the requirements as much as possible. The review concluded with minimal changes to the preexisting requirements of the MBC that were made effective in 2010 other than one significant change: the requirement for a drain water heat recovery system. This requirement – the first of its kind in Canada – improved the efficiency level of new homes in Manitoba and was applauded by energy efficiency advocates from across the country. At the time of implementation, plumbing suppliers in Manitoba did not stock drain water heat recovery systems in their regular inventories. The incoming code required suppliers, contractors, and homebuilders make changes to their build practices and resulted in savings in all new households in Manitoba. In order to help prepare industry for the incoming changes, a short term incentive program was offered in advance of the code enforcement date. Assistance with installation and technical support was available to contractors and included a 24-hour help line and a technical seminar delivered to members of the Manitoba Home Builders Association.

**Building Code** 

Manitoba Building Code, amendment (PROVINCIAL) Regulation (Proposed) Effective date: 2020

Efficiency Manitoba's New Homes Program will promote and offer incentives to customers for the installation of energy efficient technologies and building practices within the new home construction industry. Efficiency Manitoba will work closely with industry stakeholders with the



aim to build market acceptance for ease of adoption in the Manitoba Building Code in 2020.

## **Residential Lighting**

<u>General Service Lamps</u> National Resources Canada (FEDERAL) Amendment 12B to Energy Efficiency Regulations Published: January 15, 2014 (Canada Gazette Part II) Effective date(s): January 1<sup>st</sup>, 2014 - 75 to 100 watt equivalent lamps December 31<sup>st</sup>, 2014 - 40 to 60 watt equivalent lamps

The Government of Canada announced in Amendment 12B to the Energy Efficiency Regulations, published on January 15, 2014 that they would introduce Minimum Energy Performance Standards (MEPS) for general service lamps in 2012. The consequent Regulations came into force in December 2013 and applied to 100 and 75 W bulbs manufactured on or after January 1, 2014, and to 60 and 40 W bulbs manufactured on or after December 31, 2014. The Regulations prohibit the importation and interprovincial shipment of non-compliant products. The Regulations provide for a number of alternatives to inefficient bulbs. Where no alternatives exist, exemptions are made.

#### **Residential Appliances**

Local efficiency staff are key players on the Canadian Standards Association's Strategic Steering Committee on Performance, Energy Efficiency and Renewables (SCOPEER). This committee is responsible for changes to provincial and national performance standards and legislation which have resulted in the improvement of energy utilization of numerous appliances such as dishwashers, clothes washers & dryers, refrigerators and freezers, and ranges/stoves/cooktops. Each year, new products are added to Energy Efficiency Regulations through the work of SCOPEER.

#### **Other Residential Equipment**

# <u>Central Air Conditioning</u> National Resources Canada (FEDERAL) Amendment 9 to Energy Efficiency Regulations Test Standard: CAN/CSA-C656-05

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Published: November 15, 2006 (Canada Gazette Part II) Effective date(s): November 15, 2006

In November 2006, the CSA published a standard (C656-05) which specified mandatory MEPS applied to permanently installed 'air-source' air-conditioner and heat pumps. Equipment types include air conditioners and heat pumps that are single package and split system, single and three-phase, with rated capacity of less than 19 kW (65,000 Btu/h). For air conditioners, a minimum SEER rating of 13 was mandated.

Historically, Manitoba Hydro provided a fixed interest finance plan that could be used for renovations including central air, mid-efficient natural gas/electric furnaces and water heaters, direct vent natural gas fireplaces, security lights and fixtures under the Energy Finance Plan. Pre 2005, a minimum SEER rating of 10 for Air Conditioners was required for eligibility for financing under the plan. In order to comply with the forthcoming national standard, Manitoba Hydro raised the minimum SEER to 13 for eligibility of financing in October 2005; approximately one year earlier.

Residential High Efficiency Furnace National Resources Canada (FEDERAL) Amendment 10 to Energy Efficiency Regulations Published: December 24, 2008 (Canada Gazette Part II) Effective date: December 31, 2009

On December 12, 2008 the Federal Government amended the Energy Act to require increased efficiency requirements for replacement gas (natural gas and propane) furnaces and boilers. Effective December 31, 2009 replacement furnaces up to 225 000 Btu/h sold in Canada are required to have a minimum AFUE of 90%.

Local efficiency staff played a material role in the amendment of the Federal Energy Act. Local efficiency staff assisted the Federal Government by providing technical and market data regarding the heating market in Manitoba and comments to the proposed Amendment during the consultation process. Demand Side Management programs such as the Residential Loan and the High Efficiency Furnace and Boiler Rebate influenced the Manitoba market to the point



that 80% of all equipment installed in 2009 was high efficiency products, thus making the Amendment acceptable to the industry and to consumers.

<u>The Energy Act (PROVINCIAL)</u> Regulation 181/2009 Published: November 12, 2009 Effective date: December 30, 2009

On November 12, 2009 the Manitoba Government passed a regulation under the Energy Act to require increased efficiency requirements for replacement gas (natural gas and propane) furnaces and boilers. Effective December 30, 2009 replacement furnaces up to 225 000 Btu/h sold in Manitoba are required to have a minimum AFUE of 92%.

Local efficiency staff played a major role in the development of the Provincial Regulation. Local efficiency staff assisted the Province by providing technical and market data regarding the heating market, hosting an industry consultation with contractors and other interested parties, preparing a formal market impact study, and providing general guidance to regulatory staff. Demand Side Management programs such as the Residential Loan and the High Efficiency Furnace and Boiler Rebate influenced the market to the point that 80% of all equipment installed in 2009 was high efficiency products, thus making regulation acceptable to the industry.

## **Commercial Building Code**

## Manitoba Energy Code for Buildings (MECB) - enacted 2014

The national commitment to update the 1997 Model National Energy Code for Buildings (MNECB) was initiated in Manitoba by the Energy Code Advisory Committee (ECAC) which was led by Manitoba Hydro efficiency staff. Manitoba Hydro efficiency staff also chaired the national Building Energy Code Collaborative (BECC), which was formed in response to the recommendations provided by ECAC.

As a result of the work done by BECC, formal support was provided by jurisdictions across Canada to undertake the work to update the 1997 MNECB and a national working group was formed to conduct the detailed work for updating the code. Manitoba's Minister of Labour provided formal support that signaled Manitoba's intention to adopt the document once

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published, however the Province still moved forward with their own energy strategy and convened a sub-committee of the Building Standards Board of Manitoba to recommend Manitoba-based energy and water efficiency recommendations that could be implemented in advance of the release of the revised NECB.

In January 2011, the energy efficiency amendments developed for the Manitoba building code were approved by the Building Standards Board of Manitoba and the Minister of Labour. However, with the NECB already through its public consultation phase and targeting a release date of Fall 2011, it was decided to hold back on regulating the specific Manitoba amendments so that a review and implementation of the NECB could be implemented. The sub-committee that developed the Manitoba amendments was reconvened in fall of 2012 with the task of reviewing the NECB and determining its applicability to the Manitoba market. Once again, local efficiency staff played a key role contributing to this process. The sub-committee provided a recommendation that was formally adopted with minor adjustments in the December of 2013 for implementation and enforcement in December of 2014. The result was the enactment of the MECB.

Since this first enactment of an energy code for new commercial construction in the province, local efficiency staff have contributed to the national process for the development of the 2015, 2017, and 2020 editions of the NECB and several local efficiency staff formally attend regular code development meetings to ensure energy efficiency objectives are met.

# **Commercial General Service Lighting Standards**

Since 1992, Manitoba Hydro had been actively promoting energy efficient lighting technologies for commercial applications. Activities involved in developing lighting standards include:

- Collaboration with other utilities, identify necessary research
- Work with Canadian Electrical Association
- Liaise with manufacturers to encourage the development and improvement of energy efficient lighting
- Product testing
- Liaise with National Research Council
- Participation on the CSA Standards Setting Committee
- Participation on the Canadian Lighting Industry Collaborative



## General Service Lamps

National Resources Canada (FEDERAL) Amendment 12B to Energy Efficiency Regulations Published: January 15, 2014 (Canada Gazette Part II) Effective date(s): January 1st, 2014 - 75 to 100 watt equivalent lamps December 31st, 2014 - 40 to 60 watt equivalent lamps

The Government of Canada announced in Amendment 12B to the Energy Efficiency Regulations, published on January 15, 2014 that they would introduce Minimum Energy Performance Standards (MEPS) for general service lamps in 2012. The consequent Regulations came into force in December 2013 and applied to 100 and 75 W bulbs manufactured on or after January 1, 2014, and to 60 and 40 W bulbs manufactured on or after December 31, 2014. The Regulations prohibit the importation and interprovincial shipment of non-compliant products. The Regulations provide for a number of alternatives to inefficient bulbs. Where no alternatives exist, exemptions are made.

#### Exit Signs

National Resources Canada (FEDERAL) Amendment 8 to Energy Efficiency Regulations Test Standard: CAN/CSA-C860-01 Published: September 22, 2004 (Canada Gazette Part II) Effective date: November 1, 2004

In September of 2004, Natural Resources Canada's (NRCan's) Office of Energy Efficiency (OEE) amended Canada's Energy Efficiency Regulations (the Regulations) in order to strengthen the minimum energy performance standard for internally lighted exit signs with the publication of Amendment 8 in Canada Gazette Part II. This standard contains voluntary minimum performance standards of 22 watts for signs 120 V or less, and 27 watts for signs greater than 120 V. These levels were harmonized with the National Building Code of Canada. The standard also addresses the visibility performance of the exit sign. To meet these standards, typically requires that LED technology be employed. In the area of LED lighting, the program supported



these minimum efficiency levels for new exit signs with signs set at a level that only LED exit signs could meet.

<u>Fluorescent lamp ballasts</u> National Resources Canada (FEDERAL) Amendment 9 to Energy Efficiency Regulations Test Standard: CAN/CSA-C654-M91 Published: November 15, 2006 (Canada Gazette Part II) Effective date(s): November 15th, 2006 (New Construction Market) April 1st, 2010 (Renovation Market)

In November of 2006, Natural Resources Canada's (NRCan's) Office of Energy Efficiency (OEE) amended Canada's Energy Efficiency Regulations (the Regulations) in order to strengthen the minimum energy performance standard for florescent lamp ballasts with the publication of Amendment 9 in Canada Gazette Part II. Manitoba Hydro's Commercial Lighting Program helped support this Federal code change that required fluorescent lamp ballasts meet a prescribed minimum energy performance standard in the new construction market in 2006 and the renovation market in 2010.

#### Other commercial equipment standards

<u>Commercial Pre-Rinse Spray Valve</u> Manitoba Plumbing Code Regulation 32/2011 Adoption of National Plumbing Code of Canada 2010 Published: March 28, 2011 The Buildings and Mobile Homes Act (C.C.S.M. c. B93) Effective date: April 1, 2011

On April 1, 2011 the Manitoba Government repealed the Manitoba Plumbing Code, Manitoba Regulation 128/2006 and adopted the National Plumbing Code of Canada 2010 issued by the Canadian Commission on Buildings and Fire Codes, National Research Council Canada. The code states that the maximum flow rate for a pre-rinse spray valve not exceed 6.1 litres per minute (1.60 gallons per minute). The Manitoba Hydro Rinse & Save Program influenced market adoption; converting the Manitoba market to pre-rinse spray valves with equal or higher energy



efficiency than the code. Manitoba Hydro's involvement expedited market transformation and thus facilitated the adoption of the code.

<u>Commercial Boilers</u> National Resources Canada (FEDERAL) Bulletin published: August 2010 Test Standard: HI BTS 2000, Rev 06.07 Method to Determine Efficiency of Commercial Space Heating Boilers Proposed Effective date(s): 2020/23 Efficiency Plan planning horizon

In August of 2010, Natural Resources Canada's (NRCan's) Office of Energy Efficiency (OEE) Natural Resources Canada (NRCan) proposed to amend Canada's ENERGY EFFICIENCY REGULATIONS (the Regulations) to require dealers to comply with minimum energy performance standards (MEPS) for commercial gas and oil-fired boilers, imported or shipped inter-provincially, for sale or lease in Canada. NRCan proposed that commercial packaged boilers meet minimum efficiency ratings of 90% for the new construction market and 85% for the replacement market. NRCan has postponed changes to minimum energy performance standards numerous times since August 2010, however they are anticipated to move forward within the timeframe of the 2020/23 Efficiency Plan.



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PREAMBLE TO IR (IF ANY):

## QUESTION:

Explain how the Plan addresses interactive effects (i.e. additional electricity consumption) with respect to electrically heated homes and businesses (i.e. an LED light bulb or a retired fridge provides would not be expected to provide net savings during the heating season as additional electric heating is required).

## **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

The installation of electric energy efficient measures generally results in a reduction in the amount of waste heat generated by the measure. This reduction in waste heat results in an increased heating requirement and a decreased cooling requirement. For facilities and homes heated by electricity, the increased electric heating requirements are subtracted from the electric measure savings. For facilities and homes that are electrically cooled, the decreased cooling requirements are added to the measure savings. The net measure savings after considering the estimated heating and cooling interactive effects are used in the measure forecasts in the 2020/23 Efficiency Plan.



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PREAMBLE TO IR (IF ANY):

## QUESTION:

Confirm whether interactive effects from Codes and Standards are counted against natural gas savings, reducing the gross gas savings to net gas savings. If not, why not? If confirmed, explain why the Commercial interactive effects are substantially larger than the Residential interactive effects.

## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

Confirmed, interactive effects from Codes and Standards are counted against natural gas savings to determine net gas savings.

Commercial interactive effects are substantially larger than the Residential interactive effects because the magnitude of Commercial energy savings are substantially larger than Residential energy savings. The interactive effects counted against both commercial and residential programs are proportional to the projected savings.



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## PREAMBLE TO IR (IF ANY):

## QUESTION:

- a. Confirm whether Efficiency Manitoba uses i) the definition of normal weather used by Manitoba Hydro and ii) the methodology used by Centra to weather normalize gas consumption and iii) the methodology used by Manitoba Hydro to weather normalize electricity consumption. If not confirmed, explain the definition of normal weather and the weather normalization methodologies used by Efficiency Manitoba.
- b. Subsection 7(1) of the Efficiency Manitoba Act specifies that the natural gas savings target is to be based on the consumption of natural gas in the preceding year. Explain how using the 2017/18 actual gas consumption complies with the Act.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

a. For the purpose of complying with the Efficiency Manitoba Act, Efficiency Manitoba will utilize weather normalized actual energy consumption defined and provided by Manitoba Hydro for both natural gas and electricity consumption to verify actual achievement of energy savings targets using evaluated energy savings. Within the 2020/23 Efficiency Plan ("Plan"), Efficiency Manitoba established annual electric targets based upon weather normalized energy forecast data as provided in PUB/EM I-45a. Within the Plan, Efficiency Manitoba established annual natural gas targets based upon actual Manitoba Hydro (non-weather adjusted) 2017/18 annual consumption in order to use publicly available natural gas volume information (as provided in PUB/EM I-45d). Efficiency Manitoba, in response to COALITION/EM I-3h, has also provided annual natural gas targets based upon actual (non-weather adjusted) Manitoba Hydro 2018/19 annual consumption.



b. In order to create an Efficiency Plan that did not reveal information considered commercially sensitive by Manitoba Hydro, Efficiency Manitoba presented the natural gas savings against the publicly available 2017/18 actual natural gas consumption provided within the Manitoba Hydro 2017/18 Annual Report. Future assessments and actual performance evaluation of the 2020/21 through 2022/23 fiscal years will be completed against weather normalized actual natural gas consumption of the preceding year.



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PREAMBLE TO IR (IF ANY):

### QUESTION:

Absent a date being prescribed, confirm when Efficiency Manitoba will file the independent assessor's report with the Board.

## **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

At the present time, Efficiency Manitoba is not in a position to determine the date that an external program evaluation report may be available.



Efficiency Plan p.224 of 591

PREAMBLE TO IR (IF ANY):

## QUESTION:

Explain whether and how electric load growth (due to factors such as population or customer growth, increased numbers of electric vehicles) will affect Efficiency Manitoba's savings targets and the attainment of those savings targets.

## **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

As per Section 7 of the Efficiency Manitoba Act, both the electricity and natural gas savings targets are based upon the respective consumption in the immediately preceding year. As a result, electric load growth due to factors such as customer growth or increased saturation of electric vehicles will increase the level of savings that Efficiency Manitoba will need to achieve to reach the savings target of 1.5%.

Efficiency Manitoba will work closely with Manitoba Hydro's Load Forecasting Department to understand projections of load growth to ensure that activities being pursued in future efficiency plans are sufficient to achieve the level of savings based on projected future consumption.



## **REFERENCE:**

Efficiency Plan p.223-225 of 591; 2018 Manitoba Hydro Electric Load Forecast; 2018 Gas Volume Forecast; Efficiency Manitoba Act s.7

## PREAMBLE TO IR (IF ANY):

"For 2021/22 and 2022/23 years, an adjustment is also made to the load forecast to remove energy savings from prior DSM activity (example 2020/21) included within the Plan." Manitoba Hydro's load forecast does not include DSM savings in forecast years: "DSM savings arising from future program-based offerings incremental to the above mentioned Codes and Standards are not reflected in this forecast. They are accounted for separately in Manitoba Hydro's DSM Plan and Power Resource Plan."

## **QUESTION:**

- a. When establishing the electricity savings target, explain the adjustment that Efficiency Manitoba is making to remove DSM savings from the 2018 electric load forecast.
- b. Explain why electricity savings are being calculated at generation and not at the meter, consistent with prior Manitoba Hydro Power Smart and DSM Plans.
- c. With reference to the tables in the 2018 Electric Load Forecast, identify where the reference electric loads in Table A2.1 are found or how they are derived. File the relevant tables from the 2018 Electric Load Forecast.
- d. With reference to the tables in the 2018 Gas Volume Forecast, identify where the reference electric loads in Table A2.2 are found or how they are derived. File the relevant tables from the 2018 Gas Volume Forecast.
- e. Considering the 2018 Electric Load Forecast predicts General Consumers Sales growth (not including DSM impacts) to be 1.0% in 2021/22 and 1.1% in 2022/23, and with savings targets of 1.5% annually, explain why the reference electric loads in Table A2.1 are not declining by approximately 0.4% to 0.5% annually.
- f. Confirm whether the electric load to serve the Diesel Zone customers is included in the reference electric loads in Table A2.1. If not confirmed, explain why not.



## **RATIONALE FOR QUESTION:**

## **RESPONSE:**

Manitoba Hydro's 2018 Electric Load Forecast is publicly available at the link below. <u>https://www.hydro.mb.ca/docs/regulatory\_affairs/pdf/electric/electric\_rate\_applicatio</u> <u>n\_2019/15\_appendix\_15\_-\_2018\_electric\_load\_forecast.pdf</u>

The following is a link to Manitoba Hydro's Annual Report for the year ended March 31, 2018. <u>https://www.hydro.mb.ca/corporate/ar/pdf/annual\_report\_2017\_18.pdf</u>

- a. Please refer to the table provided below. The Manitoba Hydro 2018 Electric Load Forecast (Table 7, gross firm energy, p. 21 of 88) includes the forecast load reductions from future DSM savings associated with existing Provincial building codes and improved equipment efficiency standards and regulations (codes and standards). As shown in the table provided and in order to establish an appropriate base electric load for the percent of load calculation to following adjustments are needed:
  - the projected cumulative 2018 DSM codes and standards savings must be added. This prevents the double-counting of codes and standards savings. See PUB/EM
     I-26b for the 2016/17 Power Smart Plan - 15-year Supplement (from codes & standards savings found on p. 86 of 128);
  - An adjustment is also made to the load forecast to remove energy savings from prior DSM savings. See PUB/EM I-26e for the 2019/20 DSM Plan (p. 21 of 72); and
  - Since the base electric load forecast does not include projected Efficiency Manitoba DSM savings, activity from the 2020/23 Efficiency Plan ("Plan") needs to be removed in subsequent years to reflect projected energy savings.

Once the base electric load is established, electric energy savings targets are calculated as the percentage of the prior year's forecasted electric load.



Electric forecast year	2019/20	2020/21	2021/22
2018 Electric Load Forecast (GWh)	26,237	26,528	26,759
Add: Cumulative 2018 Codes and Standards (GWh)	160	224	278
Less: 2019/20 DSM Plan (GWh)	350	350	350
Less: Cumulative Plan savings (GWh)	-	373	776
Reference electric load (GWh)	26,047	26,029	25,911
Table A2.1	2020/21	2021/22	2022/23
Reference electric load (GWh)	26,047	26,029	25,911
Target percent of load	1.5%	1.5%	1.5%
Electric energy savings required to achieve target (GWh)	391	390	389

*Note:* Total may not add up exactly due to rounding. Reference electric load and energy savings values are at generation.

- b. Electricity savings in the 2020/23 Efficiency Plan are being calculated at generation. This is consistent with prior Manitoba Hydro Power Smart and DSM Plans which were also reported at generation.
- c. Please see PUB/EM I-45a.
- d. Please refer to the table provided below. The 2017/18 reference natural gas million (million m3) volume in Table A2.2 of the 2020/23 Efficiency Plan, Section A2, p. 225 of 591, can be derived by referencing the Manitoba Hydro 2017/18 annual report (PDF p. 107 of 110), table "Natural Gas Revenues and Deliveries". This value is then used as a proxy natural gas forecast value to use publicly available information. This delivery value is then adjusted consistent with the "consumption" definition contained within the Act. As shown in the table provided and in order to establish an appropriate reference natural gas volume for the percent of load calculation to following adjustments are needed:



- Natural gas consumption used as an input to industrial production and natural gas used to generate electric power were removed as per the description for "consumption" provided in Section 2 of the Efficiency Manitoba Act;
- An adjustment is also made to the natural gas volumes to remove energy savings from prior DSM savings. See PUB/EM I-26e for the 2019/20 DSM Plan (p. 21 of 72); and
- Since the base natural gas volume does not include projected Efficiency Manitoba DSM savings, activity from the 2020/23 Efficiency Plan ("Plan") needs to be removed in subsequent years to reflect projected energy savings.

Once the base natural gas volume is established, natural gas energy savings targets are calculated as the percentage of the prior year's forecasted natural gas volume.

Natural Gas Forecast Year	2019/20	2020/21	2021/22
2017/18 actual natural gas consumption (million m <sup>3</sup> )	2,048	2,048	2,048
Less: Adjustment from Section 2 of the EM Act			
2017/18 adjusted natural gas consumption (million			
m³)			
Less: 2019/20 DSM Plan (million m <sup>3</sup> )	8.0	8.0	8.0
Less: Cumulative EM Plan savings (million m <sup>3</sup> )	-	11.7	24.5
2017/18 reference natural gas volume (million m <sup>3</sup> )	1,632	1,621	1,608
Table A2.2	2020/21	2021/22	2022/23
2017/18 reference natural gas volume (million m <sup>3</sup> )	1,632	1,621	1,608
Target percent of load	0.75%	0.75%	0.75%
Natural gas savings required to achieve target (million m <sup>3</sup> )	12.2	12.2	12.1

*Note:* Total may not add up exactly due to rounding.

 e. The approach taken to determine the electric energy savings targets is shown in PUB/EM I-45a. Efficiency Manitoba did not use General Consumers Sales growth in the derivation of the electric energy savings targets. 2b & 4a



f. The electric load to serve diesel zone customers is not included in the reference electric loads in Table A2.1 since this electric consumption is not included within in the gross firm energy at generation, which is used by Efficiency Manitoba to calculate the percentage of load (as shown PUB/EM I-45a).



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## PREAMBLE TO IR (IF ANY):

Efficiency Manitoba states: "As this load forecast accounts for future codes and standards, Efficiency Manitoba adds back codes and standards savings from prior years to establish a base electric consumption from which the impacts of the Plan can be assessed."

## QUESTION:

Clarify whether this means that Efficiency Manitoba removes the impact of Codes and Standards from (i.e. "adds back" the savings to) the load and volume forecasts to arrive at the reference electric loads and gas volumes used in the calculation of the savings targets, as shown on pages 224 and 225. If this is not what is being done, explain what the add back is and why it is being done.

#### **RATIONALE FOR QUESTION:**

#### **RESPONSE:**

Please see PUB/EM I-45a for a table and description of derivation of the annual electric energy savings targets.

Please see PUB/EM I-45d for a table and description of derivation of the annual natural gas energy savings targets.


# 2020-2023 Efficiency Plan PUB/EM I-47a-d

## **REFERENCE:**

Efficiency Plan p. 224, 225 of 591; Regulations s.9; 2018 Manitoba Hydro Electric Load Forecast; 2018 Gas Volume Forecast

### PREAMBLE TO IR (IF ANY):

### QUESTION:

- a. Is the reference electric load for 2020/21 based on the forecast electricity consumption for 2019/20? Is the reference gas volume for 2020/21 based on the forecast gas volumes for 2019/20?
- b. Considering section 9 of the Regulations specifies that the savings targets are to be based on the consumption of the preceding fiscal year, confirm whether the savings targets are expected to change in years two and three of the Plan, based on the actual weather-adjusted consumption in years one and two of the Plan. If confirmed, explain how Efficiency Manitoba will address savings targets that are potentially higher than specified in the Plan.
- c. Provide the 2018/19 actual electric consumption, 2018/19 weather normalized electric consumption, and the forecast electric consumptions for 2019/20 to 2022/23 according to the 2018 Electric Load Forecast.
- d. Provide the 2018/19 actual gas consumption, 2018/19 weather normalized gas consumption, and the forecast gas consumptions for 2019/20 to 2022/23 according to the 2018 Gas Volume Forecast. Provide these on a gross basis as well as net of any consumption that is not to be included in the baseline according to definition of consumption in the Act.

### **RATIONALE FOR QUESTION:**



# 2020-2023 Efficiency Plan PUB/EM I-47a-d

### **RESPONSE:**

- a. The 2020/23 Efficiency Plan energy savings targets are based on forecasted values (electric) or on 2017/18 fiscal year actuals (natural gas). Actual performance will be evaluated in a manner that is consistent with both the Efficiency Manitoba Act and the Efficiency Manitoba Regulations. Specifically, Efficiency Manitoba will complete an independent assessment of savings results obtained for each fiscal year for the entire electric and natural gas portfolio. These savings will be compared to weather adjusted prior year consumption of electric and natural gas to determine the evaluated savings targets as a percentage achieved for 2020/21 through 2022/23. These actual percentages will be compared against the target to inform the development of future efficiency plans.
- b. Energy savings targets may or may not change in 2021/22 and 2022/23 based on the actual weather-adjusted consumption. As per The Efficiency Manitoba Act, Section 7(2), shortfalls or surpluses in annual net energy carry forward during the 15-year period for determination of cumulative energy savings targets. Efficiency Manitoba would address any shortfalls or surpluses in subsequent Efficiency Plans.

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	Gross Firm Energy
	(GWh)
2018/19 Actual	Not publicly available
2018/19 Weather Normalized	Not publicly available
2019/20 Forecast Load	26,237
2020/21 Forecast Load	26,528
2021/22 Forecast Load	26,759
2022/23 Forecast Load	27,018

Forecast values can be found in Table 7 (p. 21 of 88) of the 2018 Electric Load Forecast, link can be found in PUB/EM I-45.



# 2020-2023 Efficiency Plan PUB/EM I-47a-d

d.

	Gross Consumption (million m <sup>3</sup> )	Adjusted Consumption per Efficiency Manitoba Act (million m <sup>3</sup> )	
2018/19 Actual			
2018/19 Weather Normalized			2a
2019/20 Forecast Volume			
2020/21 Forecast Volume			
2021/22 Forecast Volume			
2022/23 Forecast Volume			

2a & 2b



### **REFERENCE:**

Efficiency Plan p. 335-336 of 591; Regulations s.8(3)

### PREAMBLE TO IR (IF ANY):

### QUESTION:

Explain why there are no natural gas savings projected under the Indigenous Program that may result from insulation or building envelope improvements in the Diesel Zone communities, as contemplated by subsection 8(3) of the Regulations.

### **RATIONALE FOR QUESTION:**

### **RESPONSE:**

Manitoba Hydro's previous First Nation Insulation Program had estimated that all homes eligible for insulation and building envelope enhancements had been complete, except for a few homes in one diesel community. Efficiency Manitoba plans to work with all four diesel communities to confirm remaining opportunities for insulation and building envelope improvements. As these projects are identified, Efficiency Manitoba will work with the diesel communities to complete the work and then account for the savings as contemplated in subsection 8(3) of the Regulation.